



Photo: TOF

Samuel Bengat, a farmer in Kabianga tends his stevia crop. Farmers in the country have started uprooting stevia, a high value crop, citing exploitation by a multinational company including middlemen. Page 4 and 5

Dear farmers,

There has been a lot of interest on stevia (swwet leaf) in the country in the last few years. TOF has always advised farmers take care before going into full scale production of any crop. This also applies to cash crops produced under contract terms with companies or middlemen.

Despite these warnings, hundreds of farmers who went into stevia production about four years ago are now uprooting the crop after realising that the companies and middlemen did not keep their promises on prices.

Many farmers have not made profit from stevia production due to the low prices offered by contracting companies and middlemen. This is a huge loss especially for those who uprooted cash crops such as tea to grow stevia following promises that they would be paid more for their stevia crop.

This does not mean that stevia is the wrong crop to grow; indeed stevia is a high value crop in the world market. Research shows that dry stevia leaf fetches about Ksh 200 per kilo at the farm gate. Its dried leaves can be used in place of sugar particularly by people suffering from diabetes or those who want to avoid refined sugar. The problem is that many small-scale farmers have been shortchanged by companies and middlemen who want to maximize their profits at the expense of the hardworking farmers. The situation is similar to that faced by farmers growing tobacco, French beans, horticultural crops and flowers.

Perhaps it is time contracting companies are compelled by the national or county governments to engage small-farmers under fair trade terms before they are allowed to enter into any contracting agreements with them. This will not only protect the interest of the farmers in pricing of agricultural produce but also ensure traders abide by the rules that govern the exploitation of natural resources such as reducing pollution to the environment and adherence to other safety standards. (Page 4 & 5)

Suitable crops for short rains

TOF - There has been uncertainty about the weather in the last two weeks of July with most parts of the country reporting a dry spell that has left immature maize crop in need of rain. This should, however, not discourage farmers preparing for the short rains that usually begin in September or October every year. The unusual weather changes across the country are as a result of climate change.

Farmers should learn to adapt to the weather changes

by adopting new methods of crop production and crop varieties. For example, instead of planting maize, which requires a lot of water to grow, it is important to try drought resistant crops such as millet, sorghum, cassava or sweet potatoes. These food crops take a short time to grow and do not require a lot of rain.

However, this does not mean we are discouraging maize production. There are many drought tolerant maize varieties that mature within short period. Below we provide farmers with the varieties and where they can be grown:

Medium altitude varieties

Varieties that grow well in medium altitude areas are likely to do well even in high altitude areas during the short rains because they take a short time to mature. Farmers whose maize did not do well can take advantage of the short rains to replant. The following are some of the varieties they can use:

Kenya Seed Company: H513, H515, H516, H517, H518, H519, H520, H521 and H522.

Western Seed Company: WH507, WH505, WH403, WH403 and WH402.

FRESHCO: KH500-33A and KH500-13A.

Dryland varieties

Due to the unpredictability of

the weather pattern, it is important that farmers do not plant only the medium altitude varieties. They can also plant dry land varieties. The following dryland varieties are available in the market:

KARI: Katumani composite (open pollinated*).

Kenya Seed Company: DH01, DH02, DH03 and DH04.

FRESHCO: KDV1 and KDV-6 (open pollinated).

* Open pollinated varieties can be planted as seed without having to buy again for two or three planting seasons (see TOF No. 105, February 2014 for more information on maize seed varieties).

GMOs in Kenya!



The Kenya Agricultural Livestock Research Organization together with African Agricultural Technology Foundation (AATF) have applied to The National Biosafety Authority (NBA) to be allowed to release a GMO maize variety that was rejected in 2005 in Kenya. Page 3 and 7

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Use earthworms to improve soil fertility

Farmers can use earthworms to make high quality organic fertilizer that can be used to grow any crop and cut the cost of buying organic and chemical fertilizers.

Peter Kamau | Compost making is important in any organic farm. Farmers can improve the quality of the compost they make using earthworms which help produce high quality compost that has more nutrients than ordinary compost to nourish crops and enable them to grow well. The process of using earthworms to make compost is called **vermicomposting**. Special earthworms called red wigglers or African night crawlers are used in the composting process.

Earthworms enrich the soil by speeding up decomposition of organic matter. As earthworms eat and digest plant material they mix organic and mineral soil particles. The organic matter is enriched and then passed out of the worm's body in the form of casts, which are the richest and finest quality of humus. In this way, they help build and maintain the soil structure. Their casts contain nitrogen, phosphorus, potassium, magnesium and calcium. Earthworms also improve drainage and prevent soil erosion and water logging.

For vermicomposting, the earthworms convert the nutrients in the soil into plant available form. As they deposit their castings, their mucous is deposited into the soil. It helps to slow the release of nutrients and prevents them from being washed away with the first watering. Earthworm manure or casts are richer in minerals than the soil in which the earthworms work to breakdown their organic matter.

An earthworm produces casts equal to its own weight in a day. In open fields, earthworms improve the soil structure and aeration. They also help control nematodes by up to 60 per cent,



therefore reducing their damage to crops. Red earthworms are most commonly used in vermicomposting as they can feed and convert organic matter into compost faster than other earthworms. They also adapt to new environment much faster.

How to prepare earthworm compost pit

1. Get 200-litre plastic or wooden trays (as shown on the right). Cut it lengthwise into two halves and place it under a shade. On one end of the drum put a 1/2 inch drainage pipe. Plastic bins, wooden trays or compost pits can also be used.
2. Put a layer of ballast at the bottom of the drum but leave about 2 1/2 feet space at the top. Put a liner (sack) for filtration purposes. Add a thin layer of sand on top of the ballast.
3. Place a layer of organic matter such as potato peelings, vegetable remains, grasses, crop residue and other composting remains on top of the grass layer. You can add any material that can break down easily like fruit and vegetable peels to ensure the earthworms have enough organic matter to feed on. Sprinkle some farmyard manure on the pile.
4. Apply some water on the compost to make it moist, not wet. Use a sisal gunny sack or banana leaves to cover the material because the earthworms do not like light.

Get 3-4kg of red earthworms and introduce (put) into the

waste material. It is possible to get worm juice after 1 month;

and compost after 3 to 6 months. At this time farmers can harvest worm casts (high quality earthworm compost). If you have more organic material for composting and you want to increase your compost, pile the material in a polyethylene sheet. Put material for compost and introduce the earthworms. The compost will be ready after about 3 months although this depends on the temperature of the area and size of the pit.

Farmers get training and buy earthworms from JKUAT Enterprises Ltd Tel 0722 728 815, 067 524 20, Juja Nairobi.



Step 1
Prepare the worm bedding and add water to make it moist



Step 2
Add covering materials on top of the sand and ballast in the worm bin and introduce the earthworms.



Step 3
Add food waste and other organic material as earthworm feed.



Step 4
After about 3 months earthworm compost is ready for use.

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The Organic Farmer is an independent magazine produced monthly for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. The articles in the The Organic Farmer do not necessarily reflect the views of ICIPE and Biovision Foundation.

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Why all Kenyans should oppose GMOs

Despite denials from multinational companies promoting them, studies show GMOs can affect humans, animals and even the environment. They also pose a big threat to local seed varieties that have until recently ensured food security for millions of people.

Wanjiru Kamau | Many farmers are following the ongoing debate on whether or not Kenya should allow Genetically Modified Organisms (GMOs) as one way of improving crop production and controlling pests and diseases. Multinational companies and several well-funded organizations in the country have launched a big campaign to persuade the government to allow the introduction of GMOs in the country. On the other hand, civil society organizations have countered claims by GMO lobbyists and managed to show that GMOs are not as safe as their supporters would want farmers and consumers to believe.

Last month, scientists from the Kenya Agricultural and Livestock Research Organisation (KALRO) together with African Agricultural Technology Foundation (AATF) re-introduced an insect resistant *Bt* maize variety that the government ordered to be destroyed in 2005 when an experiment on the variety failed to produce the desired results. They have now applied to the National Biosafety Authority (NBA) to have the variety released as seed to farmers.

In this issue, TOF educates farmers on dangers of GMOs by providing available facts about their effects on crop production, human, animal and environmental health.

What are GMOs?

GMO crops are developed by manipulating genes (units in plant cells that determine the characteristics or behaviour of plants such as ability to produce a bigger fruit, resist a particular pest or disease, grow or mature fast or even resist drought conditions). Genetic engineering technologies are used to develop the GMOs - a gene from a plant of related or unrelated species is inserted into another plant to change its characteristics such as the ability to resist pests, diseases and grow fast or in a desired



GMO crops are developed using genetic engineering techniques in order to increase yields, resist pest, diseases or drought. However, most of their long term effects on human, animal and the environment can take upto four generations (40 years) to manifest themselves.

way.

In the normal way of developing crop varieties, scientists use selective breeding where crops from the same family or species are crossed either through crop pollination, grafting or tissue culture to come with varieties that give higher yields, resist drought, pests and diseases or possess any other desired characteristic for survival in a given environment.

With GMOs, researchers also use an unstable, combination of genes from animals, bacteria and even viruses in order to produce certain traits in plants. Genetic engineering (GE) has been opposed by scientists in many developed countries on the basis that they have adverse effects on crops, human, animal and environmental health.

Are GMOs safe?

Most developed countries do not consider GMOs to be safe due to reasons given below. In more than 60 developed countries, including Australia, Japan and the European Union, there are restrictions or outright bans on the production and sale of GMOs because of their known side effects. In USA where GMOs have been allowed, there is strong lobbying by consumers to force the government to label GMO products to enable consumers to choose between GMOs and non-GMO foods.

Some of the concerns raised about GMOs are outlined below:

1. Dangerous organisms from GMOs detected in human blood

According to studies done in Canada, pesticides used in



GMOs like Monsanto's *Bt* toxin were found in unborn children and even in non-pregnant women's blood (*Journal of reproductive toxicology*, 2011). The study used blood samples from 30 pregnant and an equal number of non-pregnant women. The research pointed out that unborn children were highly vulnerable to foreign chemical substances found in an organism that is not produced naturally.

2. Genetic material from GMOs can end up in humans

A study published in a respected journal (*Public Library of Science (PLOS) July 30, 2013 DOI: 10.1371/journal.pone.0069805*) emphasized that there was sufficient evidence to show that DNA (material in living organisms that transmits genetic information) fragments from GMOs can carry complete genes that can enter the human body through mechanisms that scientists are studying. This has potential to cause ailments to both humans and animals. The study was based on 1000 human samples tested in four independent studies. A research paper published in the *Journal of Organic Systems in the USA in 2014* linked genetically

engineered crops to 22 diseases in the country. These include hypertension, stroke, diabetes, obesity and cancers of the thyroid, liver, bladder, pancreas and kidney.

GMOs crops contaminate local seed varieties

Multinational companies promoting GMOs target staple crops in developing and poor countries. These countries have often relied on either local seeds or high yielding hybrid seed varieties suited to local conditions that are developed by research institutions. With the introduction of GMOs in such poor countries, there is great risk of cross-pollination and eventual loss of these traditional varieties.

GMO seeds expensive

Since GMO seeds are patented and carry breeders rights, farmers have to buy all their seeds from the suppliers or manufacturing companies regardless of the price. Most of the seeds from GMO companies have terminator genes meaning they cannot be replanted. This could force farmers to go back to the seed dealers every year to get seeds, and thus deny them the right to share seeds. It could also eliminate current diversity of seeds and compromise food security in the long term.

Indigenous crops have been found to have more nutrients than GMOs. For example, traditional rice in the Far East was found to have more Vitamin A than GMO Golden rice by 350 per cent (Vandana Shiva, 2015).

Wanjiru Kamau is the Information Liaison and Policy Manager at KOAN.

Sweet stevia turns bitter for Kenyan farmers

Many Kenyan farmers who have gone into stevia production with the hope of making good money are uprooting the crop because of exploitation by companies and middle men.

Peter Kamau | When Kibet Tanui, a tea farmer in Kabianga Division of Kericho County, heard that a new cash crop was being introduced in his area, he was excited and accompanied fellow farmers in his village to attend a meeting organized by a multinational company. But after three years of producing stevia (a natural sweetener), Tanui realised the crop was not bringing in good returns as they had been promised. He eventually uprooted his stevia crop and planted tea instead.

Tanui is not alone - of the more than 400 farmers who had registered to grow stevia in Kabianga division, only 60 farmers are presently still growing the crop. The farmers have abandoned the crop for what they claim are low prices and non-fulfillment of promises made by the company that is contracting farmers to grow stevia for export.

Failed to honour contract

"First we discovered that the company did not offer the prices that had been promised. Secondly, although we signed the contracts, we were not given copies of the same in order to read all the terms. The firm did not visit farmers to offer technical support as they had promised. Thirdly, some of the inputs that were supposed to improve the soil for stevia production such as agricultural lime to correct soil acidity were not provided. They only tested my soil and advised me to look for lime which is not available locally," adds Tanui.

Uprooted stevia

Tanui's neighbour, David Chirchir, planted stevia for the last six years. Chirchir had planted 12,000 stevia seedlings initially but he has reduced this to only 4,000 plants. He says that although the crop requires extra labour compared to other crops, this would not be a problem since the crop is not prone to pests and diseases. This makes it cheaper to grow stevia compared to other crops such as potatoes, tomatoes and vegetables which require a lot of money for purchase of chemicals to control diseases and pests. It appears that the main problem with stevia production is with the low prices offered by



Francis Mugo in Kianyaga, shows a portion of his land where he had uprooted tea to grow stevia but has now removed the stevia to replant tea.

the company.

Unexplained deductions

Chirchir says the other problems facing the farmers relationship with the company are the unexplained deductions. "When we signed the contracts with the company, we were told that the only deduction they would make when we deliver the dry leaf was the 30 per cent of what we deliver to pay for inputs provided to us such as fertilizers and polyethylene material for nursery sheds. But we later on learnt that they have an arrangement with the Agricultural Finance Corporation (AFC) in Kericho where they make further deductions which were not explained in the payment slips," he says.

Chirchir explains that if the prices do not improve this season, he will also have to uproot the

remaining stevia plants and grow vegetables instead. Another farmer from Kibara village, Samuel Bengat, is also thinking of abandoning stevia production for cabbage, which he was producing before.

Lack of transparency

"If they can pay better prices for stevia, then it would make business sense to grow it, but at the current prices no farmer can grow stevia and make a profit. If the price was good we can even increase the acreage under production but for now the only option is to uproot the crop and grow other crops," says Bengat.

The farmers are of the opinion that if the company was fair, it would explain the various deductions on their deliveries. "Infact we do not know how much the company is making when they

export and process stevia, yet we continue to labour for a crop that has brought us great misery due to the poor prices," says Tanui.

Company denies farmer exploitation

The company's General Manager refutes claims by farmers that poor prices are the reason for uprooting of stevia crop. He says that since the company entered the Kenyan market, there has not been any downward revision of prices.

He says the company started with a price of Ksh 70 in 2011 but it has since increased to Ksh105, which will be raised to Ksh 140 soon, an increase of 100%.

"I think the farmers uprooting stevia are just poor managers of their crops. Stevia requires good management to give good returns. Most farmers have shown poor weed management and even fertilizer application, hence they end up with poor yields and less income," he adds.

The firm denies that there are unjustified deductions on farmer's payments, adding that the only deductions made are for inputs supplied on credit such as polyethylene sheds, seedlings and fertilizers, which are deducted at the rate of 30 per cent of the value of every delivery to the company. The manager denies that there are other deductions made on farmer's earnings apart from the 30 per cent.

He says many middlemen have entered the market in the name of the company and could be responsible for some of the allegations made against it. Paul Mwangi, a farmer from Kangawa village in Molo has the same experience. He says farmers in his village were introduced to stevia production by the Network for Ecofarming in Africa (NECOFA), which supplied stevia seedlings to farmers in the region. "The organization was buying stevia at a reasonable price of Ksh 200 per kg of dry leaf but they stopped buying. So we had to sign production contracts with a multinational company, which he claims, has not been paying well.

"Many farmers have abandoned stevia production. From the 11 farmers who were growing stevia here, only four of us have the crop now. We are thinking of abandoning commercial production and only grow it for our own use," he says. Francis Mugo a farmer from Kianyaga has the same story, he says they were contracted by a company that later refused to collect the leaf. He has been forced to uproot stevia and replant tea.

What is stevia?

Stevia or sweet leaf (*Stevia rebaudiana*) originated from Central and South America where it has been used for its sweetness and medical properties for thousands of years. Its sweetness comes from steviol glycosides. These substances are about 200 times sweeter than ordinary sugar but they do not give any energy to the body when consumed, a reason why people suffering from diabetes are advised to use stevia. In western countries and urban centres in the rest of the world, stevia extracts are used as sweetener, to fight caries, obesity, diabetes and high blood pressure. Some of the biggest producers of stevia are Paraguay, China, India, Malaysia and other countries in the Far East.

The international farmgate price for one kilogram of dry stevia leaves is about Ksh 180 (about 2 US dollars). To get



one kilogramme of Steviol glycosides (stevia powder) factories use 14-16 kg of the dry leaf, which must contain about 10% Steviol glycosides. About 4 to 6 kg of dry leaf is lost during processing. The price for 50g of stevia powder (mainly imported from china and India) in local pharmaceutical outlets and supermarkets ranges between Ksh 370 and Ksh 450; however, high quality stevia powder in local high end stores goes for between Ksh 500- Ksh 600.

Fair trade protects farmers from exploitation

Fair trade ensures small-scale farmers get a fair price for their produce and safe working conditions. It also ensures they engage in practices that protect the environment, promote gender equality and reduce child or forced labour.

Elkanah Isaboke | For decades, farmers have difficulties especially in marketing of farm produce. Many have been exploited especially because of the traditional way of agribusiness, where making profit is more important than safeguarding the livelihoods of farmers. Civil society movements in Europe have, however, questioned the global free market system that emphasizes on demand and supply at the expense of agricultural production systems.

The campaigners insisted that prices of farm produce should be directly related to the actual production costs where all producers are given free and equal access to markets. The campaigners started what is called the **fair trade movement**. Its aim was to ensure that the poor and disadvantaged farmers in developing countries were on the world market. They wanted to stop the exploitation of farmers and foreign dominance in the marketing of agricultural products. As a result of the campaign to fight for the rights of farmers, the World Fair Trade Organization was started in 1989.

Principles of fair trade

The WFTO operates on 10 basic principles:

Principle One: *Creating opportunities for disadvantaged farmers*

The Fair Trade Organisation supports small-scale farmers in family businesses, farmers' groups, associations or cooperatives, who are often marginalised. It works to change farmers from income insecurity and poverty to self-sufficiency and ownership.

Principle Two: *Transparency and accountability*

The organization is transparent in its management and commercial relations. The organization uses appropriate, participatory methods that involve employees, members and small-scale farmers in its decision making processes. It ensures relevant



Fair trade ensures that small-scale farmers in developing countries get good prices for their farm produce.

information is provided to all its trading partners. Its communication channels are good and open at all levels of the supply chain. It is also accountable and respects the views of its stakeholders while maintaining confidentiality of commercial information supplied to it.

Principle Three: *Fair trading practices*

The organization trades with concern for social, economic and environmental well-being of marginalised small-scale farmers and does not maximise profit at their expense. It is responsible and professional in meeting its commitments in a timely manner. Suppliers respect contracts and deliver on time and to the desired quality and specifications. Fair trade buyers recognise the financial disadvantages of producers (farmers) and suppliers face, and ensure all orders are paid on time and according to agreed guidelines.

Farmers under Fair Trade agreement can get a prepayment of up to 50% if they request usually at a reasonable interest rate. Buyers also consult with suppliers before cancellation or rejection of orders - adequate compensation is guaranteed for the work already done. The organization maintains long term relationships based on solidarity, trust and mutual respect that contributes to the promotion and growth of Fair Trade.

Principle Four: *Payment of a fair price*

Fair price means an acceptable payment that considers the circumstances of the producers and is based on what they consider to be fair. Fair trade mar-

keting and importing organizations support capacity building to farmers to enable them set a fair price.

Principle Five: *No child or forced labour*

The organization does not allow any labour that involves children, and neither does it support forced labour. Organisations registered with WFTO do not buy goods produced using child or forced labour.

Principle Six: *Commitment to non-discrimination, gender equity and women's economic empowerment, freedom of association.*

The organization does not discriminate in hiring, remuneration, access in training, promotion, termination or retirement based on race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, HIV status or age.

Principle Seven: *Good working conditions*

The organization provides for a safe and healthy working environment for employees/members. It complies with national and International Labour Organizations (ILO) conventions. It ensures working hours and conditions of employees, and complies with established national, local and ILO conventions. Employers are required to raise awareness of health and safety conditions affecting farmers or producers.

Principle Eight: *Capacity building*

The WFTO seeks to increase positive developmental impacts for marginalized small-scale producers through fair trade. The organisation works directly

with farmers to improve their management skills, production capabilities and access to markets. Organisations buying fair trade products assist to develop capacity of producers that they work with.

Principle Nine: *Promoting fair trade*

The organization raises awareness of the need for greater justice in the world trade through fair trade. It provides its members with information about itself, its markets, and farmers organizations that make or harvest the products. Honest advertising and marketing are promoted.

Principle Ten: *Respect for environment*

Producer organisations must use raw materials from sustainably managed resources. Their production technologies seek to reduce energy consumption and where possible use renewable energy that reduce greenhouse gas emissions. The Fair Trade agricultural commodity producers minimize their environmental impacts by using organic or very low amounts of pesticides wherever possible.

Buyers and importers of fair trade products also give priority to buying products made from raw materials that originate from sustainably managed sources and which conserve the environment. All organizations buying fair trade products use recycled or easily biodegradable materials for packing. Goods are dispatched by sea wherever possible.

Products with a Fair Trade label fetch a premium in overseas markets. Already a few farmers groups in the Kenya growing crops such as macadamia nuts, coffee, tea and cashew nuts have registered and sell these commodities on Fair Trade.

Organic or conventional farmers interested in selling under Fair Trade label can get information on companies buying produce under Fair trade terms on the following address:

Fair Trade Labelling Organization
5th Avenue Office Suite, Room 8 & 9

5th Ngong Avenue, Ngong Road
PO Box 3308-00200

Nairobi, 00200 Kenya

+254 20 272 1930

Email: info@fairtrade.or.ke

www.fairtrade.or.ke

Farmer turns home into a resource centre

On learning of the huge demand for agricultural information, Alfred Karanja has converted part of his house into a resource centre where farmers come to learn various sustainable agriculture and organic farming methods.

Peter Kamau | Unless there is a very special agenda, bringing farmers together is not easy. This reality dawned on Alfred Karanja, six years ago when he was approached by officials from USAID-funded Dairy Sector Competitive Programme to mobilise farmers in Kwa Mbira village in Limuru for training on dairy farming.

"We did not have an appropriate venue to hold our meetings. I decided to convert part of my house into a resource centre where I could train fellow farmers," says Alfred Karanja, a retired telecommunication engineer.

Farmers not willing to pay for training

Although he started charging every farmer a small fee of Ksh100 per training session, many farmers were not willing to pay for the training, which forced him to reduce the fee to Ksh 5 for every training session and a monthly fee of Ksh 20 for



Mr. Karanja uses his kitchen garden as a demonstration plot to train other farmers.

the maintenance of the resource centre. Soon, many companies supplying agricultural inputs and drugs recognised Wanjiru Parkside Farm Resource Centre as an important venue for training of farmers.

Training demand driven

Due to lack of resources, Alfred changed his approach to provide training on demand. Farmers interested in training on specific agricultural technologies would pay an individual fee of Ksh 250 for any group with more than 10 farmers, which he used to buy training material and other expenses. His wife Rahab Wanjiru, a librarian at KALRO, Muguga would assist him with resource material for training farmers.

In the year 2012, Mr. Karanja met an official from Biovision Farmer Communication Programme (FCP) who introduced him to sustainable agriculture and organic farming. He was given copies of the Infonet-Biovision CD and *The Organic Farmer* magazine which he read keenly.

Changed to organic farming

"After reading the material, I started practising a few organic farming technologies such as compost making and the use of safe methods of pest control like the Push-Pull method for stemborer control. Then I introduced the various sustainable agriculture methods to farmers

and they were very keen to learn and practice them. Since then most farmers I trained have fully embraced organic farming methods," he adds.

Park farm Resource Centre now trains between 150 to 200 farmers every month on every aspect of sustainable agriculture. It has established five youth groups complete with demonstration plots in Limuru area where farmers learn how to practise organic farming technologies, dairy farming, fodder establishment, pest control, and agroforestry and soil conservation.

Huge demand for information

Mr. Karanja says there is a huge demand for agricultural information in Kenya and the East African region. Farmers in Kenya have come to learn about the centre and have invited Mr. Karanja to train them on the various technologies on sustainable agriculture and agribusiness. He has trained many groups on how to establish and run a farmers resource centre. Through his training farmers groups in Ndeiya, Bibirioni and Nazareth have now opened up their own resource centres that provide information and training to more farmers.

"The biggest problem facing farmers in Kenya is lack of relevant information. Much of the information on sustainable agriculture is available online, but many farmers have limited access to the Internet and most of the content cannot be easily understood and applied by the farmers," Karanja laments.

Need for relevant information

Karanja notes that much of the information farmers receive is provided by people who have no background in agriculture and therefore it is distorted. He says that the mainstream media which have started disseminating agricultural information are not helping because the information is packaged in a way that farmers cannot apply it.

He has received enquiries for training from farmers in Uganda, Tanzania and even Rwanda and Burundi but his resources are limited. He challenges organizations supporting agricultural programmes in the region to help establish farmer resource centres to enable more farmers to access to information. ■

continued from page 2 ► **Farmer uses earthworms to make fertilizer**

Martha Kihara, a Nairobi city resident was concerned about the quality of vegetables she was buying from grocers. She suspected they were grown using chemicals that have negative effect on human health. So she started growing her own vegetables using pots in her house in South B Estate.

Over a year ago, Martha bought a ½ acre plot in Garden estate, where she continued growing vegetables such as amaranth, kales (*sukumawiki*) spinach, and spring onions and spices for her own use. Since she wanted natural fertilizer for her vegetables, she decided to make organic fertilizer using earthworms.

To do it successfully, she did a lot of research on earthworms composting from the internet and individual farmers who were already doing it. Today, Ms Kihara makes earthworm



compost and even worm juice in her vermiculture shed which she uses in the garden. The surplus is sold to farmers who collect it in jerricans and use it in their

kitchen gardens as foliar feed.

She has teamed up with 17 organic farmers in other parts of Nairobi to form the Innovative Organic Group of Farms, which intends to produce various organic products for sale in the local market outlets in Nairobi.

The group will also train other farmers on organic farming, marketing and the benefits of vermicomposting. Her group also intends to help other farmers put up their own earthworm composting sheds. Martha also plans to do integrated farming whereby fish from a fish pond she is preparing will be fed with algae grown using the vermicompost and worm juice.

Martha Kihara sells earthworms and trains farmers interested in vermicomposting. Interested farmers can call her on Tel. 0737 640 143

Be careful when buying chickens in adverts

I have been searching for KARI improved *kienyeji* chickens recently and noticed many advertisements claim to sell indigenous chickens.

As far as I am aware, we do not have a system for identifying "pure-bred" chickens. I keep chickens in my compound, and only have 6 or 7 at a time. The larger (and I would assume) more reputable breeders sell in bulk, thus putting them out of reach for those wishing to purchase a couple of layers (for example). If we could establish a pedigree system, as we do for dogs, would it be feasible to do the same for chickens, I wonder? This would provide some level of assurance to buyers, whilst allowing those breeders of pure-bred chickens to charge a little more. At the moment I fear that some breeders are claiming to sell KARI improved chickens (and charging accordingly) when they clearly are not "pedigree." Chris Taylor

It is difficult for farmers to accurately tell the quality of chickens



being advertised. Many farmers may not understand the complexities of breeding. Information on breeding is confined to research institutions and companies selling day old chicks mainly for hybrid chickens and the few existing good breeders who mainly practise breeding to produce their own flocks. To enable farmers understand how breeding is done, we would like

them to know that all day-old chicks or chickens obtained from KALRO are obtained from the parent flock.

The parents produce the first generation of chicks (called the F1). The F1 is what is sold to the farmer. When the eggs from the F1 flock are hatched, they produce the second generation chicks (now called F2); the farmer breeders can sell the F2 to

other farmers since F2 are usually more superior genetically than the F1. Any chicks hatched from the F2 (now F3) will be of inferior quality because at they will have lost their genetic vigour. What many farmers are doing is to sell chicks hatched from third, fourth and even fifth generations claiming it is the KALRO breed.

Buyers of day-old chicks from breeders should look at the seller's farm records to know when they bought the batch from the institution.

From these records, it is easy to tell if the chicken are F2, F3 or even F4 which are of lower quality. Another option for poultry farmers is to buy chicks or eggs from well known breeders who are unlikely to sell inferior quality chickens.

Farmer breeders are required to get a new flock of day-old chicks from KALRO once they have sold their F2 flock; any chickens reproduced after the F2 generation will be of inferior quality. Selling only F2 chicks maintains breed quality.

My chickens have stopped laying eggs

I have mature hens and cocks. I provide them with all the necessary feeds and environment for reproduction but they are not laying eggs. What could be the problem?

Hens may stop laying for a number of reasons some of which are given below:

Moulting: Many poultry farmers particularly those keeping chickens for a long time become puzzled when the hens suddenly stop laying eggs. This happens at times when the birds appear quite healthy. This phenomenon is called **moulting**. Moulting is process of shedding or renewing feathers. During the moulting period, the reproductive system of a bird comes to a complete rest from laying eggs as the bird builds up its body reserves of nutrients.

Feeding: Inadequate or lack of balanced feed may reduce or stop hens from laying eggs. Some nutrients such as proteins (amino acids) are very crucial for egg laying chickens. Calcium deficiency in feed may also reduce egg production; one egg takes away 10 per cent of calcium from a hen's body (it takes about 2g of calcium for an egg to form). Insufficient minerals can also reduce egg production in chickens. Too much

feeding can make hens too fat for egg production. Feed with a large proportion of maize can sometimes lead to accumulation of fat in the hen which reduces egg production.

Age: After 18 months of eggs laying, a hen's egg production ability goes down. Aging hens become poor layers and should be culled and a new laying flock started.

Diseases: A poultry farmer should always observe their

chickens for any signs of disease; should the chickens show any change in behaviour, the farmer should consult a vet immediately.

Stress: Any form of stress in chicken can make hens reduce egg production. Farmers should ensure chickens are well housed with good ventilation.

Hens can become stressed if they lack water, feed or even fear of predators; these factors

can make them reduce egg production.

Light: A laying hen requires 14 hours of light per day. Hens housed in dark places can reduce or even stop laying eggs since the reproductive state is regulated by the amount and duration of light they are exposed to - if the hours they receive light increases, hens may improve on egg production.

Farming Tip

Research body about to release GM maize

The Kenya Agricultural and Livestock Research Organisation (KALRO) and the African Agricultural Technology Foundation (AATF) have made an application to Kenya's National Biosafety Authority (NBA) seeking the release of a Genetically Modified (GMO) maize variety.

The maize variety has been genetically modified by inserting the *cry1ab* gene obtained from *bacillus thuringiensis* (*Bt*) a biopesticide used in the control of pests in various crops. The Genetically Modified (GMO) *Bt* maize has been rejected in several European countries

after traces of the toxic *Bt* gene were found in unborn children (See page 3).

A factsheet released by KALRO and AATF says the *Bt* maize variety will greatly reduce maize yield losses caused by the pests such as stemborer, which cause an annual maize yield loss estimated at 400,000 bags that account for 13 per cent of total maize production in Kenya.

However the factsheet does not elaborate how the *Bt* maize will be grown by farmers to prevent the transfer of the *cry1ab* gene to other maize varieties, which has been a major

issue raised by opponents of GMO maize. Neither does it explain whether the *Bt* maize will prevent the emergency of stemborer pests that are resistant to the *cry1ab* gene.

The NBA has published a public notice inviting interested parties to send their concerns or comments to the authority by August 23, 2015.

The notice says that currently, the *Bt* maize is undergoing scientific review by the body together with other regulatory agencies including independent experts to ascertain its safety to people, animal and the environment.

TOF Rad answers your questions

TOFRadio is broadcast on Milele FM at 8:45pm on Sunday, and KBC on Thursday at 8:45pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondence to the radio program. Send your questions and comments via SMS 0715 916 136.

Taking care of goats during wet and cold season

How can I manage my dairy goats during the cold and wet season?

Many farmers are now turning to goat rearing as goats are easy to manage even on a small piece of land. Goat milk and meat also fetch higher prices compared to that of cows. A litre of goat milk fetches an average of Sh.70 at the farm gate while the cow milk averages at Sh.30 in rural areas. A kilo of goat meat is currently retailing at Sh.500 as compared to the beef's Sh.400.

Goats need proper shelter, feeding and management of diseases in order to give farmers good returns. Well kept goats grow faster and give birth twice a year with a higher chance of producing twins.

More diseases in wet season

The care given to goats during the wet and cold season is different to the routine management throughout the rest of the year. During the wet and cold season, the farmer should be on the lookout for health problems such as pneumonia, mastitis and foot rot. Examine animals and treat them early as it is costly to treat them later; you may lose them if the disease outbreak is serious. You should also take adequate measures to maintain high standards of cleanliness in the shelter.

A goat farmer should assess the quality of air in the shelter daily. To reduce risk of disease, remove and replace bedding and clean the shelter.

When the weather is very cold, goats tend to crowd together for warmth. This might also increase the likelihood of respiratory diseases. It is important for the farmer to provide a well covered shelter which protects the animals from various elements such as wind, rain and cold weather.

Provide quality feed

During the cold season, goats eat more than normal in order to maintain body temperature. Quality fodder should be provided. Never sacrifice quality for quantity. Ensure adequate nutrients are available to meet the nutritional needs of your



Goats housed in shelters that expose them to the cold are prone to diseases such as pneumonia.

animals. If feed is limited, consider putting non-lactating animals to browse in bushy areas. You can also let them browse leftover crops or maize stalks if you have harvested your farm. It is important to provide best quality forage first to lactating goats and second to the breeding herd.

By giving your goats enough fodder every day, you can satisfy some of their energy, proteins, vitamins and minerals needs which are vital in surviving the cold weather. Fodder includes grass and other crop residues such as banana leaves, shrubs



and trees. It is also important to give your goats energy-dense feed, such as a grain.

Some plants stimulate milk production more than others as farmers from Mwigito village in central Kenya have observed. "The most important fodder feed I have experienced that stimulates a lot of milk is banana stem mixed with sweet potato vines. After harvesting the banana stem, I chop it properly then dry it well. I take sweet potato vines, chop and mix them properly with some grass to make it a little dry. When goats eat the mixture they give me a lot of good milk", says Teresia Muthumbi.

Another goat farmer John Gitonga says he gives his goats grevillea because it provides proteins especially when mixed with maize stalks and banana leaves.

Proteins

Leaves from cow peas, beans, calliandra and grevillea trees are rich in protein. Other good sources of proteins are soya bean meal, fish meal, and cotton seed cake. These can be found in animal feed outlets.

Supply goats with clean water at all times in a



0717 551 129 / 0738 390 715

Beehives for sale: We make beehives for sale. Interested farmers can make orders on any quantity they require. The following are prices for various hives: Langstroth Ksh 4,500, Kenya Top Bar Hive Ksh 3,800, Stingless bee hives cost Ksh 400 and Ksh 1,500 depending on size. Interested farmers can call Stephen on 0734 371 557.

Liquid organic fertilizer: Seaweed extract with over 60 nutrients. Ideal for all crops *sukumawiki*, wheat, tomatoes, chillies, potatoes, fruit trees, Napier grass, tea, coffee, beans and others. Quantity 1-4 liters. Contact 0721 96 09 49 or 0734 020 982. Email: bweru@gmail.com

Fruit seedlings: We have fruit seedlings for sale. Grafted Apple mango at Ksh 150 per seedling, grafted Avocado at Ksh120, grapes at Ksh 300, grafted purple passion at Ksh 300, tree tomato at Ksh 50, pawpaw at Ksh 50, breadfruit at Ksh 500, tangerines at Ksh150, peach at Ksh 300, Pomegranate Ksh 150. Call 0714 118 794.

Avocado seedlings for sale: I have Hass variety of avocado seedlings at Ksh 150. Interested farmers can get in touch with me on 0720 031 754, 0722 608 855, Eldoret.

Fresh farm produce: We sell fresh and natural bananas, avocados, sugarcane. We have watermelon too. 0725 455 844, Kisii.

Turkey chicks wanted: I would like to know where I can buy 5 turkey chicks Age: 51 day old to 1 month old; Breed: Broad breasted bronze or broad breasted white. Call Agnes on 0722 409 869, Nairobi.

Silage tubes for sale: We have silage tubes for sale. We also conduct train farmers groups. Call Star Rays Education Centre Tel. 0721 245 443.

clean trough. By drinking water, goats digest the fodder better.

Proper management of your goats even in cold and wet weather will help you get the best from the animals - keep them healthy so that they can produce more milk, good quality meat and healthy kids for many years.

To watch a video on dairy goat feeding, visit www.accessagriculture.org **Joyce Wambui**