

**SCIENCE**

# SAYANSI

*All science information*

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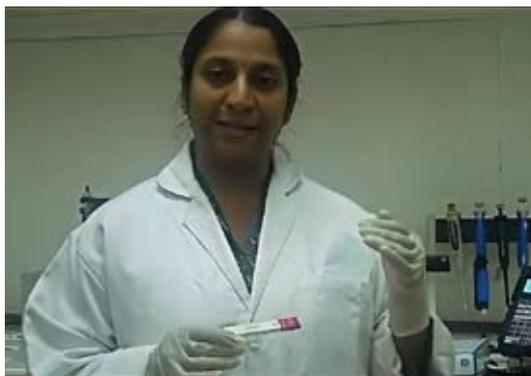
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## Who we are

**T**he Media for Environment, Science, Health and Agriculture (MESHA) was founded in November 2005 in Nairobi, Kenya, and is an organisation that provides support to science journalists covering health, development, technology, agriculture and the environment. It does so by offering training workshops, consultancies and encouraging networking through meetings and conferences among journalists, scientists and other stakeholders in Kenya.

The association emphasises on rural journalism and communication.

The idea for the formation of this association sprang up from the fact that there were many organisations and communicators in the fields of agriculture, environment, health and development. However, few organisations in the region bring journalists covering these issues together, for better reporting in the media.

MESHA believes that in a democratic society where science must be answerable to the public, there is need to find new and innovative ways of effective mass communication about the benefits of science, and other areas of concern to the general public.

MESHA aims to ensure continuity, sustainability and consistent coverage of science and development issues as they arise.

## SAYANSI

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# Stunted Growth, Stunted Economies

**G**overnments, particularly in developing nations, can save millions of dollars for development annually by simply investing in nutrition.

Evidence prepared by an independent group of influential experts committed to tackling global nutrition, shows that sustained reductions in malnutrition significantly contribute to poverty alleviation and budgetary savings for governments.

The findings contained in the third technical brief of the high profile Global Panel, entitled: *The Cost of Malnutrition: Why Policy Action is Urgent*, calls on policymakers to invest without delay in more cost-effective nutrition initiatives.

Malnutrition, in all its forms, carries huge direct and indirect costs at every level – to individuals, families, communities and nations. The estimated impact on the global economy could be as high as US\$ 3.5 trillion per year. This equates to US\$ 500 per person.

“Stunted children today means stunted economies tomorrow,” said African Development Bank President and Panel Member, Dr. Akinwumi Adesina when addressing the appalling cost of malnutrition globally.

The brief indicates that this enormous cost results from loss in economic growth and reduced or lost investments in human capital associated with preventable child deaths, as well as premature adult mortality linked to diet related non-communicable diseases.

Prof. K. Srinath Reddy, President of the Public Health Foundation of India, and Panel Member is emphatic: “Although the price of addressing malnutrition can be huge, evidence shows that the cost of doing nothing is immeasurably greater.”

Of course there are impressive economic benefits of investments in nutrition actions, according to the brief. It is estimated that a US\$ 18 return is achieved from every one US dollar invested in reducing wasting and stunting. Investing in actions to improve food systems and diets worldwide can also accelerate nutrition gains and economic rewards.

Overweight and obesity also tag along a high cost - at least 2.6 million people die each year as a result of being overweight or obese.

It is therefore our call to local and national governments to stick their necks out and ensure they remain instrumental in promoting healthy eating laws and policies. For example, we expect the government to start to explicitly support nutrition efforts by bodies charged with that responsibility be they government, civil society, private sector, donor or academic.

Governments must therefore be continuously reminded of the fact that by 2050 the world will have another 2 billion mouths to feed. Without enough to eat and by extension – balanced diet served in adequate quantities and quality, people in developing countries can't even begin to work their way out of poverty. For children especially, being hungry or malnourished means they can die from common infections or suffer poor health in the long run – limiting their ability to learn in school, work or progress.

We must respond to these challenges in a sustainable way, making sure food is fairly distributed and help people access nutritious diets. Without this, our inactivity definitely puts current and future generations at risk.

**John Mwendwa Gitari**



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**Dr Kalule Okello, the programme leader for groundnut breeding, explains the process of breeding from green house to field trials in Serere District, Uganda**

# Farmers' Friends: Ugandan scientists step up efforts of breeding oil crops

By Lominda Afedraru | lominda25@gmail.com

**F**armers engaged in growing oil crops in the Semi-Arid areas of Uganda and East Africa have the privilege to engage scientists involved in improving varieties at the National Semi Arid Resources Research Institute (NaSARRI) Serere in Eastern Uganda.

Oil crop research programme at the institute handles three crops namely groundnuts, Simsim (sesame) and sunflower, where scientists are improving varieties of the crops preferred by farmers addressing issues of yield, maturity period, pest and diseases, oil content, drought tolerance and better adoption of agronomy practices among others.

Looking at sunflower and simsim research work at the institute the scientists are mainly improving hybrid varieties using conventional means by making crossing from the flower of one plant to another, to develop improved varieties.

Farmers are mainly growing traditional open pollinated varieties, especially simsim but some hybrid varieties of sunflower are with farmers growing the crop mainly in Northern and Eastern region of the country.

Dr Walter Anyang in charge of sunflower and simsim breeding at the institute, explains that sunflower was introduced in Uganda in 1920s.

Its production has since increased and is now one of the major cash crops in the country.

NaSARRI sunflower research focuses on variety development and management practices for improved production like planting dates, compactness of the seed, weed management, fertilizer use and intercropping with other crops.

These scientists have tested and released a number of hybrids, the most recent ones being Sesun 1H and Sesun 2H.

Sesun 1H has uniform growth both at vegetative and after flowering.

The head bends and forms a goose neck, which is always hidden below the leaves and can be good in avoiding flying birds.

It matures between 89-100 days and the oil content is 43% with black coated seed.

Sesun 2H matures at the same period like Sesun 1H, and its oil content is 36% and can yield up to 1,600 kg per hectare. Some of the varieties are obtained from Australia and are crossed with the local ones in Uganda.

Under the simsim research programme, which is a major oil crop in Uganda, ranked second to groundnuts, Dr Anyang's team has so far released Sesim I variety which is white and matures within 110 days, with yield potential of between 500 - 800kg per hectare. It has oil content of 42% - 45% while Sesim II matures at the same period and yields from 500 - 900 kg per hectare with oil content of 42% - 45%.

© seed.uno



Farmers are advised to plant the two crop varieties in fine seed bed, when there is enough moisture in the soil, at seed rate of 6 - 9 kg per hectare and the spacing should be 30cm by 10cm.

Application of fertilizer to the land before planting is important and weeding is done at most twice. Control of fungal diseases can be done using Dithane M - 45 chemical, which is mixed in water. It should be sprayed at all times of detection of such a disease.

Whereas sunflower and simsim research work is taking good shape at the institute, the groundnut research aims at development of improved varieties, maintenance and conservation through germplasm collection not only in Uganda, but also other countries growing the crop like Nigeria, Brazil and Malawi, looking at its biological characteristics through breeding, and evaluating the results for release to farmers.

Dr David Kalule Okello, in charge of ground breeding explains that the crop is cultivated in semi-arid tropical regions in nearly 100 countries in six continents comprising between 40°C North and South of the Equator.

"Groundnut is an important legume grown and consumed globally, especially Sub-saharan

Africa as a source of protein content of 25% to 34%, cooking oil content of 44 to 56% and vitamins. This quality makes it a nutritional supplements mainly to cereal diets like maize, sorghum and millet. In Uganda, people make groundnut cake and peanut for human consumption, while its foliage and stem are used for livestock feed. The crop is known for fixing nitrogen in the soil, meaning farmers living in dry lands are at advantage in growing it because it improves on soil fertility," Dr Kalule explains.

Most varieties grown by farmers in Uganda are landraces adapted mainly for survival than for increased yield.

He notes that yields from such varieties average 800 kg per hectare from dry pods yet, yields of 3,000kg per hectare have been achieved from on - station plots.

Farmers usually obtain low yields because of a combination of factors such as unreliable rainfall, non-irrigated cultures, and traditional small scale farming with little mechanisation, outbreaks of pest and diseases and the use of low yielding seed varieties, mainly uncertified seeds.

Research efforts have endeavored to breed varieties that are high yielding, resistant to major pests and

diseases, tolerant to drought, high in oil content and have a short to medium maturity period, as well as to develop appropriate production packages.

These efforts have resulted in the release of 14 varieties, the most recent being Igola 1, Serenity 1R, Serenut 2T, Serenut 3R, Serenut 4T and Serenut 6T, which is particularly resistant to aphids a major threat to the crop because it releases poisonous substance when feeding.

There is an on-going research addressing issues of pest and disease resistance as well as drought tolerance. The initial line was obtained from Malawi and Scientists crossed the pollen to the hybrid serenut series. Currently they are evaluating the uniformity size of the seed, stability in growth, iron content, level of protein and ability for good yield at the field trial site in Serere.

This variety has been taken to Nabwine in Moroto for field trials, showing between 1,000 to 1,200 kg per hectare yield potential maturing in 80 days. It has a characteristic of being covered with soil and has deep roots. It also has oil content of between 43 to 50%.

Ms Christine Eclama, a field assistant, explains that the process of breeding groundnuts is not that smooth because she has to ensure that the seed bed is well prepared, mark the date of planting, carry out irrigation and mark those that have failed to germinate. This close observation leads to selection of the right breeding material.

Dr Kalule advises that farmers who are already engaged in growing groundnuts should observe the right spacing between rows, which is 45cm as well as proper harvesting practices where they should be allowed to dry.

The groundnut programme is funded by development partners like the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), in conjunction with Naro. The project attracts between US\$ 120,000 - 150,000 annually.



## Grubs up: insects for nutritious animal feed

By 2050, world meat production is projected to double, with the fastest increases occurring in developing countries. While this growing market provides an opportunity for livestock farmers, the necessity for quality protein – the most important (and costly) component – in livestock feed is ever more important.

By Jessica Summers, WRENmedia

**A** project in Kenya and Uganda, 'Insect Feed for Poultry and Fish production in Sub-Saharan Africa, (INSFEED)' is investigating how insects can be utilised for animal feed in place of soybean, for example. "Insects are an excellent source of proteins with nutritional qualities similar to those of meat and fish," explains Dr Sunday Ekesi, leading the programme on insects for feed at *icipe*.

To keep up with rising worldwide consumption of meat, livestock farming is proving to be increasingly more costly, not just financially, but also for the environment, especially if animal feed production

and transportation are taken into consideration. Livestock farming currently accounts for around 18% of human-induced global emissions, which will increase with rising demand for animal products. As demand increases, so does the necessity for livestock feed, of which protein is the most expensive component (provided usually in powder form, as well in granules from soybean and fishmeal). "Nitrous oxide is released from fertilisers applied to fodder crops grown for livestock feed. Using insects as feed, instead of fodder, limits the level of harmful gases being released. 25 kg of feed are required to produce 1 kg of beef compared to 2.2 kg required to produce 1 kg of crickets," explains Ekesi.

"We can therefore play a role in mitigating climate change as well as ensuring protein and other essential minerals are available in nutritious animal feed."

So what is this innovative project doing to meet this challenge? Firstly, INSFEED is developing an open-access inventory of insects detailing specific nutritional qualities of commonly-found and easily-reared insects. "This is helping us focus on the species with the most potential for use in poultry and fish feed," explains Ekesi. So far, an Africa-based list of 500 species have been identified as a starting point. "We are looking at appropriate insects with basic requirements for rearing and harvesting in Kenya and Uganda:

grasshoppers, crickets, black flies, fruit flies and beetles." The next step will be to develop rearing and harvesting guidelines for small-scale farmers.

The project is aiming to engage small-scale farmers in a number of ways. "Firstly, we want small-scale poultry farmers to rear their own insects, to mix them in with other ingredients used for poultry feed, which they are currently doing but, with more expensive protein sources. Secondly, small-scale poultry farmers will also be able to buy cheaper but safer commercially produced, insect-based feed on the market. Thirdly, small-scale insect farmers can use their own reared insects in other livestock feed, or to sell to larger companies for processing. Finally, small-scale insect farmers could also create associations to produce insects for sale as raw material or semi-processed (e.g. dried whole insects or ground into flour) for sale to smallholder, and medium to large-scale poultry and fish producers," suggests Dr Komi Fiaboe, senior scientist and coordinator of the INSFEED project at *icipe*.

### Reaching out: a market built on trust and safety

One of Dr Ekesi's key roles in relation to the project is assessing food safety issues throughout each step in production and marketing, later ensuring that any poultry or fish feed developed meets the regulatory standards of the Bureau of Standards in both Kenya and Uganda. "We have had to engage government from the beginning as insects are still considered impurities in Eastern Africa. There are no guidelines in place for insect-based feed for animal consumption so we are working to establish a national committee [in Kenya and Uganda] which can monitor the whole value chain, recognising the role insects can play in providing protein for animal feed."



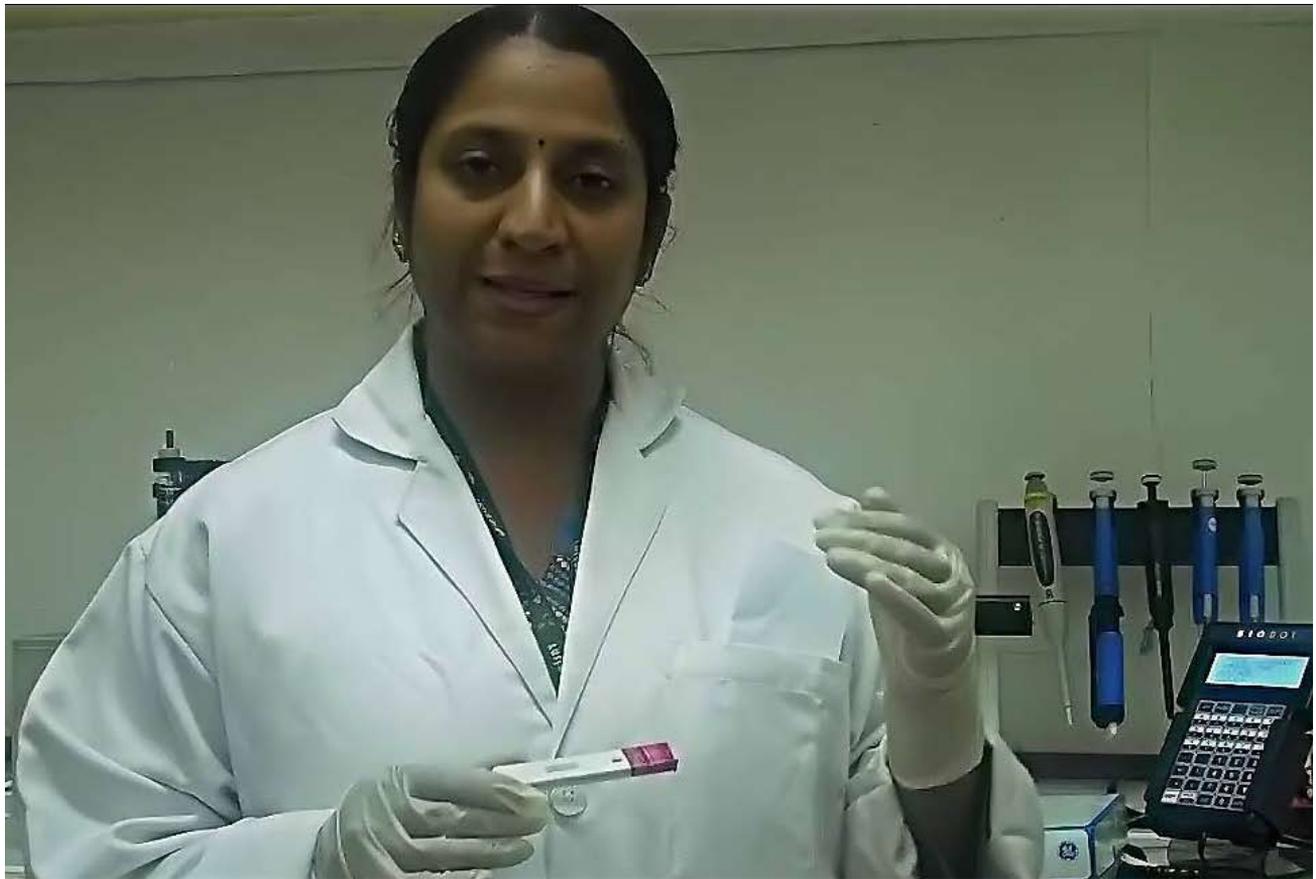
Another critical factor is the attitudes of potential customers, growers and existing livestock keepers towards using insects as a key nutritional resource for animal feed. "What we are finding at this preliminary stage of the project is that commercial users are primarily concerned with livestock health and not the specific source of protein for feed. As long as scientific evidence can prove that using insects in feed does not negatively impact livestock health, livestock feed producers are happy and we are confident the market is there." However, Ekesi continues: "The challenge will be making insects for feed available in sufficient quantity in a cost-efficient way as a viable alternative to fishmeal and poultry by-product meal production."

The project is also investigating how accessible rearing of insects will be for smallholders and youth in particular. "This was one of the top criteria for our insect species-selection. We are looking at various production techniques, availability of substrates and also food safety issues," emphasises Ekesi. A widespread problem in Africa is collection and disposal of organic waste materials, for example from vegetable markets. However, the black soldier fly (*Hermetia illucens*) can be reared on organic waste before being harvested for protein in feed.

Therefore in production, the black soldier fly has a dual purpose: to break down waste which can be used as fertiliser; and to be harvested or dried for nutritional use in animal feed. But to ensure sustainability, Ekesi acknowledges that it will be essential to work closely with the private sector and initial responses have been promising. "So far, our private sector partners have been amazed by the black soldier fly's high level of production, flexibility and ease," he enthuses.

However, there will be ongoing challenges as other insects are proving harder to produce. For example, grasshoppers and beetles take a relatively long time to multiply, therefore further research is needed to establish commercial viability. Still, Dr Ekesi and his team remain optimistic about progress in the coming months. "Firstly, we want to make production simple so rearing insects can be done in a backyard garden, as well as on a medium-scale. Secondly, we want to be sure that the protein content we obtain from insects does not vary too much depending on the production system. Thirdly, we will continue working to help create an enabling regulatory environment."

"We are not saying insects are the answer to global food security. But it is clear that certain insect species can bridge a significant gap in nutritional year-round, affordable animal feed," concludes Ekesi.



## First portable low-cost device developed for rapid detection of aflatoxins

*New device can detect contamination at levels of 10 parts per billion (ppb) in less than 15 minutes*

**By Showcat Rabi Nather** | [R.Showkat@cgiar.org](mailto:R.Showkat@cgiar.org)

**A** new technology that detects aflatoxins within 15 minutes on location has been launched. The rapid test kit device will cost under US\$ 2 and is expected to save lives and open export markets for African and Asian countries. It will be the first portable cost-effective way for farmers and others to detect aflatoxins instantly.

"ICRISAT has been working with smallholder farmers in Africa to

combat the aflatoxin problem. This kit will enable rapid and cost-effective deployment by the government and private sector to protect public health and also improve the export prospects for African countries," says Dr David Bergvinson, Director General, ICRISAT.

The test kit, developed by Dr Anitha Seetha requires limited technical knowledge or training. For example it can be used by traders to check for contamination

before concluding a sale. The rapid detection is useful for public health authorities to help identify suspected samples in cases of an outbreak of aflatoxin poisoning.

The compact portable device is based on the lateral flow immunoassay test (popularly known as the strip test like that used to detect glucose in human blood). If aflatoxin is present in the sample, then one pink line appears on the strip, whereas if the sample doesn't have any aflatoxin, two pink lines will appear.

“The device will contribute to manage and reduce the entry of aflatoxins in the food value chains, improve diagnosis for local and export trade and support the food processing industry to maintain low exposure levels in food products in our local markets as well as for export markets,” said Dr Seetha who currently works as a scientist at ICRISAT, Malawi.

Its predecessor, the competitive Enzyme-Linked Immunosorbent Assay <cELISA> test, (also developed by ICRISAT in 2000) has to be done in a laboratory by trained technicians, and other analytical tests) can take up to 2 days.

Aflatoxin is carcinogenic which basically refers to any substance, radionuclide or radiation that is an agent directly involved in causing cancer.

This may be due to the ability to damage the genome or disrupt cellular metabolic processes.

The Food and Agriculture Organization (FAO) estimates that 25% of all crops in the world are affected by aflatoxins. The WHO recently estimated that in 2010 around 20,000 people died globally from aflatoxin poisoning and an equal number fell ill.

Groundnut, maize, sorghum, pearl millet, chilies, pistachios, cassava and other food products are contaminated by aflatoxin each year. They not only affect human and livestock health but can also affect the marketability of food products. Many countries reject imports of agricultural products that exceed certain levels of aflatoxin, costing farmers millions of dollars every year.

Around 90 countries have regulations that establish maximum aflatoxin limits in food and feed products. The limits range from 4 ppb in the EU to 15 ppb in the USA.

Aflatoxin contaminated food can pose a serious health risk. Symptoms of aflatoxin poisoning include: liver cancer, fluid retention, increased incidence of Hepatitis B infection, and stunting in children. In poultry and livestock, aflatoxin can cause feed refusal, loss of weight, reduced egg production and contamination of milk. Tropical countries are primarily affected, which includes the majority of Africa, India and other south Asian countries.

The test kit was developed by ICRISAT with funding from the McKnight Foundation and in collaboration with partners including the National Smallholder Farmers Association of Malawi-NASFAM, Farmers Union Malawi (FUM), Kamuzu Central Hospital and Nkhoma Hospital, Malawi. It is a simple non-laboratory based kit that can be used directly by non-technical people such as farmers, agro-dealers and food processors. Currently, the test can be applied to detect aflatoxin in groundnuts.

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**Benson Ninai on his way to the community bylaw drafting meeting at a local school**

# Ogiek's unending struggle to protect their ancestral home

**By Sophie Mbugua** | [sophiedans0@gmail.com](mailto:sophiedans0@gmail.com)

Since the 1970s, Benson Ninai of Sesimwani village in Eastern Mau Forest has held on to a land number allocated to him by the then government. All these years, he has held on to hope that the government would one day recognise it and issue a title deed for the land he claims to be his ancestral home – the Mau Forest Complex.

"We have those old numbers allocated by the government in 1975. The former government said the areas they allocated us are already occupied by other communities who are title deed holders," says Ninai. "We feel discriminated against as the other farming communities were allocated land but when they got to us,

they claimed our area was forest land" adds Ninai.

The Ogiek, a hunting and gathering community, totaling to about 350,000 members, have been living in the Mau Forest for generations.

The Mau Forest Complex is the largest block of forest cover in Kenya. Located in the central part of the Rift Valley province, it measures approximately 400,000 hectares. It is a critical water catchment area and the source of fourteen out of fifteen major rivers found on the western side of the larger Rift Valley. The complex feeds five major lakes, among them Lake Natron, Lake Turkana, and Lake Victoria, shared amongst Kenya, Tanzania, Ethiopia and Uganda.

In March, this year, Sarah Osasi of Ngongongeri Village of Marishoni area in Elburgon was among members of the Ogiek community forcefully evicted from the land they claim to be their ancestral land. "People who had title deeds evicted us, drove our livestock away, and burned our belongings and food under the protection of the authorities," she claims.

The forest has been a source of food for the hunter-gatherer community. It has caves and shrines used for religious and cultural rituals and sacred trees used in traditional ceremonies.

Trees such as the Sopoitit (*Ficus thonningii*), the Oloirienit (*Olea europaea*) and the Septet (*Podocarpus latifolius*) are sacred and used in



**Joseph Chemaina showing the logbee hive affixed on the indigenous Yemdit tree**

circumcision ceremonies while prayers are held under them. Tea made from the Sinentet (*periploca linearifolia*) is sweetened with honey and served to the elders conducting the prayer service. During wedding ceremonies, the sinentet and sopoitit leaves are used for bridal decoration to signify blessings from the parents.

Daniel Kobei, executive director of the Ogiek Peoples' Development Programme (OPDP), says that the Ogiek community has lacked recognition since colonial times, leading to their political, social and economic marginalisation. With the support of the Namati Community Land Protection Programme, OPDP is helping the community to map and document their ancestral land and create by-laws that will govern them in preparation for the passing of the 2015 Community Land Bill.

"The Ogieks have had traditional rules that have governed the use of trees, protection of water sources, sacred places, where to graze, and social rules. However these rules haven't been written down. We aim to empower the community to use national land laws to protect their customary and indigenous land," explains Kobei.

When the bill is enacted (probably by August 2016) – the 67 per cent of the country's community land held in trust by the County government will be officially registered. This will enable communities such as the Ogiek to secure land rights and to possess title deeds.

OPDP has been educating communities on various legislations such as the Constitution, the

Community Land Bill, and the Kenya Forest Service Act - as well as the United Nations Declaration on the rights of Indigenous Peoples, governing the Indigenous people globally.

Once the draft by-laws have passed legal checks to ensure they abide by existing local, national, and international laws, the community will vote on the by-laws. If two-thirds of the community votes in favour,



**Joseph Barngetuny shows off langstroth beehives in his farm**



**Nahashon Kiptoo shows the wild berries they fed on**

the by-laws will officially be adopted by the community and a copy of the signed legislation handed over to the county government.

According to Kobei, the Ogiek community has been seeking justice over their land in the Kenyan law courts since 1992 without success. At some point, they were allocated five acres, but other communities were given their reserve. This forced them to take the case to the African Court to fight for their reserve- this case is still ongoing.

"In 2009, we went to the African Commission on Human and Peoples Rights and in 2012, the case was taken to the African court. In 2014, we had a hearing in Addis Ababa, and we were told to have an amicable settlement with the government, which gave us weird conditions - every

Ogiek to bring a birth certificate. Where would an Ogiek born in the forest with our forefathers never visiting hospitals at the time get one?" asks Kobei

Kobei is optimistic that the pending case at the African Court will not hinder them once the community land bill is passed. He also hopes that the county government will accept the adopted by-laws, and a management plan will be drawn to protect and give the community access to their ancestral land.

Odenda Lumumba, the Kenya Land Alliance Chief Executive Officer, notes that at the moment, a decision or a ruling by the African Court ruling can only be an added value, but cannot delay the Ogiek efforts from obtaining title deeds to their community land.

"In any case, the African Court seems to prefer the matter to be

settled through Alternative Dispute Resolution Mechanisms (ADR), with the African Commission on Human and Peoples Rights being the Arbitrator. ADR is faster, quicker and not drawn back by the tedious litigation process that often tends to lean more on technicalities," explains Lumumba.

However, Lumumba is quick to add that, community land law once passed could be delayed in implementation due to an excuse of lack of resources. but more so due to vested interests in natural resources embedded in community land.

"It would take more than a minority group of Ogiek community to pressure the government to commence and enforce the community Land law, assuming it retained the pro-poor community friendly provisions," notes Lumumba.

# New storage bag developed to fight post harvest losses



By **Diana Ngaira** | [Daina\\_ngaira@dai.com](mailto:Daina_ngaira@dai.com)

**A** user friendly hermetic storage bag, hailed as a measure to curb post-harvest losses at the farm level, has been launched in Tanzania. Simply known as Purdue Improved Crop Storage (PICS) bags storage, the technology is set to help mitigate against post-harvest losses.

Currently the bags cost USD 2.5 in Nairobi and its environs.

Post-harvest crop losses, currently estimated at between 25 and 40% in the country, continue to

affect food security in the region. Often maize and beans are the main staples, and both crops are highly susceptible to infestation. The current practice of applying chemicals to the produce for preservation has often proved ineffective, expensive and poses risks to consumers' health.

Pee Pee Tanzania Limited, a beneficiary of a grant from the FoodTrade East & Southern Africa (ESA) programme, launched the technology in Dodoma, Tanzania.

The company has tested the PICS bags in more than 3,400 villages in collaboration with district councils and the media. At full capacity, Pee Pee Tanzania Limited can produce 3,000,000 PICS bags per year. Overall distribution of the PICS hermetic technology is estimated to have reached more than 1.1 million farmers in Tanzania and Kenya, by June 2016.

The technology provides farmers with appropriate storage options and flexibility about when to store or sell their produce. UKAID, through the FoodTrade ESA programme, provided a grant of £500,000 to build the capacity of Pee, Pee Tanzania Limited, a project dubbed Capacity Enhancement; Hermetic Storage Sacks.

The grant has enabled the company to establish a commercially sustainable Agro Dealer network, supported installation and commissioning of new machines and utilities, facilitated conclusive operational and process training in the manufacture of PICS bags for the newly recruited additional workforce, and allowed the company to raise substantial regional awareness of the product.



**Impact of climate change as this farmer's sweet potato veins are destroyed by frosting**



## Hope for farmers in new Climate Change Act 2014

By Joyce Chimbi | [j.chimbi@gmail.com](mailto:j.chimbi@gmail.com)

**A**s the farming sector in Kenya continues to buckle under the weight of severe climatic changes, experts are blaming the low adaptive capacity on the lack of a national policy and law on climate change.

But this will soon change since the Climate Change Bill 2014 was recently assented to by President Uhuru Kenyatta making it legal and binding.

"It has been a long journey but we finally have a law that will guide the design, implementation, monitoring and evaluation of climate change adaptation and mitigation efforts," says Judith Gicharu, a scientist and environment expert.

The United Nations scientists have already warned that as maize growing areas become warmer, maize production-the country's main staple

crop - will reduce by a fifth and yields on other staple food including beans will shrink by 68 percent.

In Rift Valley region alone at least 300,000 maize farmers are facing this threat. Additionally, an estimated 500,000 small scale tea farmers are facing uncertainties to their livelihood necessitating the need for the passing the Bill to provide a roadmap for adaptation and mitigation efforts.

Kenya's climate change legal framework has until now been sectoral and fragmented, each sector having its own legislation, which includes the Water Act 2000 and the Environment, Management and Coordination Act 1999.

Experts such as John Kioli, the Chair of the Kenya Climate Change Working Group whose main mandate is to combat climate change, and the brains behind the Climate Change, Authority Bill 2012, say that sectoral

laws cannot meet the challenge of severe climatic changes.

"We carried out research on the effects of climate change on various sectors including agriculture and concluded that there were significant legislative gaps hence the need for a clear climate change Act," he says.

He says that the nearly 100 sectoral laws and policies relevant to climate change can in no way comprehensively address the real threat that climate change continues to pose to at least five of the eight million households in Kenya who depend directly on agriculture.

Hon Wilberforce Ottichilo, a Kenyan Member of Parliament who chairs the parliamentary Network on Renewable Energy and Climate Change, an informal caucus says, "Kenya is the only country in Africa that is spearheading issues of climate change by initiating this vital climate change Bill."

Kioli says that the country's first tangible commitment to combating climate change was in the December 2009 promulgation of the National Climate Change Response Strategy (NCCRS) – a plan that would ensure robust measures were put in place to combat climate change.

Kenya has already been hailed for adopting the 2013-2017 National Climate Change Action Plan to operationalise NCCRS. Experts say that NCCRS is however, not a policy document.

Although a policy is not enacted by the national assembly and therefore not legally binding, it is an important framework implemented through an Act.

Gicharu says that the National Climate Change Action Plan "accomplished the difficult task of highlighting the need to have a policy and law specifically on climate change."

But she says that these efforts have placed Kenya, among few other African countries including Ethiopia, Rwanda, Mozambique and South Africa that are taking domestic action to tackle climate change.

But it has nonetheless taken five years for the Bill to get to this juncture and upon its passing into an Act, one of its key provisions is to establish a Climate Change Council.

"The Council will be independent and autonomous bringing together stakeholders from the government, Civil Society Organisation, the private sector, as well as representatives from the community," Gicharu explains.

Involving the community is key since lack of public involvement led to the Bill's rejection in 2013 by the then President of the country Mwai Kibaki.

A critical task that the Council is expected to accomplish is that of addressing the incoherencies in the existing laws and policies relevant to climate change and this is no mean task for there are nearly 100 of them.



Since climate change has now been acknowledged as more of a development than environmental issue relegated to just one or two government ministries, the Council acknowledges this humongous task and will advise both national and county governments on measures necessary to mitigate and adopt to climate change.

In keeping with the seriousness of the matter at hand, this Council shall be attached to the Office of the Deputy President (who will also serve as Chair of the Council), and shall be the sole policy-making body of the government tasked to coordinate, monitor and evaluate the programs and actions of the government.

"The Council will, even more importantly, guide the implementation of regional and international conventions to which Kenya is party to and file a report on Kenya's adherence to these obligations," Gicharu expounds.

Now that it has been enacted, the Act will establish an independent Climate Change Authority with legal powers to self-regulate and a Climate Change Trust Fund to finance adaptation projects.

Money is key towards effective and efficient adaptation and mitigation efforts since government estimates

show that the five year National Climate Change Action Plan requires a substantial investment of about one trillion (US\$ 12.76 Billion), which is equivalent to the national budget.

Additionally, experts hail further ongoing efforts to put a policy in place that will go hand in hand with the Act. The policy is key and will be implemented through the Act.

Dubbed the Climate Change Framework Policy 2014 - and the Act were being developed concurrently.

Although Kioli says that in as far as legislation is concerned, the country is in the right direction particularly now that a law is in place, challenges abound particularly "the inadequate understanding on the difference between environment and climate change."

Kioli says that this is evident in the fact that some quarters have been calling for the revising of the 1999 Environment, Management and Coordination Act to serve as a solution to climate change.

Actual allocation of funds for climate change will present additional challenges as will the selection process of the persons to join the critical Climate Change Council which is the heart of the Bill's implementation when it soon becomes law.

**Patricia Nzamwitankuze displays her tomato tree fruits on the family farm**



## Rwanda: How fruit trees are fighting poverty and malnutrition

By **Sophie Mbugua** | [sophiedans0@gmail.com](mailto:sophiedans0@gmail.com)

**K**nown as the land of a thousand hills for its lush, rising and falling landscape, the green steep slopes of Nyabihu province, 71 kilometres west of Kigali, compete with layers of tree shrubs bearing egg-shaped edible fruits.

Underneath the tree shrubs, Kamanzi Celestin is busy tending to a layer of tiny trees planted in neatly arranged black 1 kilogram paper bags. "These are tree tomato or tamarillo nursery beds," Kamanzi explains with a smile.

Kamanzi and his wife have been planting and selling tomato trees and fruits for over two years now. They have also been composting organic manure from trees, which they use instead of inorganic fertilizers.

"The tree tomato seedlings are very expensive and in high demand in Nyabihu District. A seedling costs RF100 (Kshs 14) making it impossible to buy bulk seedlings during planting," explains Kamanzi.

Currently, he has over 2000 trees on a nursery which he has grown from collecting seeds from other farms and that of his wife. "I bought mature fruits, dried them and developed seeds from them. 1 kilogram of the fruits cost about RF1000 (US\$ 1.3). We will plant about 500 at the farm and we will sell the surplus at RF100 {Kshs14} each," he says with a smile.

His wife, Patricia Nzamwitankuze, currently has 52 mature fruits and an extra 350 trees, which she expects to start harvesting in the next one month.

"My children can now enjoy eating fruits which was never the case before. Currently, I harvest 20 kilograms after every two weeks after which I sell a kilogram at RF700 (US\$ 1) and buy food and porridge flour for my young children and other different fruits" explains Nzamwitankuze. "This year I have also managed to buy two mature sheep and a lamb which cost me about RF73000 (US\$ 100).

The fruits rich in vitamins, iron, dietary fibre and minerals have not only added an extra coin to the Kamanzi family but also enhanced the family nutrition. The family which lived on less than a dollar a day before, could not have managed to buy fruits daily from the market. "It's hard making a choice between fruits and porridge

flour when you have little money, but now it's not a hard choice as the fruits are readily available and I have some cash every two weeks. My family can have alternative fruits compared to before," she asserts.

According to the Rwanda Demographic and Health Survey 2014/15, 38 per cent of all children in Rwanda are chronically malnourished or stunted (shorter than they should be for their age) mostly due to insufficient food intake, micronutrient deficiency (minerals and vitamins) lack of knowledge about proper infant and young child feeding, household food insecurity and recurrent illnesses.

1 in 5 women aged between 15 and 49 years are anaemic (have a deficiency in red blood cells in the blood), with inadequate nutrition among pregnant women contributing to a higher number of babies born with low birth weight.

"This indicates a degree of progress. Between 2010 and 2014/15, the percentage of underweight children (weighing less than they should be at their age) reduced from 11% to 9% and those stunting (shorter than their age) has reduced from 44 to 38%, while the anemic women have reduced from 1 out of 10 in 2010 to 1 out of 5 in 2014/15," explains Rwanda's minister for Agriculture and Animal Resources, Mukeshimana Geraldine.

According to the United Nations International Children's Emergency Fund (UNICEF), vitamins and minerals found in fruits such as the tree tomatoes, are critical components of a high-quality diet and have a major impact on health. Millions of children suffer from stunted growth, cognitive delays, weakened immunity and disease as a result of micronutrient deficiencies. The lack of essential vitamins and minerals in pregnant women increases the risk of low birth weight, birth defects, stillbirths, and even death. While they are only required in tiny quantities, micronutrients are the fundamental building blocks of healthy brains, bones and bodies.



### Agro-forestry tree biomass

Apart from growing tree tomatoes, the Kamanzis cultivate *Alnus acuminata* trees for soil improvement and soil erosion prevention. *Alnus acuminata* trees are a fast-growing, nitrogen-fixing tree species which enrich soil quality as they grow.

"We prune the trees during the dry season, then we bury them under the soil about 5 layers of the tree leaves with cow dung and ash added atop the leaves, then we leave it for 5 months to decompose. We prepare enough organic manure to plant during the rainy season," says Kamanzi. "The organic fertilizer helps generate higher yields, it's friendly to the soil and climate and it's easily available compared to the inorganic fertilizer we buy at RF34,500 (US\$ 47) per bag," he adds.

The World Agro-forestry country representative in Rwanda, Dr Athanase Mukuralinda notes that healthy soils should be capable of taking up, holding and supplying water and nutrients to the plants. "Compositing manure helps break down nutrients into forms

that are easily taken up by the crops, hence providing required nutrients to each crop in a soluble form that plants can use immediately. This increases soil stability, aeration, its ability to hold water, moisture, moderates soil temperatures and protects the plants from diseases," adds Mukuralinda.

With reduced soil fertility, rising population and climate change already exerting significant negative pressure on the Eastern African country's agriculture, Mukuralinda advises on embarking on agro-forestry, in particular fruit trees that would allow for both environmental and economic benefits.

The Trees for Food Security Project funded by the Australian Centre for International Agricultural Research (ACIAR) is aimed at enhancing food security for resource-poor rural people in Eastern Africa through research that underpins national programmes to scale up the use of trees within farming systems in Ethiopia and Rwanda. The successes are being scaled up in Uganda and Burundi.

# Vaccines boost backyard poultry rearing in western Kenya

By James Karuga | james.karuga@gmail.com

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## The graduate poultry keeper

In Homa Bay County, located in western Kenya, poultry vaccinations provide a new lease of life for the indigenous village poultry sector. Spearheaded by the Global Alliance for Livestock Veterinary Medicines (GALVmed), vaccines have transformed traditional indigenous poultry keeping into a thriving enterprise attracting people of all ages due to the improved income it now offers.

James Guma Ojwang is a 26 year old communications and media graduate, and a full-time indigenous poultry farmer. He began rearing indigenous chickens in 2014 at his father's home in the Wangcheng Location of Homa Bay County. Previously, Guma had worked on short-term contracts as a researcher for Population Services International, Kenya. To earn extra income, Guma decided to rear chickens, which take up little space compared to goats or cows. "The land here is not mine so rearing other animals can be challenging," he said.

Guma began with five chickens, which increased to 94 by hatching the conventional way using a hen and fertile eggs. But his early success was cut short in 2015 after losing 60 chickens to poultry diseases. Since then, Guma now diligently vaccinates the chickens against Newcastle, Gumboro, and Marek's diseases. He spends approximately KSh 5,000 (US\$ 49.40) on vaccines over the course of four months' worth of protection.

Today, Guma has 70 indigenous chickens of the improved Rainbow breed – 15 cocks and 55 hens with



135 six-week-old chicks. He rears his chickens in a metal house built of iron sheets where the chickens stay at night. Chicken mesh fencing extends around a small compound with pawpaw trees where the chickens can roam freely during the day.

According to Guma, regular vaccinations have increased his chickens' survival and productivity. He vaccinates the chicks at one-day-old, two weeks and up to a month. And Guma enjoys the earnings – in a good month he makes KSh 12,000-15,000 (US\$ 120-150) selling eggs when laying is at its peak. During the 2015 Christmas period and into early January 2016, Guma made KSh 80,000 (US\$ 792) selling 140 chickens at the market. "Chickens, unlike electronics, aren't liabilities. I earn from them and that's why I value rearing them," said Guma. He explains that unlike most youths who spend their money on buying the latest technological gadgets like phones, he would rather have a long term outlook and invest his money on poultry with guaranteed income returns.

The positive economic impact of rearing chickens means Guma has

chosen not to look for other jobs. Instead he sees his poultry enterprise as a viable source of income to provide start-up funding to enable him to expand. In the long-term, Guma plans to supply organic markets with indigenous chickens. "I aim to rear chickens in an organic way to target consumers in that niche market," said Guma.

## The motorcycle-taxi driver turned poultry keeper

Within the same county in Kubuya East Sub-location, 25 year old Kelvin Odhiambo, a motorcycle-taxi operator (boda boda), also agrees his future has been improved by indigenous chicken rearing. He began rearing chicken in February 2016 after transporting chicken feed to a client's home and admiring the flock. Odhiambo bought 100 day old chicks from Kukuchic Breeding Farm in Rakwaro, his hometown, and credits timely vaccinations to all of them surviving to five months old. "I have vaccinated the chicks about five times so far since February," he said.

Odhiambo consistently vaccinates his chickens against Gumboro,

Newcastle Disease and Fowl Typhoid. He also understands how important hygiene is. Before anyone enters the chicken shed, they must dip their feet in a disinfectant to avoid spreading possible infections. Since he started rearing chickens four months ago, vaccinations and medicines have cost him about KSh 4,000 (US\$ 40). Once the chickens are five to six months old, he will start collecting eggs and sell them locally. Odhiambo aspires to rear 1,000 chickens and quit working as a boda boda operator, which he hopes will happen soon.

Odhiambo rears his chicken in a metallic shed with an adjacent chicken-mesh area. The shed which cost him KSh 70,000 (US\$ 700) to build including feeders/drinkers, surrounds a small compound with a tree where chickens freely roam during the day. Drinkers with water and feed hang from the tree, Odhiambo feeds the chicken at 8am and 1pm each day.

"I value rearing chickens more than cows because in a few months I will get the eggs, but cows take about three years before getting anything from them," he said.

### **The pastor turned poultry keeper**

For 40 year old Newton Onyango Atela, pastor and father of five, improved indigenous chicken rearing economically sustains a home he runs for 187 disadvantaged children. Survival (and vaccination) of his 1,500-2,000 chickens matters, especially after he lost three-quarters of his 700 chickens to diseases preventable by vaccination in 2014. The chickens are reared free range and roam in a chicken mesh-enclosed compound. There are also iron sheet sheds where chickens stay at night, and the mud huts are used for brooding.

To ensure the chickens don't succumb to Newcastle, Gumboro or Fowl Typhoid diseases, Onyango vaccinates them every two to three weeks up to eight weeks old.



Medication and vaccines cost him up to KSh 15,000 (US\$ 150) every four to six weeks. Hygiene practices are also maintained in the sheds, which have reduced disease outbreaks. "We are very serious on vaccines but we give medicine only when there is a disease," said Onyango. That has reduced deaths to 2%, which mostly occur in the brooder.

Revenue at Onyango's 12 hectare farm is generated by bulk sales of chickens to individual buyers or institutions such as colleges. During good months – such as festive periods – chicken sales are worth up to KSh 200,000 (US\$ 2000) and in bad months are worth about KSh 100,000 (US\$ 1000). Buyers also purchase chicks from the farm aged from one day old to over three weeks old. But eggs from the 350-360 layers are for the children in the home. Onyango has treasured chickens since he began rearing them two years ago; at times they have gotten him out of financial difficulties. "I have satisfaction having them. It's something golden to me," he says.

### **The tailor turned poultry keeper**

Onyango's view is shared by 54 year old Hellen Atieno Rudolph who values her flock of 28 improved indigenous chickens above any other possession. She has been a tailor in her hometown of Kakwaro for 20

years and as a tradition, kept local indigenous chicken. Still she never imagined the chickens would out-earn her tailoring business.

That changed in 2014 when, after training by the NGO, Technoserve, in her village, Atieno switched to rearing improved indigenous Rainbow breed chickens. She learned the importance of vaccinating her chickens against diseases like Gumboro, Newcastle Disease and Fowl Pox. Today, with 0.4 hectares, the widowed mother of three earns about KSh 1,200-1,500 (US\$ 12-15) per month from selling a single chicken.

Atieno currently collects five eggs a day and locally sells one egg for KSh 10 (US\$ 1). "In a week I can alter and repair one or two dresses but the chickens bring in a lot more than tailoring," she says. Atieno vaccinates her chickens every three weeks until they are eight weeks old. On her piece of land she also grows groundnuts, maize, millet and vegetables on a subsistence basis. "Most of the food I eat I get from my farm. I don't rely on buying from the local markets," says Atieno.

According to a report by the Kenya Institute for Public Policy Research and Analysis, Kenya has about 31.4 million indigenous chickens being reared by farmers in rural areas. Actually indigenous chickens account for 84.1% of all poultry reared in the country.

# Taking control: tackling sheep and goat plague

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By **Susanna Cartmell-Thorp**, WRENmedia | [s.cartmell@wrenmedia.co.uk](mailto:s.cartmell@wrenmedia.co.uk)

**S**mall ruminants – sheep and goats – are a vital asset for many of the world’s poorest livestock keepers and are reared in large numbers by pastoral communities. However, according to the UN Food and Agriculture Organization (FAO), 80% of the world’s 2 billion small ruminant population in Africa, the Middle East and Asia are threatened by a disease known as Peste des Petits Ruminants (PPR). First discovered in 1942 in Côte d’Ivoire, this virulent disease has since spread to over 70 countries and many more remain at risk, particularly with the movement of animals by pastoral communities. Once introduced, the PPR virus can infect up to 90% of a flock or herd and is fatal to up to 70% of infected animals.

Another similar viral disease affecting sheep and goats is known

as Sheep and Goat Pox (SGP), which has a mortality rate of about 50% and equally presents a significant loss for any livestock keeper.

Vaccines for both PPR and SGP are available but their use has been predominantly limited to governments vaccinating livestock once an outbreak occurs. However, this does not prevent fatalities and farmers therefore lose infected herds and flocks. Even animals do not die, they lose weight, milk yields fall and their market value is reduced. There is no treatment for infected animals and vaccination is the only way to prevent and reduce the incidence of these serious ruminant diseases. Despite the value of their animals, and the devastating effects of these two diseases, livestock keepers do not routinely vaccinate their livestock to prevent serious losses occurring.

“When PPR was first reported in Uganda in 2007, an estimated 700,000 goats and sheep died,” says Chrisostom Ayebazibwe, senior veterinary officer in Uganda’s Ministry of Agriculture, Animal Industry and Fisheries (MAIF). “Since then, there have been regular interventions to avoid another major epidemic. But, we still estimate that around 10% of sheep and goats are dying quietly from PPR. Many more poor livestock keepers are affected by SGP, which often goes unreported. We need to do a lot of work to assist the populations that keep these small ruminants.”

To help raise awareness about the two diseases and the need for routine vaccination, the Global Alliance for Livestock Veterinary Medicines (GALVmed) is working with partners in various countries to sensitise pastoralist communities and other livestock keepers.

This is no easy task when livestock keepers are used to governments vaccinating their animals for free. "Our challenge is to inform livestock keepers so that they can take control of their own livelihoods; if they routinely vaccinate their animals then outbreaks will not take hold and losses will be reduced," says Abdallah Said Twahir, GALVmed's Director of Market Development and Access.

### "Two-for-one"

GALVmed, a not-for-profit organisation working towards making livestock vaccines available and accessible for smallholder farmers, is supporting the wider availability of a combined vaccine for PPR and SGP developed by the Moroccan animal health company, M.C.I. Santé Animale. MCI is the only vaccine manufacturer worldwide to produce and register a combined PPR/SGP vaccine. The combined vaccine will provide protection against both diseases and will be made available through government vets, private vets and agrovet shops at a fee. Farmers will be able to purchase the vaccine to protect their livestock against PPR or SGP.

In 2015, Ayebazibwe reports that vaccine trials of the MCI combined PPR/SGP vaccine - LYOPOX-PPRTM were launched. In Moroto, in Karamoja in north-eastern Uganda, 700,000 sheep and goats were vaccinated along with 30,000 in Sembabule in central Uganda. "Karamoja is a hot spot area for PPR," states Ayebazibwe. "This is where the first PPR outbreak was reported. It is a pastoralist area and there is a lot of cross border movement of animals."

Livestock keepers have greatly appreciated using the combined vaccine. Farmers reported that livestock are healthier and they would like a continuous vaccination programme. In Karamoja the vaccination has been free.



This is because livestock keepers have few resources and reducing the disease in the region is a national priority. However in Sembabule, MAIF is exploring cost-sharing with the private sector, whereby farmers pay a small fee for the vaccine. "The cost of the vaccine per animal is around US\$1," Ayebazibwe says. "This is still a lot of money for most farmers, particularly women and young people who own just a few sheep and goats to help with household expenses. But in regions like Sembabule, where a goat can be sold for up to US\$30, farmers are better able to afford veterinary and vaccination services."

One way to encourage communities to purchase the combined vaccine to protect their livestock is to target opinion leaders, states Twahir. "If we can convince commercial farmers to vaccinate and an outbreak occurs, others in the community see that their animals have not been affected and uptake becomes much better." He adds that, "Government priorities change over time and livestock keepers cannot rely on government regularly providing free vaccination services.

With a private sector approach,

farmers can choose to protect their animals and control their livelihoods. This approach allows for the sustainability of distribution of the combined vaccine."

The LYOPOX-PPRTM vaccine is registered in Morocco and awaits marketing authorisation in several countries where registration dossiers have already been submitted and accepted by regulatory authorities. These are the UEMOA centralised registration (grouping of eight Francophone West African countries), Kenya, Tanzania and Uganda. In Uganda, following the positive response from livestock keepers and communities to MCI's initial 100,000 doses, the government and FAO have ordered further supplies of the combined vaccine. "We have the capacity to supply at least 135 million doses per year," says Baptiste Dungu, head of MCI strategy business development. "The project with GALVmed to prime the market has been very useful in creating awareness and triggering more use of the combined vaccine. We hope to expand on this approach."



**European Union's Dr. Hjordis Ogendo, engages Head of Nutrition and Dietetics Ministry of Health, Kenya, Mrs Gladys Mugambi (left) during a workshop held in Naivasha, Kenya. Looking on is Josephine Kachapin from West Pokot County**

## Malnutrition: The Hidden Crisis

By **John Mwendwa Gitari** | john.mwendwa17@gmail.com

**S**nider Nabwire, a standard six girl, lives in Quare slum, an informal settlement on the east side of Nairobi, the capital city of Kenya. Quare was once a quarry that fed Nairobi's fast growing real estate sector with stone. The pit was reclaimed and filled with soil, an environmental feat that provided extra settlement space, but brought with it a myriad of social problems because Quare is home to some of the city's poorest, who live in deplorable conditions. Snider is going to school hungry yet again. Going by a recent study carried out by research

ouffit TNS, Evelyne is among one in every ten mothers who cannot afford to provide their children with breakfast daily. "I hope she does not have too many negative thoughts and can read hard and pass her exams," Evelyne says.

Undeterred, Snider jumps over streams of effluent and trash in her congested neighbourhood as she makes her way to Beyond the Vision primary school, a community school run on the good will of well-wishers. Many of the 300 pupils in this school will only have had tea for breakfast.

The school head, Jacqueline Musyoka understands what it means to teach hungry children. "Children who have not fed well do not concentrate in class, usually fall sick, fail to turn up for class and therefore tend to perform poorly in their exams." Jacinta Wayua, a standard 6 girl in the same school, says she concentrates more in class and plays more at school and at home when she has had breakfast in the morning.

Nutrition expert, Professor Judith Kimiyemwe agrees saying that lack of proper nutrition particularly Vitamin A affects the immune system,

leading to cognitive and psychomotor underdevelopment and low physical capacity. Malnutrition therefore reduces a child's chances of escaping the poverty trap.

Nutrition is a fundamental and Constitutional right for every person but Kenya's malnutrition rates are critical. According to the Kenya Demographic Health Survey (2014) 26% of all children are stunted, 4% are wasted and 11% are underweight. About one in every 26 children dies before reaching one year of age and about one in every 19 does not survive to his or her fifth birthday.

More significantly, malnutrition is the single greatest contributor to child mortality. Even though there has been a decline in maternal mortality, other nutritional conditions of concern among women include micronutrient deficiency, which also increases the risk of complications in pregnancy and compromises the future health of the mother and child.

Under-nutrition is also becoming a major factor because people are taking up bad feeding habits. Consequently, the Head of Nutrition and Dietetics at the Ministry of Health, Gladys Mugambi has sounded a health warning because 33% of women in Kenya are overweight or obese, which exposes them to diseases like high blood pressure and diabetes, which are very expensive both for the victim and for counties who now manage health care under the devolved structure of government.

While many diseases result from poor nutrition, the government invests less than 1% of its annual budget to nutrition programmes. County governments either have low budgetary allocations or non-existent budget lines for nutrition. It is estimated that funding from both government and donors represents less than 10% of sector requirements. So while Kenya was recognised in the Global Nutrition Report 2015 as the only country on course to achieve all the World Health Assembly nutrition targets, there is a real opportunity to



**Malnourished child in Nigeria**

scale up commitments and actions to deal with malnutrition more effectively.

**While many diseases result from poor nutrition, the government invests less than 1% of its annual budget to nutrition programmes**

The Scaling Up Nutrition (SUN) network bringing together government, civil society, business, the United Nations, donors and academia has the capacity to strengthen partnerships and coordination of programmes towards nutrition nationally and at county level. First Lady Margaret Kenyatta has also taken up the responsibility as the national nutrition patron, which has helped to elevate the profile of nutrition in the public domain and it is hoped will lead to stronger political and funding commitments to nutrition. Brands such as Blue Band and Mumias Sugar have fortified their products with Vitamin A as food manufacturers are urged to make food more affordable for Kenyans.

A workshop organised by the European Union in Kenya that brought together representatives from the ministry of health, county governments, civil society, the United Nations and donor agencies concluded that there is need to step up commitments to nutrition. A key highlight of the deliberations was that nutrition can no longer be approached as a health issue, but as an issue requiring multi-sectoral interventions. Nutrition expert Dr. Faith Thuita emphasised that programmes must be nutrition specific and sensitive, and incorporated in agriculture, livestock, fisheries, education, water, planning and devolution. There were also calls for follow up on legislation to operationalise the food and nutrition policy and the need for media campaigns to educate on nutrition. Additionally, there is need for more nutritionists from national to village level.

Back at Beyond the Vision primary school in Quare, a small effort bears fruit. Through well-wishers, Snider Nabwire and Jacinta Wayua will have lunch. This is one of the reasons children at the school enjoy the school term because during the holidays, having a simple meal is often a privilege and having a good meal is a miracle.



Dr Nsamba (putting on a name tag) explains to stakeholders how the incubator he made works

## Ugandan scientist develops an incubator

By Lominda Afedraru | lominda25@gmail.com

Most scientific technological appliances used in daily operations in the science sectors in Uganda namely health, agriculture, information communication technology and energy among others are imported.

However Uganda National Council for Science and Technology which is mandated to regulate research related to scientific innovations has now put scientists

on notice not only to carry out research for documentation but also develop innovations to make life easy and cheap for the society.

In response to this call, a Ugandan space scientist, Dr Chris Nsamba has invented a locally made incubator which aims to save lives of premature babies delivered in Uganda.

Preterm births contribute 25 per cent which is 13 births per 1,000 live births of all neonatal deaths in the country,

putting Uganda in the 28th position worldwide with the highest preterm deaths. This is according to the recent UNICEF report which further states that Uganda loses 45,000 newborns annually.

Dr Nsamba, 30, belongs to African Space Research Programme, an Association of scientists and well-wishers promoting space science in Uganda.

While exhibiting the Neonatal Intensive Care Unit Incubator (NICUI) during a high level meeting



organized by Uganda National Council for Science and Technology in Kampala for scientists to show case of their scientific innovations recently, Dr Nsamba explained that the idea of developing this machine was as a result of the overwhelming number of premature babies dying in hospitals due to lack of incubators.

Right now his focus is on the Neonatal Intensive Care Unit Incubator which he developed within six months putting together all the requirements ranging from the international guidelines to follow when developing such equipment and gadgets such as computer system, thermo reactor and buss tunnels among others

World over a scientist involved in developing Neonatal Intensive Care Unit Incubator equipment must

observe guidelines such as making sure the temperature is between 37 to 38°C and the humidity is supposed to be between 50 and 100%.

Even though there are such incubators that can be monitored manually, Dr Nsamba notes that the automated one, like what he has developed is better because whatever goes on with the baby can be shown on the computer.

In case of challenges in water flow which is used in the process of heating the equipment, this can be shown on the computer and refilling of water can be done manually.

The equipment has been kept in their stores in Ntinda since 2014 due to lack of a buyer. It was tested by about three private hospitals where a baby was placed in the gadget to see if it works well.

He has tried to market it to the government but received no positive results and now he is going to donate it to a hospital of interest in a bid to save lives of babies produced prematurely.

The equipment costs USD 8,000 with a warrant period guaranteed to any user of three years. Its life span is about 50 years. An ordinary imported incubator costs about USD 1,000. A sophisticated one costs ten times and above this rate.

Complications associated with premature births have become the leading single killer of children under five, outpacing pneumonia and claiming 3,000 lives every day in what has been described as "one of the greatest health challenges of the 21st century," a study published in the medical journal, *The Lancet* says.

# A glimpse of hope as malaria vaccine roll out planned

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The death of children under five years from malaria in developing countries could be dealt a fatal blow after Gavi, the Vaccine Alliance announced a plan to co-fund the first phase of the pilot implementation of the RTS,S Malaria vaccine, to a tune US\$ 27.5 million.

In a media statement released in July, Gavi announced that it was ready, in collaboration with other donors, to fund the pilot implementation of the first ever malaria vaccine, known as the RTS,S, targeting to protect children below the age of five years from dying of the disease that has claimed the lives of thousands of people.

In her speech, the Gavi Board chairman, Dr. Ngozi Okonjo-Iweala, called on other funders to match Gavi's proposed malaria vaccine pilot commitment. "GAVI is ready to play a role in supporting the World Health Organization's (WHO) malaria vaccine pilots. The decision, taken by the Board, would see up to US\$ 27.5 million of support for the first phase of the pilots," she said.

The vaccine's manufacturer Glaxo SmithKline (GSK) and PATH welcomed the commitment by Gavi and said that the announcement represents another critical step towards helping the world's first malaria vaccine reach young children in Africa. In a joint statement, both PATH and GSK said that they remain committed to working in partnership with the



WHO, Gavi, UNITAID, and other stakeholders to ensure successful implementation of the pilot programme.

"In support of the programme, GSK and PATH will collaborate to donate doses of RTS,S for use in the WHO pilots," said Luc Debruyne, President, Vaccines at GSK. "Gavi's commitment is a critical milestone in preparation for the pilot programme and in the 30-year effort to bring a malaria vaccine to the children who need it most. We believe that the potential of this vaccine to reduce the burden of disease in Sub-Saharan Africa is significant and we welcome the support for the pilot programme to enable us to gain additional information about how best to deliver RTS,S in a real-world setting," he added.

## Lakeside project hailed for increasing uptake of reproductive health services

By Caroline Nyandat and Monica Oguttu

A project which offers survivors of unsafe abortion health care has been hailed as a major success by health experts.

Known as Closing the Gap, the project has, since its launch in Nyanza last year, seen tremendous uptake of long acting reversible contraceptives in three counties of Southwest Kenya namely Kisumu, Siaya and Migori Nyanza.

"Our work is to ensure that young women who survive death due to unsafe methods of termination of pregnancy and suffer complications are taken care of comprehensively," says Sam Owoko of Kisumu Medical and Education Trust which in partnership with Planned Parenthood Global (PPG) is implementing the initiative.

The project's overall objective is to increase awareness of,

access to, and use of quality contraceptive and comprehensive abortion care services in high need communities in the target counties with focus being laid on strengthening the capacity of healthcare providers to offer facility-based youth-friendly services and advocate for expansion of sexual and reproductive health rights and services.

# Come to Kenya's Ondiri Swamp and experience its wonder

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**C**an you imagine yourself walking on a giant bouncing castle that has no air but water underneath it?

Then welcome to Ondiri Swamp in Kikuyu, the only place in Kenya where you can get the unbelievable 'wow'-walk-on-water-experience ala Jesus on the Sea of Galilee. This surreal experience is yours for the asking if you can afford to take a short drive or board a matatu to Kikuyu town, approximately 25 kilometres west of Nairobi. Nestled in a valley just past the famous Alliance high schools, you will reach Ondiri Swamp just after the bridge that goes to the famous schools, above the Southern bypass.

The name Ondiri Swamp is misleading because it is not really a swamp. It is what is known as a quaking bog and with a total area of 30 hectares and a perimeter of three and a half kilometres, it is the largest in Kenya and reportedly the second largest in Africa after the mangrove swamp in Douala in Cameroon, the site where a Kenyan Airways plane, KQ507, crashed on 5th May 2007.

It is composed of wetland vegetation growing and floating on a massive thick mat of partly decomposed fibrous plant material known as peat. This sponge-like material is what makes it quake, creating the feeling of walking on water.

Those who have walked here say it was the most unforgettable walk of their life. However, for some like Sam Kimotho who does it almost on a daily basis, it is about the only way to get to and from Kikuyu Town where he has his office from which he reaches clients who need his electrical wiring and other electrical repair services. "I have walked over it so many times



**Ondiri swamp, near Kikuyu town is Kenya's largest highland quaking bog**

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that I can virtually do it blindfolded," says Kimotho who lives in Kanyethi village of Kikuyu Constituency.

While it may not be a big deal for Kimotho, it can be a little scary for those who take the walk for the first time. With only two logs to walk on where the water is on the surface, it is a rather daunting balancing act and certainly not for the faint hearted. One false step could see you plunging into the cold water whose depth is not exactly known. In the days of yore, a lot of visitors, especially Asians, used to come to the swamp. Locals say that the Asians would come to scatter the ashes of their departed loved ones here after cremation like they do in the Ganges River in India. Seeing a chance to make a quick buck from these Asian visitors, local boys started doing some dare devil manoeuvres that left many holding their breath. They would dig a hole from one spot in the swamp and another one about a hundred feet away. Then like expert

scuba divers, they would undress, leave their clothes there and dive into the hole and swim under water to emerge at the other hole.

This daredevil swim would leave many stiff with anxiety and there would be a thunderous cheer when the boys walked back to where they had left their clothes to collect a well-earned prize from the Asian onlookers. However, once in a while, tragedy would strike when one or two boys would fail to emerge from the second hole, apparently swept away by the current when it got too strong. It was said that their bodies would emerge in Lake Naivasha weeks later; reinforcing the long-running myth that Ondiri Swamp is an underground drainage for Lake Naivasha, which does not have a surface drainage. It did not take long for the provincial administration to ban the diving practice and with it the domestic tourism of Ondiri Swamp.

With the rising population and a combination of man-made and natural factors, this gem of a wetland now faces multiple threats that threaten its very existence. Key among this is the very high abstraction of water for irrigation. By virtue of its proximity to Kikuyu town, the wetland has attracted horticultural farmers who are exploiting its water to grow horticultural crops, especially tomatoes and capsicums. Loaded with wads of cash, 'entrepreneurs' have now leased all the riparian land in the swamp and dozens of greenhouses have mushroomed all round the swamp. Greenhouse horticultural farming, while assuring good yields, also has its inherent dangers. Chief among these is the heavy use of pesticides and fungicides to control the plethora of pests and diseases that thrive in the hot and humid microclimate that is created by the greenhouses. When it rains, all these chemicals are washed into the swamp, killing most of the fauna and flora in the wetland and in effect creating a dead wetland.

This is aptly demonstrated by the plight of the Grey Crowned Crane, an elegant bird of unmatched beauty that is the national emblem of the neighbouring country of Uganda after which her national football team, the Uganda Cranes, is named. The crane largely breeds in wetlands and globally it is an indicator of wetland health. In the past, there were dozens in Ondiri but now, you will be hard put to count more than three at any time of the day. With no small reptiles and amphibians to feed on, the cranes have no choice but to relocate to healthier wetlands. The indigenous forest that surrounded Ondiri swamp has also been severely depleted. This has dealt a double blow to the Grey Crowned Crane because it is the only crane that roosts on trees. This is yet the most poignant indicator that unless urgent remedial action is taken, Ondiri will soon slide irreversibly into what is called 'the tragedy of the commons'. This is the scenario that arises when everyone



**His Excellency  
William Kabogo,  
Kiambu County  
Governor**

seeks to maximize benefits from a resource without anyone bothering to put in anything to conserve or sustain it. Apart from water abstraction, there are the vegetation harvesters who come in to cut the green vegetation of the swamp and sell it to livestock keepers as fodder. This has denuded large swathes of the swamp and they are drying up because of the severe evaporation that takes place upon exposure to sunlight.

They also have the habit of setting the swamp alight during the dry season so that fresh grass can sprout. What they do not understand is that peat bogs are massive stores of atmospheric carbon, held in the partly-decomposed fibrous plant material that could catch fire and smoulder below the surface for days. The fires are dangerous and in 2010, smoke from one such fire killed an estimated 3,000 people in Moscow.

Above its aesthetic value, Ondiri has national value unbeknown to many Kenyans. Through an underground channel; the wetland is a water source for Kikuyu Springs which provides 2 per cent of the water consumed in Nairobi City, the oldest source of Nairobi's water. More recently, the World Bank has funded a project that is pumping water from the springs to Kikuyu town to satisfy the rising water demand as the town becomes a major urban centre. Unconfirmed reports have it that even the water used in State House has its source in Kikuyu

Springs. In fact, Kenya's foremost eco-warrior, the late Professor Wangari Maathai, fought tooth and nail to protect the forest around the springs from falling into the greedy hands of land grabbers who were eyeing it for grabbing in the 1990s. Now all this is set to change with the coming into force of the county governments in 2010.

With a limited number of tourism sites, Ondiri lends itself suitable for development into an ecotourism site for Kiambu.

A Community-Based Organization for its development and management, the Green Fingers Community Initiative, was registered in 2011. It has put together a comprehensive proposal for funding and will be soon selling it to funders who may be interested in developing Ondiri into an ecotourism site. According to the Ward Manager for Kikuyu Ward, David Wakogi, the Kiambu County Governor, William Kabogo, is keen on this venture which has the potential of contributing to the coffers of the Kiambu County Government.

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***Naftali Mungai, a conservationist has worked in Ondiri for 10 years. He is the chairman, Green Fingers Community Initiative while Juliet Kure, an agro-ecologist has researched on conflicts within the swamp and its basin extensively.***



## New soil testing kit now available in Kenya

By **Aghan Daniel** | [aghan@meshakenya.org](mailto:aghan@meshakenya.org)

In her small piece of land on the shores of Lake Victoria, Claris Otieno is busy weeding her maize plantation. For years, she has been doing this but with very little coming out of her farm. Perhaps she has used the wrong seeds again or it is the soils.

Farmers like Claris will no longer need to worry about the status of their soils as a newly introduced soil scanner is now available to help test their soils. The scanner known as SoilCares Scanner, is an innovative kit that tests soil for nutrients in only 10 minutes.

According to Katharine Macmahon of SoilCares, the scanner is light, easy-to-use and is a fast way of testing soil for results within the field. "A farmer who wants to know if he or she can grow maize on his or her plot, for example, only has to put the tool on the ground where the maize will come from.

The tool assesses the composition of the soil, sends the information to the Cloud (web) and the farmer gets the message on his or her mobile telephone with advice about whether it's a good idea to go ahead and plant the maize. Or else, the message so received will prescribe on what the soil needs," she adds.

The Scanner has the capacity to give fertilizer recommendation and a soil correction plan. The Scanner can be bought by anyone interested in making a business out of soil testing, and can be purchased in Nairobi for Ksh 225,000 (USD 2250).

SoilCares is known as an innovator of new technology. Besides the soil scanner, the company also promotes a Lab-in-a-box (LiaB), which is basically a big lab which tests for micro- and macro-nutrients in the soil, as well as giving a soil correction plan and fertiliser usage plan.

The LiaB works to provide a complete overview of the soil for the farmer and help them to move forward to grow more food and earn more money. The LiaB suits a large company, such as a fertiliser plant, a large agro-dealer or an NGO working with small scale farmers.

Both products work using infrared technology, and collect results by connecting to the SoilCares database. The database is created from hundreds of soil samples collected across Kenya and allows new samples to be compared against them as a way of checking the nutrients within the soil. These products allow farmers to test their soil in a cheap, effective and reliable way, without the hassle of a long delay or confusing results.

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