Monitoring Report: 2015
Arakalagudu Biogas Project II
ID: GS817

FONDATION GOODPLANET

Project title:	**GS VER- ARAKALAGUDU BIOGAS PROJECT II**
Report by:	GoodPlanet Fondation, France and SKG Sangha, India.
Project start date:	01/02/2010.
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Project location:	Arakalagudu Taluk, Hassan District, Karnataka state, INDIA
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Monitoring Period:	01/01/2015 – 31/12/2015. (The monitoring period includes both the starting and end day of the crediting period)
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Contents

1. Introduction:

The project activity aim is to provide a sustainable solution for daily cooking needs of the beneficiaries by providing biogas plants and vermicomposting units in the villages of Arakalagudu Taluk, Karnataka state, India. The project has been funded by GoodPlanet Fondation and was implemented along with its project partner SKG Sangha. The project aimed to completely replace the use of firewood by the biogas units for daily cooking needs of the rural communities. The SKGS team has carried out the monitoring of the project with regular visits to the units during the year. To avoid any double counting of the biogas plants during the monitoring survey, each plant has been provided with a unique identification number. A total of 755 biogas and vermicomposting units have been constructed. The complete list of 755 beneficiaries has already been provided to the Gold Standard in the previous verification process of the project activity.

2. Monitoring:

a) Monitoring survey methodology

The required samples for the monitoring survey were selected on a random basis. A total of 119 beneficiaries were selected for the monitoring sample out of the total units functioning in the year 2015. The survey was carried out by SKGS team along with the local supervisors in-charge of the monitoring of respective villages in the project. The SKGS survey team collected the data from each of the beneficiary through a series of questionnaires. A sample copy of the survey sheets has been provided to the Gold Standard for further verifications. These survey sheets were rechecked by the SKGS senior staff member before recording them into the excel sheets. The report includes both the sustainable development indicators and the parameters used to determine the total emission reductions for the year 2015. The report includes a detailed description and justification for each of the parameters included in the monitoring survey.

SKGS survey team members were trained by the senior staff before the surveys on the following aspects of the survey forms:

1. Weight of the basket to be used to collect the cow dung.
2. Weight of the wood used for cooking and / or water heating.
3. Hours of biogas stove operation,
4. Head counting the number and type of animals
5. Types of repairs carried out on biogas unit and vermicomposting unit,
6. What aspects to be covered in the comments box,
7. Random selection of the household to be surveyed,
8. How to pose questions related to sustainable development and other parameters of development in the questionnaire and etc.

The monitoring surveys were carried out between the 29th Nov. 2015 and 12th Dec. 2015.

b) Continuous monitoring of the project:

Apart from this annual monitoring survey to collect the required data, the SKGS field teams have also visited the biogas and vermicomposting units on a monthly basis. The field visits by the team were conducted as a part of the maintenance of the units. These field visits also gave the SKGS team an opportunity to provide on-site training to the beneficiaries on the use and maintenance of both the biogas/ vermicomposting units. These on-site training have helped the team to observe and understand the various field issues, which were further discussed during the team meeting. Such regular team meetings also helped other field supervisors to solve similar problems during their field visits. The present monitoring survey data also includes details of the on-site training given to the beneficiaries by the SKGS team.

The GoodPlanet Foundation team members also carried out a random field visit to the project units in the month of September 2015. The units visited were functioning and did not come across any plants that had faced any major technical problems. Each beneficiary was asked to demonstrate the working of the biogas units and/or to demonstrate the feeding procedure of animal dung into the biodigester. These few demonstration to the GoodPlanet team also assured that the beneficiaries were well trained by the SKGS field officers about the minimum quantity of animal dung and water that is needed for a regular supply of the biogas.

Fig: The damaged biogas stove pipe being replaced by the SKGS team during one of the site visits.

3. Sustainable development monitoring parameters

Data / Parameter:	Soil condition (quality and quantity)
Description	The slurry from the biogas unit is pre-treated along with the animal dung (if any remaining) before sending it for the vermicompost process. The vermicompost is used as an organic fertiliser for the agricultural activities.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The parameter has been measured by asking specific questions regarding the use of the application of either the biogas slurry and/or vermicompost for agricultural needs. The total quantity of bags produced by each beneficiary in the monitoring survey has been recorded. The use of the biogas slurry and/or vermicompost also justifies the reduction of the use of chemical fertilisers by the beneficiaries.
Monitoring frequency:	Once a year.
QA/QC procedures:	Each beneficiary was asked the total amount of vermicompost produced during the year by measuring it with the locally available bags (40kg per bag). The monitoring survey data gives the total quantity of vermicompost used for agricultural needs by each beneficiary during the year 2015. The additional vermicompost, which is not utilised by the beneficiaries during the year, are dried and stored for future needs.
Any comment:	The monitoring survey for the year 2015 shows that around 16% the beneficiaries have produced vermicompost and these beneficiaries have been able to reduce their annual fertiliser use for agriculture. The beneficiaries had stored the compost in a dried and aerobic condition. On an average 19 bags (*weighing about 40 Kgs*) of vermicompost were produced in the year 2015. Most of the beneficiaries have completely stopped producing vermicompost due to lack of water and/or worms eaten by ants/rats etc. The SKGS team is trying to motivate the beneficiaries to restart the vermicomposting units by providing them a new batch of earthworms at no additional costs. The GoodPlanet team also visited the beneficiaries to check the vermicompost units. As per the field observations, some beneficiaries had stopped vermicompost production. The team also met beneficiaries who have well maintained the units and are still producing vermicompost on a regular basis. The team has been regularly visiting the units and are trying to promote a proper management of these units to assure that the production of the vermicompost continues in the coming years.

Data / Parameter:	Air Quality
Description	Total quantity of firewood used for daily cooking needs after the implementation of the project activity.

Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The indicator has been analysed through a series of questions that were asked to each beneficiary in the monitoring survey to know if there has been any improvement of the air quality due to the project activity. This has been compared to the baseline situation where the beneficiaries carried out indoor cooking with firewood, releasing harmful pollutants affecting the health of the beneficiaries.
Monitoring frequency:	Once a year.
QA/QC procedures:	Appropriate questions were posed in order to ensure that the indicator has been assessed properly. The monitoring team have also visited the kitchen to ensure that the beneficiary did not continue using firewood for cooking needs. GoodPlanet team has also visited the beneficiaries and have interviewed the beneficiaries in regards to this particular indicator. The beneficiaries have been content with the use of the biogas, which has improved the overall air-quality of the kitchen.
Any comment:	Out of the total 119 households surveyed – • 94 % of the beneficiaries have agreed to reduction in respiratory & eyes irritation problems due to the availability of biogas for daily cooking needs. Out of the total household surveyed, 7 units were non-functional since the families have either sold their cattle or have moved to other area. The units which had technical problems were repaired by the SKGS team • Around 5 of the beneficiaries had faced technical problems with the biodigester. The SKS team repaired it and the amount firewood used during the absence of biogas has been taken into account in the emission reduction calculations. Other minor issues like stove-pans/stove cock were immediately taken into account and replaced by the SKG technical team.

Data / Parameter:	Livelihood of the poor
Description	Access to animal waste management system by providing a biodigester to each family and disposing the animal waste in a sanitary way assuring hygiene around the household.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The indicator has been analysed through a series of questions that were asked to each beneficiary in the monitoring. This has been compared to the baseline situation where the beneficiaries dumped the animal dung along with other waste into traditional compost pits near the households leading to unhygienic conditions. The change in the annual income due to the use of biogas and vermicompost was reviewed during the monitoring survey.
Monitoring frequency:	Once a year.
QA/QC procedures:	This indicator was assessed on three different scenarios. First, the saving of time from collecting the firewood. Second, if any savings of income due to the project. And third, if the beneficiaries have a better waste-management system compared to earlier and lastly, if they have either pre-treated the additional animal dung before using it for the vermicompost process.
Any comment:	Out of the total 119 households surveyed – • 94% of the households had access to the waste management systems provided through the project activity and have been working without any problems. The beneficiaries have reported a hygienic environment around the households since they have been able to utilise the animal dung in the biodigester. The beneficiaries, who had lost earthworms, were provided another batch of worms by the SKG team without any additional costs.

	• Around 5 beneficiaries had reported the technical problems of the biogas unit, which was repaired by the SKG team. • During this monitoring period the beneficiaries have not provided the actual data on their income saving but have only confirmed about the savings arising from the use the biogas slurry as a organic compost. The savings in income has occurred due to reduction in the use of chemical fertilisers and the regular use of biogas for daily cooking needs.

Data / Parameter:	Access to affordable and clean energy services
Description	The access to energy services of the beneficiaries in the project area has been monitored in terms of the biogas supply for daily cooking needs.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The indicator has been analysed through a series of questions that were asked to each beneficiary in the monitoring. This has been compared to the baseline situation where the beneficiaries used firewood for daily cooking needs.
Monitoring frequency:	Once a year.
QA/QC procedures:	Appropriate questions were posed in order to ensure that the indicator has been assessed properly. GoodPlanet team has also visited the beneficiaries and have interviewed some of the beneficiaries on this indicator.
Any comment:	Out of the total 119 households surveyed – • 94% households surveyed had sufficient supply of biogas as per their daily cooking needs. Some minor problems related to the appliances like the stove knobs, stove stands have either been repaired or replaced by the SKGS team during the field visits. • Five beneficiaries had faced any technical issue with the biodigester and were repaired by the SKG team. • A total of 7 beneficiaries have stopped using the biogas plants either because they moved to other areas and/or have sold their cattle leading to no availability of animal dung. The non-functional units are taken into account while calculating the total emission reductions. A regular follow-up is carried out with all the beneficiaries by the technical staff of SKG to assure the continuous working of the units.

Data / Parameter:	Quality of Employment
Description	Any employment opportunity due to the projects and/or if any additional income generated by selling the vermicomposting.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The indicator has been analysed through a series of questions that were asked to each beneficiary in the monitoring. This has been compared to the baseline situation where the beneficiaries (women) did not have any source of income.
Monitoring frequency:	Once a year.
QA/QC procedures:	Appropriate questions were posed in order to ensure that the indicator has been assessed properly. GoodPlanet team has also visited the beneficiaries and have interviewed some of the beneficiaries on this indicator.
Any comment:	Out of the total 119 households surveyed – 94 % beneficiaries in the project activity have confirmed that they were able to benefit from an income savings. SKGS team has been trying to continuously follow-up with the beneficiaries, especially on the composting aspects considering the various issues faced for a regular production. The project still aims that each beneficiary is trained

	continuously and also takes the initiative to maintain and produce the vermicompost in the coming years.

Data / Parameter:	Human and institutional capacity
Description	Human and institutional capacity (including empowerment, education, involvement, gender) of the beneficiaries in the project area has been monitored in terms of access of the biogas for cooking.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	The indicator has been analysed through a series of questions that were asked to each beneficiary in the monitoring.
Monitoring frequency:	Once a year.
QA/QC procedures:	Appropriate questions were posed in order to ensure that the indicator has been assessed properly. GoodPlanet team has also visited the beneficiaries and have interviewed some of the beneficiaries on this indicator.
Any comment:	Out of the total 119 households surveyed – • 94% of the beneficiaries in the project activity have witnessed saving of time from collecting firewood. • Each beneficiary surveyed has received on-site training from the SKG supervisor during his field visits. • The beneficiaries have also confirmed have income savings due to the project activity.

Data / Parameter:	Technology transfer and technological self-reliance
Description	The technological self-reliance parameter in the project has been monitored in terms of training provided to the beneficiaries on maintenance of the biogas and vermicomposting units.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	SKGS carries out various training programs both for the technical staff and the beneficiaries. These training are carried out in a group and also on an individual basis during the field visits. Each beneficiary in the project activity was asked in the monitoring survey if they have received any training by the trained staff of SKGS.
Monitoring frequency:	Once a year.
QA/QC procedures:	Appropriate questions were posed in order to ensure that the indicator has been assessed properly. GoodPlanet team has also visited some of the beneficiaries and have interviewed the beneficiaries on this indicator.
Any comment:	The survey shows that 94% of the beneficiaries had regular supply of biogas and had received a training programme by the SKG staff. The training programmes are provided to beneficiaries who still had maintenance issues related to the biogas and vermicomposting units.

	SKGS has also carried regular team meetings during the year. The training programmes provided to the SKGS team since the implementation of the project activity were as follows: • May 2010: Mr R Prasad –senior manager of SKGS, trained 35 local supervisors of SKGS at Ajjuru Village, Hassan district. • October 2011: Training programme for supervisors and on monitoring survey. • December 2013: Training programme for supervisors and other supporting staff on 'Conducting the monitoring survey'. • June 2014: Mr. Mahesh (SKGS Manager) trained the supervisors on maintenance of earthworms at the SKGS Head Office. • 28th to 1st December 2014: Mr. Umesh (SKGS Manager), visited the project sites and guided the monitoring staff on continuous monitoring of units and collection of data required for yearly monitoring surveys. He also visited some of the sites and provided suggestions to the supervisors on regular follow-up with the project beneficiaries. • September 2015: During the site visits, GoodPlanet team had also participated in one of the SKGS team meeting at the head office.

Data / Parameter:	Biodiversity
Description	The beneficiaries either collect the firewood from forest and/or buy from the local market to meet daily cooking and water heating needs. This firewood consumption in the longer years could result in decrease of the forest area.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	This indicator has been assessed by comparing the quantity of firewood used in the baseline scenario with the present project scenario.
Monitoring frequency:	After every 2 years.
QA/QC procedures:	-
Any comment:	All the beneficiaries have replaced the use of firewood by biogas for their daily cooking needs. The beneficiaries who had used firewood for few days during the repair work of the biodigester are taken into account into project emissions. To be conservative the firewood use is considered for the entire year for these beneficiaries.

4. Emission reduction monitoring parameters

Data / Parameter:	**D 5 / $n_{hh.y}$**
Data unit:	755
Description	Total number of households participating in the project activity.
Source of data:	SKGS Database with all the details of the beneficiaries.
Measurement procedures (if any):	The total number of the households in the project activity is derived from the detailed database in which each unit has been allocated a unique identification corresponding to each beneficiary. This database has been maintained by the SKGS team, and also helps the team to avoid any double counting of the units during the monitoring survey.
Monitoring frequency:	Annually
QA/QC procedures:	Each household of the project activity has been allocated a separate serial number to avoid any double counting. The complete list of the details of each HH in the monitoring survey has been provided for further verification.
Any comment:	The total units functional in the project activity are 746 and the same are considered for VER calculations for the present monitoring year. A total of 9 beneficiaries have stopped using the biogas units and the details are provided in the monitoring survey data. The GoodPlanet team has also cross-checked this 'detailed list' during the field visits to the units. The allocated identification number to each household was also cross-checked and there have been no repetitions of any numbers allocated to the units.

Data / Parameter:	**ID 8 / $F_{i,y,pj}$**
Data unit:	0.27 kg/day
Description	Amount of fuel wood consumption for cooking needs in the project in year 2015
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	During the survey, the monitoring team asked each beneficiary in the survey sample about the average firewood consumed per day after the implementation of the project activity.
Monitoring frequency:	Annually
QA/QC procedures:	To assure that the beneficiary gives a correct data, the monitoring team weighed the firewood using the weighing machine, to record the accurate data.
Any comment:	In the present monitoring, 5 households had no supply of biogas for about 15 days due to some technical problems. The SKG team repaired these units. The firewood used for cooking in the absence of biogas, has been taken into account in the project emissions for the entire year rather than the days used so as to be more conservative while estimating the total emission savings. Remaining beneficiaries had a continuous supply of biogas throughout the monitoring year. The emission reductions of the firewood use have been taken into account while calculating total VER's.

Data / Parameter:	**ID 11/ $MS_{(T,biodigester,k)}$**
Data unit:	75 %
Description	Fraction of livestock category *T*'s manure fed into the biodigester, *S*
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	It's calculated by the total amount of cow dung that is collected by the beneficiary and fed into the biodigester.
Monitoring frequency:	Annually
QA/QC procedures:	The GoodPlanet team rechecked all the monitoring data and the excel sheets to be reassured that all the values corresponded to the revised documents.
Any comment:	The fraction of manure for each category of the animal has been calculated depending on the time it spends in the sheds.

Data / Parameter:	**ID 12 / PL**
Data unit:	10 %
Description	Physical Leakage of the biodigester
Source of data:	Default values of 10%. From the 2006 IPCC Guidelines for National Greenhouse Gas Inventories are taken into account.
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	**-**
Any comment:	If any changes in the IPCC guidelines are observed for this parameter, the necessary documents will be revised.

Data / Parameter:	**ID 13 / LC**
Data unit:	**3** numbers per Household.
Description	Number of life stock of category –**Dairy cows.**
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	This is the average numbers of dairy cows present with each household.
Monitoring frequency:	Once a year
QA/QC procedures:	The GoodPlanet team rechecked all the monitoring data and the excel sheets to be reassured that all the values corresponded to the revised documents.
Any comment:	

Data / Parameter:	**ID 13 / LC**
Data unit:	**1** numbers per Household.
Description	Number of life stock of category –**Buffaloes.**
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	This is the average numbers of buffaloes present with each household.
Monitoring frequency:	Once a year
QA/QC procedures:	The GoodPlanet team rechecked all the monitoring data and the excel sheets to be reassured that all the values corresponded to the revised documents.
Any comment:	

Data / Parameter:	**ID 13 / LC**
Data unit:	**1** numbers per Household.
Description	Number of life stock of category –**Other Cattle**.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	This is the average numbers of other cattle's present with each household.
Monitoring frequency:	Once a year
QA/QC procedures:	The GoodPlanet team rechecked all the monitoring data and the excel sheets, to be reassured that all the values corresponded to the revised documents.
Any comment:	

Data / Parameter:	**ID 16 / GWP_{CH4}**
Data unit:	25 tCO_2e / t CH_4
Description	Global Warming Potential (GWP) of methane
Source of data:	Most recent IPCC guidelines
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	**-**
Any comment:	-

Data and parameters to be monitored, in order to take into account specificities of the project

Data / Parameter:	**ID 17 / $MS_{S,T,h,p}$**
Data unit:	8 %
Description	Fraction of livestock category *T*'s manure not fed into the biodigester and treated according to the animal waste management system S.
Source of data:	Monitoring survey data 2015
Measurement procedures (if any):	This parameter is measured by asking each beneficiary in the monitoring survey to total amount of animal dung collected from the shed and fields. The amount of dung fed to the digester and the amount left in the open pits.
Monitoring frequency:	Annually
QA/QC procedures:	The GoodPlanet team rechecked all the monitoring data and the excel sheets to be reassured that all the values corresponded to the revised documents.
Any comment:	The remaining 8 % is pre-treated in an aerobic condition by mixing the cow-dung with agricultural residues at a regular interval. As a conservative approach, this 8 % has also been considered in the project emission calculations as per the registered PDD.

5. Emission Reductions

Monitoring results:
The following data gives total emission reductions for the year 2015 from the project activity: -

1	Baseline Emissions	6.80 tCO2/yr./household	Baseline Survey
2	Project Emissions	1.06 tCO2/yr/household	Monitoring Survey
3	Emission Reductions	5.74 tCO2/yr./household	Calculated

Summary of the Emission Reductions: -

Year	Months	Total Number of Units functional	TOTAL VERs	UNIT
2015	January –December	746	**4281**	tCO_2
TOTAL EMISSION REDUCTIONS			**4281**	tCO_2

Conclusion: -

Total Emission reduction for the year 2015 is – **4281 tCO2e**
The emission reductions are claimed from 01/01/2015 till 31/12/2015.
The monitoring period includes both the starting and end day of the crediting period.

Annexe I

Few samples of the monitoring sheets have been uploaded on the GS registry.