

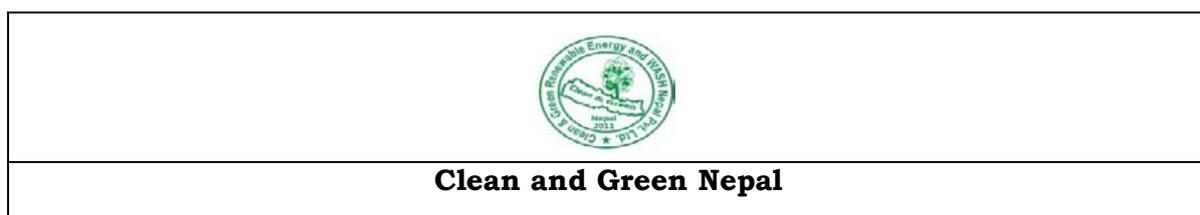
Commercial Biogas Plant Detail Feasibility  
Study Report  
Of  
**Laliguras Dairy Farm and Research Centre,  
Khaireni NP-11, Chitwan**

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***Submitted to:***



***Submitted by:***



***Supported by:***

		
<b>SNV Netherlands Development Organisation</b>	<b>Alternative Energy Promotion Centre (AEPC)</b>	<b>Laliguras Dairy Farm and Research Centre, Khaireni NP, Chitwan</b>

**14 June 2016**



## **8.2 Appendix II: Environmental and Social Management Plan (ESMP) Laliguras Dairy and Research Center Pvt. Ltd.**

**Executive Summary:** This Environmental and Social Management Plan (ESMP) has been developed for proposed 35m<sup>3</sup> biogas project in Laliguras Dairy and Research Center Pvt. Ltd. for mitigating likely environmental impacts predicted during environmental and social screening. This project is classified as “Category C”, which means there is minimum environment impact and hence there is no need of conduction of further environmental or social assessment. Some of the impacts caused by the project are: health and safety issues of construction workers, construction related health risks, possible water sources contamination due to leakage of slurry liquid, workers health during slurry handling and foul smell. The possible mitigation measures have been proposed in this ESMP and shall be implemented by the Construction Company and developer. The likely impacts not identified during screening as well as in this ESMP, if perceived during construction and/or operation phase shall also be avoided or mitigated by the Construction Company and/or developer.

**कार्यकारी सारांश :** लालीगुरास डेरी यण्ड रिसर्च सेन्टरमा प्रस्तावित ३५ घन मिटरको बायोग्यास प्लाण्ट निर्माण तथा सञ्चालनबाट हुनसक्ने सम्भावित प्रतिकूल वातावरणीय तथा सामाजिक प्रभावहरूको न्यूनिकरण गर्न यस वातावरणीय तथा सामाजिक व्यवस्थापन योजना तयार गरिएको छ । सम्भाव्यता अध्ययनको सिलसिलामा सम्पन्न वातावरणीय तथा सामाजिक छनौटले पहिचान गरिएका प्रतिकूल प्रभावहरूलाई मध्यनजर गरि यस परियोजनालाई “ग बर्ग” मा बर्गीकरण गरिएको छ । यस परियोजनाबाट उल्लेख्य वातावरणीय तथा सामाजिक प्रभावहरू पार्ने नदेखिएतापनि सामान्य प्रभावहरू जस्तै निर्माण चरणमा कामदारहरूको स्वास्थ्यमा हुनसक्ने प्रभाव, निर्माण क्षेत्रमा धुलोको सामान्य वृद्धि, डोम उत्खननबाट निस्कने माटोको व्यवस्थापन, स्लरीको चुहावटबाट पानीको श्रोतमा हुनसक्ने प्रदुषण, स्लरी तथा कम्पोष्टमल सम्बन्धीका कार्यगर्दा हुनसक्ने स्वास्थ्य सम्बन्धी समस्या तथा परियोजना क्षेत्रमा हुनसक्ने दुर्गन्ध जस्ता प्रभावहरू पर्न सक्ने देखिन्छ । यस वातावरणीय तथा सामाजिक व्यवस्थापन योजनाले माथि उल्लेखित सामान्य प्रभावहरूको न्यूनिकरणका उपायहरू निर्दिष्ट गरेको छ र यी प्रभाव न्यूनिकरणका उपायहरू अनिवार्य रूपमा लागु गर्नाका साथै सो को अनुगमन समेत गर्नुपर्ने छ । यदि यस योजनामा उल्लेख नभएका कुनै प्रभावहरू परियोजना निर्माण तथा सञ्चालनका समयमा उत्पन्न भएमा त्यस्ता प्रभावहरूलाई समेत न्यूनिकरण गर्ने दायित्व निर्माण कम्पनी वा सञ्चालकको हुने छ ।

### **1. Introduction**

For implementation of the biogas project, this environmental and social management plan is prepared for Laliguras Dairy and Research Center Pvt. Ltd., Khareni-11, Chitwan, Nepal. The organization is going to establish a 35m<sup>3</sup> large biogas plant within its premise. The project is supported by AEPC/NRREP/SREP.

### **2. Description of Subproject and Location**

The project lies in Khareni-11, Chitwan district. The biogas plant is proposed to be constructed within the organization. The Google map of the proposed location is provided below:



**Figure: Location Map of proposed project**

The gas produced by the plant will be 7.7m<sup>3</sup> per day. The plant will produce 428 kg of slurry per day which will be stored in compost pit to make dry and convert it into compost manure.

The construction work starts with excavation of earthwork followed by stone lining, and reinforcement and cement aggregate works. Once after the construction completion, the dung and kitchen waste will be fed into the digester. The gas produced from the subproject shall be used for thermal process only. AEPC will provide subsidy only after successful testing and commissioning of plant against guaranteed performance requirement as mentioned in DFS report.

### **3. Relevancy of preparing ESMP**

This Environmental and Social Management Plan (ESMP) has been done for the proposed project in order to mitigate the likely environmental impacts predicted during environmental and social screening. Any land acquisition or displacement of inhabitations will not be involved in the sub project intervention. The significant negative impacts are not envisaged, however, negligible impacts identified during screening process might prevail during construction and operation phase. This project is classified as “Category C”, which means there is minimum environment impact and hence there is no need of conduction of further environmental or social assessment. The Environmental and Social Management Plan has been prepared in order to reduce thus identified adverse impacts prior to sub project implementation.

### **4. Environmental and Social Baseline**

Topographically, the project site lies in Terai. From environmental aspect there are no public water sources from the project vicinity. The meteorological data from indicates that the region has hot summer days with mild winter temperature. Similarly from social aspect the region is dominated with Tharu community. The land-use pattern of the project area indicates of agricultural land as major land-use.



## **5. Environmental and Social Impacts**

During feasibility study of Laliguras Dairy and Research Center, considering environmental and social screening performed, it is not predicted to have significant negative environmental and social impacts.

The beneficial impact in environment is conversion of waste into compost and gas. Socially the positive impact is control of foul smell in the surrounding areas. This may encourage the developer to install large biogas plant utilizing all the farm waste and produce large quantity of fertilizer sufficient of farms in the community.

### **5.1 Beneficial impact**

Considering benefit to the community, the waste management from the project can reduce the pollution on the surrounding. The fertilizer from the project can be sold to farmer community at low cost helping them to produce more agricultural products. The farm is also buying grass from farmers giving them opportunity to earn money. The project can also provide job to local skilled workers during the construction phase. The project will provide renewable energy to the farm.

### **5.2 Adverse impact**

There will be no any major adverse impact to the surrounding community and environment. During construction phase, some minor impacts may be seen such as dust pollution, increased noise level and occupational health and safety of construction workers.

#### **5.2.1 Adverse impact (Construction phase)**

During the construction phase the adverse impact that are expected to happen are:-

- a. Worker health from dust inhalation during excavation and construction work.
- b. Pit waste material transport and disposal
- c. Noise

#### **5.2.2 Adverse Impact (Operation Phase)**

During the operation phase the adverse impact that are expected to happen can be listed as below:-

- a. Ground water pollution or contamination of water source due to leakage of slurry liquid.
- b. Infection of pathogens during slurry handling
- c. Foul smell due to slurry around surrounding community, during extreme temperature and windy day.
- d. Polluting the road and foul smell from compost while transporting to market

## **6. Mitigation Measures**

The environmental mitigation with their time of action, mitigation cost and responsibility are illustrated in the following table:

**ENVIROMENTAL AND SOCIAL MITIGATION MEASURES**

<b>Phase</b>	<b>Issue</b>	<b>Mitigating Measure</b>	<b>Cost of Mitigation (If Substantial)</b>	<b>Responsibility*</b>	<b>Start Date</b>	<b>End Date</b>
Construction	Worker health from dust inhalation	<ul style="list-style-type: none"> <li>Workers will be required to wear filter masks and eye protection</li> <li>Dusty areas (construction site) will be sprayed with water, particularly during hot, windy weather</li> </ul>	Minor Minor	Construction contractor	Digester pit, outlet pit and, manhole construction activities begin	Digester, outlet and compost pit construction is complete
Construction	Noise	<ul style="list-style-type: none"> <li>Work will be conducted weekdays from 8:00 AM to 6:00 PM. If additional time is required local residents will be informed.</li> </ul>	Minor	Construction contractor	Construction activities at site and connection line begin	Construction activities at site and connection line end
Construction	Pit waste material transport and disposal	<ul style="list-style-type: none"> <li>The waste material will be used for filling up a nearby pit or low land, the useful stone will be used in construction purpose the waste will be disposed safely.</li> </ul>	Minor	Construction contractor	Construction of pit begins	Construction of pit ends.
Operation	Ground water pollution due to leakage of slurry liquid	<ul style="list-style-type: none"> <li>Compost pit will be water tight, rain water will be drained avoiding entering into the pit</li> </ul>	Minor	Contractor	Compost pit construction/project operation phase	End of compost pit construction/end of project operational phase
Operation	Pathogens harm during Slurry handling to clear compost pit and making dry compost	<ul style="list-style-type: none"> <li>Workers will be required to provide with appropriate cloths, globe and masks. The equipments should be rinse with clean water after use and kept in safe place. soap for cleaning themselves</li> </ul>	Minor	Client	Periodic, during clearing up slurry and making dry compost	Till the compost is transported to the market.



operation	Polluting the road and foul smell from compost while transporting to market	<ul style="list-style-type: none"> <li>The transporting trolley will be fully covered</li> </ul>	Minor	Client	After loading the compost in transporting vehicle	Till It reaches to the market or farm field.
Operation	Foul smell due to slurry around surrounding community, during extreme temperature and windy day.	<ul style="list-style-type: none"> <li>Covering compost pit with plastic, cultivation flower trees for aesthetics</li> </ul>	Minor	client	Till the project runs	Till the project runs
Operation	Flies and mosquito breeding, due to slurry	<ul style="list-style-type: none"> <li>Avoiding waste water pits/ditches near project area</li> </ul>	Minor	Client	Till the project runs	Till the project runs



## ENVIROMENTAL AND SOCIAL MONITORING PLAN

<b>Phase</b>	<b>What parameter is to be monitored?</b>	<b>Where is the parameter to be monitored?</b>	<b>How is the parameter to be monitored/ type of monitoring equipment?</b>	<b>When is the parameter to be monitored- frequency of measurement or continuous?</b>	<b>Monitoring Cost What is the cost of equipment or contractor charges to perform monitoring</b>	<b>Responsibility</b>	<b>Start Date</b>	<b>End Date</b>
Construction	Worker health	At construction site	Visual: Worker wearing equipment	Weekly: random times	Minor	Construction Contractor	Construction activities begin	Till construction work ends.
	Dust levels		Dust visible	Weekly, more frequently during dry, windy weather	Minor	Construction Contractor		
Construction	Noise	At construction site	dB meter	Weekly or if there is local complaint	Minor	Construction Contractor	Construction activities at site and when vehicles run frequently	Construction activities end
Construction	Pit waste material transport and disposal	At construction site	Visual: Trucks covered or watered	daily	Minor	Construction Contractor	Start of construction of pit	Till pit construction ends
		At disposal site	Material properly deposited	Weekly	Minor	Construction Contractor		



Operation	Ground water pollution due to leakage of slurry liquid; possibility of contamination of drinking water sources due to the surface and subsurface flow of slurry liquid	Around construction and nearby surrounding	Water testing, slurry properly manage	Yearly	5000	Developer	Entire operation phase	Entire operational phase
Operation	Pathogens harm during Slurry handling to clear compost pit and making dry compost	For workers	Health check up, pathogens lab test	Once in two month	Minor	Developer	Start of Compost pit clearing	End of compost pit clearing
Operation	Polluting the road and foul smell from compost while transporting to market	From project site to market	Visual: Proper procedures followed	During transportation	Minor	Client	Transportation begins	Transportation ends
Operation	Foul smell due to slurry around surrounding community, during extreme temperature and windy day	Farm area and surrounding community	Comment from community, and workers in farm	Monthly	Minor	Client	Project operation phase	End of project operation phase.
Operation	Flies and mosquito breeding, due to slurry	Nearby farm area	Physically seen	Weekly	Minor	Client	Project operation phase	End of project operation phase

## 7. Conclusion

The above mentioned mitigation measures shall strictly be implemented by the responsible individuals as mentioned in this ESMP. In addition, the monitoring as mentioned in this ESMP shall also be performed accordingly. The likely impacts not identified during screening as well as in this ESMP, if perceived during construction and/or operation phase shall also be avoided or mitigated by the Construction Company and/or developer.