

Cristo Rey Farmers Group (CRFG)

“Development of a sustainable pig farming system as an opportunity for employment and income generation for 10 members in Cristo Rey Village”

Environmental Management Plan

June 2015

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1.0 Project Background:

Cristo Rey Village located in the beautiful Maya Mountains, an area in the Cayo District, is 3 miles from our rapid population growth of San Ignacio and Santa Elena Town with commercial trades of crop produce, livestock and imported commodities that is done on a weekly basis. It is also located very close to our magnificent Macal River, once used for logging and fishing as a form of food for our villagers, and it also has a diverse landscape of savannah, grassland and inland creeks that is suitable for crop and animal production.

CRFG registered on March 6, 2014, comprises of 10 farmers, of whom 3 are women will be engaged in this pig production project. Cristo Rey Village does not have a pig project in the village and CRFG seeks to commercialize pork meat within the village and surrounding villages. Although this group has been recently formed, its members all have practical experience in pig and poultry production as well as crop production. CRFG has members that have experience in producing cassava and corn plantation.

The group has 15 years' experience in livestock-piggery production, business and farm administration, crop production in corn, beans, rice, etc. Each member of the group has its own farm land that will be used for this pig project and will cultivate an acre of crop for supplying as alternative pig feed. Even though, CRFG has just recently been formed, it has members that have worked in housing construction. The group will also cooperate in the construction of the 10 pig sheds and also build a water catchment for each pig shed.

2.0 Main activities and expected environmental impacts

2.1 Preparing pig feed – A portion of the feed for the pigs will be produced from the raw materials grown by the group. Most of the material, such as corn, pumpkin, legumes and root crops, to be used as feed is already being cultivated for sale on the local market. Members will attend training in feed preparation that will be delivered by the Extension Services of the Ministry of Agriculture in Toledo. Any feed preparation residue will be composted so no adverse impacts are expected.

2.2 Constructing pig pens – Individual pig pens will be constructed on the premises of ten households. The areas where the pens will be located are on gently sloping ground with inclines of 5% or less. This allows for easy cleaning of pens and waste disposal as it will allow for easy drainage into the biodigester. Pens will be of one basic floor plan of 16' x 24', with two different layouts depending on whether a boar will be kept. The sites to be used are adjacent to the individual homes. Group members, under the supervision of an experienced builder, will construct the pen.

No negative impact is expected, taken the construction activities follow good environmental and health and safety practices.

2.3 Selecting breeders – No negative impact is expected.

2.4 Installation of the individual Biodigesters. The installation of the bio-digesters will require the excavation of a small area approximately five feet wide by ten feet long by four feet deep. The impact on the immediate environment will be minimal but is essential in ensuring the proper functioning of the digesters.

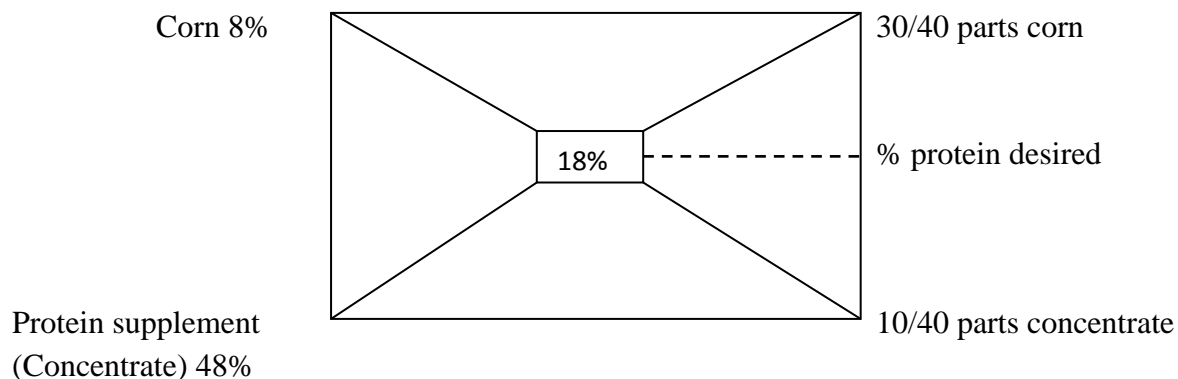
2.5 Feeding pigs – Pigs will be fed a combination of commercial feeds and locally grown supplemental feeds.

2.5.1 Use of feed bins so feed is not wasted.

2.5.2 Measurement of commercial and supplementary feed amounts will be done according to a guideline developed by the Ministry and Agriculture and the group, based on size of pigs.

2.5.3 Supplemental feeding will be done based on a Pearson's Square (example below) to ensure that there is a balanced diet.

2.5.4 Provide legumes to make up 17-25% of daily intake



2.6 Maintaining the pig pen and pigs – The pens will be cleaned twice a day to avoid pigs contracting diseases and other infections. Group members will attend training in production best practices so pigs can be kept as healthy as possible. Self-watering systems will be used to ensure pigs have adequate drinking water supply. The pigs will be sprayed regularly with water to ensure that they are keep cool. Rain water will be collected in rain vats during rainy season for use during the dry season. No negative impact is expected as this is a component of the compost production plan.

2.7 **Slaughtering** – In the first year of the project pigs will be sold live so there will be no need to do slaughtering.

3.0 **Mitigation Measures**

3.1 **Water management**

Since the amount and quantity of available water varies from place to place and time to time, it is hard to generalize about water efficiency strategies. These strategies, however, are necessary in both rearing and processing. Farmers will collect and store available rainwater for later use.

3.2 **Waste treatment system**

It is important to dispose of pig waste (composted solids, as well as liquids) well away from all waterways, whether permanent or temporary. There are no permanent waterways on or near the sites, but three sites do have temporary waterways created by runoff during the rainy season.

Attention will be given to the positive environmental impacts of sustainable pig farming, especially when pig production is part of agro-silvo-pastoral systems or organic farming systems where outdoor production is integrated with crop rotation. The residue from the biodigesters will be used as natural soil enhancement for crop production.

3.3 **Biodigesters.**

Primary waste treatment will be low cost biodigesters and will follow the instructions set out in the Biodigester Manual that is an annex to this document. Residue from the digesters will be used as organic fertilizer for corn, beans and vegetable production.

3.4 **Best Practices – some notes**

- Pigs are omnivorous and can eat meat and plants.
- Pigs are a monogastric animal, which means they have a single stomach similar to humans.
- Pigs require a diet that is balanced and includes protein, energy and minerals.
- Grains, most commonly corn, are the chief source of carbohydrates for calories and energy in pig rations.
- Grains alone are deficient in needed protein, vitamins and minerals. A 14 to 15 percent protein level is adequate for the entire growing period.
- Pigs require plenty of clean, fresh water every day. A sow with young will need
- 20 - 30 liters of water a day.
- Feed pigs from 1 - 3lbs twice each day. Feed them from a dry trough and a wet trough, as appropriate.

- Minimize soy based feeds, use local legumes, or a locally made concentrate if purchasing. Legumes should be no more than 25% of daily diet.
- Control of pests and parasites.

4.0 Monitoring Program

A monitoring programme is important in livestock production because of the number of variables involved. Pigs in particular need attention because of the challenge they pose when raised in confined spaces.

Indicator	Response	
	Yes	No
1. Pen floor has the required slope to allow for proper drainage?		
2. Drains are adequate for the removal of liquid and semisolid waste		
3. Adequate quantities of water are available for rehydration, cooling and cleaning		
4. A feeding schedule is prepared at the beginning of the week		
5. A feeding regime has been developed for all the animals in the pen		
6. A person is assigned to the daily feeding and cleaning		
7. Pens are cleaned daily		
8. Growth rates are monitored and recorded		
9. Pigs are checked regularly for symptoms of the more prevalent illnesses.		
10. Veterinary services are secured on a monthly basis		
11. Biodigester is monitored on a daily basis		
12. Biodigester is maintained according to the schedule provided in the manual		
13. Residue from the biodigester is properly composted or disposed of		
14. Pigs are slaughtered in accordance with the existing regulation and with permission from the proper authorities		

5.0 Lines of Responsibility:

The project will train members of the group in the proper handling and maintenance of pigs. The first line of response on any matter will be the members who are trained and responsible for the individual pens. The final authority is the president of the group, Mr. Vidal Tun, or any person that is properly delegated to undertake a particular activity.

6.0 Cost estimates and sources of funds:

Proper care and cleanliness are central to the success of the project. Sick and infirm pigs will not grow well and cannot be sold. Hence, a clean environment with proper feeding regimes is important. It is essential that proper waste disposal is done to ensure a clean area for the pigs. Proper storage for feeds is also an important component. The cost of these have been built into the project budget.

7.0 Budget:

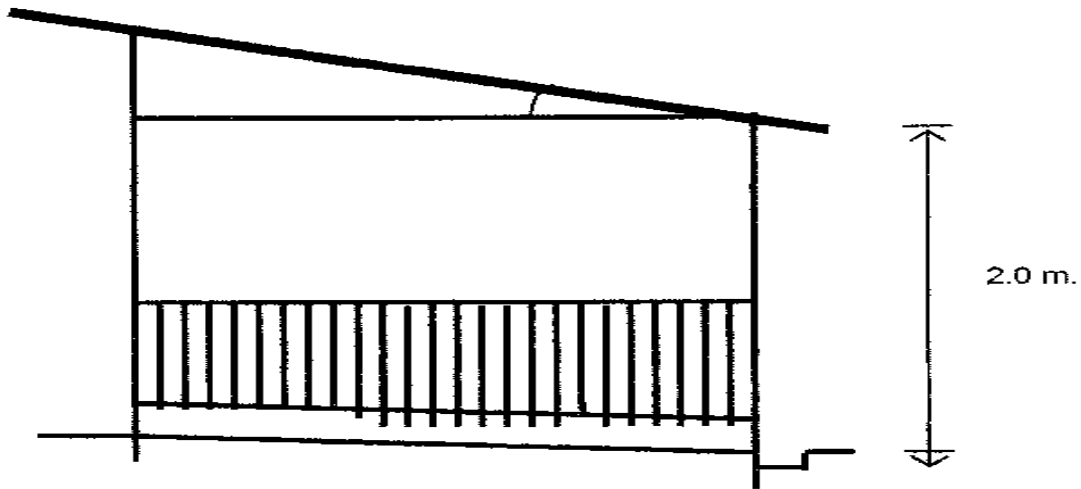
Item / Activity	Units	Total
Biodigesters (complete)	10	\$11,000.00
Pen construction (materials)	10	\$70,900.00
Pen construction (labour)	10	\$51,500.00
Total		\$133,500.00

Summary table on environmental impacts and their management

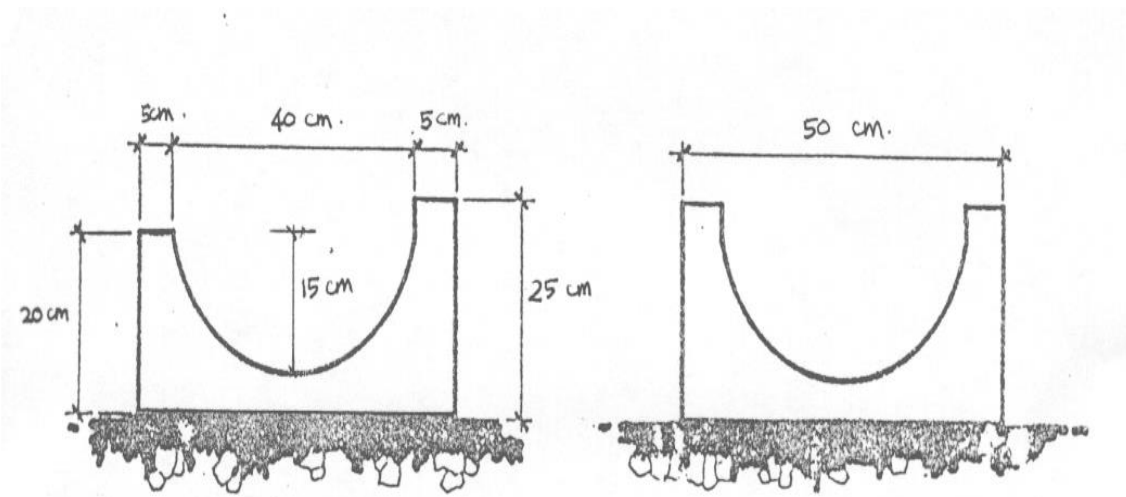
Activity	Impact	Indicator	Response/Mitigation Measure	Responsibility
Planting Corn/staples food	- Land clearing	- Already cleared (10 yrs)	- Larger branches removed and leaf litter left as mulch	All members
Harvesting agricultural products	-	-	-	All members
Processing pig feed	-Generation of bi-products	-Accumulation of half ton of agricultural bi-products	Composting	All members
Construction of pig pen/storage room	-Land clearing	-Land is cleared -Checking credentials	Employ only adults	Project Coordinator
Building biodigester waste disposal system	- Land clearing	-Land is cleared -Checking credentials	Employ only adults	Project Coordinator
Operating compost	- Scent	Locating the compost area away from homes. Compost being full	Use of Effective Microorganisms Empty compost on a regular basis	Selected group of members
Feeding pigs	-Excess nutrients in waste	-Excess feeding	Measuring adequate levels of feed per meal	Project Coordinator
Maintenance of pig pens	-Washing pig pens	- Unclean pens; generation of scent	-Clean the pens twice daily	Household members

8.0 Additional Information

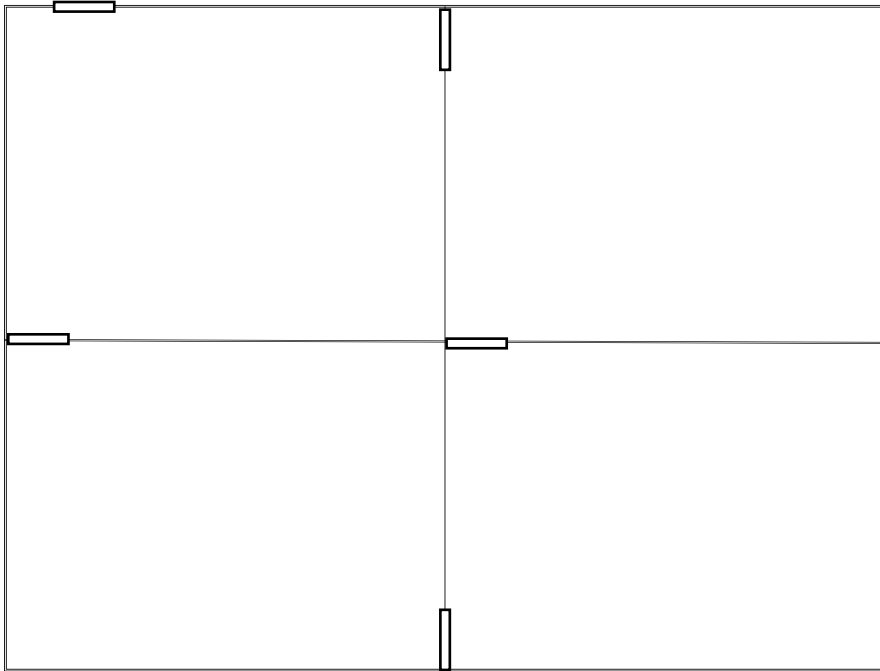
Three designs will be used for the pens that will be placed on the individual properties. A total of six pens are to be built following three different, but similar designs. All three designs will have a sloping roof with a concrete floor and block walls four feet high. A drain will be built around the perimeter of each pen to channel the runoff from cleaning into the biodigester. The floor plan will be one of the three shown below depending on whether it is a one sow, two sow or one sow with boar unit. The boar services will be shared by the entire group but will be housed by one member.



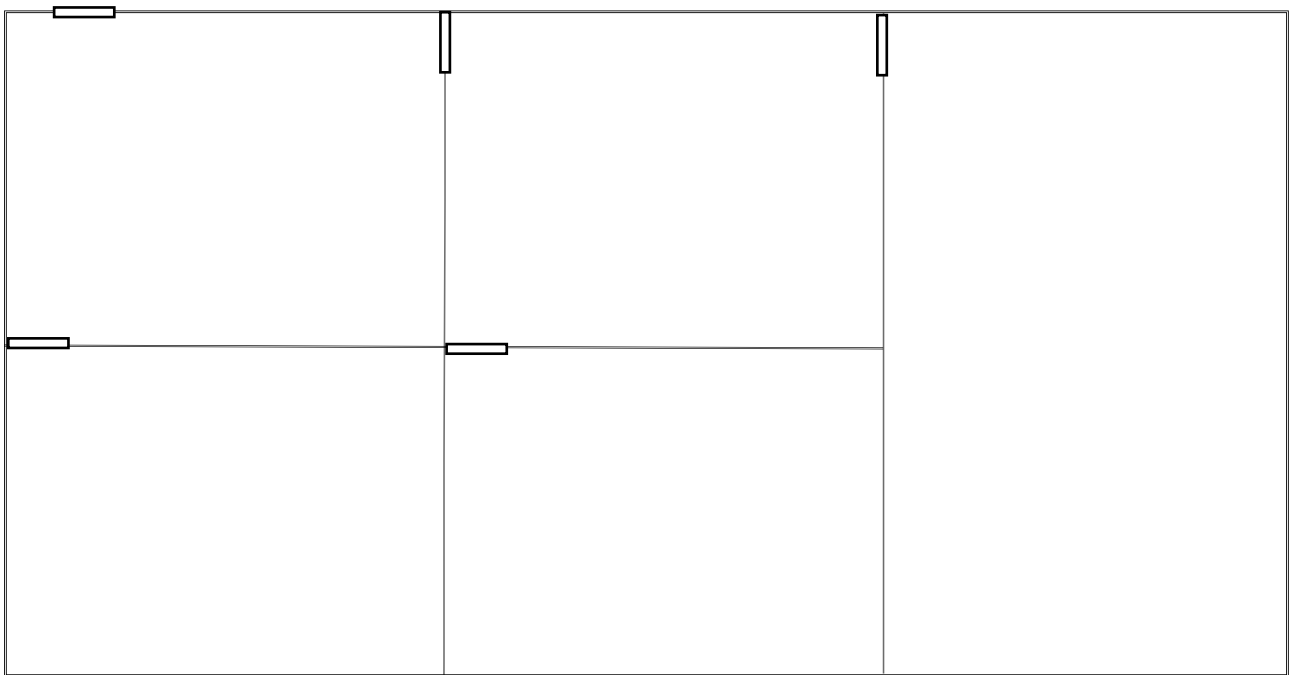
Roof and siding design



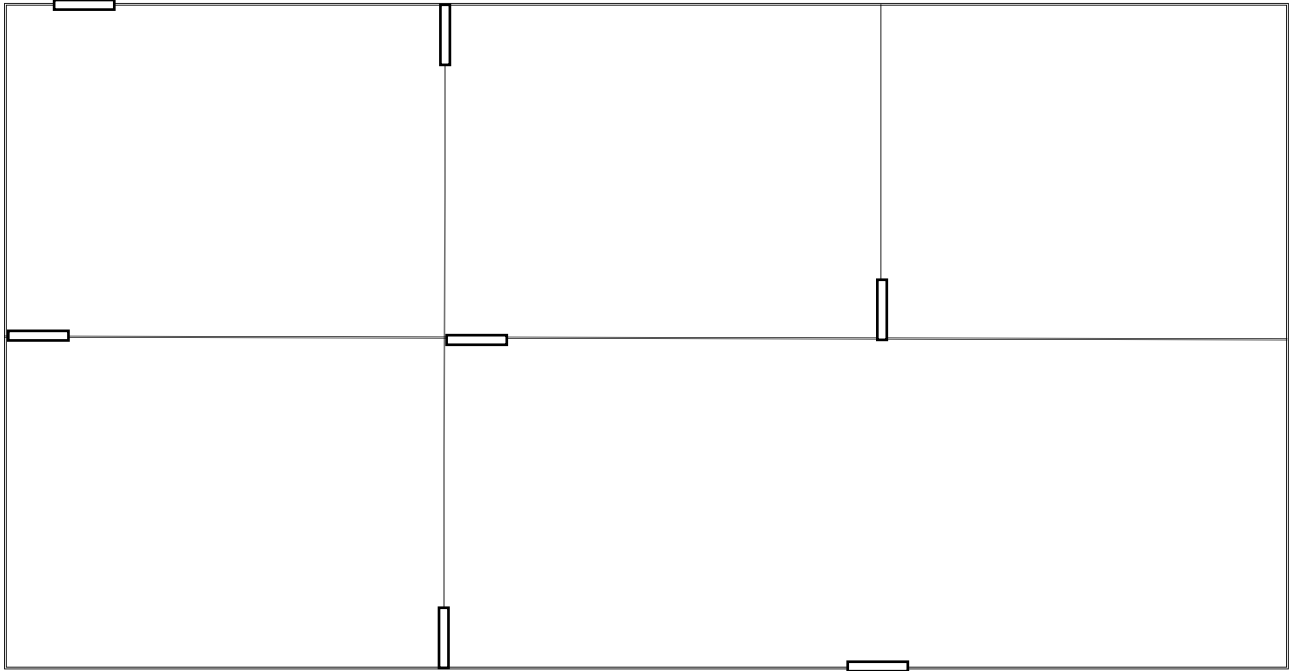
Feeding trough design



Floor plan for one sow unit



Floor plan for one sow unit with space for a boar



Floor plan for two sow unit