

ENVIRONMENTAL
MANAGEMENT PLAN
AUGUST 2015

TOLEDO DRIED FRUIT
PROJECT

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PROJECT DESCRIPTION

Barranco Roots: Barranco is the southernmost village in Belize and the oldest Garifuna village. More than 150 years ago, the high sea cliff, proximity to fresh water, lush rainforest and excellent fishing grounds attracted families to settle. In its heyday, Barranco was the breadbasket of the country, famed for producing the largest pineapple and most bananas. However, due to lack of infrastructure or economic opportunities, the village has been steadily shrinking since the 1960s. The population now is about 100, with only 22 students in the primary school. Fishing, farming, social security checks for the seniors and remittances from family abroad keep Barranco alive, but not flourishing. Barranco Roots is a grassroots organization with 14 members whose mission is to make Barranco once again a vibrant and attractive place to live and raise families.

Peini Food Processing: Punta Gorda Town, or “Peini” in Garifuna, is the district capital of Toledo. The inhabitants are a mixture of Garifunas, Mayas, Hispanics, Creoles, and East Indians. The main sources of income are government jobs, fishing, agriculture, tourism and remittances. Punta Gorda has a designated land reserve for the Garinagu, called the St. Vincent Block Property of the Garinagu of Punta Gorda Town. This property, known locally as “Cerro”, was set aside by the Government of Belize for the descendants of the Garinagu, many of whom now utilize the property for agriculture, housing and business. Peini Food Processing was established in February 2014. Its 24, mostly female, members came together to create jobs and improve their community. Their mission is to provide high-quality food products for local and markets, and provide reliable employment and income to members and Punta Gorda youths.

Vision Verde: The village of Bella Vista was founded in 1996 and has rapidly grown to become one of the largest settlements in Toledo, with a population of >5,000 in 900 households. About 75% of the population is Mestizo and 25% Maya. The majorities (60%) are immigrants, mainly from Guatemala, Honduras and El Salvador, and the remaining 40% are children of immigrants. The most common form of employment is unskilled labor on banana, citrus and shrimp farms. An estimated 40% of plantation workers also work part-time on their own farm and a small percentage of the people are full-time independent smallholder farmers. Vision Verde is a 14 member group that officially registered in May 2014 but which has been working together informally for over 10 years. The group’s mission is to improve their wellbeing and the environment, and their vision is for “a greener Bella Vista”.

This project will establish three linked, but geographically separate, solar-dried fruit production centers with a shared, guaranteed market. Three solar fruit drying facilities will be built, one each in Barranco, Punta Gorda and Bella Vista. Each of the three community based organizations – Vision Verde in Bella Vista, Barranco Roots in Barranco, and Peini Food Processing in Punta Gorda – will register a separate company that will manage and own their facility. Thirty participants (including 23 women) will receive training to operate the facilities and run successful businesses.

The groups will sell 80% their dried fruit that meet the quality standards to a Toledo-based company, El Toque Moho Ltd. through a semi-exclusive purchase agreement. Financial projections show the three companies will produce a combined total of \$472,000 per annum in employment, profits, purchase of local produce and taxes by year 3.

PROJECT OBJECTIVES

1. Establish three solar fruit drying businesses in Barranco, Punta Gorda and Bella Vista, and operate them to meet quality production standards and become profit-making within 1 year
2. Create part-time employment for 52 people (including 33 women) in fruit-drying and fruit growing
3. Establish the Toledo Fruit Drying Oversight Committee as a coordinating body that allows production centers to be geographically distributed while still reaping the benefits of larger organization
4. Establish secondary products for each business (a line of herbal teas in Barranco, dried fish in Punta Gorda and fruit preserves in all three villages) in order to increase profits and spread risk
5. Identify additional markets for dried fruit and the secondary products besides the guaranteed market already identified
6. Plant 840 fruit trees, 1,800 banana plants and 18,000 pineapples in Barranco, Punta Gorda and Bella Vista
7. Maintain a healthy workforce and environment by choosing organic cultivation
8. Introduce primary school children to entrepreneurialism and personal economic initiative by hosting workshops at the fruit drying facilities
9. Improve child nutrition by providing organic dried fruit products to primary schools

Project Activities

1. Establish and operate the Toledo Fruit-Drying Oversight Committee.
 - a. Meant to develop standards for the fruit drying industry in order to act as a platform for sharing innovations and best management practices.
2. The construction of properly equipped fruit-drying facilities in Barranco, Punta Gorda and Bella Vista, consisting of:
 - a. A main building containing three rooms (a fruit preparation room, an office, a changing room)
 - b. A separate and indirect solar drying room
 - c. A separate small thatch with a cement floor for cleaning drying decks
 - d. Six direct solar dryers, which are small structures separate from the main building. In Punta Gorda and Bella Vista, all of the structures will be built new.
 - e. In Barranco, a retrofit of an existing building (the old school warehouse) to create the main building and construct the other components new.
3. Training workshops for the group members and facility employees pertaining to the following:
 - a. Food handler's certificate, a 2 day course.
 - b. Book-keeping and business management a 1-day course taken twice.
 - c. Problem solving, communication, teamwork, and conflict resolution 1-day course, taken twice.
 - d. Basic computer literacy, a one 2-day course.
 - e. Fruit drying process, a one 5-day course that includes training in fruit-drying, facility maintenance, quality control, and inventory management for USDA organic certification.

- f. Business registration, a 4-day practical training in which will cover the legal requirements of running a business and aspects of finance.
 - g. Learning exchange, three 1-day exchanges between the group in order to for them to visit each other's facilities and learn from one another.
4. Inauguration ceremonies
 - a. To celebrate and build solidarity and support among the three groups once the facilities are constructed and equipped.
5. Label Design
 - a. To invest in a graphic designer to create labels for the products
6. Developing additional products
 - a. This will help diversify their product lines to reduce waste
7. Planting of Fruit Tree
 - a. Group members and other community members will plant 840 grafted fruit trees, 1,800 banana plants, and 18,000 pineapples.

Expected Results

This project provides financial, social, and environmental sustainability for the three businesses and their communities. Financially speaking, each business will become profit seeking after 6 months. Each company plans to save and reinvest into the company so that they will be able to successfully expand their facilities in the next ten years. The social benefits include each of the three businesses to learn for their in depth training experiences which acts as a social mechanism for the members. Training food hygiene, operating a fruit drying facility, business administration, teamwork, communication, computer skills, problem-solving, conflict resolution, and basic finance will ensure the groups have the skills they need to run their businesses autonomously by the end of the project, and years after. Finally, the results of increased wealth and employment can be accomplished without straining natural resources.

Expected Impacts

The positive effects of solar dryers on the environment depend on the drying methods used at present. If fossil fuel or biomass dryers are replaced, this can lead to a reduction in pollution, biomass consumption and the consumption of imported fuel. If non-solar drying is used instead of the traditional method of drying in the sun, this does not have any positive environmental impact. The fact that the fuel mix used for crop drying varies for different crops needs to be considered when estimating the net fossil CO₂ emissions mitigation potential. If the fruit is dried close to where it is grown, transport costs are reduced and the crop waste can be used as fertilizer on the land. Furthermore, shipping the dried fruit to overseas markets is less energy intensive than transporting fresh fruit, because no cooling or air freight is required for dried fruit, and the amount of fruit that can be transported per container is much higher.

The fruit drying method takes advantage of the abundant solar energy in Belize; therefore each business requires extremely low energy and low greenhouse gas emissions. Due to the demand for organic fruit, the businesses plan to incentivize a sustainable land use called organic arboriculture, which is environmentally friendly because it does not involve agrochemicals, thus leading to maximal environmental sustainability.

Solid Waste Disposal

It is expected that 90% of the solid waste generated will be skins, trimmings and sub-par fruits that will need to be disposed of. While they are biodegradable, there needs to be an appropriate waste disposal mechanism. Disposal of discards, skins and trimmings will be done through a composting system that will return the compost material back to the area where the fruit trees are planted. Discarded material will be held in covered rubber 30 gallon rubber bins during the preparation process and will be disposed of once per day or when full, whichever comes first. Non-biodegradable material will be disposed of through the municipal waste disposal system.

Pest Control

Wherever there is fresh fruit it is expected that there will be insect pests and possibly rodents. There is the need to protect against flying and crawling insects as well as possibly rats and raccoons. These pests will be attracted to the fresh fruit as well as the dried product. To prevent entry of pest into the working and storage areas, all windows and doors will be fitted with a #12 fiberglass or metal insect screen that is reinforced by 16 gauge 20 mm square mesh wire. Each building will have one main entrance that has an airlock type entry to prevent passage directly from the outside into the work area. The storage area will also be behind a similar 'airlock' entry system. Natural products such as NEEM will be used to deter crawling insects. Each facility will be cleaned and secured at the end of each day.

MITIGATION MEASURES

- Develop a composting system for production waste. Each facility will need to develop and manage a compost facility for the waste products such as skins, trimmings and fruit that do not meet the drying standards or quality. This compost can then be used by the groups or sold locally. The groups are responsible for establishing and maintaining the composting system.

The composting area at each location will consist of a concrete slab five feet wide and twenty feet long. Five feet square and four feet tall adjoining composting bins will be constructed on the concrete slab. The bins will be constructed of recyclable scrap lumber from local sawmills. A rudimentary thatch roof will be constructed from cohune leaves and scrap lumber. When a bin is filled it will be left to compost for 4 – 8 weeks before it is emptied. Group members will have first option to the available compost material. Examples of possible designs are below.

- Develop adequate and well maintained storage for fresh fruit and finished product. Fruit storage will be based on the regulations for handling and storage of food as defined in the Public Health and BAHA legislation.

MONITORING PROGRAM

There is no need for a separate monitoring program as the existing management and administrative procedures take into consideration the activities required to ensure that there is adequate storage and disposal.

LINES OF RESPONSIBILITY

Each location will have a person that supervises the daily operations. Site supervisors will be responsible for ensuring that proper procedure is followed by everyone involved in production, particularly proper, handling, storage and waste disposal. The supervisors at each site report to the executive for the respective group and the representative for each group reports to the managing committee for the project. Any person working in the drying facility must report to the supervisor for that facility.

CULTURALLY APPROPRIATE CONSULTATION AND PARTICIPATION

In May of 2013 Dr. Roy Young, the consultant hired by BEST to do the baseline assessment and Project Orientation held a two day workshop in Punta Gorda for residents in Punta Gorda, San Miguel, Monkey River and Punta Negra. A similar workshop was held in Bella Vista Village for members of the communities of Bella Vista, San Isidro, Trio and Bladen. At these workshops Dr. Young introduced the participants to the project and worked with them to identify possible sub-project ideas and areas of focus. In September of 2013 BEST staff held a similar meeting in the community of Barranco. At all the meetings participants were encouraged to come up with ideas for projects that would be beneficial for the environment and which would generate income. During the development of the sub-project proposals groups met and discussed their individual concepts. The Technical Officer and proposal writing consultant worked with each groups to ensure that there was inclusion and consensus. The Technical Officer then did the relevant due diligence to ensure that the concepts were technically sound and financially feasible.

In 2014 the Project Steering Committee instructed that all projects of a similar nature in the same region should be amalgamated into one. As a result, Vision Verde of Bella Vista, Peini Producers of Punta Gorda and Barranco Roots were brought together as groups having an interest in dried fruit production. Over a series of several meetings held in Punta Gorda a single proposal was developed and submitted on behalf of the three groups. Again the emphasis was on inclusion and consensus. The three groups have formed a managing committee that will oversee the implementation of the project. The committee is comprised of two members from each of the three groups involved in the project. This committee will meet once per month or more frequently if necessary. The groups also have planned to meet in their entirety at least three time pre year. At these meetings any concerns can be addressed. There is no special protocol that is used for meetings and consultation with these groups, but requires that members be notified at least five days in advance of any meeting.

COST ESTIMATES AND SOURCES OF FUNDS

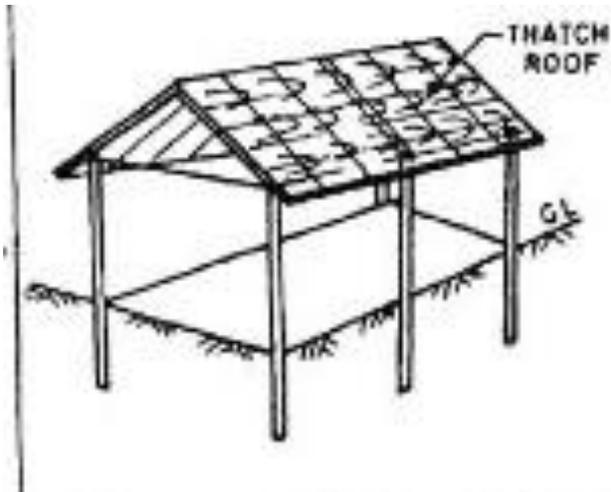
The cost of operations and of developing and implementing adequate storage and waste disposal is already built into the budget so there is no need for additional budgeting for these activities. The cost of setting up the composting systems will be borne by the individual groups.

Approved Budget

	JSDF	Beneficiary Contribution	Total
Construct and equip drying facilities	164,901	8,820	173,721

Training in fruit preparation and drying	3,045	13,900	16,495
Training in registration and formation of a company	3,045		3,045
Written guidelines for fruit drying	270		270
Inauguration ceremonies	4,608	154	4,762
Operation of fruit drying facilities	46,523		46,523
Register businesses	180		180
Fruit trees and plants	20,710	12,852	33,562
Identify and secure markets	19,121	9,750	28,871
Quarterly Steering Committee meetings	1,853	2,300	4,678
Exchange visits	4,362	-	4,362
Contingency	6,250	-	6,250
TIDE Technical Assistance	27,486	-	27,486
TOTAL:	\$302,354	\$47,776	\$350,130

ADDITIONAL INFORMATION



Possible cover for the compost site.



Design for the compost bins.

Works Cited

¹Kumar, A.; Kandpal, T. C. (2005): Solar drying and CO₂ emissions mitigation: potential for selected cash crops in India. In: Solar Energy, Volume 78, Issue 2, p. 321-329.

²Oekozentrum (2007): Energy Efficiency and Renewable Energy Food Drying Processing in Rural agricultural Cooperatives of Eritrea and Burkina Faso. Langenbruck, Switzerland.