

WWF-Central America Freshwater Program Case Study

PART I

**“Ridge to Reef” conservation through the Water Fund project in Guatemala,
Mesoamerican Caribbean Reef Ecoregion**

Presented by Melissa Edwards

PART II

“Building and validation of a *Voluntary Payment Mechanism and incentives for the use of environmental services by industries on the Motagua Valley*, articulated to the Sierra de las Minas Water Fund”.

Presented by Carlos Morales





PART I

“Ridge to Reef” conservation through the Water Fund project in Guatemala, Mesoamerican Caribbean Reef Ecoregion. Case Study

Background

The Mesoamerican Reef (MAR) extends nearly 1,000 km from the Bay Islands of Honduras north through Guatemala and Belize to the tip of Mexico’s Yucatan peninsula. It contains the largest barrier coral reef system in the Western Atlantic and is part of a larger interconnected system of coastal habitats and currents that stretch throughout the Caribbean basin and beyond. Although the MAR ecoregion sustains the livelihoods of over two million people from Mexico, Belize, Guatemala and Honduras, an array of anthropogenic threats are resulting in the deterioration of this globally outstanding priority ecoregion. Among those threats identified as having the greatest negative impact upon the ecoregion is the decline in water quality caused by increased sedimentation and harmful chemical and non-chemical effluents.

According to WWF’s MAR Ecoregional Conservation Planning process (2002) the transboundary drainage systems that impinge most upon the MAR reefs in terms of relative discharge levels (area x annual rainfall), extend from southern Belize through Guatemala and northern Honduras. Moreover, two of the six watersheds that pose the greatest magnitude of threat to the reefs include the Polochic (later becoming the Dulce) and Motagua Rivers, both of which run parallel along the northern and southern sides of the Sierra de las Minas Biosphere Reserve, respectively, and which drain out into the Gulf of Honduras.

Inadequate land use changes in the form of deforestation, slash-and-burn agriculture, forest fires and dredging in the upper, middle and lower watershed areas of the Motagua and Polochic rivers are resulting in increased erosion and siltation with sediment being transported out to sea. This, in turn, is decreasing water clarity and consequently coral growth extension rates while enhancing the proliferation of fleshy algae, non-calcifying invertebrates, and bio-eroding organisms. Sedimentation from terrestrial nutrients and organic matter associated with sewage and runoff from industrial, agricultural and aqua-cultural activities is also leading to eutrophication and affecting freshwater organisms, in an area where the Biodiversity Support Program (1995) has also identified a number of regionally outstanding freshwater ecoregions. Finally, this scenario also causes serious concern to human health.

Thus, although until 2002, most of WWF-Central America’s resources within the MAR were allocated towards the establishment and effective management of a marine protected areas network, the Program has since increasingly stepped up its efforts to streamline resources into mitigating land based threats linked to adjacent terrestrial areas by rivers and groundwater that carry nutrients, sediments and pollutants from the Region’s Caribbean drainages. It has also established a freshwater program to integrate conservation work between forest and marine biomes within a “Ridge-to-Reef” approach.

Promoting water-based funding mechanisms in Guatemala

Among others, since 2003 the Motagua-Polochic System Water Fund Project in Guatemala was designed to promote voluntary payment for environmental services and to link downstream water



users with upstream forest conservation within and adjacent to the Sierra de las Minas Biosphere Reserve (SMBR). By channelling funding and technical resources for integrated river basin management, this initiative is helping to mitigate threats to forest, freshwater ecosystem and downstream coastal marine biodiversity.

The SMBR has been managed by the Defenders of Nature Foundation (“Fundación Defensores de la Naturaleza” or “FDN”), WWF’s long-time Guatemalan partner, since October 1990. For over a decade, WWF has worked in the SMBR on conservation and sustainable development issues. During the last several years, it has become increasingly clear to both partners that the downstream users of water originating in the SMBR needed to be involved in upstream conservation. Conversations between WWF, FDN, and CINPE (a Costa-Rican research organization with experience in environmental services) led to WWF proposing exploratory work on water issues in the Reserve and surrounding communities.

With funding from WWF, research has initially focused on the southern side of the SMBR due to this area’s relatively high consumption of water generated in the Reserve, interest in water conservation, and prolonged water deficits. WWF-Central America supervised and coordinated CINPE’s groundwork with Defensores de la Naturaleza to understand the relationship between upstream forest conservation and downstream water users. Initially, the lack of quantitative data prevented project implementers from proving that forest cover in the SMBR contributed to recharging aquifers in the Motagua river, leading us to adopt the precautionary principle. More recent scientific research, though, has confirmed the positive relationship between the cloud forest in SMBR with the availability of ground- and surface water in surrounding valleys.

The cloud forests of the SMBR and 63 permanent rivers provide essential freshwater resources to surrounding communities for domestic consumption as well as to an array of industrial, agricultural, service sector and hydro-electric users located both along the Motagua and Polochic river valleys. Besides its environmental benefits, the project will also help ensure the long-term quality and abundance of this vital resource for production, employment generation and sustainable development in Guatemala’s north-eastern region.

Since its conception, this project has increasingly attracted the attention and support among an array of national and international governmental and non-governmental organizations. In addition to WWF, these also include The Nature Conservancy, USAID, the Mesoamerican Biological Corridor Initiative and the British Embassy in Guatemala. Most recently in March 2003 WWF-Central America and FDN were awarded the ReSource prize for integrated river basin management by Switzerland’s largest reinsurance company, Swiss Re. Similarly, in December 2003 the Avina Foundation generously granted the project additional financial assistance for a two year period. Negotiations are also underway to secure vital financial resources and buy-in from The Coca-Cola Company (TCCC) under the unique memorandum of understanding signed by WWF and TCCC on a global scale.

To date, an estimated US\$120,000 has been invested in the project. These funds have essentially gone towards: 1) the design of the financial mechanism 2) the development of water valuation studies 3) scientific data gathering for monitoring and evaluation and 4) constituency building. The latter is particularly important to promote local stakeholder buy-in that will ensure project sustainability once donor funding is terminated.



Problem statement and involved local stakeholders

WWF-Central America has collaborated with Defensores de la Naturaleza on the management of the SMBR since 1990. Initially, WWF helped establish the protected area and initiate traditional protected area management¹. In the late 1990's, WWF focused on resolving land tenure conflicts, promoting gender issues, and developing economic alternatives based on sustainable natural resource use². WWF also helped the FDN obtain a "co-management" contract granting that organization the right to manage the reserve. At present, some of the *most* urgent threats have been mitigated and basic management is in place. However, neither governmental nor private funding is available in sufficient quantities to adequately finance these activities.

The current WWF priority is to promote sustainable resource use in and around the SMBR via user payments for environmental services. Despite the dependence of downstream users upon water provided by the SMBR, there are no financial mechanisms to channel user fees upstream to maintain forest cover and vulnerable upper watershed areas intact. Beverage companies make no payment for water pumped from aquifers and surface water users, agro-industry, farmers, and residential dwellers pay fixed fees which are not based on consumption levels. In no case, do collected fees go to protect and manage the SMBR's Tropical Montane Cloud Forest so critical to water supply.

Large industrial water users, agro-industry, small and medium scale farmers, hydro-electric plant generators, domestic water users and local government officials have noticed a gradual decrease in both water quality and quantity. Since early 2003, a working relationship has been established with all of these stakeholders in order to raise awareness and ensure project buy-in for conservation measures that will help ensure a long-term water supply. Nevertheless, the project strategy focuses initially on ensuring that payments are made by large water users with the greatest financial capacity to pay, whilst emphasizing in-kind contributions with poorer sectors of society.

By working with the private sector along the dry Motagua Valley, WWF and FDN are raising corporate responsibility towards environmental conservation and also linking the strategy to better management practices. The promotion of better management practices not only are project implementers expecting a reduction in company production costs (savings which could partially be invested in the Water Fund), but also a reduction in harmful waste waters and inefficient water use. In this manner, the Water Fund project takes on a true "Ridge to Reef" approach, considering the critical importance of water from source –up in the mountains of SMBR– to sink – in the MAR–.

¹ The Sierra de las Minas Biosphere Reserve (SMBR) is arguably one of Guatemala's "crown jewels" within the National Protected Areas System. As the oldest mountain range in the region, with altitudes ranging from almost sea level to over 3,000 meters, it is one of the most spectacular and species rich mountain chains in all of Central America. The SMBR harbors over two thirds of all registered mammals and reptiles registered in Guatemala and Belize, a large variety of ecosystems grouped into 6 life zones (dry, conifer and cloud forests) and critical habitats for endangered species including the Jaguar, Tapir, Howler Monkey and Harpy Eagle. It is also considered one of the world's most important "gene banks" for coniferous species.

² These activities were funded by WWF-Austria and WWF-Switzerland and were completed in 2001.



Innovative project aspects and anticipated results

- The Motagua-Polochic Water Fund is much more than a protected area-based initiative. Rather, it focuses on having an impact across a much broader landscape-scale area that links highland cloud forests, with freshwater rivers and streams and low lying coastal marine areas within the Mesoamerican Reef Ecoregion. This “Ridge-to-Reef” approach, seeks to ensure connectivity among ecosystems and to maintain healthy animal and plant populations within a focal area of the Mesoamerican Biological Corridor.
- Secondly, the project represents an important attempt to internalize an externality (water) within a market-based economy which has traditionally only recognized the partial economic cost of water extraction and distribution, and –so far– ignored the upstream value of conservation and the downstream impacts of polluted water on freshwater, coastal and marine ecosystems.
- Third, the establishment of a stakeholder-based Board of Directors to establish and run the Water Fund is also unique. This representative and highly participatory financial mechanism provides local resource users, including municipalities, domestic water users, large bottling companies, agro-exporters and hydro-electric plants, among others, with ownership and a stake in an internal decision-making process to sustainably manage freshwater resources.
- Fourthly, investment in protection and maintenance of freshwater ecosystem health is part of a broader poverty alleviation and sustainable development strategy and which contributes to the Central American Alliance for Sustainable Development (ALIDES). The conservation of high priority freshwater ecoregions and/or protected areas will be critical in future in order to ensure abundant and clean water resources to increasingly vulnerable and impoverished human populations in Central America.
- This initiative seeks to build alliances with large industrial water users, who have traditionally been seen as “the bad guys” by more traditional environmentalists. This too represents an exciting and novel aspect of this project. By involving the private sector and strengthening corporate responsibility we are making important links between freshwater conservation and sustainable long-term production that generates employment and socio-economic wealth.
- Another innovative aspect of this project includes its tremendous potential for replicability as a model to be shared with other Latin American countries and the World. Although Guatemala and the isthmus as a whole cover a relatively small surface area, the Region nevertheless has the potential to become a valuable learning laboratory for the development of novel conservation methodologies and tools and to “export” such experiences internationally.
- The Water Fund model could represent a useful platform upon which to create a coherent legal framework for freshwater conservation and resource management. To date, Guatemala lacks either a Water Policy or Water Law to define user rights and obligations. Water continues to be considered an open access resource in this country and in this context the Water Fund building a foundation to instil a sense of value vis-à-vis the use of this vital resource.



- The project is promoting important freshwater conservation science research in a country where significant gaps have traditionally existed. Biophysical and socio-economic data are being gathered of both surface and underground freshwater resources and this wealth of information is being stored in a comprehensive hydrological database. In turn this database will allow project implementers to monitor and evaluate project process and to improve effective and adaptive project management in future.
- Finally, the project is also novel in terms of its emphasis in working closely with existing local stakeholder social structures and organizations. By working with already established organizations, the project is anticipated greater success and can work towards creating solid river basin management committees and governance structures. On-site outreach, environmental education and communications efforts are all underway to raise awareness among target populations and to promote the project's freshwater agenda within the context of last year's UN declared International Year of Freshwater.

PART II

Building and validation of a *Voluntary Payment Mechanism and incentives for the use of environmental services by industries on the Motagua/Polochic Basins, as a section of the Sierra de las Minas Water Fund*

Project Background (History, purpose, approach)

Water, the earth's vital liquid, is exposed daily to a series of threats that affect the wide array of ecosystems in the Mesoamerican Reef (MAR) ecoregion. For this reason, the World Wildlife Fund (WWF) is working to prevent water pollution in the priority ecoregions of the (MAR).

One of the greatest threats to the Mesoamerican Reef is water pollution caused by waste products derived from ships, spills, pesticides, urban and industrial effluents, and fertilizers, which end up in the tributaries and, ultimately, reaching the ocean.

Deforestation also contributes to sedimentation of the waters flowing into the coast and constitutes another threat to the coral barriers. Water pollution affects fishing as well as other species associated with the reef. This is why water quality is a medullar point for WWF's work in the Mesoamerican Reef Ecoregion.

The Freshwater Program is a component of the global strategy for Central America and seeks to enhance wetland conservation, wetland management and use, and river management, acknowledging the vital interdependency between land, water, and the ecosystems, and encouraging more efficient uses of water by the industrial and agricultural sectors.

One of the main goals of the Fresh Water Program is: to build alliances with the larger water users among the private and industrial sectors in Central American, bringing about the 'Ridge to Reef' global approach that integrates conservation efforts sponsored by the forest, freshwater, and coastal marine sectors; and create innovative projects that, independent of their relatively small scale, may offer valuable lessons applicable to other Latin American countries.



The Sierra de las Minas Water Fund is a joint project of an environmental NGO (Defensores de la Naturaleza), WWF-Central America, and a series of other national and international partners. The project has developed an innovative financial mechanism for conservation, which proposes to establish a link between the water users downstream and forest conservation upstream. This link seeks to mitigate threats to the protected area caused mainly by deforestation, forest fires, and agricultural expansion. It also encourages protection, landscape restoration, and sustainable management of micro watersheds in the Sierra de las Minas Biosphere Reserve.

WWF's priority in Central America is to promote the development of this initiative, supporting more than anything, the consolidation of the payment strategies for environmental services and the connection to the industries using the resources in the Motagua/Polochic Basins.

Currently, the industries in the Motagua and Polochic watersheds are not making any payment and they aren't valuating the cost of the water being pumped from the aquifers. Surface water users, such as the agro-industrial sector and farmers that use irrigation, are not making any payments for the service either. Residents of the watershed have established a value for residential fees, but it is not based on consumption levels, much less on the real value of the resource. At any rate, in neither of these cases, do the fees collected cover the cost of protecting and managing the tropical mountain cloud forest of the Sierra de Las Minas Reserve. For this reason the water supply has turned into a critical problem in an area of low annual rainfall (approximately 600 mm/yr). In fact, users have noticed a gradual decrease of water in the rivers and phreatic layers.

The project's strategy is initially centered on establishing a payment and incentive system for large water users, such as the industries, that have the financial capability to make significant voluntary contributions to the water fund; this would subsequently be complemented by payments from other economically weaker sectors.

The project represents an important attempt to internalize and exteriorize the value of water, represented as an economic asset, in an economy based on supply and demand market mechanisms, which traditionally recognize only the partial economic cost of extraction and distribution of the water resource and not the value of the resource *per se*.

This initiative seeks to build alliances with large industrial water users, who have been traditionally viewed as "environmental enemies" by more traditional conservation groups. This also represents a consolidation of the valorization of the resource and promotes responsible conduct codes and good management practices encouraging the reduction of the volume of water used, optimizing costs, and reducing pollution in the effluents.

General Project Goal

Promote the Water Fund Guatemala related to the industrial sector in the zone via technical assistance oriented to encourage voluntary incorporation to the collection/incentive mechanism of the Water Fund/Industrial Sector in the Motagua Valley, to help preserve the hydric resource and mitigate the negative impacts on the Mesoamerican Reef from toxic wastes polluting the water.



Specific Objectives

- a) Calculate the costs and average actual consumption rates (water, energy, and other inputs) for at least three selected industries in the Motagua Valley.
- b) Determine the economic impacts of the application of Cleaner Production (CP) techniques in the industry with the preparation of 3 business plans using the software COMFAR (PNUD) and Crystal Ball.
- c) Set up “benchmarking” for the economic valuation of the hydric resource and the collection mechanisms and incentives found in other parts of the world, preparing a compendium of lessons learned, obstacles/solutions, and tools, that could be applied to our case in particular.
- d) Validate the water value standard, using the most adequate method(s), in order to use this parameter to build the collection mechanism for the Water Fund for the industries in the Motagua Valley.
- e) Develop a business model that describes the:
 - a. stakeholders involved, their role, and their interrelationships,
 - b. data flow, activities, and incentives,
 - c. cash flow and financial management
 - d. connection to the Water Fund’s general strategic plan (5 years),
 - e. project description
 - f. financial pre-feasibility analysis

including the economic quantification, the collection mechanisms, and other details of the participation of the Industrial Sector in the Water Fund.

- f) Obtain at least 2 of the 3 acceptance letters from industrial water users in the Motagua Valley for their commitment to incorporate to the Collection Mechanism of the Water Fund/Industrial Sector.
- g) Encourage the participation of other industries in the Water Fund with the incorporation of the industrial sector Business Model.



Work Strategies

The strategy is based on two fundamental aspects: *promotion of better practices of land and water use in key watersheds*. By 2010, three sustainable management practices for water use should have started in the Polochic and Motagua watersheds in Guatemala, and the Aguan watershed in Honduras. These practices seek to promote conservation and restoration of the ecological processes in priority freshwater ecosystems, mitigate pollution threats to the Mesoamerican Reef, and *develop policies and models for Payment of Environmental Services (water)*: In the same manner, by 2005, five industrial water users in the Motagua valley should voluntarily contribute financially to the Motagua-Polochic Water Fund, to ensure the integrity of the ecosystems responsible for their water supply.

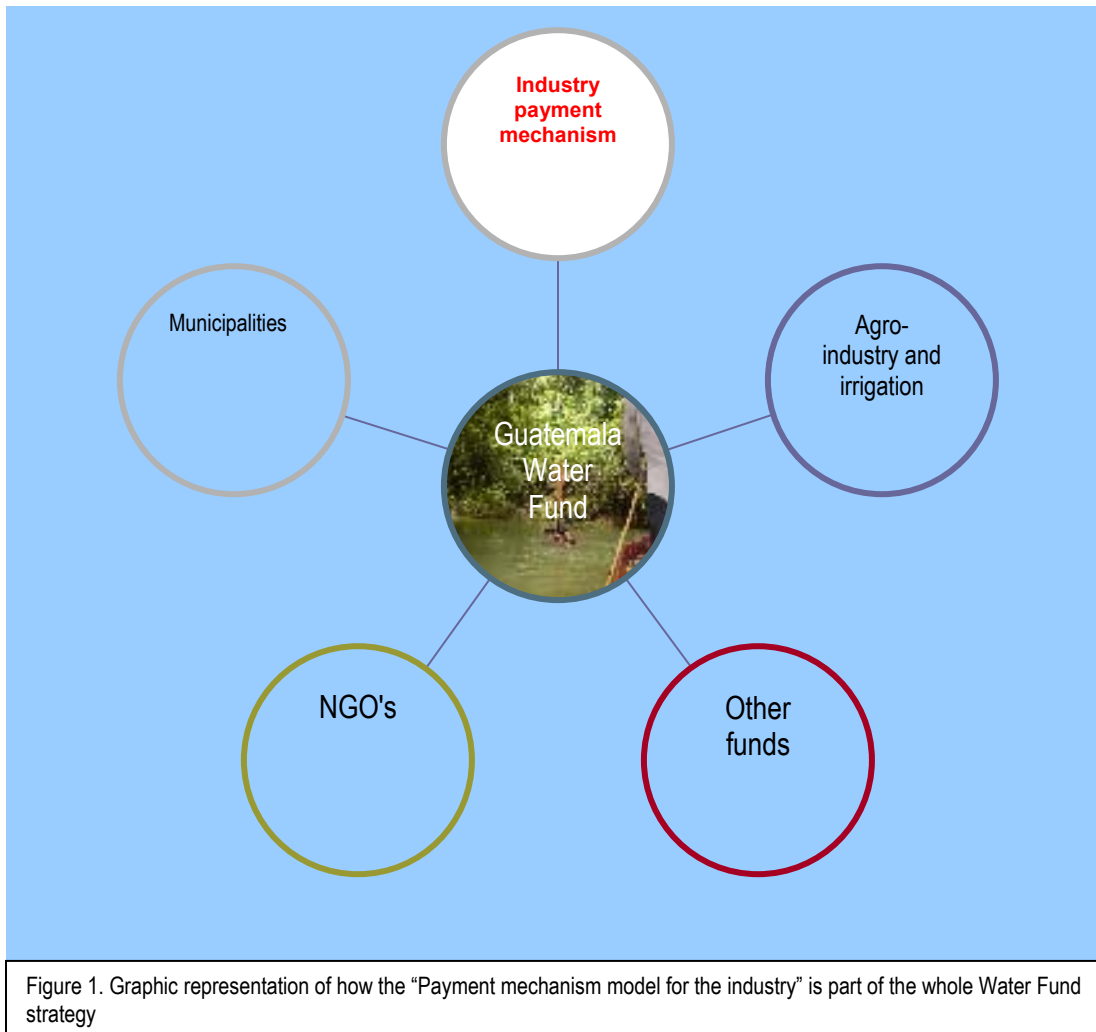
The environmental services payment plan will begin with the large water users in the Motagua Valley (hydroelectric plants in Pasabien and Rio Hondo, and the Coca-Cola, Pepsi, and rum bottling plants) which have shown greater aperture and payment capacity. We are beginning with the larger users because the activities oriented to improve the availability of water, are looked on favorably by the industry; WWF and Defensores de la Naturaleza, have decided also to focus on the industry, in the first place, for reasons of fairness in the region and also to encourage corporate responsibility among large water users. Once this sector has been covered, work will continue on with the agricultural sector and, lastly, including the domestic users of the resource.

The initial phase of the industrial sector component included a series of training sessions held at four industrial plants that showed interest in participating. The topics for the training sessions were: Environmental Services, Cleaner Production, Solid and Liquid Waste Management, Environmental Accounting Management, Eco-Designs, Environmental Management Systems, and Environmental Risks. The topics presented at each plant were selected based on the negotiations made WWF's representatives during the first visits to the plants. The main goal of the training was to raise awareness among the plant personnel, both at the management and technical levels, over the water resource and its importance for the industries where they work; and the reasons why they should contribute to the conservation of the Sierra de las Minas, which is the ultimate source of such an important input for their industries; their contribution would, in turn, reduce the environmental risk for their industries.

This project is a follow-up of the "Training to stimulate participation of the Private Sector in the Water Fund of the Motagua-Polochic System in Guatemala" project implemented in 2003. The purpose of this project was ***to encourage the compromise for voluntary payments for environmental services by the industries on the Motagua Watershed.***

Implementation of this project will be articulated with the national partner, Defensores de la Naturaleza, a Guatemalan NGO with a large trajectory and vast reach in the country, founder of the Water Fund, and responsible for co-management of the Sierra de las Minas.

Parallel to this project, the Water Fund will continue developing the other sectors involved. Nevertheless, this project will be focused solely on the industrial sector.



To reach this goal, we must first build the tools that respond to questions such as: How much do I have to pay? How do I pay? What do I get in return? How does the Water Fund's general financial plan articulate? Consequently, the overall work is structured in three parts that can be implemented in a parallel manner:

DATA GATHERING AND LEASONS LEARNED

This stage is indispensable for building the payment mechanism, taking into account similar experiences in other parts of the world, learning from their successes, their problems, and ways they solved them. Data gathering and interpretation will contribute to build the following tools:

Mechanisms for payments/incentives. Set up Benchmarking and outline the model that would be more adequate for our situation. We must also gather information about real use of the resource and consumer costs for the local industry and determine the previous experience in the optimization of costs with the use of less polluting technologies and resource conservation.



Validation of the hydric valoration. Using the actual value as a base, compare it to other values obtained with other methodologies and other use scenarios.

Link to the 5-year strategic plan for the Guatemalan Water Fund and the local policies for water use. This work is vital to engage the mechanism to the Fund's general model.

VALIDATION

Using adequate data validate the current economic estimates for the water resource, under different use scenarios (different industries) and under different econometric approaches. During this process, we should also validate the results of the business plans and other results with the future client (industry) so that the methodology approaches more the local situation.

BUILDING THE MODEL

Based on the data gathered and validated, build a model for the mechanism to collect voluntary payments that would include the following components:

a) Project Profile: The project would be defined based on the data gathered initially, data provided by the potential partners, their goals, the resources they would be capable of contributing, the general characteristics of the target market, and the overall setting. The Profile would describe, in a few pages, the market opportunity and how we could use this opportunity with the resources (tangible and intangible) that the stakeholders have. It would also quantify and define the limits of the possible transaction; identify the main investment needs, and provide a Budget and Preliminary Timetable.

b) Business Model: Based on the Profile, the Model would provide (also in a few pages), a possible structure plan for the partners, define the roles, the tangible and intangible contributions, partner participation, and the main commitments for each partner and the whole group. It would also include a feasible preliminary financing structure.

c) Pre-Feasibility Analysis: The model would present the main lines of products/services, the volumes for each line, their prices in the target market, and the investment budget and operating costs, to make financial projections to determine the economic feasibility (characterized by cash flows) and its financial management tied in to the water fund.

REACHING THE COMPROMISE

The proof that the model works will be the "approval" by the selected industries to participate in the mechanism and its application in their future operative work. For this, we need at least three acceptance letters for the future application of the model in three different industries.

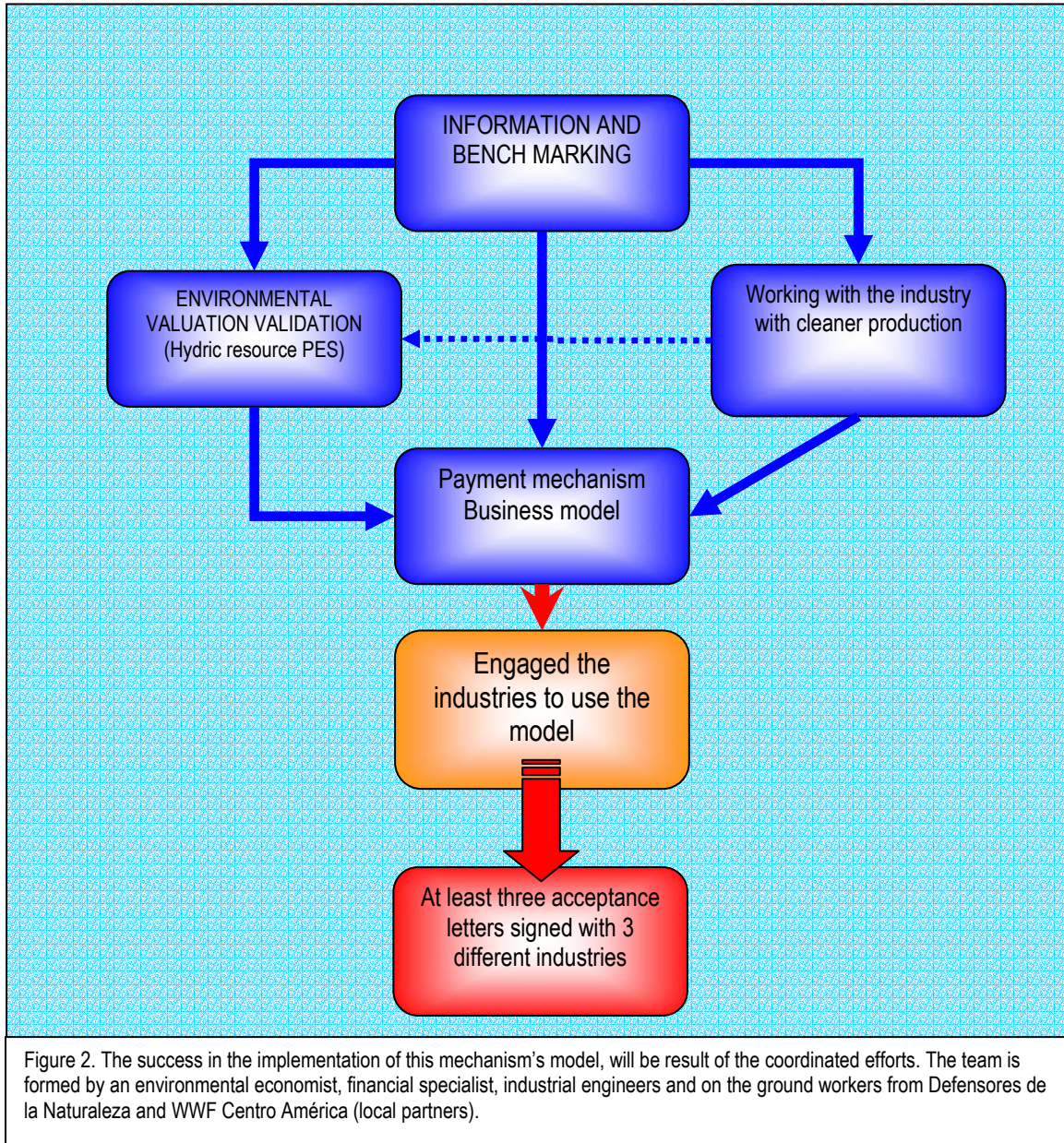


Figure 2. The success in the implementation of this mechanism's model, will be result of the coordinated efforts. The team is formed by an environmental economist, financial specialist, industrial engineers and on the ground workers from Defensores de la Naturaleza and WWF Centro América (local partners).



Implementation Organization

The Cleaner production section will be developed by “Centro Guatemalteco de Producción Más Limpia” (Guatemalan Center for Cleaner Production). The Center is a technical institution whose mission is to develop and facilitate services, promote conditions, and encourage local training in the application of Cleaner Production, to make national businesses more efficient, competitive, and environmentally compatible. It has the support of the following national institution: Guatemalan Chamber of Industry (Cámara de Industria de Guatemala), Guatemalan Sugar Producers Association (Asociación de Azucareros de Guatemala), and Guatemala del Valle University (Universidad del Valle de Guatemala); it also has the support of international organizations such as the United Nations Environmental Program, the United Nations Industrial Development Organization, and the Swiss Agency for Development and Cooperation. The Center participated in the first phase of the Water Fund; their participation consisted in providing training to the industries being considered for incorporation to the collection mechanism for the Water Fund/Industrial Sector. The training was related to payment of environmental services, cleaner production, environmental risks, and other topics.

The financial mechanism will be developed by a regional consultant with wide experience in building thrust fund, ventures capitals, green markets and so on. The benchmarking study of the PES methodology and validation of the hydric resource valuation, will be assisted by experts in the area with the support from the WWF’s network and other allies organizations.

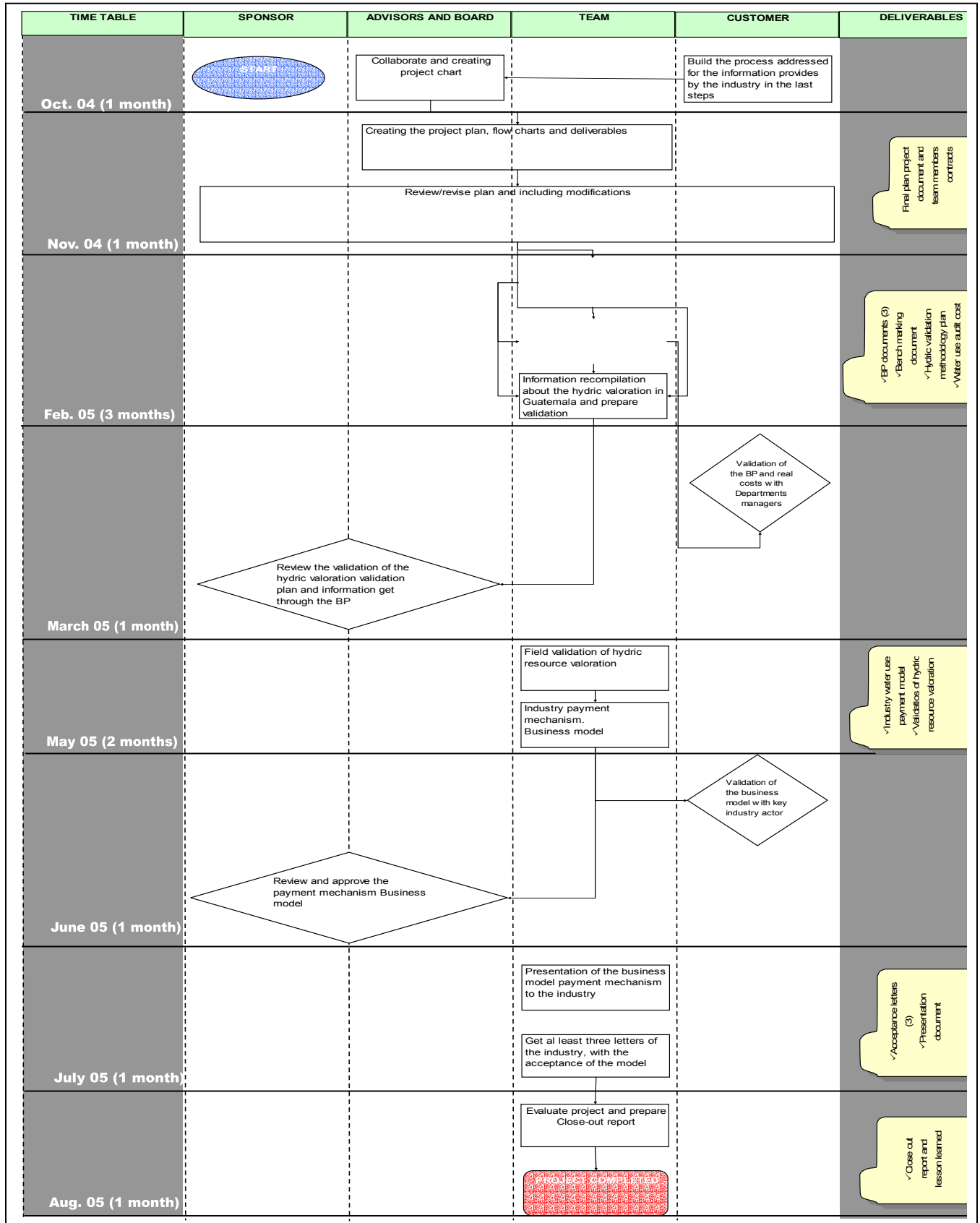


Action Plan (+ expected results and timetable)



C:\Documents and Settings\Carlos Moral

See attached Project Manager Document



Budget

See attached file in excel

Annexed

Press released from the project in the national and international press networks

6 • Domingo 20 de abril de 2003
NACIONAL
SigloVeintiuno

Sierra de las Minas garantiza suministro de líquido vital a 400 mil pobladores

Luchan por calidad del agua

Defensores de la Naturaleza gana un premio mundial por la propuesta innovadora de crear un fondo para garantizar el agua a generaciones futuras.

Luis Ismatul, Siglo Veintiuno
lismatul@sigloxxi.com

Para garantizar los afluentes vírgenes de la Sierra de las Minas, Defensores de la Naturaleza, un organismo no gubernamental, pondrá en marcha este año un plan en el cual involucra a las industrias embotelladoras del Nororiente del país para evitar la contaminación de las aguas en el Valle del Motagua.

Para lograr el éxito del plan, la entidad necesita por lo menos \$5 millones (unos Q40 millones), que serán aportados por una industria de papel, una hidroeléctrica y tres embotelladoras anuentes a participar. El financiamiento para el proyecto provendrá de los intereses que genere el capital.

Con este estudio, Defensores de la Naturaleza, una entidad netamente guatemalteca, y la WWF de Centroamérica fueron reconocidas en marzo pasado con el Premio Internacional para el Manejo Sostenible de las Cuenclas, otorgado por la aseguradora suiza Swiss Re.

La iniciativa fue seleccionada de un total de 105 concursantes de todo el mundo por su propuesta innovadora de crear el Fondo del Agua, un mecanismo para la generación de ingresos que permita financiar actividades de manejo y protección mediante el pago por servicios ambientales dirigidos a la iniciativa privada.

Oscar Nuñez, director ejecutivo de Defensores de la Naturaleza, hizo una presentación a Siglo Veintiuno en la cual revela cómo evitar la contaminación en los ríos de la Sierra de las Minas, que es el mayor proveedor de agua en el nororiente (vea recuadro Proyecto ganador)

Se prevé la creación de un programa de monitoreo del recurso hídrico, que consiste en la medición de calidad y cantidad del agua. Para ello se realizarán muestreos mensuales en las tres cuencas seleccionadas, Río Pasabién, Colorado y Río Hato de los departamentos de Zacapa y el Progreso. Se controlarán los niveles de contaminación, cantidad de agua, número de tomas en los ríos y especies de fauna.

El río Cahabón que nace en la Sierra de las Minas provee de agua a habitantes de Cobán.

Proyecto ganador

Oscar Nuñez explica cómo será invertido el premio en la Reserva de la biosfera Sierra de las Minas. Lo resume en las siguientes actividades.

- ▶ Determinación del valor del agua en las cuencas de los ríos Pasabién, Colorado y Hato, en Zacapa y El Progreso.
- ▶ Estimación de los usos industriales, sistemas de riego, hidroeléctricas y consumo de agua potable para realizar provisiones y planes.
- ▶ Establecimiento de un programa de monitoreo del recurso hídrico con parámetros de calidad y cantidad de agua.
- ▶ Muestreo mensual en las cuencas para medir el grado de contaminación del agua.
- ▶ Verificación para que los sistemas de riego no transporten sedimentos.
- ▶ Involucrar a municipalidades y universidades en el proyecto.
- ▶ Buscar el consenso con los usuarios para el transporte del agua con poca inversión.
- ▶ Conservación y manejo de los bosques.
- ▶ Preservación de los valles.
- ▶ Garantizar la energía local con modelos agroindustriales.
- ▶ Establecer un comité por cada cuenca.
- ▶ Planificación para evitar el desperdicio de agua.
- ▶ Campaña de conciencia de cinco años en la Zona Núcleo para preservar el vital líquido.

AMENAZAS constantes

Los peligros a los cuales se enfrenta la reserva de agua en Guatemala son muchos. Defensores de la Naturaleza resalta los siguientes:

- ▶ Aumento de la contaminación en el río Polochic y lago de Izabal.
- ▶ Uso indiscriminado en sistemas de riego privados y comunarios que se apropiaron de las fuentes y nacimientos de agua sin ningún control, ocasionando desvío de caudales y desastres.
- ▶ Aumento de industrias en el valle del Motagua, que hacen uso excesivo del líquido subterráneo y superficial.
- ▶ Explosión de proyectos hidroeléctricos en el valle del Motagua que no invierten en el manejo de las microcuencas.
- ▶ Aumento de la vulnerabilidad por malas prácticas del uso de los suelos.
- ▶ Expansión demográfica y avance de la frontera agrícola que hace un uso mayor del agua.
- ▶ Ausencia de planificación para los desechos líquidos.

Fuente: Estudio Defensores de la Naturaleza. Infografía: Siglo Veintiuno/Daniel Luz Sandoval

Refugio de la biodiversidad

Nuñez refiere que la Sierra de las Minas es refugio de vida silvestre y del 80% de la biodiversidad en el país, y es fuente principal de abastecimiento de agua de la región nororiental y atlántica de Guatemala.

La información se trasladará a los usuarios para que mejoren sus sistemas de distribución y manejo de agua. Por ejemplo, para los sistemas de riego por goteo, es importante que el agua no transporte sedimentos a fin de que no existan posteriores gastos en el destapado de la tubería o aspersores.

Para que esto sea una realidad, Defensores de la Naturaleza funcionará con los intereses que genere un fondo que varias industrias del país crearán.

La información se trasladará a los usuarios para que mejoren sus sistemas de distribución y manejo de agua. Por ejemplo, para los sistemas de riego por goteo, es importante que el agua no transporte sedimentos a fin de que no existan posteriores gastos en el destapado de la tubería o aspersores.

Para que esto sea una realidad, Defensores de la Naturaleza funcionará con los intereses que genere un fondo que varias industrias del país crearán.

medidas urgentes para su preservación (vea gráfica Amenazas constantes).

“Buscamos planificación a largo plazo para que los pobladores de las partes altas de la cuenca conserven y manejen adecuadamente sus bosques, y los de las partes bajas usen eficientemente el agua y no la desperdicien. Es un trabajo de equipo”, resalta.



Link to Water Fund Guatemala press released, will be in the internacional press next Thursday, October 28:

http://www.panda.org/news_facts/newsroom/features/news.cfm?uNewsID=15531

28, Oct 2004

Hope for Guatemala's national bird

By Urs DrÄ±ger

Water drips from the fronds of the ferns; mist fills the air; the loamy soil is slippery. This is the cloud forest of the Sierra de las Minas Biosphere Reserve, home to the quetzal â€” Guatemalaâ€™s highly revered, yet highly threatened, national bird.

â€œI've seen quetzals there before,â€ says the reserveâ€™s Director Caesar Tot, pointing to a massive oak tree through the mist. â€œBut we won't be seeing the shy birds today, they are hiding from the rain.â€

Even in good weather, the quetzal (*Pharomachrus mocino*) is becoming an increasingly rare sight. Its natural habitat is being destroyed by logging, cattle ranching, forest fires, and agricultural expansion. If nothing is done to protect the species, it could soon be heading for extinction; left to spread its wings only on Guatemalaâ€™s currency, the Quetzal.

A protected biosphere reserve since 1990, Sierra de las Minas is the largest-remaining habitat of the Mayan Indianâ€™s revered â€œbird of paradiseâ€. It is also one of the largest unbroken extents of cloud forest in Mesoamerica, covering around 1,300km², of which some 65 per cent is primary forest. In addition to the quetzal, hundreds of other bird, mammal, amphibian, and reptile species live here, including the endangered tapir, howler monkey, jaguar, and Harpy eagle.

â€œThis forest is home to the most diverse range of species in Central America,â€ says Tot, a native Qâ€™eqchi Indian who grew up in the region. â€œIt houses more than three-quarters of all flora and fauna found in Guatemala and Belize, much of which is endemic.â€

But it is not only plants and animals that depend on the cloud forest for their survival â€” so do the people who live on the foothills of the mountain chain.

Located in one of the driest regions of Central America, the Motagua Valley, these peopleâ€™s very existence depends on the water flowing from more than 30 streams arising in the cloud forest. Half a million people â€” most of whom are small farmers â€” compete with large industrial water users, such as Del Monte, Pepsi and Coke, for this scarce natural resource. But, not without consequences. The Motagua Valley watershed carries less and less water each year; the water table sinks lower and lower.

Too many forest fires

Experts believe one reason for the dwindling water supply is overexploitation of water by companies and communities in the area. However, the root of the problem is a lot deeper â€” or higher. Even the streams that cascade untouched from the mountains carry less water each year. Many blame the indiscriminate use of slash-and-burn farming techniques that are clearing the forest at a rapid pace.

â€œLess forest means less water,â€ says Oscar NuÃ±ez, Director of Defensores de la Naturaleza, a national environmental organization that manages the Sierra de las Minas Biosphere Reserve. â€œThe exposed soil cannot retain the rainwater...pressure on the reserve is increasing.â€

Such pressure can be seen by the great number of people who, day in and day out, carry firewood to their villages situated lower down the slopes. Women carry huge branches; men carry bundles of firewood on their backs; even children drag home as much wood as they can. And every day, the villagers have to climb a little higher to find wood. Itâ€™s a depressing sight for Oscar NuÃ±ez. But, the wood-carrying caravans are not his greatest worry.

â€œWhat's worse are the forest fires that people light on purpose to make new areas for planting and grazing,â€ he says. â€œThe fire-ravaged expanses of former forest where farmers proceed to plant corn and coffee are already exhausted five years later.â€

Money flowing upstream

Prompted by the close connection between dwindling forest and dwindling water resources, NuÃ±ez had the idea of establishing a link between water usage downstream and protection of the cloud forest upstream. This resulted in a joint Defensores de la Naturalezaâ€™WWF Central America partnership to create a water fund â€” where, in



return for using water, downstream companies and communities can make voluntary contributions to finance forest protection upstream.

“Once money flows upstream, enough water will flow downstream,” says Melissa Edwards, former Freshwater Programme Officer at WWF Central America.

The idea has received support from the global reinsurer Swiss Re, who in 2003 awarded the project its US\$70,000 ReSource Award for sustainable watershed management.

Counting on people's own interests

A number of municipalities have already shown interest in supporting the water fund, including the mayor of San Augustin Acasaguastlan, who is responsible for 22 neighbouring villages.

“We would like to work with Defensores de la Naturaleza,” says the mayor. “With their help, we can find a solution to our own problems. This is why we are willing to contribute to the water fund.”

Besides the communities, there are hopes that the major water consumers – industry and businesses in the Motagua Valley – will get involved in the project. The chances of their involvement look extremely good because their key resource, water, is becoming an increasingly scarce commodity. The large paper factory, PAINSA, for example, has expressed its interest.

“Water accounts for 99.5 per cent of the raw material used in the manufacture of paper,” says plant director Rommel Najera. “However, towards the end of the dry season in April, the Motagua River is often so parched that we have to switch off one or two of our three machines.”

Sometimes the situation is even worse.

“In 1998, we had to actually bring production to a complete halt for a number of days because there was no more water; the river had simply dried up,” says Najera.

“Factory managers such as Najera are very much aware of the importance of water,” says Edwards. “They understand how important it is to do something. But not all companies can warm to the idea of having to pay for the water they have always drawn for free from the river or water table.”

Defensores de la Naturaleza and WWF are in the process of providing an incentive to these companies to participate in the water fund. They are to benefit from the services of the National Cleaner Production Centre of Guatemala (NCPCG), which advises companies on how to manufacture their goods more efficiently, ecologically, and, ultimately, more cheaply. A portion of the money saved will flow into the water fund.

Better living conditions

One of the potential beneficiaries of the water fund is Carlos Alvarez. This old *mestizo* lives in Albores, a village located in the centre of Sierra de las Minas. He nods thoughtfully in response to the question as to whether he would be willing to help preserve the forest. Like most farmers in Albores, he is ready to do his part.

“That is if someone helps us and pays for the additional work involved,” he quips.

Projects financed by the water fund, such as the production of environmentally friendly organic coffee, could represent an urgently needed source of income for farmers, who nowadays can barely scratch a living from coffee as its price has plummeted on the international market.

Defensores de la Naturaleza is also identifying alternatives to exploiting the cloud forest. For example, the organization is advising farmers to switch to a more environmentally friendly method of cultivation known as “agroforestry”, which combines sustainable forestry with agricultural practices.

“We show the farmers that they can exist, and even earn a better living, without having to burn parts of the forest to the ground,” says Nuñez. “This is the best way to protect the forest.”

Using the proceeds from the water fund, conservationists want to compensate farmers for planting trees and train them how to fight forest fires.

All the measures to be financed by the water fund have one thing in common – they not only protect the cloud forest, but also offer its inhabitants a source of additional income. This is sorely needed as the fate of the cloud forest and its wildlife is intrinsically linked with the well-being of those living in the region. The quetzal bird can only survive once the villagers have a few more Quetzal notes in their pockets – and thanks to the water fund, both these prospects look better.

* Urs Dräger is a freelance writer based in Switzerland.

Further information:

**Sierra de las Minas Biosphere Reserve**

Located in southeast Guatemala, the Sierra de las Minas Biosphere Reserve was designated a UNESCO-MAB Biosphere Reserve in 1992. Protection of the area is particularly important because it contains an estimated 60 per cent of Guatemala's remaining cloud forest. Because of its geographic isolation and wide range of elevation, the reserve is home to at least 885 species of birds, mammals, amphibians and reptiles. More than 17 distinct species of evergreen forest are endemic to the area. The area is also considered an irreplaceable seed resource for reforestation and agroforestry throughout the tropics. The reserve's managers are engaged in environmental education for local community leaders, many of who are Q'eqchi Maya. The goal is to discourage ongoing encroachment into the forest and to establish sustainable agricultural activities instead.

The Water Fund

The water fund is financed via contributions from water users and by interest income earned by a US\$5 million trust fund set up several major international donor organizations, including the World Bank. The water fund is managed by a foundation comprising a maximum of seven members, and includes representatives of the biggest user groups – industry, agriculture, hydroelectric plants, and local authorities, as well as environmental organizations, such as Defensores de la Naturaleza.

Contact information:

Carlos Morales, Freshwater Programme Officer
WWF Central America
Tel: +502 2367 0480
E-mail: cmorales@wwfca.org