

**SMALL-SCALE CDM PROGRAMME ACTIVITY DESIGN DOCUMENT FORM  
(CDM-SSC-CPA-DD) - Version 01**



NAME /TITLE OF THE PoA: \_\_Nepal biogas support programme activity(draft)\_\_



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<b>CLEAN DEVELOPMENT MECHANISM SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD) Version 01</b>
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**NOTE:**

- (i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.
- (ii) The coordinating/managing entity shall prepare a CDM Small Scale Programme Activity Design Document (CDM-SSC-CPA-DD)<sup>1,2</sup> that is specified to the proposed PoA by using the provisions stated in the SSC PoA DD. At the time of requesting registration the SSC PoA DD must be accompanied by a CDM-SSC CPA-DD form that has been specified for the proposed SSC PoA, as well as by one completed CDM-SSC CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the SSC PoA must submit a completed CDM-SSC CPA-DD.

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<sup>1</sup> The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

<sup>2</sup> At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

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**SECTION A. General description of small scale CDM programme activity (CPA)**

**A.1. Title of the small-scale CPA:**

         Village Development Community biogas support project in central development region

**A.2. Description of the small-scale CPA:**

This is the CDM project which is designed to reduce the consumed amount of firewood as non-renewable biomass and avoid emission of methane gas which is released from the open dumped livestock dung by installing biogas plants at each household and using the generated methane gas as cooking fuel.

In the project, the amount of emission reduction is expected to be          t-CO<sub>2</sub>/y per one 6m<sup>3</sup> type plant.          households install the biogas plant, that is, the number of plants is totals          plants. Therefore, the amount of GHG emission reduction is expected to be          t-CO<sub>2</sub>/y.

On managing, coordinating and monitoring of PoA, IT tool is used because villages as CPA sites are scattered in the whole of Nepal. In particular, tele-center (=the base where IT coordinator is stationed in order to disseminate information from internet terminals among people of communities) is established at each CPA sites, and the information on monitoring during project period, operation and management situations of plants are shared with Coordinating or Managing entity.

**A.3. Entity/individual responsible for the small-scale CPA:**

>> Here the information on the entity/individual responsible of the CPA shall be included, hence forth referred to as CPA implementer(s). CPA implementers can be project participants of the PoA, under which the CPA is submitted, provided their name is included in the registered PoA.

The CPA is managed by Anaikot V.D.C. biogas support corporation (tentative name). It is composited of the digester installed household, village office, and schools, and is also responsible for its installation, construction, management and monitoring.

**A.4. Technical description of the small-scale CPA:**

**A.4.1. Identification of the small-scale CPA:**

**A.4.1.1. Host Party:**

Federal Democratic Republic of Nepal

**A.4.1.2. Geographic reference or other means of identification allowing the unique identification of the small-scale CPA (maximum one page):**

The proposed CPA site is          Village Development Community (V.D.C.) in Nepal. This area is Hill and locates in          km away from Kathmandu (GPS: N         ”         ’, E         ”         ’, EL          m at a certain household in this VDC). The average temperature is more than 5         . Many households follow the plow and feed the livestock like buffalo.



**A.4.2. Duration of the small-scale CPA:**

**A.4.2.1. Starting date of the small-scale CPA:**

October 1<sup>st</sup>, 2010

**A.4.2.2. Expected operational lifetime of the small-scale CPA:**

7years

**A.4.3. Choice of the crediting period and related information:**

**Fixed Crediting period**

**A.4.3.1. Starting date of the crediting period:**

**A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:**

**A.4.4. Estimated amount of emission reductions over the chosen crediting period:**

\_\_\_\_\_ t-CO<sub>2</sub>

**A.4.5. Public funding of the CPA:**

BSP is supported by funding from DGIS(the Netherlands), KfW(Germany) and AEPC(HMG/Nepal). However, the sponsors committed that these funding is not any divergence of their respective ODAs.

**A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component**

There is no large scale PoA in Nepal.

**A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:**

This CPA is neither other registered CDM project activity and isn't part of another registered PoA, because of there is no registered PoA in Nepal.

**SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions**

**B.1. Title and reference of the Registered PoA to which small-scale CPA is added:**

Biogas Support Programme of Activity in Nepal.

**B.2. Justification of the why the small-scale CPA is eligible to be included in the Registered PoA :**

1. The yearly average temperature in the region is more than 5°C.
2. Firewood is not used in household as cooking fuel.
3. Household have livestock (e.g.cows), and the dung is open dumped.
4. Household is able to repay a loan.

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**B.3. Assessment and demonstration of additionality of the small-scale CPA , as per eligibility criteria listed in the Registered PoA:**

According to the Attachment B of General guidance to small scale methodology, one additionality of several barriers shall be proved. And investment, technology and other barriers at CPA level are described as the following sections.

In case of installing biogas plant at household, subsidies for construction cost are provided by BSP, Operation of BSP is available only after CER revenue. In the case that household install of biogas plant without CDM, they are forced to install the plants by their own capital or microfinance loan equivalent to the total amount or the part of construction cost. In that case, the project would not be obviously implemented, according to the trial calculation below.

The result of hearing survey which has been conducted to financial organizations and biogas companies on microfinance is described as the table below.

General description of microfinance

Categories	Contents (only valid within the hearing survey, and not applicable to all case)
Microfinance organization	180 organizations such as banks and Agricultural Cooperatives in Nepal
Term of repayment	Generally, no longer than 5 years
Interest rate on repayment	Generally, more than 10%
Mortgage	A guarantor, recommendation by biogas companies, land and others
Others	The above contents are on micro financial system exclusively for installation of biogas plants. There is other micro financial system.

Financial organizations include banks, Agricultural Cooperatives and others. As shown above, financing conditions are that term of repayment is generally no longer than 5 years, and interest rate on repayment is generally more than 10% and so on. Considering that construction, the cost of biogas plant at household is financed by microfinance organization, trial calculation is as the table below.

General description of loan on microfinance

Conditions	Contents
Initial cost	60 thousand yen /plant
Average salary	225 thousand yen
Total amount of capital	60 thousand yen
Total amount of capital to average salary	26.7%
Term of repayment	Three years
Interest rate on repayment	15%

Repayment schedule is as the following table.

Repayment schedule

Repayment schedule	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
Repayment amount of capital	20	20	20
Interest on repayment	9	6	3
Total repayment amount	29	26	23
Total amount of debt to average salary	12.9%	11.6%	10.2%

Unit: Thousand yen

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According to the table above, debt to income rate is 10.2% to 12.9%, and mortgage such as land and others are required for loan. However, households could not be financed because they have less mortgage. For a lot of households, the scenario of installation of biogas plant would not be implemented. And therefore, investment additionality is also proved at CPA level.

**B.4. Description of the sources and gases included in the project boundary and proof that the small-scale CPA is located within the geographical boundary of the registered PoA.**

Scenario	Methodology	Emission source / activity	GHG	Included?	Reasons
Baseline emission	AMS-I.E.	Combustion of non-renewable biomass	CO <sub>2</sub>	Yes	Major emission source
			CH <sub>4</sub>	No	Emission factor of CH <sub>4</sub> is sufficiently smaller than that of CO <sub>2</sub>
			N <sub>2</sub> O	No	Emission factor of N <sub>2</sub> O is sufficiently smaller than that of CO <sub>2</sub>
	AMS-III.D.	Open dumped of livestock dung	CH <sub>4</sub>	Yes	Major emission source
Project emission	AMS-III.D.	Leakage of CH <sub>4</sub> from biogas plant	CH <sub>4</sub>	Yes	Not a major emission source, but calculation is considered
		Combustion of biogas	CO <sub>2</sub>	No	Carbon neutral
			CH <sub>4</sub>	Yes	Not a major emission source, but calculated
			N <sub>2</sub> O	Yes	Not a major emission source, but calculated
Power and thermal energy source for plant	CO <sub>2</sub>	No	Not used as power and thermal energy		
Leakage	AMS-I.E.	Leakage in production of renewable biomass	CO <sub>2</sub>	No	Not included in applying conditions
		Potential source of leakage	CO <sub>2</sub>	No	Not calculated, but ex-post survey is conducted
		Leakage on transfer	CO <sub>2</sub>	No	Calculated only when transferred

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**B.5. Emission reductions:**

**B.5.1. Data and parameters that are available at validation:**

<b>Data / Parameter:</b>	$HG_{p,y}$
Data unit:	TJ
Description:	The amount of thermal energy which has been generated by renewable energy in the year y
Source of data used:	Estimated value from the amount of consumed firewood
Value applied:	0.0048
Justification of the choice of data or description of measurement methods and procedures actually applied :	The quantity of consumed firewood is given in the Biogas User Survey in 2006/07 by BSP-Nepal. This survey is conducted carefully, so the value is reliable.
Any comment:	-

<b>Data / Parameter:</b>	$\eta_{old}$
Data unit:	-
Description:	Efficiency of the replaced thermal devices (cooking stoves).
Source of data used:	Reference literature value
Value applied:	0.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value is referred to the Eritrea Improved stove project
Any comment:	—

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<b>Data / Parameter:</b>	$f_{NRB,y}$
Data unit:	-
Description:	Non-renewable biomass of the biomass which is consumed in the absence of the project in the year y
Source of data used:	Assessment from the survey result on the forests
Value applied:	1
Justification of the choice of data or description of measurement methods and procedures actually applied :	If the amount of saving the non-renewable biomass by installation of the biogas plant would be less than the amount of non-renewable biomass in Nepal, the factor $f_{NRB,y}$ equal 1. This is because the total amount of consumed firewood is more than renewable biomass in Nepal, that is, the deforestation in progress.
Any comment:	—

<b>Data / Parameter:</b>	$EF_{\text{projected fossilfuel}}$
Data unit:	tCO <sub>2</sub> /TJ
Description:	Emission factor of fossil fuel which is considered to have been consumed in the baseline
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.2
Value applied:	63.1t-CO <sub>2</sub> /TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	$GWP_{CH4}$
Data unit:	-
Description:	Global Warming Potential
Source of data used:	Kyoto Protocol/1995 IPCC GWP values
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

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<b>Data / Parameter:</b>	$D_{CH_4}$
Data unit:	t/m <sup>3</sup>
Description:	Methane concentration
Source of data used:	Default value
Value applied:	0.00067(at room temperature(20°C) and 1atm pressure)
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	$UF_b$
Data unit:	-
Description:	Model correction factor
Source of data used:	AMS-III.D.
Value applied:	0.94
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	$MCF_j$
Data unit:	-
Description:	Methane conversion factor in the baseline of livestock dung management procedure j
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.4 Chapter 10 Annex 10A.2
Value applied:	Other cattle (Table10A-5) : 0.0015 Buffalo (Table10A-6) : 0.0015 Breeding swine (Table10A-8) :0.0015 Goats (Table10A-9) :0.0015
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

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<b>Data / Parameter:</b>	$B_{0,LT}$
Data unit:	$m^3CH_4/kg\text{-}dm$
Description:	Maximum methane producing potential from volatile solid which is discharged from livestock LT
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.4 Chapter 10 Annex 10A.2
Value applied:	Other cattle (Table10A-5) : 0.1 Buffalo (Table10A-6) : 0.1 Breeding swine (Table10A-8) :0.29 Goats (Table10A-9) :0.13
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	$N_{LT,y}$
Data unit:	-
Description:	Annual average head number of livestock LT in the year y
Source of data used:	Monitoring data
Value applied:	Other cattle : 4.2 Buffalo : 2 Breeding swine :1 Goats :3.4
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value is average of the monitoring data confirmed by hearing and watching survey in proposed CPA site.
Any comment:	-

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<b>Data / Parameter:</b>	$VS_{LT,y}$
Data unit:	Kg-dm/animal/year
Description:	The amount of volatile solid by livestock LT which is to be fed into livestock dung management system in the year y
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.4 Chapter 10 Annex 10A.2
Value applied:	Other cattle (Table10A-5) : $3.9 \times 365=1,424$ Buffalo (Table10A-6) : $2.3 \times 365=840$ Breeding swine (Table10A-8) : $0.3 \times 365=110$ Goats (Table10A-9) : $0.35 \times 365=128$
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

<b>Data / Parameter:</b>	$MS\%_{oBb,y}$
Data unit:	-
Description:	Fraction of manure handled in baseline animal manure management system “j”
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol.4 Chapter 10 Annex 10A.2
Value applied:	Other cattle (Table10A-5) : $3.9 \times 365=1,424$ Buffalo (Table10A-6) : $2.3 \times 365=840$ Breeding swine (Table10A-8) : $0.3 \times 365=110$ Goats (Table10A-9) : $0.35 \times 365=128$
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

**B.5.2. Ex-ante calculation of emission reductions:**

Baseline emission

The amount of baseline emission by combustion of non-renewable biomass is calculated, according to AMS-I.E.

$$BE_y = \frac{HG_{p,y}}{\eta_{old}} \cdot f_{NRB,y} \cdot EF_{projected\_fossilfuel} \quad (A)$$



Where,

- $BE_y$  : Emission reductions during the year in t-CO<sub>2</sub>
- $HG_{p,y}$  : Quantity of thermal energy generated by the new renewable energy technology in the project in year y (TJ)
- $\eta_{old}$  : Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values
- $f_{NRB,y}$  : Fraction of biomass used in the absence of the project activity in year y that can be established as non renewable biomass using survey methods.
- $EF_{projected\_fossil\ fuel}$  : Emission factor for the projected fossil fuel combustion in the baseline. The fossil fuel likely to be used by similar consumers is taken.

The amount of baseline emission by the open dumped livestock dung is calculated according to AMS-III.D.

$$BE_y = GWP_{CH_4} \cdot D_{CH_4} \cdot UF_b \cdot \sum_{j,LT} MCF_j \cdot B_{0,LT} \cdot N_{LT,y} \cdot VS_{LT,y} \cdot MS\%_{Bl,j} \quad (B)$$

Where,

- $GWP_{CH_4}$  : Global Warming Potential (GWP) of CH<sub>4</sub> (21)
- $D_{CH_4}$  : CH<sub>4</sub> density (0.00067 t/m<sup>3</sup> at room temperature (20 °C) and 1 atm pressure).
- $LT$  : Index for all types of livestock
- $j$  : Index for animal waste management system
- $MCF_j$  : Annual methane conversion factor (MCF) for the baseline animal waste management system “j”
- $B_{0,LT}$  : Maximum methane producing potential of the volatile solid generated for animal type “LT” (m<sup>3</sup> CH<sub>4</sub>/kg dm)
- $N_{L,Ty}$  : Annual average number of animals of type “LT” in year “y” (numbers)
- $VS_{L,Ty}$  : Volatile solids for livestock “LT” entering the animal manure management system in year “y” (on a dry matter weight basis, kg dm/animal/year)
- $MS\%_{Bl,j}$  : Fraction of manure handled in baseline animal manure management system “j”
- $UF_b$  : Model correction factor to account for model uncertainties (0.94)

Project emission

The emission in Methane recovery in animal manure management systems is calculated according to AMS-III.D.

$$PE_y = PF_{PL,y} + PE_{flare,y} \quad (C)$$

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Where,

- $PE_y$  : Project emissions in year “y” (tCO<sub>2</sub>e)
- $PE_{PL,y}$  : Emissions due to physical leakage of biogas in year “y” (tCO<sub>2</sub>e)
- $PE_{flare,y}$  : Emission from flaring or combustion of the biogas stream in the year “y” (tCO<sub>2</sub>e)

Leakage

In AMS-I.E. and AMS-III.D, leakage is not calculated. However, ex-post survey is implemented for potential leakage of non-renewable biomass in AMS-I.E.

**B.5.3. Summary of the ex-ante estimation of emission reductions:**

Year	Estimated project activity emissions (tonnes of CO <sub>2</sub> e)	Estimated baseline emissions (tonnes of CO <sub>2</sub> e)	Estimated leakage (tonnes of CO <sub>2</sub> e)	Estimated total emission reductions (tonnes of CO <sub>2</sub> e)
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Year 6				
Year 7				
<b>Total</b> (tonnes of CO <sub>2</sub> e)				

**B.6. Application of the monitoring methodology and description of the monitoring plan:**

**B.6.1. Description of the monitoring plan:**

The quantity monitored in the project is the following.

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<b>Data / Parameter:</b>	$N_{hh}$
Data unit:	-
Description:	The number of household where biogas plant and thermal application are appropriately operated
Source of data to be used:	Monitoring data
Value of data applied for the purpose of calculating expected emission reductions in section E.6	_____ (household )
Description of measurement methods and procedures to be applied:	Confirmation by hearing and visual inspection
QA/QC procedures to be applied:	Quality of haring data can be assured through training program for staffs who confirm by hearing and visual inspection
Any comment:	—

<b>Data / Parameter:</b>	$N_{LT,y}$
Data unit:	-
Description:	Average head number of livestock $LT$ in the year $y$
Source of data to be used:	Monitoring data
Value of data applied for the purpose of calculating expected emission reductions in section E.6	Other cattle : ____ Buffalo : ____ Breeding swine : ____ Goats : ____
Description of measurement methods and procedures to be applied:	Confirmation by hearing and visual inspection
QA/QC procedures to be applied:	Quality of haring data can be assured through training program for staffs who confirm by hearing and visual inspection
Any comment:	-

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<b>Data / Parameter:</b>	$BG_{burnt,y}$
Data unit:	$m^3/year$
Description:	The amount of used biogas
Source of data to be used:	Monitoring data
Value of data applied for the purpose of calculating expected emission reductions in section E.6	-
Description of measurement methods and procedures to be applied:	The measured value of gas flow meter is read and recorded
QA/QC procedures to be applied:	The accuracy guarantee period of gas meter flow is 10 years. Calibration is not required during the period.
Any comment:	-

<b>Data / Parameter:</b>	$w_{CH_4,y}$
Data unit:	%-mass
Description:	Methane gas ratio of biogas
Source of data to be used:	Monitoring data
Value of data applied for the purpose of calculating expected emission reductions in section E.6	0.6(Refer to the literature value)
Description of measurement methods and procedures to be applied:	This quantity is measured by methane gas analyzer
QA/QC procedures to be applied:	By periodical calibration
Any comment:	The central value of the following table shall be introduced temporary.

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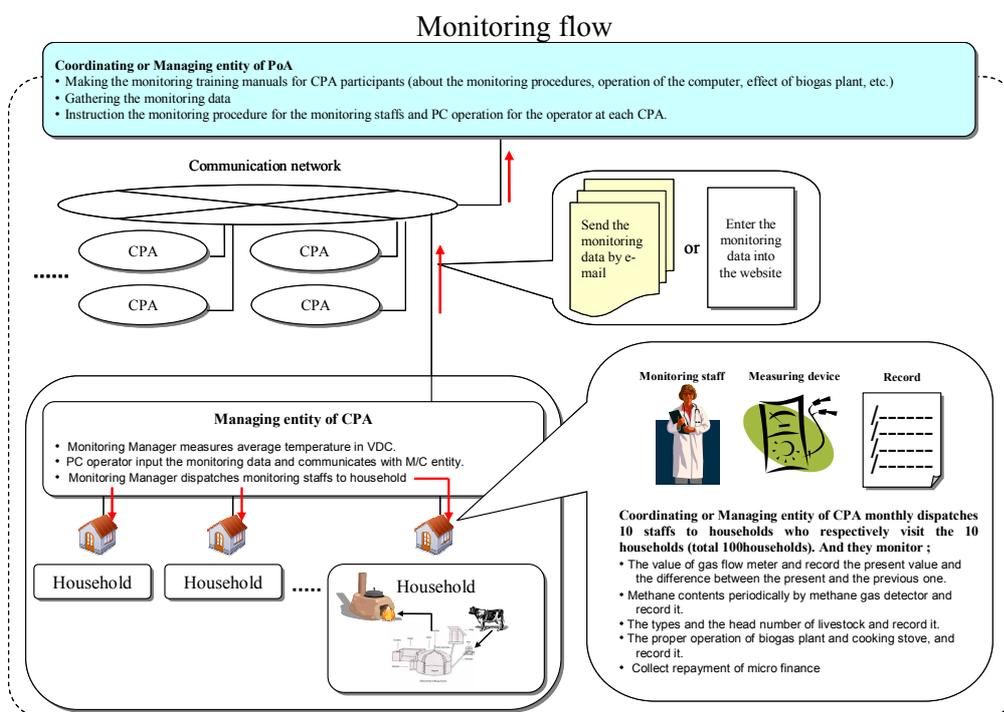


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<b>Data / Parameter:</b>	<i>FE</i>
Data unit:	%
Description:	Flaring efficiency
Source of data to be used:	The literature value
Value of data applied for the purpose of calculating expected emission reductions in section E.6	0.99
Description of measurement methods and procedures to be applied:	Monitoring staff would confirm whether the application properly flare by visual inspection, whether the whole of the flare hole in cooking stove flare or not.
QA/QC procedures to be applied:	-
Any comment:	-

Monitoring procedure in the project is as following.



Managing entity of CPA is established at each site, where a PC operator, a monitoring manager and 10 monitoring staffs are stationed. The entity dispatches them to each household monthly. A staff takes care of 10 households, and conduct monitoring.



Monitoring staffs are trained in advance on the method of measuring gas meter, recording and using monitoring devices. They take care of Methane gas analyzing periodically. In addition, they measure the amount of biogas by the gas meter which are installed at household, and also conduct hearing survey on the monitoring quantity.

Besides monitoring, the staffs conduct the following works.

- Collection of repayment for microfinance (repayment to micro finance organization)
- Checking the conditions of biogas plant (outputs of biogas, the amount of water to be fed into biogas plant) (inform to biogas companies or Association of Biogas Companies, if any)
- Collection of comments from households (inform to Coordinating or Managing entity through Managing entity of CPA)

Data recording staff at Management entity of CPA sends monitoring data monthly to Coordinating or Managing entity through communication tool after hearing data and record of gas meter value are checked.

Coordinating or Managing entity drafts monitoring report after they accumulate the received data.

#### SECTION C. Environmental Analysis

**C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:**

Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

**C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

**C.3. Please state whether an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA), in accordance with the host Party laws/regulations:**

#### SECTION D. Stakeholders' comments

**D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

**D.2. Brief description how comments by local stakeholders have been invited and compiled:**

**D.3. Summary of the comments received:**

**D.4. Report on how due account was taken of any comments received:**

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**Annex 1**

**CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA**

Participant

Organization:	NTT GP-ECO communication, Inc.
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**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

**Annex 3**

**BASELINE INFORMATION**

**Annex 4**

**MONITORING INFORMATION**

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