MONITORING REPORT

BIOGAS TANKS IN GUIZHOU PROVINCE IN CHINA

GS 614

A broken biodigester was diagnosed by ID's technician in May 2013

The Fifth and Sixth Crediting Year, 1st April 2012 to 31st March 2014

Version History of the Monitoring Report

Version number	Date	Change
1	31st Jul, 2014	First draft
2	21st Oct, 2014	First round verification feedback
3	10th Nov, 2014	Second round verification feedback

Abstract

This is the fifth and sixth crediting year monitoring report for the project GS 614 "Biogas Tanks in Guizhou Province in China". The project area comprises two different climatic zones (Weining and Danzhai) and two monitoring surveys are conducted per year (one during summer 2012 and one during winter 2012-2013, one during summer 2013 and one during winter 2013-2014).

The baseline and the project situation had been surveyed to monitor the Green House Gases emission of the targeted households but also their expenses in fuel purchase, the share of biogas in the total energy requirement of the households and indicators of hygiene improvement.

The fifth and sixth crediting year

A total of 2,578 metric tons of CO2 equivalent had been saved thanks to the project activity during the fifth crediting year and 1,382 metric tons of CO2 equivalent during the sixth crediting year.

For the fifth crediting year In Weining, farmers had saved an average 855.4 RMB on their yearly fuel expense and biogas contribute to 39% of their energy needs, the global hygiene rank has increased by 6.5. In Danzhai, biogas contributes to 63% of the energy needs, the global hygiene rank has been increased by 2.5 and they use the biogas lamp 6 minutes per day.

For the sixth crediting year In Weining, farmers had saved an average 841.5 RMB on their yearly fuel expense and biogas contribute to 34% of their energy needs, the global hygiene rank has increased by 6.9. In Danzhai, biogas contributes to 45% of the energy needs, the global hygiene rank has been increased by 2.0.

These results prove the impact of the project on Green House Gases Emission reductions but also its contribution to local and sustainable development and poverty alleviation.

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CALCULATION METHODOLOGY

The emission reductions (ER) calculations are based on the Gold Standard biodigester methodology which has been also described in the PDD. There are two different climatic zones in the project, so the ERs are calculated separately for the each one of them. There are also two energy consumption pattern in the years. During the warmest months of the year, villagers don't heat their house (we consider this period summer even if it is longer than the actual three months of summer). During the coldest months of the year, they heat their house (we consider this period winter even if it is longer than the actual three month of winter). Therefore there are two monitoring surveys conducted per year, one for each energy consumption pattern, thus the period covered by each survey is not a full year but a season.

The ERs are then calculated for each season, and ERs for the year are the sum of the ERs for the summer and for the winter.

CLIMATIC ZONE

Two different climatic zones have been identified in the project area: the districts of Weining and Danzhai. Each zone has specificities regarding fuel use, as described in the following paragraphs.

i. Weining

This zone is located at the north west of the Guizhou province. The average altitude is above 2000m and the average temperature is around 11° C. In this area the villagers start to heat their house at the beginning of October and do so until mid-February. In this zone we can distinguish three areas with different fuel consumption pattern: Caohai where people are using mostly coal, Dajie where people are using mostly firewood and Niupeng where people are using both coal and firewood. Thus having a good representativeness between these three areas is important to have a right estimation of the Emission Reductions.

ii. Danzhai

This zone is located at the south east of the Guizhou province. The average altitude is around 1000m and the average temperature around 14° C. In this area the villagers start to heat their house at the beginning of November and do

so until end of February. The fuel consumption pattern is pretty homogenous in the area, villagers are mostly using firewood.

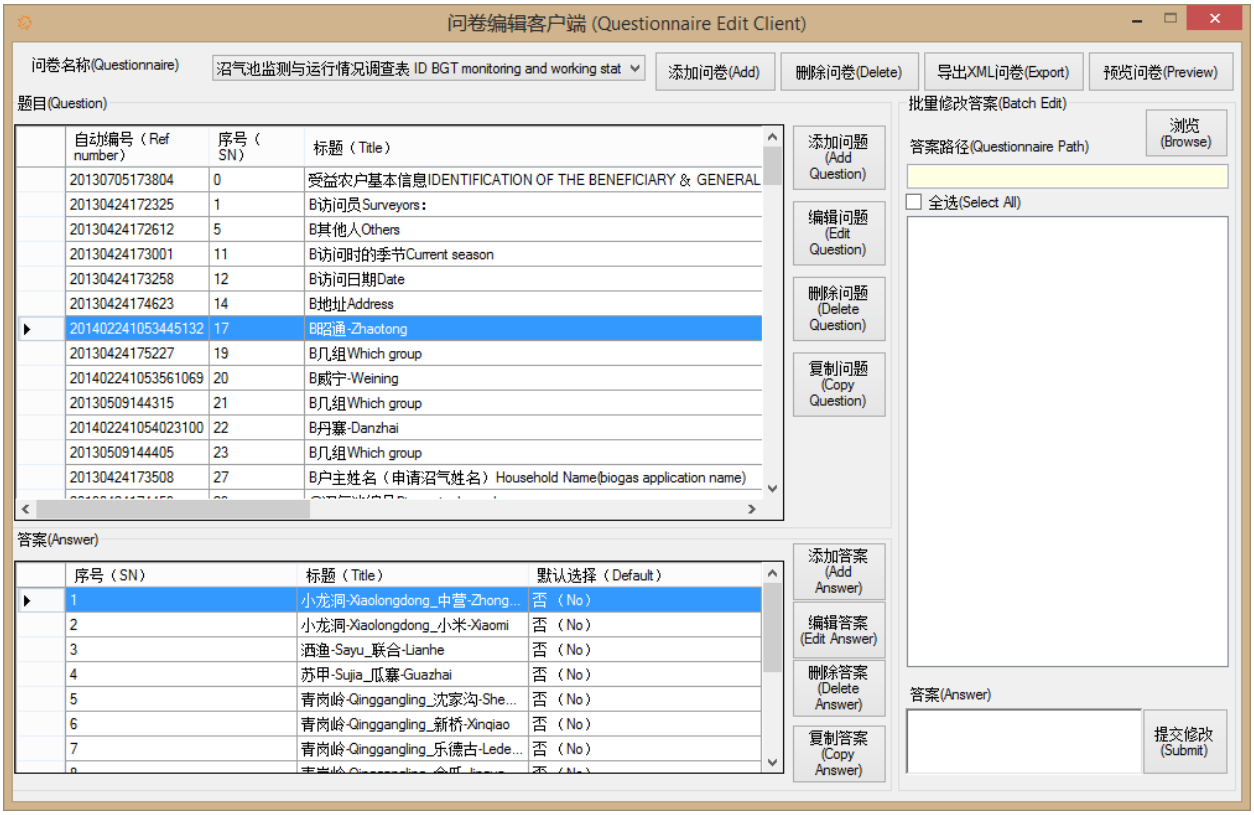
NUMBER OF BIODIGESTERS AND SURVEY DONE

i. Project activity updates

During the two crediting years, there is no new biodigester has been constructed. This is in line with what is written in page 18 in PDD.

ii. Android survey system

Since crediting year 6, ID China decided to deploy a whole new electronic household survey system to better avoid data capturing mistakes and be more efficient. It consists a questionnaire creator on PC and a survey client on portable Android device such as cell phone or tablet. A brief workflow is described as follow: 1) Questionnaires are created by office worker and then put them into Android devices which are used by surveyors to carry out household survey on site. 2) After survey, filled questionnaire (XML format) can be export on the android device into excel file and then be send to ID office via internet. 3) Data in Excel file are checked by office worker. If there is any mistake, relevant surveyor is asked for justified explanation or redo the survey. A hard copy of beneficiary signing list is also required when do the survey based on GS suggestion in order to ensure the authenticity of the data. The relevant screenshot of survey creator and client, as well as the sample signing list are shown below.



Questionnaire creator on PC

Survey App on Android device

iii. Data problem in Danzhai Year 5

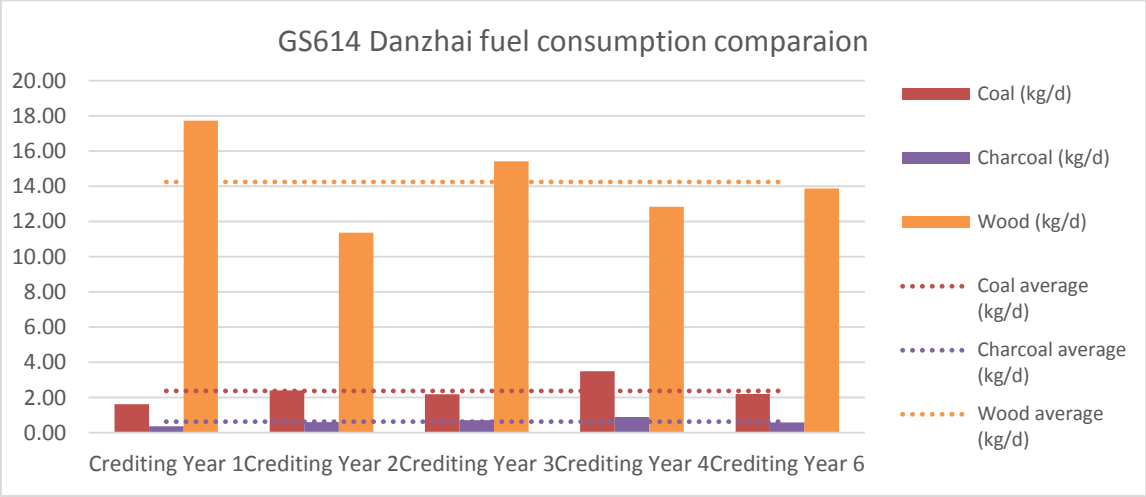
For the fifth crediting year in Danzhai, we have encountered a survey problem. The newly hired local surveyor who works independently since the beginning of the 5th crediting year. However, he did not do the fuel consumption survey correctly and the fuel consumption data does not make sense and cannot be used to calculate the VER. Besides this problem, all the other data such as household identification info or biodigester working rate are correct. This caused the big underestimation of ERs for Danzhai Year 5. So that we have trained the surveyor again and improved the data checking procedures in order to avoid this problem in the future. For the Year 6 Danzhai, the data have been checked and no problems were found. After discussed with GS about the issue, a compromised solution is proposed to fix this problem.

According to GS's opinion, the Year 4 fuel consumption value can be used as the consumption for Year 5. The reasons are:

a) Fuel consumption value variance is minor

The standard deviation below shows that the variation of fuel data among these years is not big.

	Crediting Year 1	Crediting Year 2	Crediting Year 3	Crediting Year 4	Crediting Year 6	Standard Deviation
Coal (kg/d)	1.62	2.40	2.18	3.49	2.20	0.61
Charcoal (kg/d)	0.38	0.60	0.72	0.91	0.60	0.17
Wood (kg/d)	17.72	11.36	15.42	12.84	13.88	2.19



b) Year 4's ER/tank is the most conservative value among these five crediting years

Crediting year	ER/tank (tCo2)
Year 1	4.91
Year 2	2.20
Year 3	2.23
Year 4	1.87
Year 6	1.53

It shows that Year 6's value is the lowest, however if Year 6's data applied, the total ER and ER/tank is less conservative than the Year 4's situation. Both situation are showed below (detailed calculation can be found in the ER calculation spreadsheet):

	Danzhai Year 5 emission reduction (tCo2)	Danzhai Year 5 ER/tank (tCo2)
Year 4's data applied	1337	2.56
Year 6's data applied	1682	3.42

As a result, the value below (Year 4' value) are proposed to be the Year 5's fuel consumption for Danzhai:

Proposed Value for Crediting Year 5 (Max among crediting year 1, 2, 3, 4 and 6)					
Summer Coal (kg/d)	**Winter Coal (kg/d)**	**Summer Charcoal (kg/d)**	**Winter Charcoal (kg/d)**	**Summer Wood (kg/d)**	**Winter Wood (kg/d)**
0	6.98	0	1.81	10.88	14.80

The following tables summarize the number of tanks built in each climatic zone. Only the tanks that are completely finished and that are producing gas at the beginning of the season are taken into account. It also displays the survey done to estimate the baseline situation and the project situation.

i. Danzhai the fifth crediting year (1st April 2012 to 31st March 2013)

d_villag	d_distric	Name in Chinese			Name in Pinyin			Summer 2012					Winter 2012 to 2013				
									Baseline		Monitoring			Baseline		Monitoring	
		District	Township	Village	District	Township	Village	Number of biodigester	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring	Number of biodigester	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring
1	11	丹寨	兴仁	甲脚	Danzhai	Xingren	Jiajiao	57	14	25%	7	12%	57	14	25%	7	12%
2	11	丹寨	兴仁	者拉	Danzhai	Xingren	Zhela	64	16	25%	8	13%	64	16	25%	8	13%
3	11	丹寨	扬武	排倒	Danzhai	Yangwu	Paidao	17	4	24%	3	18%	17	4	24%	3	18%
4	11	丹寨	扬武	排莫	Danzhai	Yangwu	Paimo	69	17	25%	11	16%	69	17	25%	9	13%
5	11	丹寨	扬武	羊望	Danzhai	Yangwu	Yangwang	11	3	27%	1	9%	11	3	27%	1	9%
6	11	丹寨	排调	宰宿	Danzhai	Paidiao	Zaisu	19	5	26%	3	16%	19	5	26%	2	11%
7	11	丹寨	龙泉	五里	Danzhai	Longquan	Wuli	50	13	26%	6	12%	50	13	26%	7	14%
8	11	丹寨	龙泉	得禄	Danzhai	Longquan	Delu	103	25	24%	13	13%	103	25	24%	14	14%
9	11	丹寨	龙泉	杉木	Danzhai	Longquan	Shanmu	11	3	27%	1	9%	11	3	27%	1	9%
23	11	丹寨	龙泉	交圭	Danzhai	Longquan	Jiaogui	100	25	25%	13	13%	100	25	25%	13	13%
38	11	丹寨	龙泉	金山	Danzhai	Longquan	Jinshan	15	4	27%	2	13%	15	4	27%	1	7%
39	11	丹寨	龙泉	龙洞	Danzhai	Longquan	Longdong	8	2	25%	1	13%	8	2	25%	1	13%
45	11	丹寨	龙泉	高排	Danzhai	Longquan	Gaopai	28	7	25%	4	14%	28	7	25%	4	14%
46	11	丹寨	龙泉	金瓜洞	Danzhai	Longquan	Jinguadong	31	8	26%	4	13%	31	8	26%	4	13%
47	11	丹寨	兴仁	点力	Danzhai	Xingren	Dianli	75	19	25%	10	13%	75	19	25%	10	13%
48	11	丹寨	兴仁	白头	Danzhai	Xingren	Baitou	42	11	26%	5	12%	42	11	26%	6	14%
49	11	丹寨	兴仁	排佐	Danzhai	Xingren	Paizuo	25	6	24%	3	12%	25	6	24%	3	12%
58	11	丹寨	兴仁	城望	Danzhai	Xingren	Chengwang	35	9	26%	5	14%	35	9	26%	4	11%
		TOTAL						**760**	**191**		**100**		**760**	**191**		**98**	

ii. Danzhai the sixth crediting year (1st April 2013 to 31st March 2014)

d_villag	d_distric	Name in Chinese			Name in Pinyin			Summer 2013					Winter 2013 to 2014				
									Baseline		Monitoring			Baseline		Monitoring	
		District	Township	Village	District	Township	Village	Number of biodigester	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring	Number of biodigester	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring
1	11	丹寨	兴仁	甲脚	Danzhai	Xingren	Jiajiao	57	14	25%	7	12%	57	14	25%	7	12%
2	11	丹寨	兴仁	者拉	Danzhai	Xingren	Zhela	64	16	25%	8	13%	64	16	25%	8	13%
3	11	丹寨	扬武	排倒	Danzhai	Yangwu	Paidao	17	4	24%	3	18%	17	4	24%	3	18%
4	11	丹寨	扬武	排莫	Danzhai	Yangwu	Paimo	69	17	25%	11	16%	69	17	25%	9	13%
5	11	丹寨	扬武	羊望	Danzhai	Yangwu	Yangwang	11	3	27%	1	9%	11	3	27%	1	9%
6	11	丹寨	排调	宰宿	Danzhai	Paidiao	Zaisu	19	5	26%	3	16%	19	5	26%	2	11%
7	11	丹寨	龙泉	五里	Danzhai	Longquan	Wuli	50	13	26%	6	12%	50	13	26%	7	14%
8	11	丹寨	龙泉	得禄	Danzhai	Longquan	Delu	103	25	24%	13	13%	103	25	24%	14	14%
9	11	丹寨	龙泉	杉木	Danzhai	Longquan	Shanmu	11	3	27%	1	9%	11	3	27%	1	9%
23	11	丹寨	龙泉	交圭	Danzhai	Longquan	Jiaogui	100	25	25%	13	13%	100	25	25%	13	13%
38	11	丹寨	龙泉	金山	Danzhai	Longquan	Jinshan	15	4	27%	2	13%	15	4	27%	1	7%
39	11	丹寨	龙泉	龙洞	Danzhai	Longquan	Longdong	8	2	25%	1	13%	8	2	25%	1	13%
45	11	丹寨	龙泉	高排	Danzhai	Longquan	Gaopai	28	7	25%	4	14%	28	7	25%	4	14%
46	11	丹寨	龙泉	金瓜洞	Danzhai	Longquan	Jinguadong	31	8	26%	4	13%	31	8	26%	4	13%
47	11	丹寨	兴仁	点力	Danzhai	Xingren	Dianli	75	19	25%	10	13%	75	19	25%	10	13%
48	11	丹寨	兴仁	白头	Danzhai	Xingren	Baitou	42	11	26%	5	12%	42	11	26%	6	14%
49	11	丹寨	兴仁	排佐	Danzhai	Xingren	Paizuo	25	6	24%	3	12%	25	6	24%	3	12%
58	11	丹寨	兴仁	城望	Danzhai	Xingren	Chengwang	35	9	26%	5	14%	35	9	26%	4	11%
		TOTAL						**760**	**191**		**100**		**760**	**191**		**98**	

iii. Weining the fifth crediting year (1st April 2012 to 31st March 2013)

id_village	id_district	Name in Chinese			Name in Pinyin			Summer 2012					Winter 2012-2013				
									Baseline		Monitoring			Baseline		Monitoring	
		District	Township	Village	District	Township	Village	Number of biodigesters	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring	Number of biodigesters	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring
10	12	威宁	牛棚	范家田	Weining	Niupeng	Fanjiatian	38	10	26%	7	18%	38	10	26%	7	18%
11	12	威宁	牛棚	营山	Weining	Niupeng	Yingshan	9	2	22%	2	22%	9	3	33%	2	22%
13	12	威宁	牛棚	邓家营	Weining	Niupeng	Dengjiaying	43	11	26%	9	21%	43	12	28%	8	19%
14	12	威宁	牛棚	鱼塘	Weining	Niupeng	Yutang	30	8	27%	5	17%	30	8	27%	5	17%
37	12	威宁	牛棚	新山	Weining	Niupeng	Xinshan	30	8	27%	5	17%	30	8	27%	5	17%
15	12	威宁	草海	东山	Weining	Caohai	Dongshan	64	17	27%	12	19%	64	16	25%	14	22%
16	12	威宁	草海	郑家营	Weining	Caohai	Zhengjiaying	62	16	26%	11	18%	62	16	26%	11	18%
31	12	威宁	草海	吕家河	Weining	Caohai	Lujiahe	11	3	27%	1	9%	11	4	36%	2	18%
32	12	威宁	草海	响塘	Weining	Caohai	Xiangtang	3	0	0%	1	33%	3	0	0%	0	0%
34	12	威宁	草海	石龙	Weining	Caohai	Shilong	10	3	30%	2	20%	10	3	30%	1	10%
25	12	威宁	大街	高华	Weining	Dajie	Gaohua	45	12	27%	8	18%	45	14	31%	8	18%
43	12	威宁	大街	大街	Weining	Dajie	Dajie	3	1	33%	0	0%	3	0	0%	1	33%
44	12	威宁	牛棚	新营	Weining	Niupeng	Xinying	158	41	26%	29	18%	158	41	26%	29	18%
50	12	威宁	牛棚	中寨	Weining	Niupeng	Zhongzhai	42	11	26%	8	19%	42	11	26%	8	19%
		TOTAL						**548**	**143**		**100**		**548**	**146**		**101**	

iv. Weining the sixth crediting year (1st April 2013 to 31st March 2014)

id_village	id_district	Name in Chinese			Name in Pinyin			Summer 2013					Winter 2013-2014				
									Baseline		Monitoring			Baseline		Monitoring	
		District	Township	Village	District	Township	Village	Number of biodigesters	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring	Number of biodigesters	Number of baseline survey	Ratio Baseline	Number of monitoring survey	Ratio Monitoring
10	12	威宁	牛棚	范家田	Weining	Niupeng	Fanjiatian	38	10	26%	7	18%	38	10	26%	7	18%
11	12	威宁	牛棚	营山	Weining	Niupeng	Yingshan	9	2	22%	2	22%	9	3	33%	2	22%
13	12	威宁	牛棚	邓家营	Weining	Niupeng	Dengjiaying	43	11	26%	7	16%	43	12	28%	8	19%
14	12	威宁	牛棚	鱼塘	Weining	Niupeng	Yutang	30	8	27%	5	17%	30	8	27%	5	17%
37	12	威宁	牛棚	新山	Weining	Niupeng	Xinshan	30	8	27%	5	17%	30	8	27%	5	17%
15	12	威宁	草海	东山	Weining	Caohai	Dongshan	64	17	27%	11	17%	64	16	25%	13	20%
16	12	威宁	草海	郑家营	Weining	Caohai	Zhengjiaying	62	16	26%	9	15%	62	16	26%	11	18%
31	12	威宁	草海	吕家河	Weining	Caohai	Lujiahe	11	3	27%	2	18%	11	4	36%	2	18%
32	12	威宁	草海	响塘	Weining	Caohai	Xiangtang	3	0	0%	0	0%	3	0	0%	0	0%
34	12	威宁	草海	石龙	Weining	Caohai	Shilong	10	3	30%	2	20%	10	3	30%	2	20%
25	12	威宁	大街	高华	Weining	Dajie	Gaohua	45	12	27%	9	20%	45	14	31%	8	18%
43	12	威宁	大街	大街	Weining	Dajie	Dajie	3	1	33%	0	0%	3	0	0%	1	33%
44	12	威宁	牛棚	新营	Weining	Niupeng	Xinying	158	41	26%	29	18%	158	41	26%	29	18%
50	12	威宁	牛棚	中寨	Weining	Niupeng	Zhongzhai	42	11	26%	9	21%	42	11	26%	8	19%
		TOTAL						**548**	**143**		**97**		**548**	**146**		**101**	

v. Summary of the Baseline and Monitoring survey led for this report

ID	Date of the survey	Purpose of the survey	Defects or improvement in a survey or the method, if any
BL 4	March 2008	Assess the baseline situation in **Weining** in the village that got their tank built in 2007.	This survey did not take into account pig food fuel consumption. It was abandoned and replaced by survey BL 14 (see MT report Year 1).
BL 10	July, August 2009	Assess the Baseline situation in **Weining** for the household that got their tank built in 2008	
BL 14	August 2010	Assess the baseline situation in **Weining** in the village that got their tank built in 2007.	This survey was done with non-beneficiaries (in order to get the fuel consumption without biogas tank) in the village that got a tank in 2007. That's why the questionnaires don't have Tank ID number.
BL 12	September to December 2009	Assess the baseline situation in **Weining** in the village that got their tank built in 2009.	
MT 28	August 2012	Assess the project summer 2012 situation in **Weining** (tank built in 2007, 2008 and 2009)	All selected household were surveyed even if their tank is not working.
MT 32	December 2012	Assess the project winter 2012-2013 situation in **Weining** (tank built in 2007, 2008 and 2009)	All selected household were surveyed even if their tank is not working.
MT 2013 summer WN	Aug. to Sep. 2013	Assess the project summer 2013 situation in **Weining** (tank built in 2007, 2008 and 2009)	All selected household were surveyed even if their tank is not working.
MT 2013 winter WN	December 2012	Assess the project winter 2013-2014 situation in **Weining** (tank built in 2007, 2008 and 2009)	All selected household were surveyed even if their tank is not working.
BL 5	March 2008	Assess the baseline situation in **Danzhai** for the tank built in 2007	The survey assessed the average daily fuel consumption all over the year rather than considering specific consumption for Summer and for Winter 2011-2012.

BL 6	May 2009	Assess the baseline situation in **Danzhai** for the tank built in 2008	
BL 11	October November 2009	Assess the baseline situation in **Danzhai** for the tank built in 2009	
BL 17	September 2011	Assess the baseline situation in **Danzhai** for the 35 tanks which replaced the broken composite tanks	
MT 29	September 2012	Assess the project summer 2012 situation in **Danzhai** for the tank built in 2007, 2008 and 2009	All selected household were surveyed even if their tank is not working.
MT 31	Dec. 2012 to Jan. 2013	Assess the project winter 2011-2012 situation in **Danzhai** for the tank built in 2007 2008 and 2009	All selected household were surveyed even if their tank is not working.
MT 2013 summer DZ	August 2013	Assess the project summer 2013 situation in Danzhai for the tank built in 2007, 2008 and 2009	All selected household were surveyed even if their tank is not working.
MT 2013 winter DZ	Jan. 2014	Assess the project winter 2013-2014 situation in Danzhai for the tank built in 2007 2008 and 2009	All selected household were surveyed even if their tank is not working.

EMISSION REDUCTIONS CALCULATION

From the baseline and project emissions, we obtain the following Emission Reductions. More details are given in the Excel spreadsheet.

In order to have conservative values, CO2 emissions calculations have only been taken into account for active biodigesters. The failure rate has then been integrated in the final seasonal calculation, as described above.

i. Danzhai the fifth Crediting Year (1st April 2012 to 31st March 2013)

DANZHAI	GHG Emission (tCO2 eq/hh)	Emission Reduction (tCO2eq/hh)	Number of biodigester	Failure Rate	VER (tCO2eq)
Summer baseline emission corrected	4.55	1.87	760	25%	1064.3
Summer Project emission corrected	2.68				
Winter Baseline emission corrected	5.77	0.69	760	48%	273.0
Winter 2012-2013 Project emission corrected	5.08				
Total		**2.56**			**1337**

ii. Danzhai the sixth Crediting Year (1st April 2013 to 31st March 2014)

DANZHAI	GHG Emission (tCO2 eq/hh)	Emission Reduction (tCO2eq/hh)	Number of biodigester	Failure Rate	VER (tCO2eq)
Summer baseline emission corrected	4.55	1.18	760	51%	441.0
Summer Project emission corrected	3.37				
Winter Baseline emission corrected	5.77	0.34	760	63%	95.8
Winter 2013-2014 Project emission corrected	5.43				
Total		**2.75**			**537**

iii. Weining the fifth Crediting Year (1st April 2012 to 31st March 2013)

WEINING	GHG Emission (tCO2eq/hh)	Emission Reduction (tCO2eq/hh)	Number of biodigesters	failure rate	VER (tCO2eq)
Summer Baseline emission corrected	6.51	2.07	548	31%	781.7
Summer Monitoring emission corrected	4.45				
Winter Baseline emission corrected	7.31	1.44	548	42%	459.6

Winter 2010-2011 Monitoring emission corrected	5.87				
Total		**2.89**			**1241**

iv. Weining the sixth Crediting Year (1st April 2012 to 31st March 2013)

WEINING	**GHG Emission (tCO2eq/hh)**	**Emission Reduction (tCO2eq/hh)**	**Number of biodigesters**	**failure rate**	**VER (tCO2eq)**
Summer Baseline emission corrected	6.51	1.72	548	42%	544.1
Summer Monitoring emission corrected	4.79				
Winter Baseline emission corrected	7.31	1.21	548	54%	301.4
Winter 2013-2014 Monitoring emission corrected	6.10				
Total		**2.09**			**845**

v. Separated ER in 2012 and 2013 of the fifth crediting year

	2012	**2013**	**The fifth crediting year**
Weining Emission Reduction (tCO2eq/hh)	969	272	1241
Danzhai Emission Reduction (tCO2eq/hh)	1158	179	1337
Total (tCO2eq/hh)	**2127**	**451**	**2578**

i. Separated ER in 2013 and 2014 of the sixth crediting year

	2013	**2014**	**The sixth crediting year**
Weining Emission Reduction (tCO2eq/hh)	667	178	845
Danzhai Emission Reduction (tCO2eq/hh)	474	63	537
Total (tCO2eq/hh)	**1141**	**241**	**1382**

ii. Number of tank built and VER comparison

Year	Number of tank planned in PDD	Expected VER	Actually built	Actual VER
2008	300	1073	384	738
2009	600	3460	475	1644
2010	400	4950	449	2978
2011	0	4950	0	2837
2012	0	4950	0	2578
2013	0	4950	0	1382
Total	**1300**	**24333**	**1308**	**12157**

SUSTAINABLE DEVELOPMENT INDICATORS

Four sustainable development indicators have been monitored: the cost of energy, the percentage of traditional fuel in total energy requirement, the improvement of hygiene and the use of the biogas lamp.

To evaluate the hygiene a mark between 0 and 12.5 is given to each household according to the following criteria:

Is there a trashcan used in the latrine? Yes = 2 No = 0
What material is the latrine floor made of: Cement = 2 Paved = 2 Ground = 0 Wood = 1
Is there rubbish in the floor? Yes = 0 No = 1.5
Is there an animal pen? No = 0 Yes = 1
Is there a cemented floor in the animal pen? Yes = 1 No = 0
Is there a canal for excrement evacuation to the biodigester? Yes = 2 No = 0
Is there a pen? Yes = 1 No = 0
Is there a roof? Yes = 0.5 No = 0
Do you need to go nearby the animal pen to go to your room? Yes = 0 No = 1.5

Then the average of all household is made in the baseline situation and in the project situation. To calculate the use of the lamp, we take the average time of use of all household

i. Danzhai the fifth Crediting Year (1st April 2012 to 31st March 2013)

DANZHAI	Hygiene Score	Indoor air pollution					Daily cooking time (hr/day)	Daily firewood collection time (hr/day)	Energy Used (GJ/season)	Cost of Energy (RMB/season)	Use of Biogas Lamp (min/day)
		Smoke in the Kitchen	Cough	headache	eyes infection	respiratory problem					
Summer Baseline	7.8	1.8	1.1	0.8	0.4	0.6	2.6	1.2	80.9	77.4	0
Winter Baseline									92.6	909.6	
Summer Project	10.3	1.1	0.1	0.0	0.0	0.0	0.9	0.6	0.2	0.0	6
Winter 2012-2013 Project									64.4	1323.1	
Comparison	**2.5**	**0.7**	**1.0**	**0.8**	**0.4**	**0.6**	**1.7**	**0.6**	**63%**	**-336.1**	**6**

ii. Danzhai the sixth Crediting Year (1st April 2013 to 31st March 2014)

DANZHAI	Hygiene Score	Indoor air pollution					Daily cooking time (hr/day)	Daily firewood collection time (hr/day)	Energy Used (GJ/season)	Cost of Energy (RMB/season)	Use of Biogas Lamp (min/day)
		Smoke in the Kitchen	Cough	headache	eyes infection	respiratory problem					
Summer Baseline	7.8	1.8	1.1	0.8	0.4	0.6	2.6	1.2	80.9	77.4	0
Winter Baseline									92.6	909.6	
Summer Project	9.8	0.2	0.0	0.0	0.0	0.0	1.1	1.3	38.2	0.0	0
Winter 2013-2014 Project									57.1	834.2	
Comparison	**2.0**	**1.7**	**1.1**	**0.8**	**0.4**	**0.6**	**1.5**	**0.0**	**45%**	**152.8**	**0**

iii. Weining the fifth Crediting Year (1st April 2012 to 31st March 2013)

WEINING	Hygiene Score	Indoor air pollution					Daily cooking time (hr/day)	Daily firewood collection time (hr/day)	Energy Used (GJ/season)	Cost of Energy (RMB/season)	Use of Biogas Lamp (min/day)
		Smoke in the Kitchen	Cough	headache	eyes infection	respiratory problem					
Summer Baseline	4.0	2.4	1.1	1.0	1.0	0.3	4.2	1.3	77.9	1119.4	0
Winter Baseline									88.2	1254.5	
Summer Project	10.5	0.5	0.0	0.0	0.0	0.0	2.0	0.7	44.8	607.6	2
Winter 2010-2011 Project									56.6	910.9	
Comparison	**6.5**	**1.9**	**1.0**	**1.0**	**1.0**	**0.3**	**2.2**	**0.6**	**39%**	**855.4**	**2**

i. Weining the sixth Crediting Year (1st April 2013 to 31st March 2014)

WEINING	Hygiene Score	Indoor air pollution					Daily cooking time (hr/day)	Daily firewood collection time (hr/day)	Energy Used (GJ/season)	Cost of Energy (RMB/season)	Use of Biogas Lamp (min/day)
		Smoke in the Kitchen	Cough	headache	eyes infection	respiratory problem					
Summer Baseline	4.0	2.4	1.1	1.0	1.0	0.3	4.2	1.3	77.9	1119.4	0
Winter Baseline									88.2	1254.5	
Summer Project	10.9	0.5	0.0	0.0	0.1	0.0	2.0	0.3	52.0	636.1	1
Winter 2010-2011 Project									58.3	896.2	
Comparison	**6.9**	**1.9**	**1.0**	**1.0**	**0.9**	**0.3**	**2.2**	**1.0**	**34%**	**841.5**	**1**

The hygiene in Danzhai has not been improved very much by the project because it was already good in the baseline situation. Compare to baseline situation, beneficiary spent RMB 336.1 more in the fifth crediting year. This is due to a switch from firewood to coal consumption during winter for space heating. Coal has to be bought whereas firewood is collected for free by the households. We still can see that biogas can contribute to 63% of the energy need of the household as well as 0.6 hour per day reduction on fuel collecting time. For the sixth crediting year, biogas can contribute to 45% of the energy need of the household and 152.8 RMB can be saved on the fuel purchase.

In Weining hygiene has increased a lot in the fifth and sixth crediting year thanks to the project because the baseline situation was not so good. Biogas contributes to 39% and 34% of the energy requirement of the household and allows them to save 855.4 RMB and 841.5 RMB on their fuel purchase.

ANNEX 1: DATA TO BE MONITORED (PDD SECTION D.2.1.1)

ID number	Name	Data variable	Source of data	Data unit	Measured, calculated, estimated	Recording frequency	Proportion of data to be monitored	How will the data be archived?	Comment
PE.1	$N_{sample,p}$	*Number of households in the monitoring sample*	*ID*	*Households*	-	*Twice a year*	-	*Electronic*	*A monitoring survey is conducted during each period p.*
PE.2	$N_{hh,p}$	*Number of beneficiaries in the climatic areas*	*ID*	*Households*	-	*Twice a year*	-	*Electronic*	*Number of household in the climatic area that use their biogas tank at the beginning of the period p.*
PE.3	$F_{i,p,h}$	*Daily consumption of fuel i of households of the monitoring sample*	*Survey*	*Kg*	*estimated*	*Twice a year*	*Sample (at least 60 households)*	*Electronic and paper*	*The daily consumption concerns different activities according to the type of period and climatic area. Cooking is always one of these activities.*
PE.4	MS_p	*Average fraction of livestock's manure fed into the biodigester*	*Survey*	*%*	*estimated*	*Twice a year*	*Sample (at least 60 households)*	*Electronic and paper*	*The fraction is estimated for all the animals whose manure is put into the biodigester. No differentiation is made by type of animal.*
PE.5	$LC_{T,p,h}$	*Number of heads of livestock category T*	*Survey*	*Animals*	*estimated*	*Twice a year*	*Sample (at least 60 households)*	*Electronic and paper*	*The animals are the ones whose share of manure is put into the biodigester.*
PE.6	D_p	*Average duration of the*	*ID*	*Date*	*estimated*	*Twice a year*	-	*Electronic*	*This date is estimated by monitoring the period of*

		considered period p							*heating of households in the climatic areas.*
PE.7	GWP_{CH4}	*Global Warming Potential of methane*	*IPCC Guidelines*	-	-	*According to IPCC's publications*	-	*Electronic*	-
PE.8	$\mu_{nr,h}$	*Non-Renewabilty Rate of the biomass consumed*	*Study*	*%*	*estimated*	*In case other project activities will impact on the NRB fraction*	-	*Electronic and paper*	*Original NRB studies have already been conducted. It may be updated whether indeed other project activities are initiated that would possibly have a significant impact on the NRB fraction. The methodology is given in a specific document.*

ANNEX 2: SUMMARY OF MONITORING RESULT

Name	Description	Unit	Value
$N_{ben,WN,sum}$	Number of beneficiary in Weining climatic zone during summer 2012	household	548
$N_{ben,WN,win}$	Number of beneficiary in Weining climatic zone during winter 2012-2013	household	548
$N_{ben,WN,sum}$	Number of beneficiary in Weining climatic zone during summer 2013	household	548
$N_{ben,WN,win}$	Number of beneficiary in Weining climatic zone during winter 2013-2014	household	548
$N_{ben,DZ,sum}$	Number of beneficiary in Danzhai climatic zone during summer 2012	household	760
$N_{ben,DZ,wint}$	Number of beneficiary in Danzhai climatic zone during winter 2012-2013	household	760
$N_{ben,DZ,sum}$	Number of beneficiary in Danzhai climatic zone during summer 2013	household	760
$N_{ben,DZ,wint}$	Number of beneficiary in Danzhai climatic zone during winter 2013-2014	household	760
$N_{BL,DZ,sum}$	Number of baseline survey in Danzhai climatic zone during summer	household surveyed	191
$N_{BL,DZ,wint}$	Number of baseline survey in Danzhai climatic zone during winter	household surveyed	191
$N_{BL,WN,sum}$	Number of baseline survey in Weining climatic zone during summer	household surveyed	143
$N_{BL,WN,wint}$	Number of baseline survey in Weining climatic zone during winter	household surveyed	146
$N_{MT,DZ,sum}$	Number of monitoring survey in Danzhai climatic zone during summer 2012	household surveyed	100
$N_{MT,DZ,wint}$	Number of monitoring survey in Danzhai climatic zone during winter 2012-2013	household surveyed	98
$N_{MT,DZ,sum}$	Number of monitoring survey in Danzhai climatic zone during summer 2013	household surveyed	100
$N_{MT,DZ,wint}$	Number of monitoring survey in Danzhai climatic zone during winter 2013-2014	household surveyed	98
$N_{MT,WN,sum}$	Number of monitoring survey in Weining climatic zone during summer 2012	household surveyed	100
$N_{MT,WN,wint}$	Number of monitoring survey in Weining climatic zone during winter 2012-2013	household surveyed	101
$N_{MT,WN,sum}$	Number of monitoring survey in Weining climatic zone during summer 2013	household surveyed	97
$N_{MT,WN,wint}$	Number of monitoring survey in Weining climatic zone during winter 2013-2014	household surveyed	101
$BE_{WN,sum}$	Baseline Emission in Weining climatic zone during summer	metric ton of CO_2e/household	6.51
$BE_{WN,wint}$	Baseline Emission in Weining climatic zone during winter	metric ton of CO_2e/household	7.31
$BE_{DZ,sum}$	Baseline Emission in Danzhai climatic zone during summer	metric ton of CO_2e/household	4.55
$BE_{DZ,wint}$	Baseline Emission in Danzhai climatic zone during winter	metric ton of CO_2e/household	5.77
$PE_{WN,sum}$	Project Emission in Weining climatic zone during summer 2012	metric ton of CO_2e/household	4.45
$PE_{WN,wint}$	Project Emission in Weining climatic zone during winter 2012-2013	metric ton of CO_2e/household	5.87
$PE_{WN,sum}$	Project Emission in Weining climatic zone during summer 2013	metric ton of CO_2e/household	4.79
$PE_{WN,wint}$	Project Emission in Weining climatic zone during winter 2013-2014	metric ton of CO_2e/household	6.10

$PE_{DZ,sum}$	Project Emission in Danzhai climatic zone during summer 2012	metric ton of CO_2e/household	2.68
$PE_{DZ,wint}$	Project Emission in Danzhai climatic zone during winter 2012-2013	metric ton of CO_2e/household	5.08
$PE_{DZ,sum}$	Project Emission in Danzhai climatic zone during summer 2013	metric ton of CO_2e/household	3.37
$PE_{DZ,wint}$	Project Emission in Danzhai climatic zone during winter 2013-2014	metric ton of CO_2e/household	5.43
$ER_{WN,sum}$	Emission Reduction in Weining climatic area during summer 2012	metric ton of CO_2e/household	2.07
$ER_{WN,wint}$	Emission Reduction in Weining climatic area during winter 2012-2013	metric ton of CO_2e/household	1.44
$ER_{WN,sum}$	Emission Reduction in Weining climatic area during summer 2013	metric ton of CO_2e/household	1.72
$ER_{WN,wint}$	Emission Reduction in Weining climatic area during winter 2013-2014	metric ton of CO_2e/household	1.21
$ER_{DZ,sum}$	Emission Reduction in Danzhai climatic area during summer 2012	metric ton of CO_2e/household	1.87
$ER_{DZ,wint}$	Emission Reduction in Danzhai climatic area during winter 2012-2013	metric ton of CO_2e/household	0.69
$ER_{DZ,sum}$	Emission Reduction in Danzhai climatic area during summer 2013	metric ton of CO_2e/household	1.18
$ER_{DZ,wint}$	Emission Reduction in Danzhai climatic area during winter 2013-2014	metric ton of CO_2e/household	0.34
$ER_{WN,year5}$	Emission Reduction in Weining climatic area during the fifth crediting year	metric ton of CO_2e	1241
$ER_{WN,year6}$	Emission Reduction in Weining climatic area during the sixth crediting year	metric ton of CO_2e	845
$ER_{DZ,year5}$	Emission Reduction in Danzhai climatic area during the fifth crediting year	metric ton of CO_2e	1337
$ER_{DZ,year6}$	Emission Reduction in Danzhai climatic area during the sixth crediting year	metric ton of CO_2e	537
ER_{year5}	Emission Reduction for the full project during the fifth crediting year	metric ton of CO_2e	2578
ER_{year6}	Emission Reduction for the full project during the sixth crediting year	metric ton of CO_2e	1382
$\%TF_{trad,BL,WN}$	% of traditional fuel in total energy consumption in Weining before the project	dimensionless	100%
$\%TF_{trad,BL,DZ}$	% of traditional fuel in total energy consumption in Danzhai before the project	dimensionless	100%
$\%TF_{trad,MT,DZ}$	% of traditional fuel in total energy consumption in Danzhai for the fifth crediting year	dimensionless	37%
$\%TF_{trad,MT,DZ}$	% of traditional fuel in total energy consumption in Danzhai for the sixth crediting year	dimensionless	55%
$\%TF_{trad,MT,WN}$	% of traditional fuel in total energy consumption in Weining for the fifth crediting year	dimensionless	61%
$\%TF_{trad,MT,WN}$	% of traditional fuel in total energy consumption in Weining for the sixth crediting year	dimensionless	65%
$\%Biogas_{WN}$	% of biogas in total energy requirement in Weining for the fifth crediting year	dimensionless	39%
$\%Biogas_{WN}$	% of biogas in total energy requirement in Weining for the sixth crediting year	dimensionless	35%
$\%Biogas_{DZ}$	% of biogas in total energy requirement in Danzhai for the fifth crediting year	dimensionless	63%
$\%Biogas_{DZ}$	% of biogas in total energy requirement in Danzhai for the sixth crediting year	dimensionless	45%
$NRJ_{cost,BL,WN}$	Average amount of money spent per family before the project for fuel purchase in Weining	Chinese Yuan (RMB)	2373.8
$NRJ_{cost,BL,DZ}$	Average amount of money spent per family before the project for fuel purchase in Danzhai	Chinese Yuan (RMB)	648.8
$NRJ_{cost,MT,WN}$	Average amount of money spent per family for fuel purchase in Weining for the fifth crediting year	Chinese Yuan (RMB)	1518.5
$NRJ_{cost,MT,WN}$	Average amount of money spent per family for fuel purchase in Weining for the sixth crediting year	Chinese Yuan (RMB)	1532.3

$NRJ_{cost,MT,DZ}$	Average amount of money spent per family for fuel purchase in Danzhai for the fifth crediting year	Chinese Yuan (RMB)	1323.1
$NRJ_{cost,MT,DZ}$	Average amount of money spent per family for fuel purchase in Danzhai for the fifth crediting year	Chinese Yuan (RMB)	834.2
$NRJ_{cost,SAVING,WN}$	Average amount of money saved per family thanks to the project for fuel purchase in Weining for the fifth crediting year	Chinese Yuan (RMB)	855.4
$NRJ_{cost,SAVING,WN}$	Average amount of money saved per family thanks to the project for fuel purchase in Weining for the sixth crediting year	Chinese Yuan (RMB)	841.5
$NRJ_{cost,SAVING,DZ}$	Average amount of money saved per family thanks to the project for fuel purchase in Danzhai for the fifth crediting year	Chinese Yuan (RMB)	-336.1
$NRJ_{cost,SAVING,DZ}$	Average amount of money saved per family thanks to the project for fuel purchase in Danzhai for the sixth crediting year	Chinese Yuan (RMB)	152.8
$F_{coal,WN,sum,BL}$	Average daily coal consumption in Weining in Summer in baseline situation	kg/day	10.52
$F_{coal,WN,wint,BL}$	Average daily coal consumption in Weining in Winter in baseline situation	kg/day	16.51
$F_{wood,WN,sum,BL}$	Average daily wood consumption in Weining in Summer in baseline situation	kg/day	5.47
$F_{wood,WN,wint,BL}$	Average daily wood consumption in Weining in Winter in baseline situation	kg/day	8.95
$F_{charcoal,WN,sum,BL}$	Average daily charcoal consumption in Weining in Summer in baseline situation	kg/day	0
$F_{charcoal,WN,wint,BL}$	Average daily charcoal consumption in Weining in Winter in baseline situation	kg/day	0
$F_{coal,DZ,sum,BL}$	Average daily coal consumption in Danzhai in Summer in baseline situation	kg/day	0.25
$F_{coal,DZ,wint,BL}$	Average daily coal consumption in Danzhai in Winter in baseline situation	kg/day	4.89
$F_{wood,DZ,sum,BL}$	Average daily wood consumption in Danzhai in Summer in baseline situation	kg/day	23.30
$F_{wood,DZ,wint,BL}$	Average daily wood consumption in Danzhai in Winter in baseline situation	kg/day	33.57
$F_{charcoal,DZ,sum,BL}$	Average daily charcoal consumption in Danzhai in Summer in baseline situation	kg/day	0.05
$F_{charcoal,DZ,wint,BL}$	Average daily charcoal consumption in Danzhai in Winter in baseline situation	kg/day	1.07
$F_{coal,WN,sum,MT}$	Average daily coal consumption in Weining in Summer for the fifth crediting year	kg/day	5.71
$F_{coal,WN,sum,MT}$	Average daily coal consumption in Weining in Summer for the sixth crediting year	kg/day	5.98
$F_{coal,WN,wint,MT}$	Average daily coal consumption in Weining in Winter for the fifth crediting year	kg/day	11.99
$F_{coal,WN,wint,MT}$	Average daily coal consumption in Weining in Winter for the sixth crediting year	kg/day	12.67
$F_{wood,WN,sum,MT}$	Average daily wood consumption in Weining in Summer for the fifth crediting year	kg/day	5.25
$F_{wood,WN,sum,MT}$	Average daily wood consumption in Weining in Summer for the sixth crediting year	kg/day	5.43
$F_{wood,WN,wint,MT}$	Average daily wood consumption in Weining in Winter for the fifth crediting year	kg/day	5.97
$F_{wood,WN,wint,MT}$	Average daily wood consumption in Weining in Winter for the sixth crediting year	kg/day	4.73
$F_{charcoal,WN,sum,MT}$	Average daily charcoal consumption in Weining in Summer for the fifth crediting year	kg/day	0
$F_{charcoal,WN,sum,MT}$	Average daily charcoal consumption in Weining in Summer for the sixth crediting year	kg/day	0
$F_{charcoal,WN,wint,MT}$	Average daily charcoal consumption in Weining in Winter for the fifth crediting year	kg/day	0

$F_{charcoal,WN,wint,MT}$	Average daily charcoal consumption in Weining in Winter for the sixth crediting year	kg/day	0
$F_{coal,DZ,sum,MT}$	Average daily coal consumption in Danzhai in Summer for the fifth crediting year	kg/day	0
$F_{coal,DZ,sum,MT}$	Average daily coal consumption in Danzhai in Summer for the sixth crediting year	kg/day	0
$F_{coal,DZ,wint,MT}$	Average daily coal consumption in Danzhai in Winter for the fifth crediting year	kg/day	6.98
$F_{coal,DZ,wint,MT}$	Average daily coal consumption in Danzhai in Winter for the sixth crediting year	kg/day	4.40
$F_{wood,DZ,sum,MT}$	Average daily wood consumption in Danzhai in Summer for the fifth crediting year	kg/day	10.88
$F_{wood,DZ,sum,MT}$	Average daily wood consumption in Danzhai in Summer for the sixth crediting year	kg/day	10.73
$F_{wood,DZ,wint,MT}$	Average daily wood consumption in Danzhai in Winter for the fifth crediting year	kg/day	14.80
$F_{wood,DZ,wint,MT}$	Average daily wood consumption in Danzhai in Winter for the sixth crediting year	kg/day	17.02
$F_{charcoal,DZ,sum,MT}$	Average daily charcoal consumption in Danzhai in Summer for the fifth crediting year	kg/day	0
$F_{charcoal,DZ,sum,MT}$	Average daily charcoal consumption in Danzhai in Summer for the sixth crediting year	kg/day	0
$F_{charcoal,DZ,wint,MT}$	Average daily charcoal consumption in Danzhai in Winter for the fifth crediting year	kg/day	1.81
$F_{charcoal,DZ,wint,MT}$	Average daily charcoal consumption in Danzhai in Winter for the sixth crediting year	kg/day	1.19
MS_{WN}	Average share of the manure put into the biodigester in Weining for the fifth crediting year	dimensionless	27%
MS_{WN}	Average share of the manure put into the biodigester in Weining for the sixth crediting year	dimensionless	26%
MS_{DZ}	Average share of the manure put into the biodigester in Danzhai for the fifth crediting year	dimensionless	27%
MS_{DZ}	Average share of the manure put into the biodigester in Danzhai for the sixth crediting year	dimensionless	59%
$LC_{pig,WN,BL,sum}$	Average number of pig per household in the pre-project situation in summer in Weining	animal/household	4.34
$LC_{cow,WN,BL,sum}$	Average number of cow per household in the pre-project situation in summer in Weining	animal/household	0.75
$LC_{buffalo,WN,BL,sum}$	Average number of buffalo per household in the pre-project situation in summer in Weining	animal/household	0.28
$LC_{horse,WN,BL,sum}$	Average number of horse per household in the pre-project situation in summer in Weining	animal/household	0.01
$LC_{sheep,WN,BL,sum}$	Average number of sheep per household in the pre-project situation in summer in Weining	animal/household	0.04
$LC_{goat,WN,BL,sum}$	Average number of goat per household in the pre-project situation in summer in Weining	animal/household	0.35
$LC_{pig,WN,BL,wint}$	Average number of pig per household in the pre-project situation in winter in Weining	animal/household	4.23
$LC_{cow,WN,BL,wint}$	Average number of cow per household in the pre-project situation in winter in Weining	animal/household	0.74
$LC_{buffalo,WN,BL,wint}$	Average number of buffalo per household in the pre-project situation in winter in Weining	animal/household	0.28
$LC_{horse,WN,BL,wint}$	Average number of horse per household in the pre-project situation in winter in Weining	animal/household	0.01
$LC_{sheep,WN,BL,wint}$	Average number of sheep per household in the pre-project situation in winter in Weining	animal/household	0.04
$LC_{goat,WN,BL,wint}$	Average number of goat per household in the pre-project situation in winter in Weining	animal/household	0.34
$LC_{pig,DZ,BL,sum}$	Average number of pig per household in the pre-project situation in summer in Danzhai	animal/household	3.79
$LC_{cow,DZ,BLsum}$	Average number of cow per household in the pre-project situation in summer in Danzhai	animal/household	0.67
$LC_{b0uffalo,DZ,BL,sum}$	Average number of buffalo per household in the pre-project situation in summer in Danzhai	animal/household	0.34

$LC_{horse,DZ,BL,sum}$	Average number of horse per household in the pre-project situation in summer in Danzhai	animal/household	0.29
$LC_{sheep,DZ,BL,sum}$	Average number of sheep per household in the pre-project situation in summer in Danzhai	animal/household	0.01
$LC_{g0oat,DZ,BL,sum}$	Average number of goat per household in the pre-project situation in summer in Danzhai	animal/household	0
$LC_{pig,DZ,BL,wint}$	Average number of pig per household in the pre-project situation in winter in Danzhai	animal/household	3.76
$LC_{cow,DZ,BL,wint}$	Average number of cow per household in the pre-project situation in winter in Danzhai	animal/household	0.69
$LC_{buffalo,DZ,BL,wint}$	Average number of buffalo per household in the pre-project situation in winter in Danzhai	animal/household	0.33
$LC_{horse,DZ,BL,wint}$	Average number of horse per household in the pre-project situation in winter in Weining	animal/household	0.29
$LC_{sheep,DZ,BL,wint}$	Average number of sheep per household in the pre-project situation in winter in Danzhai	animal/household	0.01
$LC_{goat,DZ,BL,wint}$	Average number of goat per household in the pre-project situation in winter in Danzhai	animal/household	0
$LC_{pig,WN,MT,sum}$	Average number of pig per household in the fifth crediting year in summer in Weining	animal/household	4.54
$LC_{pig,WN,MT,sum}$	Average number of pig per household in the sixth crediting year in summer in Weining	animal/household	4.74
$LC_{cow,WN,MT,sum}$	Average number of cow per household in the fifth crediting year in summer in Weining	animal/household	0.89
$LC_{cow,WN,MT,sum}$	Average number of cow per household in the sixth crediting year in summer in Weining	animal/household	1.02
$LC_{buffalo,WN,MT,sum}$	Average number of buffalo per household in the fifth crediting year in summer in Weining	animal/household	0.15
$LC_{buffalo,WN,MT,sum}$	Average number of buffalo per household in the sixth crediting year in summer in Weining	animal/household	0.02
$LC_{horse,WN,MT,sum}$	Average number of horse per household in the fifth crediting year in summer in Weining	animal/household	0.00
$LC_{horse,WN,MT,sum}$	Average number of horse per household in the sixth crediting year in summer in Weining	animal/household	0.01
$LC_{sheep,WN,MT,sum}$	Average number of sheep per household in the fifth crediting year in summer in Weining	animal/household	0
$LC_{sheep,WN,MT,sum}$	Average number of sheep per household in the sixth crediting year in summer in Weining	animal/household	0
$LC_{goat,WN,MT,sum}$	Average number of goat per household in the fifth crediting year in summer in Weining	animal/household	0.70
$LC_{goat,WN,MT,sum}$	Average number of goat per household in the sixth crediting year in summer in Weining	animal/household	1.53
$LC_{pig,WN,MT,wint}$	Average number of pig per household in the fifth crediting year in winter in Weining	animal/household	4.47
$LC_{pig,WN,MT,wint}$	Average number of pig per household in the sixth crediting year in winter in Weining	animal/household	4.33
$LC_{cow,WN,MT,wint}$	Average number of cow per household in the fifth crediting year in winter in Weining	animal/household	0.88
$LC_{cow,WN,MT,wint}$	Average number of cow per household in the sixth crediting year in winter in Weining	animal/household	1.02
$LC_{buffalo,WN,MT,wint}$	Average number of buffalo per household in the fifth crediting year in winter in Weining	animal/household	0.13
$LC_{buffalo,WN,MT,wint}$	Average number of buffalo per household in the sixth crediting year in winter in Weining	animal/household	0.05
$LC_{horse,WN,MT,wint}$	Average number of horse per household in the fifth crediting year in winter in Weining	animal/household	0
$LC_{horse,WN,MT,wint}$	Average number of horse per household in the sixth crediting year in winter in Weining	animal/household	0.01
$LC_{sheep,WN,MT,wint}$	Average number of sheep per household in the fifth crediting year in winter in Weining	animal/household	0.02
$LC_{sheep,WN,MT,wint}$	Average number of sheep per household in the sixth crediting year in winter in Weining	animal/household	0.00
$LC_{goat,WN,MT,wint}$	Average number of goat per household in the fifth crediting year in winter in Weining	animal/household	1.00

$LC_{goat,WN,MT,wint}$	Average number of goat per household in the sixth crediting year in winter in Weining	animal/household	1.13
$LC_{pig,DZ,MT,sum}$	Average number of pig per household in the fifth crediting year in summer in Danzhai	animal/household	4.39
$LC_{pig,DZ,MT,sum}$	Average number of pig per household in the sixth crediting year in summer in Danzhai	animal/household	2.94
$LC_{cow,DZ,MT,sum}$	Average number of cow per household in the fifth crediting year in summer in Danzhai	animal/household	0.62
$LC_{cow,DZ,MT,sum}$	Average number of cow per household in the sixth crediting year in summer in Danzhai	animal/household	0.26
$LC_{buffalo,DZ,MT,sum}$	Average number of buffalo per household in the fifth crediting year in summer in Danzhai	animal/household	0.16
$LC_{buffalo,DZ,MT,sum}$	Average number of buffalo per household in the sixth crediting year in summer in Danzhai	animal/household	0.20
$LC_{horse,DZ,MT,sum}$	Average number of horse per household in the fifth crediting year in summer in Danzhai	animal/household	0.08
$LC_{horse,DZ,MT,sum}$	Average number of horse per household in the sixth crediting year in summer in Danzhai	animal/household	0.32
$LC_{sheep,\ DZ,MT,sum}$	Average number of sheep per household in the fifth crediting year in summer in Danzhai	animal/household	0
$LC_{sheep,\ DZ,MT,sum}$	Average number of sheep per household in the sixth crediting year in summer in Danzhai	animal/household	0
$LC_{goat,\ DZ,MT,sum}$	Average number of goat per household in the fifth crediting year in summer in Danzhai	animal/household	0
$LC_{goat,\ DZ,MT,sum}$	Average number of goat per household in the sixth crediting year in summer in Danzhai	animal/household	0
$LC_{pig,\ DZ,MT,wint}$	Average number of pig per household in the fifth crediting year in winter in Danzhai	animal/household	3.54
$LC_{pig,\ DZ,MT,wint}$	Average number of pig per household in the sixth crediting year in winter in Danzhai	animal/household	3.59
$LC_{cow,\ DZ,MT,wint}$	Average number of cow per household in the fifth crediting year in winter in Weining	animal/household	0.39
$LC_{cow,\ DZ,MT,wint}$	Average number of cow per household in the sixth crediting year in winter in Weining	animal/household	0.49
$LC_{buffalo,\ DZ,MT,wint}$	Average number of buffalo per household in the fifth crediting year in winter in Danzhai	animal/household	0.18
$LC_{buffalo,\ DZ,MT,wint}$	Average number of buffalo per household in the sixth crediting year in winter in Danzhai	animal/household	0.11
$LC_{horse,\ DZ,MT,wint}$	Average number of horse per household in the fifth crediting year in winter in Danzhai	animal/household	0.19
$LC_{horse,\ DZ,MT,wint}$	Average number of horse per household in the sixth crediting year in winter in Danzhai	animal/household	0.41
$LC_{sheep,\ DZ,MT,wint}$	Average number of sheep per household in the fifth crediting year in winter in Danzhai	animal/household	0
$LC_{sheep,\ DZ,MT,wint}$	Average number of sheep per household in the sixth crediting year in winter in Danzhai	animal/household	0
$LC_{goat,DZ,MT,wint}$	Average number of goat per household in the fifth crediting year in winter in Danzhai	animal/household	0
$LC_{goat,DZ,MT,wint}$	Average number of goat per household in the sixth crediting year in winter in Danzhai	animal/household	0.10
$D_{DZ,sum}$	Average duration of the summer in Danzhai for the fifth crediting year	month	7.5
$D_{DZ,sum}$	Average duration of the summer in Danzhai for the sixth crediting year	month	7.5
$D_{DZ,wint}$	Average duration of the winter in Danzhai for the fifth crediting year	month	4.5
$D_{DZ,wint}$	Average duration of the winter in Danzhai for the sixth crediting year	month	4.5
$D_{WN,sum}$	Average duration of the summer in Weining for the fifth crediting year	month	7
$D_{WN,sum}$	Average duration of the summer in Weining for the sixth crediting year	month	7
$D_{WN,wint}$	Average duration of the winter in Weining for the fifth crediting year	month	5

$D_{WN,wint}$	Average duration of the winter in Weining for the sixth crediting year	month	5
GWP_{CH4}	Global Warming potential of methane according to the IPCC for the fifth crediting year	dimensionless	21.9
GWP_{CH4}	Global Warming potential of methane according to the IPCC for the sixth crediting year	dimensionless	25
μ_{WN}	NRB rate of the forest in Weining for the fifth crediting year	dimensionless	63.19
μ_{WN}	NRB rate of the forest in Weining for the sixth crediting year	dimensionless	63.19
μ_{DZ}	NRB rate of the forest in Danzhai for the fifth crediting year	dimensionless	61.09
μ_{DZ}	NRB rate of the forest in Danzhai for the sixth crediting year	dimensionless	61.09