



Rose Koech, at her farm in Kembu, Bomet County in Kenya. She intercroops fodder trees with maize and beans, grows fodder trees, shrubs and grass for dairy cattle. Photo: ICRAF/Sherry Odeyo

Plant trees: Protect our environment

TOF - The long rains have just started in most parts of the country. Farmers are busy planting various food crops as is the practice every year, and this is good time to also plant trees.

Everyday, farmers complain that the weather patterns are changing with the rainfall coming at the wrong times in the year and disappearing just when they are planting or when the crops need it most.

These are some of the effects of climate change brought about by the destruction of our environment, mainly the forest cover.

In Kenya, huge chunks of our forests have been hived off to create room for human settlements. The rapidly growing population has increased our energy needs.

Few trees planted

Over 80 per cent of our rural population depends on trees mainly for cooking and building. More trees are cut down to provide our different needs but very few are planted to replace them. Even where trees are planted we take very little care of them to ensure they grow to maturity. Animals are allowed to graze freely and destroy the

few trees that we plant.

Agroforestry a must in organic farming

Planting trees in our farms (agroforestry) is the easiest way we can reclaim our forests. For organic farmers, tree planting should be an integral part of the farming activities for the year. Every organic farmer should have a small tree nursery with all varieties of trees that they can plant to replace those that have been cut down or to plant new trees in areas that do not have trees. If farmers have not isolated a portion of land for tree planting, they can plant trees along the hedges or fences mainly to act as windbreaks and even to keep away some of the pests that depend on wind to move from one farm to the next. In this issue, we once more highlight the importance of growing trees. *Page 2*

You can grow oranges



Most farmers have abandoned the production of oranges in Kenya due to problems associated with diseases such as orange greening disease. *Page 5*

Dear farmers

The planting season comes with many challenges for the farmer. First, is the unpredictable weather. Although the rains started at the right time in mid March, they disappeared as soon as they had come in some places. TOF hopes that the rains will continue as usual to enable the crops that are being planted or those that are germinating to grow strong and healthy.

Second, the rainy season may also come with mixed blessings too. There may be flooding in some areas with displacement of people and destruction of farmlands and property. While farmers have little control over these calamities, they can do much to reduce some of the bad effects of the rains such as washing down of thousands of tonnes of fertile top-soil into rivers every year.

Under these conditions, good farming practices such as making terraces, mulching, as well as planting trees across the slopy land can go a long way in reducing soil erosion. Farmers who adopt these measures can prevent their soils from being washed away. It is difficult to restore the soil that loses its fertility through erosion.

Third, diseases will also be common from now on. The best practice in organic farming is to take preventive measures. Farmers should never wait until a disease or pest has attacked a crop before applying organic remedies. It is always advisable to protect your crop at all times.

Farmers need to do continuous scouting to check the progress of their crops. Walk along the planted rows and keenly observe the plants to see if there is any sign of pest or disease. Turn and check the underside of the leaves daily to ensure all is well. This helps to detect any pest, disease or nutritional problem and deal with it early before it becomes unmanageable.

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Napier grass

In our last issue of TOF magazine (TOF No. 107 March 2014) coverage of the Maize Lethal Necrosis (MLN) disease, it is indicated that plants in the grass family such as Napier grass have been found to host the disease causing viruses i.e. the Maize Chlorotic Mottle Virus (MCMV) and the Sugarcane Mosaic Virus (ScMV).

We would like to take this earliest opportunity to correct this statement because we have established that there is no scientific finding so far to suggest that grasses such as Napier grass are responsible for the transfer of the disease to maize.

The error is highly regretted.

Trees in a farm have immense benefits

'Where there are no trees, or only a limited number of trees, usually there is poverty.'

Dr. Segenet Kelemu,
Director General of - *icipe*

Caroline Nyakundi | For thousands of years, farmers planted crops without artificial fertilizers or other industrial inputs. The environment was free of pollution, and households were food secure without using chemical fertilizers, herbicides or pesticides. But today, many farmers are wondering why they are producing less and less in their farms in spite of using plenty of chemicals when growing crops.

One reason for reduced food production is the damage to the environment caused by cutting down of trees for firewood, charcoal and human settlement. Soils are now depleted and unable to sustain continuous production season after season. This is worsened by the fact that prices of farm inputs have increased significantly over the last 10 years and many farmers can no longer farm profitably. This need not be the case and farmers can turn around this situation and even make more money from conserving forests and planting trees on their farms.

Did you know that there is a direct connection between agricultural productivity and density of tree cover? Years of research by the World Agroforestry Centre (ICRAF) have revealed that trees make a farm more productive because of increased moisture in the air and in the soil (humidity) and improved soil fertility.

Farmers also benefit from more money from fodder, fuel wood, food and building materials. In very humid areas, the land has at least 20% tree cover while the driest agricultural areas have less than 5% tree cover. Farmers should therefore plant the right trees, which not only provides food for beneficial insects like bees but also prevent erosion of valuable top soil, act as wind breakers and keep away pests.



A maize plantation intercropped with nitrogen fixing trees.

Farmers are encouraged to plant trees in their farms consciously by combining trees with crops and/or animals on the farm. This is called **agroforestry**. Good organic farmers always have trees planted in their farms. There are various ways in which farmers can practice agroforestry:

1. Boundary planting

This involves planting tree types to demarcate different parcels of land, act as windbreakers, prevent soil erosion and for firewood and poles. Species grown for this purpose include *Markhamia lutea* (muu - kikuyu, Lusio - luhya), *Maesopsis eminii* (mutere - luhya), *Casuarina equisetifolia* (Muije - Kiswahili), *Albizia lebeck* (Siris tree, Mukingi - Kiswahili), *Grevillea robusta*, *Acacia polyacantha* (musewa - kikamba, mugaa - kikuyu) and other indigenous trees like *Khaya niasica* (Khaya - Luhya) and *Albizia spp.* (mukurwe - kikuyu Mukonzuli - luhya).

2. Dispersed interplanting

Trees like *Markhamia lutea*, *Maesopsis eminii*, *Albizia lebeck*, *Albizia coriara*, *Acacia polyacantha*, *Acacia nilotica* (kiroriti-kikuyu), *Ol kiroriti* (maasai), and *Acrocarpus fraxinifolius* are grown for firewood, medicine and to improve soil fertility and water conservation.

3. Fruit orchard

Farmers can also plant fruit trees for consumption and sale.

Species planted include *Mangifera indica* (Mango tree), *Citrus limon* (muchungwa-kikuyu), and *Persea Americana* (avocado).

4. Woodlot

These trees are planted for timber, firewood, medicine and animal fodder. They include *Maesopsis eminii*, *Casuarina equisetifolia*, *Podocarpus spp.*, *Markhamia lutea*, *Acacia nilotica*, *Albizia lebeck*, *Acacia polyacantha*, and *Cedrela odorata* (tropical tree).

Farmers conserve forests

Researchers from *icipe* and other partners, supported farmers living around the Kakamega rainforest (Western Kenya), Arabuko-Sokoke (Coastal Kenya) and Mwingi dry woodland forest (Eastern Kenya) to produce silk and hive-based products for income generation. In the process, the farmers helped increase the forest cover and biodiversity living in the forests such as stingless and honey bees, wild silk moths and birds.

Farmers were encouraged to conserve their forests, earn money from rearing certain Commercial Insects and improve crop production by planting certain types of trees in their farms. Commercial insects like bees and silkmoths give farmers good rewards within a short time and are not expensive to take up and maintain since they use renewable resources available in the rural environment like nectar,

pollen and leaves. Bees not only pollinate the forest plants and but also food crops in the farms that are close to them.

Dr. Evelyn Nguku, a scientist in the EU Bee Health Program cites many benefits farmers received from agroforestry (planting trees with crops). "We encouraged farmers in Mwingi, a semi-arid area, to plant acacia trees in their farms. The acacia trees provide food both for the bees and the worms, although differently. The bees use the nectar and pollen from the flowers to make honey while the silk worms feed on the leaves. As the worms feed on the leaves, the plant tends to bloom better (have more flowers). Farmers therefore have more honey since there is more food for the bees." She says.

Farmers benefited from training on how to domesticate and multiply stingless bee colonies in Mwingi Forest.

At least 200 stingless bee hives were set up in Imba, Nguni, Ngomeni, Kasanga and Kathiani in Mwingi. Not only did farmers benefit from increased honey production (stingless bee hives have sweet honey and it is used as traditional medicine) due to the increase in number of colonies but also witnessed an increase in pollination.

The communities divided their regions into zones - zone for fuel wood and poles from the forest boundary, zone for beekeeping/silk worm rearing, a zone for grazing and water catchment, a zone for afforestation area (all areas that were previously encroached), socio-cultural sites, eco-tourism sites, and a medicinal plants harvesting zone.

Dr. Nguku says the Mwingi farmers were best advised to plant woodlots in their farms.



Dr. Evelyn Nguku.

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The Organic Farmer is an independent magazine for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. It is published monthly by *icipe*. The reports in the *The Organic Farmer* do not necessarily reflect the views of *icipe*.

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Prevent blights in your tomatoes and potatoes

A farmers' group wants to know how they can control early and late blight in tomatoes and potatoes. Here we give information on the two common crop diseases that occur in crops grown during the wet season, which is approaching. This will help farmers prevent the diseases early enough.

The Organic Farmer | In organic farming, the first line of defence against diseases and even pests is to grow healthy crops by providing them enough nutrients and managing them well. A healthy crop can withstand diseases and pests. The other method is ensuring that the crops are always protected from diseases through crop rotation and use of safe inputs such as biopesticides and fungicides that help keep away diseases and pests. It is possible to control early and late blight if farmers can adhere to these practices. As we always advise, prevention is the best measure for an organic farmer.

Below are some of the measures that farmers can take against the two diseases:

Late blight

Late blight is one of the most devastating diseases in tomatoes and potatoes especially in cooler and moist conditions. The disease can easily destroy the entire tomato or potato crop if it is not controlled on time. At first, the leaves turn brown; under humid conditions, a white dusty layer that contains the spores can be seen on the underside of the leaves.

Seeds: There are no certified disease free seeds on the market.

Transmission: When the weather conditions are cool and

Use Copper

In organic farming, the use of copper oxychloride is allowed. Copper oxychloride is available in many agroveterinary shops across the country under different names depending on the company selling it. One of the proprietary names is Cupravit® (WP). Applied regularly and in combination with the plant extracts given above, copper oxychloride (WP) can control both early and late blight in tomatoes and potatoes.

Early blight

Seeds: Early blight is a fungal disease that is mainly transmitted through the use of diseased seedlings. Farmers should use certified, disease-free seeds. Farmers growing tomatoes can also plant resistant varieties such as Summerset F1, Zest F1.

Transmission: The fungus that causes early blight can survive and transmit the disease from one season to the next especially if residues of infected plants from the previous crop are not destroyed through burning.

This happens when the soil is dry. The spores (the microscopically small 'seeds' of a fungal disease) are formed on infected leaves of tomatoes, stems and potatoes and fruits, and can be spread by the wind and splashes of water. A combination of warm weather and rain produces serious outbreaks, particularly if plants are weak.

Planting: Do not plant consecutively tomato crops on the same land from one season to the next. Do not rotate tomatoes with related crops such as potatoes, pepper or eggplant. Prop up the tomato plants to keep them off the soil and keep tomatoes free of weeds. For potatoes, ridging

moist, the spores usually spread very fast. Splashes of water especially during rains can transfer the spores from one plant to the other. Wind can carry the spores over great distances, in the process transferring the disease to other crops.

Planting: If you plant tomatoes in a field after Irish potatoes, remove all potato tubers, as the ones remaining in the soil after harvest can be a source of the disease for crops which follow. Crop rotation with crops that are not from the tomato family such as maize, beans, sukumawiki or cabbages for 3 to 4 years helps to break the disease cycle. After harvest, remove the crop residue or dig them deep into the soil, where the fungus does not survive for long.

Control: Use wider spacing. For tomatoes you can also prop up the plants to keep them off the soil. Add mulch to cover the soil and reduce splashes of water. Pruning will increase air movement, reduce humidity within the crop and thus reduce disease intensity. If you irrigate, do it in the heat of the day; this



Early blight in tomatoes leaves (above) in tomato fruit (below).



Early blight in potato tuber (above) on potato leaves (below).



(earthing) prevents the leaves from touching the soil where the disease-causing fungus can get into contact with the plants and infect them. After harvest, residues should be removed from the field or destroyed immediately.

Control: There are several plant extracts that help in controlling fungal diseases. These are:

- **African marigold:** Fill a drum with a half (or $\frac{3}{4}$) full of flowering African marigold plants.

Leave it to stand for 5 to 10 days. Stir regularly. Strain before use. Dilute the filtered liquid (filtrate) with water at a ratio of 1 part filtrate to 2 parts water (1:2). Add 1 teaspoonful of soap to every litre of the extract you use for application.

- **Garlic:** Bulbs may be dried and crushed. Add water to the powder and spray.

- **Milk:** Spray every 10 days with a mixture of 1 litre of milk to 10 or 15 litres water.



Late blight in tomatoes fruit (above) in tomato leaves (below).



Early blight in potato leaves (above) on potato tuber (below).



allows the crop to dry before nightfall and reduce transmission and development. In wet weather, sprays should be applied regularly to prevent the disease. Do not wait until you see the disease to start spraying as this may fail to eliminate the disease. The following plant extracts are useful in disease prevention:

Onions: Apply 100 grammes of onion leaves in every 1 litre water used; let it stand for 4 to 7 days in a covered container before spraying.

African Marigold: Crush 100 – 200 grammes of leaves, roots or flowers. Pour on 1 litre boiling water, soak for 24 hours, add 1 litre of cold water and spray. ■

Sahiwal: Easy to handle dual-purpose breed

Kenya is one country in Africa with enormous genetic resources of Sahiwal cattle that is used as source of breeding stock and semen for the country and the entire continent.

Josephat Chengole | Sahiwal is a breed of Zebu cattle, which is loved for its ability to give high quality milk with high butter fat content in semi-arid areas where pure exotic breeds find it difficult to cope. Among small scale farmers, the breed is used for milk production, while in ranches, it is used primarily for commercial meat production. The biggest advantage of the Sahiwal is its higher milk production compared to the Boran; its weaners are healthier and heavier (60 – 75 kg).

The Sahiwal originated from Sahiwal district of Pakistan, and reared in the Punjab region of India. Sahiwal is known for its easy calving, rapid weight gain, heat and drought tolerance, capacity to cope with bloat, hybrid vigour and longevity (they can reproduce up to 20 years). Sahiwal beef is noted for its even fat cover and leanness. The breed was introduced in Kenya in the 1930s and 1940s and has been bred in the marginal areas for both beef and milk.

Physical characteristics

Sahiwal's colour ranges from reddish brown to red, with varying amounts of white on the neck, and the underline. In males, the colour darkens towards the head, neck, legs, and tail. The tail ends with a black switch. The breed is also known for drooping ears. The hump is massive, but in the female it is nominal. At the KARI multiplication centres (Naivasha and Perkerra), adult females weigh 460 kg and males weigh 680kgs, though higher values for males have been documented.

According to research conducted by KARI, the breed is a good milk producer - compared to other local breeds and is capable of an average of producing about 8-10kgs per day, with a fat content of 4.5 %, within an average lactation period of 10 months. Sahiwal has larger teats compared to other Zebu breeds, making milking easier. They produce small calves (average weight of 27kg) without diffi-



A one year old Sahiwal bull at KARI- Perkerra station, Baringo.

culty or requiring assistance. Sahiwal is also relatively resistant to tick-borne diseases, though not as much as Boran. These characteristics make the Sahiwal attractive to the arid and semi-arid lands of Kenya.

Kenya has made great contribution to the improvement, conservation and distribution of the Sahiwal genetic pool. This takes place at the Kenya Agriculture Research Institute's National Animal Husbandry Research Centre. Due to its excellent performance, KARI Naivasha established the National Sahiwal Stud (breeding farm).

The farm has two main objectives (i) to produce pure-bred Sahiwal cattle for use in the arid and semi-arid areas, and (ii) cross breeding of Sahiwals with exotic breeds such as Friesians to produce a breed that is suitable for milk production in both

high and low rainfall areas.

The success of the breeding program has also seen the Sahiwal exported to South Africa where it is being reared both as a pure breed and used for cross breeding with *Brahman*, *Simmmental* and the indigenous *Nguni*. In Kenya, Sahiwal has more advantages over other Zebu breeds in the market—it's used for dual-purpose production in middle- to lower-potential areas. In fact, the animal is so popular among the Maasai – its color is referred to as *rangi ya pesa* (the colour of money).

Cross breeding

Sahiwal is an excellent grazer, able to use pastures in arid and semi-arid areas, making it a good alternative choice for farmers who are not interested in zero grazing or want to have both milk and beef. Cross-breeding

with Friesian, Jersey or Ayrshire increases the milk production potential of its heifer. A Sahiwal-Friesian cow gives higher milk yields compared to a purebred Sahiwal, yet it does not eat as much as the Friesian breed. The breed is also resistant to most of the common cattle diseases compared to the Friesian. According to research conducted by KARI, the Friesian-Sahiwal cross gives average milk yields of 15-18kgs per day. Calves grow faster and so heifers can be served early.

Feeding

Sahiwal thrives on natural pastures – including Kikuyu grass (*Pennisetum clandestinum*), star grass (*Cynodon plectostachyum*) as well as raised fodder grasses like Boma Rhodes (*Chloris gayana*), Foxtail grass (*Cenchrus Ciliaris*) and Fodder Sorghum, among others. It is advised that the cows are grazed rotationally in paddocks to give grasses time to re-grow.

Water and mineral licks should be provided as the farmer desires. Sahiwal cows kept for milk production can be supplemented with a protein legume and concentrate for more milk production.

Health management

Ticks pose a major risk to cows in pasture areas. Dip or spray animals with acaricide once a week to prevent tick bone diseases. To prevent internal parasites, deworm animals regularly every three months and as is necessary depending on the helminth fecal egg count.

In addition, routine vaccinations against diseases like Foot and Mouth, Anthrax, Lumpy Skin Disease (LSD), and other epizootic diseases should be done. East Coast Fever (ECF) vaccine is now available and given once in the animal's lifetime for Foot and mouth disease. Anthrax vaccinations were given twice a year.

Notice: KARI (Naivasha and Perkerra) has both Sahiwal and Sahiwal-Friesian crosses that are periodically sold to breeders and farmers.

Talk to the centre directors of the two stations on 0770 735 453 and 0773 479 017 respectively for more information. Farmers can get Sahiwal Semen from Kenya Animal Genetic Resources Centre (formerly CAIS). Talk to an Artificial Insemination (AI) agent or semen distributor in your area.



A mature Sahiwal bull at the Kerio Valley Development Authority (KVDA) farm in Marigat.

Farmers can fight diseases and grow oranges

The secret behind successful orange production is to plant disease-free seedlings and strictly control pests that transfer dangerous diseases such as the greening disease which has forced many farmers to abandon growing of oranges.

Peter Kamau | Kenya was a large producer of oranges until an outbreak of the greening disease in the late 1980s. Since then, the country has been a net importer of oranges from other African countries such as Uganda, Tanzania and South Africa. Many farmers believe it is no longer possible to grow oranges due to diseases and pests. That is why the country has very few farmers growing oranges due to fear of losing their investments.

But farmers need to understand that just like any other fruit crop, oranges require the right choice of seedlings and good management to keep away diseases and pests. Once proper management is practised in an orchard, farmers can grow oranges like any other fruit crop. Below, we provide guidelines on how to grow oranges while keeping disease and pests under control:

Seedlings: Farmers intending to grow oranges should acquire seedlings (preferably grafted seedlings) only from certified seedling producers. Avoid roadside seedling traders as they can sell diseased seedlings that transfer diseases and pests to your *shamba*. To make orange trees to withstand diseases and pests, experienced seedling growers graft the orange seedlings with trees that are genetically resistant to diseases such as kei-apple, lemon or lime trees. The trees are used as rootstock (lower section of graft) while the orange cutting becomes the upper section of the graft (scion).

Site Selection: Sandy loam soil is the best type of soil for growing oranges and other citrus fruits. Planting in water-logged soil can cause root rot (gummosis disease or phytophthora). Ensure the growing site has good drainage. Oranges and other citrus trees do not like shade. All trees or any structure that brings shade should be removed from the orchard.

Planting: Oranges should be planted when the rainy season



Photos: TOF

has started because the soil is moist at that time. Dig planting holes on time before buying the seedlings. When digging, put the top-soil on one side of the planting hole and the sub-soil on the other. Fill the lower part of the hole with the top-soil and top up with the sub-soil when planting. Ensure the seedlings are planted at exactly the same depth as when they were in the nursery.

Spacing: Planting holes should be dug at a spacing of 3m (between rows) and 2.5m (between one hole and the next).

Weed control: An orange orchard should be kept free of weeds or any other unwanted material. Farmers should cut all grass or weeds growing near orange trees.

Fertilizer application: Well-composited fertilizer can be used at the time of planting. Farmers should never use farmyard manure, which has not been composited as this can burn the young seedlings and spread disease-causing viruses, bacteria and fungi. The compost should be mixed with the top soil that is applied on the lower part of the planting hole. After a year, compost can be applied around the base of the orange tree but not

too near the stem. Apply about 2kg of compost for every tree in one year.

Pest and disease management

This is perhaps the most important part in orange production. Controlling diseases and pests in oranges requires skill and commitment on the part of the farmer. Orange orchards should be located in an area where they cannot be affected by pests or diseases from other trees. Farmers should remove all indigenous trees growing near their orange orchard; most indigenous trees are responsible for transfer of diseases through their root systems.

Pests: Oranges are prone to many pests during the growth phase. Some of the most common pests in East Africa are the citrus psyllid, aphids, thrips, mealy bugs, whiteflies, mites, leaf miners and nematodes (worms). Routine spraying with biopesticides e.g. nimbecidine®, spinosad® or *Bacillus thuringiensis* (Bt) will control the pests. Pests are responsible for the transfer of diseases from other affected trees or crops to oranges or from one orange tree to the next.

For organic farmers constant and thorough inspection of the orange trees can help control most of the orange pests. Preventive spraying is also important at all times to keep the pests away-farmers should not wait for the pests to appear in order to start spraying.

Diseases: Diseases that affect orange trees include greening, citrus canker, scab, gummosis, sooty mould and leaf spot. Pests are one of the major vectors (carriers) of diseases. The best way to control diseases in an orange orchard is to ensure the orange trees are kept free of pests. A combination of biopesticides and copper-based fungicides (copper-oxchloride is allowed in organic farming) are recommended. Well-fed orange trees can withstand most of the diseases. Regular scouting can also help control and monitor pests or diseases.

Orchard sanitation: This is one of the most important control measures in an orange orchard. All debris such as fallen leaves, fruits or prunnings should be removed, buried or burnt far away from the orange orchard. This helps to keep diseases and pests from spreading into the orange trees. ■

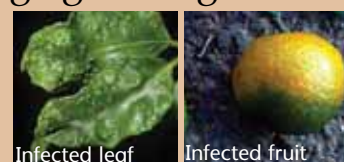
How to control orange greening disease

The orange greening is one of the most destructive disease and as can destroy all citrus trees in an orchard. The destruction caused by the disease has caused many farmers to abandon the production of oranges in most parts of East Africa.

Symptoms

Greening is a bacterial plant disease that is spread by one main pest-the citrus psyllid. It destroys the production, appearance and the value of citrus trees. It makes the trees produce bitter and inedible misshapen fruit. Once a tree becomes infected it dries and dies.

Detection of the greening disease is not easy because once a citrus tree is infected, it does not show any symptoms for more than one year. The first symptoms are yellowed leaves but farmers may not know the cause because yellowing is often associated with lack of nutrients. To tell if the tree has the greening disease, the farmers should observe the leaves carefully. The presence of patches or spots of yellow colour confirms this. Later, the orange produces



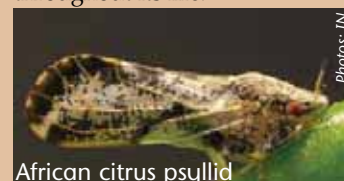
Infected leaf

Infected fruit

small fruits that drop off. As the disease progresses, entire shoots and branches turn yellow.

How it is spread

When the African citrus psyllid feeds on an infected tree, it can pick the bacteria that causes the greening disease. The tiny insects then carry the bacteria throughout its life.



African citrus psyllid

Photos: IN

Prevention

The best way to protect orange and other citrus trees from the greening disease is prevention. Once a tree is infected by the greening disease, it must be removed because it can become the source of the disease that will be later transferred to other trees by insects.

Indigenous vegetables benefit farmers

A rural development organization is changing lives and improving human health through promotion of indigenous African vegetables.

The Organic Farmer | For centuries, African communities have relied on indigenous vegetables to supplement their traditional carbohydrate-based diet of cassava, sorghum, millet, arrowroots and fruits. But with modern living and lack of knowledge on the benefits of these vegetables, many people have abandoned these nutritious vegetables in favour of modern vegetables such as cabbages and *sukumawiki*.

A tradition with indigenous vegetables

In Western Kenya region, communities have maintained a tradition of preference for indigenous leafy vegetables. But this knowledge is slowly disappearing especially among the younger generation who have developed a taste for meat and processed foods, which are responsible for many health conditions and diseases such as obesity, diabetes, heart disease, cancer, hypertension, among others.

But a non-profit organisation in Western Kenya is changing all that. The Rural Outreach Programme (ROP) realized the danger of rural communities abandoning their traditional sources of food. Although these have sustained them for centuries many now favour modern

processed foods, most of which are grown using fertilizers and chemicals that are dangerous to human health.

Promoting indigenous vegetable benefits

Under their founder Prof. Ruth Oniang'o, a scientist and food nutritionist, ROP has sensitised the communities on the importance of indigenous leafy vegetables in maintaining their health. ROP promotes the production of indigenous leafy vegetables in six regions in Western Kenya that are divided into six clusters; Emuhaya, Butere, Lurambi, Hamisi, Sabatia and Vihiga.

Among the Africa indigenous vegetables promoted are the spider plant (*sagaa*), black nightshade (*managu-sucha* in Luhya), crotolaria (*mitoo*), corchorus (*mrenda*), cowpea (*kunde*), pumpkins (*malenge*), amaranth (*terere* or *mchicha*) and Ethiopian kales (*Kanzira*).

Vegetables grown organically

Prof Oniang'o says the role of traditional vegetables is gaining popularity because of the growing interest in nutritious foods. She says her organization is working to protect and revitalize African leafy vegetables as a nutritious source of food that is found in Africa's rich biological and cultural diversity. The indigenous vegetables are grown organically using farmyard manures. To protect them against pests, the farmers use traditional methods such as ash

or plant extracts. Most of the vegetables are disease resistant and require less management in terms of disease control.

Increased income for farmers

A project officer with the organization, Mr Thomas Mutuli, says increased awareness of the benefits of eating indigenous vegetables has created a huge demand for the vegetables among the population in the region.

The demand for the vegetables in the local open air and even supermarkets, hotels and individual buyers has translated into increased income for close to 30,000 farmers in the six cluster regions where the project is operating.

Ekilai Okello, a mother of five from Butunyi village in Butere says the growing of indigenous vegetables has transformed her life.

She says she has managed to educate her 5 children with income from the vegetables. She has educated her first-born daughter up to university level with earnings from indigenous vegetables.

Seed banks maintained

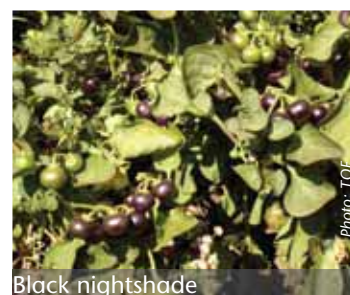
The organization trains farmers on agronomic aspects of indigenous vegetable growing, preparation of seed and storage. It also maintains seed banks where new farmers who require seeds can buy and start production. (*Additional information-Thomas Mutuli, Project officer-ROP 0727 160 840*).



Amaranth



Pumpkin



Black nightshade



Corchorus

Where to buy quality potato seed for planting

There is an acute shortage of clean, disease free potato seed in the country. The following selected seed producers have good quality seed that farmers can buy and multiply their potato seed through positive seed selection method. This ensures that farmers have good seeds for planting. (See TOF No.106, March 2014).

(Source: KARI National Potato Centre-Tigoni, Limuru Tel. 0733 834 675)

List of potato seed producers in Kenya.

Name	Location	Varieties	Tel. No
1. Edward Mbugua	Limuru	Tigoni, Dutch, Sherekea & Kenya Mpya	0722 734 919
2. Mr. James Mburu	Limuru	Tigoni	0723 078 218
3. Mrs Anne W. Ng'ang'a	Limuru	Tigoni, Sangi and Dutch	0726 288 046
4. Ann Mbugua	Molo	Sangi, Kenya Mpya and Dutch	0722 691 245
5. Njabini A.T.C	Nyandarua	Sangi	0733 834 425
6. Wambugu A.T.C	Nyeri	Sangi	0722 599 764
7. Kisima farm	Meru	Tigoni, Asante, Kenya Mpya & Sherekea	0721 325 269
8. David Kipkoeh	Nyahururu	Sangi, Dutch and Tigoni	0722 460 649
9. Oljoroorok A.T.C	Nyandarua	Kenya Mavuno	0714 028 024
10. Stephen Wachira	Nyeri	Sangi and Dutch	0722 680 799
11. James Muendo	Nyandarua	Sangi	0722 959 184
12. Mary Wanja	Molo	Dutch, Tigoni and Kenya Mpya	0721 673 830
13. Stephen Karanja	Limuru	Kenya Mpya Sherekea and Tigoni	0721 265 814
14. Alice Gathekia	Nyeri	Sangi and Dutch varieties	0733 192 349

How to control fungal maize disease

Maize head smut disease is a major problem affecting farmers in our area. What can we do to prevent the disease from recurring?

Maize smuts or head smut (*sphacelotheca reiliana*) is a common disease that affects the maize crop in many regions in the country. It is a fungal disease that affects the cobs and tassels of the maize plant. It is suspected the disease originated from maize seed imported into the country.

Symptoms

The affected maize cob develops white swollen pouches, which turn black, and then burst releasing more black spores that later infect other maize plants. The affected maize becomes



A maize cob affected by the head smut fungal disease.

unproductive and can contaminate the entire maize crop. The fungal spores are transported by wind, water, human beings,

and animals over great distances to other areas where they infect other crops. The fungus may remain in the soil for many years.

Chaffer grubs not a big threat to maize



How can one control chaffer grubs in maize to stop their destruction?

Chaffer grubs are creamy-coloured pests about 1.5cm (0.6 inch) length. The pests are common in the root system of most growing plants. Chaffer beetles lay their eggs on the ground. The eggs later hatch into chaffer grubs, which dig into the soil and come out of the soil later as chaffer beetles. The chaffer grub is difficult to control using pesticides. But they are controlled naturally by nematodes. The nematodes look for chaffer grubs and attack

them by entering through the grubs' body openings. Once inside the chaffer grub, the nematodes release bacteria that inhibit the chaffer grubs from feeding, in this way eventually killing them. The nematodes reproduce inside the dead chaffer grubs and release more nematodes which also go for other chaffer grubs.

Nematodes control chaffer grubs naturally

Most farmers do not bother with chaffer grubs because they are controlled by nematodes naturally. You will notice that chaffer grubs never last long in the affected shamba. They therefore cause very little damage to crops. Farmers should ignore chaffer grubs as the damage they cause is not much compared to other pests. If the destruction of the maize is widespread, it is important to check if there are other pests responsible for the problem and take preventive measures such as spraying with plant extracts or related biopesticides.



Too much water causes blood in calf urine

My young calf seems to be passing blood in the urine. I have tried several remedies given by friends but the problem seems to persist. Please advise me on what I can do to stop this.

Incidences of blood in the urine in young calves are very common. The problem is mainly caused by excessive intake of water especially for calves fed milk using a bucket. A calf used to getting its milk in a bucket usually develops a habit

Control measures

There is no known cure for the disease, apart from good crop husbandry. Farmers who notice maize smuts in their *shambas* should cut the affected plant before it releases the spores, and destroy it by burning. Do not put such crop residue in compost heaps or pits.

The head smut fungus also affects sorghum with similar symptoms. If the disease is noticed, no crops from the grass family should be planted in the field for a minimum of three years. All *shambas* bordering the affected farm have to check if their maize or sorghum has developed the signs of the disease and remove any diseased plants. This prevents the disease from spreading.

of taking anything it finds in the bucket. If it finds water, it will drink it non-stop until its kidneys become overworked-blood will then start appearing in its urine.

The solution is to limit the amount of water the calf takes. You can do this by ensuring the calf does not have unlimited access to buckets or other open water containers in the compound. But ensure the calves have enough water just to quench their thirst and let the calves graze with the other animals.

Bloody urine more serious for adult cows

For heifers and adult cows blood in the urine can be a sign of a more serious infection such as inflammation of the kidney, a condition caused by a number of diseases including some that are transmitted by ticks.

It is difficult for the farmer to know the cause; that is why it is important to consult a veterinarian immediately you notice these problems in your cattle. The condition is treatable.

Continued from page 2 Agroforestry

This ensured they had sufficient wood for fuel and timber, thus minimizing deforestation which is a major cause of the rainfall decline. Consequently, there is an increase in vegetation which prevents soil erosion and the environment is conserved.

Another advantage, especially to the bee farmers, is that the bees have more flowering trees for forage (food plants). "The bee population increases and

there is better crop yield in the area because of increased pollination. The insects not only pollinate food crops, but also other plants, which improves vegetation as well as the environment. "Bees are responsible for up to 90% of the pollination in our environment."

In Kakamega, farmers planted the *Bidelia* trees (instead of acacia), and the effect was the same.

Although the project ended in 2008 farmers have continued the good practices. Many are however not aware of the good market out there for honey and silk. Although silk production is new and unexploited in Kenya, the government through the Kenya High Tech Silk Project hopes to invest in the industry so that the country can produce its own silk.

Additional information from: Jonathan Muriuki, *Towards an evergreen agriculture in Africa*; ICRAF, *Agro-*

forestry: Tree Domestication (2012); ICRAF, Trees on Farm: Analysis of global extent and geographical patterns of Agroforestry (2009); Bo Tengnas, Agroforestry extension manual for Kenya.

Farmers interested in rearing silk worms or bees commercially can contact Dr. Everlyn Nguku on 020-8 632 062.

In the next issue of TOF, we highlight how farmers can grow various types of trees in their farms and homesteads.

TOFRadio answers your questions

TOFRadio: TOFRadio is broadcast on Milele FM at 8:30pm on Tuesday, and KBC on Thursday at 8:15pm. 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 correspondences to the radio program. Send your questions and comments via SMS 0715 916 136.

TOFRadio expands its reach through vernacular broadcasts

Hudson Shiraku - The first radio show was aired on 28th July 2008, and TOFRadio has grown to be one of the leading information channels on sustainable, ecofriendly farming practices, agribusiness options for small scale farmers in Kenya. It is also a major pillar of Biovision Farmer Communication Program (FCP), which disseminates the messages carried by TOF magazine.

It started with *Kilimo Hai* that aired every Thursday at 8:15 pm on KBC Kiswahili together with the Agriculture Information Resource Centre's (AIRC) *Sikio la Mkulima*. The drive to reach a wider audience ushered an expansion to Milele FM with *Kilimo Endelevu* broadcast every Tuesday at 8:30pm on Milele FM.

Vernacular radio provides opportunities to reach farmers in their local language. TOFRadio has responded with 2 programs; *Uthuuu Mundani* target-



ing Ukambani region is aired through *Mbaitu* FM every Friday at 7:30pm. The latest program to be launched is *Kabotik ak Kabotisiet* broadcast via KASS FM on Wednesday at 7:15pm. This expansion is aimed at reaching and enabling more farmers to access valuable agricultural information to improve their farm production and incomes.

Call for innovative farmers

TOFRadio promotes farmer-to-farmer learning - farmers can learn from fellow farmers who have implemented useful technologies and practices and suc-

ceeded. TOFRadio is constantly looking for farmer innovations; creative ways in which farmers are using to solve the challenges they face on their farms everyday. These could be practices (that have been tried and tested) or new technologies that enable farmers produce more as they take good care of their soils and the environment. The innovations could be in any of the 4-H areas of animal health, plant health, human health and environmental health.

If you have such innovations then get in touch with TOFRadio presenters and they will visit your farm and enable you share your experiences and lessons with other farmers across the country. Your story may also be published in the TOF Magazine.

Keep listening to TOFRadio's educative radio programs and let us know how we can improve the programme content and presentation - by email (tofradio@organickenya.org) or via SMS on 0715 916 136.

TOF Radio has become a farmer's best friend

Musdalafa Lyaga - "My name is David Kimondo, a farmer from Mweiga in Nyeri County. I cultivate and process a plant known as rapeseed which when pressed produces a highly nutritious vegetable oil known as Canola oil. This plant has not only been a great source of income for my family but the edible oil has been a major source of nutrition. I always advise my neighbours and fellow farmers in areas where the plant does well to grow rapeseed to attract bees that help in pollination so as to increase their crop yields. Rapeseed is also a rotation crop and it can restore soil fertility.

The Organic Farmer radio visited my farm and recorded a radio program which was aired on KBC radio and was feature on the February edition of TOF magazine. When people listened to and read my story I received requests from farmers who were interested in farming rapeseed, so that they could supply my processing plant with raw material for making Canola oil and cake. Farmers from as far as Busia have con-



tacted me expressing their intention of supplying me with the rapeseed.

I have leased one acre of land which produces upto two tonnes of rapeseed, enough to produce 500 litres of Canola oil. The land serves as a demonstration site for farmers interested in cultivating rapeseed. I have also contracted various farmers and farmer groups to supply me with the rapeseed for making Canola oil.

Canola cake makes nutritious livestock feeds. Farmers buy the Canola cake for Ksh 60 per kilogram. They mix 3 kilograms of Canola cake with 70 kilograms of animal feed as a food supplement for cattle, chicken, rabbits and other farm animals.

The story on both TOF Radio

and TOF Magazine has given me a new drive of scaling up production to meet the rising demand of Canola oil and Canola cake. Already, I have invested over Ksh 200,000 to buy a Canola oil pressing machine to boost the output of my processing plant from the initial 100 liters to 200 litres of oil per day. The oil costs Ksh 400 in the shops. I sell to retailers at Ksh 300. For farmers who want me to process their Canola seeds I sell one litre at Ksh 15, and they take with them the Canola cake, a by-product.

"I would like to thank the TOFRadio for highlighting my story."

David Kimondo can be reached on mobile number 0722 550 053 and email - kienimaizemillers@yahoo.com.

 farmers forum

0717 551 129 / 0738 390 715

Mulberry cuttings for sale: I have fully grown mulberry seedlings; they can be fed to silkworms and rabbits. Any farmer interested can get in touch with me. Call 0725 353 581 email: mufics@yahoo.com

Organic fertilizer wanted: I need organic fertilizer for my 1½ acre plot in Kitale. Companies selling can contact me on 0728 235 130.

Mango seedlings for sale: I have mango seedlings for sale to interested farmers. Call 0724 974 412, 0712 159 188.

Compost manure for sale: We have compost manure for sale in Matungu, Kakamega county. Interested farmers can call us on 0725 104 591.

Kienyeji eggs for sale: We have kienyeji eggs for sale call 0721 230 690, Nakuru.


Indigenous tree seedlings: We would like to buy indigenous seedlings. Contact us on 0725 104 591.

Guinea fowl wanted: I am interested in West African guinea fowl which are bigger in size compared to the local ones. Call me on 0724 873 849.

Fruits seedlings for sale: We have the following fruit seedlings for sale to interested farmers: 3000 yellow passion seedlings, 2000 avocados (Hass variety), 2000 grape tree seedlings. Call 0720 720 242 email: greenplants091@gmail.com

Biogas plants for sale: We sell biogas plants to farmers. All types and sizes available. For enquiries call 0725 353 581.

Advice to farmers

We have been receiving many calls and enquiries on items advertised in this column. We would like to bring to the attention of buyers and sellers of various items advertised that **they should contact the advertisers directly through telephone, emails and facebook accounts given and not The Organic Farmer magazine.** We would also like to advise farmers to be careful not to send money before they have verified the quality of any items they intend to buy. The magazine will not accept any responsibility for any loss as a result of any transaction between the buyers and sellers of items advertised in the magazine. The symbol  denotes the facebook address of the contact advertiser - it is not possible to access facebook unless you have an account.