

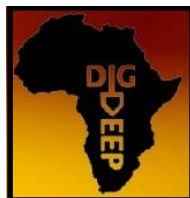
Dream Children's Home Ngong, Kenya

Biogas Project



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Dig Deep Registered Charity Number: 1121493

First of all we would like to thank everyone who donated so generously towards our Biogas Project which was a great success. We reached our fundraising target of just over £4,000 and as a result, we were able to implement a 16m³ biogas digester. Everyone at Dream Children's Home, from the youngest child to Grandma couldn't put into words how grateful they were and asked us to pass on their heartfelt thanks to you. It was an extremely successful project in a very deserving location and is being well maintained.

We returned home at the beginning of November and have prepared a report to provide you with some background information on the home as well as highlighting the enormous benefits that the Biogas Project has brought to this community.

Dream Children's Home

The home is located along the Ngong-Kiserian Road, 4km from Ngong Town, just north of Nairobi in the Ngong Hills. It was founded in December 2004 by Rachel Gichia, with the aim of addressing the needs of children orphaned by Aids pandemic, together with other destitute and abandoned children in society. Rachel was unhappy with the way children were treated and from a young age had always wanted to do something to help. Thus in 2004 she took in Naomi whose parents had succumbed to the Aids virus. There are now currently 50 children ranging from age 3 to 18 at the home all being cared for by Rachel and her husband Stephen. With no outside funding until recently, they relied solely on Stephen's wages as a woodwork teacher at a deaf school in Kambui.



Prior to this initiative all cooking for the 50 children was done using firewood in an outside kitchen. The availability and consequent cost of firewood was a constant concern for the orphanage. We cooked for the children one night using firewood and experienced firsthand the negative effects the smoke had on our eyes. However, the children never complain although there are serious health effects with the most obvious impact being on the lungs following long-term smoke exposure. Nelson, (17) who is in charge of cooking breakfast for the children every morning would get up at 3am to light the firewood, which during the rainy season often proved difficult as the wood was wet and much harder to light. The children would often go to school unfed if a fire could not be lit or there was a shortage of firewood.

Our Project

The aim of our project was to replace wood with flammable biogas supplied by a regular feed of cow manure into a biogas digester. This is a completely renewable way to generate energy through anaerobic digestion. The project was a great success!

On the 5th July we arrived in Nairobi and met with our consultant from Biogas Energy Solutions Ltd, Hannes. Our initial project had been at the Kambui Home for the physically disabled. However, a week before we were due to arrive in Kenya, Hannes had visited the site to find another NGO doing a biogas project there. We decided not to merge with this group and instead to start afresh at Dream Children's Home, thereby benefitting two homes.

On arrival at Dream we met with Rachel and Stephen and explained to them exactly what we were there to do. They were very excited as they had previously looked into the cost of a biogas digester and found it to be beyond their means. We assessed the site and decided on the size of the fixed dome biogas digester which was 16m³, based on the number of cows, water availability and estimated cooking time needed per day. Our calculations also allowed for expansion in the future.



The first stage was to 'peg out' the circumference of the site and to start the excavation of the pit. During the two weeks it took to dig by hand, we were busy placing orders for all the relevant materials from the hardware store in Ngong and organising their transportation. The delivery of the necessary materials was rather challenging for the lorry drivers as the road up to Dream is very steep and muddy; the photo below right shows sand which had to be deposited halfway up the entry track as the lorry could not make it to the top. Once the materials arrived, we were able to start with the construction.

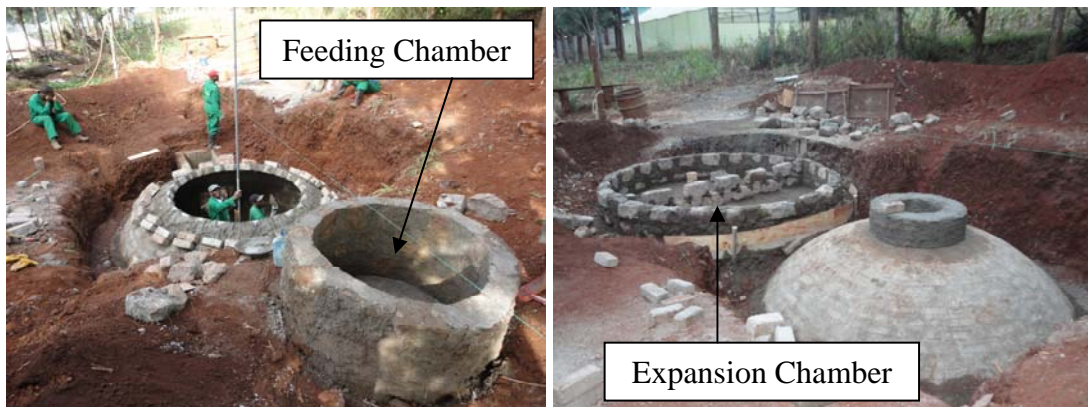


A cement slab was cast at the base of the pit and a vertical wall built from quarry stones around the outside. Meanwhile, we began making the bricks which was actually a lot more strenuous than we had anticipated. This involved mixing up the sand, ballast and cement and compacting it into a mould, 750 times! These smaller bricks were then chiselled into shape and used to build the dome shaped roof of the digester.

Below: the children eagerly watching the workers construct the reinforcement ring for the base. Right: the workers using corrugated iron as a slide for the cement mixture to cast the slab.



There were two other components to the project that involved construction: the feeding chamber and the expansion chamber. The feeding chamber is a small cement circular wall built next to the digester on higher ground. The idea is that manure and water are mixed in the chamber before a plug is removed, which allows the mix to be gravity-fed into the belly of the digester where it ferments producing the methane gas which is then trapped under the dome. As fresh manure is fed in through the feeding chamber, the older already treated material that no longer contains any methane, then flows out into the expansion chamber as a natural, and very rich fertiliser.



The whole construction contains no moving parts and works very simply in that whatever volume of material is fed into the digester, then the exact same volume of treated material will be forced out the other side on lower ground. The gas produced by the manure is trapped between the surface of the manure/water mix and the roof of the dome, and the upward pressure caused by the fertiliser sitting in the expansion chamber is sufficient enough to push the gas up through the pipes and into the two kitchens, where it is lit on a burner and then used for cooking.



Once the children saw the actual flame coming from the burner, they were truly shocked and amazed. They suddenly grasped the full concept of what they had been waiting for and they were fascinated to see that such heat could come from something as basic as cow manure. Rachel and Stephen were delighted and to celebrate we cooked spaghetti bolognaise for everyone or as the children called it 'the red stew'.

