

Project title: **GS VER- ARAKALAGUDU BIOGAS PROJECT II**
Report by: GoodPlanet Fondation, France and SKG Sangha, India.
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Monitoring Period: 01/01/2012 – 31/12/2012.

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Contents

1. Introduction.
2. Monitoring –
 - a) Monitoring survey methodology.
 - b) Annual monitoring of the project.
3. Sustainable development monitoring parameters.
4. Emission reduction monitoring parameters.
5. Emission Reductions.
6. Annexe I - Sample copies of monitoring survey sheets.

1. Introduction:

The purpose of this project was to provide biogas plant and vermicomposting unit to the project beneficiaries in the villages of Arakalagudu Taluk, Karnataka state, India. The project has been funded by GoodPlanet Fondation and was implemented by its local partner SKG Sangha. The project aimed to 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 continuous visits to the units during the year. To avoid any double counting of the units during the monitoring survey, each unit has been provided with a unique identification number.

In the year 2010, a total of 505 biogas and vermicomposting units were constructed and the following year i.e. in 2011 another 250 units were added in the project activity. A total of 755 biogas and vermicomposting units have been constructed. The complete list of 755 beneficiaries has been provided to the Gold Standard for further verification.

2. Monitoring:

a) Monitoring survey methodology

The required samples for the monitoring survey were selected on a random basis. A total of 152 beneficiaries were selected for the monitoring sample (out of the 755 units). 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 2012. 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 of SKGS 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 in the month of January 2013 by the SKGS team.

b) Continuous monitoring of the project:

Apart from this annual monitoring survey to collect the required data, the SKGS field team has also carried out a regular monthly monitoring of the biogas and vermicomposting units. 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 proper use and maintenance of the biogas/ vermicomposting units. Such field visits have assured that the beneficiary has received training from the visiting officer if she has not been able to attend any of the previous training programs carried out by SKGS. These on-site training have helped the team to observe and understand the various field issues. These issues are discussed during the team meeting, which also helps the other field supervisors to solve similar problems. 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 August 2012. 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 some of the beneficiaries were requested 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.

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 2012
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 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 2012. The additional vermicompost, which is not utilised by the beneficiaries during the year, are usually stored for future needs.
Any comment:	<p>The monitoring survey for the year 2012 shows that all the beneficiaries have produced vermicompost and out of which more than 60% of the beneficiaries have been able to reduce their annual fertiliser use for agriculture. Remaining 40% of the beneficiaries had not produced enough vermicompost, and therefore there has been no change in their annual fertilisers consumption. It has also been observed that not all the beneficiaries have been able to produce the same quantity of compost, either due to poor maintenance of the units, or due the loss of the earthworms – either eaten by the birds or other predators.</p> <p>The beneficiaries who had lost all the earthworms were provided a new batch of worms by SKGS at no additional costs and a proper training was given to the beneficiaries on handling and protecting of the earthworms.</p> <p>On an average, about 15 bags (weighing about 40 Kgs) of vermicompost were produced in the year 2012. The additional available dung was pre-treated with the biogas slurry for vermicomposting process. 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 compost increases in the coming years.</p>

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 2012
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

	<p>assessed properly. The monitoring team have also visited the kitchen to ensure that the beneficiary did not continue using firewood for cooking needs.</p> <p>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.</p>
Any comment:	<p>Out of the total 152 households surveyed –</p> <ul style="list-style-type: none"> • 100 % of the beneficiaries have agreed to reduction in respiratory & eyes irritation problems due to the availability of biogas for daily cooking needs. • None of the beneficiaries had faced any technical problem with the biodigester. Other minor issues like stove-pans/stove cock were immediately taken into account and replaced by the SKG technical team. • None of the beneficiaries have experienced any respiratory and/or irritation of eyes from the use of biogas for daily cooking needs.

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 2012
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:	<p>Out of the total 152 households surveyed –</p> <ul style="list-style-type: none"> • All 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 completely utilise the animal dung in the biodigesters. The beneficiaries who had additional animal-dung have pre-treated it with the biogas slurry for the vermicompost production. The beneficiaries, who had lost earthworms, were provided another batch of worms by the SKG team without any additional costs. • Some of the beneficiaries have provided the actual data on their income saving while others have only confirmed about the savings but have not provided any data. This savings in the income has occurred due to reduction in the use of chemical fertilisers and the regular use of biogas for daily cooking needs. The monitoring surveys shows that more than 95% of the beneficiary have been able to witness some income saving.

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 2012
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:	<p>Out of the total 152 households surveyed –</p> <ul style="list-style-type: none"> All the 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. None of the beneficiaries had faced any technical issue with the biodigester. <p>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.</p>

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 2012
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:	<p>Out of the total 152 households surveyed –</p> <p>Though all the beneficiaries have agreed to have earned and/or had income savings due to the project activity, some of them have not provided the actual data on annual income savings. The amount of income savings for the respective beneficiaries has been provided in the survey sheets.</p> <p>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.</p>

Data / Parameter:	Human and institutional capacity
Description	Human and institutional capacity (including empowerment, education, involvement, gender) of the beneficiaries in the project area have been monitored in terms of access of the biogas for cooking.
Source of data:	Monitoring survey data 2012
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 152 households surveyed – <ul style="list-style-type: none"> • 100% of the beneficiaries in the project activity have witnessed saving of time from collecting firewood. • Around 18% of the beneficiaries had the opportunity to participate in either the local village meeting or the self-help women groups meeting to share the benefits of the project activity. • The annual saving due to the project activity has been observed for each beneficiary in the project activity and the actual amount saved has been provided in the monitoring survey sheets.

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 2012
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 all the beneficiaries had regular supply of biogas and therefore not all the beneficiaries 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. The monitoring survey sheets indicate the type of the training received by the beneficiary and the name of the SKGS officers who have provided the training.

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 2012
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 firewood consumption for daily water heating needs has reduced from 1.83 tons/yr in the baseline scenario to 1.55 tons/yr in the project scenario.

4. Emission reduction monitoring parameters

Data / Parameter:	D 5 / $n_{hh,y}$
Data unit:	755
Description	Total number of households participating in the programme in year 2012.
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 biogas and vermicomposting units for the project activity are 755 units. The GoodPlanet team has also cross-checked this 'detailed list' during the field visits to the units and the team has observed that the allocations of the identification to each households has been carried out precisely and there has been no repetitions of any numbers allocated to the units.

Data / Parameter:	ID 8 / $F_{i,y,pj}$
Data unit:	0 kg/day
Description	Amount of fuel wood consumption for cooking needs in the project in year 2012
Source of data:	Monitoring survey data 2012
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:	All the households have reported a continuous supply of biogas for their daily cooking needs. None of the beneficiary has used firewood for cooking during this monitoring period.

Data / Parameter:	ID 11/ $MS_{(T,biodigester,k)}$
Data unit:	59 %
Description	Fraction of livestock category <i>T</i> 's manure fed into the biodigester, <i>S</i>
Source of data:	Monitoring survey data 2012
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:	4 numbers per Household.
Description	Number of life stock of category – Dairy cows.
Source of data:	Monitoring survey data 2012
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 2012
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:	0 numbers per Household.
Description	Number of life stock of category – Other Cattle.
Source of data:	Monitoring survey data 2012
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:	21 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:	9 %
Description	Fraction of livestock category <i>T</i> 's manure not fed into the biodigester and treated according to the animal waste management system <i>S</i> .
Source of data:	Monitoring survey data 2012
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 29 % is pre-treated in an aerobic condition by mixing the cow-dung with agricultural residues at a regular interval. This mixture is further introduced in the vermicomposting units to produce an organic fertiliser. As a conservative approach, this 29 % 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 2012 from the project activity: -

1	Baseline Emissions	6.80 tCO ₂ /yr./household	Baseline Survey
2	Project Emissions	0.63 tCO ₂ /yr./household	Monitoring Survey
3	Emission Reductions	6.71 tCO ₂ /yr./household	Calculated

Summary of the Emission Reductions: -

Year	Months	Total Number of Units functional	TOTAL VERs	UNIT
2012	January –December	755	4655	tCO ₂
TOTAL EMISSION REDUCTIONS			4655	tCO ₂

Conclusion:-

Total Emission reduction for the year 2012 is – **4655 tCO₂e**

The emission reductions are claimed from 01/01/2012 till 31/12/2012.

A set of all the copies of the monitoring survey sheets have also been sent to the Gold Standard Foundation local contact (Delhi, India), as a part of the verification requirement.

Annexe I

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