

## RENEWABLE ENERGY: Household Biogas

<b>Title of Best Practice</b>	Household Biogas by Kijabe Environment Volunteers (KENVO)
<b>City/Town</b>	KIMENDE
<b>Country</b>	Kenya

### Background

Located between 0°50' and 1°40' S and 36°35' and 36°43' E in Kiambu County, the Lari-Kijabe Landscape is part of the larger Kikuyu Escarpment landscape that lies on the eastern slopes of the Aberdare Mountains of Central Kenya. The landscape is approximately 442Km<sup>2</sup> with a human population of 123,895 persons (2009, Census).

The climate is largely influenced by altitude; however the landscape is divided into two agro-ecological zones, the lower and the upper highland zones, with altitude varying from 1760m above sea level in the lower zone to 2610m a.s.l in the upper zone respectively. The land is purely an agriculture zone and the agricultural practices are rain dependent. (Mwangi J.N. and Mutua J.M). Soils in the landscape are highly fertile, very deep, well drained, dark reddish brown, strongly calcareous and saline in many places. The soils have high organic carbon content (3-4%), which reflects high level of applied organic matter, low nitrogen, while phosphorus levels remain average (Makokha Stella, Kimani Stephen et. al). There is use of both organic matter and inorganic fertilizers for soil fertility.

Forest covers about 37,000 ha with 13,000 ha located in a different landscape. The highest percentage of this forest is natural indigenous forest and a small section of exotic tree plantation for timber production. The forest is designated as an Important Biodiversity Area and listed by Birdlife International in the highest category "critical" for conservation action (Bennun and Njoroge 1999). It hosts a variety of important global species and is particularly rich in bird life. It is home to 140 bird species, 20 of which are considered rare ("BirdLife", 2007). The forest is an important community asset which has been a main source of forest products including water, fuel wood, herbal medicine, fodder for livestock, building materials as well as leisure space. The forest is an important catchment area that supplies water to the Kenyan capital, Nairobi (Kuria and Githiru 2007). Despite this importance of the forest, it has in the past faced major challenges among them deforestation as a result of unsustainable human activities such as charcoaling, timber logging, uncontrolled firewood collection, encroachment (during the Shamba-system era), uncontrolled grazing among others.

Over the years the Kijabe Environment Volunteers (KENVO) a local CBO has engaged the local community towards conserving the forest for its biodiversity and biological importance as well as for the livelihood improvement of the local community. So far, the community has been able to eliminate illegal timber logging and charcoaling. However firewood consumption and grazing in the forest today remain as major threats to the forest, thus KENVO is promoting use of biogas as a way of addressing both grazing in the forest and use of firewood. This is done through training dairy farmers to adopt zero-grazing as a farming practice from which they can then construct biogas digesters and have clean energy supply at the household level. The organization has done this by establishing demonstration households where other members of the community can learn from.

### **Description of the biogas project**

The project involves supporting dairy farmers to install biogas digesters for the production of biogas as an alternative source of energy at the household level which is renewable. This is for demonstration purpose to showcase that zero grazing can be more productive than grazing in the forest. Grazing in the forest has been a major challenge to forest rehabilitation efforts being carried out by KENVO and other groups such as the Community Forest Associations. Further use of biogas shall also enhance use of organic fertilizer to enhance food production of horticultural crops which is a major agricultural activity in the area. This shall be done through use of slurry emanating from the biogas digester. Thus use of biogas shall contribute to conservation effort including reduction of carbon as well as in enhancing agricultural production. Use of biogas will also supply cooking energy to households reducing firewood sourcing from the forest. The beneficiaries are selected from within the project area who include past beneficiaries of zero grazing units as well as farmers who have adopted zero grazing as a modern method of dairy farming. KENVO provides all the materials and skilled labour required for the construction of the biogas except for the timber and the unskilled labour which the farmer provides. Each farmer is selected from an organized group so that other members of the group can learn from him/her.

### **Outcomes of the Best Practice and sustainability**

The Biogas digester is 8M<sup>3</sup> provides cooking gas for about 3 hours in the morning and 3hrs in the evening with most farmers using it for about an hour over lunch hour. This has greatly reduced the amount of fuel wood used at the household level with some farmers completely stopping to use fuel wood at all. For those who are still using some amount of fuel wood/charcoal it's mainly for warming the house especially during this cold season. In terms of financial cost saved, an average size household used at least one load of fuel wood per week which costs Kshs.300 (\$3.5) translating to about Kshs.1, 500 per month. In addition there is no more smoke in the kitchen thus contributing to good respiratory and eye health. In terms of environmental well-being, use of biogas reduces the amount of methane gas released to the atmosphere from livestock waste. Methane is one of the greenhouse gases that contribute to depleting of ozone layer. In addition the bio-slurry from the digester is used for organic farming, thus further reducing the use of inorganic fertilizers hence improving soil fertility. So far 14 farmers have benefited from this initiative.

### **Lessons Learned**

It is important to create direct link between conservation and the day to day livelihood of the community in order to achieve both conservation and development goals. It is also important to have a participatory process from the project design stage to implementation, monitoring and evaluation. This creates a sense of ownership not only to the output but the ownership of the goal the project is trying to achieve since the community members are fully involved in identifying the problems as well as possible solutions.

### **Best Practice Transferability**

The purpose of this initiative was to pilot and demonstrate that use of biogas is viable in the area and can be used to address both conservation and livelihood issues. This is transferable and scalable, however most of the average rural families cannot afford the technology since it is expensive especially when using the fixed digesters which is more suitable in this area. Alternative financing is thus important. It would also be important to link farmers who are using biogas to other income sources such as carbon credits as the initiative is contributing to reduction of greenhouse gas emission, both carbon and methane.