CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-SSC-CPA-DD)
Version 01

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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)[1,2] 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.

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

[2] 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).

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

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

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Title: Biogas Development Programme at household/ small farm level in Gansu Province—CPA -XXXX

Version: 03

Date: 19/09/2012

Version No	Date	Description and reason of revision
01	30/08/2011	GSC Version
02	11/04/2012	The first revised version based on CAR&CL.
03	19/09/2012	The second revised version based on CAR&CL.

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

>>

Biogas Development Programme at household/ small farm level in Gansu Province—CPA-XXXX (hereafter referred to as the CPA) is located in XXXX, XXXX, Gansu Province, P. R. China, which is coordinated by Lanzhou Hualong Poultry Breeding Co. (hereafter referred to as the CME). The CPA aims to reduce a large amount of greenhouse gases (GHG) by setting up biogas digesters for XXXX individual households/small farms in XXXX, XXXX, Gansu Province, P. R. China, during the year of YYYY.

In the biogas digester, the main feed organic waste, i.e. livestock waste, will be decomposed into biogas for cooking or cooking and lighting[3], and biogas residues for bio-fertilizer.

Prior to the implementation of the CPA, the livestock waste utilized in the CPA would be left to decay anaerobically emitting methane to the atmosphere and the households would use fossil fuel as fuel for XXXX, this is also the baseline scenario.

The installed biogas units contribute to the reduction of greenhouse gases in two ways: 1) a manure management system that reduces methane emitted to atmosphere; 2) the produced biogas replaces conventional fossil fuels for cooking. The average annual emission reductions of the CPA are estimated to be XXXX tCO_2e.

As a renewable energy project, biogas application in rural areas is an important measure to build economizing society and environment amicably society, and an important approach of constructing harmonious rural village. The contribution of the CPA to sustainable development can be concluded in the following aspects:

[3] For the sake of conservativeness the emission reductions for electricity substitution will not be accounted in the baseline of the CPA.

Social benefits:

- Provide employment opportunities during the CPA operation.
- Avoid epidemic disease spread among people and animal because of innocuous treatment of dung.

Environmental benefits:

- Improve the dung treatment system, and avoid smoke in kitchens, which make the living environment in rural areas improved;
- Reduce GHG and pollutant emissions because of using clean energy, which is in favor of environment protection.

Economic benefits:

- Reduce fuel and fertilizer expenses;
- Change the traditional agriculture mode, and increase farmers' income;

Technological benefits:

- Adopt more advanced anaerobic treatment technique to increase the quantity of recovered biogas;
- Improve the technology of biogas digester maintenance and management, as well as biogas application.

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

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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, and their names are included in the registered PoA.

The CPA will be implemented by the following entities:

1. Lanzhou Hualong Poultry Breeding Co. (also acting as the CME)
2. A&T Carbon Asset Co., Limited
3. The Gansu Rural Energy Office

Of which Lanzhou Hualong Poultry Breeding Co. and A&T Carbon Asset Co., Limited will be responsible for all CDM related tasks and communication, while the Gansu Rural Energy Office will be responsible for the technical implementation and the communication with the participating households.

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

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

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A.4.1.1. Host Party:

>>

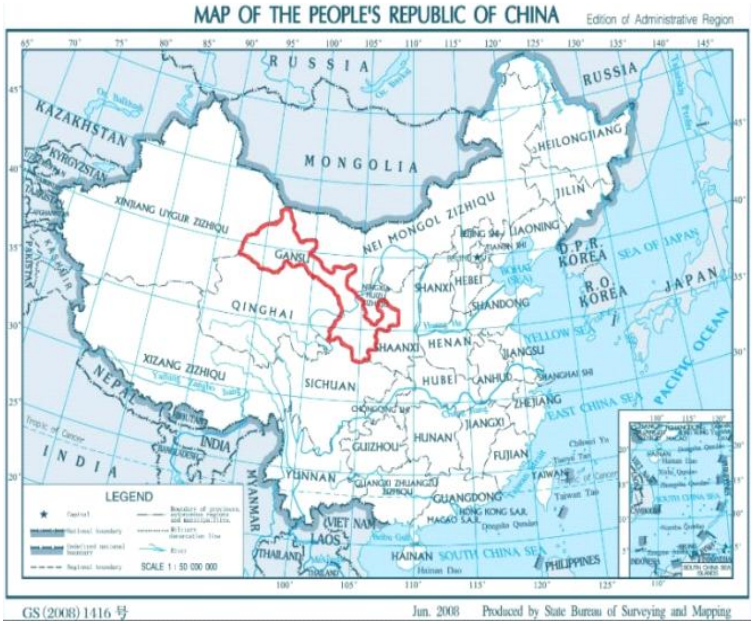
The People's Republic of China

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

>>

The CPA is located in XXXX, XXXX, Gansu Province, P.R.China. The location of the CPA can be seen in the Figure 1. The geographic coordinate is from XXXX °E to XXXX °E, XXXX °N to XXXX °N. Physical location was labelled in Figure 1:

Gansu Province



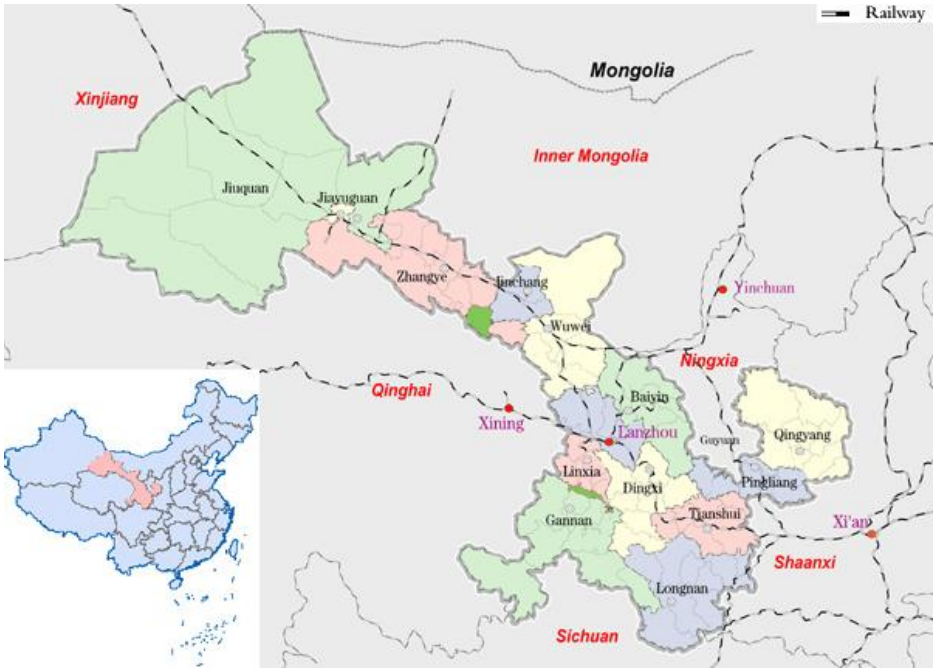


Figure 1. The location of the CPA

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

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

>>
The start date of the CPA is DD/MM/YYYY, which is not prior to the date of the PoA GSP.

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

>>
15 years

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

>>
XXXX Crediting period

A.4.3.1. Starting date of the crediting period:

>>
DD/MM/YYYY (The date of inclusion of the CPA into the PoA or the date when the CPA put into operation, whichever is later.)

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

>>
XXXX years and 0 month (the crediting period should not exceed the end date of the PoA)

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

>>
XXXX crediting period is adopted and the estimation of the emission reduction in the XXXX crediting period is presented in the following table.

Year	Estimated emission reduction (tCO_2e)
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
DD/MM/YYYY-DD/MM/YYYY	XXXX
Total estimated emission reduction (tCO_2e)	XXXX
Total number of crediting years	XXXX
Annual average over the crediting period of estimated reductions (tCO_2e)	XXXX

A.4.5. Public funding of the CPA:

>>
There is no public funding from Annex-I countries available to the CPA.

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

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According to Annex 13 of EB 54, "Guidelines on assessment of de-bundling for SSC project activities" (Ver.03)**,** if each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.

Determining the occurrence of debundling for multiple CDM projects involving independent subsystem/measures	Eligibility criteria
1) The total thermal installed capacity of each biogas digester is no larger than 1% of the installed capacity limitation of the methodology AMS-I.I of $45MW_{th}$, i.e. $450kW_{th.}$	According to the Eligibility criteria (13), The thermal installed capacity of each unit is no larger than 150 kW_{th}.
2) Emission reductions from methane recovery of each unit under a CPA are less than 5 tonnes of CO_2e, which is lower than 1% of $60ktCO_2e$ threshold defined by AMS-III.R. i.e. $600tCO_2e$.	According to the Eligibility criteria (14), The emission reductions from methane recovery of each unit are no more than 5 tCO_2e per year.

So according to the guideline above, it is considered that the CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

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

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The CME confirms that the CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA.

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:

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Biogas Development Programme at household/ small farm level in Gansu Province

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

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The CPA is eligible for inclusion in the PoA because it meets all of the criteria outlined in section A.4.2.2. of the SSC-CDM-PoA-DD, as below:

Eligibility criteria for inclusion of a SSC-CPA in the PoA	Situation of the CPA	The documents for the CME to check whether the features of potential CPAs meet the eligibility criteria
1. All the project activities under the CPA should be located in the boundary of the PoA, i.e. within Gansu Province;	The project activities under the CPA locate in XXXX, XXXX, which is within Gansu Province.	--The verification statement on all households/small farms of the real case CPA issued by Gansu Rural Energy Office, including the householder's name and households' address.
2. First, the implementers of the project activities under the CPA should confirm in a written statement to the CME that: a) The project activities under the CPA are not and will not be part of another CDM project or programme activity; and b) The implementer of the project activities under the CPA is aware and agrees with the inclusion of the CPA to the proposed PoA. Second, all the project activities under the CPA should be registered and recorded in the database controlled by the CME. The CME should make sure that each project activity (household/small farm) has its unique registration information to avoid to be double counted within the PoA.	According to the information provided by the CME, the implementers of the project activities under the CPA have confirmed in a written statement to the CME that: a) The project activities under the CPA are not and will not be part of another CDM project or programme activity; and b) The implementer of the project activities under the CPA is aware and agrees with the inclusion of the CPA to the proposed PoA. Further, according to the information from the CME, all the project activities in the CPA has been registered and recorded in the database and each of them has exclusive ID information under the CPA.	--The confirmation by households/small farms; --The database established and controlled by the CME. --The verification statement on all households/small farms of the real case CPA issued by Gansu Rural Energy Office, including the householder's name and househod's address.
3. Under the CPA, project activities will install biogas digesters and their auxiliary facilities to treat manure and collect biogas which will be used in the cooking stove and the lighting (the lighting is not installed for all CPAs).	All the project activities under the CPA install biogas digesters and their auxiliary facilities to treat manure and collect biogas which will be used in the XXXX.	--Project approval by the Gansu Development and Reform Commission and the Gansu Rural Energy Office. --Agricultural Industry standard of China for biogas digester(NY/T 1639-2008)

Eligibility criteria for inclusion of a SSC-CPA in the PoA	Situation of the CPA	The documents for the CME to check whether the features of potential CPAs meet the eligibility criteria
		--National Standard of China (GB/T 3606-2001) for biogas stove. --Agricultural Industry Standard of China (NY/T 344-1998) for biogas lamp.
4. The start date of the CPA, which is the earliest date among equipment purchase date, and construction start date, is later than the PoA GSP start date of 14/09/2011.	The start date of the CPA, which is the earliest date among equipment purchase date, and construction start date, is DD/MM/YYYY, later than the PoA GSP start date of 14/09/2011.	--Equipment purchase contract --Construction contract
5. For each CPA under the PoA, combination of AMS-III.R and AMS-I.I is applied, other than sole AMS-III.R or AMS-I.I is applied.	Combination of AMS-III.R and AMS-I.I is applied in the CPA under the PoA.	-- CPA-DD
6. In the baseline scenario, animal manure and wastes are stored under anaerobic conditions in pit storage or uncovered anaerobic lagoon;	In the baseline scenario, animal manure and wastes are stored under anaerobic conditions in pit storage or uncovered anaerobic lagoon.	-- CDM file card 1 of Household information prior to implementation of the CPA
7. In the baseline scenario, no biogas was recovered or destroyed; all biogas was released into air freely;	In the baseline scenario, no biogas was recovered or destroyed; all biogas was released into air freely.	
8. Prior to the implementation of the CPA, the households use coal (including coal briquette) as main sources of energy for cooking.	Prior to the implementation of the CPA, the households use coal (including coal briquette) as main sources of energy for cooking.	
9. After the proposed project, all sludge generated by biogas system will be treated under aerobic	After the proposed project, all sludge generated by biogas system will be treated	-- CDM file card 2 of Household information after implementation of the CPA

Eligibility criteria for inclusion of a SSC-CPA in the PoA	Situation of the CPA	The documents for the CME to check whether the features of potential CPAs meet the eligibility criteria
conditions;	under aerobic conditions.	
10. After the proposed project, all biogas generated will be utilized;	After the proposed project, all biogas generated will be utilized.	
11. The total thermal generation capacity shall not exceed 45MW_{th}.	The total thermal generation capacity is XXXX MW_{th}, not exceed 45 MW_{th};	-- Project approval by the Gansu Development and Reform Commission and the Gansu Rural Energy Office. -- Households list issued by Gansu Rural Energy Office --Calculation and record in the database by the CME --Name brand of biogas stove or equipment purchasing contract
12. The emission reductions from type III component of the CPA is no more than 60 $ktCO_2e$ per year.	The emission reductions from type III component of the CPA is XXXX tCO_2e per year, no more than 60 $ktCO_2e$ per year;	
13. The thermal installed capacity of each unit is no larger than 150 kW_{th}.	The thermal installed capacity of each unit is XXXX kW_{th}, no larger than 150 kW_{th};	
14. The emission reductions from methane recovery of each unit are no more than 5 tCO_2e per year.	The emission reductions from methane recovery of each unit are XXXX tCO_2e/y, no more than 5 tCO_2e per year;	
15. Under the CPA, project implementers are rural households or small farms;	Under the CPA, project implementers are XXXX;	--Project approval by the Gansu Development and Reform Commission and the Gansu Rural Energy Office.
16. The end users of all CPAs under the proposed PoA are rural households.	The end users of the project activities under the CPA are rural households.	
17. The project activities under the CPAs are not sponsored by any funding from Annex I parties.	According to the information from the CME, the project activities under the CPAs are not sponsored by any funding from Annex I parties.	--Project approval by the Gansu Development and Reform Commission and the Gansu Rural Energy Office. -- Statement by CME.
18. Each CPA will be monitored and verified. The sampling approach is only used to estimate the	Each CPA will be monitored and verified. The sampling approach is used to estimate	-- Sampling plan included in the CPA, which is completed in accordance with '*Standard for*

Eligibility criteria for inclusion of a SSC-CPA in the PoA	Situation of the CPA	The documents for the CME to check whether the features of potential CPAs meet the eligibility criteria
value of the monitoring parameter, and the sampling approach will be applied to all the CPAs included in the PoA.	the value of the monitoring parameter as stated in section B.6.1 of CPA-DD, which is completed in accordance with '*Standard for sampling and surveys for CDM project acitivities and programme of activities (version 02.0, EB 65 Annex 2)*.	*sampling and surveys for CDM project acitivities and programme of activities (version 02.0, EB 65 Annex 2)*'
19. The CPA crediting period does not exceed 31/12/2040 (the PoA end date).	The end date of CPA crediting period is DD/MM/YYYY, which does not exceed the PoA end date.	--CPA-DD

To sum up, the CPA is eligible for inclusion in the PoA.

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

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Additionality of a CPA will be demonstrated based on "Guidelines on the Demonstration of Additionality of Small-scale Project Activities" (Ver. 09.0) (hereafter referred to as the *Guideline*).

According to paragraph 2 in the Guideline, documentation of barriers is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of:

(a) list of the following grid-connected and off-grid renewable electricity generation technologies that are automatically defined as additional, without further documentation of barriers, consists of the following grid-connected renewable electricity generation technologies of installed capacity up to 15 MW:

(i) Solar technologies (photovoltaic and solar thermal electricity generation);
(ii) Off-shore wind technologies;
(iii) Marine technologies (wave, tidal);
(iv) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW;

(b) The following off-grid electricity generation technologies where the individual units do not exceed the thresholds indicated in parentheses with the aggregate project installed capacity not exceeding the 15 MW threshold:

(i) Micro/pico-hydro (with power plant size up to 100 kW);
(ii) Micro/pico-wind turbine (up to 100 kW);
(iii) PV-wind hybrid (up to 100 kW);
(iv) Geothermal (up to 200 kW);
(v) Biomass gasification/biogas (up to 100 kW);

(c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds;

(d) Rural electrification project activities using renewable energy sources in countries with rural electrification rates less than 20%; the most recent available data on the electrification rates shall be used to demonstrate compliance with the 20 per cent threshold. In no case shall data be used if older than three years from the date of commencement of validation of the project activity.

For each CPA, as per eligibility criteria (16) for inclusion of a SSC-CPA in the PoA described in the Section A.4.2.2, the end users are households as option (c) above. Besides, as per eligibility criteria (11) for inclusion of a SSC-CPA in the PoA described in the Section A.4.2.2, the total installed capacity of

each CPA is smaller than the small-scale CDM thresholds for type I component of 45MW_{th}. Also as per eligibility criteria (12) for inclusion of a SSC-CPA in the PoA described in the Section A.4.2.2, the emission reductions from type III components of the CPA is no more than small-scale CDM thresholds for type III component of 60 ktCO_2e/yr. Furthermore, according to eligibility criteria (13) and (14), the thermal installed capacity of each unit is no larger than 150 kW_{th} and the emission reductions from methane recovery of each unit are no more than 5 tCO_2e per year, which are both no larger than 5% of the small-scale CDM thresholds, i.e. 2250 kW_{th} and 3000 tCO_2e/yr.

Conclusion:

Therefore, according to paragraph 2 in the *Guideline*, each CPA under the PoA is automatically additional.

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.

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As per Methodology AMS-III.R and ASM-I.I, the boundary of the CPA is the physical, geographical site of the methane recovery and combustion systems and the equipment producing thermal energy. For the CPA, the geographic sites of all individual biogas systems included in the CPA define the CPA boundary. A biogas system consists of a biogas digester and a cooking/combustion unit. The Table 1 and Figure 2 below visualize the sources and gases included in the SSC-CPA boundary.

Table 1. The emission source and the category of GHG

	Source	Gas	Included?	Justification/Explanation
Baseline	Thermal generation	**CO_2**	**Included**	**The major source of emissions in the baseline**
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
	Treatment of manure and wastes from agricultural activities	CO_2	Excluded	Excluded for simplification. This is conservative
		CH_4	**Included**	**The major source of emissions in the baseline**
		N_2O	Excluded	Excluded for simplification. This is conservative
Project activity	Use of fossil fuels or electricity for the operation of biogas digester	CO_2	Excluded	Neither fossil fuels nor electricity is consumed for operation of biogas digester. Therefore this source is excluded.
		CH_4	Excluded	Neither fossil fuels nor electricity is consumed for operation of biogas digester. Therefore this source is excluded.
		N_2O	Excluded	Neither fossil fuels nor electricity is consumed for operation of biogas digester. Therefore this source is excluded.
	Fossil fuel	CO_2	Excluded	The emission reduction from fuel replacement is

	consumption for thermal energy			calculated based on the thermal energy generated using the measured quantity of biogas. According to AMS-I.I, this source is excluded.
		CH_4	Excluded	The emission reduction from fuel replacement is calculated based on the thermal energy generated using the measured quantity of biogas. According to AMS-I.I, this source is excluded.
		N_2O	Excluded	The emission reduction from fuel replacement is calculated based on the thermal energy generated using the measured quantity of biogas. According to AMS-I.I, this source is excluded.
	Physical leakage of biogas digester	CO_2	Excluded	Excluded for simplification.
		CH_4	**Included**	**The major emission source.**
		N_2O	Excluded	Excluded for simplification.

A general schematic view of the boundaries for each biogas unit included in a CPA under the PoA is shown in the Figure 2 below:

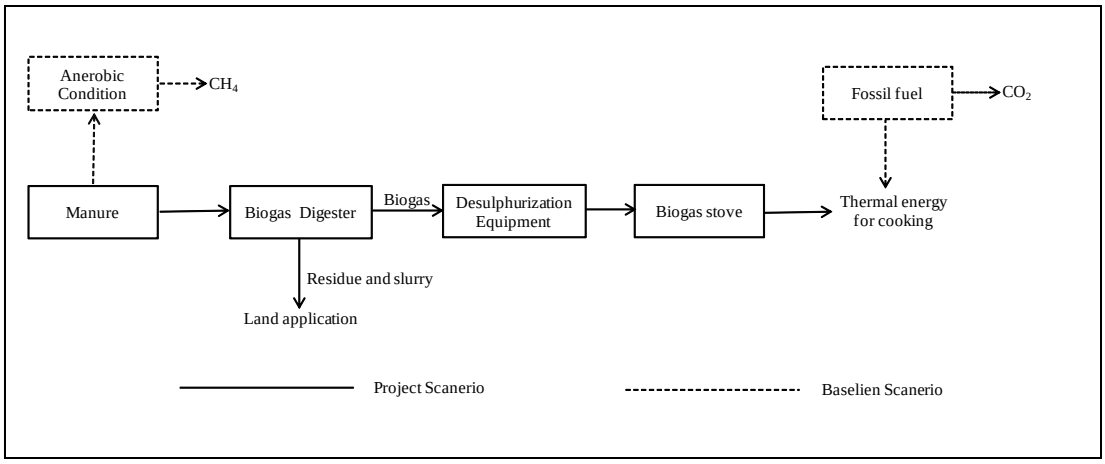

Figure 2. Project boundary

All the project activities included in the CPA are located in XXXX, XXXX, which is within Gansu Province as the geographical boundary of the CPA.

B.5. Emission reductions:

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

>>

Data / Parameter:	***GWP_{CH4}***
Data unit:	tCO_2e /tCH_4
Description:	Global Warming Potential (GWP) of CH_4

Source of data used:	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value
Any comment:	21 for the first period, and Shall be updated according to any future COP/MOP decisions.

Data / Parameter:	D_{CH4}
Data unit:	t/m^3
Description:	CH_4 density
Source of data used:	AMS III.D.
Value applied:	0.00067
Justification of the choice of data or description of measurement methods and procedures actually applied :	Recommended by the methodology.
Any comment:	at room temperature (20 ℃) and 1atm pressure

Data / Parameter:	UF_b
Data unit:	-
Description:	Model correction factor to account for model uncertainties
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 :	AMS-III. D is credible data source.
Any comment:	-

Data / Parameter:	MCF_j
Data unit:	%
Description:	Annual methane conversion factor (MCF) for the baseline animal manure management system *j*
Source of data used:	IPCC default values provided in table 10.17 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10.
Value applied:	See section B.5.2 for details
Justification of the	For the MCF value, country-specific MCF values are not available, so the IPCC

choice of data or description of measurement methods and procedures actually applied :	default values provided in table 10.17 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 was used. The site annual average temperature is taken from official data at the nearest meteorological station, or from data available from historical on site observations. For simplification, anaerobic lagoon is also considered as pit storage. Therefore, the value of pit storage was used for determination of MCF. This is conservative.
Any comment:	-

Data / Parameter:	$B_{O,LT}$
Data unit:	$m^3/CH_4/kg$ dm
Description:	Maximum methane producing potential of the volatile solid generated for animal type "LT"
Source of data used:	Default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10.
Value applied:	See section B.5.2 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to AMS-III.D, The maximum methane-producing capacity of the manure (Bo) varies by species and diet. Since country specific Bo values are not available, default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10 can be used. For the proposed CPA, animal were purchased and growing in China, so default Asia values from 2006 IPCC Guidelines was chosen to calculation, it is reasonable.
Any comment:	-

Data / Parameter:	$MS\%_{Bl,j}$
Data unit:	%
Description:	Fraction of manure handled in baseline animal manure management system "j"
Source of data used:	The CPA Owner
Value applied:	100% or lower
Justification of the choice of data or description of measurement methods and procedures actually applied :	All manure generated on the households/small farms are handled in baseline animal manure management system.
Any comment:	-

Data / Parameter:	$MS\%_{i,y}$
Data unit:	%
Description:	Fraction of manure handled in system *i* in year *y*
Source of data used:	-
Value applied:	100%
Justification of the choice of data or	In the proposed CPA, the parameter was used to calculate the $PE_{CH4,y}$, so the value was adopted as 100%, which is conservative.

description of measurement methods and procedures actually applied :	
Any comment:	-

Data / Parameter:	$VS_{LT,y}$
Data unit:	kg dm/animal/day
Description:	Volatile solids for livestock *LT* entering the animal manure management system in year *y*
Source of data used:	Default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10.
Value applied:	See section B.5.2 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	For the VS value, data from nationally published sources and country specific VS values are not available, so IPCC default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10 are chosen to calculation. For the proposed CPA, animal were purchased and growing in China, so default Asia values was adopted, it is reasonable.
Any comment:	-

Data / Parameter:	$NCV_{biomass}$
Data unit:	GJ/m^3
Description:	Net calorific value of the biogas
Source of data used:	AMS-I.I
Value applied:	0.0215
Justification of the choice of data or description of measurement methods and procedures actually applied :	According to AMS-I.I., for biogas, use default value: 0.0215 GJ/m^3 biogas (assuming NCV of the methane: 0.0359 GJ/m^3, default methane content in biogas: 60%)
Any comment:	-

Data / Parameter:	$\eta_{PJ/BL}$
Data unit:	-
Description:	Ratio of efficiencies of project equipment and baseline equipment
Source of data used:	lab test
Value applied:	2.75 ($\eta_{biogas\ cooking\ stove} \div \eta_{coal\text{-}based\ cooking\ stove}$ = 55% ÷ 20% = 2.75)
Justification of the choice of data or description of measurement methods and procedures actually applied :	***1.*** $\eta_{biogas\ cooking\ stove}$ **:** According to National Standard of P.R. China (GB) GB/T 3606-2001, the thermal efficiency of biogas cooking stove can not lower than 55%. Therefore, the thermal efficiency of the biogas cooking stove used in the PoA is adopted as 55%.

	2. $\eta_{coal\text{-}based\ cooking\ stove}$: According to the AMS-I.I, Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) measured once prior to validation applying the same test procedure (e.g. lab test), as per a national or an international standard. Official data or scientific literature can be used for cross-check purposes. The thermal efficiency of the coal-fired stove that would have been used in the absence of project activity is adopted as 20%. It was explained in the real case CPA.
Any comment:	-

Data / Parameter:	x_j
Data unit:	-
Description:	a fraction representing fuel type *j* used by the baseline thermal applications displaced by biogas
Source of data used:	-
Value applied:	See section B.5.2 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	-

Data / Parameter:	$EF_{FF,j}$
Data unit:	tCO_2/GJ
Description:	CO_2 emission factor of coal (Brown coal briquettes)
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 1, table 1.4
Value applied:	0.0873
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value of Brown coal briquettes is used in the proposed PoA, as: 1) The type of coal commonly used in Gansu Province for rural households is Brown coal briquettes. 2) The value of Brown coal briquettes is the lowest one among all type of coal stated in the IPCC. 3) The lower limit of 95% confidence interval is adopted for more conservative.
Any comment:	-

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

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I. Calculate emission reductions from type III component

1. Calculate baseline emissions from type III component

According to AMS-III.R., the option in paragraph 9(a) and relevant formulae shown in paragraph10 of AMS-III.D "Methane recovery in animal manure management systems" shall be used to calculate baseline emissions. The calculation of baseline emissions from type III component is as below:

$$BE_{CH4,y} = GWP_{CH4} * D_{CH4} * UF_b * \sum_{j,LT} MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{Bl,j} \quad \text{(I-1)}$$

Where:

$BE_{CH4,y}$	Baseline emissions duet to biogas recovery in year *y* (tCO_2e)
GWP_{CH4}	Global Warming Potential (GWP) of CH_4 (21)
D_{CH4}	CH_4 density (0.00067 t/m^3 at room temperature (20 ℃) and 1 atm pressure)
LT	Index for all types of livestock
j	Index for animal manure management system
MCF_j	Annual methane conversion factor (MCF) for the baseline animal manure management system *j*
$B_{0,LT}$	Maximum methane producing potential of the volatile solid generated for animal type *LT* (m^3 CH_4/kg dm)
$N_{LT,y}$	Annual average number of animals of type *LT* in year *y* (numbers)
$VS_{LT,y}$	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)

Determination of $B_{0,LT}$

According to AMS-III.D, The maximum methane-producing capacity of the manure (B_o) varies by species and diet. Since country specific B_o values are not available, default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 4 Chapter 10 can be used.

For the proposed CPA, animal were purchased and growing in China, so default Asia values from 2006 IPCC Guidelines was chosen to calculation, it is reasonable.

Determination of $VS_{LT,y}$

Volatile solids (VS) are the organic material in livestock manure and consist of both biodegradable and non-biodegradable fractions. For the calculations the total VS excreted by each animal species is required. The preferred method to obtain VS is to use data from nationally published sources. These

values shall be compared with IPCC default values and any significant differences shall be explained. If data from nationally published sources are not available, country-specific VS excretion rates can be estimated from feed intake levels, via the enhanced characterisation method (tier 2) described in section 10.2 in 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10. If country specific VS values are not available IPCC default values from 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10 table 10 A-4 to 10 A-9 can be used provided that the project participants assess the suitability of those data to the specific situation of the treatment site particularly with reference to feed intake levels;

For the VS value, data from nationally published sources and country specific VS values are not available, so IPCC default values from tables 10 A-4 to 10 A-9 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 chapter 10 are chosen to calculation. For the proposed CPA, animal were purchased and growing in China, so default Asia values was adopted, it is reasonable.

Determination of MCF_j

Methane Conversion Factors (MCF) values are determined for a specific manure management system and represent the degree to which B_o is achieved. Where available country-specific MCF values that reflect the specific management systems used in particular countries or regions shall be used. Alternatively, the IPCC default values provided in table 10.17 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 can be used. The site annual average temperature is taken from official data at the nearest meteorological station, or from data available from historical on site observations;

For the MCF value, country-specific MCF values are not available, so he IPCC default values provided in table 10.17 of 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Chapter 10 was used. The site annual average temperature is taken from official data at the nearest meteorological station, or from data available from historical on site observations.

For simplification, anaerobic lagoon is also considered as pit storage. Therefore, the value of pit storage was used for determination of MCF. This is conservative.

Determination of $N_{LT,y}$

According to AMS-III.D, the annual average number of animals ($N_{LT,y}$) are determined as follows:

$$N_{LT,y} = N_{da,y} * \left(\frac{N_{p,y}}{365} \right) \qquad \text{(I-2)}$$

Where:

$N_{da,y}$ Number of days animal is alive in the farm in the year *y* (numbers)

$N_{p,y}$ Number of animals produced annually of type *LT* for the year *y* (numbers)

The result of each project activity under the CPA is summarized as the Table 2.

Table 2. Summary of the $BE_{CH4,y}$ Calculation

For Group 1[4]:

Parameters	(Livestock Type)	(Livestock Type)	Unit
GWP_{CH4}	21	21	-
D_{CH4}	0.00067	0.00067	t/m^3
MCF_j	XXXX	XXXX	
$B_{0,LT}$	XXXX	XXXX	m^3 CH_4/kg dm
$N_{LT,y}$	XXXX	XXXX	numbers
$VS_{LT,y}$	XXXX	XXXX	kg dm/animal/year
$MS\%_{Bl,j}$	XXXX	XXXX	%
UF_b	0.94	0.94	-
$BE_{CH4,y}$	XXXX	XXXX	tCO_2e
SUM	XXXX		tCO_2e

For Group n:

Parameters	(Livestock Type)	(Livestock Type)	Unit
GWP_{CH4}	21	21	-
D_{CH4}	0.00067	0.00067	t/m^3
MCF_j	XXXX	XXXX	
$B_{0,LT}$	XXXX	XXXX	m^3 CH_4/kg dm
$N_{LT,y}$	XXXX	XXXX	numbers
$VS_{LT,y}$	XXXX	XXXX	kg dm/animal/year
$MS\%_{Bl,j}$	XXXX	XXXX	%

[4] 'Group' means series of project activities located in the same county, such as Jingning county. Considering that some parameters, such as site annual average temperature or livestock type, may vary, one county is always bundled as one Group for ER calculation. One CPA may contain some Groups.

UF_b	0.94	0.94	-
$BE_{CH4,y}$	XXXX	XXXX	tCO_2e
SUM	XXXX		tCO_2e

2. Calculate project emissions from type III component

According to AMS-III.R., project emissions consist of CO_2 emissions from use of fossil fuels or electricity for the operation of the system and the physical leakages of methane from the recovery system. Neither fossil fuels nor electricity is consumed for operation of biogas digester in the CPA, and therefore the physical leakage of methane from the recovery system is the only emission source.

As per AMS-III.R., project emissions due to physical leakage of biogas digester is estimated using one of the two options using the method indicated in paragraph 13 of AMS-III.D "Methane recovery in animal manure management systems". Option (a) is adopted in the CPA, which is as follows:

$$PE_{CH4,y} = 0.10 * GWP_{CH4} * D_{CH4} * \sum_{i,LT} B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{i,y} \quad \text{(I-3)}$$

Where:

$MS\%_{i,y}$ Fraction of manure handled in system *i* in year *y*

The result of each project activity under the CPA is summarized as the Table 3 belolw.

Table 3. Summary of the $PE_{CH4,y}$ Calculation

For Group 1:

Parameters	(Livestock Type)	(Livestock Type)	Unit
GWP_{CH4}	21	21	-
D_{CH4}	0.00067	0.00067	t/m^3
$B_{0,LT}$	XXXX	XXXX	m^3 CH_4/kg dm
$N_{LT,y}$	XXXX	XXXX	numbers
$VS_{LT,y}$	XXXX	XXXX	kg dm/animal/year
$MS\%_{i,y}$	100%	100%	%
-	0.1	0.1	-
$PE_{CH4,y}$	XXXX	XXXX	tCO_2e
SUM	XXXX		tCO_2e

For Group n:

Parameters	(Livestock Type)	(Livestock Type)	Unit
GWP_{CH4}	21	21	-
D_{CH4}	0.00067	0.00067	t/m^3
$B_{0,LT}$	XXXX	XXXX	m^3 CH_4/kg dm
$N_{LT,y}$	XXXX	XXXX	numbers
$VS_{LT,y}$	XXXX	XXXX	kg dm/animal/year
$MS\%_{i,y}$	100%	100%	%
-	0.1	0.1	-
$PE_{CH4,y}$	XXXX	XXXX	tCO_2e
SUM	XXXX		tCO_2e

3. Calculate leakage emissions due to type III component

No methane recovery and combustion equipment is transferred to/from another activity. As per AMS-III.R., leakage is not considered. i.e.

$$LE_{CH4,y} = 0$$

4. Calculate emission reductions from type III component

$$ER_{CH4,y} = BE_{CH4,y} - PE_{CH4,y} - LE_{CH4,y} \quad \text{(I-4)}$$

Where:

$ER_{CH4,y}$ Emission reductions from type III component achieved by the project activity for year *y* (tCO_2e)

$BE_{CH4,y}$ Baseline emissions from type III component for year *y* (tCO_2e)

$PE_{CH4,y}$ Project emissions from type III component for year *y* (tCO_2e)

$LE_{CH4,y}$ Leakage emissions due to type III component for year y (tCO_2e)

The result of each project activity under the CPA is summarized as the Table 4 belolw.

Table 4. Summary of the $ER_{CH4,y}$ Calculation

Parameters	$BE_{CH4,y}$	$PE_{CH4,y}$	$LE_{CH4,y}$	$ER_{CH4,y}$
	tCO_2e/a	tCO_2e/a	tCO_2e/a	tCO_2e/a

Group 1	XXXX	XXXX	XXXX	XXXX
……	XXXX	XXXX	XXXX	XXXX
Group n	XXXX	XXXX	XXXX	XXXX
SUM	XXXX	XXXX	XXXX	XXXX

II. Calculate emission reductions from type I component

As per AMS-I.I., the emission reductions from type I component shall be determined using one of the options below.

Option 1: Based on avoided quantity of fossil fuel consumption (applicable only to biogas projects)
Option 2: Based on thermal energy generated

Option 2 is adopted in the CPA, which is as follows:

$$ER_{Thermal,y} = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} - LE_{Thermal,y} \quad \text{(II-1)}$$

Where:

$N_{k,0}$	Number of biogas cook stove commissioned
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating in year *y* (fraction)
$BS_{k,y}$	The net quantity of biogas consumed by the biogas cook stove in year *y* (mass or volume units, dry basis)
EF	CO_2 emission factor (tCO_2/GJ)
$\eta_{PJ/BL}$	Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) measured once prior to validation applying the same test procedure (e.g. lab test), as per a national or an international standard. Official data or scientific literature can be used for cross-check purposes
$NCV_{biomass}$	Net calorific value of the biomass (GJ/unit mass or volume, dry basis). For biogas, use default value: 0.0215 GJ/m^3 biogas (assuming NCV of the methane: 0.0359 GJ/m^3, default methane content in biogas: 60%)

No energy generating equipment is transferred from outside the boundary to the PoA. Besides, biogas digesters are part of Type III CDM activity. According to AMS-I.I., leakage is neglected. Therefore, the formula above can be simplified as below:

$$ER_{Thermal,y} = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} \quad \text{(II-2)}$$

$$EF = \sum_j x_j * EF_{FF,j} \quad \text{(II-3)}$$

Where:

x_j a fraction representing fuel type *j* used by the baseline thermal applications displaced by biogas

$EF_{FF,j}$ CO_2 emission factor of coal (tCO_2/GJ)

Group No.	x_j	$EF_{FF,j}$	EF	$N_{k,0}$	$n_{k,y}$	$BS_{k,y}$	$\eta_{PJ/BL}$	$NCV_{biomass}$	$ER_{thermal,y}$
Unit	%	t/GJ	t/GJ	number	%	m^3	-	GJ/m^3	tCO_2e
Group 1	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
……	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
Group n	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX
SUM	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX	XXXX

III. Calculate emission reductions achieved by a CPA

$$ER_y = ER_{CH4,y} + ER_{Thermal,y} \quad \text{(III-1)}$$

Parameters	$ER_{CH4,y}$	$ER_{thermal,y}$	ER_y
	tCO_2e/a	tCO_2e/a	tCO_2e/a
Group 1	XXXX	XXXX	XXXX
……	XXXX	XXXX	XXXX
Group n	XXXX	XXXX	XXXX
SUM	XXXX	XXXX	XXXX

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

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Year	Estimation of project activity emissions (t CO_2e)	Estimation of Baseline emissions (t CO_2e)	Estimation of Leakage (t CO_2e)	Estimation of Emission reductions (t CO_2e)
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
DD/MM/YYYY- DD/MM/YYYY	XXXX	XXXX	XXXX	XXXX
Total (tonnes of CO_2e)	XXXX	XXXX	XXXX	XXXX

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

B.6.1. Description of the monitoring plan:

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Data / Parameter:	$N_{k,0}$
Data unit:	-
Description:	Number of project activity (biogas digester and biogas cook stove) commissioned
Source of data to be used:	The CME
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See the section B.5.2 for details
Description of measurement methods and procedures to be applied:	At the time of installation all project activity systems will be inspected and undergo acceptance testing (commissioning) for proper operation in compliance with specifications. The installation date of each system will be recorded. The biogas cook stove will be tested by Local Energy Office workers based on the national standard and procedure. The relevant information will be recorded in the CDM file and database.
QA/QC procedures to be applied:	-
Any comment:	-

Data / Parameter:	$n_{k,y}$

Data unit:	-
Description:	Proportion of $N_{k,0}$ that remain operating at year *y* (biogas digester and biogas cook stove)
Source of data to be used:	100% is used for ex-ante calculation of emission reductions, the actual value will be sourced from ex-post monitored.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	100%
Description of measurement methods and procedures to be applied:	Emission Reductions can only be applied to systems that are demonstrated to be operational and in compliance with manufacturer required maintenance procedures, at least once every two years (biennial) during the crediting period. After the inspection and acceptance testing at year of installation, the inspections can be done in years 3, 5, 7, etc. and the results of such inspections can be applied to crediting years 3 and 4, 5 and 6, 7 and 8, etc. Ongoing rental/lease payments or a recurring maintenance fee by users can be a substitute to actual site visits. A statistically valid sample of the residences was used to determine the percentage of systems operating, as per the relevant requirements for sampling in the Standard for sampling and surveys for CDM project activities and programme of activities. The project proponent chooses to inspect biennially, a 95% confidence interval and 10% margin of error requirement shall be achieved for the sampling parameter.
QA/QC procedures to be applied:	-
Any comment:	Remark： As required by AMS.III.R, recording biennially the number of systems operating using survey methods is needed, which is same with this monitoring parameter. Thus, this monitoring parameter means recording biennially the number of systems (both biogas digester and biogas cooking stove) operated.

Data / Parameter:	$BS_{k,y}$
Data unit:	m^3
Description:	The net quantity of biogas consumed by the biogas cook stove in year *y*
Source of data to be used:	The CME
Value of data applied for the purpose of calculating expected emission reductions in section B.5	See the section B.5.2 for details
Description of measurement methods and procedures to be	Gas meters are used to monitor accumulated biogas supplied to biogas cook stove. Measurement campaigns will be undertaken at selected sites. Five campaigns

applied:	per digester type will be carried out in each year of the crediting period. Continuous measurement made for one month at a single digester is considered as a campaign. Monthly average value is annualised taking into account seasonal variation in gas production which is mainly a function of ambient temperature. Digester type was divided as per capacity (6 cubic meter or 8 cubic meter), type (fixed dome or floating dome) and average annual temperature.
QA/QC procedures to be applied:	Gas meters will undergo maintenance/calibration subject to appropriate industry standards.
Any comment:	-

Data / Parameter:	$N_{da,y}$
Data unit:	Number
Description:	Number of days animal is alive in the farm in the year y
Source of data to be used:	Ex-post survey
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Please see individual CPA-DD
Description of measurement methods and procedures to be applied:	This parameter will be measured by sampling survey with a 95% confidence interval and 10% margin of error.
QA/QC procedures to be applied:	-
Any comment:	To determine the annual average animal population ($N_{LT,y}$)

Data / Parameter:	$N_{p,y}$
Data unit:	Number
Description:	Number of animals produced annually of type LT for the year y
Source of data to be used:	Ex-post survey
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Please see individual CPA-DD
Description of measurement methods and procedures to be applied:	This parameter will be measured by sampling survey with a 95% confidence interval and 10% margin of error.
QA/QC procedures to be applied:	-
Any comment:	To determine the annual average animal population ($N_{LT,y}$)

Data / Parameter:	Soil application of the final sludge
Data unit:	-
Description:	The proper soil application of the final sludge as fertilizer for vegetable and crops under aerobic condition.
Source of data to be used:	Sampling basis
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Not applicable
Description of measurement methods and procedures to be applied:	This parameter will be measured by sampling survey with a 95% confidence interval and 10% margin of error.
QA/QC procedures to be applied:	-
Any comment:	-

1. Monitoring parameters

First, Each CPA will be monitored and verified.

Second, for project activities under the CPA, the monitoring parameters were shown in the section E.7.1. The CME will conduct the monitoring process as per AMS-III.R and AMS-I.I.

Of which, $BS_{k,y}$ is monitored through Gas meter installed at selected sites as per AMS-I.I. at least five campaigns per digester type will be carried out in each year of the crediting period. Continuous measurement made for one month at a single digester is considered as a campaign. Monthly average value is annualised taking into account seasonal variation in gas production which is mainly a function of ambient temperature; Digester type was divided as per capacity (6 cubic meter or 8 cubic meter) and type (fixed dome or floating dome)

The other monitoring parameters will be monitored by sampling survey method.

2. Sampling plan

The objective of the sampling effort is to estimate values of the parameters that were listed and required to be monitored through sampling method. For the proposed PoA, the following parameters are shown as below:

- $n_{k,y}$, Proportion of $N_{k,0}$ that remain operating at year y; (Recording biennially the number of systems operating using survey methods)

- $N_{LT,y}$, The annual average animal population (this will be determined by $N_{da,y}$ and $N_{p,y}$);
- Soil application of the final sludge;

$N_{LT,y}$ is considered as one parameter in the sampling plan: $N_{LT,y}$ is determined by $N_{da,y}$ multiple $N_{p,y}$/365. Therefore the sampling process and target households for $N_{da,y}$ and $N_{p,y}$ are required to be identical.

Regarding the sampling method, requirements in the ”Standard for sampling and surveys for CDM project activities and programme of activities” will be followed. A 95% confidence interval and 10% margin of error requirement will be achieved for the sampling parameter.

Target population

The target population of this sampling plan is the households included in CPAs under the PoA. The households to be sampled will be drawn from the list of individual ID numbers contained in the PoA database.

Sampling method

The CME will draw a single sample for each defined sampling frame. The required number of households to be selected for sampling of each parameter will be determined by the CME according to the level of reliability required for that parameter.

As the population is relatively homogeneous with respect to the object of the sampling effort, simple random sampling method will be adopted within the whole PoA (i.e. covering a group of CPAs) in this sampling design.

To ensure a random selection, random number generators shall be applied. Each household in the target population is uniquely identifiable by its individual ID number. Each household can thus be allocated a Sample Selection Number in each monitoring period. Applying the random number generators, the households can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

To determine the parameters, sampling will involve the following approaches:

$n_{k,y}$: visual inspection of biogas digesters and biogas cook stove installed in the sampled households to see if the biogas digester and biogas cook stove is operational and in compliance with manufacturer required maintenance procedures. (Yes/No)

$N_{LT,y}$: interview and visual inspection of the sampled households to determine $N_{da,y}$ and $N_{p,y}$, and then to get the annual average animal population (Mean Value), multiplied by total households.

Soil application of the final sludge: visual inspection of the final sludge from biogas digester to see if it is fully utilized in farmland under aerobic condition. (Yes/No)

Sample size

According to “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”, parameter values shall be estimated by sampling in accordance with the requirements in the

applied methodology separately and independently for each of the CPAs included in a PoA except when a single sampling plan covering a group of CPAs is undertaken applying 95/10 confidence/precision for the sample size calculation.

This sampling will be conducted at PoA level, and 95/10 confidence/precision will therefore be applied for the sample size calculation.

For the parameters to be monitored using sampling method, two ($n_{k,y}$ and Soil application of the final sludge) are proportions/percentages and the other ($N_{LT,y}$) are mean values. In order to calculate the required sample size estimates for the proportions and the mean values are required. Furthermore, the standard deviation needs to be assumed in case of sampling for a mean value. For the first monitoring period, 1 is applied for value of V for sample size calculation. For the following monitoring periods, the estimates shall be adjusted taken the results of the previous monitoring period(s) into account.

According to "best practices examples focusing on sample size and reliability calculations" (Version 01.0) issued at EB 67 Meeting, for the two proportional parameters ($n_{k,y}$ and Soil application of the final sludge) the following equation is applied:

$$n \geq \frac{z^2 \times N \times V}{(N-1) \times precision^2 + z^2 \times V}$$

Where:

$$V = \frac{p \times (1-p)}{p^2}$$

n	=	Number of elements to be sampled
N	=	Total number of elements in the population
p	=	Proportion
z	=	Constant referring to the level of confidence (e.g. 1.645 for 90 % confidence and 1.96 for 95 % confidence.
$precision$	=	Required precision (e.g. 10% = 0.1)

For the other parameters ($N_{LT,y,}$ to be determined by $N_{da,y}$ and $N_{p,y}$) the following equation is applied:

$$n \geq \frac{z^2 \times N \times V}{(N-1) \times precision^2 + z^2 \times V}$$

Where:

$$V = \left(\frac{SD}{mean} \right)^2$$

n	=	Number of elements to be sampled
N	=	Total number of elements in the population
mean	=	Average value of the parameter that is expected in the total population
SD	=	Standard deviation of the parameter that is expected in the total population
z	=	Constant referring to the level of confidence (e.g. 1.645 for 90 % confidence and 1.96 for 95 % confidence.
precision	=	Required precision (e.g. 10% = 0.1)

For the first monitoring period, V of each sampling parameter is set at 1 for sample size calculation. Thus, for each sampling parameter, the minimum sample size is as below:

$$n \geq \frac{1.96^2 \times N \times 1}{(N-1) \times 0.1^2 + 1.96^2 \times 1}$$

If result of the sampling cannot achieve the required precision (95/10), additional sample will be taken to achieve the required precision.

Sampling frame

The above mentioned parameters are sampled synchronously.

Parameter	Sampling frames
$n_{k,y}$	All households included in CPAs under the PoA.
$N_{LT,y}$ ($N_{da,y}$ and $N_{p,y}$)	All households included in CPAs under the PoA.
Soil application of the final sludge	All households included in CPAs under the PoA.

Field measurements

The following parameters will be measured as indicated below:

Parameter	Timing (indicative)	Frequency (required by AMS III.R. or AMS-I.I)	Methods to be applied	Comments
$n_{k,y}$	After the inspection and acceptance testing at year of biogas stoves installation,	biennially	Visual inspection of biogas digesters installed in the sampled households to see if the biogas digester is	Sampling will be applied across all CPAs up to the PoA level.

	the inspections can be done in years 3, 5, 7, etc.		operational and in compliance with manufacturer required maintenance procedures.	
$N_{LT,y}$ ($N_{da,y}$ and $N_{p,y}$)	First monitoring is likely to occur within 12 months after registration of the PoA	Not specified in AMS-III.R. It will be conducted based on CME's opinion.	Interview and visual inspection of the sampled households to determine $N_{da,y}$ and $N_{p,y}$, and then to get the annual average animal population (Mean Value), multiplied by total households.	Sampling will be applied across all CPAs up to the PoA level.
Soil application of the final sludge	First monitoring is likely to occur within 12 months after registration of the PoA	Not specified in AMS-III.R. It will be conducted based on CME's opinion.	Visual inspection of the final sludge from biogas digester to see if it is fully utilized in farmland under aerobic condition.	Sampling will be applied across all CPAs up to the PoA level.

3. Monitoring Structure

In order to implement the monitoring plan effectively, the specific person in charge of the Programme is designated by CME to make sure the implementation of monitoring plan and keep in touch with EB, DNA and other relevant parties. The monitoring structure is clearly shown in the following Figure 3.

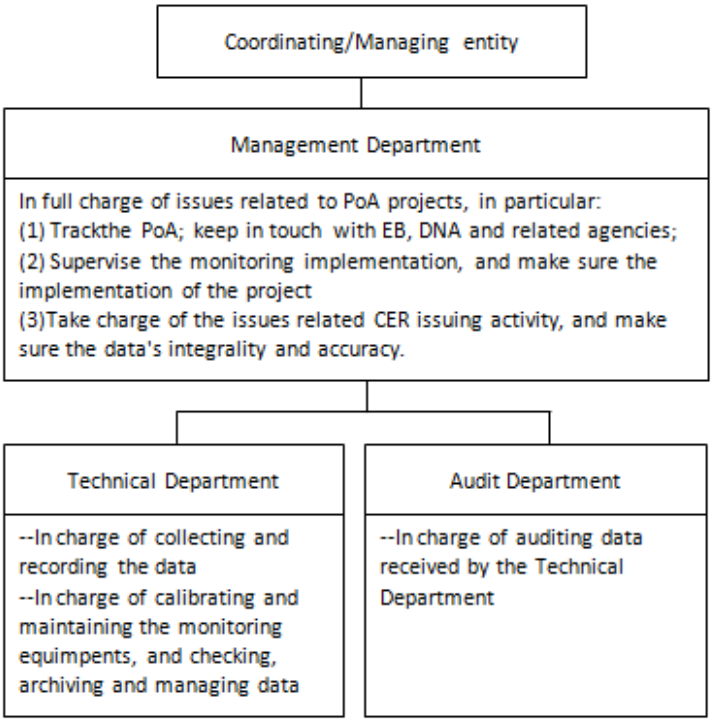

Figure 3. Monitoring Structure

4. Data Collection and Management

All data will be down-top collected as per monitoring structure above. The regular summary should be made and reported to management department by statistician periodic; all the data after internal validation should be saved up to 2 years after the end of the crediting period.

5. QA/QC

The PoA manager shall supervise the implementation of project monitoring plan, and check the monitor report. Once there is any unusual, the manager shall find the solution immediately. During emergency time, CER form the CPA will not be calculated.

All the procedures and/or methods adopted during the monitoring shall comply with the requirements of the applied methodologies and guidelines and/or any other referenced documents. All the data/parameters involved in the monitoring shall satisfy corresponding methods/procedures described in this PoA-DD. In case of any unexpected situation, urgent solution shall be given properly.

Following procedures will be used for Quality assurance / Quality control for sampling.

The potential for non-responses, refusals and related issues will be considered by the CME during sample selection. If the sampling results are insufficient to achieve the target reliability levels, the CME has a number of options to address this (see below).

- By selecting a larger than necessary sample size before commencing monitoring, the CME can help ensure that an adequate number of responses are obtained during sampling.
- The calculation of the sample size will be carried out using estimates for proportions, mean of values and standard deviations as the actual characteristics of the population/sampling frame are unknown. In the event that the sampling results do not fulfill the required level of confidence and precision, the CME can undertake additional samples.
- If the reliability is still not sufficient after additional samples, the sampling may be repeated with an increased sample size.

The data contained in each individual CPA Monitoring Record and collected during field measurements will be transferred to the CME.

6. Verification

The verification of emission reduction is carried out based on CPA principal's requirements. The person in charge of the CPA should provide DOE documents and evident related to monitoring.

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:

>>
The environmental analysis is conducted at the PoA level.

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

>>
Not applicable

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:

>>
Not applicable

SECTION D. Stakeholders' comments

>>

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

>>
The stakeholders' comments consultation is conducted at the PoA level.

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

>>
Not applicable

D.3. Summary of the comments received:

>>
Not applicable

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

>>
Not applicable

Annex 1

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

Organization:	Lanzhou Hualong Poultry Breeding Co.
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding from Annex I parties for the programme of activities.

Annex 3

BASELINE INFORMATION

There is no additional baseline information.

Annex 4

MONITORING INFORMATION

There is no additional monitoring information.

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