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Potable Water Stand Pipe

## Our Projects

### ATDER-BL Project History

#### Drinking Water Projects:

- San José de Bocay
- Ayapal
- Luz de Bocay
- Amaka
- Okuhli, Navawás, & Kayaywás
- El Cuá - redesign of pipe system and storage tank
- Villa Nueva & El Chilamate
- Kayaska

- El Bote
- El Galope
- El Cedro/La Union and Santa Rosa de Tapaskún - design
- Agua Za-ca - design
- San Luis - design

## **Small Hydroelectric Projects:**

- San José de Bocay - 235 kW, including fabrication of the turbine, design and construction of the electrical lines, training of linesman and plant operators, supported a local organization to assume operation and ownership of the system.
- La Pita de Carmen - 30 kW
- El Cuá - 100 kW, repair & rehabilitation of hydroelectric plant & electrical distribution system.
- El Bote - 930 kW, including 65 km (40 miles) of transmission power lines.
- Paso Real - 15 kW
- Design and construction of a number of small hydro plants in the 3 to 8 kW range for local farmers including fabrication of the turbines in the El Cuá mechanical shop.

## **Small Hydroelectric Studies:**

- 30 Sites Project - 30 prefeasibility studies of isolated rural potential sites to supply local towns and villages in the 150 kW to the 800 kW range.
- 11 Sites Project - 11 prefeasibility studies of sites to provide power to the national grid in the 5 to 30 MW range.
- Bonanza - 2 prefeasibility studies for the municipality of Bonanza and HEMCO mining company.

## **Watershed Conservation:**

- Conservation of the Watershed - San José de Bocay hydroelectric project
- Conservation of the Watershed - El Bote hydroelectric project

## **Transfer of Technology:**

- Fabrication and sale of ram pumps for farm irrigation.
- Fabrication and sale of equipment for manual drilling of water wells.
- Design, fabrication and installation of pico-turbine systems for school and medical post lighting. Just sufficient to charge a single car battery.
- Design and construction of a number of micro hydro plants in the 3 to 8 kW range for local farmers including fabrication of the turbines in the El Cuá mechanical shop. Training for construction, installation and operation of these systems was provided to farmers who attended classes provided by ATDER-BL.

## **Other Projects:**

- Installation of machining equipment in the mechanical shop in El Cuá.
- Installation of rice grinding and drying equipment in San José de Bocay.
- Technical Training for the following trades: welders, machinists, electricians, power line workers, and power plant operators.
- Training for a number of administration and accounting positions.
- Support has been provided upon the request of governmental and non-governmental organizations in the form of engineering land surveys, technological transfer and civil works design and construction.

## **Potable Water Projects**

A principal aspect of ATDER-BL has been drinking water systems. The lack of quality drinking water has been a severe health hazard in our region. Villagers use rivers and creeks to bathe, wash clothes, and water livestock and thereby heavily contaminate these nearby sources of water. ATDER-BL responds to community requests, raises money and assists communities to build gravity-feed potable water systems from clean and forested mountain watersheds. Fifteen or more drinking water systems have been designed and built by us while several other drinking water projects have been designed by us and built by others. The El Cuá water system was redesigned and upgraded by ATDER-BL. We have also constructed new drinking water systems for the towns of San José de Bocay and Ayapal.

Along the banks of the lower Bocay River, which flows into the Rio Coco are thirteen Mayagna (Sumu) First Nation villages. ATDER-BL has built several drinking water systems in this area. The largest village is Amak with 700 people. Before their water system was constructed, villagers in Amak travelled 40 minutes by boat to gather potable water in plastic pails. Amak is a two day trip by poling downstream from the end of the road in Ayapal in a dug-out canoe and four days upstream. Therefore good planning was critical for this project due to the difficulties

in transportation and communication.

Good planning and design is important in all the aspects of the construction of potable water systems, for example water stand pipes should have good drainage to avoid disease transmitted by mud generated in the vicinity or by water pooling beneath the tap.

Children bathing in the river, Village of Amak

## **Small-Scale Hydro Projects**

San José de Bocay is a town of 3,000 inhabitants about 33 km northeast of El Cuá. In 1994 the San José de Bocay Micro Hydro project was completed. A 235 kW project. ATDER-BL machinists built the pelton turbine for Bocay in the El Cuá mechanical shop. Villagers and contract workers built the concrete dam and the 1,300 metre pipeline (4,300 ft.). To this day visiting foreign engineers come into the powerhouse and are impressed by the turbine and generator's smooth operation. APRODELBO is a non-profit organization of San José de Bocay that initially was the custodian of the town's drinking water system. Since 1996 APRODELBO has been operating the Bocay hydro plant. This includes the operation and maintenance of the plant, metering and billing, and the expansion of the distribution system. They have also been good stewards of the watershed. Educating farmers in soil conservation. Supplying grain silos. Supplying Pelibueys (a cross between goat and sheep) for meat production. They have conducted several campaigns of reforestation. And recently they have provided every farmer in the watershed with solar panels.

From a sleepy town that went to bed at eight in the evening and rose at four in the morning and light accomplished by kerosene lamps, San José de Bocay has greatly prospered since their small hydro plant began running. One of the many uses of power is the grinding of corn and the hulling of rice. This is a highly time consuming and physically hard task that in the past women did by hand. At one time women ran these electrically powered corn grinders and the profits went to the women's association.

Since the completion of the Bocay Hydro project, ATDER-BL has designed small hydro systems for campesinos or farmers, providing training for their installation, maintenance and operation. Many farmers have been able to mechanize their coffee operations and install lighting for their workers. These systems are commonly in the 3 to 8 kW range. Small pelton turbines are manufactured for these farm systems in the El Cuá machine shop using housings, nozzles and runners designed and fabricated in the shop. The bronze cast, pelton cups that make up the runners are purchased from the "Intermediate Technology Development Group" located in Peru. The small pelton turbines manufactured in the El Cuá shop are in use in several dozen small farm hydro projects.

With the success of building many small-scale hydro power plants from 3 kW to 930 kW using local labor and expertise and at very low cost, the Nicaraguan Ministry of Mines and Energy and the United Nations Development Program have often turned to ATDER-BL for advice in regards to a national hydroelectric program. Under contract by the UNDP and the Ministry, we have completed over forty pre-feasibility and feasibility studies of potential hydroelectric projects across Nicaragua.

The Ministry of Energy and Mines are building several hydro projects for communities elsewhere in Nicaragua that are isolated from the national grid based on our preliminary designs and studies. Representatives from these communities come to the San José de Bocay plant and to the APRODELBO offices to learn from and use as a model this successfully operated and maintained community hydro system.

## **Special Projects**

One of many special projects of ATDER-BL and the machine shop is the fabrication of Ram pumps. Ram pumps use the water power of a stream to pump water and irrigate arable land at a higher elevation. At any time low cost Ram pumps can be purchased at the El Cuá machine shop for water powered irrigation.

235 kW Pelton turbine, San José de Bocay

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