

**Report about a practical training at Mpfuneko Community Support in Gawula / South Africa**

**Period of time:** 27. September 2010 – 3. November 2010

**Company:** Mpfuneko Community Support

[www.idsfoundation.org](http://www.idsfoundation.org) for current information on the project.

Mpfuneko Community Support is a non governmental non profit development aid organisation. Its aim is to improve the quality of life of the population in rural areas in southern Africa by introducing the use of biogas. The approach to achieve this aim can be called innovative and could show a new way of sustainable development cooperation.

**Development aid**

Development aid has changed quite a lot during the last decades. It has changed from a one way flow of money and pre-casted technologies to a cooperation which intends to find the right way to solve the approached problem by working together, considering cultural aspects and handing the know how over to the population by education and instruction. What is wanted, is to make a project the property of the local people. Because only in that case, the project has the best chance to be successful and sustainable.

But often, development projects suffer through the problem that the capital investments required for introducing the technology are much higher, than what a local community could afford. And that is even the case when a low tech approach is used. It is for example not too difficult to construct cisterns for rainwater harvesting, which can store sufficient water to supply a whole family for the time in between the rainy seasons. But even though there are in most cases local constructors who are able to construct those cisterns, the families won't be able to spend sufficient money for the capital investment which is necessary to buy the materials needed (steel and cement). That is why even projects where a lot of effort is put in including the local people, subsidies for capital expenditures are often still required from funding agencies from developed countries.

This is especially the case for biogas digesters, and maybe even more for fixed dome biogas digesters. To solve this problem Mpfuneko Community Support follows a different way in introducing biogas digesters to rural communities.

**How it should work**

A company (Mpfuneko Community Support) is founded, which is constructing biogas digesters. The constructed digesters stay in the property of the company, which is only selling the produced gas to three surrounding households next to the digester. The family pays a fixed price for this gas, which they can use for cooking. They have a contract with the company that they pay that amount of money every month for the next five years and in return the company assures that the households have sufficient gas for cooking.

Theoretically, to use biogas makes a lot of sense for most of the households in the rural parts of South Africa. Biogas can replace fuelwood, which causes much damage to the health of the women because of the smoke. In addition the women will have to spend less time on collecting fuelwood. And of course the replacement of fuelwood can reduce deforestation.

Before trying to introduce biogas and founding the biogas company, a household survey was conducted. The results indicated that a huge majority of the households visited would be willing to buy biogas and sign a contract. The amount of money which most of the families would be willing to pay was about 125.00 Rand per month, what would be approximately 12.50 Euros.

To have an idea of what that amount of money means for an average South African rural family, it may help to compare it with the salary of the family members. A unqualified assistant earns about 800 Rand per month (20 working days at 8 hours at 5 Rand each). A constructor who is able to lay bricks and to plaster earns twice as much.

Introducing a company which is selling biogas has in theory many advantages in comparison to selling biogas digesters or accordingly (how it is practiced in many development aid projects) giving biogas digesters to households. For example in the case of a company selling biogas, also families which have no access to cow dung (fixed dome biogas digesters are mainly filled with cow dung) can have biogas, because the company is responsible for employing somebody to collect cow dung and fill the digesters. Handling cow dung by hand is accepted in African communities as it is even used for decoration purposes in yards.

In Gawula and the surrounding villages the amount of available cow dung is more than sufficient, as many families have quite a lot cattle. Cattle is kept in kraals (a small piece of land demarcated with thick pieces of wood) during the night, which makes it possible to collect cow dung from the kraals in the morning.

Another advantage is that the families are not responsible for the biogas digester. If there are any problems with the digester and they do not have gas for cooking, they just do not have to pay. As the digester is owned by the company, the company has to assure that the digester is working and has to do the repair and maintenance work when necessary.

If the digester would have been given to the family by a development aid project and they would encounter problems later, they would have to pay for repairing the digester. To do this skilled labour is needed, which is why even if the family should have the money to pay for the repair works, it is quite likely that the digester is not repaired at all and fails.

### **The financial aspect**

The main advantage, which is also the reason why this project can be called innovative, is that it could be by far more sustainable than a project which consist only of one investment.

The financial part of this project works as follows: A funding agency from the Netherlands, ICCO (Interchurch Organisation for Development Cooperation), is financing the construction of 60 biogas digesters, which are supposed to supply three households each. The number of biogas digesters, which are planned to be constructed, was chosen that high, to reduce the overhead cost (tools, transportation, management) per digester. And 60 biogas digester would be sufficient as a basis for a biogas company.

One 15 cubic meter biogas digester (the size to supply three households) cost about 30,000 Rand (including overhead costs and labour). If three families pay each 125 Rand per month per five years (the duration of the contract) the company would get 22,500 Rand. That means if only one family renewed the contract, the capital expenses spend for the biogas digesters would have been earned back. Every additional extension of contracts would be a profit for the company. Well constructed biogas digesters should have at least a lifetime of 15 years, which implies that there would be a lot of profit which could be invested in the construction of more biogas digesters, if the company could sell the produced gas over the whole lifetime of a digester. Of course some of that money also had to be invested into maintenance and repair works.

The idea by funding the first 60 digesters was to construct a critical mass of digesters which fees would be sufficient to finance a company. The money spent by the funding agency would just work as a start-up capital.

According to the household survey which was carried out before the start up of the project, there was a clear interest and willingness from most families to spend 125 Rand per month on biogas. However, although the basis of a development project was clear (need, method e.g. technology, organisation, funding), somehow there were still a number of problems that occurred during the course of the project. And at this point, after explaining the background of the project, it is where I as a volunteer enter the stage.

## **The area**

I spent five weeks in Gawula (Limpopo Province), a rural village about 8 kilometers from Kruger National Park. Gawula has about 5,000 inhabitants. On each plot there is at least one rondavel (traditional hut) but the village is changing. In the course of the Rural Development Program (RDP) more and more square houses are built. The people from Gawula who have a job are mainly self employed farmers, cattle owners or working in Giyani, which is about 35 kilometers from Gawula. Additionally in Gawula and a few surrounding villages a public works program is taking place, where people without work clean the roads. This program employs 400 people, who are earning 400 Rand each.

## **Filling a digester**

The number of cattle owners in Gawula, but also in most of the other villages in that area is quite high. During daytime the cattle is grazing in the bush, but at night they come back to stay in the kraals. That is why enough cow dung is available and can be collected easily early in the morning. Due to traditional belief no women are allowed in the kraal, and the dung has to be collected as long

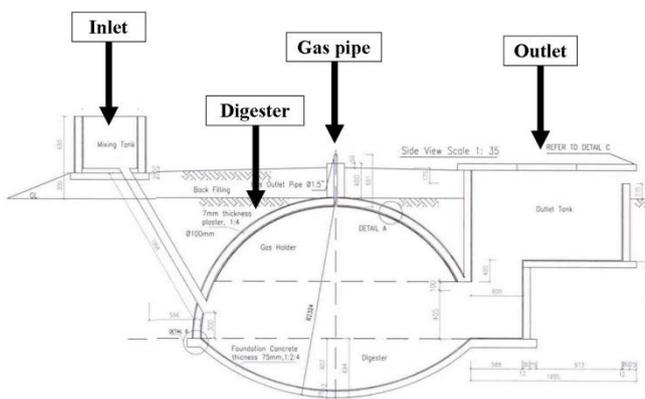
as the cattle is still in the kraal. This makes the organisation of filling the digesters, which is carried out by the company, a bit complicated, as all the dung needs to be collected before 7 a.m. at the latest.

If one employee has to travel to several villages for filling the digesters this is nearly not possible. To be able to employ a villager to fill the digesters in one village only, the company needs to have several digesters in each village. At this stage of the project there are not many digesters to be filled by the company, but it was already a struggle to make sure that all the digesters are filled regularly and reliably. For control purposes a paper was introduced where the families who have a contract with the company sign to confirm that their digester was filled.



To make sure that the digester produces the amount of gas that the plant is supposed to produce, it is absolutely important to fill the digester properly. To give an idea what it means to fill a 15 cubic meter digester (which produces sufficient gas for three families), it is useful to have a look at the amount of material needed. For a 15 cubic meter digester six 20 liter buckets of cow dung are mixed with six buckets of water. 20 liter of cow dung is about the amount one cow produces per day.

### Constructing a biogas digester



A short overview of the different steps of building a biogas digester:

1. Calculating the required volume of the digester, adjusting the measurements, and making a drawing
2. Selecting the site for the digester
3. Drawing of the contour lines on the cleared ground (1 h)
4. Digging (7 days)
5. Pouring concrete (1 day + 4 days drying)
6. Laying the bricks of the dome (5 days)
7. Plastering the inside of the dome (5 layers) (5 days)
8. Digging of the trench for the pipeline and for the watertrap (2 days)
9. Laying the pipe and connect the burner (1 day)





### Cooking on biogas

This family cooks since July 2008 on biogas and seems to be happy with it.



During the five weeks I was able to stay in Gawula, I had the chance to watch and also to perform myself every single step of the construction work. This was a great experience as the physical work, the different construction methods (pouring concrete, laying bricks, plastering, plumbing) and also working together with the other workers was something new but also very fulfilling to me.

I have to thank the managing director Jotte van Ierland and his wife Prudence great time for welcoming myself. Being included not only into the daily working routine of a construction project, but also into their daily life besides work, was a real pleasure for me.

I learnt a lot about the construction of biogas digesters, but not only.

## **How to run a biogas project**

I learnt a lot about how to run a biogas project. Or maybe it is better to say that I know now more about the questions and problems which will arise when running a biogas project.

### **Organisation:**

-Transportation: How to organise transportation? Two cars are available, but there are more than two construction sites. Materials have to be bought, constructors have to be collected from another village and appointments have to be kept. Biogas digesters in different villages have to be filled.

-Time schedule: Several construction sites, several construction steps, which take a different amount of time and require a different number of workers with different skills.

-Labour: How much labour is needed? How many assistants, how many constructors are needed? Where to find suitable constructors? How to find out if they are suitable?

### **Finance:**

-Wages: How much do you want to, do you have to, can you pay every single worker? What is a appropriate salary? How many working hours has every worker? How to reward extra and well done work? How much transportation money has to be paid?

### **Marketing:**

-How to find new clients? How to reach the publicity?

## **Problems**

And I learnt a lot about problems which can occur in development cooperation projects:

What do the people really need? What do they want, but not really need? Do they express their real needs or do they just say what they think the development worker wants to hear to make him stay? Can you be sure that somebody who said that he would be able and willing to pay a certain amount for a certain product, will also do so, when it comes to action?

Have the residents really understood what it means to sign a contract over five years?

Is it likely that the advantages of a new technology like biogas will outbalance the effects of the addiction to traditions like collecting fuelwood and cooking on wood? Is the perception of a technology the same amongst different groups?

How much discomfort can you tolerate from your workers? What kind of trouble would it cause to fire somebody who is known amongst the villagers?

I learnt that the personal relations amongst the villagers and the development cooperation team are of an enormous importance for the functioning of a project. Of course it is important that the implemented technology is working well, but if it is not accepted or the relations between the different people involved are somehow complicated this might endanger the project as well.

As a concluding statement, I have to note that talking about a development aid project and planning the project is something completely different than implementing it in a foreign country itself. Only on site you know under which conditions you have to work, which influences will shape the project, which people will be involved, which people you have to involve, how personal relations work and where your own position is going to be.

I am sure that the experience I made will have a lasting influence on my further life.

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## MPFUNEKO'S BIOGAS SYSTEM

### Description

Biogas is a renewable energy suitable for cooking and heating water. Bacteria produce biogas from cow dung and water in a system called a biogas digester. It is a underground structure made of bricks and concrete. A gaspipe transports the gas from the system to the place where you are cooking. A biogas stove is very similar to any other gas stove. Biogas can be used to replace fuelwood and electricity as an energy source for cooking.

### Advantages of using biogas

Costs Cooking on biogas is in most cases cheaper than buying electricity or fuelwood.

Time Cooking on biogas saves time as the gas burns immediately and you don't have to collect fuelwood anymore.

Health Cooking on biogas is healthy as a biogas stove does not emit smoke.

Environment Cooking on biogas contributes to a better environment since it avoids deforestation and reduces global warming.

### Safety

Biogas is non-toxic and safe when used according to the guidelines. We will train you in how to use the system safe and efficiently.

### How does it work?

The biogas digester needs to be filled with a mixture of cow dung and water every day. The bacteria in the cow dung take 30 days produce biogas. So when you fill it today, you will have gas next month. By filling it every day you make sure that you have gas every day. You can not store biogas and therefore there is no use in over-filling the biogas system.

### Mpfuneko Community Support

Mpfuneko Community Support is a local non-profit organisation that constructs and operates biogas digesters. Local constructors are trained to make the system gas-tight and let it perform to your expectations. MpfunekoCS is here to help people and therefore offers households biogas systems at subsidised rates.