

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

CPA 20

Methane Recovery and Power Generation Project

Ref. No. 5979-0006

CPA-20 Methane Recovery and Combustion with Renewable Energy Generation from Anaerobic Animal Manure Management Systems under the Land Bank of the Philippines' Carbon Finance Support Facility

June 2019

LIST OF ABBREVIATIONS

BOD	Biological Oxygen Demand
CDM	Clean Development Mechanism
CFSF	Carbon Finance Support Facility
CMR	Compliance Monitoring Report
CSR	Corporate Social Responsibility
DENR	Department of Environment and Natural Resources
DNA	Designated National Authority
DO	Dissolved Oxygen
DOE	Designated Operational Entity
DP	Discharge Permit
ECC	Environmental Compliance Certificate
EMB	Environmental Management Bureau
EMF	Environmental Monitoring Fund
EPMD	Environmental Program and Management Department
ERPA	Emissions Reduction Purchase Agreement
ESMP	Environmental and Social Management Plan
ESSF	Environmental and Social Safeguards Framework
LBP	Land Bank of the Philippines
MOA	Memorandum of Agreement
MRF	Methane Recovery Facility
MSDS	Materials Safety Data Sheet
PCO	Pollution Control Officer
P.D.	Presidential Decree
PoA	Program of Activity
PPE	Personal Protective Equipment
PTO	Permit to Operate
R.A.	Republic Act
SMR	Self-Monitoring Report
SPA	Subproject Agreement
TSD	Treatment / Storage / Disposal
TSS	Total Suspended Solids
WTF	Water Treatment Facility

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PURPOSE OF THE DOCUMENT

This Environmental and Social Management Plan (ESMP) is prepared as part of the requirements of the Safeguards Framework for Clean Development Mechanism (CDM) projects implemented under the Carbon Finance Support Facility (CFSF) of the Land Bank of the Philippines (LBP). The Environmental and Social Safeguards Framework (ESSF) was developed to ensure the establishment of protection, compliance, and mitigation measures for relevant environmental and social aspects of projects under the CDM program which covers the Methane Recovery and Power Generation of CPA 20 (Leidebril).

Scope

Since the Methane Recovery and Power Generation Project is a key component of the CPA 20's wastewater treatment facility (WWTF) – which handles the primary waste (manure) produced by its operations – this ESMP thus encompasses the operations of the entire farm described herein.

1 PROJECT SUMMARY

The Methane Recovery and Power Generation Project of CPA 20 is an initiative developed under LANDBANK's CFSF. Its goal is to capture greenhouse gases, particularly methane from piggery wastewaters that would otherwise dissipate into the atmosphere, and convert them into electrical energy.

1.1 Proponent Profile

Proponent: CPA 20
Business Address: Tuguegarao, Philippines
Owner / CEO:

Farm Name: CPA 20
Project Site: Cagayan, Philippines
Farm Coordinates:

Project Type: Livestock Project
Philippine Standard
Industrial Classification: 0145 - Hog Farming

Contact Persons **CPA 20**
Farm Manager:
Contact details:

Pollution Control Officer:
Contact details:

LANDBANK

Lending Programs
Management Group: Emellie V. Tamayo
Designation: Head / First Vice President
Telephone No.: (632) 405-7309
Fax No.: (632) 528-8542

Environmental Program &
Management Department: Prudencio E. Calado III
Designation: Head / Assistant Vice President
Telephone No.: (632) 405-7339
Fax No.: (632) 528-8484

1.2 **Pig Farm Profile**

Farm area:	30,000 m ²
Production:	Farrow-to-Finish
Housing type:	Conventional, open-sided
Capacity:	500 sow level
Start of operation:	2006
No. of Employees:	20
Operating hours:	24

CPA 20 is a family-run business engaged in hog breeding and raising. Currently, it is able and licensed (as per its Environmental Compliance Certificate) to house 500 sow level. The site layout in Figure 1 shows the basic facilities of the farm.

The farm is connected to the grid of Cagayan 1 Electric Cooperative (CAGELCO), its primary source for electricity. The farm's working biodigester system provides for a secondary source of power. The farm is able to utilize electricity generated by the biogas system for around 6 to 8 hours per day. Water for its operations is sourced from deep wells within its premises.

1.3 Project Description

The project covers the installation and operation of an anaerobic digester system and its ancillary facilities, including post-treatment wastewater lagoons and a biogas-powered electricity generation system, collectively referred to herein as methane recovery facilities (MRF).

1.3.1 Components and Design

CPA 20's wastewater treatment process features two phases:

- *Anaerobic digestion*, or the disintegration of biodegradable materials in the wastewaters through biological processes facilitated by microbes which thrive in the conditions promoted by the reactor; and
- *Post-Treatment* of biogas, effluent, and sludge resulting from anaerobic digestion.

In general, the WWTF is mainly composed of a covered earthen lagoon, an aeration lagoon, a filtration system, and a clarifying lagoon. The MRF basically consists of biogas generator sets.

Overall, the anaerobic digester system has been intended to accommodate wastes generated by up to the maximum number of pigs the farm could house. The design and layout of the WWTF are in the construction plans in Appendix A. Properties and specifications of the WWT-MRFs, including capacities, outputs, and efficiencies, will be detailed in the succeeding version of this ESMP.

Table 1. Specifications of CPA 20's Wastewater Treatment Facility-Methane Recovery Facility

Phase	Process	Component	No. of Units	Description / Equipment	
Pre-treatment	settling	pre-storage settling tank	1	-not specified-	
	Delivery	Wastewater canal lines	20	6 in diameter HDPE solid pipes	
Anaerobic treatment	anaerobic digestion / fermentation	Biogas fermentation chamber	1	50 m x 25 m x 6.5 m, HDPE cover and liner	
Post-treatment	Biogas	combustion	scrubber system	1	-not specified-
			generator set	1	150 kVa
	Effluent	clarification	Water recovery	2	-not specified-
	Sludge	Removal	Sludge removal system	1	HDPE solid piping system

1.3.2 Operation

Wastewaters from pig sheds are conveyed through drains along the sides of the buildings into the anaerobic digester. They remain in the chamber until they are displaced by newly flushed influent. From the biodigester, partially treated wastewaters flow onto the aeration lagoon equipped with paddle motors.

After aeration, wastewaters are made to pass through the filtration system and then drain onto the clarifying lagoon where they are stored prior to being reused in the farm for cleaning and irrigation.

Biogas produced in the anaerobic digester is directed to a biogas storage tank. From here, gas is propelled towards one of the two generator sets for conversion to electrical energy. Electricity from the biogas is used to power the farm. The generator sets operate alternately for 200 hours each before being shut down for maintenance activities.

Sludge is removed from the anaerobic chambers through gravity release pipes and dried on a concrete bed. Dried sludge is used as fertilizer.

Figure 1 illustrates the processes involved and the project components employed in the wastewater treatment and power generation process in Leidebril. A manual presenting a more detailed description of the WWTF-MRF's operations, including process times, flushing schedules, and water usage, will be prepared and appended to the succeeding version of this ESMP .

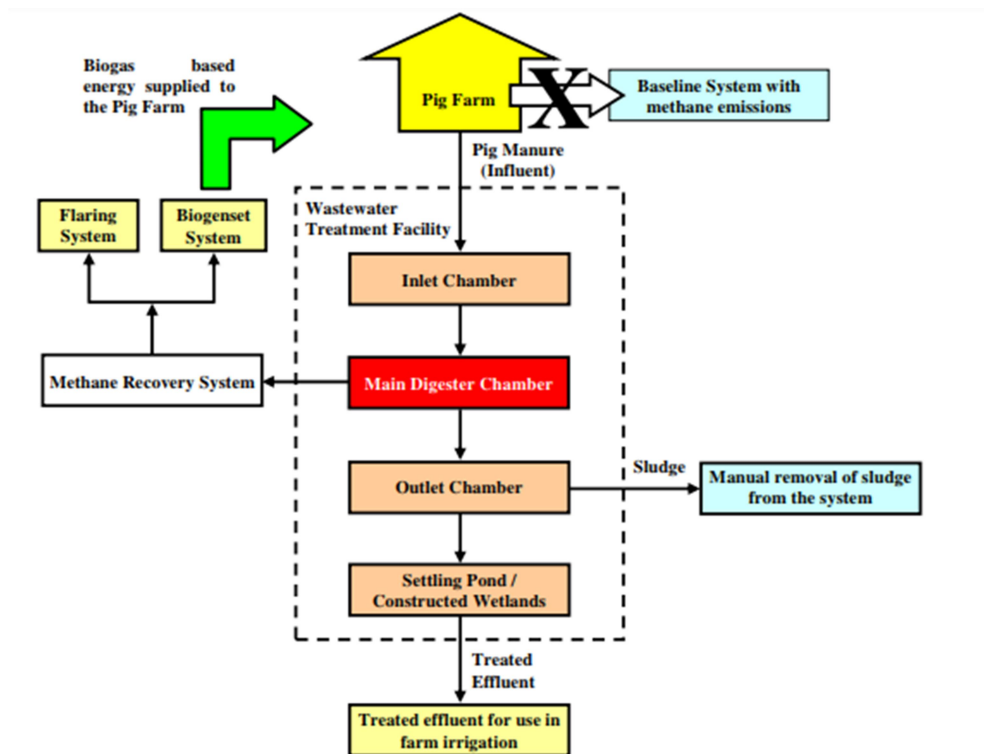


Figure 2. Wastewater treatment and power generation process in CPA 20

1.4 Existing Environmental Conditions in the Farm / Project Site

CPA 20 is a 30,000 m² property in Iguig, Cagayan.



Figure 3 . Map of the Philippines showing the location of Iguig, within the province of Cagayan.

1.4.1 Land Classification and Use

The area in which the farm stands is classified as an Agro-industrial area.

1.4.2 Climate

Köppen-Geiger system classifies the climate in Iguig, Cagayan as tropical, with rainy summers. Sta. Barbara has an average annual temperature of 27.1 °C and an average annual precipitation of 1790 mm. (climate-data.org)

1.4.3 Topography and Soil

The Farm sits on land that is flat, primarily composed of rice fields and woodlands (<http://www.namria.gov.ph/7378-IVAlcala.html>).

1.4.4 Water Resources

An unnamed creek is located south of the farm. The farm does not discharge into this creek.

1.4.5 Natural Hazards

As per the Landslide and Flood Susceptibility Map of San Carlos Quadrangle Pangasinan Province, Philippines, the farm is located in an area which has low to moderate flood susceptibility.

1.4.6 People and Communities

The farm is located in a relatively isolated area. The nearest residential area is a medium-density community located approximately 1.5 km west.

2 ENVIRONMENTAL DUE DILIGENCE

2.1 Impact Assessment

2.1.1 Positive Impacts

CPA 20 provides employment opportunities to residents of Barangay Bagontaas and to people from neighboring towns. It also generates revenue for the local government.

The project was built to improve CPA 20's method of handling and disposing pig manure and liquid waste. Compared to open lagoons, the biodigester has significantly amended the farms' wastewater treatment process, resulting in better effluent quality. Foul odors from effluents have also been greatly abated, improving the environment for both workers and livestock, as well as for surrounding communities.

Using biogas-generated electricity reduces the farms' reliance on the grid (and on power from conventional fuels), translating to savings for the business.

By providing a mechanism to capture methane and use it as a source of energy, the project has lowered the Leidebril's overall carbon footprint. With inputs coming from about its current average population, through the project, the farm is estimated to be capable of reducing greenhouse gas emissions equivalent to around 6,581 tCO₂e annually.

Finally, having been being registered as a component project activity (CPA) in the CDM Program, Leidebril has an opportunity to earn monetary incentives by selling carbon credits to World Bank. It may also opt to trade its carbon credits in the wider carbon market.

2.1.2 Negative Impacts

Certain aspects of the pig farms' and the project's operations inevitably result in potential harm to the environment, including generation wastewaters; hazardous and non-hazardous wastes; air pollutants; foul odors, noise, dust and other nuisance; and depletion of natural resources. These pose inherent risks to environmental quality and natural ecosystems and to health and safety of workers, communities, and livestock.

2.2 Due Diligence

CPA 20 commits to undertake environmental due diligence in its dealings and operations through compliance with relevant regulatory safeguards and implementation of the measures provided in the environmental management and monitoring plan in Table 3 and of other relevant provisions herein.

2.2.1 Legal Framework

CPA 20 operates in the context of laws prescribing the regulatory safeguards in the tables below:

Table 2. Environmental documents and statutory requirements regulating the operation of CPA 20

DOCUMENT	PARTICULARS	
Environmental Compliance Certificate (ECC)	Reference No.	C-A-ECC-2005-0215-05
	Issuing Agency	EMB Region 2
	Date of Issuance	January 2, 2005
	Valid Until	- no expiration -
	Conditions	<ul style="list-style-type: none">• area of operation: 30,000 m²• maximum population: 500 sow level
Discharge Permit (DP) for Water Pollution Source / Control Facilities	Reference No.	2016-DP-G-0215O-006
	Issuing Agency	EMB Region 2
	Date of Issuance	
	Valid Until	June 1, 2017
	Conditions	<ul style="list-style-type: none">• FOR RENEWAL
Permit to Operate (PTO) Air Pollution Source Control Installations	Reference No.	2016-POA-G-0215O-012
	Issuing Agency	EMB Region 2
	Date of Issuance	
	Valid Until	July 5, 2021

Hazardous Waste Generator ID	Conditions	• Biogas generator set
	Registration No.	For application
	Approving Agency	
	Date of Approval	
	Valid Until	
PCO (Pollution Control Officer) Accreditation Certificate	Conditions	-
	Accreditation No.	
	Issuing Agency	
	Date of Issuance	
	Valid Until	

a permit has been secured from the Department of Agriculture for the safe reuse of wastewater.

Table 3. Permits ensuring the safety of CPA 20's facilities and operation

DOCUMENT	PARTICULARS	
Business Permit	Permit No.	AVAILABLE
	Issuing Agency	
	Date of Issuance	
	Valid Until	
	Prerequisites	•
Zoning Clearance	Reference No.	AVAILABLE
	Approving Agency	
	Date of Approval	
Fire Clearance	Reference No.	AVAILABLE
	Issuing Agency	
	Date of Issuance	
	Valid Until	
	Prerequisites	•
Sanitary Permit	Permit No.	AVAILABLE
	Issuing Agency	
	Date of Issuance	
	Valid Until	
	Prerequisites	•

Copies of the permits and licenses in the lists and other relevant documents are in Appendix B.

2.2.2 Preventive and Mitigating Actions for Major Negative Impacts and Risks

Wastewaters

- ▮ Surfacewater contamination is prevented by treating all pig wastewaters in the WWTFs. The WWTF is kept in optimal working condition through regular inspection and maintenance activities. This ensures that effluents meet Class C quality standards set by EMB (Appendix C).
- ▮ Biodigesters have been constructed with durable materials.
- ▮ Adequate separation of rainwater and wastewater have been provided.
- ▮ Technical specifications and actual performance of the WWTF-MRF will be determined to know the system's efficiency. Information on these will enable the farm to optimize its operations and improve (or maintain) the WWTF-MRF's performance.

Hazardous Wastes

- ↗ The farm will register as hazardous waste generator to be able to dispose through accredited TSD (transport, storage, disposal) providers.
- ↗ Pig carcasses and potentially hazardous wastes are placed in a mortality pit.

Odor

- ↗ Treatment in the WWTF-MRF has significantly abated odors coming from effluents.
- ↗ Trees have been planted within and around the farm.
- ↗ The biogas collection system has been constructed with durable materials and is kept in good working condition through regular inspection and maintenance activities.

Groundwater Depletion

- ↗ Water conservation measures are being implemented in the farm.
- ↗ The farm will secure a Water Permit to comply with existing regulations and recompense for its consumption of groundwater.

2.2.3 Environmental Management and Monitoring Plan

Table 3 summarizes the measures intended to address the environmental impacts and risks identified in Section 2.1.2. Adequate training will be given to concerned employees to ensure that the content of this environmental management plan will be properly carried out.

Table 3. Environmental Management and Monitoring Plan of CPA 20

IMPACT	SOURCE / ACTIVITY	MEASURES	STATUS			MONITORING METHOD	FREQUENCY	PARAMETER / INDICATOR	RESPONSIBLE ENTITY	REPORTING TO	Cost, Php
			Existing / Current Practice	For Implementation / Under Construction	Adoption Under Review						
A. Wastewater											
a.1 generation of wastewater	pig raising	water conservation strategies	✓			quantify wastewater production	monthly	volume of wastewater produced	Farm pesrnnel	Farm Manager	
		treatment of wastewater in WWTF	✓								
a.2 generation of domestic wastewater	general farm activities	water conservation strategies	✓			check siphoning and hauling records	every 5 years	volume of sewage hauled	PCO	Farm Manager	Siphoning costs
		sewage septic tanks	✓								
		sewage disposal and hauling by accredited hauler	✓								
B. Solid Waste											
b.1 generation of manure, sludge	pig raising, feed wastage, WTF	minimize feed wastage - fixed feeding schedule;	✓			quantify (dried) sludge produced	monthly	amount of sludge produced	biodigester operators	PCO	Feed costs
		treatment of manure in WWTF	✓								
		sludge used as soil conditioner	✓								
b.2 generation of (non-infectious) carcasses, blood	injuries, adverse environmental conditions, etc.	observe sound pig raising practices and biosecurity measures	✓			weigh disposed materials	Daily, or as needed	weight of materials disposed	Farm personnel	PCO	Php 350,000 for staff salaries
		carcass disposal burial in mortality pit	✓								
b.3 generation of general solid wastes	general farm activities	waste segregation	✓			weigh solid wastes disposed of (recyclables and residuals)	every hauling	weight / details on wastes generated, stored, and disposed of	Farm personnel	PCO, Farm manager	
		provides adequate collection bins, storage area in strategic locations	✓								
		reduce, reuse, recycle of materials	✓								
C. Hazardous Materials											
c.1 generation of hazardous, toxic wastes	facilities' operation and maintenance	monitor resource usage to avoid expiration of chemicals, etc.	✓			quantify each type of hazardous waste produced / stored and disposed of (check hazardous waste manifests)	every hauling and disposal	quantity of each hazardous waste type stored and disposed	PCO	Farm manager	Disposal and hauling costs
		disposal through accredited TSD	✓								
		reusing, recycling certain materials (for various construction and maintenance activities)	✓								
c.2 generation of infectious, pathological wastes, carcasses	veterinary activities, infections, outbreaks	carcass disposal through burial in mortality pit	✓								Php 350,000 for staff salaries
		pathological / innfectious materials disposed in mortality pit	✓								
D. Air Pollution											
d.1 generation of biogas	anaerobic digestion	capturing through biodigesters and combustion using biogas-fueled engine	✓			record electric meter reading of biogas gensets	daily	kWh produced	biodigester operators	Farm manager	Project cost
d.2 generation of air pollutants	stand-by generator sets (fossil fuel combustion)	operate machineries according to manufacturer’s instruction	✓			review inspection and maintenance record	monthly	number and details of machinery issues noted	Farm personnel	Farm manager	Php 11,000 maintenance costs
		regular inspection and preventive maintenance of equipment	✓				every 200 running hours	running hours			
E. Risk of Environmental Degradation											
e.1 (risk of) surface water and groundwater quality degradation, disruption of soil properties, contamination	e.1.1 wastewater collection, transport, treatment, disposal	operates WWTF as prescribed	✓			effluent sampling and testing by an EMB-accredited laboratory	quarterly - more frequently during rainy seasons	effluent quality indicators: BOD, TSS, ammonia, phosphate (must meet standards for Class C effluent)	PCO	Farm manager	Testing fees
		regular inspection and preventive maintenance of WWTF; regular desludging	✓								
		maintainance of vegetation (filter strips) around lagoons	✓								
		ensures effluents meet EMB standards^	✓								
	e.1.2 sludge management, storage, leachate	drying of sludge and using it as soil amendment	✓			review inspection and maintenance record	monthly - more frequent during rainy seasons	number and details of leak / breach incidents	biodigester operator	PCO	Php 11,000 maintenance costs
		regular inspection and preventive maintenance of drying bed	✓								
maintainance of vegetation (filter strips) around drying bed		✓									

	e.1.3 pathological wastes, carcass disposal, leachate	established vegetative filter strips around disposal site	✓			review inspection and maintenance record	monthly - more frequent during rainy season	number and details of leak / breach incidents	Farm personnel	Farm manager	Landscape maintenance costs	
	e.1.4 handling, transport, storage, disposal of hazardous and infectious materials	uses materials according to registered use / manufacturer's instruction	✓			review inspection and maintenance record	weekly	number and details of leak / breach incidents	Farm personnel	PCO, Farm manager	Php 350,000 staff salaries	
		use of suitable containers with labels	✓								Signage costs	
		provides secured collection and storage area	✓								Spill kit costs	
		regular inspection of storage, disposal facilities	✓									
		will make MSDS available on-site of use		✓								
		will develop and observe safety protocols		✓								
		will install appropriate signage, warnings		✓								
		will provide spill kits on storage areas		✓								
		will prepare a contingency response plan		✓								
		will provide adequate training to staff on handling of hazardous materials		✓								
e.2 (risk of) pollution from fugitive biogas	biogas collection, storage, combustion	operates MRF as prescribed	✓			review inspection and maintenance record	monthly	number and details of leak / breach incidents (odor detection)	biodigester operator	PCO	Php 11,000 maintenance costs	
		regular inspection (leak test) and preventive maintenance of MRF	✓									
F. Health and Safety – Anaerobic Digester System												
f.1 explosion hazards	biogas collection, storage, combustion	No smoking or hot works in the vicinity of biogas facility	✓			review inspection and maintenance records, incident reports, complaints register	monthly	number and details of explosion, fire incidents	Farm personnel	Farm manager, PCO	Php 11,000 maintenance costs	
		Restrict access to biogas facility										
		Place signages										
		Regular maintenance of biogas system										
f.2 asphyxiation	biogas	Buddy system when conducting work	✓			review incident reports	monthly	number and details of asphyxiation, poisoning incidents	Farm personnel	Farm manager, PCO		
		Restrict access to biogas facility										
		Regular maintenance of biogas system										
f.3 chemical hazards	sludge	Use appropriate PPE	✓			review incident reports	monthly	number and details of infection, infestation incidents	Farm personnel	Farm manager, PCO	PPE costs	
						review results of health checks	annually				Doctor’s fees	
G. Health and Safety – General Farm Operations												
f.1 odor - nuisance, discomfort, health issues	f.1.1 pig houses, manure	regular cleaning of pig houses and maintenance of drains	✓						PCO	Farm manager	Disposal and hauling costs	
		maintains existing vegetation	✓									
		provision and use of appropriate PPE	✓									
	f.1.2 WTF, effluent, MRF	gas trapping and combustion through MRF	✓									Php 350,000 for staff salaries
		will ensure adequate retention time of wastewaters in the biodigester is achieved	✓									
		regular inspection and preventive maintenance of WWTF- MRF	✓									
		provision and use of appropriate PPE	✓									
		ensure sludge pile is well aerated, prevent waterlogging	✓									
	f.1.3 decomposing materials (sludge and organic solids)	provision and use of appropriate PPE	✓									
	f.1.4 decomposing materials (placental materials and carcasses)	disposal through burial, composting	✓									
		prevent leakage of leachate in disposal sites (see e.1.3)	✓									
		provision and use of appropriate PPE	✓									

f.2 noise - nuisance, discomfort	f.2.1 pigs	Fixed feeding schedule	✓			review complaints register	monthly	number and details of noise complaint	PCO	Farm manager	Feed costs Php 5,000 for change oil services and general maintenance
		provision and use of appropriate PPE	✓								
		Maintains existing vegetation, will plant trees	✓								
	f.2.2 vehicles, machineries	operate equipment, machineries according to manufacturer's instruction	✓								
		regular inspection and preventive maintenance of machineries	✓								
		generator sets are fitted with mufflers	✓								
	provision and use of appropriate PPE	✓									
f.3 dust - nuisance, discomfort, health issues	f.2.1 pig houses, feed handling	limits dust-generating activities during day time, low wind movement (as much as it is practical)	✓			review complaints register	quarterly - more frequent during typhoon (windy) season	number and details of dust complaints	PCO	Farm manager	Php 350,000 for staff salaries
		tunnel ventilation system prevents dust build up	✓								
	f.2.2 composting areas, dried compost handling	use of appropriate containers, barriers	✓								
		damping of dried materials	✓								
		limit dust-generating activities during day time and low wind movement (as much as it is practical)	✓								
		provision and use of appropriate PPE	✓								
	f.2.3 vehicles, machineries	sealing and damping of unpaved roads	✓								
		limits vehicular speed on unsealed roads	✓								
		operates feedmill in an enclosed area	✓								
		limit dust-generating activities during day time, low wind movement (as much as it is practical)	✓								
provision and use of appropriate PPE		✓									
f.4 pest and vermin proliferation / infestation - nuisance, health issues	decomposing materials and sources of odors	implement odor control measures (see f.1)	✓			review inspection results records and complaints register	monthly - more frequent during rainy season	number and details of incidents, complaints	Farm personnel	PCO	Php 5,000 maintenance costs
		imlement pest, vermin control measures (use of baits and traps)	✓								
		observes good houskeeping practices	✓								
		regular inspection of farm facilities, surroundings	✓								
f.5 health hazards, (risk of) contracting infectious diseases, sustaining injuries, livestock outbreak	handling, transport, storage of hazardous and infectious materials, movement of carrier pests and vermin, handling of ill pigs	adequate training on handling of hazardous, infectious materials	✓			review incident reports, inspection records and complaints register, results of employees' regular health checks	Monthly	number and details of illness, injury incidents, complaints	PCO	Farm manager	Php 350,000 for staff salaries
		provision and use of appropriate equipment for handling and storage of hazardous and infectious materials	✓								
		enforce, observe biosecurity measures, health and safety protocols	✓								
		observe measures for safe handling of hazardous and infectious materials (see e.1.3 & e.1.4)	✓								
		implement pest and vermin control measures (see f.4)	✓								
		regular inspection of farm facilities, surroundings	✓								
f.6 explosion, fire hazard	biogas collection, storage, combustion	WWTF-MRF constructed with durable materials	✓			review inspection and maintenance records, incident reports, complaints register	monthly	number and details of explosion, fire incidents	PCO	Farm manager	Php 11,000 maintenance costs
		operates WWTF-MRF according to design	✓								
		regular monitoring of pressure within the MRF system	✓								
		regular inspection (leak test) and preventive maintenance of MRF	✓								
		restricts access to MRF	✓								
		prohibits ignition sources (smoking) near MRF	✓								
		will install signage and warnings			✓						
		reporting and recording of explosion, fire incidents			✓						
f.7 drowning hazard	open ponds, lagoons, tanks	restrict access to WTF, install fences			✓	review incident reports	monthly	number and details of drowning incidents	Farm pesronnel	PCO	Signage costs
		install signage and warnings			✓						
		reporting and recording of drowning incidents			✓						Construction costs
f.8 freshwater depletion	pig raising and general farm activities	water conservation strategies			✓	quantify volume of freshwater consumption	monthly	volume of freshwater consumed	Farm pesronnel	Farm manager	
		effluent recycling	✓								
f.9 consumption of	pig raising and	energy conservation strategies	✓			estimate power consumption from billing	monthly	kWh consumed	Farm personnel	Farm manager	Php 11,000

non-renewable resource (fossil fuels for power)	general farm activities	use of energy-efficient equipment	✓			for electricity					maintenance costs
		uses electricity generated using biogas	✓								
		pig buildings have concrete walls and roofing, providing efficient insulation against ambient heat	✓								
f.11 (risk of erosion)	rainwater runoff	plant various tree species and vegetation along roads and slopes	✓			review inspection records	monthly - more frequent during rainy season	number and details of erosion incidents	Farm personnel	Farm manager	Landscaping costs

- BOD

MSDS

PCO

PPE

SMR

TSD

TSS
- Biological Oxygen Demand

Materials Safety Data Sheet

Pollution Control Officer

Personal Protective Equipment

Self-Monitoring Report

Treatment, Storage, Disposal

Total Suspended Solids

The Environmental Management and Monitoring Plan of CPA 20 will be updated to reflect the cost of implementing the same. It will be presented in the succeeding version of this ESMP.

2.2.4 Contingency Response

Below is an overview of CPA 20's current preparation and action plan in response to the following:

- a. Fire
 - Fire extinguishers are available at strategic locations around the farm. Pig houses are also equipped with water taps from which water for putting out fire can be sourced.
- b. Earthquake
 - The open grounds inside the farm are designated as evacuation areas for when an earthquake occurs.
- c. Outbreak
 - In the event of a livestock outbreak, quarantine measures are instinctively applied. Movement of humans and animals in and out of the farm is restricted and instructions from the farm's consultant veterinarian are carried out.
- d. Power outage
 - Should there be power interruption, a diesel-fueled standby generator is able to supply the farm's electricity needs, in addition to the biogas genset.
- e. Health emergencies
 - First aid kits are readily available on site for minor injuries. Farm personnel also have access to vehicles which can be used for transporting cases needing more advanced medical care.

In the interim, CPA 20 hereby commits to develop a more comprehensive contingency preparedness and response plan that will address incidents of fire; natural hazards (typhoon, earthquake); outbreak; health emergencies; and environmental emergencies (leaks and spills of wastewaters and hazardous wastes, WWTF-MRF system breakdowns). This plan will be appended in the succeeding version of this ESMP.

2.2.5 Occupational Health and Safety

In addition to the health and safety measures presented in Table 3, CPA 20 will develop a more comprehensive health and safety risk management plan which will deal with general occupational health and safety issues associated with work in the farm. Health complaints and accidents will be recorded in a register and will serve as indicators of the plans effectiveness, together with results of workers' annual health check-ups. This plan will be appended in the succeeding version of this ESMP.

2.2.6 Biosecurity

The particulars of the farms' biosecurity protocol will be appended in the succeeding version of this ESMP.

2.3 **Monitoring, Reporting and Auditing**

The proponent will perform the monitoring plan in Table 3 and conduct regular inspection of its facilities not only for internal purposes but also to satisfy the requirements of the Environmental Management Bureau (EMB) for periodic self-monitoring reports (SMR). In addition, assessments will also be initiated during or immediately after incidents that may have compromised the integrity of the farm's facilities, especially the WWTF-MRF, and caused the release of pollutants in the environment. A registry of such incidents and other environmental emergencies and accidents will be maintained in the farm and its details reported in the SMR.

The SMR will contain the results of audits on the farm's environmental performance in terms of resource utilization, waste management, regulatory compliance, and fulfillment of environmental commitments among others. This document will be tendered to EMB quarterly. LBP-EPMD (Environmental Program and Management Department) will also be provided with copies of this document for reference and review purposes.

The owner and as well as the farm's Pollution Control Officer (PCO) have been tasked to ensure that the farm is compliant with pertinent environmental regulations, including those listed in Table 3, and is performing its environmental commitments, including the implementation of this ESMP.

During the implementation of the CDM Program, LBP-EPMD will conduct monitoring activities in the farm at least twice a year to help the proponent execute, identify gaps in, and improve and update this management plan.

3 SOCIAL DUE DILIGENCE

3.1 Consultation and Participation

Prior to construction, the Proponent, together with LBP-EPMD, identified the Project's stakeholders who were afterwards invited, through letters and notices, to a consultative meeting for the Project's establishment on July 24, 2015. A total of 29 attendees from various institutions, including local officials and residents of communities near the project site were present during the consultation.

All relevant information, especially those that pertain to the Project's environmental and social impacts, was communicated to the stakeholders during the consultations. Issues and queries raised were satisfactorily addressed by the Proponent and the other presenters.

3.2 Grievance Redress Mechanism

The farm's manager and PCO are hereby designated as the main contact persons for grievances, feedbacks, and queries related to the project. She is to ensure that the details of complaints and the actions made to address the same will be recorded completely and truthfully in a register. Such information shall be part of the regular monitoring report for the project and will be made available to relevant stakeholders.

The proponent will make every effort to settle any concern at the project level. Should his attempts be unsuccessful, issues will be raised to the following third party institutions for arbitration and possible resolution:

- Office of the Barangay Chairman
Complaints shall be entertained in the *barangay* where the Farm is situated. The *barangay* office concerned will facilitate the negotiation process and LBP-EPMD will ensure that the complainant is properly represented.
- Municipal Office
Should no agreement be reached at the *barangay* level, the matter will be elevated to a municipal government office. Depending on the nature of the complaint, grievances may be addressed to the Municipal Health Office, Agriculturist Office, Environment and Natural Resources Office, or other relevant municipal agency.
- LBP
LBP through EPMD will take part on the resolution process only after the aggravated party has gone through the previous levels and finds the decisions rendered there unacceptable. EPMD will coordinate with the Proponent to ensure that issues regarding the latter's project are resolved to the best interest of the complainant.

To further ensure the proponent's accountability, contact details of the farm's management and LBP-EPMD shall be provided to stakeholders during consultations and through postings at public notice boards including at the farm's main gate. For this project, the following individuals will serve as grievance administrators:

- Prudencio E. Calado III
Head/Assistant Vice President, LBP-EPMD
Telephone No.: (632) 405-7339
Fax No.: (632) 528-8484

3.3 Information Disclosure

This ESMP and other relevant information regarding the Project will be published in LANDBANKS's website where it can be readily accessed by the public. Printed copies of this document will be submitted to EMB Region 2 and will also be available in the barangay office, in LANDBANK's library (1598 M.H. Del Pilar cor Dr. J. Quintos St., Malate, Manila, Philippines), and in the World Bank InfoShop.

3.4 **Equal Opportunity**

CPA 20 is an equal opportunity employer, not regarding gender, age, disability, and ethnicity in evaluating and hiring potential employees. Presently, the Farm's roster of 20 employees are all males, this is due to the farm being primarily production-focused.

3.5 **Resettlement**

The project is located inside the premises of CPA 20, a private property. No individual was displaced for nor were there any indigenous peoples affected by the establishment of the farm and the project.

3.6 **Others**

Employees of CPA 20 receive standard basic salary at the minimum, 13th month pay, and other regular statutory benefits, in addition to free meals and incentives.

4 ESMP REVIEW AND UPDATING

This ESMP shall be reviewed annually and will be updated subject to the results of the semiannual monitoring activities conducted by CPA 20 and LBP-EPMD. Reviews may be done more frequently or earlier than schedule, especially after events resulting in significant adverse effect to the environment.

In the first updated version of this ESMP, which will be published in the last quarter of this year (2019), the following information and documents will be provided:

- properties, specifications, and performance parameters of the WWT-MRFs;
- WWTF-MRF Operations Manual;
- cost of implementing the Environmental Management and Monitoring Plan;
- Contingency Preparedness and Response Plan; and
- Health and Safety Risk Management Plan
- Biosecurity protocol

5 INSTITUTIONAL ARRANGEMENTS

5.1 The Proponent

The proponent will be responsible in all the aspects of the project, including the implementation of this ESMP. He will shoulder all costs associated with the construction and operation of the project, internal monitoring activities, and meeting various statutory requirements. Specifically, he shall cause the accomplishment of the following:

- exercise environmental and social due diligence in implementing the project
- incorporate sound practices in environmental, health, and safety management
- comply with relevant national and local laws and satisfy regulatory obligations
- perform diligent environmental and system monitoring
- prepare and submit on schedule accurate monitoring reports to EMB and LBP
- cooperate with the LBP and other regulatory agencies by providing assistance and correct and relevant information regarding the project and its environmental performance for reference, review, and monitoring purposes
- promote transparency by maintaining open lines of communication with project stakeholders and giving them access to relevant information
- initiate resolution of conflicts that may arise as a result of the project's operation

The proponent, in close coordination with LBP, shall implement the project based on LBP's ESSF and on the agreed activities and timelines stipulated in the memorandum of agreement (MOA) and subproject agreement (SPA) between the said entities.

5.2 LANDBANK

LBP shall serve as the financial and technical intermediary for the CDM Program of Activity (PoA) under which the project of CPA 20 is being implemented. It shall provide the proponent carbon and investment finance assistance for the installation of an anaerobic wastewater treatment facility equipped with a biodigester and methane-fueled power generator. Moreover, it shall act as the entity in charge of project validation and verification activities, and of collation of relevant information and monitoring data for the undertakings mentioned. Specifically, LANDBANK, through EPMD, shall:

- make available financing facilities to the proponent, subject to existing lending policies of LBP
- coordinate and facilitate communications and transactions between the proponent and World Bank or other carbon buyers, Designated Operational Entity, and when necessary, with other project partners
- administer the agreements (MOA, SPA) forged between LBP and the Proponent
- provide technical support and relevant trainings to farm owners and personnel in partnership with other institutions
- ensure compliance of the Project and its proponent with the rules governing PoAs and with its commitments in the MOA and SPA
- ensure compliance of the Project and its proponent with relevant standards and regulations and environmental commitments by conducting onsite monitoring and evaluation and desk reviews
- provide assistance to the proponent in complying with statutory requirements for the project
- ensure the project's sustainability by monitoring the long-term implementation of the safeguards specified in this ESMP and its environmental performance in general
- gather, collate, and review pertinent information and documents (including safeguard instruments, reports, and permits and clearances) concerning the project
- participate in conflict resolution initiated by the proponent
- prepare and submit monitoring reports to World Bank regularly
- satisfy its obligations under the Emissions Reduction Purchase Agreement between LBP and World Bank

LBP shall assist the proponent in its implementation of the project in accordance with LBP's Safeguards Framework and the agreed activities and timelines stipulated in the MOA and SPA.

5.3 Department of Environment and Natural Resources

The Department of Environment and Natural Resources (DENR) is the primary government institution mandated to manage and protect the Philippines' environment and natural resources. It is also the Designated National Authority (DNA) of the CDM Program in the Philippines. As DNA, its main role is to review and endorse PoAs to the United Nations Framework Convention on Climate Change.

5.3.1 Environmental Management Bureau

Through the EMB, DENR sanctions and regulates the activities of the Project by means of various legal instruments. EMB also leads (whether or not as part of a Multi-partite Monitoring Team) the periodic monitoring of the Project's compliance and impacts, including the fulfillment of the commitments stated in this ESMP. Prior to construction, EMB was the agency tasked to review and evaluate the environmental soundness of the Project and authorize its establishment through the issuance of an Environmental Compliance Certificate.

5.4 Municipal Government

The local government unit licenses the operation of CPA 20 through the issuance of a business permit. This permit is only given to businesses after satisfying its prerequisites – building and occupancy permits, zoning clearance, sanitary permit, fire clearance – all of which are also issued by the city government.

Agencies and offices under the local government will also, if necessary, lead / facilitate the resolution of complaints arising from the farm and project's operations.

5.5 World Bank

The World Bank is the main Carbon Buyer of the Project, but will also serve as an advisor to LPB in carrying out the latter's responsibilities as the coordinating and managing entity for CDM projects. The Bank will conduct regular monitoring, audits, and appraisals on the Project's safeguards performance against its established policies, as well as provide technical guidance to LBP and to the Proponent.

6 SUB-PROJECT ACCOUNTABILITY

In line with Section 3.02 on Sub-Project Development and Operation by the Sub-Project Entity, Item (q) of the Sub-Project Purchase Agreement (SPA) signed by the Farm Management, the Sub-Project Entity (Farm Management) agrees and undertakes to:

- (q) implement and operate the Sub-Project in compliance with the World bank Operational Policies, including without limitation and as applicable, the Environmental Management Plan, Resettlement Plan, Indigenous Peoples Plan, and any other requirement resulting from the application of the World Bank Operational Policies.

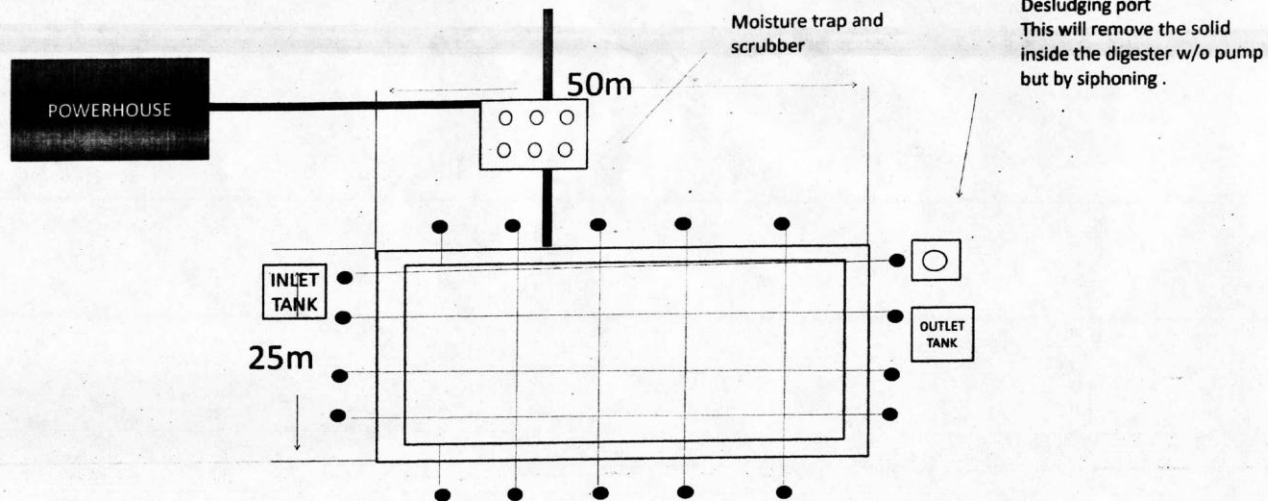
Having signed the SPA, the Farm Management is accountable to comply with the commitments stated in this document.

APPENDICES



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brgy. San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgs2113@yahoo.com

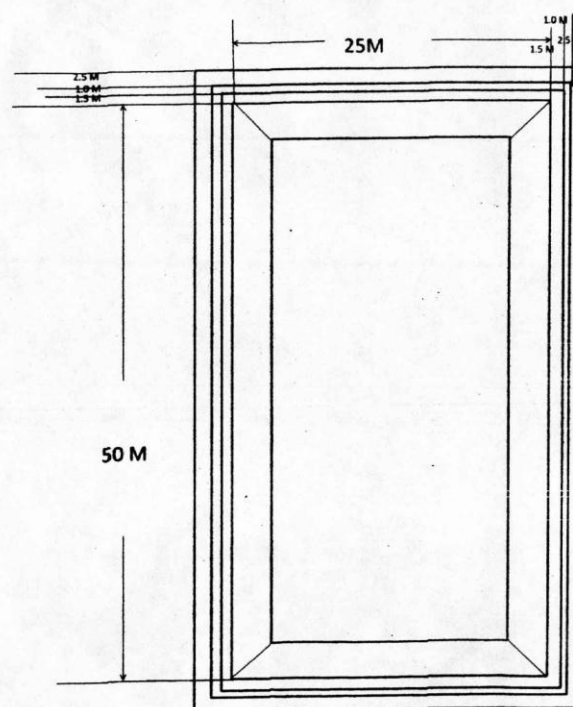
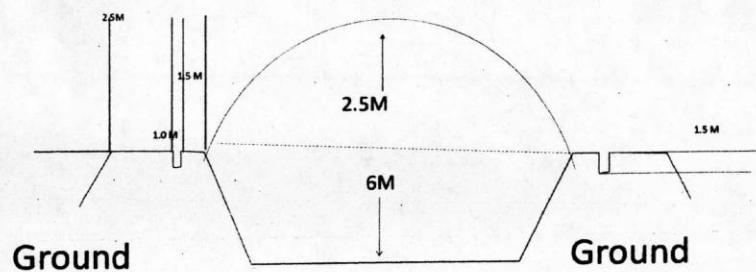


SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO	LOCATION	



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brgy. San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgs2113@yahoo.com

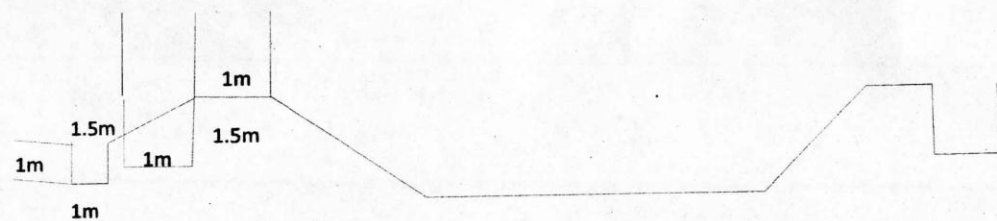


SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO	LOCATION	DIGESTER



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brgy. San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgs2113@yahoo.com

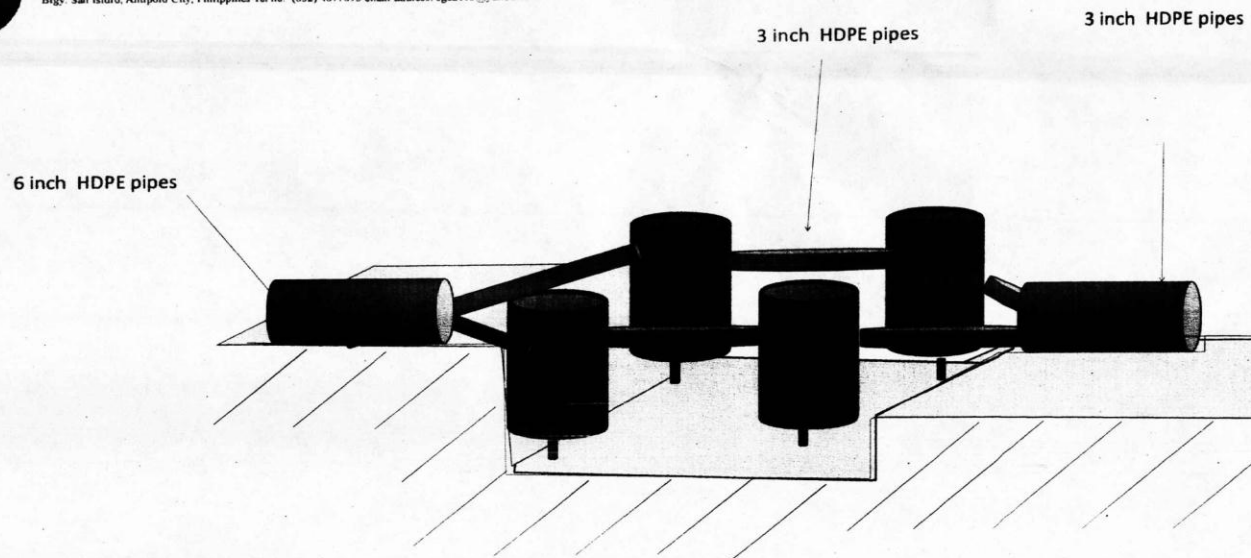


SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO		ANCHOR AND SLOPE



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brgy. San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgs2113@yahoo.com

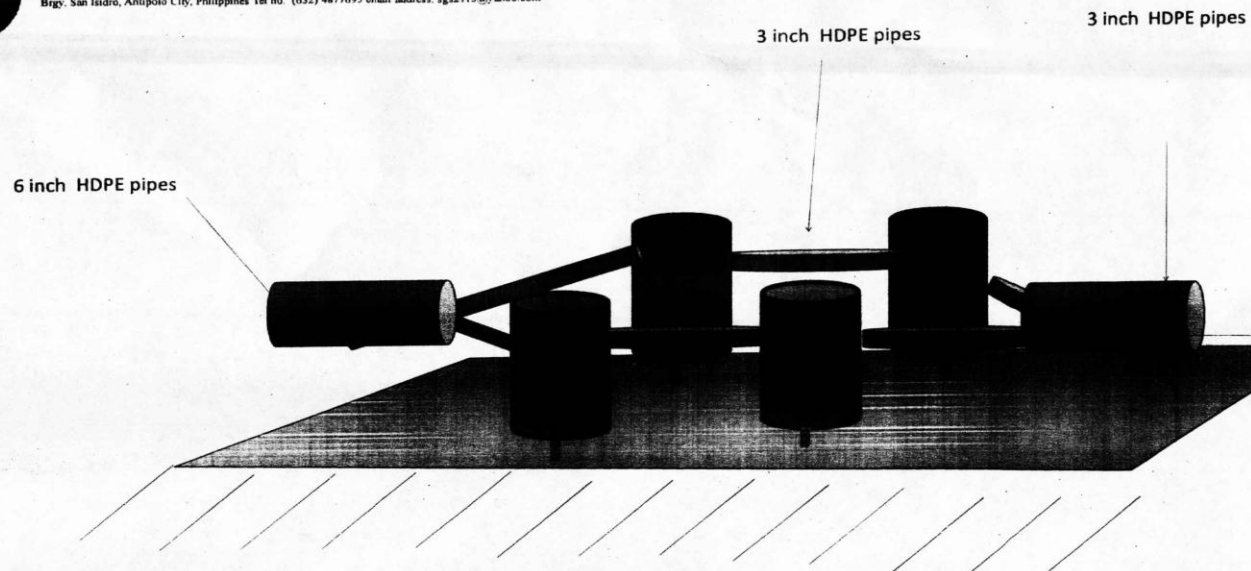


SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO	LOCATION:	MOISTURE TRAP



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brgy. San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgs2113@yahoo.com

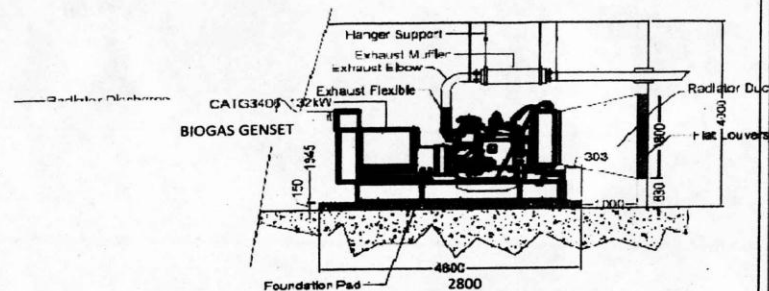
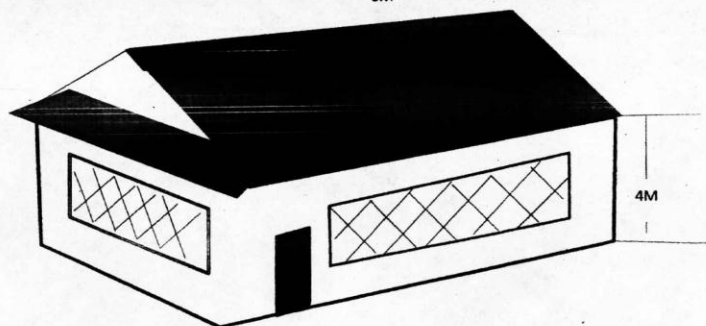
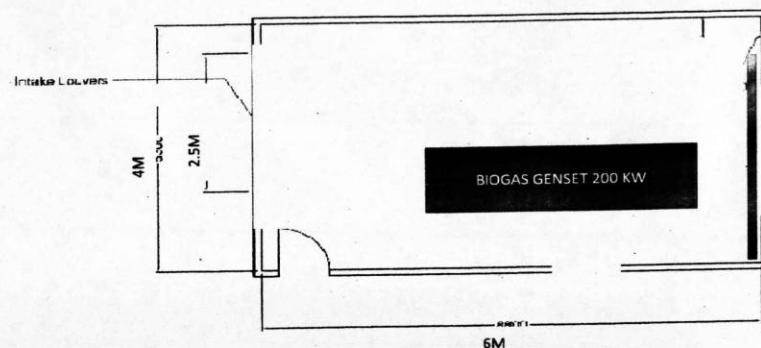


SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO	LOCATION:	SCRUBBER



Sustainable Environment thru Renewable Energy Development Environmental Consultancy

Brg: San Isidro, Antipolo City, Philippines Tel no. (632) 4877695 email address: sgr2113@yahoo.com



SERED ENVIRONMENTAL CONSULTANCY	BIOGAS WASTEWATER TREATMENT FACILITY	
PREPARED BY: SHIELSON G. SIBOLBORO	LOCATION:	POWERHOUSE

Appendix B. Health and Safety Risks Management Plan of CPA 20

Hazard	Possible Harm	Source / Cause	Prevention / Minimization	Person Responsible
physical				
noise	discomfort, hearing damage	pig squeals	<ul style="list-style-type: none"> - pigs consistently feed to prevent stress - PPEs (ear protection) - Conventional pig houses prevent pig squeals from being confined to a small area 	Farm Personnel Farm Manager
		running machineries and vehicles	<ul style="list-style-type: none"> - loud equipment located in an area relatively far from normal working areas - install noise-control devices, when applicable - regular equipment inspection and maintenance - limit noise-generating activities during day time - rotating work schedule - signage and warnings - PPEs (ear protection) 	Farm Personnel Farm Manager
vibration	discomfort, ergonomic and nerve injuries, fatigue	running machineries	<ul style="list-style-type: none"> - position vibration-producing equipment in enclosed areas - install shock absorber - ensure all loose equipment are securely placed - regular equipment inspection and maintenance - signage and warnings - rotating work schedule 	Farm Manager
electricity	shock, electrocution, burns	faulty machineries and power lines	<ul style="list-style-type: none"> - get services of a licensed electrician - consult equipment manual - regular equipment inspection and maintenance 	Farm Manager Farm Personnel
		improper use (or servicing) of electrical equipment	<ul style="list-style-type: none"> - restrict access to equipment (fencing) - signage and warnings - train staff (consult equipment manual) - ensure electricians are provided with proper PPEs for working with electrical equipment (insulated gloves, boots, etc.) 	Electrician
heat	burns	running machineries (hot surfaces, vapors, liquids)	<ul style="list-style-type: none"> - use insulation where possible - signage and warnings - ensure workers wear proper PPE such as long sleeved shirts. 	Farm Manager
	discomfort, heat exhaustion, heat stroke	adverse hot weather	adequate hydration and rest breaks	Farm Manager
		working in enclosed spaces with limited ventilation		
dust	irritation, respiratory distress / diseases	Feeds	<ul style="list-style-type: none"> - open-sided sheds - spray amounts of water during feeding to limit the dissipation of small feed particles and dust; - calm work pacing to avoid exciting the pigs - thorough cleaning of indoor spaces - PPEs (mask) 	Farm Personnel
		dried sludge		
		Compost		
poor lighting	eye strain, can't see hazards	unlit / inadequately lit areas	<ul style="list-style-type: none"> - install light sources - carry portable light sources 	Farm Personnel
chemical				
harmful gases, dust, vapors (inhalation)	discomfort (odor), asphyxiation, poisoning, respiratory distress / diseases	degrading organic wastes	<ul style="list-style-type: none"> - measures for odor control (see Table 5) - protocol for working in CONFINED SPACES - signage and warning (entrance to confined spaces) - train staff (handling hazardous substances and wastes and working in confined spaces; review MSDS / product information sheets) - PPEs (mask) - ensure first aid kits are readily available 	Farm Manager
		hazardous substances (cleaning and pest control chemicals, veterinary medicines, fuels, hazardous wastes, etc.)		
		fuel burning (machineries, vehicles)	<ul style="list-style-type: none"> - air pollution control device - regular equipment inspection and maintenance 	Farm Manager PCO
hazardous substances (contact, ingestion)	irritation, burns, poisoning, skin problems	fugitive gases	regular inspection and maintenance of MRF	Farm Personnel
		hazardous substances (cleaning and pest control chemicals, veterinary medicines, fuels, hazardous wastes, etc.)	<ul style="list-style-type: none"> - proper labelling, containers, and storage - restrict access to chemical and hazardous waste storage - train staff (handling hazardous substances and wastes; review MSDS / product information sheets) - only competent staff should administer veterinary medicines - regular inspection and equipment maintenance - ensure first aid kits are readily available - PPEs (gloves, eye glasses) 	Farm Manager PCO Farm Personnel
		wastewaters	regular inspection and maintenance of MRF	

			- PPEs (gloves, goggles, boots)	
biological				
pathogens / infectious agents, toxins and other products	various infectious diseases, parasites, irritation	pathological materials / tissues	- proper disposal of animal and veterinary wastes (see Table 5) - quarantine measures - improve ventilation - good housekeeping practices (disinfection) - practice hygienic practices (especially hand hygiene) - workers’ regular health examination - train staff (animal handling, proper waste handling and disposal) - PPEs	Farm Personnel (Vets, Animal Science practitioner) PCO
		sick animals		
		animal excretions and fluids		
		manure (wastewaters)		
		sludge		
		veterinary wastes (especially sharps)		
		potential disease carriers (objects, people, dust)		
		insects, pests, vermin	- proper disposal of odorous wastes (see Table 5) - good housekeeping practices - pest control	Farm Personnel
ergonomic				
ergonomic stress	ergonomic injuries	repetitive actions, forceful exertions, sustained awkward posture	- purchase / design equipment with ergonomic features - use aid of appropriate equipment - train staff (proper techniques and postures) - buddy system - job rotation / adequate rest (in between tasks)	Farm Manager Farm Personnel
		improper use of equipment	- train staff (consult manuals)	Farm Manager
		use of faulty equipment	- repair or replace equipment	Farm Manager
other accidents and contingencies				
slips, trips, falls	injuries, wounds, contusions	spills (slips)	- daily safety briefings and regular trainings - barricading of work areas - PPEs	Farm Personnel
		various objects, debris (trips)		
		heights, slips (falls)		
	drowning	open lagoons and biodigester	- Barricading of said areas - signage and warnings - ropes in/near lagoons (for rescuing)	Farm Manager Farm Personnel
entanglement	injuries, wounds, strangulation	machineries	- install equipment safeguards - tie back long hair - wear long sleeve shirts - avoid wearing loose-fitting clothes and personal accessories - regular equipment inspection and maintenance	Farm Manager Farm Personnel
blows, punctures	injuries, wounds, contusions	pig handling	- animal restraints - ensure enough space to maneuver - train staff (animal handling techniques) - wear appropriate PPE (boots, gloves etc)	Farm Personnel Farm Manager
sharps	sharps injuries, wounds	veterinary activities, waste handling	- train staff (proper waste handling and disposal) - PPEs (gloves, goggles)	Farm Manager
lack of oxygen / harmful gases	suffocation, poisoning	confined spaces (power house, manure pits, biodigester, enclosed pens and other chambers)	- protocol for working in CONFINED SPACES - signage and warnings - ‘buddy system’ - train staff (on protocol and rescue plan) - consider the purchase of gas monitoring equipment	Farm Manager
fires	Burns	faulty electrical systems, explosions, fugitive gases, accidental ignition	- comply with requirements and regulations of fire authorities - provide adequate and proper (multipurpose) fire protection equipment - designate smoking areas away from digester, gas tanks, and electrical equipment and storage of combustible materials (compost, sludge, chemicals) - restrict access to MRF (fencing) - prohibit smoking and use of cellphones around MRF and gas storage facilities - regular clearing of vegetation near farm structures - signage and warnings - train staff (on contingency plan and proper equipment use) - regular inspection and maintenance of electrical systems and equipment	Farm Manager Farm Personnel
blast	blast injuries	excessive pressure in biodigester, fugitive gases, contained gases in confined spaces, fires	- keep sources of heat, including machineries, at a safe distance from MRF - restrict access to MRF (fencing) - prohibit smoking and use of cellphones around MRF and gas storage facilities - regular inspection and maintenance of MRF - signage and warnings - consider the purchase of gas monitoring equipment	Farm Manager Farm Personnel

MINUTES OF STAKEHOLDERS' CONSULTATION

What:	Stakeholders' Consultation on Clean Development Mechanism (CDM) for the Proposed Methane Recovery and Combustion System (Biogas Project) -
When:	July 24, 2015, 1:30 PM – 5:30PM
Where:	
Organized by:	

REGISTRATION OF PARTICIPANTS

1. Registration of participants started at 2:00PM. The attendees are as follows:

Wilfredo Mistranza	
Mikel Barivan	
Louie Custudio	PIC- CPO
Socorro Elam Morales	MENRO Rep. – LGU Iguig
Antonio Banatao Jr.	Brgy. Captain – Malabbac, Iguig
Edgar Cabuguin	Brgy. Kagawad – Malabbac, Iguig
Epifanio Masipag	Brgy. Kagawad – Malabbac, Iguig
Marcial Lamusao	Brgy. Kagawad –Atulu, Iguig
Jefferson Carangan	Brgy. Kagawad –Atulu, Iguig
Engr. Shielson Sibolboro	President/ Consultant/ Biogas supplier - Sustainable Environment thru Renewable Energy Development Environmental Consultancy (SERED)
Gina Bacuyag	Account Officer- LBP Cagayan Lending Center
Edita Vargas	LBP- EPMD
Jose Diaz, Jr.	LBP-EPMD

2. Actual conduct of Stakeholders' Consultation activity started at 2:30PM to give time for the arrival of many participants as possible.
3. Nine (9) community members from attended the activity, including members of the Baranggay Council.
4. Ms. Socorro Elma G. Morales represented the Municipal Environment and Natural Resources Office (MENRO) of the local government of Iguig, Cagayan.
5. Engr. Shielson Sibolboro, the Consultant/ Biogas supplier
6. Attendees from Land Bank of the Philippines included Ms. Edith Vargas and Mr. Jose Diaz, Jr. – LBP- EPMD; Ms. Gina Bacuyag, AO of LBP Cagayan Lending Center
7. Total attendance to the activity is sixteen (16) pax, including management team and employees

OPENING PROGRAM

8. Opening Prayer was led by Ms. Gina Bacuyag, Account Officer – LBP Cagayan Lending Center
9. Mr. Gerry Alivia led the introduction of Management team and staff members present at the gathering and other guests in the event. He welcomed all the participants and thanked them for taking the time and effort to attend the Stakeholders' Consultation. In his message, Mr. Alivia expressed his intention to ensure environmental compliance of his piggery farm project, and to promote environmental awareness of its stakeholders, emphasizing these as the main reasons for conducting the Stakeholders' Consultation activity.

ABOUT THE CLEAN DEVELOPMENT MECHANISM (CDM) AND CARBON FINANCE SUPPORT FACILITY (CFSF)

10. Mr. Jose Diaz, Jr. discussed topics on Climate Change and CDM; and Ms. Edith Vargas presented Landbanks' CFSF.
11. The following were the highlights of the topics presented:
 - a.) The general overview of the CDM process to be implemented by LBP with the World Bank (WB), as regards validation to Carbon Credits, issuance of CERs (emission reduction certificates), and the corresponding trading of the certificates for these CERs at the negotiated carbon market price with WB;
 - b.) The United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol, as that which gave rise to the CDM--- were mentioned to participants to explain why outside institutions (i.e. WB) and several developed countries are interested in 'purchasing' Carbon Credits or CERs from developing nations;
 - c.) Basic concepts on Climate Change and Greenhouse Gas emissions, in relation to Global Warming and its perceived effects, were also discussed;
 - d.) Carbon Credits and issuance of CERs were emphasized to require accurate and regular reporting of methane gas production data from operating biogas digesters, and validation and documentation of the reported data by designated authorities;
 - e.) LBP as a government institution not only with a mandate for countryside development, but with a clear vision for ensuring and implementing environmental compliance and environmental protection initiatives;
 - f.) LBP to provide institutional assistance as regards CDM validation processes and required documentation, and technical assistance.

PROJECT DISCUSSION

12. Engr. Shielson Sibolboro of SERED presented the design and specifications of the biogas digester constructed at (Barangay Malabbac, Iguig, Cagayan. The following are the highlights of his presentation:
 - a.) Engr. Sibolboro explained that the design of his biogas digester system consists of:
 - (i) **Inlet Chamber** – to which influent (mixture composed of pig manure and wastewater) coming from pig houses at the farm, is conveyed through an open sewer line into. This inlet chamber acts primarily as a settling tank and screening chamber for removing sediments and other large particles in the influent prior to introduction into the main digester chamber.
 - (ii) **Main Digester** – a concrete-reinforced cylindrical structure designed to hold the influent material for a minimum of 10 days, thus ensuring its bio-conversion into methane gas and treated effluent material.
 - (iii) **Methane recovery system** – structured as an inverted-cone-shaped roof on the main digester chamber, for sequestering the methane gas produced and conveying it into a biogas genset system for conversion into energy as an alternative power source for farm operations. A flaring system is also installed as an option for flaring any excess methane gas produced in the system.
 - (iv) **Outlet Chamber** – designed to receive and hold sludge material by-product of the biodigestion process. Sludge material may be removed manually from the outlet chamber. Effluent passing coming from the main digester passes through the outlet chamber to be further received and treated into a series of three settling ponds. These settling ponds are designed as constructed wetlands, ensuring treatment of effluent to a water quality level appropriate for farm irrigation purposes.

- b.) He enumerated the benefits of having a biogas system installed at the farm, including: alternative power source for the piggery farm (from conversion of methane gas to energy); possible total elimination of power expenses for the farm from the methane gas produced; better waste management (of animal waste and wastewater produced from piggery operations); and reduction of air and water pollution attributed to piggery activities.

13. _____ discussed the Environmental Management System, implemented at the piggery farm, including:

- a.) Solid waste management – through segregation and proper disposal of solid waste material generated at the farm;
- b.) Proper collection and disposal of waste materials classified as biohazardous waste – through hauling by accredited transporters of hazardous wastes and disposal into a managed sanitary landfill;

OPEN FORUM/ISSUES AND CONCERNS

14. The participants were then given the chance to raise questions, issues, or concerns regarding the biodigester project at Big Boys Farm located in Barangay Malabbac, Iguig, Cagayan.

Questions, Issues, or Concerns Raised	Responses Provided
Brgy Captain Antonio Banatao, Jr. asked what benefits can the community expect to receive from the project.	I _____ Farm, replied that at present, there are no concrete plans yet as to how benefits of the project is to be shared with the community. He indicated that the farm management is willing to share the benefits, as long as it involves the community as a whole. He welcomed suggestions or ideas from the community members on how this can be implemented.

15. The community members expressed their support for the biogas project of I _____




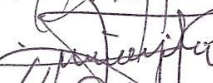


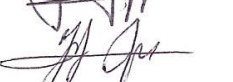


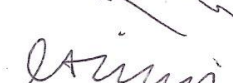
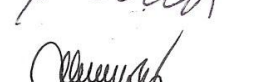
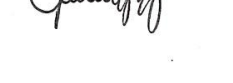

16. _____ was called on to deliver some short closing remarks. He duly thanked participants of this activity, especially the community members of Barangay Malabbac and Barangay Atulu, for taking the time and effort to attend and actively join in the discussions.

17. The Stakeholders' Consultation activity was then formally ended at 5:30PM of the same day.

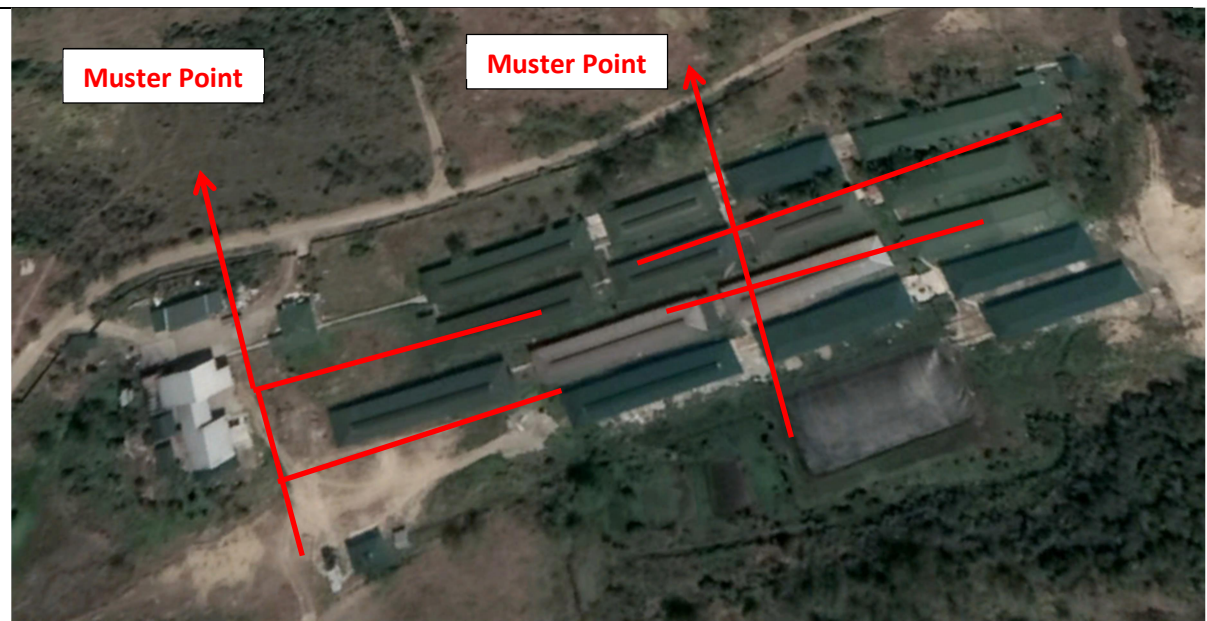
BIG BOYS FARM
CLEAN DEVELOPMENT MECHANISM (CDM)
Methane Recovery and Combustion from Animal Waste Management System
Stakeholders' Consultation
 Patio Lorenzo, Carig, Tuguegarao City
 July 24, 2015

Name	Organization / Affiliation	Address	Signature
KRISTIAN BRYAN O. TAGATA	Admin / BBIF	Malabbac, Igung, Cagayan	
WILFREDO MISTRANZA	BBIF	MALABBAC IGUNG CAG	
LOUIE B. CUSTODIO	PIC - CPO	Zaragoza, Nueva Ecija	
MIKE R. RIMAN	BBIF	MALABBAC, IGUNG, CAG.	
Gerry Alivia	BBIF - Owner / Manager	Tug. City	
Ma. Consuelo Alivia	BIGBOYS FARM	TUG. CITY	
SCORRO ELMA G. MORALES	Lau-Igung-MENRO REP.	Igung, CAG.	
Marcial Lamusao	Kag Brgy Kag	Abulu Igung Cag	
JEFFERSON B. CARANGAL	BRGY. KAG	ATUHI, IGUNG, CAG	
Antonio P. Banatouch	Brgy. Capt.	Malabbac	
EDGAR CABIGUIN	BRGY KAG.	MALABBAC	
HASIPAC ESPADO	BRGY KAG	MALABBAC	
GINA D. MACAYAG	LBP - Cag LC	Tug. City	
Eda Varga	LBP - EPMN		
Jojo Diaz	LBP - EPMN		
Shirley Sibdalo			

Registration

Name	(Date) Designation	Signature
KRISTIAN BRYAN O. TAGATA	BIGBOYS FARM	
WILFREDO MISTRANZA	BIGBOYS FARM	
LOUIE B. WSTODIO	PIC	
MIKEL L. BARIUAN	BIGBOYS FARM	
MASIRAG EPIFANIO	BRGY KAG-	
EDGAR LABUGUIN	BRGY KAG -	
Antonio P. Banatao Jr.	Brgy. Capt. -	
JEFFERSON B. CADANGAN	Brgy. KAG -	
Marcial Lamusao Jr.	Brgy KAG -	
SOCORRO EUNA G. MORALES	LCU-IGUG/MPDC/MENRO REPRESENTATIVE	
Gerry C. Alivia	Bigboys Farm manager	
Pinky L. Alina	Big Boys Farm	
GINA D. MACUXAG	Land Bank - Cagayan Lending Center	

Appendix D. Site Evacuation Plan



CPA 20 Point Persons:

Farm Manager:

Pollution Control Officer:

Biodigester Supplier: Sustainable Environment thru Renewable Energy Development
Environmental Consultancy

Local Emergency Contact Details:

Iguig Municipal Police Station: 0917 663 4524

Iguig Fire Station: 0917 895 7252

Cagayan Valley Medical Center: 078 302 0000