



A farm worker in China dumps chickens carcasses into an incinerator for burning following an outbreak of bird flu. The deadly disease has been discovered in Uganda raising fears of spread to Kenya and neighbouring countries.

Kenya on alert following bird flu outbreak in Uganda

Peter Kamau | The Kenya Government has banned the importation of chickens and chicken products from Uganda following a recent outbreak of bird flu there. At the same time, public health officials along Kenya's border with Uganda have been put on high alert to prevent the disease from spreading into the

country.

Chicken imports can spread disease

Kenyan farmers import chickens from Uganda for both breeding and eggs for consumption. Two major dual purpose chicken breeds from Uganda are very popular with local farmers as they grow fast and have a higher egg-laying capacity than local indigenous breeds. Traders also import chickens from the neighbouring country for domestic consumption, which can easily transfer the deadly disease into the country.

The Director of Veterinary Services Dr. Kisa Ngeiywa said the Country ought to remain on high alert after the disease was detected on dead migratory birds in Uganda last month, "We will not allow any poultry products from Uganda until the situation stabilizes and laboratory tests prove that the disease is eradicated," he said.

Surveillance increased along border

Kenyan authorities have increased surveillance along Kenya's border with Uganda to monitor the situation and stop

the spread of the disease into the country. The public has also been advised to report any cases of dead wild birds or domestic ones (chickens, ducks, guinea fowls, geese or any other bird).

Infected migratory birds

Ugandan Authorities first detected the presence of the deadly disease when they tested the remains of dead wild birds that had migrated to Lutembe beach on the shores of Lake Victoria to escape winter in Europe. They immediately gave an alert on the presence of the disease in the country. The Kenyan government has already set up a task force that will help plan strategies to prevent and handle the outbreak in the event it spreads into Kenya.

According to the Centre for Disease Control and Prevention (CDC), the Highly Pathogenic Avian Influenza (HPAI), which infects both animals and humans; is a disease caused by infection with an avian (bird) influenza (flu) Type A viruses. Globally, these viruses occur naturally among wild aquatic birds and can infect domestic poultry, other birds and animal species.

Dear farmer,

It is time for land preparation again before the long rain season sets in! Just like previous years, there is a lot of uncertainty on how the weather is likely to be this year. Weather forecasts indicate that the rains may begin in April at the earliest. But, this should not prevent any farmer from planning early for the planting season. Remember the importance of compost manure during planting season. It is possible for farmers to do dry planting where maize is planted. Due to the unpredictable rains, another option that farmers may practise is to divide the land into two portions, then plant one portion in mid-March and the other in April. If the rains fail, then the farmer will not lose the entire crop but they will have at least saved some inputs that can be used to plant the remaining portion.

The climate is changing rapidly and farmers have to change in the way they practise farming if they hope to remain self-sufficient in food production. Indeed, it has now come to a point where farmers should seriously think of ways to overcome the effects of the changing climate. One way to do this is to diversify into other forgotten traditional crops that are drought resistant.

Traditional crops such as cassava, sorghum and millet which have been abandoned for maize, can do well with less rain. Therefore, farmers should reduce over reliance on maize, which requires more rain and tends to fail when the rains fail. Maize production last year dropped significantly following reduced rains in June and July, when maize was just about to flower. This explains the increased prices of maize this year. In this issue, we have featured cassava farming to encourage you to grow it (page 3).

Farmer's also need to adopt sustainable methods of crop production such as conservation agriculture (page 4). Up to now, most farmers still believe that ploughing or digging land in preparation for planting is the best method to grow food.

Kenya is faced with the threat of bird flu following the outbreak of the disease in Uganda. Farmers have to remain on a full alert and report any sighting of dead birds to the veterinary authorities in their areas. Its important that farmers ensure that chickens do not come into contact with wild birds - they can do this by confining them in chicken houses properly fenced combined with other biosecurity measures.

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Starting an organic food store in your locality

The business of organic produce has good returns because of the rising demand for organic produce driven by its health benefits. In spite of this, there are few or no organic stores or shops in most of our major towns in Kenya.

Richard Ngunjiri | The organic sector is projected to reach more than 120 Million US dollars globally by the end of 2017 according to the International Federation of Organic Agriculture Movement (IFOAM). In Kenya, studies by Kenya Organic Agriculture Network (KOAN) has projected a growth of more than 20% on the retail sales and exports for organically grown products. This means the organic sector is one of the most promising areas where potential investors can put their money for higher returns.

Rise in lifestyle diseases

This is further propelled by an increase in consumers' knowledge empowerment who are increasingly opting for food products that are organically grown for enhanced well-being. The healthy organic food industry is expected to experience fast growth, helped by other factors such as rise in population of those living with non-communicable diseases (NCDs) such as cancer and diabetes and the need to contain them.

All the above factors lead to a profitable and a rewarding sector for the right entrepreneur. But, what does it take to set up a healthy food store in the market or a town?

It requires passion

A person with a genuine passion in healthy eating habits, dieticians, organic food promoters, environmental enthusiasts and those with interests in alternative medicine are usually the best suited to run this type



Organic produce on display during a market day in Karen, Nairobi

of business. Others would be those who would like to reach consumers of healthy diets. Although almost any entrepreneur with good business sense would be able to run a health food store, it certainly helps if you believe in what you are promoting and have a passion for it to follow through the dream.

Hence, a need to learn marketing strategies or employ a salesperson to handle marketing function of the organic produce.

Capital and start up costs vary depending on the location and the nature of the store or the restaurant. The location should, however, be in an easily accessible area and factors such as parking should be considered for those venturing in high end markets.

The organic food stores or restaurants should be well-designed and decorated to appeal and attract the customers. The organic mark or a banner communicating that the food has been grown organically should be strategically placed inside or outside the store where the customer can easily see and

read.

Similar to any other business, the entrepreneur should consider developing an elaborate business plan for the food store or the restaurant. An elaborate business plan with clearly outlined and allocated budget that takes into consideration costs such as maintenance, repair, cleaning, packaging, logistics and the wages; contributes to the success of the organic business venture. It's important to contact a local council to be issued with an official business permit and a health and safety regulations certification to ensure the right procedure for operating the business is followed.

Organic certification important

Certification of organic produce is an important document to have irrespective of whether it is a cereals store, a shop or a restaurant. Certification document assures the customers that the produce meets all the health requirements, hence a boost to the organic sales. If a farmer is involved in agribusiness

and outsources for the organic produce; there is need to ask the suppliers for the copies of their organic certificate documents to ascertain the integrity of the produce. You may further need to visit them in their farms to confirm and build a stronger relationship.

KOAN, an umbrella body for organic practitioners provides information of certified organic farmers and companies which you may require to source for your supply. Certification reassures the wholesalers, retailers and consumers that the produce has been organically grown and conforms to the set organic standards.

It has good returns

A study commissioned by KOAN in 2015 shows that an organic food store in the right location can make a gross profit of up to 35% in a good week. So, if total sales for the week is Ksh 100,000, then the proprietor can expect Ksh 35,000 as gross profit. This is a good investment and an additional source of an income besides improved health.

Good management is important

Some of the daily chores for such a business are;

- Regular cleaning and arranging the organic produce on the displays and shelves.
- Serving customers including providing product advice.
- Preparing and placing orders.
- Unpacking and checking incoming orders.
- Cleaning and maintenance.
- Paperwork, which is often undertaken in the evenings.

Finally, it would be in the interest of the entrepreneur to get a mentor or contact organizations near him or her that have experience in organic farming. Enjoy a successful business journey of trading in organic produce.

Mr. Ngunjiri is the Market Development Officer, KOAN

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 nor Biovision Foundation.

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Cassava is an important food crop that farmers forgot

Unlike maize, potatoes and other common food crops, cassava can grow with very little rain. Farmers can also leave in the farm and harvest it any time they require food, making it one of the most important food security crops especially with the changing climate.

Josephat Mulindo and Ishmael Njarro

The production of maize and other crops has led to many farmers abandoning important crops such as cassava. In many parts of Kenya, farmers now rely on maize, potatoes, wheat, beans or rice as their main sources of food. Due to this modern trends, important tuber and cereal crops such as cassava and millet have been abandoned and are now regarded as orphan or forgotten crops.

In some communities in Kenya cassava is largely viewed as food for the poor. But this is a very wrong perception. Indeed, cassava is one of the most important food crops that every farmer should grow in their farm or backyard. Unlike maize, cassava can grow with very little rain especially when other crops have failed.

Cassava is rich in carbohydrates, calcium, vitamins B and C, and essential minerals. Besides food, cassava can be used in other foods, confectionery, sweeteners, glues, plywood, textiles, paper, animal feed and alcohol.

Establishment. Cassava is propagated by cuttings (Figure 1). Because it is a root crop, cassava requires sandy clay loams that are well drained. Poor soils should be fed with compost to increase the organic matter level and overall fertility. In case of shallow soils, mounds or ridges should be created to increase the topsoil volume per plant. In deep soils, cassava should be planted on flat land.

Planting time: Cassava is normally planted in April at the beginning of the long rain season and in September at the start of the short rains. However, earlier plantings in March and August respectively, can significantly increase root yields.

Varieties: Six cassava varieties that are tolerant to the major

Kakamega, Siaya and Migori. The varieties are: Migyera, MH95/0183, MM96/1642, MM96/9308, MM96/4271 and MM97/0293. Cassava cuttings for these varieties are available for sale at KALRO-Kakamega and with some farmers for sale.

Preparation of planting materials: Choose healthy, disease free planting material (sets) from vigorously growing plants 8-15 months old. Select cuttings from the middle stem portions that are 25 cm long with an average of 9-12 nodes (Figure 2) and or 15-20cm using ministem method of 3-5 nodes (recommended). Cut sets using a handsaw or clean, sharp machete or *panga*. In cases of scarce cassava cuttings, rapid multiplication can be used to build the numbers for propagation.

Method of planting: Angular planting (where the cutting is not planted straight but slanted as in Fig. 3) is recommended in areas of high rainfall. Ensure two-thirds of the cutting is in the soil and a third above the soil at an angle of 45° to ensure

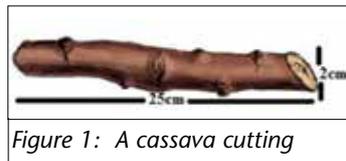


Figure 1: A cassava cutting

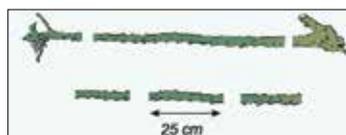


Figure 2: Better cuttings are from the middle portion of the stem

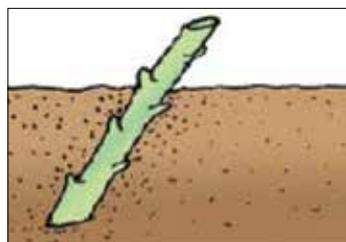


Figure 3: Angular planting

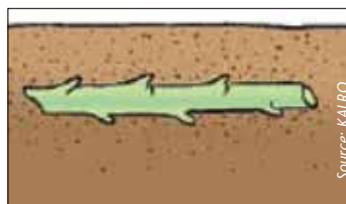


Figure 4: Horizontal planting

cassava pests and diseases are available at KALRO-Kakamega and with some selected farmers in the cassava producing counties of Busia, Bungoma,



A cassava plant and tubers (inset)

more compactly arranged roots (Figure 3). Do not plant the cuttings upside down. Vertical planting (straight planting) can be done in sandy soils to ensure roots go deeper. Horizontal planting is better in dry conditions. The whole cutting is buried in the soil (Figure 4). One acre holds about 4,000 cuttings.

Planting space: It is advisable to interplant cassava with other crops like maize, and beans to make better use of the land, reduce soil erosion and the risk of crop loss. The ideal spacing is 1m by 1m for the branching type and 1m by 0.8m for the non-branching type. All the above recommended cassava varieties are the branching type. Cuttings that do not sprout within 3 to 4 weeks of planting should be removed and replaced immediately. New cuttings should be planted in new hills (or planting excavations), not the old ones.

Weeding: The first weeding is done 3 to 4 weeks after planting. Second weeding at 8 to 12 weeks after planting; and the third weeding at 20 to 24 weeks after planting. Weeding is done by use of a hand hoe (*jembe*). The first 3-4 month is extremely critical for weed control if the expected yields have to be achieved. With good management an acre of cassava can produce upto 16 tonnes.

Harvesting

The commonly used method in harvesting cassava is hand harvesting. If the tubers are for processing, cut the plant at about 30 – 50 cm above the ground 2 to 3 weeks before harvesting

(this causes tubers to mature and increase yields by up to 10%). Use the stem to lift the roots when harvesting. Pull the plant gently and do not drag the roots. Dragging can cause bruises and cuts which may lead to early deterioration. If the soil is compact, loosen it but take care not to damage the roots. Separate the roots from the stem using a sharp knife. Cut each root near to the stem. Do not break the roots from the stump by hand. This will cause injuries which lead to root rot.

After harvesting, do not leave the roots under the sun. Too much heat causes weight loss and early deterioration. Put the tubers in crates or bags then cover them with moist jute bags to prevent vascular (blue) streaking. It takes 20 people to harvest one acre of cassava in one day.

Post-harvest handling

Cassava tubers attached to the main stem can remain safely in the ground for several months. They can be harvested piecemeal when needed. This is useful when cassava is used for home consumption. After harvest, the roots start deteriorating within 2 – 3 days, and rapidly become of little value for consumption or industrial use. Therefore, processing should be done if cassava is harvested in large quantities. (We will feature cassava management and value addition in the March 2017 TOF issue).

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Conservation agriculture improves soil fertility and crop yields

Conservation agriculture has improved soil fertility, farm productivity and income for small-scale farmers in Eastern Kenya region while protecting the environment.

Peter Kamau | Low soil fertility is one of the most serious problems experienced by small-scale farmers in Kenya. Farmers in Kenya and in many African countries believe in conventional land digging, otherwise referred to as hoeing during land preparation to grow crops. The method is characterized by soil disturbance through digging/weeding and also crop residue removal after harvesting. Digging (tilling the land) is to blame for destruction of the soil fertility that comprises good soil chemical, biological and physical properties.

Constant soil digging destroys the important soil micro-organisms that break down and mineralize organic matter to release essential nutrients utilized by crops for their proper growth. The dug soil is also known to be fragile and vulnerable to water and wind erosion, a process that moves away the fertile top soil from the farm.

Low crop yields

Therefore, conventional land preparation has destroyed the soil in many farms such that farmers can no longer get good crop yields. Studies conducted in Eastern Kenya show that average maize production at the farm level has dropped to almost 1.6 tonnes (6 bags of 90kg per acre) against the expected 6.5 tonnes per hectare (27 bags of 90kg bag per acre). For legumes such as the common beans, the yield at farm level was 0.5 tonnes per hectare (2 bags of 90kg per acre) against the expected 2.4 tonnes per hectare (11 bags of 90kg per acre) for a bean variety like Embean 14 (*Mwendu*) in medium altitude areas (main coffee zones) of Eastern Kenya.

The low crop yields was mainly due to continuous conventional land cultivation coupled with lack of inadequate application of organic, and crop residue removal from farms. To moderate the declining crop yields, a study, "Sustainable Intensification of Maize and Legumes for Improved Food Security in Eastern and South-

ern Africa (SIMLESA)" has been going-on in Eastern Kenya under the Kenya Agricultural and Livestock Research Organization (KALRO).

Principles of Conservation Agriculture

The study was established with the support of the Australian Centre for International Agricultural Research (ACIAR). The main focus of the project is to validate and expand adoption of conservation agriculture (CA) principles and practices to improving soil fertility and crop yields at farm level. The above three principles are maintenance of the **soil cover**; **minimum soil disturbance**; and crop diversification (through **crop rotation** or **intercropping** systems).

The maintenance of permanent soil cover principle encourages the farmers to keep over 75% of the soil surface covered with residues or other materials after the crop harvest. To do this, farmers who participated in the study returned over 75% of their crop residues into their farms. The returned residues are decomposed and mineralized, releasing nutrients back into the soil for next crop to use.

The crop residue also helped to conserve or increase Soil Organic Matter (SOM) and moisture. "Improved SOM and moisture have direct and positive impact on life and performance of soil microorganisms, particularly in breaking down organic materials for improved soil fertility", noted Dr. Alfred Micheni, the lead scientist in the study. Dr. Micheni further added that the crop residue on the soil surface slows down moisture evaporation, thus maintaining cool soil environment for crops and soil micro-organisms to thrive.

The minimum soil disturbance principle advises that only 25 of the soil should be disturbed (dug) during land preparation and at weeding time. Dr. Micheni pointed out that rigorous soil disturbance through ploughing or digging has negative impact on soil structure that results in soil carbon release into the air. The process also encourages soil erosion and moisture loss. Farmers participating in the study were encouraged to dig holes only where they were to plant (bury) seeds and apply fertility inputs. The crop diversification ensures that the farmer plants two or more crop species on the same piece of land either in rota-



A healthy crop of maize and beans under conservation agriculture in Embu County

tions or intercropping systems.

This leads to maintenance of the soil nutrient balance because different crops (species) take different nutrients at different soil depths. Additionally, crops such as beans and related legumes help to fix nitrogen from the atmosphere, thus improving soil fertility. Planting different crops also ensures that the farmer has a balanced diet or cash income throughout the year. This is because different crops provide food with different nutritive values. Having two or more crops in a farm is advantageous to the farmers because the crops offer a variety of farm-market needs throughout the year.

Soil pH improved

Most farms had an average soil pH of less than 4.8 before the start of the project. This was one of the reasons that led to low maize and bean yields. After 4 years, the study established that where farmers embraced the CA farming practices, the soil pH increased from 5.0 to 6.0, a range suitable for successful crop production. The soil bulk density (hardness) in most farms was 1.5 kg/m³ before the adoption of CA practices. After the farmers stopped burning the residue and recycled it back into the soil, the soil bulk density reduced to between 1.3 and 1.1kg/m³, which is porous enough for plant root penetration into the soil profile for water and nutrients uptake. Besides, the soil carbon content increased from 1.1% at the start of the project to approximately 1.8% (almost the ideal soil carbon content for most crops) in the study area(s).

Improved crop yields

Farmers participating in the study managed to improve their maize harvest from an average of 1.7 tonnes per hectare (7 bags of 90kg per acre) to 5.0 tonnes per hectare (22 bags of 90kg per acre). Beans (Embean 14) harvest also improved from 0.5 tonnes (2 bags of 90kg per acre) to 1.8 tonnes per hectare (8 bags of 90kg per acre). There was also a significant increase in soil micro-organisms in the soil which had decreased due to burning of crop residue. The increased soil productivity had a direct impact on farmer's income. Dr Micheni indicates that although farmers were encouraged to initially use herbicides to control weeds at the beginning off the project, herbicides, this became unnecessary as the permanent soil cover managed to suppress weeds." He further noted that, "the conservation agriculture principles work better when coupled with Integrated Pest Management (IPM) practices towards achieving organic agriculture farming environment.

The minimum soil disturbance tillage and furrows/ridges promotion has been embraced by farmers because of their ability to improve soil fertility and crop performance in terms of crop yields and net-benefits. The scientists involved in the study noted that the two CA farming methods were adopted by farmers and other partners in the project. In this case the out-scaling process has seen the participating farmers embrace and increasing the area under Conservation Agriculture (CA).

Why *Moringa oleifera* is called a "farmers' pharmacy"

Moringa has a wide range of nutritional and health benefits for consumers. The tree is loaded with vitamins, minerals, essential amino acids. It can help lower blood sugar levels, high blood pressure and can prevent stomach ulcers while removing toxic compounds in the human body

Dr. Peter Mokaya | *Moringa oleifera* (botanical name) is referred to as "miracle tree", drumstick or horseradish tree. It grows quickly and can reach a height of between 15 to 30 feet in just a few years. The leaves, fruit, flowers and immature pods of the tree can be eaten raw as food. The Ayurvedic (Asian system of medicine) associates moringa with the cure or prevention of more than 300 diseases. Moringa has been used medicinally and as a food source for over 4,000 years. Most traditional cultures, including African cultures, know of the nutrient potency and medicinal value of the moringa tree.

Nutritional and health benefits of Moringa

Nutritional and health benefits of Moringa tree include the following:

Moringa leaves are loaded with vitamins, minerals, essential amino acids and more. Some estimates indicate that, one hundred grams of dry moringa leaf contain 9 times the protein of yogurt, 10 times the vitamin A of carrots, 15 times the potassium of bananas, 17 times the calcium in milk, 12 times the vitamin C in oranges and 25 times the iron in spinach! (*Asian Pac J Cancer Prev. 2014;15(20):8571-6. Health benefits of Moringaoleifera. AbdullRazis AF1, Ibrahim MD, Kntayya SB.*)

Stops cell damage

Moringa leaves and other parts are a rich source of antioxidants including vitamin C, beta-carotene, quercetin, and chlorogenic acid! (*Asian Pac J Cancer Prev. 2014;15(20):8571-6*)

Lower blood sugar

Moringa lowers blood sugar levels: Moringa appears to have anti-diabetic effects, likely due to beneficial plant compounds contained in the leaves. One study found women who took seven grams of moringa leaf powder daily for three months reduced their



A moringa plant: Moringa can grow in most parts of the country

fasting blood sugar levels by 13.5 percent. Another research study revealed that adding 50 grams of moringa leaves to a meal reduced the rise in blood sugar by 21 percent among diabetic patients. (*Journal of Food Science and Technology, November 2014, Volume 51, Issue 11, pp 3464-3469*)

Moringa reduces inflammation

It contains isothiocyanates, flavonoids, and phenolic acids in the leaves, pods, and seeds which have anti-inflammatory properties. According to some studies, (*The Incredible Moringa Tree By Conan Milner, Epoch Times March 27, 2015*) "The tree's strong anti-inflammatory action is traditionally used to treat stomach ulcers. Moringa oil (from the seeds) has been shown to protect the liver from chronic inflammation. The oil is unique in that, unlike most vegetable oils, moringa oil resists rancidity (bad taste). This quality makes it a good preservative for foods that can spoil quickly. This sweet oil is used for both frying or in a salad dressing. It is also used topically to treat antifungal problems, arthritis, and is an excellent skin moisturizer.

It can reduce blood pressure

Moringa helps to maintain healthy cholesterol levels. Moringa has cholesterol-lowering properties; one animal study found its effects to be comparable to those of the cholesterol-lowering drug simvastatin (*J Ethnopharmacol. 2008 Mar 28;116(3):439-46. doi: 10.1016/j.jep.2007.12.010. Epub 2007 Dec 23*). As noted in the *Journal of Ethnopharmacology*: "Moringa oleifera is used in Thai traditional medicine as cardioprotective. In a research study moringa was fed

to rabbits. After 12 weeks of treatment, it significantly lowered the cholesterol levels and fatty accumulation in the rabbits' blood vessels by about 50% and 86%, respectively. The results indicate that this plant possesses compound that prevents heart diseases."

Moringa has anti-poison compounds

The leaves and seeds of moringa may protect against various compounds that can poison the human body. This is particularly relevant considering that some cereals, notably rice, may be contaminated. (*Asian Pac J Trop Biomed. 2014 May;4(Suppl 1):S353-8. doi: 10.12980/APJTB.4.201414B44*). Contamination of ground water by arsenic and other toxic substances is also a rising global public health concern; several studies have shown that moringa seed powder can reduce accumulation of arsenic poison in the liver, kidney and the brain. Moringa seed powder has been found to significantly protect animals from tissue arsenic concentration. (*Cell Biol Int. 2007 Jan;31(1):44-56. Epub 2006 Sep 15*).

Moringa can be used as a topical antifungal agent. Moringa oil, from moringa seeds, when applied on the surface, it is believed that it has antifungal properties in addition to relieving



Moringa powder and leaves

the pain from arthritic joint pains.

Moringa fibre cleans digestive system

Moringa is high in fibre which when consumed helps to clean up extra "grease" from the diet. It helps improve human's general digestive health.

Moringa can assist in the treatment of "stomach ulcers". These stomach ulcers are in most cases caused by a bacterium called *H. pylori*. Moringa contains compounds with anti-bacterial properties called isothiocyanates that help to rid your body of *H. pylori*, a bacteria which causes stomach inflammation and pain, ulcers, and in some cases, even stomach cancer.

It is a natural water purifier

According to a study at Uppsala University, Sweden "A protein in the seeds binds to impurities causing them to bind so that the clusters can be separated from the water. Moringa leaves are natural water purifiers: Moringa seeds have been found to work better for water purification than many of the conventional synthetic materials in use today".

How does one prepare Moringa for consumption?

From moringa tree, you can use the fresh leaves in your meals in many ways including;

- Use the powder as a flavor to your meals, especially soups and vegetable
- Include the leaves as part of your salad.
- Blend the leaves into smoothies for instance with avocado and bananas.
- Steam the leaves like *sukuma wiki* or spinach.
- Use moringa powder as a supplement powder and add to soups, and other foods for an extra nutrition.
- Organic cold pressed moringa oil can be used, like olive oil, as an addition to your salads and vegetables. It has the advantage of long shelf life.

Dr. Peter Mokaya, Director and CEO, Organic Consumers Alliance (OCA), Website: www.organicconsumers.co.ke Email: Peter.Mokaya@organicconsumers.co.ke or Mokaypm@gmail.com

Push-pull method lifts farmers out of poverty

Through adoption of sustainable agricultural practices such as the push-pull method, farmers in Butere have improved soil fertility crop yields and income.

Venter Mwongera | Daniel Olanga is a happy farmer. For many years, he had many sleepless nights as a result of endless quarrels with his wife as he could not provide for his family. His children were malnourished since they did not have enough to eat.

"Tilling my $\frac{3}{4}$ -acre of land was the only source of livelihood. Despite putting all my savings into purchase of fertilizer and certified seeds, the yields were meager and disappointing and the harvest could not sustain my family. The presence of the striga weed and stem borer rendered the land infertile," he says.

Many farmers in Butere Sub-county in Kakamega suffered the same fate as Mr. Olanga. Fortunately, many farmers in the Sub-county have come together to form groups to tackle various farming challenges that face them. The farmers groups in the Sub-county include the Mama Assembly Farmers Group, Witole Farmers Group, Star Women Group, Bukoko Community Development Group, HIV Fighters Group, Chenda Kalaha Women Group. All the

groups have come together to work under the Nambole Community-Based Organisation (CBO).

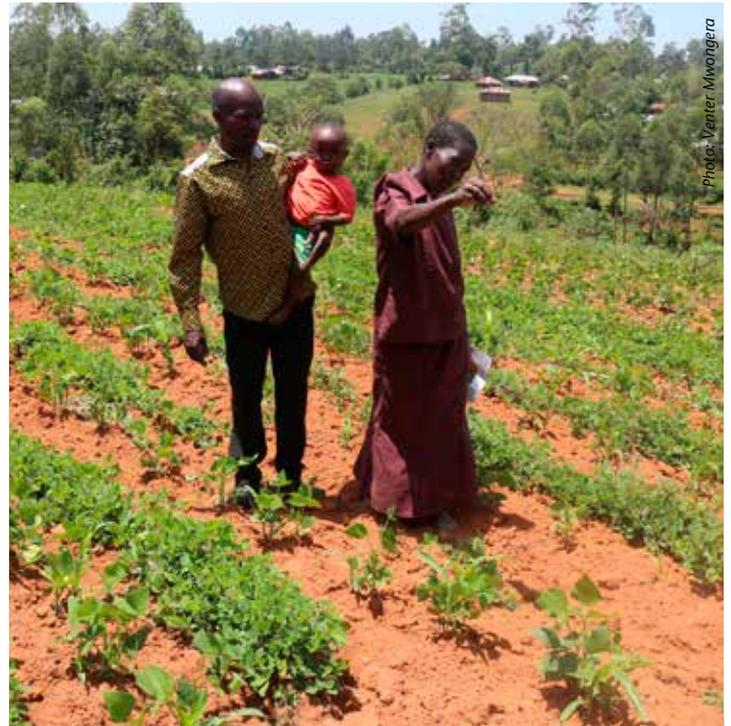
Improving farmers lives

It was during one of their meetings that they met Michael Wangalwa, the Biovision Africa Trust (BvAT) field officer for the region. He spoke to them on the importance of restoring soil fertility and the various practices that can help them to improve the quality of their soils such as preparation of compost, use of Farm Yard Manure (FYM), Integrated Pest Management (IPM) technologies such as the push-pull method that helps control striga and stemborer in maize.

Later, each of the groups invited him to train them practically on the various sustainable agriculture farming methods. After several years, the farmers have experienced a big change in their farms. The striga weed has disappeared and stemborer infestation has reduced. Soil fertility has also improved and with it crop yields," after, the training and putting into practice what we were trained, we have managed to eliminate the striga weed and the crop yields have also improved by a big margin," Mr. Olanga adds.

Yields improved

For the first time after the training, Mr Olanga says he harvested 18 bags of maize, 40kg of beans and 40kg of groundnuts.



Daniel Olanga and his wife in their shamba in Buboko village, Kakamega County

"We have enough to eat and I can now pay school fees for my children, three of who are in Secondary school with proceeds from the farm. Their health has also improved because they have enough to eat," he says. His wife, Florence Ombona says she is now a happy mother, "my children are now in good health and as you can see we have improved our mud and grass thatched house and cemented, roofed with iron sheets. We

have made all these improvements using farm proceeds," she says.

All farmers in other groups have similar story to tell. They have increased crop yields and even sales by adopting various organic farming methods.

"We thank Biovision for giving us free training on various practices that have changed our way of farming and improved our income," she concludes.

Plant Clinic

By Berita Mutune



Natural methods are effective in control of thrips

Thrips are tiny, slim insects with shortened wings. They feed by piercing the outer part of host plant tissue and sucking out the cell contents. Once they feed they leave behind black faecal matter (excrement). Without the use of a hand lens, they look like tiny dark threads. Thrips are difficult to control using chemical pesticides and is also discouraged due to increase in pest resistance.

Symptoms

Most of the thrips species are plant feeders that discolor and scar leaf, flower, and fruit sur-

faces, and distort plant parts or are a vector of plant pathogens. Both adults and larvae are responsible for spreading viruses such as tomato spotted wilt virus and impatiens necrotic spot virus. Western flower thrips is a vector of a group of viruses called tospoviruses. Most of the thrips species have been known to cause significant foliar, flower bud, and fruit damage. Common symptoms include malformed leaves and fruits, discoloration and bleaching of leaves and flowers, necrotic tissues, loss of leaves, and overall stunted growth.

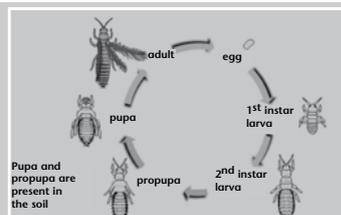


Fig 2: Thrips life cycle

Plants become pale, spotted, and silvery and then die. Injured plants are twisted, discolored and marked with scars

Crops affected: Onions, beans and carrots

Prevention and control

- Remove weeds and grass around the farm to remove potential host plants.
- Clean up crop debris in the garden, especially onion leaves after harvest.
- Discard infested plants.
- Use of strong spray of water to dislodge pests off and reduce pest numbers.



Fig 1: An adult thrip

- Use of beneficial insects, such as minute pirate bugs, and ladybugs to attack and destroy all stages of this pest.
- Blue sticky traps may be of help in trapping the adults.
- Use of safe insecticidal soaps which are effective in reducing infestation.
- Use of organic neem oil (Nimbecidine®)

Other methods of control used include use of *Beauveria bassiana* which is a fungal pathogen of thrips. (For other thrips control methods, refer to TOF No. 61, June 2010) or ssubramania@icipe.org

Sweet potato silage is good feed for pigs

I am a farmer rearing pigs in Zirombe Luwero - Uganda and would like to expand but currently faced with the challenge of high cost of feeds.

I came across a write up on the use of sweet potato vine silage to feed pigs.

I need guidance and clarification on three issues:

a) Does the recommended silage have full nutritious content expected (i.e can it be a full substitute for the normal pig feeds?)

b) How long can the silage stay before going bad? Is it like the maize silage for cows which can take a year before use?

c) Can you share the formula for the silage so that I can start my preparation of the same? Thank you. Godfrey Lule, Farmer 0772 507974 /0750 88663

Sweet potato silage is mainly used to complement the normal food ration of the pigs. Pigs should be fed on this silage to fill their stomachs so that they do not feel the pangs of hunger. It is usually given alongside their normal feeding to ensure they do not use body reserves.

Sweet potato silage contains fermented vines and roots for a minimum of three weeks. The fermentation process helps to break



Sweet potatoes in field. Sweet potato silage is highly nutritious feed for pigs

down trypsin enzyme found in fresh vines that inhibits digestibility of fresh vines when fed fresh.

Making silage from sweet potato vines

Sweet potato vines are very nutritious pig feed if well prepared and preserved. Below is a step-by-step procedure on how to prepare them

- Cut sweet potato vines and spread them in the sun for about 30 minutes.
- Chop the vines into tiny pieces and mix them with 10 kg of maize germ or pig growers mash.
- Sprinkle half a kilogramme (½

kg) of mineral salt and mix thoroughly.

- Put the chopped vines in an airtight 250-litre plastic tank.
- Compress the vines firmly to remove any air spaces just as it done when preparing silage.
- To improve the quality of the silage let it stay for 14 days (two weeks).
- If the silage has a sweet smell and has turned yellow in colour, then it is ready for feeding. silage to pigs from four (4) months of age, sows, gilts and boars at any time before or after feeding their usual daily rations. Pig farmers who incorporate sweet potato

silage into the pig diet can cut their feed costs by up to 30 per cent. In addition, the sweet potato tubers can be eaten or sold in the market. A kilogramme of sweet potato tuber retails for between Ksh 60 to Ksh 80.

Other supplementary feeds suitable for pigs include *sukumawiki* (kales), vegetables, cabbages, lucerne, amaranth (*terere*) leaves, avocados, pawpaws or even bananas. Hotel leftovers (also called *sweal*) can be given to pigs but farmers must be very careful because food leftovers may be contaminated. To ensure such food is safe for use, farmers can re-boil (cook again) to ensure all disease-causing organisms are destroyed before the leftover are given to pigs.

Note: It is important to point out that sweet potato silage does not replace commercial feeds, it is only a supplement that enhances the pigs' growth rate and a snack that pigs feed on in between their daily feed rations.

Other feed supplements for pigs

Other products that can be used as snacks for pigs include pig weed (amaranth or *terere-kikuyu*, *etoto* - Luhya) lucerne, kales, spinach, ripe avocado pawpaw and other fruits and other soft plants with proteins etc. Pigs also enjoy the food eaten by people and is recommended that what a person eats cooked, give it to pigs cooked.

Feeding pigs with sweet potato silage reduces the cost of feeding pigs by up to 30 percent (the farmer has to always ensure the pigs are provided with their normal daily feed rations - the sweet potato silage only acts as a snack that makes the pig eat less, therefore saving you the cost in terms of the feed they consume in a day).

Answers by Peter Kamau

It is not difficult to start an organic farm

I work in Nairobi but I have a farm in Machakos County and I would like to start practising organic farming. Can you advice me on how to start? Stephen Mutisya

Organic farming is holistic way of farming where the farmer takes care of the environment in which he is producing food and rearing animals.

The organic farmer has to take good care of soils, water, air and the climate within the farm regions. Organic farmers use natural methods of crop production and minimize the external farm inputs by recycling all farm waste. By adopting organic farming practices, organic farmers ensure that food is produced in a way that respects nature.

You can slowly change your farm into organic production by adopting the following practices:

Composting: In most conventional farms today, the soils are depleting due to overuse and reliance on chemical fertilizers. The starting point in organic farming is to address the problem by build-

ing up soil fertility and restoring soil health. All crop residue should not be burned; it should instead be returned to the soil or mixed with farmyard manure and composted to act as fertilizer. Doing this for several years will help build soil fertility to a level where there will be no need to use chemical fertilizers to enrich the soil. You should stop the practice of digging when planting to reduce soil erosion. Ensure that your land is permanently covered through mulching.

Pest and disease control: Plant as many trees as you can especially different species along the edges or boundaries of your farm. The trees will attract all species of insects, birds and act as natural habitats that supply food to birds animals and create a biodiversity that is very important in control of pests and diseases within the farm. In this way insect pests will be controlled naturally. Combined with other organic practices such as the making of plant teas and plant extracts that control pests and diseases while enriching the soil.

Practise crop rotation and inter-cropping: Plant different crops and divide your land into blocks in which you rotate crops (plant a different crop every year on each block). Different crops take different nutrients from the soil. Some crops such as beans and peas belong to the family of legumes that help fix nitrogen into the soil. These two practices help build soil fertility, control pests and also give you a variety of foods that improve your family's health. Diseases and pests also reduce since different crops attract particular pests and diseases. By adopting these practices your farm will gradually be transformed into a highly productive unit that produces healthy crops for your family's consumption and for the market. You can visit our website (at www.theorganifarmermagazine.org) to learnt other organic practices that you can adopt to become an organic farmer.

Contact: Our field officer John Mutisya in Machakos, on 0727 621 162.

TOF Radio answers your questions

TOFRadio is broadcast on KBC on Thursday at 8:45pm and Mbaitu FM on Friday at 8.30pm. 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.

Seed selection important during planting season

Joyce Mahui | The planting season is here again and as farmers prepare their land for planting, there are crucial decisions to make to ensure a rewarding harvest. The following are the stages to follow to ensure a bumper harvest:

Seed selection

Good harvests start with good seed selection. Good quality seeds are essential for the growth of strong and healthy crops which can resist diseases or even drought.

Healthy seeds can be bought from trusted sources like certified seeds stockists or agrovet shops. Farmers can produce their own seeds too. In that case, then, seed selection plays a major role in determining the crop yield. Best seeds offer higher yields.

There are several diseases that are transmitted via the seeds. If infected seeds are used for the next crop, seed-borne diseases are transferred into the farm. Seed selection should therefore start by obtaining seeds from healthy plants. Small, shriveled and broken seeds contain less nutrition for the developing seedling. By removing these inferior seeds, the farmer is able to grow stronger and healthier seedlings.

How to select seed

While seed selection is mainly aimed at obtaining healthier seeds, it can be used also to maintain and improve the quality of the crop variety. In a crop field, farmers may observe differences in traits between plants. Some



Dressed maize seed

plants may have characteristics that are more desirable. During the growing season, the farmer can try to observe these differences and mark preferred plants with a ribbon or with a stick. During the harvesting season, the seeds of these plants can be reserved as seed for the next crop.

In this way, the farmer can slowly improve the quality of their varieties.

Good seed selection is also key in controlling pests and diseases. It is important for farmers who want to improve their next crop to select high quality seeds at harvest time to be kept for the next season.

The selection of seeds may also be based on market preferences such as the size of the plant, colour or fruits size, number of grains per ear, among other desirable traits.

Use certified seed

Undesirable seeds that are too small, spotted, deformed or dis-

coloured should not be chosen for planting.

Certified seed should be ordered and purchased from an approved agrovet shops and other stockists. The use of uncertified seed may lead to spread of viruses and fungal diseases. Farmers should ensure the seeds are handled and stored properly. Poor storage of seed results in excessive sprouting and sprout breakage which in turn leads to poor crop vigour, irregular germination and growth of crowded plants that require thinning.

Intercropping

Farmers should consider intercropping cereals with other leguminous crops such as cowpeas, groundnuts, pigeon peas, soya beans, kidney beans and nuts. This can help fight noxious weeds such as striga in the farm.

The striga weed roots cannot attach to the root system of the leguminous plants and will therefore die. The Push-pull farming technology is a proven farming method that helps control the parasitic weed while providing farmers with desmodium for fodder and other legumes that provide an extra income.

Proper spacing

If crops are planted at recommended spacing, the plants cover the ground quickly reducing the need for weeding. In areas of reliable rainfall, weed-free conditions in properly spaced maize need to be maintained until the crop is about 45 cm high. At this stage the crop itself suppresses weeds and further weed control

measures become unnecessary. In areas of less reliable rainfall, weed-free conditions should be maintained until flowering to minimize the risk of moisture stress at this critical stage.

Timely planting

Maize planted at the right time has vigorous growth and becomes well-established before the growth of weeds. The seeds should be planted at the onset of the rains. This allows the seeds to establish before weeds develop.

Weed control

Hoeing is the most common weed control method used by small-scale farmers. This is commonly followed by hand weeding to remove the weeds that grow after digging. Weeding should be done three to four (3 to 4) weeks after planting. For a healthy crop, weeding should be done two or three (2 or 3) times because a young maize plant is very sensitive to weed competition.

It should start when the crop is about 7.5 cm high but once the crop is about 45 cm tall, weeding is not necessary except in a few cases where there are favorable conditions for weed growth.

At 45 cm, the leaves of vigorous maize plants will start covering the ground to suppress weeds. In addition, weeding after this stage will destroy the root system. For successful inter-row cultivation, farmers should ensure to start inter-row cultivation when the weeds are still in their seedling stage and to cultivate when there is moisture in the field.

An appeal for your financial support in the production of The Organic Farmer (TOF) Magazine

Dear TOF stakeholder,

For over 10 years, TOF magazine has continuously provided you with very valuable and timely information on sustainable ecological agriculture, and befitting very many farmers in Kenya and neighbouring East African countries. Biovision Foundation, Switzerland, has generously sponsored the continuous production and publication of TOF magazine in the last 11 years.

However, the demand for the publication grows each day and an increase in number of copies pushes up the printing cost. It is for the above reasons that TOF magazine seeks your financial contribution to continue availing this resourceful material to all our farmers and field partners.

Looking forward to your indication of interest to support us to reach many users of this esteemed magazine. Your support counts.

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