

**San Felipe Sheep Rearing Group
and
Indian Church Living Stream Group**

“Sheep Rearing in Two Communities in the Orange Walk District, BELIZE”

**San Felipe Village and Indian Church Villages
Orange Walk District, Belize C.A**

Environmental Management Plan

June 2015

Contents

1.0	Project Background:	2
2.0	Expected Environmental Impacts:	3
2.1	Over-grazing	3
2.2	Excess water use	4
2.3	Land clearing for pasture creation	4
2.4	Soil enrichment and nutrient run off	4
3.0	Mitigation Measures:	4
4.0	Monitoring Program:	6
5.0	Lines of Responsibility:	7
6.0	Cost estimates and sources of funds:	7
7.0	Additional Information:	7

1.0 Project Background:

The Orange Walk District is located in the northwestern section of the country of Belize. With an area of 1,829 square miles, this is the second largest district in terms of total area when compared to other districts in Belize. The district is home to mostly people of predominantly Yucatec Maya and Mestizo ethnic groups. The district's main economic activity is agriculture, with sugar cane being the primary crop. This is slowly being replaced by a combination of alternative crops such as potatoes, onions and soya beans. Orange Walk is also important for its production of dairy products, citrus fruits, beef and rum production.

San Felipe Village, with an estimated population of 2,000, is located approximately 23 miles from Orange Walk Town in the central section of the district. This community's primary economic activity is farming, mainly sugar cane, grains and vegetables. However, because of its relatively close proximity to Mennonite communities quite a few of San Felipe's residents work at these Mennonite enterprises and have gained experience and skills in rearing livestock. The San Felipe Sheep Rearing Group comprises 57 persons, 36 men and 21 women, organized with the purpose of rearing sheep in a collective manner.

Indian Church Village, with an estimated population of 260, is located approximately 37 miles south of Orange Walk Town in the eastern central section of the district on the western shore of New River Lagoon. Indian Church Village is predominantly a farming community dedicated to vegetable production. Another sector of Indian Church is involved in the production and sale of art and craft, sold at the Lamanai Maya site. The Indian Church Community Development Group is comprised of 14 members, 7 men and 7 women, with 4 youths being involved. This group also shares the common vision of rearing sheep in a collective manner.

Members of both groups have agreed to invest their land, time and labor to successfully implement the "Orange Walk District Sheep Rearing Project" thereby improving their livelihoods, and creating employment and income generation opportunities for vulnerable farmers and workers in these two rural populations in Northern Belize.

The goal of this project is to reduce the level of poverty in the communities of San Felipe Village and Indian Church Village through employment growth and income generation. This will be achieved through the use of best practices in two sheep rearing operations, which are designed to be profitable and sustainable, and will provide additional/alternative income generating activities for group members allowing for an improvement in the standards of living and ultimately benefitting the communities as a whole.

Main Project Activities include:

- Upgrading and construction of perimeter fences and partition fences with wire adequate for the safe rearing of sheep
- Construction of four (4) 20 ft. by 40 ft. sheds for the protective housing of sheep
- Acquisition of two forage chopper for the preparation of supplemental feed for sheep to ensure proper growth of the livestock
- Construction a corral for the proper handling of the animals
- Construction of shelter for watchman to ensure the safety of both equipment and animals
- Installation of water system
- Acquisition of breeding stock to start the project

Benefits that are expected from this project include:

- Employment opportunities created for group members allowing for alternative income generation and improved livelihoods
- Other small businesses (such as shops, restaurants, bookstores) will benefit through increased sales and services as the income generated by this project will find itself integrated into the communities' financial system, thereby benefitting both communities.
- Group members will gain experience in Business Management
- Livestock produced by this project will assist in increasing the national sheep herd and will assist in meeting the increasing demand of mutton

2.0 Expected Environmental Impacts:

2.1 Over-grazing

Overgrazing occurs because animals are kept on the pasture for too long. Thus it is a human issue, not a land, soil, animal or grass issue. Grazing too long is far less likely to occur in a natural world, where the grazing migrations are unhindered by humans. Excess grazing is a hindrance to strong pasture and livestock production. The soil surface is exposed and loosened and at risk of wind and water erosion. Overgrazing occurs when animals are kept in a paddock too long or brought back too soon. In the latter circumstance it means that a plant is grazed before it has recovered from a previous grazing. Overgrazing affects the species composition of the pasture vegetation and has the potential to allow for opportunistic and quick growing undesirable species to take hold. This impacts the quality of the feed available to animals and makes it necessary to consider (i) additional land clearing and/or (ii) replanting. Studies have shown that macro- and mesoscale erosion can increase significantly due to overgrazing.

2.2 Excess water use

The volume of water consumed by a sheep is influenced by several factors, principal among them being race, age, weight, type of feed (more water is consumed when dry feed is eaten), environmental conditions and physical condition (lactating ewes require more water). On average it is estimated that between 25°C and 30°C a 45 kg sheep will require approximately 4L – 6L of water per day. However, it is essential that sheep get enough water otherwise growth is retarded and they become susceptible to disease and parasites.

2.3 Land clearing for pasture creation

No land clearing will be done for this project. The groups will rehabilitate land that was either under crop cultivation or previously used for cattle pasture. However, it must be noted that traditional pasture management on deforested land is often unsustainable: after a period of high productivity, soil fertility is depleted and grass cover declines. As their production and income fall, many livestock producers resort to clearing more forest - and start the process again. To break this destructive cycle in the districts of Quindío in Colombia, Esparza in Costa Rica and Matiguas in Nicaragua, a pilot project by FAO sought to introduce silvo-pastoral systems, in which degraded pasture is planted with improved grasses, fodder shrubs and trees. The benefits of silvo-pastoral systems are already well documented. Fodder shrubs and legumes return atmospheric nitrogen to the soil, and tree roots recycle nutrients from deep in the soil where grasses never reach. Trees and shrubs also function as a "carbon sink" that absorbs carbon dioxide from the atmosphere and deposits it as solid carbon in the soil and in woody tissue. The systems create a rich and varied habitat for native forest flora and fauna, reduce surface runoff, and anchor the soil on steep slopes. Indirectly, they also reduce pressure for further deforestation by halting the cycle of soil depletion and abandonment that drives ranchers to seek "greener pastures". To adopt and expand on this concept, the project will be planting *moringa*, *nacedero* and leguminous plants to provide additional fodder for the animals. Use of fodder will also reduce the amount of land that is needed for pasture.

2.4 Soil enrichment and nutrient run off

During the pasture preparation stage there will be one application of high yield grass seeds and one application of a nitrogen-based fertilizer. Because sheep will be rotated over 30 acres of pasture, manure disposal will not be a concern.

3.0 Mitigation Measures:

The level of environmental risk posed by sheep confinement feeding systems has not been measured. Nor has there been any research into how site and environmental factors such as slope, soil type, hydrology, rainfall, distance to waterways and remnant vegetation affect the

potential for degradation. Without this information, it is hard to know how confinement systems can be best designed and managed to minimize damage to the natural resource base. However, relying on the FAO's precautionary principle approach the intent is to be preemptive and proactive.

Overgrazing:

- Employ best practices for pasture management: There are two primary pasture management systems; continuous grazing and controlled grazing. Continuous grazing allows sheep unrestricted access to a fixed pasture-unit of land. Continuous grazing requires few inputs and promotes improved individual animal performance through the opportunity for animals to select a large proportion of their diet. Controlled grazing requires a higher level of management and additional resources in the form of fence and water, and balances individual animal performance with the opportunity to enhance greater production of animal product per unit of land area. The Orange Walk Sheep Project is utilizing primarily controlled grazing and makes provision for sheds, paddocks and supplementary feeding by providing fodder material. They will also plant improved grasses, fodder shrubs and trees to maximize the use of available space and reduce on potential overgrazing.
- Monitor the time that animals spend in one particular area. Overgrazing is more a function of the length of time animals spend in an area, and the amount of forage in that area, than the amount of animals in the area. The important thing is to match the time spent to the amount of forage and the rate of consumption. This will be done through training by the Ministry of Agriculture. In addition, proper pasture management and supplemental feeding is an integral part of the project. Groups involved with the project will follow the best practices guide and instructions from the Ministry of Agriculture's Livestock Division.
- Monitor vegetation in grazing areas: It is necessary to monitor the health and rate of growth of the grasses and fodder shrubs. Animals need to be rotated out of enclosures where the fodder material is not performing well to allow these areas to recuperate.

Excess water use:

Sheep require about four to seven gallons of water per animal per week depending on size and physical state. Lactating ewes require the most water. Water use will be controlled by doing rainwater collection and using watering troughs to dispense water. Water usage will also be closely monitored as this is a first indicator of the general health of the animals. Groups will be assisted in carefully calculating the water requirements of the flocks to avoid abstracting more water than is required during the dry season (December – May). Excess water use is not a concern during the rainy season.

Land clearing for pasture creation:

This is not a concern for this project as there are 120 acres of previously used land that is already cleared and only needs to be prepared as pasture.

Soil Enrichment and runoff:

This is not an environmental concern as the number of sheep per area of land is well below the recommended amount. Additionally, the sheep will be rotated between different grazing areas on the same 30 acre block in each location. There is also an additional 30 acres in each location that can be developed into pasture.

As a part of best management practices and good hygiene, fecal material will be cleared from the shelter area will be composted.

4.0 Monitoring Program:

A monitoring programme is important in livestock production because of the number of variables involved. Sheep require special care because of susceptibility of diseases and predation. It is also necessary to ensure that they are not impacting negatively on the environment, despite the fact that they have little effect if properly managed.

Indicator	Response	
	Yes	No
1. Shelters have been built to the proper specification		
2. Fencing has been installed and is appropriate based on best practices		
3. A person is assigned to the daily feeding and care		
4. Adequate quantities of water are available		
5. A feeding schedule is prepared at the beginning of the week		
6. A feeding regime has been developed for all the animals		
7. Shelters are cleaned weekly		
8. Growth rates are monitored and recorded		
9. Sheep are checked regularly for symptoms of the more prevalent illnesses.		
10. Veterinary services are secured on a monthly basis or when needed		
11. Forage material is monitored in the unused paddocks		
12. Residue from the Shelters is properly composted or disposed of		

5.0 Lines of Responsibility:

All the members of both groups will be trained in the proper handling and maintenance of sheep. Members will be expected to take turns in the care of the sheep. The first line of response on any matter will be the members who are trained in care and maintenance. The final authority is the presidents of the two groups, Ms. Sara Melchor and Mr. Saul Morales, or any person that is properly delegated to undertake a particular activity.

6.0 Cost estimates and sources of funds:

The monitoring activities are an integral part of the best management of sheep. As a result the cost of undertaking these activities is already built into the cost of production.

Items	Total cost
Fencing	\$ 34,700.00
Sheds - 4 units of 20' X 40'	\$ 7,324.00
2 forage chopper @ \$1395.00	\$ 2,800.00
2 water pumps	\$ 2,000.00
TOTAL	\$ 46,824.00

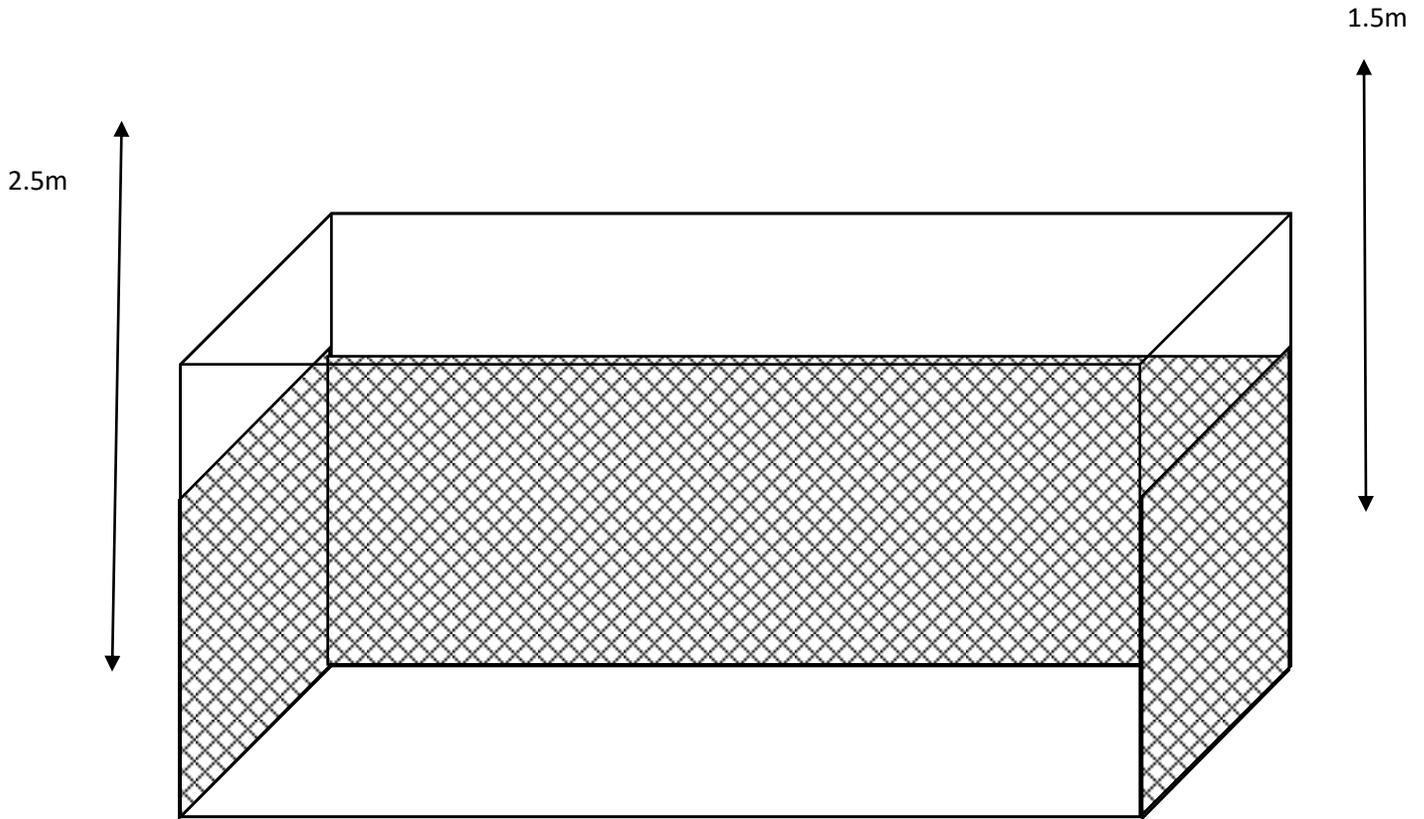
7.0 Additional Information:

Best Practices:

Successful sheep handling depends on understanding and taking advantage of the natural behaviour of sheep.

- Sheep have excellent vision and rely on this much more than their hearing, preferring to stay within visual contact of each other.
- Sheep are highly social flock animals and readily form tight groups and follow a leader. They develop relationships and sub-groups within a flock. If given the opportunity sheep will re-sort themselves into sub-groups and return to their home paddock. Take advantage of this when handling sheep.
- Sheep learn quickly, especially when young. Take advantage of this by familiarizing young sheep with shelter and paddock configurations, by training them to a familiar routine and by using the same route to and from the shelters every time.
- Good stock handling skills help ensure a good outcome when handling sheep and are more important than good yards alone.
- Use the catch-and-restrain method to restrain sheep for short procedures and the catch-and-turn method to restrain sheep for longer procedures.

The project calls for the construction of four shelters, 24' x 40' two in each location. These shelters will be constructed of wood with one side open and an earthen floor.



Basic Shed design that will have a backward sloping roof.