

# ean

## ECHO East Africa Notes

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A regional supplement to ECHO Development Notes



### **MOVING TOWARDS ENERGY SELF-SUFFICIENCY**

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### **IMPROVING SOIL WITH JACK BEAN**

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### **PARTHENIUM HYSTEROPHORUS**

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For further resources, including networking with other agricultural and community development practitioners, please visit our website: [www.ECHOcommunity.org](http://www.ECHOcommunity.org). ECHO's general information website can be found at: [www.echonet.org](http://www.echonet.org).

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## Moving towards energy self-sufficiency: addressing challenges to biogas technology uptake for improving rural livelihoods

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In recent times biogas technology is increasingly important around the world due to the requirements for renewable energy production, the need for recycling and reuse of materials and reduction in greenhouse gas emissions. Biogas addresses all the above concerns, using renewable inputs such as animal manure, producing methane-rich gas as an output which can be used as a source of energy in various ways. Another key output of biogas is the residual material which contains all the nutrients in the original raw materials and offers a way to recycle them. Besides being renewable, biogas is a source of clean energy meaning that methane when burnt is converted into heat and carbon dioxide. The latter is a lot less harmful to the environment in terms of contributing to climate change than methane which would have been released into the atmosphere in the absence of a biogas setup.

Agricultural biogas is one of the multifunctional practices that can contribute positively to improving rural livelihoods in the East African region. First, the dependency on firewood/charcoal (or other non-renewable energy sources) for domestic cooking is partially or completely eliminated. This is a significant saving to the household which would typically use a major portion of its income on the purchase of domestic energy sources. Importantly, producing biogas in the homestead reduces the workload of women and children who would typically walk far distances in search for firewood. Bio-slurry, another important output from biogas is a source of manure which enhances production of crops and maintains soil productivity. Importantly, bio-slurry is broken down and acted upon by the microorganisms during the process of biogas synthesis thus helping to create a cleaner environment free of flies and odor. As such biogas is considered to be a low-cost sustainable practice for small farmers in the region who typically have a sustainable source of animal manure.

Currently four digesters have been installed through ECHO out of which three are at the farmers homestead. Farmers are extremely happy with the biogas venture on their premises. Records show a replacement or complete substitution by biogas from charcoal/firewood for the beneficiaries. The beneficiaries who have been early adopters are becoming opinion leaders among fellow farmers/villagers in disseminating biogas practices. One demo biogas plant is within ECHO's appropriate technology section for easy viewing by visitors. Together these are providing important learning lessons for furthering the cause of sustainable energy production in the region.

ECHO is facilitating a year-long effort to improve efficiency of biogas plants through



A new tubular biogas digester built with funds from Innovate UK at a farmer homestead near ECHO (left). A new digester is already providing cooking fuel for the family (right).

remote monitoring sensors, working in conjunction with four other partners, the Centre for Agricultural Mechanization and Rural Technology, Tanzania - CAMARTEC; the University of Nottingham (UoN), CREATIVenergie, and Scene Connect Ltd from the UK. This project is funded by INNOVATE UK/DfID in collaboration with CREATIVenergie. Sensors will monitor pressure inside the digesters (a key parameter for successful biogas production) which are simple, low-cost and can relay signals through the phone network. This will enable technicians/experts to monitor digesters remotely and identify remedial actions. The monitoring of the digesters is anticipated to increase efficiency and uptake of the technology.

ECHO's ongoing efforts provide an important link between various stakeholders in the awareness and promotion of biogas. It is working together with government agencies such as the Tanzania Domestic Biogas Program along with many other local and international organizations. ECHO would like as many farmers taking up the biogas technology as possible. ECHO realizes that currently biogas is only spread through word of mouth, from farmer to farmer and person to person. ECHO would like to create awareness in the communities through printing media and online platforms using social media and mobile phones. It is anticipated that biogas practice adoption will lead to generating local employment in the form of technicians, biogas installers, entrepreneurs, financiers and conveyers in the cause for sustainable energy production in the region. ECHO is happy to further collaborate with anyone interested in the application of biogas technology to optimize the benefits and improving rural livelihoods in East Africa.

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## Improving soil nutrients by planting Jack Bean

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The Mafie family, Kaneli and Happiness, visited ECHO East Africa for the first time in March of 2016 to inquire about the use of slurry from biogas as a fertilizer. When visiting ECHO they were shown around the compound and learned various techniques of conservation agriculture that could help improve their farm, one technique being to use green manure/cover crops. The Mafie's left ECHO with a variety of fruit tree seeds and one kilo of Canavalia seeds, a cover crop that is highly encouraged to farmers for increasing nitrogen levels in the soil and providing shade for the soil.

Fast forwarding to present day, the Mafie family wanted to invite ECHO staff to see the success in their farm since using Canavalia as a cover crop. Niel Miller, Charles Bonaventure, and Malvery Begley of ECHO East Africa visited the couple and their farm located near their home in Njeku village of Arumeru District. The farm is located on an incline at the foothills of Mt. Meru. Mr. and Mrs. Mafie's farm consists primarily of coffee and bananas however they also have a corn field intercropped with beans, 60 vanilla vines, beds of spinaches, hot peppers, passion fruits and papaya trees.

When entering the coffee and banana farm it is obvious to see that the soil is well covered by Canavalia. The two say that Canavalia has helped reduce top soil erosion during strong rains. They also tried testing within their maize farm what the impact of Canavalia would be on the open area. They found that Canavalia was able to cover the soil, instead of it being open and bare and the canavalia was causing greater moisture retention and therefore healthier maize. The Mafies' continue to show neighbors and other farmers their success in using Canavalia. Kanaeli and Happiness hope that within their community the use of Canavalia will expand and a market among smallholder farmers can develop.

ECHO staff present was told by Mr. Mafie that the one kilo of Canavalia seeds from ECHO was divided in half among another farmer; the half kilo of seeds planted has now produced just over ten kilos. From their first harvest of ten kilos, they re-planted seven kilos and successfully sold the other kilos to local farmers. The harvest from the seven kilos planted is pictured below together with individually packaged half kilos to sell to local farmers.

The couple says that they are continuously harvesting Canavalia and are expecting to continue using and performing more trials on how Canavalia can further support their farm. For more information, request the seeds through this [easeeds@echonet.org](mailto:easeeds@echonet.org)



Mr. & Mrs. Mafie show off their Canavalia pods and seeds which they harvested

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## Parthenium hysterophorus

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*Parthenium hysterophorus* is a noxious weed which invades roadsides, is allergenic for humans, infests pastures and farmland, causing disastrous loss of yield, as reflected in common names such as famine weed. In many areas, heavy outbreaks affect livestock health, crop production, and human health. *Parthenium* was first spotted in Arusha in 2010, since then the weed has spread at an amazingly fast rate and is increasingly causing a threat to national food security in Tanzania.

In 2017 a committee was formed to educate and promote awareness of *Parthenium* to citizens of the Arusha region. The committee consists of twelve persons who have an intrinsic passion for community development and a desire for *parthenium* to be eradicated. The committee was recognized by Regional Commissioner of Arusha, Tanzania Mrisho Gambo, in October of 2017 at the opening announcement of the committee's project. With the support of the United States Peace Corps and ECHO the members of the *Parthenium Hysterophorus* Awareness Committee have been able to travel to rural villages of the Arusha region to combat the spread of *Parthenium* by educating locals and farmers. The goal of the project to visit fifteen villages of the Arusha Region and educate the greater communities has gained much attention. The project continues to gain support through national and local radio stations, local businesses, governmental researchers and government officers. The committee has successfully trained 54 Arusha regional and local government agriculture and livestock officers. As a result, the *Parthenium* training is reaching a far wider audience than was planned by the project and the Regional government has created a monthly 'Parthenium Day' to encourage the public to eradicate the weed wherever it is present. In the span of two weeks starting February 5, the *Parthenium* Committee has traveled to six villages across the Arusha Region of Tanzania, impacting just over 830 farmers and hundreds of school students to further understand the dangers of *Parthenium*. In Tanzania the noxious weed is referred to as "Gugu Karoti".

The committee found when arriving at various villages, that after farmers were shown which weed is "Gugu Karoti" they were shocked that they had been feeding their livestock the weed and many complained symptoms of skin rashes and hay fever, which the weed is known to cause. Many testimonials have been shared, of farmers who have abandoned farms due to *Parthenium* overtaking the land. Committee members and volunteers continue to teach farmers, teachers, students, businessmen /women to uproot *Parthenium* wearing protective clothing and gloves or something to protect one's hands. Village community members are also taught the use of GM/CCs for suppressing growth of *Parthenium* and revitalizing the soil. The ability to continue teaching across the Arusha region would absolutely not be possible without the dedication and countless hours brought by the committee and

the many volunteers from ECHO.  
Given another invasion in 2017 in the region, Fall Army Worm, also encountering an uninformed public, ECHO has combined training about Parthenium with training on how to combat the FAW.

For more information on Parthenium visit this link



Parthenium Awareness committee members pose for a picture after a project planning meeting

(<http://edn.link/jkcghq>) [<http://edn.link/jkcghq> (<http://edn.link/jkcghq>)].