ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
OF
BIOGAS PLANT
FOR JANAKPUR AGRO FARM LIMITED, DHANUSHA

Submitted To:

Alternative Energy Promotion centre (AEPC)
Biogas Sub Component
Tahachal, Kathmandu, Nepal

Submitted By:

Janakpur Agro Farm Ltd., Murgiya
Dhanushadham - 9
Dhanusha

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ACRONYMS AND ABBREVIATIONS

AD	Anaerobic Digester
AEPC	Alternative Energy Promotion Centre
Appx.	Approximately
BOD	Biological Oxygen Demand
CBS	Central Bureau of Statistics
CH_4	Methane
CITES	Convention on International Trades of Endangers
CO_2	Carbon dioxide
CNG	Compressed Natural Gas
DIA	Direct Impact Area
EPA	Environment Protection Act
EPR	Environment Protection Rules
EMF	Environmental Management Framework
ESIA	Environmental and Social Assessment
FGD	Focus Group Discussion
GoN	Government of Nepal
H_2S	Hydrogen Sulfide
HRT	Hydraulic Retention Time
IEE	Initial Environmental Examination
IIA	Indirect Impact Area
IUCN	International Union for Conservation of Nature
JAFL	Janakpur Agro Farm Limited
MD	Managing Director
NOx	Nitrogen Oxides
NRREP	National Rural and Renewable Energy Progamme
PSA	Pressure Swing Adsorption
SCADA	Supervisory Control and Data Acquisition
SO_2	Sulfur dioxide
SMF	Social Management Framework
SREP	Scaling-up Renewable Energy Program
TPD	Tons per day

Contents

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Janakpur Agro Farm Limited was established in 2075 B.S. and specializes in the production of high-quality eggs through poultry farming. The company also aims to develop a Continuously Stirred Tank Reactor (CSTR)-based biogas plant within the premises of the same poultry farm in Murgiya, Dhaara Paani, Dhanushadham-9, Dhanusha. This plant will be equipped with a double-membrane gasholder and will operate at a mesophilic temperature. The plant will produce biogas and organic fertilizer. The biogas generated will be used to produce Bio-CNG, while the organic fertilizer will be sold for commercial purposes. The available land area is 63,172.57 m^2 and land required for the biogas project is 32,500 m^2 at maximum. The land used for the purpose of developing the subproject is private land and in the name of Janakpur Agro Farm Ltd. The plant will produce 6,250 m^3 of raw biogas per day, from which 2,355 TPD of CNG can be generated. This CNG will be used to power the heater at Janakpur Agro Farm, which requires 1,109.59 kg of CNG per day. Furthermore, the company plans to utilize the surplus CNG for the heater at its Hetauda-based poultry feed plant, which requires 394.52 kg of CNG per day, and for the boiler that consumes 850.89 kg of CNG daily. The plant will also produce 9.1 tons of organic fertilizer per day which will be sold for commercial purpose.

The potential negative impacts of the sub-project during construction phase are construction spoils & mucks, washout liquid wastes, gaseous emission from vehicles carrying construction materials, emission of dust and suspended particles. Similarly, wastewater after dewatering of post-digestate slurry, leaching of raw feedstock into groundwater during rainy season, issues related with collection and transportation of waste, post-digestate slurry management, odor, noise, drainage management and occupational health of operational staffs are potential impacts during the operation phase. The Environmental and Social Impact Assessment (ESIA) has identified potential environmental and social risks and impacts during both construction and operation phases. Key social risks include change in land use, Emission due to construction, and issues due to increased transportation activities. Additionally, challenges related to a weak grievance mechanism and inadequate information disclosure could hinder effective stakeholder engagement and conflict resolution. However, there are also many positive impacts associated with the implementation of the sub-project. Employment opportunity to locals, skill development of locals and increase in local economic activities are some of the beneficial impacts in addition to substrate management.

The above identified potential adverse impacts can be alleviated by strictly following the mitigation measures proposed in this ESIA report. All vehicles and machineries used in the construction as well as operation phase should be in compliance with emission standards set by Ministry of Forests and Environment (MoFE), stockpiles should be covered to avoid washout during rainy season, mixing and washing of aggregates should be done in designated area, direct discharge of slurry and decanted waste should be avoided. Along with this, all the workers should wear Personnel Protective Equipment like helmets, safety jacket, gloves, boots in both construction and operation phase. Proper training should be provided to staff on occupational health and safety so that accidents and diseases can be prevented. Hence, from the environment and social point of view, the sub-project will not cause significant impact if the mitigation measures are strictly followed.

The roles and responsibility have been allocated to developer, construction contractor and operation team. The monitoring will be conducted by AEPC in different phases of project. The total budget allocated for this is NPR. 220,000.

कार्यकारी सारांश

जनकपुर एग्रो फार्म लिमिटेड वि.सं. २०७५ मा स्थापित भई कुखुरापालनमार्फत उच्च गुणस्तरका अण्डा उत्पादनमा गर्दै आईरहेको छ र यस कम्पनीले मुरगिया, धारापानी, धनुषाधाम-९, धनुषा स्थित सोही कुखुरापालन फार्मको प्राङ्गणमा एक Continuously Stirred Tank Reactor -CSTR_-आधारित बायोग्यास प्लान्ट विकास गर्ने उद्देश्य राखेको छ । यो प्लान्ट दुई तहको मेम्ब्रेन ग्यास होल्डरले सुसज्जित हुनेछ र मेसोफिलिक तापमानमा संचालन हुनेछ । प्लान्टले प्रमुखत बायोग्यास र जैविक मल उत्पादन गर्नेछ । उत्पादन गरिएको बायोग्यास Bio–CNG उत्पादन गर्न प्रयोग हुनेछ भने, जबकि जैविक मल व्यावासिक प्रयोजनको लागि बेचिने उद्देश्य राखिएको छ । कुल उपलब्ध जग्गाको क्षेत्रफल ६३,१७२.५७ वर्ग मी. मध्ये बायोग्यास परियोजनाका लागि अधिकतम ३२,५०० वर्ग मी. जग्गा आवश्यक हुनेछ । परियोजना विकासको लागि प्रयोग गरिएको जग्गा निजी जग्गा हो र यो जनकपुर एग्रो फार्म लिमिटेडको नाममा रहेको छ । प्लान्टले दैनिक ६,२५० घन मी कच्चा बायोग्यास उत्पादन गर्नेछ, जसबाट २,३५५ टन प्रति दिन -TPD_ CNG उत्पादन गर्न सकिन्छ । सो उत्पादित CNG जनकपुर एग्रो फार्मको हीटरको लागि आवश्यक ऊर्जाका लागि दैनिक १,१०९.५९ किलोग्राम खपत हुनेछ भने कम्पनीले यसको हेटौडा स्थित कुखुरा खाद्य कारखानाको हीटरको लागि आवश्यक पर्ने ऊर्जाको लागि पनि CNG प्रयोग गर्ने योजना बनाएको छ, जुन दैनिक ३९४.५२ किलोग्राम CNG आवश्यक पर्ने देखिन्छ र बोइलरलाई थप दैनिक ८५०.८९ किलोग्राम । त्यसै गरी प्लान्टले दैनिक ९.१ टन जैविक मल पनि उत्पादन गर्नेछ, जुन व्यावासिक प्रयोजनको लागि बेचिने उद्देश्य राखेको छ ।

निर्माण चरणमा परियोजनाको सम्भावित नकारात्मक प्रभावहरु निर्माण अवधिमा आउने फोहोर हरु, बग्ने तरल फोहोर, गाडी बाट हुने प्रदुषण, धुलो धुँवा आदि हुन् । त्यसैगरी, post-digestate slurry को फोहोर पानी निस्कने, वर्षायाममा कच्चा फिडस्टक जमिनको पानीमा फ्याँक्ने, फोहोर सङकलन र ढुवानीसँग सम्बन्धित समस्या, ग्याँसका लागि प्रयोग भएका फोहोर व्यवस्थापन, गन्ध, आवाज, ढल निकास व्यवस्थापन र परिचालन कर्मचारीहरुको पेशागत स्वास्थ्य सम्भावित छन् । तर परियोजना कार्यान्वयनसँग सम्बन्धित धेरै सकारात्मक प्रभावहरु पनि छन् । स्थानीयलाई रोजगारीको अवसर, स्थानीयको सीप बिकास र स्थानीय आर्थिक गतिविधिमा बृद्धि र सब्सट्रेट व्यवस्थापनका अतिरिक्त लाभदायक प्रभावहरु हुन् । पर्यावरणीय तथा सामाजिक प्रभाव मूल्यांकन (भ्क्ष्ब) ले निर्माण तथा सञ्चालन दुवै चरणमा सम्भावित पर्यावरणीय र सामाजिक जोखिमहरू तथा प्रभावहरू पहिचान गरेको छ। मुख्य सामाजिक जोखिमहरूमा भूमि प्रयोगमा परिवर्तन, निर्माणका कारण उत्पन्न हुने उत्सर्जन, पानीको प्रदूषण तथा यातायात गतिविधि वृद्धिबाट उत्पन्न हुने समस्याहरू सामेल छन्। साथै, दुर्बल गुनासो व्यवस्थापन प्रणाली (नचष्भखबलअभ नभअजबलष्क) र अपर्याप्त जानकारी खुलासा (प्लायचकबतष्यल मष्कअयिकगचभ) जस्ता चुनौतीहरूले स्टेकहोल्डर (संलग्न पक्ष) को प्रभावकारी सहभागिता तथा विवाद समाधान प्रक्रियामा अवरोध पुऱ्याउन सक्ने सम्भावना छ ।

उपरोक्त पहिचान गरिएका सम्भावित प्रतिकूल प्रभावहरु यस ESIA प्रतिवेदनमा प्रस्तावित न्यूनीकरण उपायहरुलाई कडाईका साथ पालना गरेर कम गर्न सकिन्छ । निर्माण तथा सञ्चालन चरणमा प्रयोग हुने सबै सवारी साधन र मेशिनरीहरु वन तथा वातावरण मन्त्रालयले तोकेको उत्सर्जन मापदण्ड अनुरुप हुनुपर्छ, स्टकपाईलाहरु वर्षायाममा भिज्नबाट बचाउन छोपिएको हुनुपर्छ, एग्रीगेटहरु धुने कार्य तोकिएको ठाँउमा गर्नुपर्छ । slurry र decanted

फोहोरका सीधा जमिनमा विर्सजन नगरी तोकिएको ठाँउमा मात्र गर्नुपर्छ । यसका साथै निमार्ण र सञ्चालन दुबै चरणमा सबै कामदारले हेल्मेट, सेफ्टी ज्याकेट, पञ्जा, जुत्ता जस्ता कर्मचारीको सुरक्षात्मक उपकरण लगाउनु आवश्य छ । दुर्घटना तथा सरुवा रोगहरु रोकथामका लागि कर्मचारीहरुलाई व्यवसायिक स्वास्थ्य र सुरक्षामा उचित तालिम दिनुपर्छ । तसर्थ, वातावरण र सामाजिक दृष्टिकोणबाट, न्यूनीकरण उपायहरु कडाईका साथ पालना भएमा परियोजनाले प्रतिकुल नकारात्मक प्रभाव पार्ने सम्भावना देखिदैन ।

विकासकर्ता, निर्माणकर्ता र सञ्चालन टोलीलाई भूमिका र जिम्मेवारीहरू बाँडफाँड गरिएको छ । परियोजनाको विभिन्न विकास चरणमा AEPC द्वारा अनुगमन गरिनेछ,। यसका लागि कुल बजेट रु. २,२०,००० विनियोजन गरिएको छ ।

CHAPTER 1: INTRODUCTION

1.1 Project Description & Location

Janakpur Agro Farm Limited was established in 2075 B.S. and specializes in the production of high-quality eggs through poultry farming. The company also aims to develop a Continuously Stirred Tank Reactor (CSTR)-based biogas plant within the premises of the same poultry farm in Murgiya, Dhaara Paani, Dhanushadham-9, Dhanusha. This plant will be equipped with a double-membrane gasholder and will operate at a mesophilic temperature. The plant will produce biogas and organic fertilizer. The biogas generated will be used to produce Bio-CNG, while the organic fertilizer will be sold for commercial purposes. The available land area is 63,172.57 m^2 and land required for the biogas project is 32,500 m^2 at maximum. The land used for the purpose of developing the subproject is private land and in the name of Janakpur Agro Farm Ltd.The land ownership documents are provided in Annex 1.

a. Background and Rational of the subproject

Janakpur Agro Farm Ltd. is a poultry farm based on state-of-the-art technology. It has raised the poultry industry to a new level producing high quality eggs and layers day-old chicks in Nepal. JAFL has now envisioned developing a biogas plant by using the poultry litter from its poultry farm along with other substrates (cow dung, press mud) which will be collected from the surrounding areas.

b. Salient Feature of the subproject

- The area of implementation of the project is in Dhaara Paani, Dhanushadham -9, Dhanusha.
- The digester of proposed biogas plant is based on CSTR, (continuously stirred tank reactor) mesophilic fitted with double membrane gas holder. The biogas produced will be used to generate Bio-CNG for captive use and organic fertilizer to sell it for commercial purpose.
- Available private land area is 63,172.57 m^2 and the land required for the biogas project is 32,500 m^2 at maximum.
- The plant will produce 6,250 m^3 of raw biogas per day, from which 2,355 TPD of CNG can be generated. This CNG will be used to power the heater at Janakpur Agro Farm, which requires 1,109.59 kg of CNG per day. Furthermore, the company plans to utilize the surplus CNG for the heater at its Hetauda-based poultry feed plant, which requires 394.52 kg of CNG per day, and for the boiler that consumes 850.89 kg of CNG daily.
- The plant will also produce 9.1 tons of organic fertilizer per day which will be sold for commercial purpose.
- 60% of the total investment shall be invested by Janakpur Agro Farm Ltd. and remaining 40% will be provided by AEPC through subsidy.
- The technical service for construction biogas plant will be acquired from KIS Group Pvt. Ltd. India. The construction, initial operation including capacity building of local human resource will be done under the close guidance and supervision of technology provider. The technology provider takes full responsibility on quality of construction, equipment as

well as outputs. The Performance Guarantee letter from KIS Group Pvt. Ltd has been attached in Annex 1.

c. Location

The project will be built in Dhara Paani, Dhanushadham Municipality – 9, Dhanusha, Madhesh Province. The coordinate of proposed plant is 26^0 55'1.953" N and 86 01'59.816" E.

Figure 1: Location of the proposed commercial biogas plant

1.2 Proponent

Janakpur Agro Farm Ltd is the proponent registered on September 30, 2018 with registration number 199851/075/076. The proprietor is Mr. Shovakanta Dhakal.

MinErgy Pvt. Ltd was assigned for conducting the ESIA of the sub-project. This ESIA has been prepared complying with the World Bank's Operational Policy and Environmental Management Framework (EMF) and Social Management Framework (SMF) of Mini Grid Energy Access Project (MGEAP).

The contact detail of the consulting firm is as follows:

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1.3 Study Methodology

The ESIA was undertaken considering Environment Management Framework (EMF) and Social Management Framework (SMF) of MGEAP, as well as the National EIA Guidelines 1993 and EPR 2020.

a. Desk Review

Available literature and secondary data were extracted from published reports; topographic maps, land use maps and aerial photographs (Google Earth), Cadastral maps etc. Similarly, detailed feasibility study report of the sub-project, environmental standards, Acts, Regulations etc. were reviewed as necessary. The district profile of Dhanusha and profile of Dhanushadham Municipality were also reviewed for acquiring demographic information of the project location.

b. Field Based Study

A field visit was carried out by a safeguard team comprising of Environmentalist, Environmental Engineer and Sociologist on August 12-19, 2024. During the field visit, site specific data were collected by visiting the proposed site and surrounding areas. The cultural and historical sites near project area were identified and information was gathered through key informant survey.

Physical Environment and Cultural Environment: Checklist and matrix were used to collect site-specific information about physical environment of the project area. Information collected during the field visit include land use pattern, land stability, topography, geology, drainage characteristics, climate, rainfall and available infrastructures near changed project structures. The checklist used to get information during field visit is attached in Annex 10.

Biological Environment: Information of different flora and fauna, hetero fauna, avians, etc. were collected along with site specific study of biological entities that could be directly in the effect radius of the proposed project.

Socio-Economic Environment: The information on socio-economic condition of the people of project affected area were collected through, informal public consultations. The information about settlement in project vicinity, religious places and present waste management practices were noted through consultation with key informants and locals.

c. Impact Assessment

After the complete documentation of baseline environmental data of the project area, impact was identified. Then impacts were categorized as direct and indirect. Each of the direct and indirect impact was further evaluated in terms of their extent as site specific, local or regional. Each of these was further analyzed in terms of duration as short-term, medium-term and long-term. The magnitude of each of the impact is then evaluated based on the National Environmental Assessment Guideline (1993).

d. Public Consultation

A public consultation meeting was held within project premises in presence of nearby localities and agricultural land owners. During the consultation, a brief description of proposed facilities was delivered and the issues raised by the public during the consultation meeting were collected and incorporated in this report. Furthermore, public consultation will be held during the construction and operation phases as well.

e. Project Impact Area Delineation

The sub-project affected areas are classified into direct and indirect impact area based on scale, nature and location of the sub-project. The Zone of influence of the sub-project also does not incorporate any protected areas, indigenous land or native communities.

Direct Impact Area (DIA): Direct Impact Area includes the area where direct activity during construction and operation of the sub-project occurs. This area endures site specific impacts which could not be avoided but its effect could be minimized or compensated by taking relevant measures. The direct impact area can be categorized as the area of 100 m radius from the sub-project site, where the construction and operation activities take place.

Indirect Impact Area (IIA): Indirect impact area includes all those areas, which endures indirect impacts by the construction and operational activities. These impacts can be minimized and mitigated. The area of 500 m radius from the sub-project vicinity is considered as Indirect Impact Area. The indirect impacts may include the percolation of liquid slurry to nearby river and lands.

Figure 2: DIA and IIA of JAFL

CHAPTER 2: PLANT DESIGN AND TECHNOLOGY

The process selected for this plant is "Mesophilic digestion with Membrane based Gas Up-gradation technology".

The major Characteristics of the technology are:

a) Anaerobic down flow Mesophilic fermentation.
b) Biomass feed- continuous type.
c) Fermentation at constant temperature & pH.
d) Continuous agitation of fermented slurry.
e) Effective scrubbing in order to achieve cleaner and safer biogas.

2.1 Digester Sizing

Mass (Final)= (30%*60000) +(30%*15000) +(20%*5000))/10%

= 235000.00 kg

= 235 m^3/day

For HRT of 37 days,

Total Substrate Volume= 235 m^3/day *37

= 8695 m^3

Recommended Digester: 2 biogas digester each of total volume of 4250 m^3

Total Digester Volume= 1000 m^3 each of 500 m^3

Table 1: Digester Sizing

S. N	Parameters	Value
1	ZPHB^R Reactor Volume	4250 m^3
2	Dome Volume	500 m^3
3	No of Reactors	2 Nos
4	Dimension	26.0 m Dia × 8.5 m Ht.

2.2 Summary of Plant

Based on the technical criteria & biomass substrate details explained above the biogas plant produces 2.35 TPD of Compressed Natural Gas and 10.7 TPD of solid fertilizer. The biogas power plant would comprise of following subsystems:

- **Pre-Treatment**

The collected poultry litter from the conveyor is transferred into the unloading tank for slurry preparation; it should be free from all feathers, shells and other impurities. The press mud and cow dung is unloaded into the unloading along with poultry for slurry preparation. The prepared slurry is passed through Sedimentation Tank for sand/silt removal followed by feed tank. The prepared slurry is homogenized with mixer to prepare slurry of 9 - 10 % solid concentration in Feed Tank. Slurry from the Feed Tank is fed to the Reactors. The dead birds can also be crushed through crusher system then taken into the unloading tank.

- **Biogas Digester:**

Organic materials such as for example cow dung, press mud, chicken manure is used as input materials. Natural methane bacteria transform organic material in the fermenter in a wet environment and the absence of air to biogas. Biogas consists of 50-75% methane, 50-25% of carbon dioxide and of trace gases such as Hydrogen sulphide.

The anaerobic treatment method utilized in this project is a non-media, proprietary ZPHB CSTR system. It is mesophilic reactor i.e.; it operates best in temperature range of 35 – 39 ^{0}C. The reactor will be made of RCC with double membrane roof. In this type, the feed slurry is introduced from side centre of the reactor and it is mixed by **Advanced Turbo Liquid and Gas Mixing system (TLGM)** which helps the slurry to maintain active, bacteria in suspension. These bacteria utilize organic matter present in slurry and produce biogas. The reactor is provided with Pressure and Vacuum breaker system to ensure efficient performance and safety of the reactor. The reactor contains a heating coil system to maintain optimum temperature of the slurry during the winter season. The overflow of slurry from the reactor is collected in slurry tank which is taken to the sludge management process for further processing.

Figure 3: Biogas Digester

- **Biogas Management System**

The biogas produced by anaerobic digestion inside the ZPHB® reactors is collected from reactor membrane roof then transferred to standalone gas holder then transferred to H_2S removal system followed by PSA system for up gradation. Biogas will be flared off safely through flare system during maintenance of BioCNG Plant and also excess gas to maintain the operating pressure in reactors.

- **Scrubber System**

The basic process is based on regeneration principle. The process requires circulation of an aqueous solution to remove H_2S and to regenerate the chemical taking part in the reaction. The raw biogas enters the scrubber in which a clean solvent washes the gas and removes the H_2S from biogas. In addition to this, some CO_2 may also get removed. The clean biogas meeting the requirement of the end application exits the absorber. The solvent, which has now become rich in sulphide due to absorption of H2S, is transferred to bio reactor. In bio reactor sulphides are oxidized to elemental Sulphur by specific bacteria and used chemical is regenerated. Biological reaction involving oxidation by atmospheric air. The details of the above processes are given below. The general block diagram is indicated.

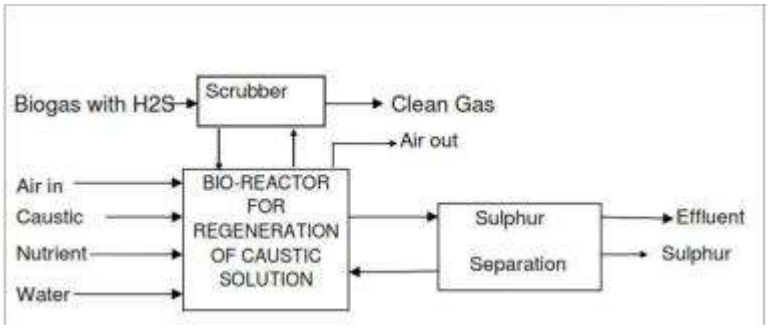

Figure 4: Scrubber System

- **Gas Upgrading**

The raw biogas is sent to Scrubber System for removal H2S before taking into the Biogas up gradation system. The H_2S removed biogas enters into the Pressure Swing Adsorption system, the raw biogas is passed through different units like, De-Sulphuriser, ACF, pre-filter, moisture separator, ADU Units & PSA Towers. After passing through all these systems, methane is purified (separated) to the purity of 93-95%. This purified methane is stored in the surge & storage tank. Further the compressor takes the gas from the storage tank and fills it into high pressure cylinders at 250 bar.

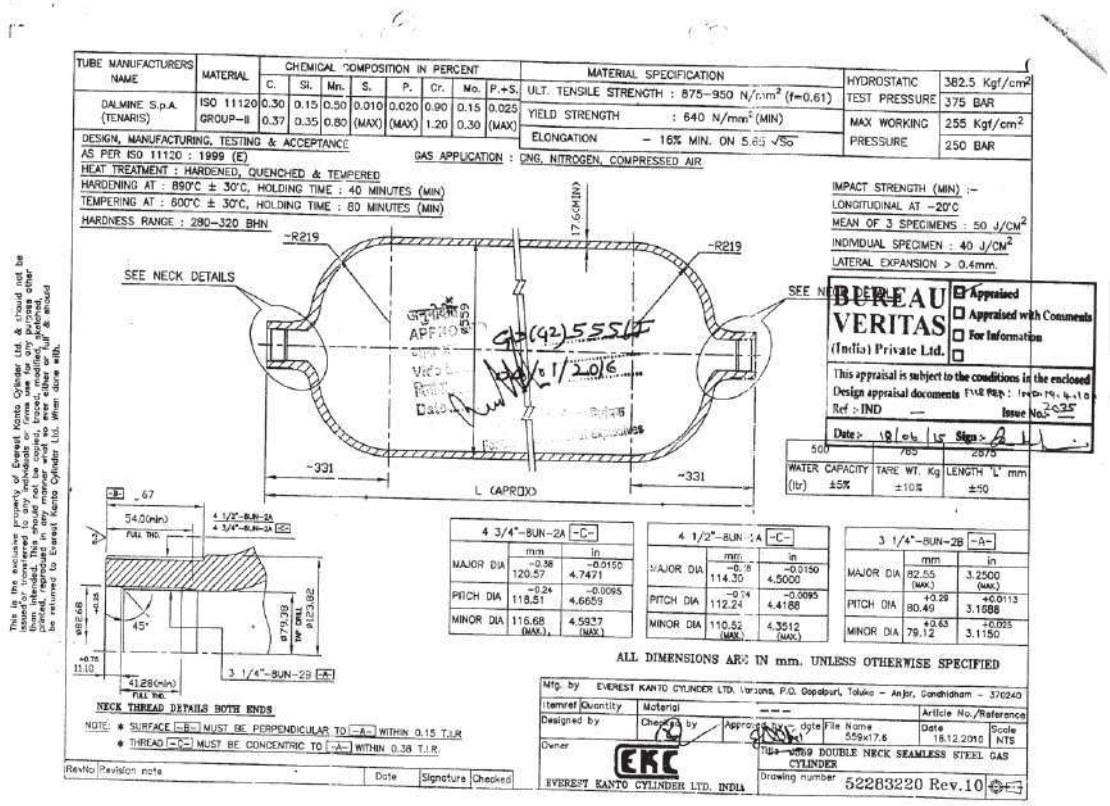

Figure 5: Indian Standards Approved Drawing Cylinder

- **Sludge Management System**

The digested sludge from the reactor is taken into the slurry tank then sent to sludge separator for separation of solids and liquid. The Separated liquid is further sent to Decanter system for

further dewatering and separation of solids. The solids from sludge separator are collected and sent to composting process to prepare the fertilizer. The Collected liquid is sent to feed preparation for preparing liquid and remaining is sent to farmers as liquid fertilizer. The final composting is weighed and bagged for sale.

The digester of proposed biogas plant is based on CSTR, (continuously starred reactor) mesophilic fitted with double membrane gas holder.

Quality of raw biogas from anaerobic digester is tabulated below:

Table 2: Quality of Raw Biogas

S. N	Parameters	Quality
1	Methane CH4	50-65%
2	Carbon dioxide CO2	40-42%
3	Hydrogen sulphide H2S	2000-5000 ppm
4	Oxygen O2	<1%

a. Process design:

The biogas plant will be two **4250 m^3** CSTR biogas plant. The technological option of the plant is shown in table below:

Table 3: Technological Option of the Plant

Type of digestion	Wet	**Temperature**	37+/-2 °C
Stage	Single stage	**Continuous/batch**	Continuous

b. Major operational parameters

The major plant operational parameters are tabulated in table below:

Table 4: Major Operational Parameters

Parameter	Biogas Yield (m^3/Kg)	TS (%)	VS (%)	Remarks
i.) Poultry Litter	0.075	30	85	

ii.) Cow Dung	0.05	20	85	
iii.) Press Mud	0.1	30	75	
Digester Temperature (^{0}C)	37 +/- 2			
Hydraulic Retention Time (Days)	37			
Water Required (Liter/Day)	198,000			Fresh water 80,000 Lit (40%)/ Recirculated water 118,000 Lit (60%)

c. Design and sizing criteria

Design and sizing criteria for all process units are listed in table below:

Table 5: Design Criteria

Parameter			Value	Remarks
Poultry Litter	Number		600,000	
	Average daily litter production by a poultry(kg)		0.1	
	Average daily litter production (kg)		60,000	
Press Mud	Quantity (kg per day)		15,000	
Cow/Buffalo Dung	Number	Big cows	145	
		Big buffaloes	70	
		Medium cows	125	
		Medium buffaloes	20	
	Average daily dung production (Kg/hd)	Big cows	15	
		Big buffaloes	20	
		Medium cows	10	
		Medium buffaloes	10	
	Average daily dung production (kg)		5,025	

The other major design criteria are tabulated below:

Period of Operation		
No. of days in operation per year	330	
Hours per day	24	
Methane in biogas (vol.)	60%	
1 m^3 methane	0.000668	Tons
1 kg of methane	50.01	MJ
1 kg of LPG	49.85	MJ

d. Testing and Commissioning

After the construction of the biogas plant, officials from AEPC will be invited to the site to test and confirm the output parameters like Guaranteed Performance Requirement (GPR), Methane Content etc. of the generated gas as claimed by the construction company. The exact date of the testing will be finalized later after smooth running of the biogas plant.

The technology partner, Knowledge Integration Service India Pvt Ltd., India in this case will be responsible for the smooth operation of the plant and will provide operational support to the developer, Janakpur Agro Farm Ltd.

e. Operation and Maintenance

Janakpur Agro Farm Ltd will hire engineers to operate and maintain the plant. The Knowledge Integration Service India Pvt Ltd., India will provide full technical support to build and operate the plant.

f. Construction

The construction materials for foundations and structural RCC include cement, concrete, steel, sand, aggregates, bricks, stone, and formwork plywood/timber. Stockpiling will be done in the available space around the project sites, and supplies will be sourced from local markets. This section presents the location of the site and its accessibility from the nearest main highway.

Figure 6: Plant Location

CHAPTER 3: ENVIRONMENTAL AND SOCIAL BASELINE ASSESSMENT

This section describes the existing environmental condition of the project area based on the site-specific information gathered through primary and secondary sources. The existing environment related to physical, biological, socio economic and cultural environment are described below.

3.1 Physical and Cultural Environment

Dhanushadham is a Municipality, which is located in Dhanusha district, Madhesh Province of Nepal. Dhanushadham has total 9 wards, which are scattered across 91.64 square kilometers of geographical area.

3.1.1 Physiography and Topography

From the physiographic point of view, the project location lies in Outer Terai region of Nepal. The project area stands at about 135 m above sea level. The project area lies in tropical climatic zone of Terai region, experiencing hot and humid summer followed by mild winter.

- North – Ganeshman Charnath Municipality
- South – Mithila Bihari RM & Shahidnagar Municipality
- East – Ganeshman Charnath Municipality
- West – Mithila & Chireswornath Municipality

According to the data provided by Meteorological Forecasting Division (MFD) 2074, the absolute maximum temperature was recorded as 34.8°C and the absolute minimum temperature was recorded as 15.6°C. Similarly, the total annual precipitation is 1552.5 mm. The general climatic condition is provided in Table 6.

Table 6: Climate Data of Project Area

Month	Mean Temperature (°C)			Precipitation (mm)
	Max	Min	Mean	
January	22.2	15.6	18.9	11.7
February	26	18.6	22.3	11.4
March	312	23.4	167.7	11.5
April	34.8	27.7	31.3	52.2
May	34.6	29.3	32.0	128.3
June	34.1	30	32.1	238.7
July	32.5	29.3	30.9	487.6
August	32.7	29.3	31.0	339.4
September	32.3	28.8	30.6	197.5
October	31.7	26.8	29.3	63.9
November	29.3	22.5	25.9	1.9
December	25.1	18	21.6	8.4

Source: *Dhanushadham Nagar Profile 2074*

3.1.2 Land use

The land use pattern of Dhanushadham municipality is dominated by agricultural land accounting about 71.02 percent following forest (11.47%). Similarly, the proposed land is barren and is owned by the proponent and the document is provided in the annex section of this report. The different land uses and its percentage coverage are presented in **Table7**.

Table 7: Land Use Pattern of Dhanushadham municipality

S.N.	Land Use	Percent
1	Agricultural Land	71.02
2	Forest	11.47
3	Shrub	4.18
4	Water Bodies	3.43
5	Sandy Area	2.29
6	Grazing Land	7.62
Total		**100**

Source: : *Dhanushadham Nagar Profile 2074*

3.1.3 Geomorphology and Geology

Nepal occupies the central sector of Himalayan arc. Nearly one third of the 2400 km long Himalayan range lies within East to West of Nepal. Similar, from South to North, Nepal can be sub-divided into the following five major tectonic zones.

- Gangetic Plain
- Sub-Himalayan (Siwalik) Zone
- Lesser Himalayan Zone
- Higher Himalayan Zone
- Tibetan-Tethys Himalayan Zone

The project is located in the Terai plain (northward extension of Indo-Gangetic plain). The North side of this area are Churey hills and its Bhavar zone whereas Southern side constitutes of flat Terai lands. Churey hills has stones, sand, coarse sand, silt, sand stone and conglomerates. Bhavar zone has gravel, sand, sandy loam, cobbles and pebbles. Similarly, Southern areas have clayey, sandy and loamy soils.

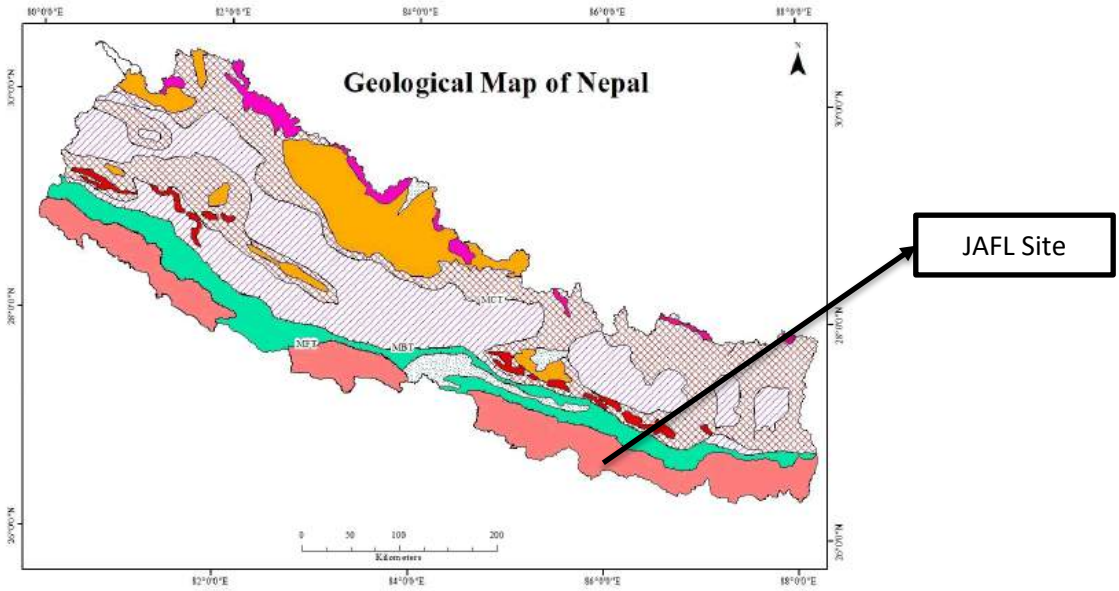

Figure 2: Geological division of Nepal. Note: Digitized after Upreti, [3], Dahal [5], and Dhital [6]. Note: (—·—) Thrust, (▭) No data, (▭) Tertiary leucogranite, (▭) Tibetan-Tethys zone, (▭) Higher Himalaya zone, (▭) Lesser Himalayan zone, (▭) Palaeozoic granite, (▭) Recent deposits, (▭) Sub-Himalayan (Siwaliks), (▭) Terai Zone.

Figure 7: Geological Map of Nepal *(Panthi and Basnet 2017)*

3.1.4 Air, Water and Noise Quality

The project vicinity has limited vehicle movement so there is negligible air and noise pollution. In addition, there are no industries and it is located in the less densely populated areas so the water quality is also fair.

Table 8 : AQI in Janakpur

Pollutant	Description	Air Quality Rating	Value	Unit
PM_{10} (Particulate Matter)	Inhalable pollutant particles <10 µm. Larger particles (>2.5 µm) can be deposited in airways, leading to health issues.	Fair	26	µg/m³
$PM_{2.5}$ (Fine Particulate Matter)	Particles <2.5 µm that enter lungs and bloodstream, causing serious health risks.	Excellent	17	µg/m³
O_3 (Ozone)	Can worsen respiratory diseases, cause throat irritation, headaches, and chest pain.	Excellent	14	36 µg/m³
SO_2 (Sulfur Dioxide)	Can cause throat and eye irritation, aggravate asthma, and lead to chronic bronchitis.	Excellent	6	6 µg/m³
NO_2 (Nitrogen Dioxide)	High levels increase respiratory risks, causing coughing, breathing difficulties, and more severe health problems.	Excellent	4	8 µg/m³

CO (Carbon Monoxide)	Colorless, odorless gas that, at high levels, can cause headaches, nausea, dizziness, and vomiting. Long-term exposure can lead to heart disease.	Excellent	1	218 µg/m³

Source: ***https://www.iqair.com/nepal/central-region/janakpur*** assessed on 11:45 , 2nd June,2024

3.2 Biological Environment

No part of the proposed site falls in the national park, wildlife sanctuary, buffer zone and conservation area as stated in Article 3, Annex 1 of EPR 2020.

3.2.1 Major Tree species:

Almost all the area within the municipality is under cultivation and built up area. There is no natural forest area with considerable size except a few patches of orchard and nurseries scattered in different places. The flora species found in this area are Sisau (*Dalbergia sissoo*), Siris (*Albizia procera*), Kadam (*Anthocephalus chinensis*), and groves of Bamboo (*Dendrocalamus hamiltoni*). Groves of bamboo are commonly found in the area. Exotic species such as Sapeta (*Eucalyptus spp*.) is also found in different parts. Kans (*Saccharum spontaneous*) and Narkat (*Phragmatis kharka*) are also found in the flood plain and banks along the flash flood track which is about 250 m away.

3.2.2 Fauna

The project site is not located in or near a sensitive ecosystem. An on-site survey of the project site confirmed the absence of unique or ecologically significant fauna. Mammals reported from the project area are Nyauri (*Herpestes auropunctatus*), Syal (*Canis aureus*) and Musa (*Rattus rattus*).

3.2.3 Avians

Major bird species reported are Battai (*Turnix suscitator*), Bhangera (*Passer domesticus*), Saras (*Ciconia episcopus*), Suga (*Psittacula himalayana*), Koili (*Cacomantis merulinus*), Parewa (Columba livia), Dhukur (*Streptopelia chinensis*), Dangre (*Acriotherus tristis*) and Kauwa (*Corvus splendens*).

3.2.4 Herpeto Fauna

Some of the Herpeto fauna found in the river area and project vicinity are King Cobra (*Ophiophagus Hannah*), Oriental rat snake (*Ptyas mucosa*) and Common krait (*Bungarus caeruleus*)..

3.2.5 Fish Species

The major fish species in these areas are: bighead carp (*Aristichthys nobilis*), silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio carpio*), and rohu (*Labeo rohita*).

3.3 Socio Economic and Cultural Environment

Dhanusha District, part of Madesh Province, is one of the seventy-seven districts of Nepal. It is situated in the Outer Terai. The district, with Janakpur as its district headquarter, covers an area of 1,180 km^2 (456 sq mi) and has a population (*CBS, 2021*) of 867,747.

3.3.1 Demographic Pattern

Dhanushadham municipality has a HH size of 4.81 which is high compared to the national average 4.6. Dhanushadham municipality has a population of 5,25,024 with whereas Ward No.9 has the smallest average HH family size of 4.48.

Table 9 : Population Characteristics

S.N	Division	Total Area (in sq.km)	Total HHs	Male	Female	Total Population	Average HH size
1	Dhanushadham municipality	91.64	10,588	25,185	26,839	52,024	4.81
2	Ward No. 9	20.45	1466	3,157	3,418	6,575	4.48

Source: CBS 2021

3.3.2 Caste/ Ethnicity, Religion and Language

Population distribution by Caste/Ethnicity

There are more than 25 caste/ethnic groups in Dhanushadham. The distribution by caste/ ethnicity comprises of 19.72% Yadav, 6.51% Musahar, 5.80% Teli, 5.75% Muslim, 5.54 Kouiri/Kushwaha, 4.89% Tamang, 4.63% and Kewat as the majority.
(Source: CBS 2021)

Language

The major language spoken in the municipality is Maithili (74.25%) followed by Nepali (7.62%), Magadi (7.06%) and Tamang (4.23%).
(Source: CBS 2021)

3.3.3 Quality of Life

Education

Dhanushadham has a literacy rate of 48.09% with 59.02% males and 37.71% females able to read and write. Ward No. 8 has the highest literacy rate whereas Ward No. 1 has the lowest literacy rate.
(Source: CBS 2021)

Health

There are 3 healthposts and 1 primary health cares in Dhanushadham municipality. There is a lack of proper Emergency Obstetric Care in this area.
(Source: CBS 2021)

Drinking Water Supply

62.59% of people in Dhanushadham are dependent on tubewell and hand pump whereas only 6.57% have piped connection. 24.7% still use open wells.

(Source: CBS 2021)

Sanitation

The subproject area has been declared as Open Defecation Free (ODF), with all households having toilets. Most of the wastewater and solid waste, being organic, is biodegradable and assimilated with the natural environment due to its nature of settings. 15% households of Ward No.9 have toilets with septic tanks.

(Source: CBS 2021)

3.3.4 Energy Use

The energy use in the project area is for mainly two purposes, one is for cooking and other is for lighting purposes. They are briefly described below:

For cooking

Majority of households in the sub-project municipality use firewood i.e. about 66.75% and 6.36% use cow dung cakes (Guithas). Only 25.95% use modern energy like LPG. The use of LP gas is increasing in major areas of the municipality.

(Source: CBS 2021)

For lighting

Most part of the Dhanushadham municipality has access to national grid. Hence, majority of the households (78.94%) use electricity for lighting followed by kerosene (20.38%). The remaining households use other forms of energy such as solar.

(Source: CBS 2021)

3.3.5 Economic Activities

About 56.6% of the total population is economically active in this municipality. Among them, about 58.3% of people are involved in Agriculture sector. About 15.1% of people are involved in wholesale and retail trade, repair of vehicles and motorcycle which is followed by 10.2% of people involved in construction field. About 2.7% people are involved in manufacturing field.

(Source: CBS 2021)

3.3.6 Cultural and Religious information

Regarding the religious and cultural sites, Ward-9 of Dhanushadham municipality only has Mane Temple which does not fall under the zone of influence or even DIA of the proposed plant. The major festivals of this municipality are Dashain, Tihar, Ram Nawami, Mahashivaratri, Haritalika, Shree Panchami, Shree Krishna Janmastami, Bibaha Panchami, Chhath, Holi, Chaite Dashain, Saune-maghe Sankranti, Matatirtha Aushi, Akshaya Tritiya, Hrishayani Haribodhani Ekadasi, Karwa Chaudh, and so on.

CHAPTER 4: RELEVANT POLICIES, LEGISLATIONS, GUIDELINES AND STANDARDS

Government of Nepal (GoN) has adopted various policies, acts, regulations and guidelines to ensure the integration of development with the environmental conservation. The ESIA was guided by the requirements and provisions of the following acts, rules and guidelines as applicable. The relevant descriptions are provided in Annex 4**.**

The Constitution

- The Constitution of Nepal

Plans and Policies

- Sixteenth Plan 2080/81(2024)-2085/86(2028)
- Fifteenth Plan 2019-2024
- Rural Energy Policy, 2006
- Renewable Energy Subsidy Policy, 2016

Acts and Rules

- Environment Protection Act, 2076 and Environment Protection Rules, 2077
- Local Government Operation Act, 2074 (2017)
- Water Resources Act, 1992
- Industrial Enterprise Act 2076 (2020)
- Solid Waste Management Act, 2011
- Solid Waste Management Regulation 2013
- Child Labor (Prohibition and Regulation) Act, 2000
- Labor Act, 2074 (2017)

Guidelines/Frameworks

- National EIA Guidelines, 1993
- Environment Management Framework (ESMF), 2018
- Social Management Framework (SMF), 2013

Standards

- National Ambient Air Quality Standards, 2003

- Nepal Vehicle Mass Emission Standards, 1999
- National Ambient Sound Quality Standard,2012
- Generic Standard for effluents to be discharged in inland surface water, 2003
- Drinking Water Quality Standard 2022

International Polices and Conventions

- World Bank Safeguard Policy (OP 4.01 Environment Assessment)
    - World Bank Safeguard Policy (OP 4.10 Indigenous Peoples)
    - World Bank Safeguard Policy (OP 4.11 Physical Cultural Resources)
    - World Bank Safeguard Policy (OP 4.12 Involuntary Resettlement)
- Convention on Biodiversity (CBD), 1993
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973
- Convention (No.169) Concerning Indigenous and Tribal Peoples in Independent Countries, 1989

CHAPTER 5: IMPACT ASSESSMENT

This section provides the predicted impact of the implementation of the proposal on environment and community. Every development project comes with some adverse impacts along with some benefits. The main purpose of conducting environmental and social assessment is to enhance the beneficial impacts and to reduce potential adverse impacts. This section distinctly categorizes the envisaged beneficial as well as adverse impacts. The adverse impacts are broadly categorized into physical, chemical, biological and socio-economic environment and assessed against the extent, magnitude and duration of the predicted impacts.

5.1 Beneficial Impacts

5.1.1 Construction Phase

a. Employment Opportunity to Locals

The sub-project will require about 50-100 person days of skilled and unskilled workers during construction period. Most of the unskilled human resources will be employed from the local community. This will increase employment opportunity to locals as well as help to enhance livelihood. Therefore, envisaged impact is high, site-specific and long term.

b. Skill Development of Locals

During the construction period, the locals involved will get to learn the skills and techniques required to carry out construction work and other sub-project related skills. This will help them to build their capacity and can use their learned skills to apply in similar projects in future.

5.1.2 Operation Phase

a. Employment Opportunity to Locals

The sub-project will require 13 numbers of skilled and semi-skilled human resources during operation period. This will increase employment opportunity to locals as well as enhance opportunities of small businesses in the surrounding areas such as establishment of retailers for selling fertilizer, small teashops, etc. which will ultimately increase the local economy.

b. Skill Development of Locals

During the operation period, the locals involved will get to learn the skills and techniques required to run and manage the plant. This will help them to build their capacity and can use their learned skills to apply in similar projects.

c. Sustainable Waste Management

The project uses 30 tons/day of substrate from poultry litter available within its own farm which otherwise would have been unused and openly disposed in the surrounding areas. The project will also produce 9.1 tons/day of compost which will be used as fertilizer in nearby agricultural lands. This project will help in keeping its surrounding vicinity clean as well as help to convert the waste into usable electrical energy and fertilizer. Therefore, envisaged impact is high, site-specific and long term.

5.2 Adverse Impacts

5.2.1 Construction Phase

a) Physical Environment

- ***Change in land use***

The proposed land of the sub-project is a barren owned by the developer. Out of total 63,172.57 sq.m of land, 32,500 sq.m of land will be used for the construction of proposed biogas plant. The construction work shall be carried out with no loss of trees and greenery measures will be undertaken around the sub-project site. Therefore, envisaged impact is low, site-specific and long term.

- ***Issues related to Air Pollution***

The construction activities such as operation of vehicles to transport the construction materials, excavation, mixing of aggregates generate dust, smoke, emission of CO_2 and other harmful gases. However, the air pollution is less likely to affect the local people as the nearest settlement is about **500 m away from the project site**. Since such activities will only continue until the construction period, the envisaged impact can be considered as site-specific in nature, low in magnitude and short term in duration.

- ***Issues Related to Water Pollution***

Percolation of wastewater generated from washing of construction materials, spillage of lubricants, grease, petroleum fuels and percolation of black and grey water generated from construction camp could contaminate groundwater. The local people depending on groundwater source for running various domestic purposes can also get affected from such activities. However, the plant's DIA and IIA do not have any major rivers. Therefore, the envisaged impact on water sources can be considered as low in magnitude, local in nature and short term.

- ***Issues Related to Soil Pollution***

Another impact that could result from construction activities is depletion of soil quality. The construction materials such as cement, contain certain level of chemicals which when mixed with soil can deplete its fertility over the time. Besides, haphazard disposal of construction debris can cause formation of muddy ditches during rainy season which would possibly hinder the staffs and local passers to walk comfortably. Other chemicals like grease and petroleum fuel if spilled will also reduce fertility of soil in the project site. The envisaged impact is site specific, low in magnitude, and short term in duration.

- ***Increase in Noise Level due to Construction Activities***

The operations of different machineries during the construction period like excavators, movement of vehicles generate noise in the sub-project site and around sub-project vicinity. However, the locals would not be significantly affected since the nearest settlement is **away from the DIA**. But the increase in noise is likely to impact construction workers. The envisaged impact is low in magnitude, site-specific in nature and short term.

- ***Issues Related with Spoil Disposal and Stockpiling of Construction Materials***

It is likely to have construction debris and stockpiles of construction materials in any construction activities. But haphazard disposal of such materials causes disturbance in aesthetic beauty of the surrounding area and besides, construction material such as cement contains certain level of chemical which when mixed with soil/agricultural field can reduce its fertility. In addition, such activities increase suspension of dust during windy season and formation of muddy surface during rainy season. The envisaged impact can be considered low in magnitude, site-specific in nature and short term.

b) Biological Environment

- ***Loss of Vegetation***

The proposed biogas plant will be constructed in agricultural land where currently maize and fodders for cattle are cultivated. Few fruit bearing trees such as mango, banana and papaya can also be found in the project site vicinity, however; the project will not require felling down of any trees. Therefore, the impact on vegetation is not envisaged.

c) Socio-economic Environment

- ***Issues related with Occupational Health and Safety of Workers***

During the construction phase, the construction work force could be exposed to number of construction related health hazards. The fugitive emissions, noise and physical injury are some of the occupational health issues for construction workforce. Moreover, work in height, confined space and hazardous environment are other potential threats to workers. The envisaged impact is moderate in magnitude, site-specific in nature and short term.

- ***Pressure on Existing Infrastructure and Community Resources***

The construction activities generally exert pressure on community water supply system, increase in solid waste generation due to increase in construction workforce etc. Since the project construction period is only few months long i.e. 8 months and construction workers are in limited numbers, there will be very negligible pressure on community utilities. Moreover, the project is going to use deep boring water in its own boundary so there won't be any pressure on community for water supply. Hence, the impact is not envisaged.

- ***Health and Sanitation Related Issues in and Around Sub-Project Site***

During the construction phase, the workers are exposed to various kind of machineries which if mishandled can cause injuries. In addition, nearby locals especially children can also meet an accident around the project area. The envisaged impact is moderate, local and short -term.

- ***Labor Influx and Associated Impacts in the Local Community***

During the development of the sub-project, various background of workforce will be employed which might cause trouble in the community. However, the labor influx during construction phase is estimated to be 50-100 person days which is lower to cause significant community disturbances. Hence, the impact caused by influx of labors to local community is negligible.

- ***Involuntary Land Acquisition and Displacement Issue***

The land proposed for the construction and implementation of the biogas plant is owned by the developer itself. Therefore, there is no requirement for additional land acquisition and issue of displacement.

- ***Grievances Management***

The grievances such as those related to odor and dust impact during the construction materials transportation and employment opportunity in the subproject are some the potential area where grievance would come. The mishandling of such grievances could invite social demonstration, opposition and conflict. The envisaged impact is low, site-specific and long term.

- ***Sexual Exploitation Abuse and Sexual Harassment***

The influx of labor in the sub-project area during the construction phase poses a risk related to sexual exploitation and abuse/sexual harassment (SEA/SH). The interaction between workers and community members could lead to increased risks of GBV in the local communities. Therefore, effective and timely mitigation measures must be implemented to address and mitigate the potential risks of SEA/SH and abusive behaviors between sub-project-related staff and the local population. The impact will be direct in nature, moderate in magnitude, local in extent and short term in duration.

- ***Gender discrimination and child labour***

Male and female workers may be paid unequally for the same or similar works. Similarly, contractor may select male and female workers for selective works rather than the capacity of individual workers. Such gender discrimination on works and pay scale may create dispute at workplace and hindrance on progress of works. Similarly, there is probability of using children in the subproject as an employee for as cheap construction labor, which is violation of legal standards, leading to immediate harm, exploitation, or deprivation of education. The impact will be direct in nature, moderate in magnitude, site specific in extent and short term in duration.

- ***Stakeholder Engagement and information disclosure***

Stakeholder engagement and information disclosure is very important for the successful implementation of the proposed subproject. Avoiding or evading the stakeholders on proposed subproject activities may hamper the progress and sustainability of the subproject. Likewise, if information regarding the subproject is not shared with concerned stakeholders and locals, it can also creates problem in subproject implementation and sustainability. The impact will be direct in nature, high in magnitude, local in extent and long term in duration

5.2.2 Operation Phase

a) Physical Environment

- ***Issues Related to Management of Raw Materials Storage and Post- digestate Slurry***

The post-digestate slurry are mostly semi solid slurry and liquid slurry. These digestate have high BOD, nitrogen content and can contaminate land and water if not managed properly. Besides digestate, the storage of raw substrate which are in large quantity can also create nuisance. If these raw feeds are not stored in a proper roofed place with sealed ground, leaching of such substrate can possibly contaminate groundwater especially during rainy season. The envisaged impact is moderate, local in nature and long term.

- ***Issues Related to Foul Odor during Storage of Raw Material and Post-digestate***

The raw materials to be used for biogas production are organic waste. Open storage of such large amount of substrate could cause foul odor in the project area and could attract flies and vector diseases. Similarly, haphazard disposal of digestate and absence of proper composting system will also create foul smell. However, the foul odor might not possibly impact the surrounding vicinity as the nearest settlement is 500 m away. So, the receptors of this impact are apparently the in-house staffs. The envisaged impact is moderate, site-specific in nature and long term.

- ***Issues Related to Extraction of Water for Meeting Demand***

The water required to operate the plant is 198 m^3/day. However, only 80 m^3 of fresh water will be used for dilution purpose as the remaining volume will be sourced in from recirculation of separated slurry water. Similarly, the project site is mostly agricultural open land and has greater availability of groundwater recharge zone so the extraction of groundwater will not impact significantly on groundwater depletion. Hence, the envisaged impact is low in magnitude, local and long term.

- ***Management of Wastewater from Digested Slurry***

The digested slurry produced from anaerobic digestion will be used as compost and also sold in the market as fertilizer. The digested slurry will be separated into liquid and solid through Screw Press Separator. The semi-solid slurry will be further dried to make compost while liquid slurry will be recirculated for operation of plant and remaining liquid slurry is proposed to be used in the owner's farm itself. However, if the liquid effluent is directly discharged to the near water body, it would increase BOD, TS and turbidity of the receiving water. Therefore, the envisaged impact is moderate, local in extent and long term.

- ***Increase in Noise Level from Plant Operation***

The noise is generated from various components to operate the plant such as hot water generator, screw press separator etc. Such operational activity can increase surrounding noise level greater than 85 dB and can cause temporary hearing loss, annoyance among the working staffs if exposed for long time. In this regard, the envisaged impact is moderate in magnitude, site-specific in nature and long term.

- ***Gas leakage and Associated Impacts Including Fire Hazard***

The biogas/methane gas is highly flammable and a naked flame can easily catch fire if leaked. This will cause loss of life and property. Moreover, emission of methane gas in atmosphere will contribute in greenhouse gas emission, which is 21 times more potent than carbon-dioxide. In this regard, the envisaged impact is moderate in magnitude, local and long term.

b) Biological Environment

- ***Maintenance and Protection of greenery in the Sub-Project Area***

There will not be any nuisance to the biological environment as the biogas plant will be installed in a well demarcated land area. Instead, plantation of trees will be done to maintain the greenery in the sub-project area.

c) Socio-economic Environment

- ***Issues Related to Occupational Health and Safety***

During the operation period, the workers are required to handle organic waste materials and slurry. Due to this, they are prone to get infected from various diseases. They are also exposed to noise from operation of plant. Prolong exposure to such activities without proper safety measures can affect their health in long run. Besides, they can also be injured due to mishandling of machineries and fire. The envisaged impact is high, site-specific and long term.

- ***Issues Related with Health and Sanitation in and around Project Site***

The operation of biogas plant consists of handling of organic waste like cow dung which might be pathogenic to some extent. Haphazard disposal and improper management can cause increase in vector borne diseases and can spread out to nearby community which could create agitation among the locals and oppose the project. The envisage impact is high, site-specific and long term.

- ***Impacts on Indigenous People and Vulnerable Communities***

The settlement of a community is found nearly 400 m away from the sub-project area. In addition, the subproject activities will be confined in the private land of developer and it is not going to use the land of indigenous people and vulnerable communities. Hence, no impact is envisaged in this regard.

- ***Inflow of People in the Project Area***

There will be 13 full time staffs during the operation phase. Similarly, due to unique nature of renewable energy industry, different people from diverse society may also visit the sub-project site. This may hinder the local culture and traditional activities of the local people which might create misunderstandings and conflict. However, since only few numbers of workers will be employed for the plant operation and management. Therefore, the envisaged impact is considered to be low, site specific and long-term.

- ***Grievances from Nearby Local Residents***

Foul odor, threat of spreading of disease, haphazard disposal of digestate are few grievances that could be raised from the community. The mishandling of such grievances could invite social demonstration, opposition and conflict. Hence, the envisaged impact is considered as high, local and long term.

Table 10: Impact Assessment

Environmental Issues	Impacts	Direct / Indirect Impact	Extent	Duration	Magnitude	Significance
Construction Phase						
Physical Environment						
Change in Land use	• Residual impact, existing agricultural land will be converted in project structures	D	S (10)	LT (20)	Lo (10)	40 Insignificant
Issues Related to Air Pollution	• Emission of dust, smoke, CO_2 and other harmful gases through vehicular movement, excavation and related construction activities	D	S (10)	ST (5)	Lo (10)	25 Insignificant
Issues Related to Water Pollution	• Pollution of groundwater through percolation of wash water from construction materials, spillage of lubricants	D	L(20)	ST(5)	Lo (10)	35 Insignificant
Issues Related to Soil Pollution	• Decrease in soil fertility of nearby agricultural land from spillage of grease and petroleum fuel • Formation of muddy ditches during rainy season	D	S (10)	ST (5)	Lo (10)	25 Insignificant

Increase in Noise Level due to Construction Activities	• Increase in noise from operation of machineries, excavation and vehicular activities	D	S(10)	ST(5)	Lo(10)	25 Insignificant
Issues Related with Spoil Disposal and Stockpiling of Construction Materials	• Degradation in aesthetic beauty • Percolation of chemical content in waste water from construction material into agricultural land • Loss of soil fertility • Formation of muddy ditches during rainy season	D	S (10)	ST (5)	Lo (10)	25 Insignificant
Biological Environment						
Loss of Vegetation	• No need to fell down any trees (Impact not envisaged)	-	-	-	-	-
Socio-economic and Cultural Environment						
Issues Related to Occupational Health and Safety of Worker	• Exposure to fugitive emission, noise and risk of physical injury	D	S(10)	ST(5)	H (60)	75 Very Significant
Pressure on Utilities and Infrastructure	• Due to shorter construction period and limited construction workers, the impact is not envisaged	-	-	-	-	-
Health and Sanitation Related Issues In and Around Sub-Project Site	• Injuries to workers while handling machineries • Community children getting into accidents	D	L (20)	ST (5)	Mo (20)	45 Significant
Grievances Management	• Grievances related with improper management of construction materials, aesthetic degradation, conflicts	I	S (10)	LT (20)	Lo (10)	40 Insignificant
Operation Phase						

Physical Environment						
Issues Related to Management of Raw Materials Storage and Post Digestate Organic Waste	• Contamination of land and water sources from leaching of raw materials and post-digestate into underground water due to improper storage system	D	L (20)	LT (20)	Mo (20)	60 Significant
Issue related to Foul Odor during Storage of Raw Materials and Post-digestate	• Increase in flies and vector disease due to improper raw material storage system and haphazard disposal of post digestate	D	S (10)	LT (20)	Mo (20)	50 Significant
Over Extraction of Groundwater	• About 66.9m^3/day of water is required for dilution purpose out of which only 13.38 m^3 of fresh water will be extracted from underground and remaining will be covered through separated water from slurry. • Excessive use of underground could lower the water table and could cause impact on availability of water in the locality that depends on underground water.	D	L (20)	LT (20)	Lo (10)	50 Significant
Management of Wastewater from Digested Slurry	• Increase in BOD, turbidity and TS of nearby water body if discharged directly into it • Groundwater pollution	D	L (20)	LT (20)	Mo (20)	60 Significant
Impact Associated with Collection and Transportation of Waste	• Foul smell along the transportation route • Possibility of dropping the waste on road • Vehicular emission	D	L (20)	ST (5)	Mo (20)	45 Significant

Increase in Noise Level from Plant Operation	• Increase in noise due to operation of biogas plant components • Temporary hearing loss, annoyance among the staffs due to prolonged exposure	D	S (10)	LT (20)	Mo (20)	50 Significant
Gas Leakage and Fire Hazard	• Methane gas being highly flammable can cause fire hazard; loss of property and life • Contribution to GHG emission due to leakage	D	L (20)	LT (20)	Mo (20)	60 Significant
Biological Environment						
Maintenance and Protection of greenery in sub-project area.	• Although no trees will be required to cut down during construction phase, greenery will be maintained.	-	-	-	-	-
Socioeconomic and Cultural Environment						
Issues Related to Occupational Health and Safety	• Physical injury to staffs • Prone to catch disease from organic waste handling	D	S (10)	LT (20)	H (60)	90 Very Significant
Issues related with Health and Sanitation In and Around Project Site	• Spread of vector borne disease around the community and staffs due to improper management of organic waste • Probable Opposition from community against the project however due to safe distance (more than 500m from community) the impact is low	D	L (20)	LT (20)	Mo (20)	60 Significant

Inflow of People in Project Area	• Increase in quarrel and debates among workforce and community	D	S (10)	LT (20)	Lo (10)	40 Insignificant
Grievances Management	• Grievances with aesthetics, odor, noise, haphazard disposal of digestate from local residents resulting opposition and conflict	I	L (20)	LT (20)	Lo (20)	60 Significant

Note: *D= Direct; ID = Indirect, S= Site specific; L = Local, R = Regional; ST= short term, NA = Not Applicable of No impact, MT = Medium Term, LT = Long Term; Lo = Low, Mo = Moderate, H = High*

Impact Weightage Criteria, National EIA Guidelines (1993)

Magnitude		Extent		Duration	
High (H)	60	Regional (R)	60	Long Term (LT)	20
Moderate (Mo)	20	Local (L)	20	Medium Term (MT)	10
Low (Lo)	10	Site Specific (S)	10	Short Term (ST)	5

Using this system, the maximum score is 140 points and the minimum 25

Significance of Impact

Total Score: *<45: Insignificant* *45-74: Significant* *>74: Very Significant*

CHAPTER 6: ENVIRONMENTAL & SOCIAL IMPACT MITIGATION

This section deals with the set of impact specific mitigation measures following the mitigation hierarchy- avoid, reduce, mitigate and compensate for any adverse environmental, occupational and social impacts.

6.1 Mitigation Measures

Mitigation measures and cost to reduce or prevent the likely environmental impacts identified in previous section have been discussed and analyzed in the table below:

Table 11: Impacts, Mitigation Measures and Cost

S.N	Environmental Impacts	Mitigation Measures	Time of Action	Mitigation Cost (NRs.)	Roles and Responsibility
A. Construction Phase					
A.1 Physical Environment					
A.1.1	• Change in land use	• Minimum land disturbance will be made while project construction. Greenery will be maintained	During Construction Phase	20,000.00	Developer
A.1.2	• Emission of dust, smoke, CO_2 and other harmful gases through vehicular movement, excavation and related construction activities	• All vehicles and machineries used in construction work shall be in compliance with emission standard set for vehicles and machineries by MoFE (with green sticker) • Regular maintenance of vehicles and machineries • Regular spray of water in the construction site and access road	During Construction Phase	50,000.00	Developer, Construction Contractor

A.1.3	• Contamination of groundwater through percolation of wash water from construction materials, spillage of lubricants	• Temporary construction of silt trap or sedimentation tank to collect washed off of aggregates • Storage of spent oil and greases in containers and its safe disposal • Provision of proper drainage system	During Construction phase	100,000.00	Developer, Construction Contractor
A.1.4	• Decrease in soil fertility of nearby agricultural land from spillage of grease and petroleum fuel • Formation of muddy ditches during rainy season	• Spent lubricants and greases, petroleum will be stored in designated vessels only. • Covering and storage of construction debris in specific place within the construction site.	During Construction Phase	-	Developer, Construction Contractor
A.1.5	• Increase in noise from operation of machineries, excavation and vehicular activities	• Provision of low sound emitting machineries • Regular maintenance of vehicles and machines • Prohibition of construction activities in night time and early morning	During Construction Phase	-	Developer, Construction Contractor

A.1.6	• Degradation in aesthetic beauty • Percolation of wash water from construction material into agricultural land and groundwater • Formation of muddy ditches during rainy season	• Stockpiling the materials in designated place within the construction site • Compaction of spoil • Covering of stockpiles to avoid washout during rainy season • Provision of necessary drainage • Using construction spoils to fill up low land area, ditches and land development work	During Construction Phase	50,000.00	Developer, Construction Contractor
A.2 Biological Environment					
A.2.1	Vegetation Loss	• No vegetation will be removed.	-	-	
A.3 Socio-economic Environment					
A.3.1	• Exposure to fugitive emission, noise and risk of physical injury	• Provision of Personnel Protective Equipment (PPE) like helmets, masks, safety jacket, gloves and safety boots, safety harness for construction workers	During Construction Phase	200,000.00	Developer, Construction Contractor

.3.2	• Injuries to workers while handling machineries • Community children caught in accidents • Transmission of communicable diseases	• Provision of PPE and Safety Aid boxes • Provision of well barricade wall in construction site • Provision of security personnel • Emergency preparedness plan, Occupational Health and Safety Plan considering the spread of communicable disease Community Health and Safety Plan (Prepared by trained staff appointed by proponent) • Provision of community health and safety plan • Awareness and orientation to construction workers to respect locals	During construction phase	50,000.00	Developer, Construction Contractor

A.3.3	• Grievances related with improper management of construction materials, aesthetic degradation resulting to conflicts	• Establish sub-project specific Grievance Redress Committee • Appoint a trained staff for handling grievances (Grievance Redress Mechanism) • Management of record keeping system of the grievance received at field level • Suggestion box will be place at the entrance of subproject premises to receive the suggestions and complaints from community people. • Instruct and assure that construction company to proceed construction work in compliance to ESIA report • Conduct periodic meaningful consultation with locals and concerned stakeholders regarding the various scope of the project and organize	During Construction Phase	-	Developer, Construction Contractor

		awareness raising program throughout the sub- project cycle.			
	Impact associated with gender and SEA/SH • Contractors, project employee and the workforce could discriminate against women and vulnerable groups • The contractor could pay differently to the male and female worker for the same work • The exploitation of children in the construction work.	• Code of Conduct (CoC) including SEA/SH for subproject staff will be implemented • Orientation of SEA/SH and gender based violence to the staff and workers of sub-projects • The use of child labour in subproject construction will be strongly prohibited (Record keeping of labour with identity card showing age will be maintained) • Both women and men and people of excluded groups will be given equal opportunity for employment and no gender discrimination will be done in terms of wages for the same or similar works.	During Construction Phase	50,000	Developer, Construction Contractor
B. Operation Phase					
B.1 Physical Environment					

B.1.1	• Contamination of land and water sources • Leaching of raw feedstock and post-digestate into groundwater and nearby river during rainy season due to improper storage system • Alter in water quality parameter	• Avoid direct discharge of slurry and decanted liquid waste into nearby water bodies and agricultural field • Storing the raw materials in roofed unit with impermeable base • Provision of compost preparation unit with sealing of base for settling solid and liquid slurry and use of slurry to make compost • Provision of proper drainage system • The feedstock storage chamber and by-product slurry chamber will be double fenced to protect workers from the fell down and accident.	During Post Construction/ Operation Phase	Included in project cost	Developer, Construction Contractor, Operation team

B.1.2	• Increase in flies and vector disease due to improper storage system of raw material and haphazard disposal of post digestate	• Avoid/minimize feedstock storage in storing yard. If needed for storing of feedstock and post digestate, store them in designated area • Covering of feedstock and post digestate • Regular cleaning around the screw press manure unit and feedstock storage area	During operation phase	100,000.00	Developer, Operation team
B.1.3	• Excessive use of underground could lower the water table and could cause impact on availability of water in the locality that depends on underground water.	• Extraction of groundwater as required quantity only. If required, extraction permit shall be collected from municipality.	During operation phase	-	Developer, Operation team
B.1.4	• Increase in BOD, turbidity and TS of nearby water body if discharged directly into it • Groundwater pollution	• Provision of proper drainage system • Prohibition of direct disposal into nearby agricultural field and water body	During Operation Phase	-	Developer, Operation team

B.1.5	• Foul smell along the transportation route • Possibility of dropping the waste on road • Vehicular emission	• Proper covering of feedstock while transporting • Proper compaction of feedstock to avoid dropping • Use of vehicles complying Vehicle Mass Emission Standard, 2069	During Operation Phase	100,000.00	Developer, Operation team
B.1.6	• Increase in noise due to operation of various equipment	• Use of low sound emitting machineries and regular maintenance of machineries • Provision of shed wherever necessary	Before Operation Phase	Included in project cost	Developer, Operation team
B.1.7	• Methane gas being highly flammable can cause explosion, fire hazard, loss of property and life • Contribution of GHG emission	• Avoid naked flame near the plant • Provision of fire extinguisher, fire balls and emergency firefighting water storage • Designation of assembly location for workers in case of occurrence of firing • Regular checking of leakage in plant	During Operation Phase	150,000.00	Developer, Operation team
B. 2	***Biological Environment***				

.2.1	• Maintenance and protection of greenery in the sub-project periphery	• Avoid throwing of waste generated by the workers in nearby area. • A strict rule for workforce not to degrade nearby greenery. • Maintenance of garden in the sub-project area.	During operation	300,000.00.	Developer, Operation team
B. 3	***Socio-economic and Cultural Environment***				

B.3.1	• Physical injury to staffs • Prone to catch disease due to handling of organic waste • Transmission of communicable diseases	• Workers shall be provided with personal protective equipment (PPE) like helmet, safety boots, safety jacket, gloves and masks • Provision of first aid kit • Staffs shall undergo a regular medical checkup • Proper orientation and training should be provided to the staff on safety so that accidents and disease can be avoided • Provision of necessary safety cautions, signposts and instructions at construction site as well as near moving machineries • Emergency Preparedness Plan • Occupational Health and Safety Plan considering communicable disease • Community Health and Safety Plan	During Operation Phase	300,000 (already provisioned in project cost)	Developer, Operation team

B.3.2	• Spread of vector borne disease around the community and staffs due to improper management of organic waste • Opposition from community against the project	• Keeping the plany areas clean with disinfectants • Avoid haphazard disposal of digestate • Awareness and training to staffs regarding sanitation and operation of plant	During Operation Phase	30,000.00	Developer, Operation team
B.3.3	• Increase in conflict (quarrel and debates) among workforce and community	• Formulation of strict rules and regulation for staffs • Aware workers to respect nearby community and their respective cultures. • Regular consultations with the local community shall be conducted right from the construction phase to mitigate the possibilities of misunderstanding and continue to have a social license to operate	During Operation Phase	-	Developer, Operation team

B.3.4	• Grievances regarding aesthetics, odor, water and noise pollution from local residents resulting opposition and conflict	• Implement mitigation measures to avoid potential impacts mentioned in B.1, B.2 and B.3 • Arrangement for handling grievances from community and proceed immediate action thereof, if any (Grievance Redress Mechanism). • Meeting with locals and awareness program to the nearby settlement regarding the nature of the sub-project	During Operation Phase	-	Developer, Operation team

CHAPTER 7: STAKEHOLDER CONSULTATION, COMMUNITY PARTICIPATION & DISCLOSURE

A public consultation was carried out on 23/09/2077 (7/1/2021) at 9:00 A.M at the JAFL premises with 14 representatives under the observation of Ward Secretary Mr. Dhyani Yadav. The community and all stakeholders are in favor of the technology implementation. The primary reason for this is that the land is located as such that it doesn't affect any of the surrounding directly. The most recent stakeholder consultation provided a platform for engaging key stakeholders, including local communities, regulatory bodies, and project partners. Discussions focused on environmental impacts, mitigation measures, and community concerns, with feedback incorporated into project planning.

Moving forward, the project will maintain regular engagement with stakeholders throughout the construction and operational phases. This will include quarterly public meetings, biannual stakeholder workshops, and an open grievance redress mechanism to address emerging concerns. Additionally, digital platforms and surveys will be used to collect ongoing feedback, ensuring transparency and responsiveness to stakeholder needs. Similarly, the involvement and assurance of participation from the inception phase of the project has had a positive impact on the community.

Shamsher Lama, Local Resident, Murgiya, Dhanushadham – 9

We only wish for mutual work and employment opportunities. The technology is something we really look forward to and we trust the team completely.

Ram Kumar Lama, Local Resident, Murgiya, Dhanushadham – 9

We have known the proponents for a long time now and we are excited about the technology. We were initially worried about the potential air and noise pollution but as we became aware and clear of the technology, we now have no worries as such. Thanks to the technology briefing that JAFL provided time and again.

A concern show time and again by the locals was their will to build a stupa in the outer premises of the allotted land. This was settle amicably by JAFL by assigning the required land and pathway to the locals on the spot. The biogas plant site will also be properly distant from the stupa. The minutes, photographs and proceedings have been provided in Annex 3– of this repot

CHAPTER 8: ALTERNATIVE ANALYSIS

In order to ensure the sub-project as an environmentally sound project, alternative analysis is carried out to choose better alternative from the environmental perspective and without compromising the process flow or production. The aim of alternative analysis is to arrive at a development option, which maximizes the benefits while minimizing the unwanted impacts. While exercising the alternative analysis, the following aspects were considered.

8.1 No Project Option

The project utilizes the organic wastes which are otherwise would have been thrown haphazardly in public areas/roadside or disposed in developer's own land. So the "No Project Option" is out of scope for this study.

8.2 Alternative Technology and Design

There are several anaerobic digestion technologies to generate biogas from anaerobic digestion. Modified GGC is the native anaerobic digestion technology promoted in Nepal. While, in this sub-project, highly efficient CSTR technology with heating and stirring is adopted for higher energy yield. CSTR technology has been tested and proven in context of Nepal. There are successful examples in Nepal where CSTR has been used for generating electrical energy for captive use. Hence, for handling large organic manure the proposed technology is appropriate.

8.3 Alternative Schedule, Process, Raw materials and Resources

Construction periods of eight months have been proposed for the proposed sub-project. The excavation activities will be accomplished in the dry period in order to reduce the erosion and sedimentation of spoils into nearby farm land and river. The construction materials will be sourced from Nepalese market by competitive bidding process or best practice. Sub-project machineries will be imported from India. During operation phase, raw materials are chosen in order to assure the quality aspects as well as economically viable. All the raw materials used will be sourced from the internal market as far as possible.

8.4 Alternative site

The proposed sub-project will be developed in a private land owned by the developer. The developer has already initiated construction of fence and cow farm in the proposed area. The proposed area is also far from dense human settlement and significant archeological site. Development of sub-project in the proposed land will not need any resettlement and felling of trees. Transporting cow dung from the proposed area to any other alternative site will endure additional cost and also have negative impacts on environment. Hence, the proposed site for the sub-project is justifiable.

CHAPTER 9: ENVIRONMENTAL AND SOCIAL IMPACT MONITORING

9.1 Project Management Responsibility

The responsibility for the implementation of mitigation measures lies with the project proponent. Because of small nature of project, the monitoring of environmental parameters during the construction and operation period should also be done by the proponent.

9.2 Environmental Standards

The GoN has endorsed environmental standards on air, water and noise quality. These environmental standards shall be treated as other acts and regulations until GoN enforces standards in the specified sector for the project environmental compliance propose.

Considering this, the environmental standards for compliance for the proposed sub-project construction and operation attached in Annex 5**.**

9.3 Environmental Monitoring Plan

The environmental monitoring plan designed for the project has three main objectives:

- To ensure that the project baseline conditions an adequately documented such that a comparative assessment of the project baseline before and after the project could be made objectively for impact evaluation
- To ensure that the mitigation commitments to minimize the predicted adverse impacts and maximize the beneficial impacts including the environmental enhancement programs were actually complied and implemented in time and with sincerity by the project.
- To verify that the project impacts were within the limits of the impact prediction or some unforeseen impacts also occurred during project development and what measures were taken to minimize the unforeseen impacts

As baseline environment of the proposal development area is grossly known and also documented in this report, the proponent itself will carry out compliance and impact monitoring of the sub-project construction and operation period. As part of compliance monitoring, the project will ensure the periodic reporting of ESIA/ESMP implementation. The proponent will submit monthly report to AEPC, detailing the progress of environmental and social safeguard measures, mitigation efforts, issues or grievances, incidents and any corrective actions taken. Based on these reports AEPC prepare quarterly progress and submit to the World Bank. These reports will also be shared with relevant stakeholders to enhance transparency and accountability. The monitoring management plan for baseline, compliance and impact is presented in Table 10.

Table 12: Baseline Monitoring, Construction and Operation Phase

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
Prior Construction Phase							
1	• Groundwater quality testing of nearby river	Proponent	Laboratory Analysis	Prior to construction period	AEPC	Project Site	15,000.00
2	• Air Quality (TSP, PM 2.5, PM 10, Methane fraction)	Proponent	Low Volume Sampler, Gas Analyzer	Prior to construction phase	AEPC	Project Site	75,000.00
3	• Noise level monitoring of project location	Proponent	Noise level Meter	Prior to construction period	AEPC	Project Site	10,000.00

Table 13: Compliance Monitoring, Construction and Operation Phase

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
Construction Phase							
1	• Vehicular emission in compliance with standard set for vehicles and machineries by MoFE • Regular maintenance of vehicles and machineries • Regular spray of water in construction site	Proponent	Site Observation/ records	During construction period	Proponent	Project Site	-
2	• Provision of drainage system and sedimentation tank • Storing of spent oil and greases in containers and designated place	Proponent	Site Observation/ records	During construction period	Proponent	Project Site	Already provisioned in construction cost
3	• Provision of low sound emitting machineries • Regular maintenance of vehicles and machines • Prohibition of construction activities in night time and early morning	Proponent	Site Observation/ records	During construction period	Proponent	Project Site and nearby community	Already provisioned in construction cost

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
4	• Stockpiling of construction materials in designated place within construction site • Provision of drainage to avoid muddy surface during rainy season • Covering of stockpiles to avoid washout during rainy season • Using of construction spoils to fill up low land area and ditches • Compaction of spoil	Proponent	Site Observation/ records	During construction period	Proponent	Project Site	-
5	• Provision of personnel protective equipment (PPE) • Provision of necessary safety cautions, signposts and instructions at construction site as well as near moving machineries	Proponent	Site Observation/consultation	During construction period	Proponent	Project Site	-
6	• Awareness and orientation to construction workers • Provision of barricade wall	Proponent	Site Observation/ Records	During construction period	Proponent	Project Site	-

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
7	• Appointing a staff for handling grievances and communicate with community • Establish Grievance Redress Committee (Project Specific) • Instructing construction company to proceed construction work in compliance to ESIA report	Proponent	Site Observation/Records	During construction Period	Proponent	Project Site	Already provisioned in human resource requirement
Operation Phase							
1	• Avoiding direct discharge of slurry and separated slurry liquid to nearby water bodies and nearby agricultural farm areas • Storage of raw materials in roofed unit with impermeable base • Provision of compost preparation unit with proper seal of base	Proponent	Site Observation	Before Operation Phase	Proponent	Project Site	Already provisioned in project cost
2	• Storing of feedstock and post digestate in designated area	Proponent	Observations	Once a year during	Proponent	Project Site	-

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
	• Covering of feedstock and post digestate • Regular cleaning around the screw press manure unit and feedstock storage area			Operation Phase			
3	• Proper covering of feedstock while transporting • Proper compaction of feedstock to avoid dropping • Vehicular emission in compliance with emission standards	Proponent	Photographs/ Records	Twice a year during Operation Phase	Proponent	Project Site	-
4	• Avoidance of naked flame near plant • Provision of fire extinguishers, fire control ball and PPE • Identification and establishment of assembly location during fire accidents and disasters. • Scheduled maintenance and testing of gas leakage in plant	Proponent	Observation/ Discussion/Record	Before Operation Phase	Proponent	Project Site	Already in project cost
5	• Provision of personal protective equipment to workers	Proponent	Observation	During construction Phase	Proponent	Project Site	Already in project cost

S.N	Provisions of compliance	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
	• Provision of first aid kit • Regular check-up of staffs • Proper orientation and training to staffs about operating plant and waste handling						
6	• Cleaning the plant area regularly • Maintenance of plant and machineries as per prescribed schedule of technology provider. • Avoidance of haphazard disposal of digestate • Awareness and training to staffs regarding sanitation and operation plant	Proponent	Observation/ Discussion/Record	During Operation Phase	Proponent	Project Site	-
7	• Implementation of mitigation measures to avoid potential impacts mentioned in B.1, B.2 and B.3 in Chapter VI • Arrangement of handling grievances from community	Proponent	Observation/Record	During operation phase	Proponent	Project site	-

Table 14: Impact Monitoring, Construction and Operation Phase

S.N	Monitoring Indicator	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
Construction Phase							
1	Effect on productivity of nearby farmland due to construction waste and percolated water	Proponent	Discussion with local people, visual observation	twice during construction period	Proponent	Nearby farmland	-
2	Increased Noise level	Proponent	Discussion with local people, noise level meter	once during peak construction work	Proponent	Nearby settlement	60,000 annually
Operation Phase							
1	Aesthetic degradation due to haphazard disposal of organic slurry in nearby water bodies and area	Proponent	Discussion with local people	Once in a year	Proponent	Nearby settlement/farm land	-
2	Occupational Health and Safety of the staffs/workers	Proponent	Clinical checkup/ Records/interview with staffs/workers	Twice in a year	Proponent	Project Site	-

S.N	Monitoring Indicator	Individuals responsible	Methods	Frequency /Time	Monitoring authority	Place	Financial commitment (NRs.)
3	Number of grievances received from community	Proponent	Registered file/complains	Every Month	Proponent	Nearby community	-
4	Water Quality of nearby water body (to compare with the baseline assessment)	Proponent	Water quality tests of source of water supply (borewell water and nearby river	Once ina year (dry month)			30,000.00 annually
5	Increased noise level	Proponent	Discussion with local people, noise level meter	Once in a year	Proponent	Project site/ Nearby Community	10,000.00 annually
6	Methane Leakage	Proponent	Gas Analyzer	Twice in a year	Proponent	Project site	15,000.00

Table 15: Summary of Environmental Monitoring Cost

Item	Quantity	Rate per month	Rate per year (NRs)	Total (NRs)
Construction Phase				20,000.00
Water Quality Monitoring	-	-	30,000 (Once)	30,000.00
Noise Monitoring	-	-	10,000.00	10,000.00
Operation Phase				
Water Quality Monitoring	-	-	15,000.00 (annual)	15,000.00
Noise Monitoring	-	-	10,000.00 (annual)	10,000.00
Methane Leakage	-	-	15,000.00 (annual)	15,000.00
Human Resource				
Environment Expert	1	60,000	120,000 (Two month input in each year)	120,000.00
Grievance Handling Officer	1	(Already in project human resource cost)	-	-
Total				220,000.00

CHAPTER 10: INSTITUTIONAL ARRANGEMENT & GRIEVANCE READDRESS MECHANISM

10.1 Project Environmental Management Plan Structure and Stakeholders Responsibility

The Project Environmental Management Framework of the proposed project is prepared to show linkages with different parties to be involved directly or indirectly during the different phases of project development and operation in compliance with the existing Act and Rules.

Overall project environmental and social management is the responsibility of Proponent of the proposed subproject. Key stakeholders to be involved for project environmental and social management in the hierarchy order are:

- Alternative Energy Promotion Center (AEPC)/World Bank (WB)/ MGEAP
- Monitoring Unit of AEPC
- Proponent (through Project Management Unit - PMU)
- Construction Contractor (CC);
- Representatives from Subproject Affected Municipality (SPAMR)

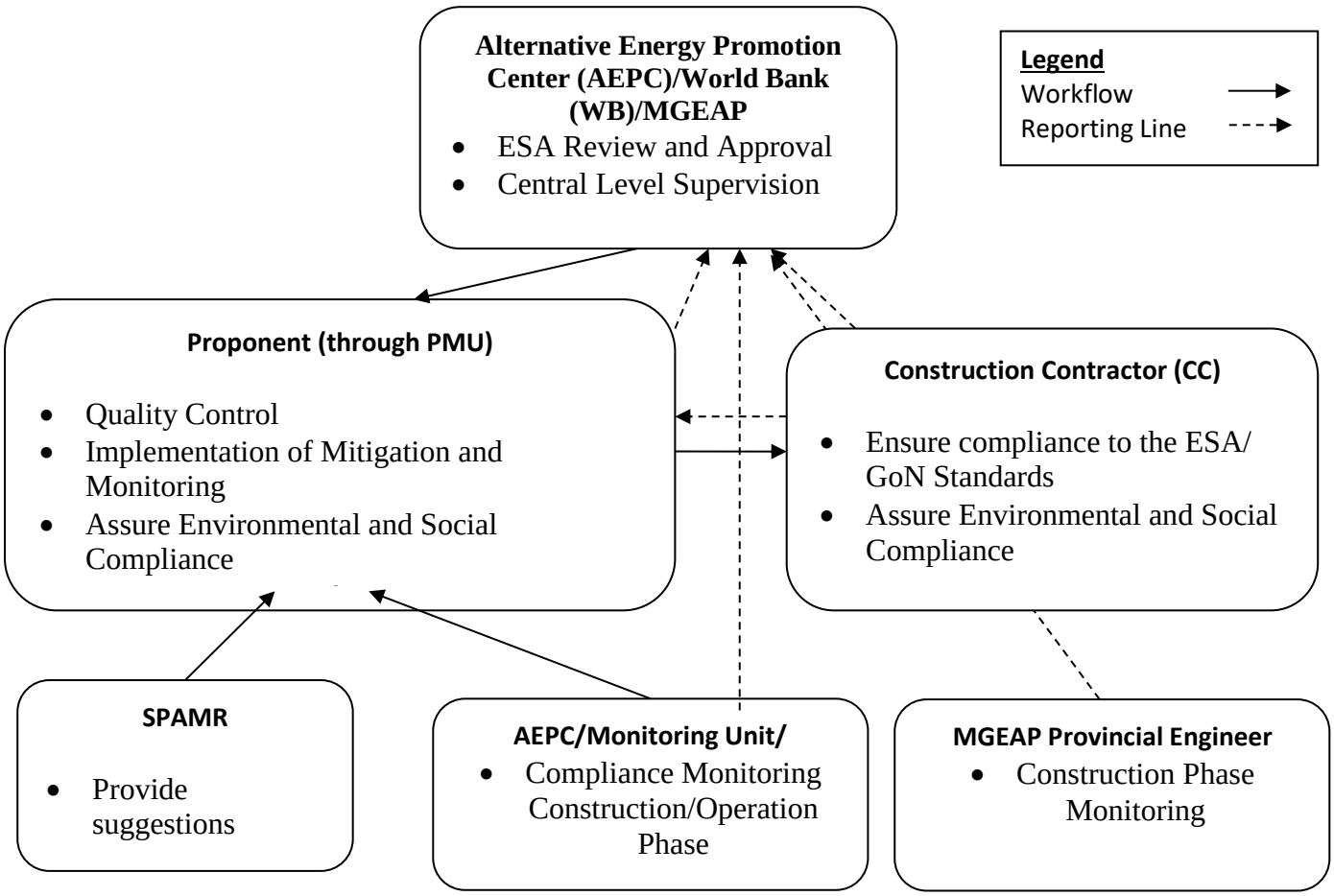

Figure 8: PEM Framework

10.2 Grievance Redress Mechanism

Grievance addressing and feedback is important so as to know what negative impact has been occurred in the community due to the implementation of the sub-project. Such grievances should be taken care in order to avoid conflicts in the society regarding the sub-project. Grievance readdress not only prevents conflicts but will also help the developer to take necessary steps to further improve the plant operation and management system. The grievances from the community and nearby inhabitants such as haphazard disposal of organic waste, construction waste, noise pollution, foul odor from the feedstock, increase in flies and vector disease, pollution in nearby water bodies can be received at any stage of the sub-project construction or implementation. Such grievances shall be managed by strictly following the mitigation measures prescribed in this report. In case, if any grievances arose, those complains will be assessed by the current Grievance Redress Committee (GRC). The management team of GRC is listed below:

Grievance Redress Mechanism Process

The figure below describes the process that will be used to resolve any grievances related to this project:

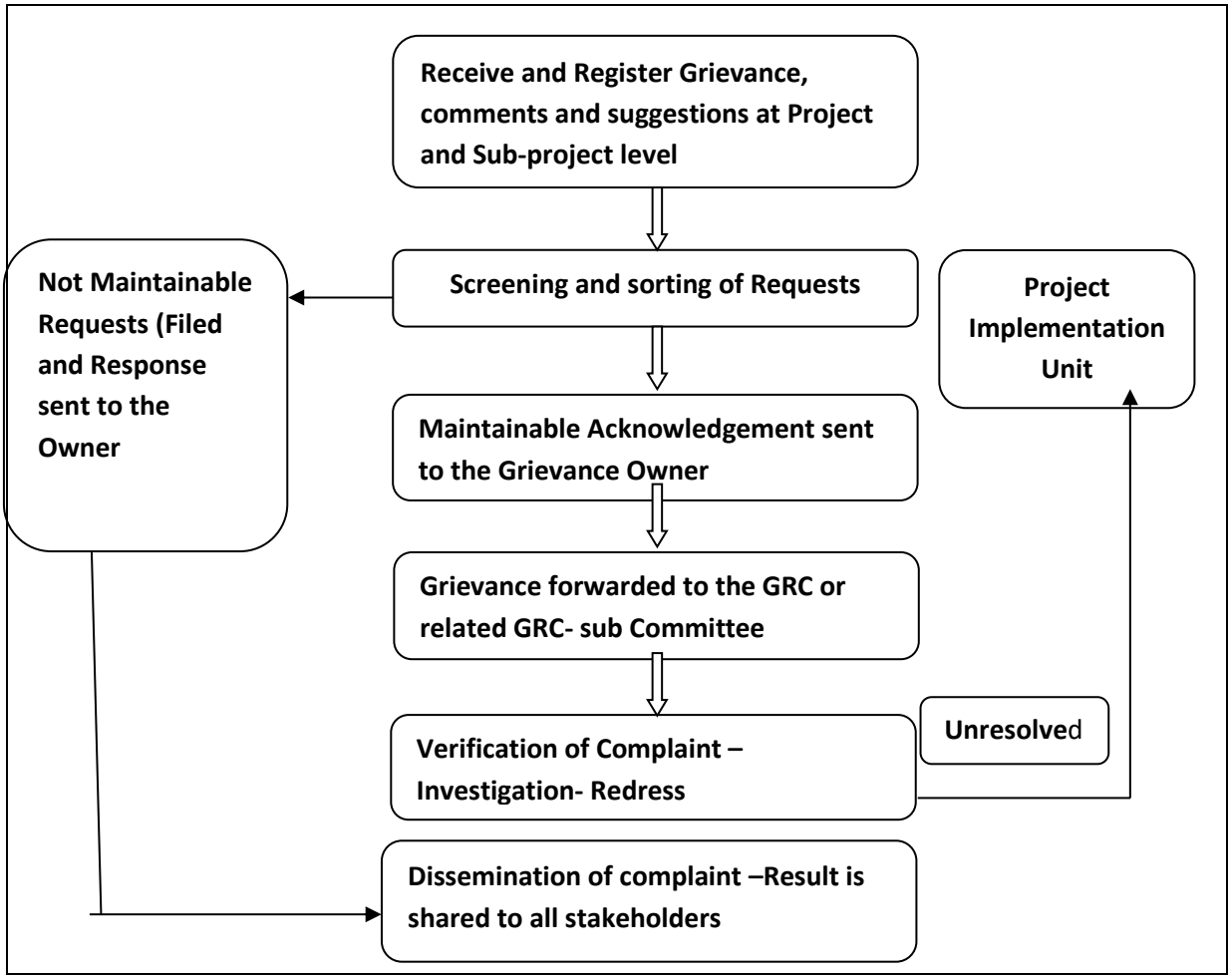

Figure 9: GRM Framework

Current Provision of GRC (as in Social Management Framework)

A. Central/AEPC Level Grievance Redress Committee (GRC)

1. MGEAP Project Manager of AEPC – Chairperson
2. Technical Specialist (Biogas)-Member
3. Representative of the developer from different categories of waste –Member
4. Environment Safeguard Expert at AEPC- Member
5. Social Safeguard Expert at AEPC – Member Secretary

B. Subproject Level Grievance Redress Committee (GRC) for JAFL

1. Chairperson/Representative of the ward office or Chairperson/Managing Director of Developer – Chairperson
2. Representative from Sub-Project Affected people – Member (2)
3. Representative from local NGO/CBO – Members (1)
4. Sexual Exploitation Abuse and Sexual Harassment (SEA/SH) Focal person – Female member (1)
5. ESMF focal person of the perspective developer/Project manager – Member Secretary

The central monitoring may be done by AEPC during the operation phase at any time of the project cycle. The subproject level GRC was formed during the public consultation held on 2081/04/30 (14/08/2024) in the premises of JAFL, Murgiya, Dhanushadham-9. The minutes are attached in Annex 3 – of this report.

The grievance redress mechanism will be assessed as described below:

- ESMF focal person of the developer/Project Manager/Site In-charge will be appointed as the focal person (Member Secretary of Subproject Level GRC) to receive/handle any kind of grievance related to the project. His/her name and contact number will be displayed at the entrance of the project site, so that affected people can have direct access to him/her.
- SEA/SH Focal Person will be representative from developers/CSOs/PAP of GRC formed at subproject level and she will be responsible to record and handle any kind of grievances related SEA/SH.

- A register will be maintained including the name of grievant, date and time of grievance recorded, issue raised and time frame to redress the received grievance (format presented in Annex 6),
- A suggestion box will be placed at the entrance of the project site as well as in project site premises to collect grievances from employees.
- Grievances can also be registered via website: http://www.aepc.gov.np/gform/gform.php
- If the sub-project level GRC will not be able to redress the grievance, it will be forwarded to the national level GRC.
- Grievances received have to be resolved within 3 weeks of receipt of complaint.
- Affected persons have the option of accessing the court of law in case of dissatisfaction with the decision of the GRC.

10.3 Capacity Development and Enhancement Measures

During the construction period, the job priorities will be given to local people with equal opportunities to women as well. The skill development training for construction works, scaffolding, casting etc. will be given to the workers so that they are able to use the learned skills in other similar projects and earn their living. The sub-project will require 13 human resource during operation phase. The priority shall be given to locals, if they have required skill and qualifications.

Enhancement Measures: There are no households in the direct impact zone of the proposed land. The following enhancement measures have been proposed to ensure that the project fully respects the dignity, human rights, economies, values and cultures of vulnerable groups, especially women and girls and the IPs.

- Prior to the construction of the project, the representatives of HHs will be consulted to address all the sensitive issues.
- Skill development training such as, driving, mechanics, plumbing, electrician etc., and/or income generation training such as poultry farming, piggery will be offered.
- Priority will be given to the needy families for job opportunities.

CHAPTER 11: COMPANY'S E&S SAFEGUARD POLICIES AND PLANS

11.1 Safety Policy and Plan

To provide a safe working environment to in-house staffs, visitors and the surrounding settlements, it is necessary to be fully aware of the safety requirements to avoid accidents from the implementation of biogas plant. These provisions are prepared based on mitigation measures suggested against probable impacts. The following issues are identified and brief safety plans are provided as follow:

- General House Keeping
  - Workers should be given orientation about the safety/emergency preparedness plan during construction and operation phase.
  - The security should inform the concerned staff when visitors arrive. The designated staff should guide the visitor.
  - Every person who enters the biogas plant premises should display a valid identification card.
  - The sub-project area should be regularly cleaned and ensure that all the floors are free from oil spillage and other harmful substances that are flammable.
  - No pipe line, power cable shall run across the path ways causing a tripping hazard.
- Fire hazard
  - Provision of alarm to notify the fire hazard.
  - Provision of fire extinguisher, fire control ball and first aid kit.
  - Provision of PPE.
  - Update contact number of fire brigade and ambulance for emergency cases.
- Explosion Protection
  - Gas leak checks
  - Optimal operation of the plant
  - Proper staff training as per technical directives
- Vandalism
  - Appointing a day and night security guard
  - Provision of physical and technological barriers such as fences, gates, security camera, ID card access
  - Ensure lighting of the premises during night time
- Leakage detection
  - Regular Monitoring of the gas leakage

- Provide training to handle gas leakage

- Infectious Disease Outbreak
  - Effective Vector Control Measures such as regular cleaning in the sub-project site
  - COVID-19 safety guidelines along with PPE and sanitization, sterilization and high preference given to vaccination.
- Odorization
  - Proper waste transport link with covering and no spillage
  - Minimal open exposure time of waste
  - Optimal digester ratio
  - Proper SWM plan

11.2 Emergency Preparedness Plan

- During catastrophe
  - Proper DRR training to all staffs
  - Drills and practices
- Wild fire
  - Proper firefighting and hazard control training
  - Spread control training
- Malfunction of the system
  - Technical team always on standby
  - Worker level staff also trained with proper technical operational parameters of the plant
  - Shutdown system provision
- Leakage and burst
  - Emergency preparedness plan training with all contacts in place
  - Fire extinguishers in place
  - Drills and practices for evacuation
  - First aid kit in place along with capacity building
- Management of substrate supply and management during interruption
  - Assurance and supply plan in place with guarantees

11.3 Occupational Health and Safety Plan

Occupational health and safety plan is a plan of action designed to prevent accidents and occupational diseases. The workers and staff are prone to getting caught in accidents, injuries and diseases during the construction and operation phase of the project. So, it is the

responsibility of the company/ organization to provide safe working environment to workers and staffs. The following safety measures should be provided by the company to its employees. Moreover, details are provided in Annex 9.

- Provision of safety equipment such as gloves, masks, boots during construction and operation phase
- PPE protection, sanitization and regular disinfection as per COVID safety protocols
- Priority given in vaccination of workers and team involved
- Provision of safety aid kit
- Awareness about potential health impacts while handling organic matters to staff
- Orienting staffs to follow proper safety measures during construction and operation phase
- Regular check-up of staffs during operation phase
- Maintain registration log of both native and migrant workers with their detail i.e.; name address, nationality, contact number, emergency contact person and their respective numbers, etc.

11.4 Gender Action Plan

Gender Action Plan will work on gender equality and empowerment of girls and women during the construction and operation of the sub-project. It will make sure that girls and women enjoy the same right, resources, opportunities and protections as by men during the implementation of sub-project. To have the equal involvement of gender during the project cycle, following measures are to be taken:

- Women will be given priority for job opportunity
- Ensure female worker's security at work place
- Provide equal wage to female workers as male workers
- Special effort will be made to get feedback from women and girls during project cycle

11.5 Substrate Handling and Slurry Management Plan

The management of substrate storage and post-digestate is a very necessary task as it will create nuisance in the sub-project area and around the vicinity. It could cause groundwater pollution, increase in flies, risks health of workers etc if not properly managed. The following steps should be taken by the developer to have a well-managed environment in and around the sub-project area.

- The base, side walls of Screw Press Manure will be made waterproof to avoid leaching
- Regular cleaning of the facility will be done to prevent flies and safety of workers
- The solid slurry separated from Screw Press Manure will be dried and sold in the market

- The liquid will be reused as dilution water in the digester. Remaining liquid slurry will be used for on-site farming for cattle.

CHAPTER 12: CONCLUSION

Janakpur Agro Farm Limited was established in 2075 B.S. and specializes in the production of high-quality eggs through poultry farming. The company also aims to develop a Continuously Stirred Tank Reactor (CSTR)-based biogas plant within the premises of the same poultry farm in Murgiya, Dhaara Paani, Dhanushadham-9, Dhanusha. . This plant will be equipped with a double-membrane gasholder and will operate at a mesophilic temperature. The plant will produce biogas and organic fertilizer. The biogas generated will be used to produce Bio-CNG, while the organic fertilizer will be sold for commercial purposes. Additionally, it will help to sustainably manage substrate by producing rich organic manure from it, contributing to sustainable waste management.

The available land area is 63,172.57 m^2 and land required for the biogas project is 32,500 m^2 at maximum. The land used for the purpose of developing the subproject is private land and in the name of Janakpur Agro Farm Ltd.

The Environmental and Social Impact Assessment (ESIA) has identified potential environmental and social impacts during both construction and operation phases. These include physical environment impact, Biological Environment impact, Socio-economic Environment. These impacts can be effectively mitigated through the prescribed mitigation measures outlined in this report.

To ensure compliance, the project proponent must strictly implement the recommended mitigation measures, including air quality management, wastewater treatment, noise control, and proper waste disposal. Additionally, issues related to grievances, SEA/SH, incidents, occupational health and safety, community health and safety during the construction and operation shall be addressed with appropriate corrective measures envisioned as outlined in e ESMP.

The estimated cost of implementing the environmental and social mitigation measures is Nrs 220,000.00, covering air, water and noise quality monitoring, Methane leakage, occupational health and safety, waste management, and community engagement programs. A detailed monitoring plan has also been developed to track the effectiveness of these measures.

Considering the lower magnitude of the overall environmental and social impact and the pragmatic mitigation strategies proposed, this ESIA concludes that the project is environmentally and socially feasible. With proper implementation of the mitigation plan and adherence to monitoring requirements, the project can proceed with minimal adverse effects.

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ANNEX 1 – COMPANY REGISTRATION AND OTHER LEGAL DOCUMENTS

नेपाल सरकार
उद्योग मन्त्रालय

कम्पनी रजिष्ट्रारको कार्यालय

कम्पनी दर्ताको प्रमाण - पत्र

दर्ता नं: १९९८५१/०७५/०७६

श्री जनकपुर एग्रो फार्म

नामको प्राइभेट लिमिटेड कम्पनी संम्वत् २० ७५ साल आश्विन महिना १४ गते रोज १ मा दर्ता भएको हुनाले कम्पनी ऐन, २०६३ को दफा ५ को उपदफा (१) बमोजिम यो प्रमाण-पत्र दिइएको छ ।

मिति: २०७५-०६-१४

स. रजिष्ट्रार

सहायक रजिष्ट्रार

Government of Nepal
Ministry of Industry

Office of the Company Registrar

Registration No: 199851/075/076

CERTIFICATE OF INCORPORATION OF COMPANY

This Certificate of Incorporation has been issued to M/s Janakpur Agro Farm Private Limited having incorporated it on the 30 day of September, 2018 pursuant to sub-section (1) of section 5 of the Companies Act, 2006.

Date: 2018-09-30

Asst. Registrar

शर्त कम्पनी संस्थापनलाई मात्र कम्पनीको उद्देश्य कार्यान्वयन गर्ने इजाजत प्रदान गरिएको सम्मिने हुनाले कानून अनुसार लिनुपर्ने अनुमति सम्बन्धित निकायबाट लिएर मात्र कम्पनीको उद्देश्य अनुसार कारोबार गर्नु पर्नेछ ।

नेपाल सरकार

उद्योग, वाणिज्य तथा आपूर्ति मन्त्रालय

कम्पनी रजिष्ट्रारको कार्यालय

कम्पनी दर्ताको प्रमाण - पत्र

दर्ता नं: २९३७०६/७८/०७९

श्री जनकपुर एग्रो फार्म

नामको प्राइभेट लिमिटेड कम्पनी संम्वत् २० ७९ साल आषाढ महिना ३१ गते रोज ६ मा प्राइभेट लिमिटेड बाट पब्लिक लिमिटेडमा परिणत भएको हुनाले कम्पनी ऐन, २०६३ को दफा १३ को उपदफा १(क) बमोजिम यो प्रमाण-पत्र दिइएको छ ।

स. रजिष्ट्रार

मिति: २०७९-०३-३१

सहायक रजिष्ट्रार

Government of Nepal

Ministry of Industry, Commerce & Supplies

Office of the Company Registrar

Registration No: 293706/78/079

CERTIFICATE OF INCORPORATION OF COMPANY

This Certificate of Incorporation has been issued to

M/s Janakpur Agro Farm

Private Limited company having Converted it from Private Limited to Public Limited on the 15 day of July, 2022 pursuant to sub-section (1) of section 13 of the Companies Act, 2006.

Asst. Registrar

Date: 2022-07-15

शर्त कम्पनी संस्थापनलाई मात्र कम्पनीको उद्देश्य कार्यान्वयन गर्ने इजाजत प्रदान गरिएको नमानिने हुनाले कानून अनुसार लिनुपर्ने अनुमति सम्बन्धित निकायबाट लिएर मात्र कम्पनीको उद्देश्य अनुसार कारोबार गर्नु पर्नेछ ।

यस कार्यालयमा मिति २०७९-०६-१४ मा प्रा.लि.नं. १९२८५१६/७५/०७६ मा दर्ता भएको जनकपुर एग्रो फार्म नामक प्राइभेट लिमिटेड कम्पनीको सम्पूर्ण ऋण धन दायित्व यसै जनकपुर एग्रो फार्म ले नै व्यहोर्ने सकार्ने गरि उक्त प्रा.लि.लाई मिति २०७९-०३-३१ को निर्णय अनुसार पब्लिक लिमिटेडमा परिणत गरी उपरोक्त नयाँ दर्ता नं कायम गरिएको छ।

नेपाल सरकार
अर्थ मन्त्रालय
आन्तरिक राजस्व विभाग

स्थायी लेखा नम्बर (PAN) दर्ता प्रमाण पत्र

दर्ता मिति

आयकर: १५ | ०६ | २०७५
दिन महिना साल

स्थायी लेखा नम्बर : ६ ० ६ ५ ८ ० ४ ६ ५

आन्तरिक राजस्व कार्यालय : आन्तरिक राजस्व कार्यालय जनकपुर

कारोबारको नाम : जनकपुर एग्रो फार्म लिमिटेड

करदाताको प्रकार : पब्लिक लिमिटेड

ठेगाना : वार्ड नं. ९, ००
नगरपालिका: धनुषाधाम,
धनुषा

व्यवसायका कारोबारहरु : पन्छीपालन, गाईवस्तु तथा भैंसी पालन, भेडाबाख्रापालन, सुँगुर/बंगुरपालन, स्वच्छ पानीमा माछा मार्ने, वन लगाउने, काँटछाँट गर्ने र अन्य वनसम्बन्धी क्रियाकलापहरू , बीउ बिन्याउने वा प्रशोधन गर्ने काय,

करदाताको दस्तखत

२०७५।०६।०६

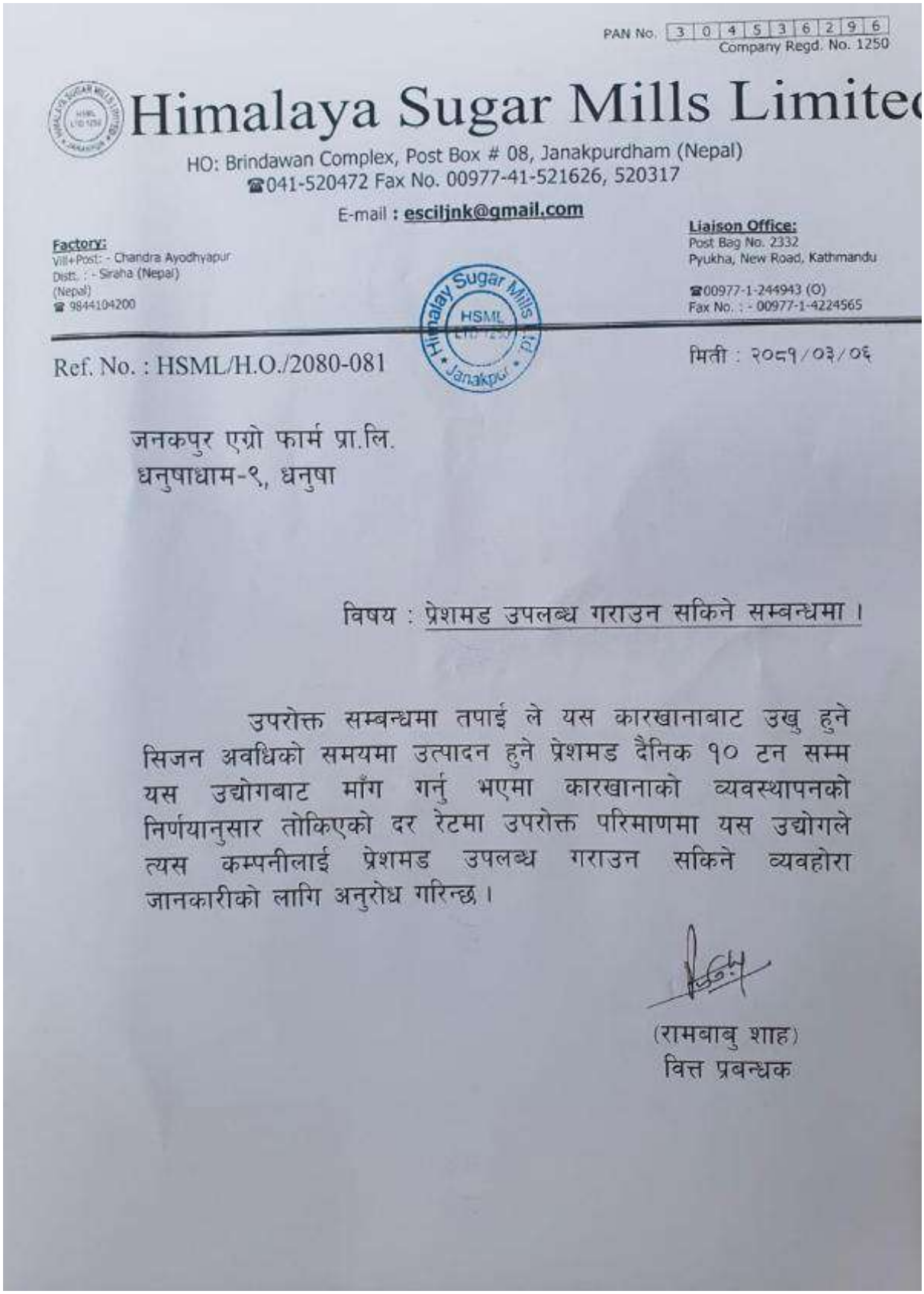
कर अधिकृत

कर अधिकृत

करदाताले पालना गर्नुपर्ने कर्तव्यहरु:

- कारोवार गर्दा अनिवार्य रुपमा बिल बिजक जारी गर्नुपर्छ ।
- मू.अ.करमा दर्ता हुनेले प्रत्येक कर अवधि (मासिक वा त्रैमासिक वा चौमासिक) समाप्त भएको २५ दिनभित्र मू.अ.कर विवरण तथा मू.अ.कर रकम बुझाउनु पर्छ ।
- अन्तःशुल्क लाग्ने कारोबार गर्नेले अन्यथा व्यवस्था गरेकोमा बाहेक प्रत्येक महिना समाप्त भएको २५ दिनभित्र मासिकेवारी र अन्तःशुल्क रकम बुझाउनु पर्छ ।
- प्रत्येक आर्थिक वर्षको आय विवरण आर्थिक वर्ष समाप्त भएको तिन महिना भित्र बुझाउनु पर्छ ।
- तोकिएको समयमा विवरण र कर रकम नबुझाएमा ब्याज, शुल्क र जरिवाना लाग्नेछ ।
- यो प्रमाणपत्र देखिने गरी कारोबार स्थल मुख्य कार्यालयमा राख्नु पर्नेछ ।
- कुनै द्विविधा भएमा कार्यालयमा सम्पर्क राख्नुहोला ।

Letter of commitment of availability of press mud from Himalaya Sugar Mills Limited



PAN No. 3 0 4 5 3 6 2 9 6
Company Regd. No. 1250

Himalaya Sugar Mills Limited

HO: Brindawan Complex, Post Box # 08, Janakpurdham (Nepal)
☎041-520472 Fax No. 00977-41-521626, 520317
E-mail : esciljnk@gmail.com

Factory:
Vill+Post: - Chandra Ayodhyapur
Distt. : - Siraha (Nepal)
(Nepal)
☎ 9844104200

Liaison Office:
Post Bag No. 2332
Pyukha, New Road, Kathmandu
☎00977-1-244943 (O)
Fax No. : - 00977-1-4224565

Himalay Sugar Mills HSML Janakpur

Ref. No. : HSML/H.O./2080-081

मिती : २०८१/०३/०६

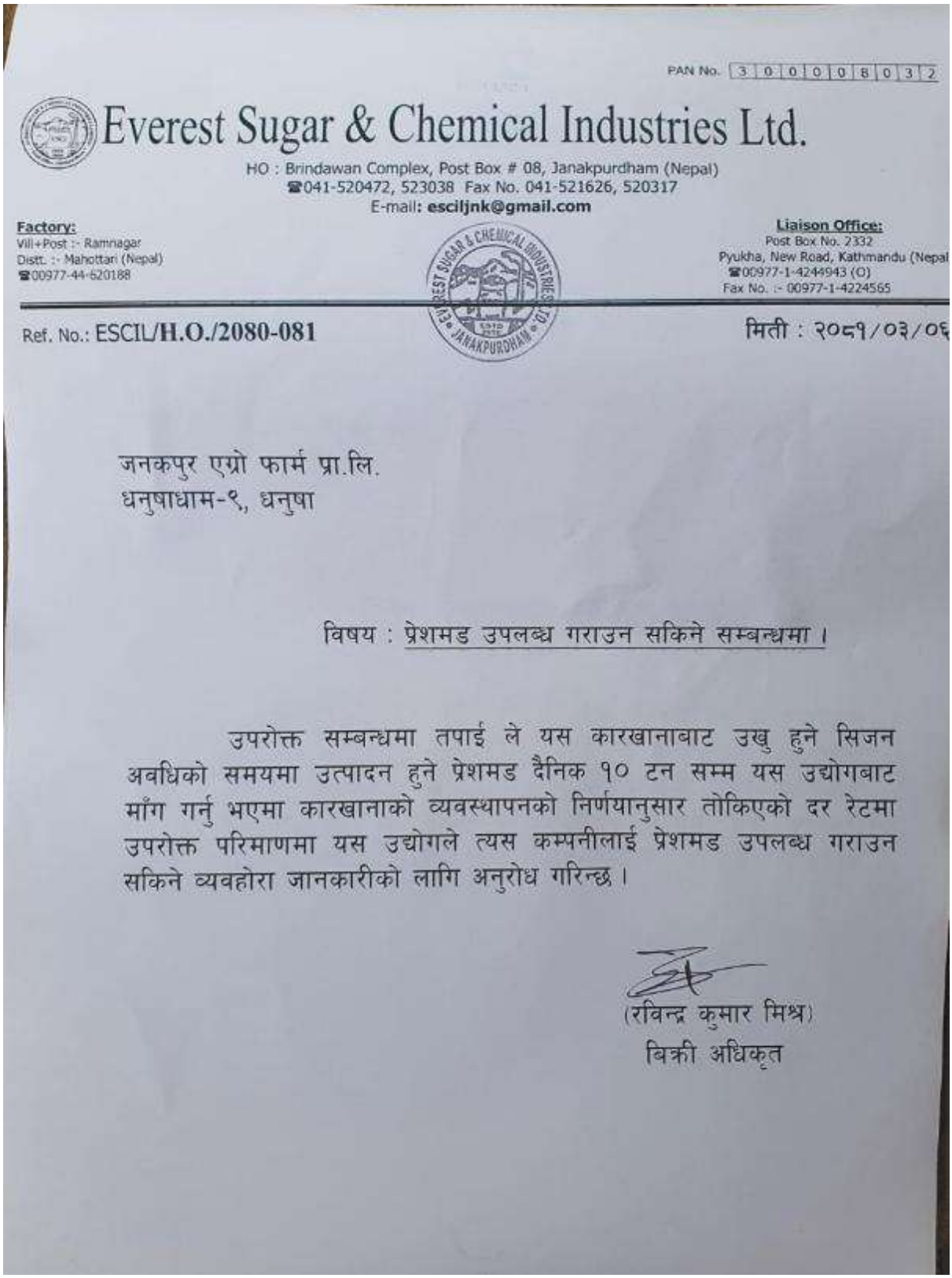
जनकपुर एग्रो फार्म प्रा.लि.
धनुषाधाम-९, धनुषा

विषय : प्रेशमड उपलब्ध गराउन सकिने सम्बन्धमा ।

उपरोक्त सम्बन्धमा तपाई ले यस कारखानाबाट उखु हुने सिजन अवधिको समयमा उत्पादन हुने प्रेशमड दैनिक १० टन सम्म यस उद्योगबाट माँग गर्नु भएमा कारखानाको व्यवस्थापनको निर्णयानुसार तोकिएको दर रेटमा उपरोक्त परिमाणमा यस उद्योगले त्यस कम्पनीलाई प्रेशमड उपलब्ध गराउन सकिने व्यवहोरा जानकारीको लागि अनुरोध गरिन्छ ।

(रामबाबु शाह)
वित्त प्रबन्धक

Letter of commitment of availability of press mud from Everest Sugar & Chemical Industries Ltd.



PAN No. 3 0 0 0 0 8 0 3 2

Everest Sugar & Chemical Industries Ltd.

HO : Brindawan Complex, Post Box # 08, Janakpurdham (Nepal)
☎041-520472, 523038 Fax No. 041-521626, 520317
E-mail: esciljnk@gmail.com

Factory:
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Pyukha, New Road, Kathmandu (Nepal)
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Fax No. :- 00977-1-4224565

Ref. No.: ESCIL/**H.O./2080-081**

मिती : २०८१/०३/०६

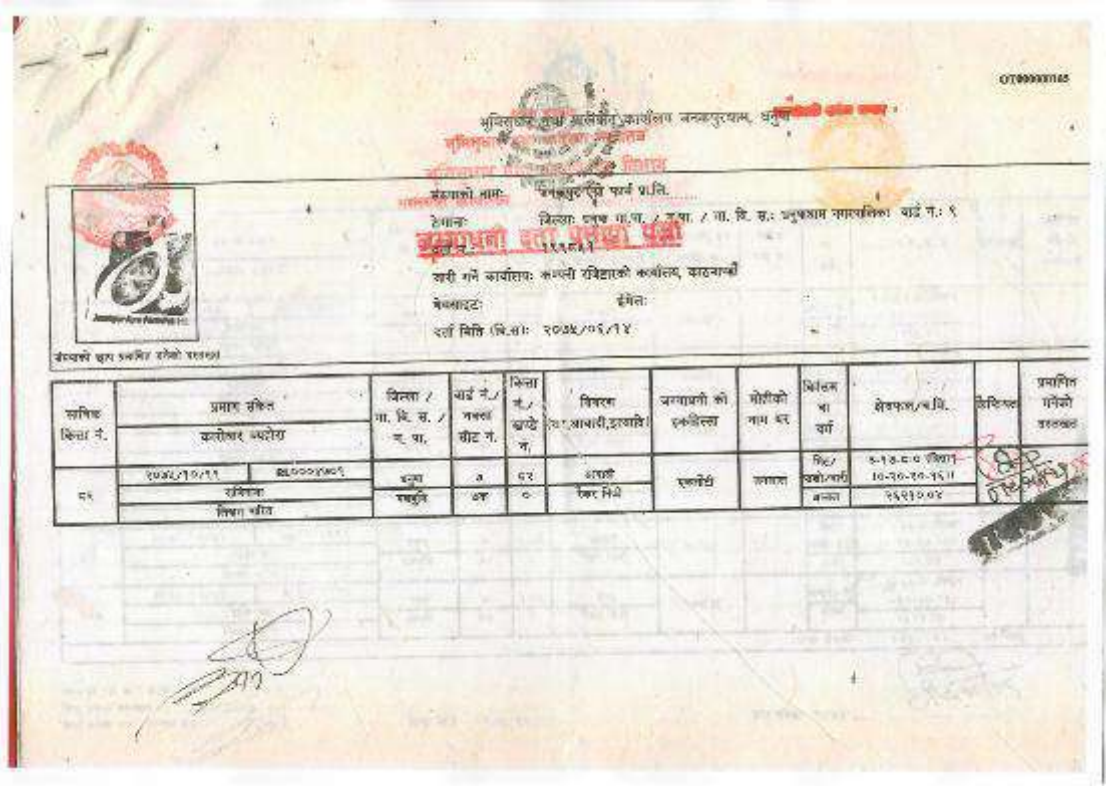
जनकपुर एग्रो फार्म प्रा.लि.
धनुषाधाम-९, धनुषा

विषय : प्रेशमड उपलब्ध गराउन सकिने सम्बन्धमा ।

उपरोक्त सम्बन्धमा तपाई ले यस कारखानाबाट उखु हुने सिजन अवधिको समयमा उत्पादन हुने प्रेशमड दैनिक १० टन सम्म यस उद्योगबाट माँग गर्नु भएमा कारखानाको व्यवस्थापनको निर्णयानुसार तोकिएको दर रेटमा उपरोक्त परिमाणमा यस उद्योगले त्यस कम्पनीलाई प्रेशमड उपलब्ध गराउन सकिने व्यवहोरा जानकारीको लागि अनुरोध गरिन्छ ।

(रविन्द्र कुमार मिश्र)
बिक्री अधिकृत

Land Document



भूमिसुधार, भूमि अभिलेख कार्यालय जनकपुरधाम, धनुषा

संस्थाको नाम: जनकपुर एग्रि फार्म प्रा.लि.

ठेगाना: जिल्ला: धनुषा न.पा. / उ.पा. / गा. वि. स.: जनकधाम नगरपालिका वार्ड नं.: ९

प्रमाणित गरिएको मिति: २०७५/०९/१४

जारी गर्ने कार्यालय: कलंती रजिष्ट्रारको कार्यालय, काठमाण्डौं

चेक्साट: ईमेल:

दर्ता मिति (वि.सं.): २०७५/०९/१४

जोत्नाको खुत स्वामित्व हस्तान्तरण

सम्बन्धित किता नं.	प्रमाण संकेत	जिल्ला / गा. वि. स. / न. पा.	वार्ड नं./ नक्सा सीट नं.	किता नं./ खण्डे नं.	विवरण (जग्गा,आबादी,ढाकाविहि)	जग्गाधनी को हकदैल्ला	सोतीको नाम थर	क्षितिज भ वर्ग	क्षेत्रफल/न.वि.	कैफियत	प्रमाणित गर्नेको दस्तखत
८९	२०७५/१०/११ ४५०००४७९	धनुषा	३	९२	आबादी	एकलौटी	जनकपुर	हि/ एबो/पार्थ	०-१३-८-० रोपनी १०-२०-२०-१६।।		
	रविलाल	धनुषा	७४	०	रिकर मिली			अन्य	२५२१०.०४		
	लिखा गरीत										

JAFL Article of Association

(दफा २० को उपदफा (४) संग सम्बन्धित)

कम्पनी ऐन, २०६३ अन्तर्गत स्थापित
जनकपुर एग्रो फार्म प्रा.लि.
को
नियमावली

२०७१/६/१९८

१. **कम्पनीको नाम** : यस कम्पनीको नाम **जनकपुर एग्रो फार्म प्रा.लि.** हुनेछ । अंग्रेजीमा यसलाई **Janakpur Agro Farm Pvt. Ltd.** भनिनेछ ।

२. **कम्पनीका रजिष्टर्ड कार्यालय रहने ठेगाना** : यस कम्पनीको रजिष्टर्ड कार्यालय धनुषा जिल्ला, धनुषाधाम न.पा. वडा नं. ०९ मा रहनेछ ।

३. **परिभाषा** : विषय वा प्रसंगले अर्को अर्थ नलागेमा यस नियमावली :
(क) "ऐन" भन्नाले कम्पनी ऐन, २०६३ सम्झनु पर्छ ।
(ख) "कार्यालय" भन्नाले कम्पनी रजिष्ट्रारको कार्यालय सम्झनु पर्छ ।
(ग) "कम्पनी" भन्नाले **जनकपुर एग्रो फार्म प्रा.लि.** सम्झनु पर्छ ।
(घ) "पदाधिकारी" भन्नाले कम्पनीको सञ्चालक, कार्यकारी प्रमुख, प्रबन्धक, कम्पनी सचिव, लिक्वीडेटर वा विभागीय जिम्मेवारी लिने कुनै कर्मचारी समेत सम्झनु पर्छ
(ङ) "सभा" भन्नाले कम्पनीको साधारण सभा सम्झनु पर्छ ।

४. **कम्पनीको उद्देश्य** :
यस कम्पनीको उद्देश्य प्रबन्धपत्रको दफा ४ मा उल्लेख भए बमोजिम हुनेछ ।

५. **शेयरको अंकित मुल्य**: यस कम्पनीको शेयरको अंकित मूल्य रु. १००। (एक सय) हुनेछ ।

६. **शेयरमा लियन रहने कुरा** : शेयरधनीहरुले कम्पनीलाई तिर्न बाकी रहेको शेयर वापतको रकम वा कम्पनीलाई कानून बमोजिम बुझाउनु पर्ने बाकी रकम वापत निजहरुका नाममा दर्ता भएको शेयर र सो वापत बाँडिने लाभांशमा कम्पनी को लियन वा दावी रहनेछ ।

७. **विभिन्न वर्गका शेयरहरु जारी भएको भए र त्यस्ता शेयरको वर्ग, त्यसमा निहित शेयरधनीको हक तथा बन्देजहरु** : हालको लागि कम्पनीले साधारण शेयर बाहेक अन्य कुनै शेयर जारी गरेको छैन ।

Performance Guarantee

KNOWLEDGE INTEGRATION SERVICES (INDIA) PVT. LTD
CIN: U74140KA2006PTC040648

KIS Group®
SUSTAINABILITY²

Ref: KIS/AEPC/BG/01/20-21
15.03.21

To,
Alternative Energy Promotion Centre,
Baleshwar
Kathmandu,

SUB: Performance Guarantee

Dear Sir,

This is to bring to your notice that we have been appointed to carry out the biogas project work of Joint Venture between Shree Janakpur Agro Farm Pvt Ltd, Dhanusha, Nepal

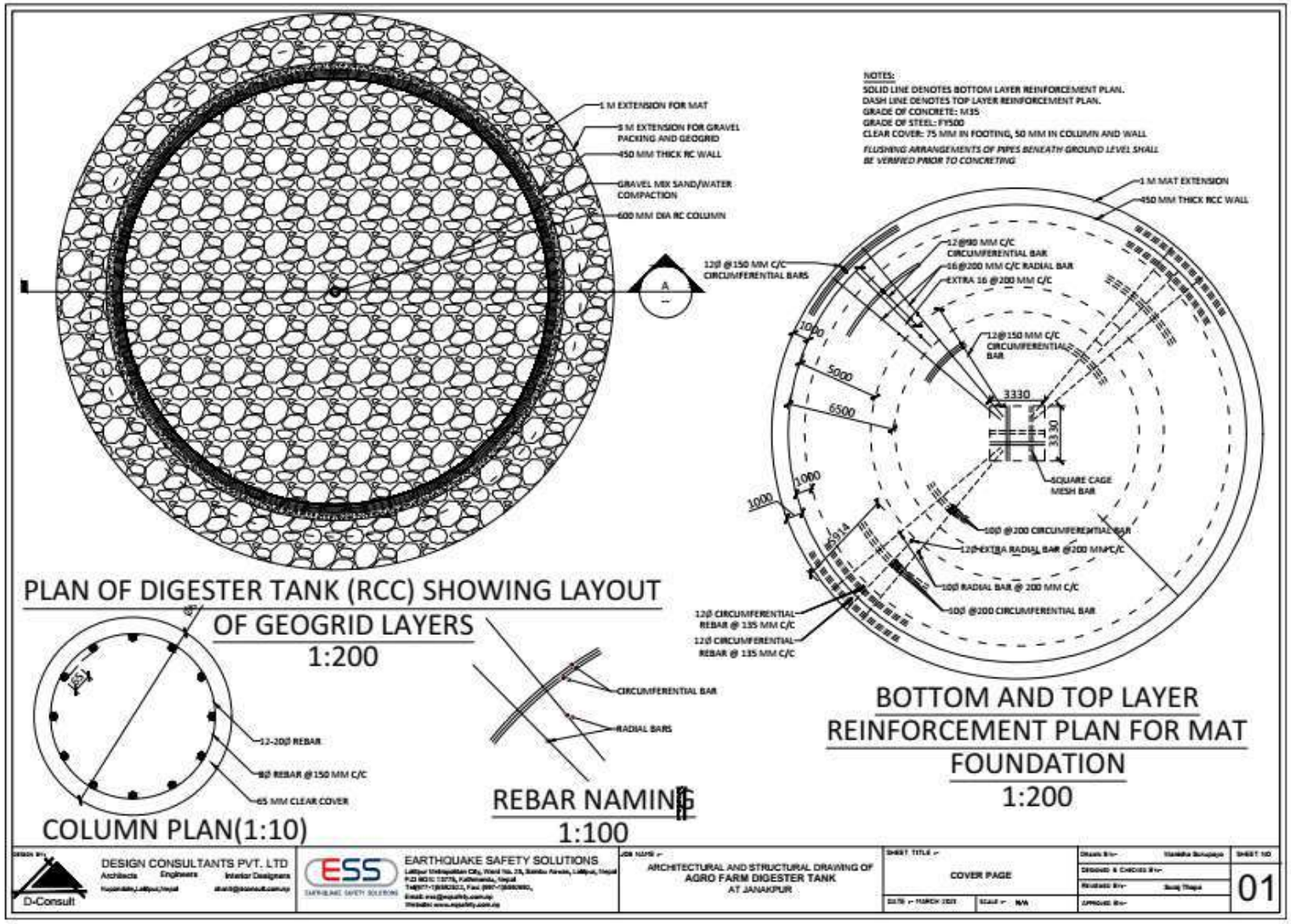
We hereby guarantee the following:

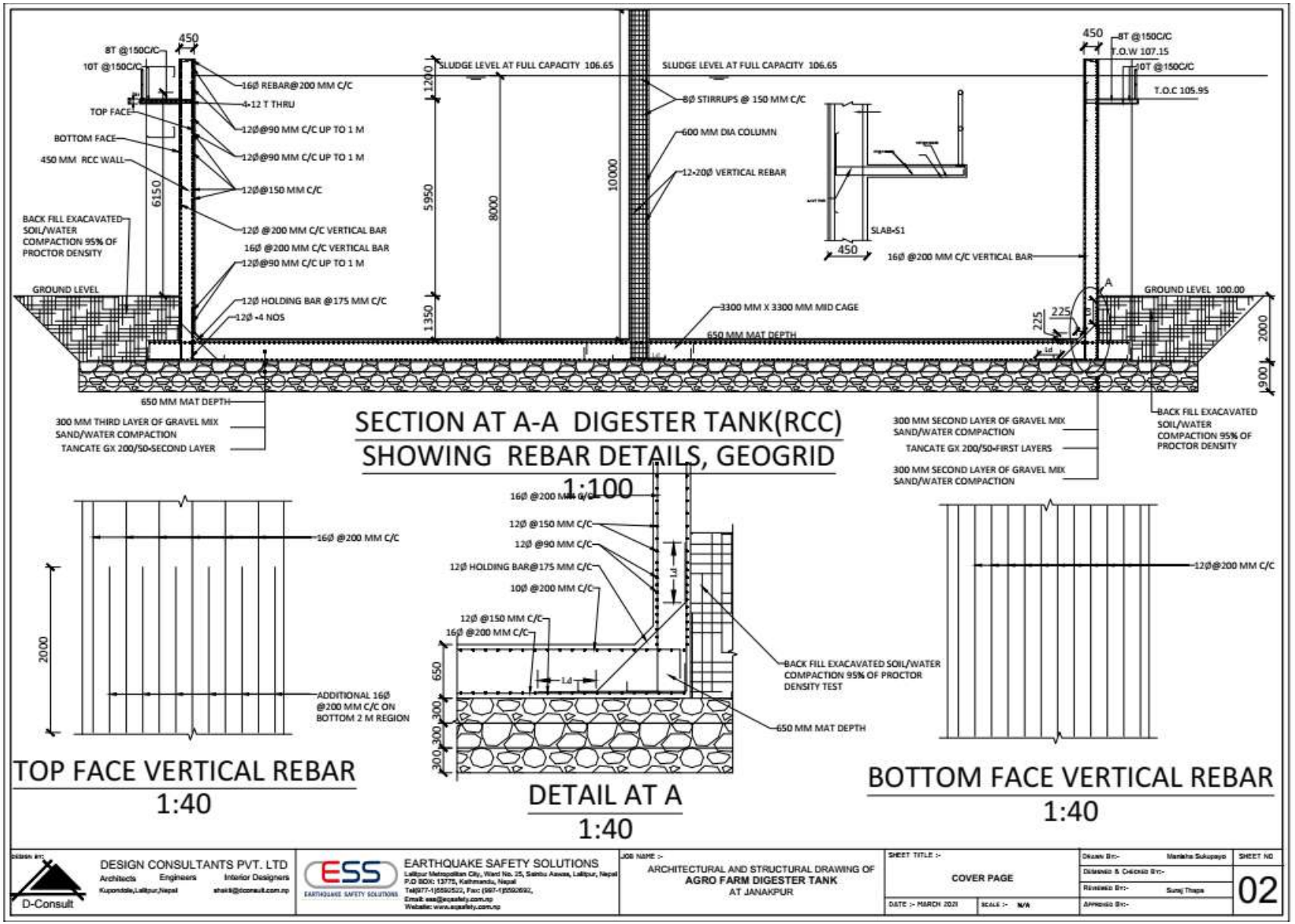
- Proper working of all our equipment's given in the offer to ensure smooth functioning of the said biogas plant.
- 6250 cum of raw biogas generation/day from the considered 80 tons of daily feedstock feeding for a minimum of 30 days. (2355kgs of Bio-CNG).
- For the first year from date of handover, KIS Group will provide one engineer having past experience in operating a biogas plant to ensure smooth running of the plant. During this period the client will appoint their human resource and our personnel will train appointed manpower. In addition, KIS Group will provide operational manual and provide tele-service or site visit in case of any unforeseen events.
- H2S content will be less than 50ppm in the end gas using scrubber system and polishing system in BioCNG Plant.

Thanking you
For Knowledge Integration Services India Pvt Ltd,

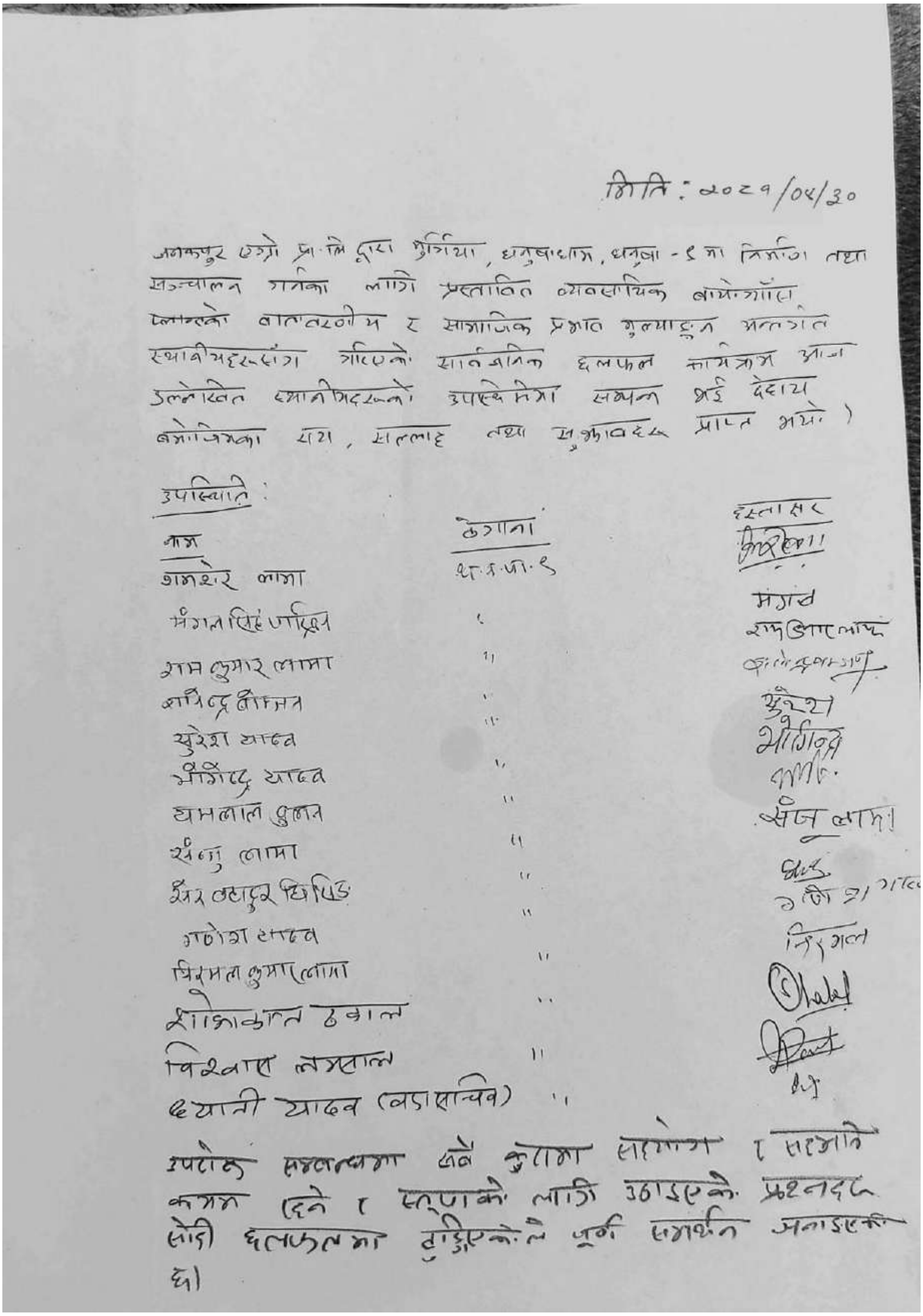
Authorized Signatory

ANNEX 2: TECHNICAL DETAILS OF THE PLANT




8T @150C/C
10T @150C/C
450
16Ø REBAR@200 MM C/C
4-12 T THRU
TOP FACE
12Ø@90 MM C/C UP TO 1 M
BOTTOM FACE
12Ø@90 MM C/C UP TO 1 M
450 MM RCC WALL
12Ø@150 MM C/C
6150
BACK FILL EXACAVATED SOIL/WATER COMPACTION 95% OF PROCTOR DENSITY
12Ø @200 MM C/C VERTICAL BAR
16Ø @200 MM C/C VERTICAL BAR
12Ø@90 MM C/C UP TO 1 M
GROUND LEVEL
12Ø HOLDING BAR @175 MM C/C
12Ø -4 NOS
1350
5950
1200
8000
SLUDGE LEVEL AT FULL CAPACITY 106.65
10000
8Ø STIRRUPS @ 150 MM C/C
600 MM DIA COLUMN
12-20Ø VERTICAL REBAR
SLAB-S1
450
16Ø @200 MM C/C VERTICAL BAR
3300 MM X 3300 MM MID CAGE
650 MM MAT DEPTH
650 MM MAT DEPTH
300 MM THIRD LAYER OF GRAVEL MIX SAND/WATER COMPACTION
TANCATE GX 200/50-SECOND LAYER
450
8T @150C/C
T.O.W 107.15
10T @150C/C
T.O.C 105.95
A
GROUND LEVEL 100.00
225
225
2000
1900
300 MM SECOND LAYER OF GRAVEL MIX SAND/WATER COMPACTION
TANCATE GX 200/50-FIRST LAYERS
300 MM SECOND LAYER OF GRAVEL MIX SAND/WATER COMPACTION
BACK FILL EXACAVATED SOIL/WATER COMPACTION 95% OF PROCTOR DENSITY
SECTION AT A-A DIGESTER TANK(RCC)
SHOWING REBAR DETAILS, GEOGRID
1:100
16Ø @200 MM C/C
2000
ADDITIONAL 16Ø @200 MM C/C ON BOTTOM 2 M REGION
TOP FACE VERTICAL REBAR
1:40
16Ø @200 MM C/C
12Ø @150 MM C/C
12Ø @90 MM C/C
12Ø HOLDING BAR@175 MM C/C
10Ø @200 MM C/C
12Ø @150 MM C/C
16Ø @200 MM C/C
1.d
650
300
300
300
BACK FILL EXACAVATED SOIL/WATER COMPACTION 95% OF PROCTOR DENSITY TEST
650 MM MAT DEPTH
DETAIL AT A
1:40
12Ø@200 MM C/C
BOTTOM FACE VERTICAL REBAR
1:40
Drawn By:
D-Consult
DESIGN CONSULTANTS PVT. LTD
Architects Engineers Interior Designers
Kupondole,Lalitpur,Nepal
shakti@dconsult.com.np
ESS
EARTHQUAKE SAFETY SOLUTIONS
EARTHQUAKE SAFETY SOLUTIONS
Lalitpur Metropolitan City, Ward No. 25, Saibu Aawas, Lalitpur, Nepal
P.O BOX: 13775, Kathmandu, Nepal
Tel(977-1)5550522, Fax: (977-1)5502692,
Email: ess@ecsafety.com.np
Website: www.ecsafety.com.np
JOB NAME :-
ARCHITECTURAL AND STRUCTURAL DRAWING OF
AGRO FARM DIGESTER TANK
AT JANAKPUR
SHEET TITLE :-
COVER PAGE
DATE :- MARCH 2021
SCALE :- N/A
Drawn By:- Manisha Sukupayo
Designed & Checked By:-
Reviewed By:- Suraj Thapa
Approved By:-
SHEET NO
02

ANNEX 3: PUBLIC CONSULTATION PROCEEDINGS



मिति : २०८१/०४/३०

जनकपुर उर्जा प्रा.लि द्वारा मुर्गिया, धनुषाधाम, धनुषा -६ मा निर्माण तथा सञ्चालन गर्नका लागि प्रस्तावित व्यवसायिक बायोग्याँस प्लान्टको वातावरणीय र सामाजिक प्रभाव मूल्याङ्कन अन्तर्गत स्थानीयहरूसँग गरिएको सार्वजनिक छलफल कार्यक्रम आज उल्लेखित स्थानीयहरूको उपस्थितिमा सम्पन्न भई देहाय बमोजिमका राय, सल्लाह तथा सुझावहरू प्राप्त भयो ।

उपस्थिति :

नाम	ठेगाना	हस्ताक्षर
शमशेर लामा	ध.धा.न.पा.-६	[illegible]
मंगल सिंह पाख्रिन	"	मंगल
राम कुमार लामा	"	[illegible]
नरेन्द्र बैनजन	"	[illegible]
सुरेश यादव	"	सुरेश
भोगेन्द्र यादव	"	भोगेन्द्र
श्यामलाल कुँवर	"	[illegible]
संजु लामा	"	संजु लामा
ईश्वर बहादुर घिसिङ	"	[illegible]
गणेश यादव	"	[illegible]
निर्मल कुमार लामा	"	निर्मल
शशिकान्त ढकाल	"	[illegible]
विश्वास लम्साल	"	[illegible]
ख्याति यादव (वडा सचिव)	"	[illegible]

उपरोक्त स्थानमा जब कुनै सहयोग र सहमति कायम रहने र सुरक्षाको लागि उठाइएका प्रश्नहरू छोडी छलफलमा उठाइएकोले पूर्ण समर्थन जनाइएको छ ।

Photographs from public consultation

ANNEX 4: REVIEWS OF PLANS/ POLICIES/ LEGISLATIONS AND GUIDELINES

1. The Constitution of Nepal

The Constitution has prioritized the human rights and protection of environment. Article 30 (1) of the Constitution asserts that every person shall have the right to live in a healthy environment. Similarly, Article 51 (G) asserts that; the State shall make such arrangements as may be required to keep the environment clean and stated Policies relating to protection, promotion and use of natural resources. The State shall give priority to the prevention of adverse impacts in the environment from physical development activities, by increasing the awareness of the general public about environmental cleanliness, as well as to the protection of the environment and special safeguard of the rare wildlife. The State shall make arrangements for the protection of, sustainable uses of, and the equitable distribution of benefits derived from, the flora and fauna and biological diversity.

2. Plans and Policies

a. Fourteenth Plan 2013-2016

s against the economic growth of 5.9 per cent during the last fiscal year, it has been projected to reach 10.3 per cent at the end of the 15th periodic plan with the average growth of 9.6 per cent during the plan period. The government has set the target of attaining over 7 per cent economic growth by the end of this fiscal year. However, the World Bank and the Asian Development Bank have put economic growth at around 6 per cent. It has also been targeted to attain 10.5 per cent economic growth in 25 years. Attaining double-digit economic growth year after year constantly is a tough proposition. Even highly developed countries cannot achieve this. However, for a least developed country like Nepal which has intended to become a developing country by 2022 AD, a middle-income country by 2030 AD and a high-income country by 2043 AD, it is not possible to notch up its objectives at the current rate of economic growth. A leap forward in economic growth is, therefore, a sine qua non.

b. Rural Energy Policy, 2006

The main rationale of formulating Rural Energy Policy is to create conducive environment that will self-motivate and mobilize local institutions, rural energy user groups, non-government organizations, cooperatives and private sector organization for the development and expansion of rural energy resources. The government will act as facilitator and promoter for involving private sector and non-governmental organizations to be involved in rural energy development for development and expansion of new technologies. It has also envisioned subsidy provision for promotion of such renewable energy technologies.

Renewable Energy Subsidy Policy, 2016

The objective of Renewable Energy Subsidy Policy is to encourage very poor households to use RETs and to encourage private sectors and financial institutions to invest in the sector ehile focusing on providing service delivery of utmost quality. The subsidy policy is based on cost per unit of energy output. Although subsidy amount differs according to technology and region, subsidy amount generally covers 40% of the total costs.

3. Acts and Rules

a. Environment Protection Act, 1997 and Environment Protection Rules, 1997 (version 2020)

Nepal has enacted a comprehensive and umbrella type environmental act, the Environment Protection Act (EPA) 1997, and followed by Environmental Protection Regulation 1997 and as amended now in 2020 which are now enforced through appropriate regulatory measures. Under section 7 of the Act, industries or any others development projects owners are required not to discharge, emit or dispose waste, sound, radiation or any such acts which will cause pollution or to allow pollution to be caused in a manner which is likely to have significant adverse impacts on the environment or to harm human life or public health. Further, the section stipulates that causing pollution or allowing such pollution to be caused a punishable act.

b. Local Government Operation Act, 2074 (2017)

Local Government Operation Act outlines work, responsibility and powers of the local governments (Rural Municipality and Municipality levels). It specifies authorities devolved by the Constitution of Nepal to the local bodies. Section 3 of the act specifies the authorities of the local government bodies. Article 11 empowers local government to formulate local level policy for the environmental conversation and biodiversity and requires the local bodies to act for the environmental risk reduction, pollution control and control of hazardous substances.

c. Water Resources Act, 1992

The Water Resources Act (1992) makes arrangements for the rational use of surface and underground water. The Act seeks to prevent environmental and hazardous effects from the use of water and prohibit water pollution by chemicals, industrial waste or litter. Water may only be used in a manner that does not permit soil erosion, landslide or flood. Pollution of drinking water is prohibited under the Nepal Drinking Water Corporation Act (1989).

d. Solid Waste Management Act, 2011

The Solid Waste Management Act, 2011 emphasize on the responsibility of waste producers (individuals/institutions) for the treatment and management of hazardous waste, health care waste, chemical and industrial waste as per the mandated standards. This act also outlines the duties of local government to take actions to control haphazard waste generation, disposal or collection and has provisions for various measures against those engaged in activities detrimental to the intentions of the act. Section 5 emphasizes any individual, organization or institution shall have to reduce the amount of generated solid waste as much as possible while carrying out any work or business. Section 38 of the Act states that to throw, keep, discharge or cause to discharge chemical waste, industrial waste, medical waste or hazardous waste haphazardly are considered as offensive and could led to punishment and penalties as mentioned in Section 39 of the Act

e. Child Labor (Prohibition and Regulation) Act, 2000

The Child Labor (Prohibition and Regulation) Act 2000 is the main legal expedient to prohibit engaging children in factories, mines or similar risky activities and to make necessary provisions with regard to their health, security, services and facilities while engaging them in other activities.

Under the Section 3 of the Act, child having not attained the age of 14 years is strictly prohibited to be engaged in works as a laborer. Similarly, under Section 4, engagement of child in works as a laborer against his/her will by way of persuasion, misrepresentation or by subjecting him/her to any influence or fear or threat or coercion or by any other means is prohibited. Under Section 6, in case any Enterprise has to engage a child in works, an approval

has to be obtained from the concerned Labor Office or any authority or official prescribed by that office and form the father, mother or guardian of the child.

f. Labor Act, 2074 (2017)

This Act strictly prohibits the concerned parties who hire the work force to over utilize them during its different activities. Section 5 of the Act prohibits child labor engagement. Similarly, Section 6 prohibits any kind of discriminations like religion, gender, caste ethnicity, mother tongue etc. among employees. Section 22 states that prior work permit is required for non-Nepali citizens and they are allowed to work in Nepal for certain period only in the area where the Nepali work force is not available or not competent. Section 28 provisioned the working hours as 8 hours a day and 48 hours a week. The same section provisioned that thirty minutes must be allowed for rest and/or refreshments should be given in every five hours of work. Likewise, Section 30 allows employer to engage employee additional of 4 hours per day or 24 hours per week and shall provide over-time payment as 1.5 times the normal wage as per Section 31. Section 74 emphasizes constitution of Safety and Health Committee where 20 or more employees are engaged.

4. Guidelines/Frameworks

a. Environmental Protection Rules 2077

To address environmental impact assessment as envisaged by NCS, 1987, National Environmental Impact Assessment (EIA) Guidelines were endorsed by Government of Nepal on 27 September 1992 and gazetted on 19 July in 1993, Volume 43, Number 5. The guideline provides criteria for project screening and initial environmental examination (IEE). This also includes scoping, preparation of terms of reference for EIA, methods of EIA report, impact identification and prediction, impact mitigation measures, review of the draft EIA report, impact monitoring, evaluation of impact studies, impact auditing, community participation and schedules and annexes to IEE and EIA. The EPR 2077 was endorsed on Asar 2, 2077 with provincial rights and delineation.

b. SREP Environment Management Framework (EMF), 2013

SREP Environment Management Framework (EMF) has been formulated on 2013 during the SREP project formulation. This document is the key document to assure environmental protection while implementing biogas subprojects under SREP Extended Biogas Programme. This document identified generic impacts caused by implementation of biogas subprojects and prescribed generic mitigation measures. The EMF proposes three levels of interventions for the all biogas sub-projects in order to ensure adequate environmental considerations. Environmental Screening and appropriate subproject categorization through comprehensive checklist, preparation of Environmental Management Plan (EMP) based on site specific baseline which will consist alternative analysis, mitigation measures and environmental monitoring plan. The document provides procedure for environmental impact identification and preparation of safeguard documents.

Any project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas--including wetlands, forests, grasslands, and other natural habitats--are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project

may vary from project to project, but it is narrower than that of Category A. category B projects required Initial Environmental Examination (IEE) or more often known as limited EIA.

5. Standards

a. National Ambient Air Quality Standards, 2003

The National Ambient Air Quality Standards, 2003 enforced by GoN has set quality standards for seven parameters: TSP, PM10, Sulphur Dioxide, Nitrogen Oxide, Carbon Mono-Oxide, Lead and Benzene for the maintenance of the ambient air quality. The project during its construction and operation will have to comply with the standards for the ambient air quality.

b. Nepal Vehicle Mass Emission Standards, 1999

Nepal Vehicular Emission Standard, 1999 enforced for the vehicles operating on petrol, gas, and diesel. The emission standards are very specific for two, three and four wheeler vehicles. The vehicles used by the project should comply with the vehicular emission standards during the construction and operation phase.

c. Generic Standard for discharging industrial effluent in inland surface water, 2001

The Ministry of Environment has set tolerance limits for the industrial effluents to be discharged into the inland surface water through Gazette Notification. Since the project is considered as an industry it will have to comply with the tolerance limits set in the generic standard prior to the discharge of the effluents into the inland surface water during the construction and operation period.

6. International Polices and Conventions

a. World Bank Safeguard Policy (OP 4.01 Environment Assessment)

An Environmental Assessment (EA) shall be conducted to ensure that bank-financed project are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. Any WB project that is likely to have potential adverse environmental risks and impacts in its area of influence requires an EA indicating the potential risks, mitigation measures and environmental management framework or plan.

EA takes into account the natural environment (air, water, and land), human health and safety, social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources) and trans-boundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

Limited EIA or IEE examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

b. Convention on Biodiversity (CBD), 1993

The main objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

c. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973

The convention classifies species according to criteria where access or control is important (e.g. I - species threatened with extinction; II - species which could become endangered; III - species that are protected; E - Endangered; V - Vulnerable, R – Rare (CITES 1983). The project will have to minimize impacts to the CITES species as far as possible.

d. Convention (No.169) Concerning Indigenous and Tribal Peoples in Independent Countries, 1989

The Article 7 of the convention provide right to the indigenous and tribal people to decide their own priorities for the process of development. However, for the national development plans and programs, it mandates consultation with them in the formulation of the plans and programs. Article 12, 13, 14 and 15 safeguards rights of the indigenous people in the land and natural resources in territories traditionally occupied by them. In the event that the state retains the right of the natural resources in their territories, it mandates formulation of special provisions under the state legislation for participation in the decision-making process and resettlement process with full compensation of the resulting loss or injury (Article 16).

ANNEX 5: ENVIRONMENTAL STANDARDS

Table 1: Standards for Effluents Discharged into Inland Waters

SN	Parameters	Tolerance Limits
1	Total Suspended solids, mg/L, Max	30-200
2	Particle size of total suspended particles	Shall pass 850-micron Sieve.
3	pH	5.5 to 9.0
4	Temperature	Shall not exceed 40 degree C in any
5	Biochemical oxygen demand (BOD) for 5	30-100
6	Oils and grease, mg/L, Max	10
7	Phenolic compounds, mg/L, Max	1
8	Cyanides (as CN), mg/L, Max	0.2
9	Sulphides (as S), mg/L, Max	2
10	Radioactive materials:	
11	a. Alpha emitters, c/ml, Max	7 OCT
12	b. Beta emitters, c/ml, Max	8 OCT
13	Insecticides	Absent
14	Total residual chlorine, mg/L	1

SN	Parameters	Tolerance Limits
15	Fluorides (as F), mg/L, Max	2
16	Arsenic (as As), mg/L, Max	0.2
17	Cadmium (as, Cd), mg/L, Max	2
18	Hexavalent chromium (as Cr), mg/L, Max	0.1
19	Copper (as Cu), mg/L, Max	3
20	Lead (as Pb), mg/L, Max	0.1
21	Mercury (as Hg), mg/L, Max	.01
22	Nickel (as Ni), mg/L, Max	3
23	Selenium (as Se), mg/L, Max	0.05
24	Zinc (as Zn), mg/L, Max	5
25	Ammonical nitrogen, mg/L, Max	50
26	Chemical Oxygen Demand, mg/L, Max	250
27	Silver, mg/L, Max	0.1

(Source: Standards adopted from MoEST, gazette on 2058/01/17 by GoN)

Table 2: Drinking Water Quality Standards

SN	Parameters	Desirable	Maximum Tolerable
1.	Colour, Hazen units, Max	10	15
2.	Odor	Unobjectionable	
3.	Taste	Agreeable	
4.	Turbidity, NTU, Max	5[1]	10
5.	Total Dissolved Solids, mg/l , Max	500	1500
6.	pH value	6.5 – 8.5	May be relaxed up to 5.5 on the lower and up to 9 on higher side.
7.	Total Hardness (as $CaCO_3$) mg/l, Max	250	
8.	Calcium (as Ca), mg/l, Max	75	
9.	Magnesium (as Mg), mg/l, Max	30	
10.	Copper (as Cu), mg/l, Max	1	may be extended up to
11.	Iron (as Fe), mg/l, Max	0.3	
12.	Manganese (as Mn), mg/l, Max	0.1	may be extended up to
13.	Chlorides (as Cl), mg/l, Max	250	
14.	Sulphate, (as SO_4), mg/l, Max	150[2]	
15.	Nitrate (as NO_3), mg/l, Max	45	No relaxation
16.	Fluoride (as F), mg/l, Max	1.5	
17.	Phenolic compounds, (as C_6H_5OH),	0.001	May be relaxed up to
18.	Mercury (as Hg), mg/l, Max	0.001	No relaxation
19.	Cadmium (as Cd), mg/l, Max	0.01	No relaxation
20.	Selenium (as Se), mg/l, Max	0.01	No relaxation
21.	Lead (as Pb), mg/l, Max	0.01	No relaxation
22.	Arsenic (as As), mg/l, Max	0.05	No relaxation
23.	Cyanide (as CN), mg/l, Max	0.05	No relaxation
24.	Chromium (as Cr^{6+}), mg/l, Max	0.05	No relaxation
25.	Residual free Chlorine, (as Cl), mg/l,	0.2	
26.	Ammonia, mg/l, Max	1.5	
27.	Aluminium, mg/l, max	0.2	
28.	Boron mg/l, max	0.3	
29.	Nickel, mg/l, max	0.02	
30.	Hydrogen sulphide, mg/l, max	0.1	
31.	Zinc, mg/l, max	3	

(Source: Standards adopted from Department of Water Supply & Sewerage)

[1] Value for turbidity is 5 in FAR(for mineral water), PFA, BS, WHO
[2] Value for Sulphate BS:200, FAR(for mineral water) and PFA:250

Table 3: National Standard for Noise Quality

SN	Area of Exposure	Noise Limit (L_{eq}) in decibels	
		Day Time	Night Time
1.	Industrial Area	75	70
2.	Commercial Area	65	55
3.	Rural Residential Area	45	40
4.	Urban Residential Area	55	50
5.	Mixed Residential Area	63	55
6.	Quiet Area	50	40

(Source: Gazette Notification,2012)

Table 4: Permissible Emission Standards for Biogas Generator (adopted from Diesel Generator Standard)

Category (KW)	CO (g/kWh)	HC+NOx (g/kWh)	PM (g/kWh)
kW <8	8.00	7.50	0.80
8=kW<19	6.60	7.50	0.80
19=kW<37	5.50	7.50	0.60
37=kW<75	5.00	4.70	0.40
75=kW<130	5.00	4.00	0.30
130=kW<560	3.50	4.00	0.20

Source: Nepal Gazette (Nepal Gazette Notification, 2069 Kartik 13, BS)

ANNEX 6: GRIEVANCE REDRESS FORMAT AND COMMITTEE FORMATION

Janakpur Agro Farm Ltd.

Grievance Record Form
(सल्लाह/सुझाव वा गुनासो टिपोट/रेकर्ड फारम)

Name of Subproject and address (परियोजनाको नाम र ठेगाना):

Name of Developer :

Name of Grievant **(सल्लाह/सुझाव/गुनासो राख्ने/ह्यान्नेको नाम):**	**Contact detail (सम्पर्क विवरण)** **Work Phone (कार्यालयको फोन नं.):** **Home Phone (घरको फोन नं.):** **Mobile No. (मोबाइल नं.):** **E-mail (ईमेल) :**
Home Mailing Address (घरको ठेगाना):	**Work Mailing Address (कार्यालयको ठेगाना):**
Date, time and place of grievance recorded (गुनासो टिपोट/रेकर्ड गरिएको मिति, समय र स्थान) :	
Detailed description of grievance (गुनासोको विस्तृत विवरण):	
Proposed solution to grievance (गुनासो समाधानका लागि प्रस्तावित प्रस्ताव):	
_____ Signature of Grievant (गुनासोकर्ताको दस्तखत)	_____ Name and Signature of Grievance Received (गुनासो प्राप्तगर्नेको नाम र दस्तखत)

Dhanusha

Grievance Record Form

गुनासो सुनवाई दर्ता पुस्तिका

क स	गुनासो/सल्लाह/सुझाव	गुनासो/सल्लाह/सुझाव दर्ता गर्नेको नाम, ठेगाना र सम्पर्क नम्बर वा इमेल	गुनासो /सल्लाह/सुझाव प्राप्त गरेको माध्यम	गुनासो /सल्लाह/ सुझाव प्राप्त गरेको मिति	गुनासो/सल्लाह/सुझावको सुनवाई वा समाधान कसरी भयो	गुनासो /सल्लाह/ सुझाव समाधान गरेको मिति	प्राप्त गुनासो/सल्लाह/सुझाव को जानकारी AEPC लाई गराईयो/गराईएन

MEETING MINUTES FOR GRIVEVANCE REDRESS MECHANISM COMMITTEE FORMATION

On 23/9/2077 (7/1/2021) at 9:00 A.M, a meeting was held in the premises of Janakpur Agro Farm Pvt. Ltd., Murgiya, Dhanushadham-9, Dhanusha for agreeing upon the following requirements of GRM as well as the appointment of focal person for the same

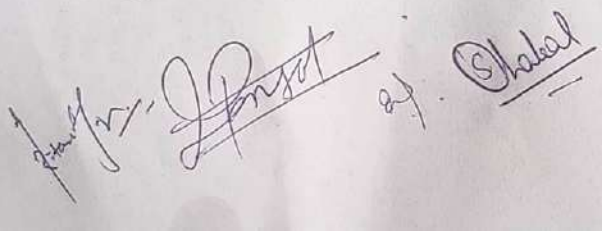
- It was agreed that a register will be maintained including the name of grievant, date and time of grievance recorded, issue raised and time frame to redress the received grievance. The register will provide information on how the grievance was solved.
- It was agreed that a suggestion box will be place at the entrance of the project site as well as in project site premises to collect grievances from employees. Grievances can be registered via website: http://www.aepc.gov.np/gform/gform.php
- It was agreed that if the subproject level GRC will not be able to redress the grievance, it will be forwarded to the national level GRC.
- It was agreed that grievances received have to be resolved within 3 weeks of receipt of complaint.
- It was agreed that affected persons have the option of accessing the court of law in case of dissatisfaction with the decision of the GRC.

Members Present:

1. Shovakanta Dhakal, MD, JAFPL
2. Dhyani Yadav, Ward Secretary
3. Suresh Yadav, Public, REP
4. Sanju Lama, Public, REP
5. Ritavrat Joshi, Consultant, Mineggy
6. Bishwas Lamsal, JAFPL

It was decided that the ESMF Mr. Shovakanta Dhakal (MD of Janakpur Agro Farm Pvt. Ltd will be appointed as the focal person (Member Secretary of Subproject Level GRC) to receive/handle any kind of grievance related to the project. His/her name and contact number will be displayed at the entrance of the project site, so that affected people can have direct access to him/her.In case of his absence, Mr. Gyanendra Raj Marashini (Admin Officer of Jankpur Agro Farm Pvt. Ltd.) will be given the authority to handle any future grievances received. Following members will now comprise the GRC of Janakpur Agro Farm Pvt. Ltd. from the date of the signing of this document.

1. Shovakanta Dhakal, MD, JAFPL
2. Dyani Yadav, Ward Secretary, Dhanushadham - 09
3. Gyanendra Raj Marashini, JAFPL
4. Suresh Yadav, Public, REP
5. Sanju Lama, Public, REP



GRC Formation for JAFL

ANNEX 7: EMERGENCY RESPONSE PLAN

1. Types of Incident, Severity and Level of Response

Types of Incident	Severity	Level of Response
Serious injury or medical emergency Fire or explosion Chemical spill Gas leak Vandalism and other threats Others	Level 1 – Minor: localized fire Level 2 – Serious: containable fire Level 3 – Severe: serious fire	**Level 1** • can be dealt with by the person identifying the problem • supervisor should be informed and the incident formally logged • do not involve plant evacuation or Emergency Response Team **Level 2** • Immediate action should be taken • the person identifying the problem call Security to summon ERT assistance • ERT takes necessary emergency actions • May involve plant evacuation **Level 3** • Immediate action should be taken • the person identifying the problem call Security to summon ERT assistance • ERT takes necessary emergency actions • Must involve plant evacuation and Emergency Response Team

ERT – Emergency Response Team

2. The Emergency Organization

Operating Personnel	ERT	External Services	Others
Problem Identifier Supervisor	Incident controller First Aiders Fire checkers Pump checkers Gas line checkers Roll Call Co-coordinator others	Ambulance Fire Medical Health & Safety Security	Crisis Management Team ESS specialist Site in charge

3. Emergency Response Equipment

Emergency Response Equipment	Location	Capability functions	Inspection frequency
Smoke Purge Generator	Utilities	To Extract Smoke To power in emergency	Monthly and quarterly
Fire pumps	Fire system pump house	To supply sprinkler water to the plant	Weekly
Fire alarm	Reception and plant rooms	To audibly alert all personnel of the presences of a Fire or Smoke	Weekly
Spill kits	Security	To contain potential local leaks	Monthly
Radio	Individually held and Reception	To ensure clear open communication in event of emergency	Weekly
Fire Extinguishers	Plant wide	To provide local, portable extinguishers for the suppression of a small fire	Annual
First Aid Kits	Security	To Supply Dressing/Burn Material	Weekly
Gas detector	Security	Gas detection CH_4 leak and H_2S leak	Weekly

Responsibility for operation should be defined

4. **Training**

To	On what
Employees	Emergency response and evacuation
Contractors	Emergency response and evacuation
Visitors	
Emergency Response Team	Emergency response procedure Basic fire response procedure Chemical Spill Gas leak
First aiders	First aid
Security	Call response and dealing with external threat
Incident controller	Incident control

5. **Drill and communication –** *should be taken annually*

6. **Incident Response**

Personal Injury/Medical Emergency			
Instructions for all employees and contractors	**Instruction for First Aid Personnel**	**Instruction for Supervisors**	**Instructions for Security**
If incident involves personal injury - remove the hazard if safe to do so	On instruction from Security or Incident Controller, proceed to scene of injured personnel	Liaise with First Aider and find out what further medical intervention is required.	Ask caller to **Remain Calm**
General Site Evacuation			
should make safe any equipment you are using if safe to do so and immediately leave the building by the nearest emergency exit Proceed to your designated Assembly Point			
Fire			
If trapped - Close as many doors as possible between you and the fire In case of smoke - Stay as low as possible			Receive emergency call Fire alarm activation Sprinkler water flow alarm
Chemical spill			
Others:			
Instructions for • Emergency Response Team • Pump House Checker • Gas Leak Checkers • Roll Call Coordinator • Others			

7. Incident Report Checklist

A. Attendance		
Person	**Present**	**Signature**

Fire checker		
Pump House checker		
Roll call coordinator		
B. Notification		
	Notified	**Response**
Ambulance	Yes/No	Yes/No
Fire brigade		
C. Responsibilities		
Issue	**Who**	**What**
Gas Leak	Gas leak checker	
Radios		
Security	Security guard	Ensured no authorized entry

8. Directory of Emergency Contacts

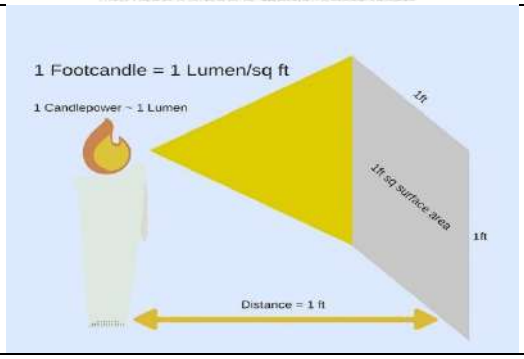
Name	Organization	Contact Address	Contact No.
	Security		
Dr.	Physician		
	Hospital		
	Fire Brigade		
	Ambulance		
	Municipality		
	Ward Office		
	ESS Focal Person		
	Team Leader, ERT		
	Contractor		

ANNEX 8: TRAFFIC MANAGEMENT PLAN

Name of the Subproject: JAFL

Address: Murgiya, Dhanushadham -9, Dhanusha

Detail of vehicle	Types of vehicle: No. of vehicle: Construction: Heavy – 5-7 Medium – 2-3 Light – 2 Operation Heavy – 2 Medium – 1 Light – 1 **(Cross check with financial plan)**	
Designated staff (who implements TMP) Equipment/vehicle operators	Name: Vehicle Incharge TBD Contact No. Contact Address:	
Work time (for vehicle movement)	10 AM to 5 PM	
Transportation route Transport in closed vehicle	Inform traffic police Co-ordination with traffic police	

Use of signage Number and type of signs to be placed Condition of signs (clean, legible, and reflective)	Do not enter Construction work is in progress Evacuation route	
Flagging	Use of flag Use of illuminating flag for night time Training for flaggers Provide high visibility vest for flaggers (especially for night time) Drivers to be warned in advance	
Work Zone protection	Speed limit to 10km/hr Communication between worker on ground and equipment operator Communication between equipment operators	
Traffic control devices	Use of Barricade, Cones Signals, Message boards	
Lightening	Illuminated for night time at least 5 foot candle (1 ft) Compound Lighting ~ 50	

Training	Training on Traffic Management Plan - Route of construction vehicle movement For those who are directly/indirectly involved	
Designated parking area for Employees & Visitors	Parking Area – 800 m^2 Equivalent of 10 four wheelers	

ANNEX 9: OCCUPATIONAL HEALTH AND SAFETY PLAN

Management Commitment to Occupational Health Safety (OHS)

Goals for OHS Plan:

- Develop, implement, and maintain a safe workplace for our employees consistent with all applicable national regulations
- Consistently improve the safety program to minimize incidents, therefore ensuring employees' long-term safety and wellness.

Person responsible for implementing and monitoring the Safety Program: *TBD*
Managing Director: *Shyam Badan Yadav*
Date:

Employer Responsibilities

To provide employees with a workplace free of hazards that may cause illness or serious physical harm.

To comply with standards, rules, and regulations

- Allow employees free access to tools and equipment necessary to do a job safely.
- Provide employees with training/orientation on specific safety issues and equipment.
- Conduct regular inspections.
- Following up after safety incidents with thorough accident investigations, correcting problems and post-accident employee training.
- Recognize employees with the best OHS practices.

Employee Responsibilities

- Handle equipment and work processes in accordance with established procedures and documented protocols.
- Report any unsafe conditions, defects in equipment, or injuries to management immediately.
- Complying with all management instructions for safe conduct.
- Attend OHS related trainings/orientations and practice drills.
- Obtain permission to operate equipment.
- Never participate in horseplay, scuffling, and other acts that endanger the safety or well-being of the team.
- Not report to work under the influence of alcohol and/or drugs or during illness.

Employee Injury and Illness Reporting

All injuries must be reported to immediate supervisor or Emergency Response Team.
Information

- Location of First-aid box and fire extinguisher
- Emergency contact number
- Emergency health centre location:
- Evacuation location:

Report any hazard to:
Supervisor's Name: Mr. Gyanendra Raj Marashini
Contact No.: 9851147178
After hours/weekends: Will be available

Incident Investigation
In an emergency situation, **dial 100** immediately

- All injuries and illnesses should be reported, no matter how large or small.
- Fill up incident Reporting Form.
- Document the injury/illness completely while doing a thorough root cause analysis of the incident so that corrective action can be determined to prevent future incidents.
- Part of the safety corrections may include employee orientation and counseling to correct unsafe behaviors, prevent injuries, and improve safety.

Hazard Identification and Assessment

Information available in the workplace may include:

- Equipment and machinery operating manuals.
- Material Safety Data Sheets (MSDS)
- Records of previous injuries and illnesses
- Patterns/trends of frequently occurring injuries and illnesses
- Existing safety and health programs, such tagout, confined spaces, process safety management, personal protective equipment etc
- Input from workers

General Safety Programs

- Confined space entry
- Driving safety
- Electrical safety (wiring methods, components and equipment, electrical system design)
- Emergency Action Plan
- Ergonomics (scientific study of people and their working environment)
- Fall protection
- Fire safety

Personal Protective Equipment
All personal protective equipment (PPE) and tools to safely perform the work will be provided to employees and properly maintained in accordance with manufacturer guidelines.

Organization's PPE plan – use of appropriate PPE
All employees will be trained on the personal protective equipment that is required to do their jobs effectively. The Company will review any employee feedback on the use of this equipment and potential improvements that can be made. This will be in line with the current COVID 19

situation and its long term implications in terms of health safety and contagion control. The following steps will be done for disinfection

1. Clean up and disinfect office space, common areas and construction site with soap/detergent water and/or disinfectant (such as 1% hypochlorite) where workers would have to move frequently
2. Disinfect frequently touched objects, surfaces and equipment
3. Provide hand washing facilities at the construction site (recommendation: use foot operated tap and soap dispenser)
4. Provide soap and water in toilet with hand drying facility such as disposable paper towel
5. Display poster on hand-washing steps

In case of someone at the construction site becomes ill with symptoms of COVID-19, developers/contractors shall develop an Emergency Response Plan to deal with the emergency situation. Project developers and contractors shall assume that everyone is potentially infectious at the construction site, thus shall introduce good infection control plan. If proper procedures are followed at all times, spread of COVID-19 can be avoided. Construction sites shall be provided with an appropriate first aid kit and at least one staff member shall be appointed as COVID-19 focal person and trained in first aid. Moreover, Personal Protective Equipment (PPE) such as facemask, gloves, gowns, eye goggles and face shields should be provided on site

Education on COVID-19

1. Orient employees/workers on COVID-19, its symptoms and Occupational Health and Safety (OHS) Plan of the project
2. Provide notification on risk and scope of risk to make understanding on the disease
3. Provide up-to-date information on weekly basis from reliable and authentic sources such as GoN and WHO
4. Instruct workers to strictly follow guidelines/ instruction of the Government of Nepal
5. Encourage workers to strictly follow OHS Plan along with GON prescribed measures to avoid and minimize the risk of Infection

Hazard Prevention and Control

Using the following standard methods:

- Safe Work Practices
- Engineering Control
- Training
- Enforcement
- Personal Protective Equipment
- Administrative Control
- Preventive Maintenance

Work Place Environment

- Light
- Temperature

- Ventilation
- Sound
- Working space Cleanliness
- Garbage Management
- Provision of Drinking Water
- Canteen
- Toilet Facility
- Resting time and resting place
- Safety provision in workplace

Communication

Standard methods for the communication with employees:

- Group orientation/individual induction
- Posters/signage/forms/formats
- Regular Meetings on OHS
- Safety suggestion box
- Online forms
- Hotline

Training and Education

Safety training will be provided for employees:

- During new hire on boarding.
- When beginning new job assignments.
- When cross training on new types of machinery/equipment.
- When new substances, processes, procedures, or equipment are introduced to the workplace and represent a new hazard.
- Periodically, in the form of refresher training (this may be following a near miss or incident, which can be required).

The purpose of our training program is to provide employees with:

- Knowledge and skills needed to do their work safely and avoid creating hazards that could place themselves or others at risk.
- Provide awareness and understanding of workplace hazards and how to identify, report, and control them.
- Specialized training, when their work involves unique hazards.

Program Evaluation and Improvement

- Verify that the core elements of the program have been fully implemented. Ensure that the following key processes are in place and operating:
    - Reporting injuries, illnesses, incidents, hazards, and concerns.
    - Conducting workplace inspections and incident investigations.
    - Tracking progress in controlling identified hazards and ensuring that hazard control measures remain effective and is completed promptly.
    - Collecting and reporting any data needed to monitor progress and performance.

- Review the results of any compliance audits to confirm that any program shortcomings are being identified and that actions are being taken that will prevent recurrence.
- Review and update plans/processes based on the company's loss history.
- The person tasked with the overall responsibility to evaluate the Company's safety program and processes is:

Name: Mr. Bhesh Raj Aryal
Contact Information: 9856025504

ANNEX 10: DATA COLLECTION CHECKLIST

Checklist for Physical Environment

A. Topography/Physiography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed Biogas Project
2. Verify the topographic characteristics of the land in the field

B. Geology and Soil Type

1. Classify the type of soil found in the project area
2. Study the geological characteristics of the project area
3. Investigate suspended sediment loads data from available literature

C. Climate

1. Study of published data (DHM) of regarding temperature, rainfall, humidity,
2. If possible, classify the climatic zone and its verification

D. River Hydrology/ Drainage Pattern

1. Study of Topographic maps/ other available maps and identify the drainage patterns
2. Verify the topographic characteristics of the river system/drainage pattern in the field
3. Collect the available information regarding the quality of river water
4. Investigate flood potential in the river and seasons of occurrence, past history of flooding

E. Land Use

1. Investigate on the land use of the project area from the topo-maps, and other available land use maps
2. Investigate the land use type of areas proposed for project components and support facilities from the statistics published by Department of Forest

F. Air Quality, Water Quality and Noise Levels

1. Collect any data on air, water and noise quality of the area from previous literature, if available
2. Investigate major water and noise polluting sources and activities of the area
3. Identify information related to water use like drinking water source, irrigation facility

Checklist For Biological Environment

A. Forest and Vegetation

A. Forest Classification by types (from expert observation supported by available forest resource maps or GIS based maps)
B. Classification of affected forest (through consultation with locals, CFUGs or management committees)
    i. Community Forest
    ii. Religious Forest
    iii. Government Managed Forest
    iv. Private Forest
C. Vegetation and Biodiversity observed: List of tree, shrub, herbfound within the influence area of the project
D. Conservation significance: The species found shall also be categorized according IUCN, CITES. and Government of Nepal Protection Category

B. Wildlife and Birds:

1. List of wildlife and birds found in and around vicinity through consultation with community and key informants

Checklist for Socio-economic and Cultural Environment

A. Sub-project District and Municipality

The details about the district and municipality will be extracted from the district and municipality profile and investigation with officials from the municipality. Most recent statistics available will be used to study about the socio-economic status of the project area. The following information will be extracted to study about the socio-economic status of the project area.

1. Demographic information (Households, Population with male and female, sex ratio, average household size)
2. Caste and Ethnicity (number of caste group in both district and municipality)
3. Language Spoken (mother tongue, major language)
4. Age wise population (infant, young, economically active, old)
5. Literacy rate
6. Sanitation (HH with and without toilet, Flush toilet/ pan toilet)
7. Drinking water facility (municipal water supply, deep boring, well, river water)
8. Source of energy for cooking and electricity (cow dung, firewood, biogas, kerosene, LPG, national electricity gridline)

B. Cultural Environment

1. Investigate the major religious sites of the project area during the field visit
2. Study about the main festivals of the area

ANNEX 11: GENDER MANAGEMENT PLAN

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
Excluded from participation in consultation/ information sharing	**Awareness campaign** about the project for the communities focusing on the vulnerable groups including women and social excluded groups.	• Information/ awareness campaigns through coordinating with locally formed Clubs, Groups, local traffic police and NGOs. • Share information about the project benefits in Nepali language (if possible in local language). • Ensure representation of women and other disadvantage groups in the grievance redress committee, benefit sharing scheme committees as well as in other committees formed under the project.	JAFL (to be verified by AEPC)	Project preparation phase of each sub project.
Excluded from Opportunities and low level of participation in decision making process because of social/cultural restriction	• **Gender inclusive consultation** and social mobilization • Ensure **increased participation** of **women** and people of all **socially excluded groups** during meetings of pre construction phase, project implementation and monitoring.	• Carry out meaningful consultation, focus group discussion, interviews, meetings and interaction program with and orientation especially to women in the project area.	JAFL (to be verified by AEPC)	Throughout the project period
Disparity in Wages	• Accord priority employment to women and people of vulnerable groups in construction activities under the project. • **Promote equal wages for equal work**	• Inform women and disadvantage groups regarding proposed works. • Identify women and people of vulnerable interested to work; assess their skills and involve them as per their capabilities. • Creating enabling environment to increase women and Indigenous People (IP) access in different level jobs created by project. • Monitor women's wage rate and do the needful to ensure	JAFL & AEPC	Project preparation phase to end of sub-project.

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
		wage equality for similar nature of works. • Prepare clause to be included in work contract documents of developer to prevent discrimination in employment on the basis of sex, caste, religion and ethnicity as per the mandate of labor law.		
Lack of trained women in Biogas sector	• Promote need based **technical, administrative and support services**.	• Conduct training to introduced technologies and its health and safety usages • Skill training to women and men proportionately	JAFL	
Less women owned Biogas Companies	**Affirmative action** for private companies and Enterprises	• Women led Companies/Enterprises will be given high priority during selection process.	AEPC	Project preparation phase to end of each sub project.
Human resource in project implementing team	**GESI inclusive approach**	• Gender balance in project implementation team. • Dedicated human resource to monitor gender and social safeguard part of project.	AEPC	Project preparation phase.

ANNEX 12: LABOR MANAGEMENT PLAN

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
Health and Safety Condition of Workers	• A **safe and healthy work environment** taking into account inherent risks and hazards. • **Awareness raising** activities to prevent accidents, injury and disease. • **Proper record of Accidents, injury and disease.**	• Regular Orientation and Training regarding Occupational Health and Safety. • Provision of preventative and protective measures (PPE use). • Documentation and reporting of accidents, diseases and incidents. • Emergency prevention, preparedness and response arrangements.	JAFL (to be verified by AEPC)	Project preparation phase to end of sub-project.
Non-Discrimination and Equal Opportunity	• **Ensure equal opportunity and fair treatment** with respect of hiring, working conditions access to training and promotion.	• **Promote fair and equitable labor practices** for the fair treatment, non-discrimination and equal opportunity to workers. • Maximize the **local employment opportunity.**	JAFL (to be verified by AEPC)	Project preparation phase to end of sub-project.
Protecting the Workforce (Child labor, Forced labor and labor influx)	• **Will not employ children** in any manner. • **Will not employ forced labor**, which consists of any work. • **Hire skilled and unskilled workers from affected communities.** • Incoming workers, their living arrangements should be **discussed and agreed with communities** in advance.	• Follow National Laws as applicable (Children below the age of 18). • Working hours for women must be between 6 AM to 6 PM and prohibits night working hours. • Labor Registration Sheet must be filled with mentioned details. **During construction phase**, it must be reported **monthly** and in **operation phase, it should be semi-annually.**	JAFL (to be verified by AEPC)	Project preparation phase to end of sub-project.

Potential Issue	Strategy	Proposed Activities	Responsibility	Timeline
Implementation of Workers Code of Conduct	• **Preparation and implementation** of Workers Code of Conduct	• Do's and Don'ts for the workers/labors • Regular Orientation regarding the code of conduct.	Developer	Project preparation phase to end of sub-project.
Lack of social and cultural awareness	**Awareness training** about different type harassment and gender-based violence.	• Social and cultural awareness training especially on gender norms and other norms and values of the community. • Implementation of sub-project GRM and ensuring accessibility of female members of community.	Developer	Project preparation phase to end of each sub project.
Labor Camp Management	Follow **Occupational Health and Safety Plan, National rule and regulation/ policies for labor**.	As per **Occupational Health and Safety Directive of Brick Industry, 2074 (O{6f p2f]u)** • Room size 10ft /8ft and 8ft height • Beside family members, separate room for male and female workers. • Kitchen and room must be separate. • Keep 100 m distance between work station and labor camp • Availability of First Aid Kit • Sufficient Water Supply (including drinking)	JAFL (to be verified by AEPC)	Project preparation phase.