



GOLD STANDARD MONITORING REPORT	
Title of the programme of activities (PoA)	Nepal Biogas Support Program-PoA
UNFCCC reference number of the PoA	9572
Gold Standard reference number of the PoA	GS3110
CPAs covered by this monitoring period and their GS reference number	Nepal Biogas Support Program CPA- 1: 20,000 digesters (GS3109) Nepal Biogas Support Program CPA - 2: 19,927 digesters (GS3113) Nepal Biogas Support Program CPA - 3: 19,959 digesters (GS3114) Nepal Biogas Support Program CPA - 4: 19,970 digesters (GS3116)
Version number of this monitoring report	2.0
Completion date of this monitoring report	14/09/2018
Monitoring period number and dates covered by this monitoring report	4 th Monitoring Period: 01/08/2016- 31/07/2017 (including both days) Regular GS Labelling Period: 01/08/2016- 31/07/2017 (including both days)
Total amount of emission reductions achieved during this monitoring period	218,588 tCO ₂ e Vintage 2016: 91,627 tCO ₂ e Vintage: 2017: 126,961 tCO ₂ e



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LIST OF ABBREVIATIONS

AEPC	Alternative Energy Promotion Centre
BSP-N	Biogas Sector Partnership–Nepal
BUS	Biogas User Survey
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CME	Coordinating and Managing Entity
CPA	Component Project Activity
CPA-PP	CPA-Passport
ER	Emission Reductions
GS	Gold Standard
MP	Monitoring Period
MR	Monitoring Report
NGO	Non-governmental organisation
PoA	Programme of Activities
PoA-PP	PoA-Passport
PDD	Project Design Document

1.0 BACKGROUND

The Nepal Biogas Support Program (BSP) is a household biogas plant Programme of Activities (CDM ref. 9572, GS ref. 3110). The biogas plants displace firewood and fossil fuels with biogas created by anaerobic digestion from animal waste and human excreta. The biogas is used as a fuel for cooking, therefore displacing the use of non-renewable biomass leading to net emission reductions. Target group are households with at least one head of cattle (generally cows or buffalos) who currently use non-renewable biomass (firewood) for cooking purpose. The baseline of the PoA considers only non-renewable biomass replaced through household biogas applications. Only households previously using non-renewable biomass are eligible to the PoA.

The technologies disseminated under this PoA are household biogas digesters of type GGC 2047 with a sludge and gas holding capacity range of 2, 4, 6, 8 to 10 m³. The biogas digesters are based on a uniform technical design and are manufactured and installed following established technical standards in Nepal. The digester itself is a closed underground container made of concrete or other materials.

All the biogas digesters implemented under this PoA are maintained by the Biogas Sector Partnership–Nepal, a national level NGO supporting AEPC implement the PoA. BSP-Nepal maintains the record of installed biogas digesters in an Oracle supported database software. Each biogas digester installed under different CPAs is identified with its unique dome gas pipe number and hence the uniqueness of the identity is maintained for each digester. Since all the digesters implemented under all CPAs of the PoA are centrally maintained, possibility of double counting of the digesters between and within CPAs is avoided.

The Nepal Biogas Support Program-PoA includes 4 CPAs (GS3109, GS3113, GS3114 and GS3116) that have been GS registered retroactively, with GS registration date being 14 August 2015. For CDM monitoring please refer to the CDM Monitoring Reports.

Table 1: Registration reference numbers and registration dates of PoA-9572 and each CPA included in the Gold Standard registration

	CDM Registration Number	CDM Registration/ Inclusion date	GS Registration Number	GS Registration Date
PoA	9572	31/01/2013	3110	14/08/2015
CPA-1	9572-0001	31/01/2013	3109	14/08/2015
CPA-2	9572-0002	08/05/2014	3113	14/08/2015
CPA-3	9572-0003	08/05/2014	3114	14/08/2015
CPA-4	9572-0004	08/05/2014	3116	14/08/2015

Table 2 provides an overview of the number of biogas digesters implemented in different ecological zones of Nepal under CPA-1, CPA-2, CPA-3 and CPA-4.

Table 2: Number of biogas plants installed under each CPA

CPA	Total number of biogas plants	Terai region	Hill	Mountain or Remote Hill
CPA-1	20,000	10,955	8,940	105
CPA-2	19,927	10,346	9,437	144
CPA-3	19,959	9,044	10,754	161
CPA-4	19,970	9,127	10,720	123
TOTAL	79,856	39,472	39,851	533



The repair and maintenance activities related to the biogas digesters damaged by earthquake in 2015 are still ongoing. Among the 18,700 biogas units identified in Gorkha, Kavre, Nuwakot and Rasuwa districts, in the country (which constitutes digesters of under this GS PoA as well as digesters installed in other programmes by AEPC in the host country), around 6030 biogas rehabilitation is completed already and the rehabilitation work in Nuwakot and Gorkha districts is still ongoing.



2.0 MONITORING PERIOD, SURVEY AND SAMPLING

This third GS Monitoring Period covers the time from 01/08/2016 until 31/07/2017 and is identical to the CDM Monitoring Period for the CPAs registered under GS.

Table 3: GS Monitoring Period

Covered Monitoring Period:	01/08/2016 – 31/07/2017
Length of Monitoring Period:	365 days
Regular GS Labelling period:	01/08/2016 until 31/07/2017

For monitoring purposes AEPC commissions an emission reduction monitoring survey i.e. the “Biogas Users’ Surveys” (BUS) to be conducted every year as part of the Monitoring Survey that covers all four CPAs (GS3109, GS3113, GS3114, GS3116). A third party (consultant) conducts the Biogas User Survey. The BUS serves as the basis for emission reduction calculation. It also assesses the benefits from biogas plants such as households having access to toilets, usage of bio slurry, impacts on environment, health and sanitation as stated in the Gold Standard Passport. The sample group is asked whether biogas plants are still operational as well as how households use the biogas plant and the kinds of economic and health benefits that they reaped from the use of the biogas plant.

Table 4: Monitoring Survey 2016/2017

Date of on-site visits for Monitoring:	17 February 2017 to 17 April 2017
Company in charge:	Sustainable Energy and Technology Management (SETM), Kamaladi, Kathmandu
Number of field visitors:	12 enumerators (five groups of two each)
Sample Size:	135 biogas plants and its users from each CPA
Sample group/location:	From 10 different districts representing 5 different regions and 3 ecological belts (hill; remote hill; terai).
Survey type:	Structured questionnaires (summarized in the “Biogas Users’ Survey (BUS) 2017”)

Sample size was determined using stratified random sampling as stipulated in annex 4 of the registered CDM PoA-DD. The sampling was performed within the level of precision of 10% and a confidence level of 90%. The sample size of 135 biogas plants per CPA was taken for Monitoring Survey 2016/17. For more details on sampling plan and methods, please refer to CDM MR. Table 5 summarizes the number of samples surveyed during the monitoring period 2016/17.

Table 5: Sample size per CPA of Monitoring Survey 2016/17

CPA-1				
Ecological Belts	Installed Biogas Plants		Sample Biogas Plants	
	Number	Proportion (%)	Number	Proportion (%)
Remote Hill	105	0.53	4	2.96
Hill	8,940	44.70	59	43.70
Terai	10,955	54.78	72	53.33
Total	20,000	100	135	100.00
CPA-2				
Ecological Belts	Installed Biogas Plants		Sample Biogas Plants	
	Number	Proportion (%)	Number	Number (%)
Remote Hill	144	0.72	4	2.96
Hill	9437	47.36	61	45.19
Terai	10,346	51.92	70	51.85
Total	19,927	100	135	100.00
CPA-3				

Ecological Belts	Installed Biogas Plants		Sample Biogas Plants	
	Number	Proportion (%)	Number	Proportion (%)
Remote Hill	161	0.81	4	2.96
Hill	10,754	53.88	69	51.11
Teraï	9,044	45.31	62	45.93
Total	19,959	100	135	100.00
CPA-4				
Ecological Belts	Installed Biogas Plants		Sample Biogas Plants	
	Number	Proportion (%)	Number	Proportion (%)
Remote Hill	123	0.62	4	2.96
Hill	10,720	53.68	69	51.11
Teraï	9,127	45.70	62	45.93
Total	19,970	100	135	100.00

Tables 6 to 9 depict percentage of operational biogas plants per CPA found during Monitoring. Monitoring of CPA-1 found 33 out of 135 sampled biogas digesters are non-operational during Monitoring Survey 2016/17. Therefore 102 biogas plant users were asked about SD indicators (see section 4) during Monitoring Survey.

Table 6: Monitoring Results of operational status of biogas in CPA-1 during MP 2016/17

Sample Description	Teraï	Hill	Remote Hill	Total
Number of biogas plants surveyed in sample	72	59	4	135
Number of biogas plants found not operational in sample	10	23	0	33
Number of operational biogas plants in sample = total number of households surveyed on SD indicators	62	36	4	102
Percentage of operational biogas plants as of survey sample	86.11%	61.02%	100.00%	75.56%

Source: Biogas Users' Survey 2017.

Monitoring of CPA-2 found 22 out of 135 sampled biogas digesters are non-operational during Monitoring Survey 2016/2017. Therefore 113 biogas plant users were asked about SD indicators (see section 4) during Monitoring Survey.

Table 7: Monitoring Results of operational status of biogas in CPA-2 during MP 2016/17

Sample Description	Teraï	Hill	Remote Hill	Total
Number of biogas plants surveyed in sample	70	61	4	135
Number of biogas plants found not operational in sample	4	18	0	22
Number of operational biogas plants in sample = total number of households surveyed on SD indicators	66	43	4	113
Percentage of operational biogas plants as of survey sample	94.29%	70.49%	100.00%	83.70%

Source: Biogas users' survey 2017.

Monitoring of CPA-3 found 22 out of 135 sampled biogas digesters are non-operational during Monitoring Survey 2016/2017. Therefore 113 biogas plant users were asked about SD indicators (see section 4) during Monitoring Survey.

Table 8: Monitoring Results of operational status of biogas in CPA-3 during MP 2016/17

Sample Description	Terai	Hill	Remote Hill	Total
Number of biogas plants surveyed in sample	62	69	4	135
Number of biogas plants found not operational in sample	2	20	0	22
Number of operational biogas plants in sample = total number of households surveyed on SD indicators	60	49	4	113
Percentage of operational biogas plants as of survey sample	96.77%	71.01%	100.00%	83.70%

Source: Biogas Users' Survey 2017.

Monitoring of CPA-4 found 18 out of 135 sampled biogas digesters are non-operational during Monitoring Survey 2016/2017. Therefore 117 biogas plant users were asked about SD indicators (see section 4) during Monitoring Survey.

Table 9: Monitoring Results of operational status of biogas in CPA-4 during MP 2016/17

	Terai	Hill	Remote Hill	Total
Number of biogas plants surveyed in sample	62	69	4	135
Number of biogas plants found not operational in sample	0	15	3	18
Number of operational biogas plants in sample = total number of households surveyed on SD indicators	62	54	1	117
Percentage of operational biogas plants as of survey sample	100.00%	78.26%	75.00%	86.66%

Source: Biogas Users' Survey 2017.

The data was collected by deploying the enumerators to the field which lasted for about 35 days. The enumerators were provided with the printed copy of the questionnaires to fill it in site. The collected information was recorded in a systematic database format. The data was presented and interpreted by using different statistical tools. The data collected from the field survey was encoded in SPSS/Excel and analyzed by a qualified statistician. To minimize the risk of data discrepancies and for assurance of the quality of data collected, the enumerators were trained and the questionnaires were pre-tested prior to their introduction in the field under the supervision and guidance of the statistician. Similarly, a thorough check of the questionnaires were filled up-by the enumerators was done during field survey to minimize the inconsistency and for the instant correction. While transferring the data from questionnaires into Excel, qualified statistician prepared the encoded database format. The data from questionnaires were transferred to that database format based on the codes provided for each response in questionnaires under the supervision of qualified statistician. Once the draft report was received, AEPC also checked the database against the filled in questionnaire in a sample basis and provided the feedback to the third party for correction and preparation of final report. So, the efforts were made to ensure the quality of data collected, data entry and data analysis for minimizing the data discrepancies.



3.0 EMISSION REDUCTIONS

Total emission reductions achieved during monitoring period (01/08/2016 - 31/07/2017) in all four CPAs is 218,588 tons of CO₂e. This total amount of emission reductions includes 91,627 tons of CO₂e emission reductions for year 2016 and 126,961 tons of CO₂e for year 2017. Table 3 provides details of emissions reductions achieved during this monitoring period.

Table 10: Emission reductions achieved for GS monitoring period (01/08/2016 to 31/07/2017)

CPA	Estimated Amount of Emission Reductions (tCO ₂ e)	GHG emission reductions (tCO ₂ e)	Apportioned CERs for Vintage 2016 (01/08/2016-31/12/2016)	Apportioned CERs for Vintage 2017 (01/01/2017-31/07/2017)
CPA-1	66889	49928	20929	28999
CPA-2	66236	55115	23103	32012
CPA-3	66329	55112	23102	32010
CPA-4	66397	58433	24493	33940
Total	265851	218588	91627	126961



4.0 MONITORING OF SUSTAINABLE DEVELOPMENT INDICATORS

4.1 Introduction

The Monitoring of Sustainable Development Indicators was conducted in accordance with the GS CPA passport (CPA PP). A comprehensive survey (BUS) has been conducted during both site visits to assess a wide range of social, environmental and economic impacts and benefits of the PoA. All questions related to the relevant SD indicators are included in this survey. According to requirements of the Gold Standard, the project activity must be assessed against a matrix of sustainable development indicators. Indicators that were not scored neutral must be monitored. The SD Matrix can be found in the GS passport.

4.2 Monitoring Method

The monitoring method consisted of a sampling survey of the statistically representative number of households. The sample was determined in accordance with the monitoring plan discussed in the CDM Project Design document registered with the CDM executive board. Stratified random sampling technique was used to survey households. In order to adjust the sample size for possible non-responses from the users, the sample size affixed in the PoA-DD (i.e. 54 samples per CPA (see page 37 of PoA-DD)) was enlarged. For more detail on the sampling please refer to the CDM monitoring report. Questionnaires were used to monitor users' perception of air quality.

4.3 Monitoring Results

4.3.1 ID 01: Air quality

Table as in the GS passport:

No		01
Indicator		Air quality
Mitigation measure		N/A
Chosen parameter		Users' perception on smoke.
Current situation of parameter		No usage of biogas units in the targeted households and therefore no reduction of harming indoor pollution.
Estimation of baseline situation of parameter		The use of open wood fire for cooking creates harmful indoor smoke.
Future target for parameter		Improved perception of indoor air quality after installation of biogas digesters.
Way of monitoring	How	In a representative survey, randomly selected users will be asked about their perception on the level of indoor smoke after installation of the biogas plant.
	When	At least biennial
	By who	Dedicated Monitoring team under responsibility of the CME

The surveyed households confirmed that the use of biogas digesters and biogas for cooking have reduced the prevalence of smoke and therefore have contributed to improvements in perceived air quality. The respondents were asked to state their perception towards air quality (with reference to indoor smoke) after the installation of the biogas digester. Their responses are summarized per CPA in the paragraphs and tables below.

a) CPA-1



Survey of CPA-1 households revealed that higher percentage (53.92%) of households perceived that the indoor smoke has reduced while 45.10% reported that they've perceived drastically reduced in the indoor smoke. In remote hills, 100% of the survey households reported that the smoke has reduced. While the households of same opinion in hills and terai were 66.7% and 43.5% respectively.

Table 11: Household perception of reduction in smoke of CPA-1 during MP 2016/17

Response	Remote Hills		Hills		Terai		Total	
	No	Perc.	No	Perc.	No	Perc.	No	Perc.
Drastically reduced	0	0.0%	12	33.3%	34	54.8%	46	45.10%
Reduced	4	100%	24	66.7%	27	43.5%	55	53.92%
Not reduced	0	0.0%	0	0.0%	0	0.0%	0	0.00%
Do not know	0	0.0%	0	0.0%	1	1.6%	1	0.98%
Total	4	100%	36	100%	62	100%	102	100%

Source: Biogas Users' Survey 2017 (General Report)

b) CPA-2

Survey of CPA-2 households revealed that only 0.00% of the respondents perceived "no reduction" in the indoor air pollution. In hills, 100% of the survey households reported that the smoke has reduced to a certain extent while the households with same opinion were 79.1% and 39.4% in hill and terai region.

Table 12: Household perception of reduction in smoke of CPA-2 during MP 2016/17

Response	Remote Hills		Hills		Terai		Total	
	No	Perc.	No	Perc.	No	Perc.	No	Perc.
Drastically reduced	0	0%	9	20.9 %	40	60.6%	49	43.36%
Reduced	4	100.0%	34	79.1 %	26	39.4%	64	56.64%
Not reduced	0	0%	0	0.0%	0	0.0%	0	0.00%
Do not know	0	0%	0	0.0%	0	0.0%	0	0.00%
Total	4	100.0%	43	100%	66	100%	113	100%

Source: Biogas Users' Survey 2017 (General Report)

c) CPA-3

The households were asked to state their perception towards the reduction in indoor smoke owing to the installation and use of biogas. Higher percentage (53.10%) of households perceived that the indoor smoke has reduced to some extent, while 46.90% reported that they've perceived drastic reduction in the indoor smoke.

Table 13: Household perception of reduction in smoke of CPA-3 during MP 2016/17

Response	Remote Hills		Hills		Terai		Total	
	No	Perc.	No	Perc.	No	Perc.	No	Perc.
Drastically reduced	0	0.0%	10	20.4%	43	71.7%	53	46.90%
Reduced	4	100%	39	79.6%	17	28.3%	60	53.10%
Not reduced	0	0.0%	0	0.0%	0	0.0%	0	0.00%
Do not know	0	0.0%	0	0.0%	0	0.0%	0	0.00%
Total	4	100%	49	100%	60	100%	113	100%

Source: Biogas Users' Survey 2017 (General Report)

d) CPA-4

The households were asked to state their perception towards the reduction in indoor smoke owing to the installation and use of biogas. Higher percentage (54.70%) of households perceived that the indoor smoke has reduced while 42.74% reported that they've perceived drastic reduction in the indoor smoke.

Table 14: Household perception of reduction in smoke of CPA-4 during MP 2016/17

Response	Remote Hills		Hills		Terai		Total	
	No	Perc.	No	Perc.	No	Perc.	No	Perc.
Drastically reduced	1	100%	12	22.2%	37	59.7%	50	42.74%
Reduced	0	0%	40	74.1%	24	38.7%	64	54.70%
Not reduced	0	0%	0	0.0%	1	1.6%	1	0.85%
Do not know	0	0%	2	3.7%	0	0.0%	2	1.71%
Total	1	100%	54	100%	62	100%	117	100%

Source: Biogas Users' Survey 2017 (General Report).

4.3.2 ID 02: Soil condition

Table as in the passport:

No	02	
Indicator	Soil condition	
Mitigation measure	N/A	
Chosen parameter	Use of slurry as fertilizer.	
Current situation of parameter	No or little fertilizer used, possibly chemical fertilizer. Evidence: BSP yearbook 2012, page 3.	
Estimation of baseline situation of parameter	See above	
Future target for parameter	An important share of biogas users make use of bio-slurry as fertilizer.	
Way of monitoring	How	In a representative survey, randomly selected users will be asked about the use of slurry as fertilizer, by a dedicated monitoring team under responsibility of the CME.
	When	At least biennial
	By who	Dedicated Monitoring team under responsibility of the CME

Bio-slurry is the only by-product of the biogas digester. Bio-slurry is rich in nitrogen content and can be utilized as farmyard manure in agricultural applications. Bio-slurry has the potential to displace the chemical fertilizers and is one of the key sustainable development contributors for the biogas technology. The survey attempted to capture the status of the application of bio-slurry in farmyard applications.

BUS Question No. 6.8: "Do you use the bio-slurry manure??"

a) CPA-1

From the survey result it is observed that over 99% of households use bio-slurry as manure. The percentage of households stating this response is almost homogenous across all ecological zones. In terai, the households stating the use of bio-slurry as manure were 98.4%. Similarly, in hills it was 100% while the entire survey respondents in remote hills reported that they use bio-slurry as manure.



Table 15: Household responses on use of bio slurry as manure of CPA-1 during MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100.0%	0	0.0%	4
Hill	36	100.0%	0	0.0%	36
Terai	61	98.4%	1	1.6%	62
Total	101	99.0%	1	1.0%	102

Source: Biogas Users' Survey 2017 (General Report).

b) CPA-2

From the survey result it is observed that over 95% of households, use bio-slurry as manure. The percentage of households stating this response is almost homogenous across all ecological zones. In terai, the households stating the use of bio-slurry as manure were 100%. Similarly, in hills it was 97.7% who reported the use bio-slurry as manure.

Table 16: Household responses on use of bio slurry as manure of CPA-2 during MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100.0%	0	0.0%	4
Hill	42	97.7%	1	2.3%	43
Terai	66	100.0%	0	0.0%	66
Total	112	95.12%	1	4.88%	113

Source: Biogas Users' Survey 2017 (General Report).

c) CPA-3

During the field survey, the entire households sampled for CPA-4 reported that they use bio slurry as manure in one form or another.

Table 17: Household responses on use of bio slurry as manure of CPA-3 during MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100%	0	0.0%	4
Hill	49	100%	0	0.0%	49
Terai	60	100%	0	0.0%	60
Total	113	100%	0	0.0%	113

Source: Biogas Users' Survey 2017 (General Report).

d) CPA-4

From the survey result it is observed that 99.1% of households use bio-slurry as manure. The percentage of households stating this response in Terai, Remote Hill and Hill is 98.4%,100% and 100% in all the ecological zones.

Table 18: Household responses on use of bio slurry as manure of CPA-4 during MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	1	100.0%	0	0.0%	1
Hill	54	100.0%	0	0.0%	54
Terai	61	98.4%	1	1.6%	62
Total	116	99.1%	1	0.9%	117

Source: Biogas Users' Survey 2017 (General Report).

4.3.3 ID 03: Quality of employment

Table as in the passport:

Table as in the passport.		
No	03	
Indicator	Quality of employment	
Mitigation measure	As described under safeguarding principle 8, in order to avoid the risk of accidents, workers will receive proper training. Protective equipment will be distributed.	
Chosen parameter	Trainings for masons.	
Current situation of parameter	Although literacy and school enrolment rates in Nepal have increased during the last 40 years, access to education and capacity-building is still not universal or equal across income and gender groups, due to poverty and lack of quality public infrastructures, especially in rural areas. Evidence: http://unstats.un.org/unsd/mdg/Data.aspx , http://borgenproject.org/facts-about-education-in-nepal/	
Estimation of baseline situation of parameter	See above	
Future target for parameter	Masons involved in the programme receive trainings on biogas technology as well as its safe and sound installation.	
Way of monitoring	How	Training reports and records, including types of trainings and, if available, pictures. This shall be done exclusively for digesters of CPAs that do not fall under the retro-active registration. Digesters that were included retro-actively have already been built prior to GS registration, monitoring of this parameter can thus not be done.
	When	At least biennial
	By who	Dedicated Monitoring team under responsibility of the CME

Monitoring Results: This parameter is not required to be monitored, since all biogas plants under CPA-1, CPA-2, CPA-3 and CPA-4 were already commissioned before GS registration (see database with respective construction dates)).

4.3.4 ID 04: Livelihood of the poor

Table as in the passport:

No	04
Indicator	Livelihood of the poor
Mitigation measure	N/A
Chosen parameter	Improved access to sanitation services
Current situation of parameter	No improved sanitation facilities available. Evidence: BSP yearbook 2012, page 3, showing that toilets are constructed together with biogas plants, which shows that there were no toilets before.
Estimation of baseline situation of parameter	See above
Future target for parameter	An important share of biogas plants counts with a connected



		toilet.
Way of monitoring	How	In a representative survey, a dedicated monitoring team under responsibility of the CME will checked at randomly selected households of biogas users if toilets have been constructed as part of the digester.
	When	At least biennial
	By who	Dedicated Monitoring team under responsibility of the CME

Construction and use of toilets reflects the status of sanitation in the households. In the biogas user households, the users are recommended to construct the toilets and connect it to their biogas if they don't have one and in case if they already have, they are recommended to connect the toilet to the biogas digester to improve the quantity of feeding materials in the digester.

BUS Question No. 6.13: Do you have toilet at your house?

BUS Question No. 6.14: When did you construct toilet?

BUS Question No. 6.15: Have you attached the toilet with your biogas plant?

a) CPA-1

The survey conducted for CPA-1 reveals that the entire households surveyed in the ecological zone have toilets in their homes. It can therefore be said that there is good sanitation access in the households having biogas digesters in CPA-1.

Table 19: Monitoring Responses on Sanitation Access for CPA-1 MP 2016/17 (Toilet Construction)

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100.00%	0	0.00%	4
Hill	36	100.00%	0	0.00%	36
Terai	62	100.00%	0	0.00%	62
Total	102	100.00%	0	0.00%	102

Source: Biogas Users' Survey 2017 (General Report).

Among the surveyed households with access to toilet, 79.41% toilets were constructed before biogas installation in their households whereas 20.59% respondents reported that their toilets were constructed after biogas installation or simultaneously with biogas systems in their households.

Table 20: Timing of toilet construction for CPA-1 MP 2016/17

Ecological Belt	Before Biogas Installation		After Biogas Installation		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	0	0.00%	4	100.00%	4
Hill	27	75.00%	9	25.00%	36
Terai	47	75.8%	15	24.2%	62
Total	74	72.5%	28	27.5%	102

Source: Biogas Users' Survey 2017 (General Report).

With the toilet connection to the biogas digesters, improving the health and hygiene in the biogas user households is likely to save other health related expenses. In total, in 79.41% of households, the toilets were found to be connected to the digester. The proportion of toilet connection to the biogas digesters in Remote Hills was 100%, in Hills 97.22% and in Terai 67.74%. There were 20.59% of cases where the toilets were not found to have been connected to the biogas digester.

Table 21: Connection of toilet with biogas digester for CPA-1 MP 2016/17

Ecological Belt	Yes		No		Total Survey Household Number
	Number	Percent	Number	Percent	
Remote Hill	4	100.00%	0	0.00%	4
Hill	35	97.22%	1	2.78%	36
Terai	42	67.74%	20	32.26%	62
Total	81	79.41%	21	20.59%	102

Source: Biogas Users' Survey 2017 (General Report).

b) CPA-2

The survey conducted for CPA-2 reveals that except for 3 households among the 113 households surveyed have toilets in their home. It can therefore be said that there is very good sanitation access in the households having biogas digesters in CPA-2.

Table 22: Monitoring Responses on Sanitation Access for CPA-2 MP 2016/17 (Toilet Construction)

Ecological Belt	Yes		No		Total Survey Household Number
	Number	Percent	Number	Percent	
Remote Hill	4	100.00%	0	0.00%	4
Hill	43	100.00%	0	0.00%	43
Terai	63	95.45%	3	4.55%	66
Total	110	97.35%	3	2.65%	113

Source: Biogas Users' Survey 2017 (General Report).

Among the surveyed households, 51.8% toilets were constructed before biogas installation in their households whereas 48.2% respondents reported that their toilets were constructed after biogas installation or simultaneously with biogas systems in their households.

Table 23: Timing of toilet construction for CPA-2 MP 2016/17

Ecological Belt	Before Biogas Installation		After Biogas Installation		Total Survey Household Number
	Number	Percent	Number	Percent	
Remote Hill	4	100.0%	0	0.0%	4
Hill	26	60.5%	17	39.5%	43
Terai	27	43.9%	36	57.1%	63
Total	57	51.8%	53	48.2%	110

Source: Biogas Users' Survey 2017 (General Report).

With the toilet connection to the biogas digesters, improving the health and hygiene in the biogas user households is likely to save other health related expenses. In total, in 95.45% of households, the toilets were found to be connected to the digester. The proportion of toilet connection to the biogas digesters in Hills was 95.35% and in Terai the same was 95.24%. There were 4.55% of cases where the toilets were not found to have been connected to the biogas digester.

Table 24: Connection of toilet with biogas digester for CPA-2 MP 2016/17



Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100%	0	0.00%	4
Hill	41	95.35%	2	4.65%	43
Terai	60	95.24%	3	4.76%	63
Total	105	95.45%	5	4.55%	110

Source: Biogas Users' Survey 2017 (General Report).

c) CPA-3

The survey conducted for CPA-3 reveals that except for one household among the 113 households surveyed have toilets in their home. It can therefore be said that there is very good sanitation access in the households having biogas digesters in CPA-3.

Table 25: Monitoring Responses on Sanitation Access for CPA-3 MP 2016/17 (Toilet Construction)

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100%	0	0.00%	4
Hill	49	100%	0	0.00%	49
Terai	59	98.33%	1	1.67%	60
Total	112	99.12%	1	0.88%	113

Source: Biogas Users' Survey 2017 (General Report).

Among the surveyed households, 54.5% toilets were constructed before biogas installation in their households whereas 45.5% respondents reported that their toilets were constructed after biogas installation or simultaneously with biogas systems in their households.

Table 26: Timing of toilet construction for CPA-3 MP 2016/17

Ecological Belt	Before Biogas Installation		After Biogas Installation		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	2	50.0%	2	50.0%	4
Hill	25	51.0%	24	49.0%	49
Terai	34	57.6%	25	42.4%	59
Total	61	54.5%	51	45.5%	112

Source: Biogas Users' Survey 2017 (General Report).

With the toilet connection to the biogas digesters, improving the health and hygiene in the biogas user households is likely to save other health related expenses. In total, in 97.32% of households, the toilets were found to be connected to the digester. The proportion of toilet connection to the biogas digesters in Remote Hills was 100%, in Hills 97.96% and in Terai 96.61%. There were 2.68% of cases where the toilets were not found to have been connected to the biogas digester.

Table 27: Connection of toilet with biogas digester for CPA-3 MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	4	100%	0	0.00%	4
Hill	48	97.96%	1	2.04%	49
Terai	57	96.61%	2	3.39%	59
Total	109	97.32%	3	2.68%	112

Source: Biogas Users' Survey 2017 (General Report).

d) CPA-4

The survey conducted for CPA-4 reveals that the entire households surveyed have toilets in their home. It can therefore be said that there is very good sanitation access in the households having biogas digesters in CPA-4.

Table 28: Monitoring Responses on Sanitation Access for CPA-4 MP 2016/17 (Toilet Construction)

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	1	100%	0	0%	1
Hill	54	100%	0	0%	54
Terai	62	100%	0	0%	62
Total	117	100%		0%	117

Source: Biogas Users' Survey 2017 (General Report).

Among the surveyed households, 57.3% toilets were constructed before biogas installation in their households whereas 42.7% respondents reported that their toilets were constructed after biogas installation or simultaneously with biogas systems in their households.

Table 29: Timing of toilet construction for CPA-4 MP 2016/17

Ecological Belt	Before Biogas Installation		After Biogas Installation		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	1	100%	0	0.0%	1
Hill	29	53.7%	25	46.3%	54
Terai	37	59.7%	25	40.3%	62
Total	67	57.3%	50	42.7%	117

With the toilet connection to the biogas digesters, improving the health and hygiene in the biogas user households is likely to save other health related expenses. In total, in 93.16% of households, the toilets were found to be connected to the digester. The proportion of toilet connection to the biogas digesters in Remote Hills was 100%, in Hills 92.59% and in Terai 93.55%. There were 6.84% of cases where the toilets were not found to have been connected to the biogas digester.

Table 30: Connection of toilet with biogas digester for CPA-4 MP 2016/17

Ecological Belt	Yes		No		Total Survey Household
	Number	Percent	Number	Percent	Number
Remote Hill	1	100%	0	0.00%	1
Hill	50	92.59%	4	7.41%	54
Terai	58	93.55%	14	6.45%	72
Total	109	93.16%	8	6.84%	117

Source: Biogas Users' Survey 2017 (General Report).

4.3.4 ID 05: Access to affordable and clean energy services

Table as in the passport:



No	05
Indicator	Access to affordable and clean energy services
Mitigation measure	N/A
Chosen parameter	Households using biogas plants
Current situation of parameter	Targeted households do not use clean energy; they cook with non-renewable biomass. Evidence: Baseline description in the PoA-DD section E.4, describing baseline scenario.
Estimation of baseline situation of parameter	See above
Future target for parameter	Biogas users cook with clean biogas and do not have to buy or collect firewood. Evidence: Monitored
Way of monitoring	How
	Number of biogas plants installed and operating checked on a random sample.

BUS Question No. 1.2: Is your biogas plant still in operation?

	When	At least biennial
	By who	Dedicated Monitoring team under responsibility of the CME

According to the monitoring plan of the registered PDD, the operational status of the biogas digesters is the critical parameter of survey and it is important that the biogas plants constructed under each CPA are functional to achieve the desired emissions reductions.

a) CPA-1

Of the total 135 plants visited during the survey under CPA-1, 102 (75.56%) digesters were found to be functional at the time of the survey. The weighted average functional status across all ecological zone for the population household (20,000) is calculated as 74.97%. Details regarding the functional/non-functional status of digesters observed at the time of the survey and their distribution along different ecological zones is presented in the table below.

Table 31: Monitoring Result on Functional Status of Biogas Plants of CPA-1 in MP2016/17

Ecological Belt	Functional Status of sampled biogas plant				Total Survey Household	Distribution across CPA (Number)	Distribution across CPA (Percent)
	Yes (No.)	Percent	No (No.)	Percent	Number		
Remote Hill	4	100%	0	0.00 %	4	105	0.53
Hill	36	61.02%	23	38.98%	59	8,940	44.70
Tera	62	86.11%	10	13.89%	73	10,955	54.78
Total	102	75.56%	33	24.44%	135	20,000	100.00
Weighted Average Functional status across all ecological zones					74.97%		

Source: Biogas Users' Survey 2017 (General Report)

b) CPA-2

Of the total 135 plants visited during the survey under CPA-2, 113 (83.70%) digesters were found to be functional at the time of the survey. The weighted average functional status across all ecological zone for the population household (19,927) is calculated as 83.06%. Details regarding the

functional/non-functional status of digesters observed at the time of the survey and their distribution along different ecological zones is presented in the table below.

Table 32: Monitoring Result on Functional Status of Biogas Plants of CPA-2 in MP2016/2017

Ecological Belt	Functional Status				Total Survey Household	Distribution across CPA (Number)	Distribution across CPA (Percent)
	Yes (No.)	Percent	No (No.)	Percent	Number		
Remote Hill	4	100.0%	0	0.00%	4	144	0.72
Hill	43	70.49%	18	29.51%	61	9,437	47.36
Teraï	66	94.29%	4	5.71%	70	10,346	51.92
Total	113	83.70%	22	16.30%	135	19,927	100.00
Weighted Average Functional status across all ecological zones				83.06%			

Source: Biogas Users' Survey 2017 (General Report)

c) CPA-3

Of the total 135 plants visited during the survey under CPA-3, 113 (83.70%) digesters were found to be functional at the time of the survey. The weighted average functional status across all ecological zone for the population household (19,959) is calculated as 82.92%. Details regarding the functional/non-functional status of digesters observed at the time of the survey and their distribution along different ecological zones is presented in the table below.

Table 33: Monitoring Result on Functional Status of Biogas Plants of CPA-3 in MP2016/17

Ecological Belt	Functional Status				Total Survey Household	Distribution across CPA (Number)	Distribution across CPA (Percent)
	Yes (No.)	Percent	No (No.)	Percent	Number		
Remote Hill	4	100%	0	0.00%	4	161	0.81
Hill	49	71.01%	20	28.99%	69	10,754	53.88
Teraï	60	96.77%	2	3.23%	62	9,044	45.31
Total	113	83.70%	22	16.30%	135	19,959	100.00
Weighted Average Functional status across all ecological zones				82.92%			

Source: Biogas Users' Survey 2017 (General Report).

d) CPA-4

Of the total 135 plants visited during the survey under CPA-4, 117 (86.66%) digesters were found to be functional at the time of the survey. The weighted average functional status across all ecological zone for the population household (19,970) is calculated as 87.87%. Details regarding the functional/non-functional status of digesters observed at the time of the survey and their distribution along different ecological zones is presented in the table below.

Table 34: Monitoring Result on Functional Status of Biogas Plants of CPA-4 in MP2016/17

Ecological Belt	Functional Status				Total Survey Household	Distribution across CPA (Number)	Distribution across CPA (Percent)
	Yes (No.)	Percent	No (No.)	Percent	Number		
Remote Hill	1	75.00%	3	75.00%	4	123	0.62



Hill	54	78.26%	15	21.74%	69	10,720	53.68
Terai	62	100.00%	0	0.00%	62	9,127	45.70
Total	117	86.66%	18	13.34%	135	19,970	100.00
Weighted Average Functional status across all ecological zones					87.87%		

Source: Biogas Users' Survey 2017 (General Report).



5.0 CONTINUOUS GRIEVANCE MECHANISM

Stakeholders could and can provide comments and complaints on CPA-1 to CPA-4 (as on other CPAs included under PoA-3110) via the following means:

1. Telephone:
 - a. AEPC provides a toll free number (16600144566)
 - b. Nepal biogas promoters association can be reached via its Central Office in Kathmandu (01- 5535116)
 - c. Nepal biogas promoters association regional offices can be reached via its branches in:
 - Pokhara: 061-526785
 - Butwal: 071-551514
 - Itahari: 025-5817745
 - Nepalgunj: 081-528066
 - Dhangadi: 091- 527379
 - Chitwan: 056- 521749
2. Internet/email:
 - a. AEPC's website : www.aepc.gov.np and online [contact](#)
3. Continuous Input / Grievance Expression Process Book:

All grievance input received was collected in a separate form, in which AEPC collected the following information of each grievance case (see attached excel file):

- Serial Number
- Complaint Date
- Owners' name and address
- Plant size (in m³)
- Problem Description
- Dom gas pipe number
- Construction Company
- Construction Completion
- Contact of Owner
- Issue resolved

All grievance cases have been resolved.



6. Additional remarks on monitoring

Design changes

No design changes applied during the monitoring period.

7. Contact information of the responsible persons(s)/entity preparing the Monitoring Report

This Monitoring Report was prepared by the following persons representing the Coordinating and Managing Entity (CME)

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