

2010

FUNDACION CUERO Y SALADO

FUCSA

**[“COMMUNITY-BASED SUSTAINABLE
MANAGEMENT OF THE SALADO RIVER
WATERSHED”
GRANT NO.NA07NOS4630033
FINAL REPORT]**

This final report presents, analyzes, and interprets the achievements and limitations of the activities and investments carried out during the execution of each one of the objectives of the project, from October 1, 2007 to September of 2010. The proposed timeframe was for 18 months but with the extension of 10 additional months, came to a total of 28 months. The main purpose was to develop actions oriented to establish Sustainable Community Management of the Basin of the Rio Salado, integrating school children, young adults, teachers, small-scale producers, and other local community organizations, as well as the establishment of better communication mechanisms.

ACKNOWLEDGEMENTS

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INTRODUCTION

The main aims of the project "Sustainable Community Management for the Rio Salado Basin" were to reduce environmentally harmful contaminants, conserve the basin of the Rio Salado and its principle tributaries, and increase the participation of local inhabitants, small agricultural producers and cattle farmers of the communities within the Cuero y Salado Wildlife Refuge. These ends were approached by means of environmental education programs, the formation of community facilitators, and the establishment of environmentally friendly management alternatives for an upstream African palm fruit processing plant that uses the basin to discharge highly oxidized effluents. The NGO project administrator FUCSA strengthened its relations within the community, with organizations for the conservation of the civil society, and with regional organs of the municipal and central government. Finally, FUCSA evaluated both the concentration levels of water contaminants and the various social aspects of the key players in the region.

FUCSA prepared an initial work plan for 18 months but for diverse reasons requested an extension of 10 months to conclude pending activities and proposals whose purposes were oriented to the conservation of the drainage basin of the refuge. During the implementation period of the project FUCSA used its buildings, equipment, and administrative and technical personnel to support all activities, prepare reports, and manage the resources contributed by NOAA. It also kept detailed and accurate financial reports.

PROJECT AREA

The Rio Salado Basin is one of the three main basins that form the wetland component of the Cuero y Salado Wildlife Refuge. The basin lies between 15° 47' N latitude and 87° 05' W longitude, 15° 33' N latitude y 86° 55' W longitude. The ~45 km long Rio Salado is formed from 22 smaller tributaries that descend from altitudes of more than 1500 meters running parallel to the Nombre de Dios mountains along the north coast of Honduras, eventually winding through the marshes and mangrove swamps of the wetland itself to flow out into the Caribbean Sea. Of the ~30,200 hectares of the total basin, ~21,400 higher elevation hectares reside within the Pico Bonito National Park. There are many small communities within the Rio Salado basin, including San Francisco, Buena Vista, Micely, Boca del Toro, Saladito, Santiago Abajo, and Salado Barra. These communities were prioritized as beneficiaries to this project due to their influence in the basin, but other surrounding communities that did not receive attention this time also exert various pressures on the basin due to the affects of subsistence agricultural activities

(yuca, cocoa, citrus, banana, papaya and other crops), commercial activities (African Palm, pineapple, rambután) and livestock ranching.

METHODOLOGY

The methods of the project to increase capacity facilitated the filling of knowledge gaps and the incorporation of environmentally friendly tools useful to the community. Both community members and facilitators alike benefited from such capacity-building programs. With the assistance of AFE-COHDEFOR, now the Forest Conservation Institute (ICF) the actions of reforestation in impacted areas were measured, as were the establishment of communication mechanisms between community organizations, municipalities, the state organ ICF, FUCSA and other conservation organizations. These ends raised the baseline for different parameters demonstrating the state of health and water quality of the basin and also FUCSA's technical abilities in geo-referencing, benefits that were extended to other environmental NGOs.

During business meetings, planning sessions, interviews, and third party acquisitions between community beneficiaries, education authorities, municipalities, and government groups, data was collected on the various development activities. During such events participation was documented in lists and with photographs. Meetings and training usually occurred on weekends to take advantage of the availability of community members and producers, and were held in community schools, the properties of various participants, the reserve itself, and municipal buildings.

In summation, even considering the interruptions and limitations, FUCSA was able to establish a work methodology that will succeed upon implementation in the second critical watershed, the Rio Cuero and Rio San Juan.

RESULTS AND PRODUCTS

The results and products obtained through the project are presented according to the structure by which the project was approved:

Objective 1: Increase the internal capacity of 5 local communities to sustainably manage the Rio Salado watershed in order to reduce the amount of contamination reaching the river.

Method 1.1: Educate the community members on the effects of land-use activities within their watershed and on how to evaluate water quality.

Community Facilitators

For their importance as central populations in the watershed, the 7 communities within Santiago and San Francisco were selected by project facilitators and integrated as main project beneficiaries.

A program of modular training was prepared and executed by FUCSA, resulting in 14 qualified and certified community facilitators to support the project. Qualified and certified by FUCSA to

support the project, rural schools and common agencies in their communities. The distribution of these facilitators is: five (5) in the community of Santiago Abajo, two (2) Saladito, two (2) Buena Vista, two (2) Boca Del Toro, two (2) Micely in the municipality, and one (1) in the community of Salado Barra, municipality of El Porvenir. The synthetic training program for the formation of community facilitators included the following themes: a) basic clean-up, b) management of solid waste, c) water quality analysis, with basic equipment, d) composting areas and seedling nurseries, e) species threatened or in danger of extinction, f) rural ecotourism, g) self-esteem and gender equity, h) preparation and management of community projects, i) design and construction of biodigestors.

In the end, community facilitators have been integrated in training processes and environmental education programs in their communities, and they maintain good communication with the technical field staff of FUCSA. As such, they are now linked to other projects, municipal governments, and community organizations (water protection agencies, committees for the protection of the basin) that have been formed in alliance with the environment and FUCSA to address the threats of hydroelectric projects that do not comply with environmental impact assessments and/or community mitigation or benefits, local patronage, and tourism opportunities.

M1.2: Initiate sustainable environmental education programs for each of the 4 primary schools to complement adult education.

Training of School Teachers

FUCSA and the Environmental Unit of the Department of Education of Atlántida (DDEA) strengthened the capacities of rural school teachers in the communities within the zone of influence of the Cuero y Salado Wildlife Refuge resulting in 18 teachers now qualified in the techniques of environmental education for rural school children. The central themes of the training programs oriented teachers in the management of seedling nurseries and school composting systems as well as on local flora, fauna, and ecosystems of wetlands and reefs. Additionally, each school received methodology guides used by the Marine Reef System (SAM), including laminates of important species of insects, birds, reptiles and mammals, and as other printed educational material made available through FUCSA.

The teachers were trained within the classrooms of the wetland and the community by means of dynamic, collective modules and environmental play, which developed group themes and put into practice the acquired know-how. Due to the continual rotation of the school staff, continued efforts are being made with the Department of Education of Atlántida to specify in a firm letter of intent a permanent method to integrate environmental education with an emphasis of wetlands and coastal marine zones into regional primary school education.

Both teachers and community facilitators were qualified in the use basic monitoring tools for water quality in their communities, at the same time serving to instruct senior students about how to evaluate water for levels of: fecal coliform, biochemistry demand of oxygen, nitrate, dissolved oxygen, temperature, pH, phosphate, and turbidity. These results were shared with members of the community during meetings.

Environmental Education Field Trips

Teachers and community facilitators participated in educational excursions to the refuge with school groups that integrated 6 rural schools. Each group consisted of 5 students, 1 facilitator, 1 teacher, or 1 father of a family in a school of each community. These excursions served to celebrate the Refuge's 'wetland day' in February and was delivered by means of dynamic games, competence testing of travel through the channels and aquatic paths in Rio Salado. Costs were administered through the NGO and included: vehicle transportation, delivery via van and boat, food provisions for the groups, and t-shirts with logos of the project and 'Wetland Day'.

Groups of 2 rural schools composed of 13 students in their final year, who practice a System of Tutorial Learning (SAT) and are located in the zone of influence for the Refuge, (San Antonio and Tripoli), teacher tutor and students were joined by community facilitators and naturalist guides during the educational tours. The guides employed environmental games to establish the ethic of 'Leave No Trace'.

The objective of the educational tour was to endow these 26 final year students and local residents from the region with simple techniques and practices in environmental education, as well as knowledge of the importance of conservation in the wetland and surrounding watershed. During their visit they carried out plastic litter removal on paths and beaches, and learned the flora, fauna, and ecology of the wetland, including important species that reproduce in the marine environment and species in danger of extinction such as manatee (*Trichechus manatus*), a keystone species and object of conservation efforts in the Cuero y Salado Refuge.

The environmental education tours were carried out in the community of Salado Barra'a public use area visitor centre with its canoes and boats that permit excursions to understand the state and importance of the different aquatic channels, located in the Rio Salado watershed and other areas of interest such as the lagoon system and beach.

M1.3: Present alternative management strategies and incentives to encourage and promote their use.

Involved residents, small producers, community leaders, school teachers, and municipal representatives were brought together to devise and plan alternatives for: the planning and execution processes, and meetings and field trips to the interior of the refuge carried out throughout the middle watershed to the estuary of the Rio Salado, in the community of Salado Barra. The successful reforestation of impacted areas in the middle watershed was not completed because the project PROBOSQUE- AFE-COHDEFOR (now ICF, Forest Conservation Institute) itself was pulled from the zone as the department entered into a phase of institutional re-organization due to a period of state-wide instability.

Seedling Nurseries

One (1) communal seedling nursery was installed in the community of Salado Barra with the main objectives of organic compost preparation and native species propagation: ceiba (*Ceiba petandra*), icaco (*Chrysobalanus icaco*), almendro (*Terminalia catappa*), sincho (*Lonchocarpus lasiotropis*), caoba (*Swietenia macrophylla*) and especially red mangrove (*Rizophora mangle*). All these species are used by the community to restore the demonstration site and banks of the lower Rio Salado in the municipality of El Porvenir.



Seeds and propagation material were collected in the wetland with the support of the community. The nursery still depends on a manager for its management, at present reinforced by the support of agricultural economy and forestry engineering students of the National Autonomous University of Honduras in the La Ceiba region. The nursery has the current capacity to maintain a maximum of 2500 plants and also propagates several common fruit-bearing species such as: paterna (*Inga paterna*), chupete (*Sandcorium koetjape*), jobo (*Spondius mombis*), and the energy-yielding species guama (*Inga edulis*) and guanacaste (*Enterolobium cyclocarpum*).

For increased control and management a second (2) seedling nursery was installed on the property of one of the facilitators in the community of Lower Santiago in the municipality of San Francisco. Its objective is the guarantee of organic production and the propagation of native species for reforestation, fruit-bearing trees, and energy species, with a capacity to maintain some 1.500 plants. It is important to note that the municipal government has bought plants for the reforestation of the upper watershed areas, up keeping its mandate to protect sources of drinking water.

These nurseries are minimally equipped with only that which is necessary. This supports local community involvement and FUCSA's continued development of project activities.

Energy-generating Plots

Three energy plots of a hectare each were established. One in the community of Salado Barra, a second in lower Santiago, and another in the community of Boca del Toro. Seed and cuttings were used for the propagation of species that grow rapidly. Fences were placed around to protect

them from animal browsing and for their maintenance. Another perimeter fence was installed in order to protect a 25.41 hectare site where a demonstration plot was installed using analog forestry on the part of the community of Salado Barra where native species have been introduced including: zapotón (*Pachira aquatica*), red mangrove seedling (*Rhizophora mangrove*) networks and black mangrove (*Avicennia germinans*) to replace the invasive species African palm. African palm is rampant in several mangrove swamp areas, and it should continue being removed and the area restored.

Improved Agribusiness Practices

Better practices were developed with small producers in the management of both agrochemicals used in cultivations of palm and in animal welfare for cattle and swine ranchers. Low cost methane producing biodigestors were introduced in places that are less vulnerable in the winter. In this process, community facilitators interested in expanding their know-how were integrated, considering that most of them work in the agricultural sector.

Small-scale African Palm Producers

Ten (10) small-scale producers of African palm (*Elaeis guineensis* jacq) in the community of Boca del Toro and Micely were taught environmentally friendly weed control, fertilization, pruning, and better management practices. This activity was carried out on the property of one of the participants, and in the end the group received recommendations for improvement. The contract for training was awarded to Mario Santiago Defenses, an expert with more than 15 years of experience in palm, who illustrated with palm cultivation figures (2008) indicating that the department of Atlántida is the second largest palm oil producer in the country with 32.500 hectares, representing the 25% of department cultivation, and 4 oil extraction plants.

Better management of the crop by local small-scale producers is essential because the species' appearance in the refuge poses several special issues. It both displaces livestock rearing activities and is a severely invasive species. Its abundant seeds, from which palm oil is extracted, are very easily dispersed throughout the refuge when they fall into flowing water, or by mammalian and bird dispersal vectors who are capable of carrying them to all areas within the refuge. It is a serious threat to the native biodiversity of the entire watershed.

Animal Health and Welfare

The animal health component was delivered via a series of intensive training modules directed to 5 small-scale producers and community leaders that work extensively with livestock, as well as interested community facilitators in the communities of Micely, Boca del Toro, San Francisco, Buena Vista, Saladito, Santiago Abajo, La Unión y Ceiba Mocha. These workshops improved their capacities for the overall management of their farms. Two participating farms (Gabino Perdomo and Rufino Orellana) hosted these activities, allowing hands-on practical training in livestock and poultry rearing.

John F. Kennedy Agricultural School offered their training facilities.

Four (4) workshops were carried out using a hands-on case study approach where participants revised their own practices. On each workshop and field day, the necessary equipment and printed materials were given to the participants, and copies of everything remained with the community leader in Bocas del Toro.



The training sessions dealt with the typical livestock issues of the region: a) types of mastitis, causes of illness, symptoms, CMT test, hygiene, processing, packaging security measures, and other control measures; b) types and life cycles of endoparasites, causes, symptoms, tests, medicinal preparations and treatment, care, preventive measures and control; c) swine rearing: in this module, they became familiar with the 4 breeds the school handles: Duroc, Hampshire, Landrace and Yorkshire, in terms of morphology, feeding, water

needs, reproduction, and hygiene. The participants also learned about parasite control and male castration; d) the final module was focused on poultry and a sanitation plan where they learned of: common illnesses found in rearing facilities of chickens, turkeys and ducks, diet, hygiene and disinfection, pest control, management and administration.

All the modules emphasized the responsible use and personal care in the handling of medicines, the handling of spent containers, and to not throw them in the water courses. Also instructed were the economic and environmental impacts for the small producer in using such medicines. In the case of mastitis, the farms on which the workshops were conducted presented a level of infestation in 56% of the herd, thus herd renewal was recommended along with increased control measures.

Biodigestors

With their low costs and easy maintenance, the use of energy contained in organic wastes was another alternative introduced for areas with low susceptibility to winter flooding. The communities that received the technology in the region were: Santiago Abajo, Salado Barra, Buena Vista, La Unión, Saladito, and Trípoli. This permits rural families to derive biogas as a clean energy source for home and farm use. It also teaches ecological alternatives for the management of animals, diminishes the consumption of firewood and removes the contamination of the tributaries of the watershed of the Rio Salado, which in turn improves the health of the reefs and conserves the forest. A bi-product of the process is a high-quality organic fertilizer.

The process created 2 community facilitators with the capacity construct biodigestors. After building the first two, these facilitators were entrusted with the construction of the rest for the project. Today they receive requests by other projects for their expertise. The 12 biodigestors were installed in the communities of: Salado Barra (2), Saladito (2), Buena Vista (1), Santiago Abajo (2), San Francisco Escuela John F. Kennedy (1), La Unión (1), Trípoli (2) y Esparta (2).

Just two of these biodigestores have ceased to function due to poor management and little interest, in the communities of Salado Barra and Saladito.

Due to the large quantity of organic wastes available and its future goal of certifying agronomy professionals, 15 senior students and 2 teacher guides built a biodigestor for the cafe at John F. Kennedy School. The school then received the recommendation to construct a biodigestor facility large enough to handle all the school's organic wastes and supply enough energy for all the school's needs.



Each biodigestor was awarded to the recipient family and in each case neighbors, ICF technicians, DDEA, teachers, school children, environmental NGOs and municipal authorities were invited to visit and tour the sites.

Objective 2 Reinforce the relations between FUCSA and members of the communities, local organizations, governmental agencies and NGOs, in order to improve watershed management.

Committee for the Conservation of Rio Salado Watershed

A committee for the conservation and protection of the Rio Salado Watershed was formed containing 7 community facilitators of 5 beneficiary communities. The objective is to watch over all activities that generate negative impacts in the different tributaries and drinking water sources within each community. This committee acts as an aid to all project organizations. The committee was sworn into effect under the witness of local leaders, municipal authorities of San Francisco, and ICF representatives.

Two mentionable and important actions taken by the watershed committee are: 1) a meeting with the administration of the palm oil extraction factory in the proximity of Micely and Buena Vista, to understand the state of the oxidation pools, solid waste management, and rat management in the solid waste component. This activity was undertaken by technical staff from ICF, FUCSA and coincided with the visit from the staff auditors from the National Tribunal of Accounts of Tegucigalpa; 2) linking members of the conservation committee in defense against private interests that wish to develop hydroelectric projects in adjoining watersheds using poor designs and fraudulent claims.

From the visit to the palm extraction company CAICEHSA the following agenda of activities was formed: a) develop periodic staff visits to the factory and its oxidation pools with the accompaniment of members of the watershed conservation committee, technical staff of FUCSA, ICF, and the municipal UMA. b) write and sign a memorandum of understanding between FUCSA and CAICEHSA. Note that although the letter appears FUCSA and USAID MIRA, the initiatives were conducted jointly. Please see the annexed copy of the covenant.

The committee suggested three mitigation measures as well as others that the factory should implement: a) train staff to avoid the littering of plastic wastes in the plantation and factory, b) the factory should permit and support the establishment of a waste collection centre for plastics, c) subject to the request of the company and with the assistance of FUCSA, ICF and UMA, the committee will collect water samples for analysis. These three measures are now in action. Meanwhile the following will be the object of monitoring for their implementation: a) the cleaning between the rows and drainage systems of the plantation, b) the cleanup of fallen palm fruits in the canals and plantation to stop their being dispersed to the wetland during the rainy season, c) the introduction of biological and organic methods to control pests and reduce the use of lethal agrochemicals.

Solid waste collection centers

With the initiative of the community facilitators 3 solid waste collection centers were created. This provides a business opportunity for a small enterprising individual or group as these plastic wastes can be sold to the recycling industry. The collection facilities were installed in the communities of San Francisco, Santiago Abajo and Salado Barra.

The collection centre is small hut of 4 by 3 meters and 2 meters in height. Each is to be built with a lumber ceiling, roof and cement floor, with wire all around, one door and to security lock. The location should be provided by the person or group in charge.

In San Francisco, the collection centre was installed in the John F. Kennedy School of Agriculture to alleviate the volume and establish an improved solid waste management for the 225 inhabitants, among them students, teachers, and field administrative assistants. It is managed by first-year students who benefit by learning hands-on how to manage an environmental initiative, gaining a small source of revenue, as well as gaining class merits.



FUCSA and the Agriculture School signed a covenant that will serve to: Promote the Environmental Education Program 'Leave No Trace' within the protected area and transfer environmentally friendly, sustainable agricultural and livestock ranching practices to the producers within the region around the refuge. This has permitted the strengthening of relations between the JFK Agricultural School, FUCSA, community facilitators and local producers. Refer to Anex I, Covenant FUCSA-EAJK.

The second collection centre is in the community of Santiago Abajo in the county of San Francisco, Atlántida, which has a population of 120 inhabitants. It is near the community of El Naranjal, in the county of La Másica, with an approximate population of 350 inhabitants. This is on the transportation route to the plantations and facilities of the palm oil extraction factory, located in the buffer zone of the Cuero and Salado Refuge and its tributary rivers.

The third collection centre is in the community of Salado Barra, with a fluctuating visitor population to the public use area of around 350 people and a steady population of 250 inhabitants. The centre is managed by young people of the community and generates income via the sale of plastics for recycling.

Objective 3. Evaluate project success using both quantitative and qualitative methods

M3.1: Evaluate the concentrations and possible sources of community contaminants in the watershed by creating an environmental database

Ten (10) sites within the watershed's 22 tributaries were selected for a water quality analysis. For the sample sites for the three completed analyses in 2008, 2009, and 2010, see the map in Annex II.

ite	Name of the site	X	Y
N 1	Community of Boca Del Toro, Santiago River	498020.3	1737909
N 2	Confluence of the rivers Santiago and Limon	498415.7	1738205
N 3	Agua Buena stream	499243.4	1737218
N 4	Jimerito river, tamagas stream, camellias and others	498917.8	1735956
N 5	Perla river	498912.7	1735841
N 6	Confluence of rivers Salado and Marinero	498776.9	1742219
N 7	Up stream of Marinero river known as la puntilla in confluence with moja bolas stream	496145.5	1738071
N 8	Low stream of Marinero river	497333.7	1741565
N 9	Up stream of Salado river, in front of the dock	500056.8	1743204
N 10	Low stream of Salado river in front the drainage of the Visitors Center water treatment system	500016.3	1743204

Three (3) water quality analyses were completed during the execution of the project in the 10 selected wetland sites. Levels for 9 parameters were measured: Total Solids in Suspension (STS), Total Dissolved Solids (TDS), Fat and oils, Phosphorus (PO₄), Nitrates (NO₃), Ammoniac nitrogen (NH₄), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Recount of fecal coliforms.

Due to intensified activities of the palm oil industry during the winter, two (2) analyses were conducted during this time and one (1) in the summer. The first analysis showed high levels of fecal coliforms, especially in the community of Boca del Toro, and minor levels in sites near Salado Barra. In a second analysis, tolerable levels were found in 2009 and by 2010 the results had improved.

These analyses motivated the community facilitators to take action to improve poor latrines within the community with the help of the water board. Meanwhile, in Salado Barra, FUCSA completed the following tasks: a) improved the brown and grey water treatment systems at the visitor centre with the incorporation of bacteria in the septic well (with funds from CCAW-USAID), b) constructed 2 biodigestors in the community with funds from NOAA.

In summary, according to the results of water quality analyses the project has resulted in a reduction of agrochemical contamination. Also, due to the solid waste collection sites, plastic refuse has been reduced. Altogether, the presence of contaminants has been reduced in the canals, mangrove root systems, and tributaries of the Rio Salado and beach. See Annex III: Results of water analysis.

Create a geospatial database

To create a referenced database, all information was registered with the use of a Garmin GPS meanwhile training 4 employees in the use of GPS, compass, and basic cartography. For the creation of the maps, FUCSA trained 2 technicians of its staff in Arc-view software, and also shared this capacity-building with 4 other participants invited from 2 other local environmental organizations, managers of the Fundación Guaruma and the Fundación Nombre de Dios; also included in the group was 1 member of the Unidad Ambiental de la Municipalidad de Esparta, from the municipalities west of the Cuero y Salado Refuge.

In summer, 25 tributaries that drain into the wetland of the Rio Salado watershed were georeferenced. The points were measured on the principal highway that goes from the Rio Perla bridge to the Rio Santiago Bridge which served as a base to distribute and select 10 water sampling sites of interest for the analysis. Many of these watersheds have no official name, and for this reason only their coordinates and distribution appear. See Annex IV: Map with georeferenced micro watersheds of the Rio Salado Watershed.

M3.2: Evaluate the social aspects of the project with community participants, leaders, and local organizations

In 2009, the participation of community facilitators in the ICF's second evaluation the Effectiveness of Management of the Refugio was very valuable. During the evaluation, management for protected areas was discussed as well as new management aspects for future projects. These new projects will be the task of municipalities that have influence on the Refuge in conjunction with the ICF as the state authority with maximum influence on forestry and environmental issues. In this evaluation, FUCSAs community social indicators were improved. The social sphere for the Year 2006 was at **488%** using the **Regular** Management Scale, and was improved to the **Acceptable** Scale at **693%** during 2009.

No	AMBITOS	2006	2009
1	Social	488	693
2	Administrativo	630	642
3	Recursos Naturales	492	618
4	Político	691	809
5	Económico	302	609
	PROMEDIO DE EFECTIVIDAD DE MANEJO	547	657

Source: Monitoring of Effectiveness of Management of the Refugio de Vida Silvestre Cuero y Salado, Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre. USAID.

Scale of Management

Unacceptable < 200, Barely acceptable 201- 400, Regular 401-600, Acceptable 601-800, Satisfactory > 800

Two other evaluations were conducted. One with the community and other outside institutions to make adjustments to the project without altering it negatively. The exception was that the

significant reforestation efforts were excluded because they were not included in funding from the government's PROBOSQUE. The second served to extend lessons learned to members of conservation groups from the south of the country, members of ICF and UMAS of southern zone municipalities, groups of fishermen, and representatives from the Ministry of Education. This second meeting, attended by 38 participants was concluded with a visit to the field.

CONCLUSIONS AND RECOMMENDATIONS

In summary, even considering all interruptions and limitations, this project has allowed FUCSA to establish a work methodology that will be used in future funding proposals with the European Union. These methods will be implemented in the middle watersheds and adjoining wetlands of the Rio Cuero and Rio San Juan.

The project permitted the promotion and fortification of relations between the JFK Agricultural School and community facilitators and has been successful to such a degree as to have arrived at the establishment of a covenant between both institutions to support environmental education and environmentally friendly practices among local small-scale producers. The community facilitators served as key players in the processes of training and environmental education. Additionally, they facilitated increased communication with other similar projects, municipalities, community organizations, water boards, committees for the protection of the watershed, and local tourism committees. For such reasons it is recommended to integrate facilitators in future community projects, especially in the municipality of San Francisco to take full advantage of their relevant experiences and know-how, as well their familiarity with the problems of their communities.

Because they form an integral part of the collective with FUCSA, ICF, and the UMAS for the monitoring of the African palm factory and its host of environmental problems (oxidation pools and contaminating effluents), a watershed conservation committee for the Rio Salado was organized that integrated members of the five beneficiary communities. Also, solid waste management was addressed with the proposal of a waste collection facility in the factory. The latter action was ratified with a memorandum of understanding between FUCSA and the factory CAICEHSA. Although the letterhead appears as FUCSA and USAID MIRA, the initiatives were conducted jointly.

During the execution of the FUCSA project, the evaluated Management Effectiveness Average in five environments for Year 2006 passed from **547%** (**Regular** management Scale), to an **Acceptable** scale for the year 2009 with a score of **693%**. This result was obtained by applying a modified version of the official 2007 PROARCA methodology, the same one implemented by the National Institute of Forest Conservation, Protected Areas, and Wildlife (ICF).

Due to the high degree of teacher rotation, negotiations were resumed with the Department of Education in Atlántida to agree on a letter of intent to permanently bring up to date the methodology of regional primary school teachers with respect to environmental education and to incorporate them into classroom and field studies, with emphasis on wetlands and coastal marine zones.

Support will be continued for the demonstrative mangrove restoration plot and the seedling nurseries of the community of Salado Barra. Focus will be on native wetland species such as: zapotón (*Pachira aquatica*), red mangrove (*Rhizophora mangrove*), and black mangrove (*Avicennia germinans*) to replace African palm and other invasive species in the restoration plots inside the mangrove swamp areas.

Environmentally friendly practices within the area must be considered in new management plans for the communities within and around the watersheds. These include: the introduction of family biodigestors for the derivation of low-cost energy with organic wastes; the installation of multipurpose seedling nurseries; the construction and management of solid plastic waste collection facilities to diminish contaminants in the watershed; the planting and upkeep of 'energy plots' with native species of rapid growth such as guama (*Inga edulis*) to provide for rural energy needs.

Local small-scale producers should be trained by leading producers from the JFK Agricultural School in areas such as: cattle herd and swine management, agrochemical use, and plant propagation. It is also recommended that the large volumes of organic wastes generated by the Agricultural School be utilized by a larger capacity project to generate sufficient energy to meet its demands.

ANALISIS DE AGUA
Western Hemisphere Analytical Laboratory
Proyecto: 0401-005-0000

PROJECT No.:0401-005-0000

No. de LAB.	Identificacion	Fecha de Muestreo	mg/L		mg/L							
			Fosforo Total	*DBO	*DQO	Nitratos	Nitritos	Nitrogeno Amomiacal	Solidos sedimentables	Solidos suspendidos	Aceites & Grasas	
8578	Boca del Toro	7:30 a.m.	04/30/2010	0.03	2.61	< 20	0.220	< 0.01	0.58	< 0.1	5.0	0.0
8579	Confluencia Rio Limon & Sal	7:47 a.m.	04/30/2010	0.03	2.67	< 20	0.195	< 0.01	0.28	< 0.1	5.0	0.0
8580	Quebrada Agua Buena	7:59 a.m.	04/30/2010	0.04	2.34	< 20	0.266	< 0.01	0.25	< 0.1	9.0	0.0
8581	Rio Jimerito	8:20 a.m.	04/30/2010	0.02	2.40	< 20	0.207	< 0.01	0.33	< 0.1	3.0	1.0
8582	Rio Perla	8:28 a.m.	04/30/2010	0.05	2.43	< 20	0.062	0.01	0.33	< 0.1	4.0	1.0
8583	Confluencia Rio Salado Marinero	9:03 a.m.	04/30/2010	0.02	2.59	< 20	0.176	< 0.01	0.28	< 0.1	3.0	0.0
8584	Rio Marinero Abajo	9:11 a.m.	04/30/2010	0.02	3.01	2.32	< 0.05	< 0.01	0.24	< 0.1	4.0	0.0
8585	La Puntilla, Confluencia Moja Bolas	9:41 a.m.	04/30/2010	0.05	4.27	8.34	0.275	0.210	0.31	< 0.1	7.0	2.0
8586	Rio Salado, fte Embarcadero	10:20 a.m.	04/30/2010	0.02	2.45	< 20	0.164	< 0.01	0.30	< 0.1	3.0	1.0
8587	Rio Salado, fte Drenaje de Agua Tratada	10:26 a.m.	04/30/2010	0.02	2.78	1.89	0.144	< 0.01	0.31	< 0.1	4.0	1.0
Concentración máxima permisible				5	50	200	N.R.	N.R.	20	1.0	100	10

* DBO : Demanda biológica de oxígeno

* DQO : Demanda química de oxígeno

N.A.: No Aplica por ser una muestra muy oscura

N.R. : No lo requiere la norma técnica nacional para aguas residuales.

Nota: WHAL no se hace responsable de la aplicación que se le de a los resultados expuestos en este reporte.

ANNEX

Annex 1.

Annex 2. Water Analysis

Western Hemisphere Analytical Laboratory, (Standard Fruit de Honduras, La Ceiba)

** Maximum permissible concentration

In compliance with the Conservation Committee of the Watershed more field inspections have been planned to obtain samples in the Rio Marinero sector with FUCSA technical staff upstream of the Rio Marinero known as 'La Puntilla' in confluence with 'Moja Bolas' and sites 9 and 10, to reevaluate the levels of fats and oils and DBO, DQO, and total suspended solids.

As for DBO, the maximum value in estuaries is 15mg/L, and the DQL values that appear in green are four times greater than the DBO, at 60mg/L. This generates a reduction in available oxygen in the water column and disrupts the normal development of phytoplankton and zooplankton.

The maximum allowable value for estuaries is 1 mg/L, which indicates that maximum levels have been exceeded in La Puntilla and the confluence with Moja Bolas. This is most likely due to residual effluents from the past processing of African palm oil in the factory.

Clarification of the project, 'Community-Based Sustainable Management of the Rio Salado Watershed' Grant no.NA07NOS4630033

FUCSA reported in its semiannual report dated April 1 to September 30, 2009 that AFE COHDEFOR, now Conservation Institute (ICF), through its Executing Unit "PROBOSQUE", did not provide the counterpart funding for the project to develop Objective 2, Method 2.1 and the expected result, FUCSA and the communities support each other in the planning, implementation and maintenance of the watershed management activities, including the COHDEFOR Project. It is important to note that the AFE COHDEFOR only participated through informal talks, because the staff that had been working with FUCSA was separated and after June 30, 2009 COHDEFOR suffered funding problems.

Moreover, the political situation in Honduras generated funding problems. Furthermore, COHDEFOR was transformed from an autonomous institution to a Ministry in the government. At this point all we know of PROBOSQUE, unofficially managed by the AFE unit is that COHDEFOR should have provided resources to fund Objective 2, Method 2.1 and the expected result. The resources were applied elsewhere according to verbal reports from its office in Tegucigalpa. We do not know PROBOSQUES' final report and their justifications or limitations.

The latest version sent on January 25, 2011 by Carlos Pineda Escoto, the person in charge of AFE COHDEFOR indicator: "With such drastic budget cuts suffered by the AFE COHDEFOR, PROBOSQUE was forced to reschedule its entire program and among the changes made was the elimination of Component No. 3 called "productive projects" and reduced to a minimum component No. 2, called Local Public Administration for Forestry Development. Component No. 2 which was intended to finance the so-called institutional projects, including the case before us. These decisions were once made officially to the board of Director of COIZP. I do not know the details of the project designed with the Foundation Cuero and Salado, because back then PROBOSQUE engaged the services of a "Zonal Executive, Mr. Alfredo Martinez, who was fired".

"We have just completed the process of terminating the PROBOSQUE, effective 31 January; please feel free to ask for any other questions or concerns."

As you can notice, our FUCSA report COHDEFOR'S Statements are similar.

Therefore, FUCSA requests support for the demonstration plot located on the banks of Rio Salado to restore red mangrove plants (*Rizophora mangle*) and Zapoton (*Pachira aquatica*) as well as the implementation of the nursery in the community of Barra Salado. The nursery is managed by residents of the Salado community and aided by college students. In an effort to increase reforestation a second nursery was developed in the community of Santiago Abajo. The nursery is used for the propagation of plants for the Santiago river basin, propagation of native plants Guama (*Inga edulis*), Chupete (*Sandcorium koetjape*) and Paterna (*paternal Inga*). Both nurseries continue to operate. In the Salado Barra demonstration plot adult oil palm plants and exotic oil palm (*Elaeis guineensis Jacq*) were removed.

AFE COHDEFOR was not a functioning government agency due to the political turmoil present during 2009; therefore, meetings with the major independent producers of palm oil were not possible. Consequently, it was not possible to sign any agreements with these producers to keep from planting close to the river banks as set forth by law. FUCSA believes river banks should be

protected with native plant species rather than using oil palm due to its weak and small root system.

Other activities were performed in the projects among which are the following:

- Two workshops were held with small cattle ranchers to teach them the proper use of chemicals used for the control of diseases and parasites and how to manage small cattle herds.
- Two workshops were held to teach small farmers proper management of farm fowls such as pigs, chickens and ducks.
- In the workshops the small farmers were taught to know the importance of price of products, medical dosage, and proper preventive and control measures for common animal health problems. At the end of the workshops the farmers were giving a batch of drugs, syringes, knives, gelding blades, gloves and other related items.
- One workshop was made to teach the small farmers in the family plots how to do vegetative propagation for commercial fruit tree varieties (such as avocado, rambutan, oranges and limes). Additionally, the farmers were exposed to the proper agriculture practices before and after performing bud propagation. The farmers were given shears, knives and plastic bags.
- During the workshops community facilitators and teachers from the Escuela John F. Kennedy in San Francisco, Atlántida.
- In addition to the 5 biodigestors used to capture and use methane gas already in use, seven more were built due to the interest of some of the farmers. Among the 7 additional units is one which was built as an educational tool for the Escuela John F. Kennedy.
- In terms of reforestation the construction of the perimeter fence was built to fence in an area of 25.41 hectares. This area will be used to build a seedbed for the mangrove plants and Zapoton in the Salado Barra. All oil palm seedlings were disposed from this area.

Three collection points were installed for plastic waste recycling in Santiago Abajo, the palm oil processing unit and in the Escuela John F. Kennedy.

ACTIVIDADES EJECUTADAS POR PROYECTO NOAA

