



Annette Kwamboka peels the husk off a cob of her mother's maize in Bugita, Kenya. Maize farmers are advised to harvest early to reduce damage on their crop due to the expected El Nino rains.

Photo: Kelvin Owino

## Dear farmers,

We are living at a time when the entire planet is faced with the realities of climate change. Our agricultural systems therefore need to be changed by adopting farming methods, practices and technologies that can enable farmers to produce food and address devastating effects of climate change such as the El Nino weather phenomenon.

On many occasions, TOF has advised farmers to plan their farming activities in order to take advantage of the prevailing weather conditions. For example, the current weather forecasts have indicated that there is a high possibility of El Nino rains in East Africa beginning this month. If these forecasts are accurate, then farmers need to plan and grow crops that can help them increase their food stocks and income.

Depending on its intensity, El Nino can be a double-edged sword; it can cause great havoc by destroying crops, roads and other infrastructure in rural and urban areas. But we can also use it to our benefit by harvesting the rain water and using it to irrigate crops after the rains stop. Certain crops such as early maturing maize varieties, peas, sorghum and wheat can do well if planted in areas that are not prone to flooding.

Due to depressed rains, the maize crop has not done very well this year, and farmers in arid and semi-arid areas which suffer from perennial food scarcity can grow maize and other crops during the rains. These can save the government a lot of money spent in buying and distributing relief food.

Since El Nino rains are always followed by periods of extreme drought, farmers should dig dams to store water, which can be used by livestock and for irrigation purposes later. It is sad that up to now, small-scale farmers in Kenya lack simple skills and technologies to conserve water for use during the drought.

Human and livestock diseases such as the Rift Valley Fever (RVF) are quite common during and after the El Nino rains. Pastoralists in Northern parts of the country are especially at great risk of losing their livestock as a result. The government should start early vaccination to prevent losses that result from RVF outbreaks. **Page 3**

## Harvest early to avoid El Nino damage

TOF - Farmers lose their crop every year due to damage from excess rains especially when crops are harvested late. Besides, maize that is harvested late faces many risks such as pest damage, rotting, and even mycotoxin contamination.

This year, the situation is expected to be more serious

due to the threat posed by the expected short rains. Weather forecasts indicate there is a possibility of El Nino beginning this month. This places farmers at a great risk of losing their crops, especially maize and beans.

It has been a tradition for small-scale farmers to wait until the month of November and December to start harvesting their maize, in order to cut their labour costs by using their children who are usually on holiday during this period. Because of this, farmers lose a big proportion of their maize



crop due to rotting (as illustrated above) and pest damage.

It is important for farmers to harvest early to avoid losing the entire season's crop.

## Threat of Rift Valley Fever

With the likelihood of El Nino rains starting this month, livestock farmers are faced with the risk of an outbreak of Rift Valley Fever (RVF). It is important that farmers take preventive measures to protect their livestock from the disease which is caused by the RVF virus. This virus is spread through the bite of infected mosquitoes, mainly the Aedes mosquito species, which can acquire the virus after feeding on infected animals or through infected eggs that hatch and produce mosquitoes with RVF. Since the disease has no cure, farmers should protect their stock from the disease through vaccination. *See page 3*



Aborted sheep foetus

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# Harvest early to reduce aflatoxin contamination

Heavy rains at the time of harvest can destroy maize through rotting, pest damage and aflatoxin poisoning that bring losses to farmers.

**Elkanah Isaboke** | Heavy rains, especially at the time of maize harvesting, have serious effects on the quality of maize. Some varieties of maize open their ears too early; if it starts raining, the water goes into the maize cob causing rotting. Pests also easily enter the maturing maize cob and destroy it even before it is harvested or stored.

High levels of moisture in maize make it easy for mould to develop leading to aflatoxin contamination. Aflatoxin is a highly toxic substance, produced by the fungus *Aspergillus flavus*. Aflatoxin, which causes cancer, suppresses the body's immune system, retards growth, causes liver damage and even death if consumed by humans, chickens and other farm animals. This is one reason farmers need to harvest their mature maize early even if rains persist.

## Dry and store your maize well

After harvesting, maize should be properly dried



before storage. Most farmers are, however, likely to face the problem of drying their crop during the rainy season. Heavy cloud cover makes it difficult for farmers to dry their maize, and this may force farmers to store it even before it has attained a moisture content of about 13.5 percent, which is the recommended moisture level before maize, beans, sorghum and other cereal grains can be safely stored. You can squeeze the grain with your thumbnail to see how hard it is - dry grain is difficult to squeeze.

## How aflatoxins develop

The UN World Health Organisation (WHO) estimates that billions of people in Africa and much of developing world are

exposed to aflatoxin poisoning. Aflatoxins cannot be seen by the naked eye; infected maize may look normal which makes it difficult for farmers to tell if their maize is infected.

Aflatoxins can develop in maize when it is still growing in the *shamba*, before it is arranged



in stakes and harvested. This usually happens when maize takes too long before it is harvested. Damage through broken grains and holes drilled by pests like weevils and stem borers allow the fungus to invade seeds in the field and stores.

## Aflatoxin biocontrol product

Scientists in the USA use several methods to control biologically aflatoxin in growing maize. One recommended method is the use of Aflasafe® which is, a biocontrol solution. Aflasafe® is broadcast in maize while it is still growing. The harmless strains of the Aflasafe® fungus compete with the poisonous strains blocking them from multiplying - this process reduces aflatoxin production in grains during both crop development and post harvest storage. This technology is particularly effective as it addresses the source of aflatoxin (the fungus in the soil) before it can contaminate the crop before harvesting.

## Tips on maize drying and storage

- Harvest early, when the maize has matured.
- Separate rotten maize from healthy maize to reduce contamination.
- Dry the maize until it is completely dry (if you have a moisture metre ensure maize to be stored has at least a 13.5% per cent moisture content).
- Do not throw harvested maize on bare ground where it comes into contact with soil.
- Clean the maize store thoroughly by removing any previous grains as they may harbor pests.
- Ensure maize to be stored is shelled before storage-this reduces pest damage, maize on the cob is more prone to pest damage compared to shelled maize.

Farmers wishing to get Aflasafe® can contact the nearest KALRO office in their area. Training is necessary before using the product.

## Use diatomite for maize storage

Farmers facing pest problems in their stored maize can use diatomite. Diatomite is a fine powder made up of fossilised microscopic plants called diatoms. Diatomite contains millions of small particles which have very sharp edges. When diatomites sharp edges come into contact with an insect or a parasite, their protective coating is pierced, causing the insect to dehydrate and die. This makes diatomite an excellent and natural pesticide that does not have negative side effects.

Farmers across the world have used diatomite for decades



Diatomite powder

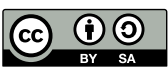
to control pests. Diatomite can be mixed with maize, wheat, barley, wheat, oats, beans rice, sorghum at a rate of a half kg (500g) for every 90 kg of any of these grains. Diatomite is safe for both humans and animals. Cereals preserved with diatomite can be stored for up to 4 years or longer without damage so long as they are kept in a

cool dry place that has no signs of rat damage. Grain that has been treated with diatomite has to be washed and dried before cooking or milling. The only limitation for farmers is that diatomite is not available in most agrovet shops in the country. But farmers groups can come together and purchase the powder and share among themselves. A 2kg package goes for Ksh 200. Diatomite is sold by African Diatomite Industries in Gilgil town along the Nakuru-Nairobi road.

Interested farmers can Contact African Diatomite Industries (ADL) on 0722 277 120.

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

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# Protect your animals from Rift Valley Fever

Eggs from mosquitos that cause the Rift Valley Fever can survive for several years under dry conditions. They then hatch and increase mosquito populations especially in low lying areas that flood during heavy rains.

**William Ayako** | With the expected El Nino rains, farmers keeping livestock especially cattle, goat and sheep are advised to vaccinate their animals against Rift Valley Fever (RVF). There is a high likelihood of RVF disease in parts of the country beginning this month if El Nino rains fall as expected.

The disease not only affects livestock but also people and is caused by a type of virus called phlebovirus. In cattle, RVF is characterized by abortion in pregnant cows and liver complications in calves. Transmission of RVF is made by insects and mainly mosquitoes. People can also contract the disease when they get exposed to blood, body fluids or tissues of infected animals.

RVF mainly occurs in Africa and is therefore regarded as an African disease. It is common in East, West and Southern Africa.



Tanzanian Maasai vaccinate their calves: Farmers need to vaccinate their livestock to prevent death from Rift Valley Fever.

The disease epidemic occurs in cycles of between five and twenty years especially when there is heavy build up of mosquitoes which come after abnormally heavy rains.

## Clinical signs

Incubation in calves may take 12-36 hours. In very severe infections in calves, death may occur in 2 days after the incubation without the animal showing any clinical signs.

- In severe cases, calves develop high fever and may vomit. Some

nasal discharge may also be seen followed by prostration and mortality (death rates) may reach up to 70%.

- In mature animals, abortion in pregnant dairy cows is common. There is high fever and in very serious cases, upto 70% mortality is experienced, erosion of the oral mucus membranes may be observed.

- People affected by the disease show a lack of appetite, nausea, severe headache, joint pains, dizziness and nose bleeding. Deaths are rare and affected people

usually recover and develop life-time immunity.

## Preventive measures

- Prohibition of movement of suspected animals from affected areas can prevent transfer and incidence of new infections.

- Grazing of animals in mosquito infested areas should be avoided.

- Vaccination of animals with suitable vaccines should be done. Pregnant cows should be vaccinated with killed vaccines to avoid the risk of abortion while humans should be vaccinated with formalin killed tissue culture vaccine.

- In Kenya, the State Department of Livestock in collaboration with other stake holders are currently preparing a national vaccination campaign to control infection in people and animals.

- The campaign involves provision of free vaccines and personnel. The public has been sensitized through the local electronic print mass media. They are encouraged to cooperate during the campaign to save livestock and protect the people.

**Warning: Vaccination should only be done by qualified personnel to avoid human infection through handling of the vaccines or infected animals.**

## Take advantage of El Nino rains to harvest water

If the El Nino rains begin this month as has been predicted by our weathermen, a lot of water for irrigation and domestic use will go to waste if it is not harvested and stored. Farmers can, however, benefit from the run-off water if they can build simple structures for collecting the water. There are various methods that farmers can use for this purpose:

### Roadside diversions

Whenever it rains, especially in areas with gentle or steep slopes, farmers can direct run-off

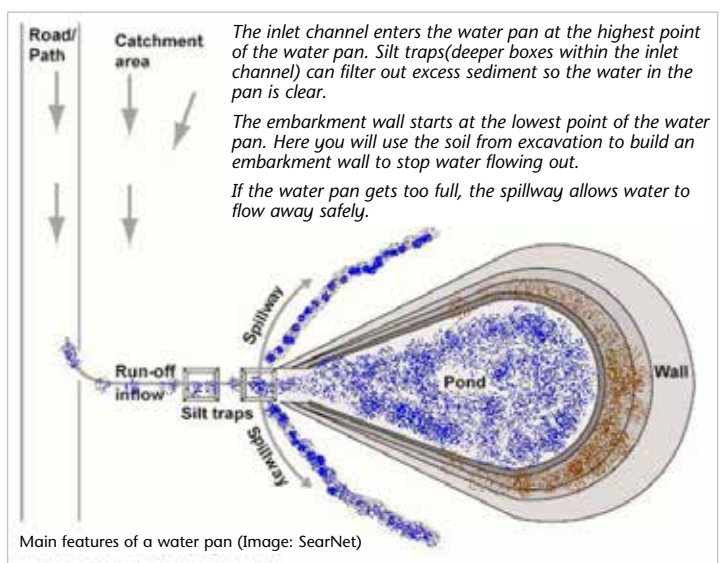
water from road sides. This water can then be collected in shallow dams and later used for growing trees or pasture grasses for livestock. Farmers should know that water collected this way may contain disease-causing organisms, which makes it unsuitable for crop production or domestic use.

### Water dams and pits

Water dams and pits are some of the best methods for water storage. Depending on the availability of labour, farmers can dig dams either in groups or as individuals. The water collected in such dams can be very useful during the dry season both for irrigation and livestock.

### Infiltration ditches

In areas with sandy soils, lining dams with plastic polyethylene liners can prevent water from seeping out of the dam. Depending on the size of the dams and water pits, a farmer can store water for between 6 months



and a year.

Infiltration ditches can be dug 2-5 feet deep along the contours above the crop fields. These ditches prevent soil erosion during the rains; the run-off water from such ditches usually gets into the soil and flows slowly into the crop fields below the ditches.

### Bench terraces

On steep slopes, it important to dig bench terraces- these are commonly called *fanya juu* terraces. They are made by digging trenches along the contours and throwing the soil uphill to form an embankment. Fodder grasses or shrubs can then be planted to stabilize the terraces.

# Build your beef farming enterprise gradually

Farmers who want success in beef farming should not rush; good planning, careful selection of beef cows, proper feeding and managements are key to prosperity in such enterprise.

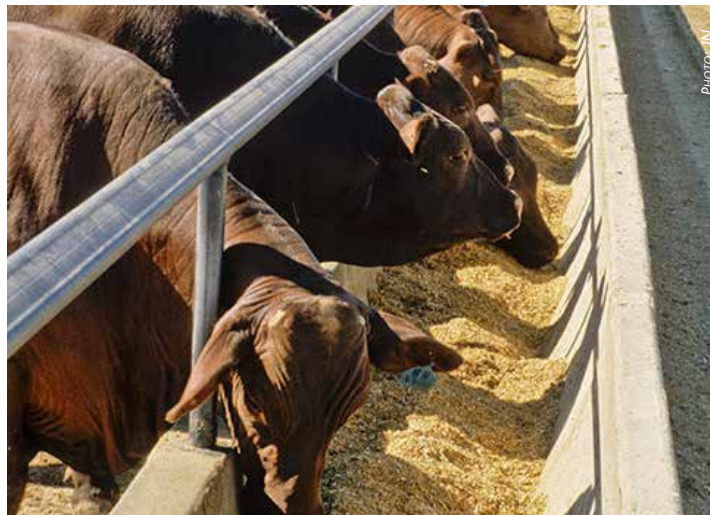
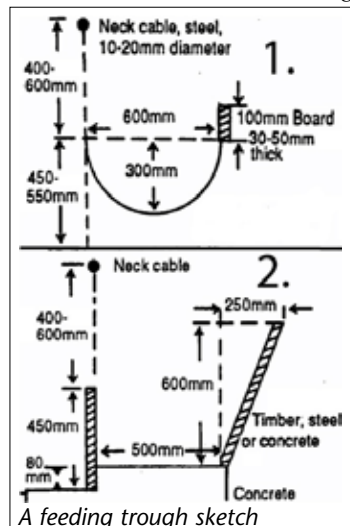
**Josephat Mulindo** | The article titled, 'Raise bull calves and sell them for meat' in the September 2015 edition of TOF generated interest from our readers who want to explore beef farming enterprise. Many of those who sent enquiries wanted to know which breeds are best suited for beef, what feeding options are available to farmers, especially those in arid areas, and general information on what it takes to establish a beef rearing enterprise. In this edition, we provide more information on how to manage a beef enterprise.

First, breed selection is important, especially for farmers who are in the arid lands. Poor choice of breed can compromise your investment. Basically, there are three main types of cattle: Those bred for milk, those breed for meat and those kept for both meat and milk. **Fresians** are bred for milk, **boran** is kept for meat, and **sahiwal** is a dual-purpose breed that gives both meat and milk in fairly good quantity and quality.

The dual purpose, pure beef and crossbreeds do well in arid and semi-arid grazing systems, while the milk breeds are better suited for intensive systems where feed is adequately catered for.

## Options for raising beef cattle

A farmer can focus on raising



Beef cattle need good feed that has enough proteins, energy, fat, minerals, vitamins and water.

calves and weaners. It is important to know that calves will take at least 15 months before they can grow to the age and weight that will make good money in the market. Depending on the breed, others may take as long as 24 months. This means the farmer must have enough feed for the animals for the entire period.

Perhaps, the easiest way for those who are not patient enough to wait for that long is to fatten mature animals for the market. This can be done in grazing systems or in feedlots, where animals are confined and provided with feed and water.

## Sourcing animals

The simplest way to build your beef enterprise is to buy animals during the lean months; when people are disposing their animals to pay school fees for their children or during the dry months when farmers dispose their animals because they do not have enough fodder to sustain them through the dry season. During these times, the price of animals is relatively low because of the high supply of animals in the market.

Visit the nearest State Department of Livestock office to find out dates for cattle auctions in your locality or neighbouring counties, and buy animals for fattening. Make sure you buy animals that you can keep for a maximum of 5 months. Normally, feedlot animals will take about 3 months to improve their body condition and attract favourable prices in the market.

If you have enough pasture you can select animals that are not very attractive in the market because they are thin but are otherwise healthy. Feed them

to gain weight and improve on body condition, then sell them off at a profit.

## Caution

When sourcing for animals during the dry season, be careful not to buy sick animals. Consult a veterinarian to determine whether an animal is just emaciated because of lack of feed or disease.

## Tips on feeding beef animals in a feedlot

Roughage is important in the diet of ruminants as it enables normal rumen activity. Grass (hay) is the common source of roughage and is the first feed to consider if the animals are confined in a feeding area. Good quality grass hay and protein hay like lucerne or desmodium is essential. The roughage can be chopped and mixed before being fed to animals. However, care should be taken to ensure the hay is not too fine, which reduces its roughage qualities.

## The feeding trough

Feeding animals using troughs prevents feed wastage, particularly in the feedlot. Provide adequate space so that all animals can access the feeding trough. Animals that are used to grazing in the fields may find it difficult to adapt to the feedlot environment. They can be trained through hand feeding with hay before the feeding trough is introduced. Once all the cattle in the herd are eating the hay, gradually introduce grain supplements mixed with the hay.

## Feeding grain

Grain is one of the most expensive ingredients in feed formu-

lation. The best grains that can be used in Kenya are maize, sorghum, barley, wheat and oats. However, a farmer has to gauge if it makes economic sense to feed grains to his animals. Grain can be introduced in one of the following situations:

- (i) In feedlot
- (ii) As a supplement to grazing, and
- (iii) As a short-term drought ration meant to see the animals to the rainy season when pasture is abundant. The amount of grain used in the three situations above will vary.

Levels of feeding of grain as a supplement range from 0.5% to 1.5% of live weight per day. This means an animal of 300kg can be fed on between 1.5kg to 4.5kg of grain. In the feedlot environment, and where grain is fed as the major component of rations, the maximum daily grain intake animals is 2.5% of live weight.

When grain is fed to cattle, it is important to give time for their digestive systems to adapt gradually. If grain is introduced in large quantities, the digestive system of an animal that is only familiar with grass will not be able to cope with rations higher in grain. The negative effects of introducing larger amounts of grain into the diet include lactic acid poisoning which can easily cause death.

The best way to go about this is to do base feeding on fibrous grains such as oats that are safer to feed than grains with little fibre such as wheat. Also, introduce grains in small amounts. This may not be easy in group feeding where some animals bully others and may end up consuming larger quantities of the provided ration than others. To avoid this, separate aggressive animals from the shy ones or group the animals according to temperament. Animals affected by the grain should be removed from the herd and fed separately on hay until the symptoms go away, then reintroduce them into the herd.

## Supplements

When grain is used as supplement in feedlot situations, 1% of ground agricultural limestone should be added to make up for a shortage of calcium in the grain. For lactating or young animals, 1% of common salt (sodium chloride) should be added to the grain to correct sodium deficiency. ■

# Dangers of growing and eating GMO Bt maize

By inserting the crylab gene into maize, GMO scientists have literally converted the Bt maize into a pesticide, which has the potential to kill other beneficial insects and even harm people who consume it.

**Dr Peter Mokaya** | Our last article on GMOs (TOF No. 123, August 2015) provided an overview on GMOs and their planned introduction into the Kenyan agricultural system. This was through an application for open cultivation and commercialization of Bt maize, by the Kenya Agricultural and Livestock Research Organisation (KALRO) and the African Agricultural Technology Foundation (AATF).

It has come to our attention that a majority of Kenyans including farmers and consumers have little or no information on how GMOs are likely to affect their lives if they find their way into the Kenyan environment and food chains. In this article, we provide some more information on the Bt maize.

## GMOs are not natural

GMOs are "new plants or organisms" that otherwise would not exist in nature if they were not "created" in laboratories by genetic scientists or "genetic engineers." In simple terms, GMOs are created when a portion of a gene from unrelated species such as *Bacillus Thuringiensis* (Bt) is introduced into the DNA of another species, creating a combination or hybrid type maize, which expresses some desired characteristics.

In the case of Bt maize, the new "maize" is able to produce a toxin (a poison) which kills the common maize pest called the stem borer. The important thing to note is that the "new maize" would NEVER occur in nature, if it was not "invented" in the laboratory by genetic engineers.

Bt Maize is, therefore, in many ways unnatural because mother nature may not know how to deal with these new proteins. People who support this type of biotechnology argue that the bacteria called *Bacillus thuringiensis* (Bt) exists in nature and is used by organic farmers for pest control.

While this is true to a certain extent, they do not tell the whole



A maize plantation: GMO maize is likely to have negative effects on human, animal and environmental health.

truth - while the naturally occurring Bt bacteria does its job naturally, the gene removed from it is modified and inserted into the maize, a completely unrelated species (mixing animal genes with plant genes!) such that every cell of the "new maize" contains and releases the Bt toxins.

## Bt maize is harmful to consumers

In other words, a normal natural maize variety, through genetic engineering is changed into a "Bt toxin producing factory" whose primary purpose is to kill the maize pest, the stem borer.

Unfortunately, research has shown that when you convert normal maize into a "pesticide factory" the toxin or poison it produces unfortunately affects other beneficial insects like lady birds, butterflies, bees and even human beings. This has been proven through research.

Chemicals tend to be poisonous if not used as prescribed

and even when used as per instructions, they often have side effects (undesired and unexpected negative effects). In agriculture they are called agrochemicals while in healthcare they are called pharmaceuticals. Petroleum is a key ingredient of agrochemicals and pharmaceuticals.

Farmers should know that some GMOs, like Herbicide Tolerant (HT) Roundup maize® are harmful to people. The World Health Organisation (WHO) has warned that the glyphosate used in Roundup Ready® maize can cause cancer in humans. Unfortunately, due to farmers' lack of information, the developers of GMOs crops deliberately use these examples and brand those opposed to GMOs as being opposed to all biotechnology. That is an attempt to confuse the masses.

Agro-chemical farming and industrial agriculture have been associated with numerous human diseases, which include allergies, brain dysfunction, diabetes, heart diseases, kidney diseases, liver diseases and many types of cancer.

## GMO maize is designed to withstand chemicals

GMO crops are genetically engineered to withstand high doses of herbicides and pesticides. While it may not make good sense in terms of health, it

makes good business for the multinational companies, especially if the same chemical companies that produce the GMO seeds own the herbicide and pesticide manufacturing companies. This is a strategy for business because it guarantees profits, season after season. They sell the maize seeds to the farmers, every planting season, and they ensure that the farmers return to buy chemicals to control pests and diseases, which easily attack maize.

Emerging evidence seems to suggest that manufacturers may have known the dangers posed by Roundup Ready® maize but may have deliberately decided to keep this information away from the public.

## Fear of contamination

Are GMOs good for the environment? Farmers need to know that GMOs have the ability to pollute other natural varieties of similar open pollinated crops and "convert" them into GMOs. This is a major concern for organic farmers and opponents of GMOs. GMO crops cannot co-exist with non-GMO crops of the same species, including our traditional crop varieties such as maize, because of contamination.

GMO varieties spell disaster for the entire organic sector. This is because it signals the start of contamination, destruction and collapse of the organic farming sector and related organic value chains; from the farmers, producers, processors, retailers and finally to the organic consumers. This will have far reaching and irreversible public health consequences that will affect the human, animal and environmental health.

Farmers and consumers should be given the opportunity to make informed choices over what seeds to grow and consumers given a choice on what foods to consume. Let us make informed decisions, let us choose organics over GMOs. Remember, industrial farming is different from organic farming. Organic farming encourages and promotes the use of organic and natural products which repair and enrich the soil in a sustainable and eco-friendly manner.

For more information contact Dr. Peter Mokaya, Director and CEO, Organic Consumers Alliance(OCA) at [peter.mokaya@organicconsumers.co.ke](mailto:peter.mokaya@organicconsumers.co.ke) or [Mokayapm@gmail.com](mailto:Mokayapm@gmail.com) or go to [www.organicconsumers.co.ke](http://www.organicconsumers.co.ke)



# Young farmers change to organic farming

Many young men in Katoloni village are learning and practising organic farming methods, which has led to crop diversification, improved health and better use of scarce water resources for agriculture in the semi-arid region.

**Caroline Nyakundi** | Joseph Mbithi is a young farmer from Makueni County who has changed from conventional to organic farming and has seen many benefits in growing his fruits and vegetables. He grows watermelon, pawpaw, avocado, maize, beans, green grams, *sukumawiki* and *kunde*. Mbithi also keeps cows and chickens. He does all these without using harmful chemicals and industrial fertilizers and has more than enough food for his family and for sale.

## Water harvesting to grow crops

Mbithi has demonstration plots in his shamba, which he uses to train other interested farmers. Because Makueni is semi-arid, he has employed water harvesting technologies such as the use



Mbithi shows some members of the TOF Editorial Advisory Board a fruit orchard in his farm on which he grows fruits organically.

of *zai* pits that trap water during irrigation. A dam, which was constructed under his leadership with support from the Constituency Development Fund, has helped the community practice farming, and hopes to make it a commercial village that produces organic products.

## Applied organic farming information

Through the Biovision sup-

ported Katoloni Mission CBO information resource centre, Mbithi gets all the information he needs on how to grow the various crops and keep livestock. "I have always disseminated the information to farmers in my area," he says.

## Indigenous vegetables

Previously, farmers in Makueni County would not plant vegetables because of the poor rains

but now nobody is complaining as they have enough to eat and sell," he says.

The farmers have even adopted growing of the indigenous varieties like *managu* and *terere* which are very nutritious. Mbithi has seen his family's health improve due to the improved nutrition. Articles published in TOF especially those on nutrition have helped him a lot: "In May this year, TOF published an article on the benefits of celery. I want to grow this vegetable because it helps reduce blood pressure" he adds.

The older generation of farmers, trained and inspired Mbithi to practise organic farming. Ms Regina Muthama, Coordinator of the Katoloni Mission CBO is proud to be a good example to young farmers in her region. She says farmers from as far as Kitui County have visited their CBO to learn various methods of pest and disease control.

Mbithi, who has high school education, is now pursuing a Diploma in Community Development so that he can better serve his community, especially the farmers groups that he trains.

# A water purifier that makes water safe for h

Pollution of water sources in most rural and urban areas in Kenya poses serious health problems to people due to water-borne diseases such as typhoid, diarrhoea and amoebiasis. Boiling water for drinking uses energy that would otherwise be used for other purposes such

as cooking. There are, however, simple methods people can use to purify their drinking water to make it safe for drinking. One of these methods is the use of Solvatten®, a solar water purifier that purifies water when placed in the sun for about 2 to 6 hours.

Solvatten® is a combined portable (can be carried from place to place) water purifier and water heater system that is designed for use at the household level especially in rural areas which lack treated water. The plastic container or jerrican uses the sun's rays to treat water. The purifier uses filtration, pasteurization and UV sterilization to make water safe for drinking and other domestic uses. The purifier can

be used in places where there is water scarcity, contamination and in disaster situations when the water available is not safe for domestic use.

Each Solvatten® unit consists of two 5-litre containers that have transparent plastic surfaces that allow the penetration of UV light, specifically UV-B which is highly effective at destroying microorganisms. Water is poured in through an opening that houses a filter that removes larger particles. Once filled, the unit is placed in direct sunlight, which simultaneously heats the water and exposes it to the sun's radiation. After 2 to 6 hours, the water is heated to between 55°C and 75°C. Making it safe for drinking, hand washing, bathing and domestic cleaning. Rural households using the Solvatten® water purifiers reduce the use of firewood and charcoal by ½ to 1kg per day which has environmental, economic and social values for users. The Purifier costs Ksh 1000.

For local sales (Kenya) <http://www.mamamikes.co.ke>  
+ 254 722 760 655 [shop@mamamikes.com](http://shop@mamamikes.com)



Joshua Wasike, Vi Agroforestry project Energy officer shows how the Solvatten® purifier works.

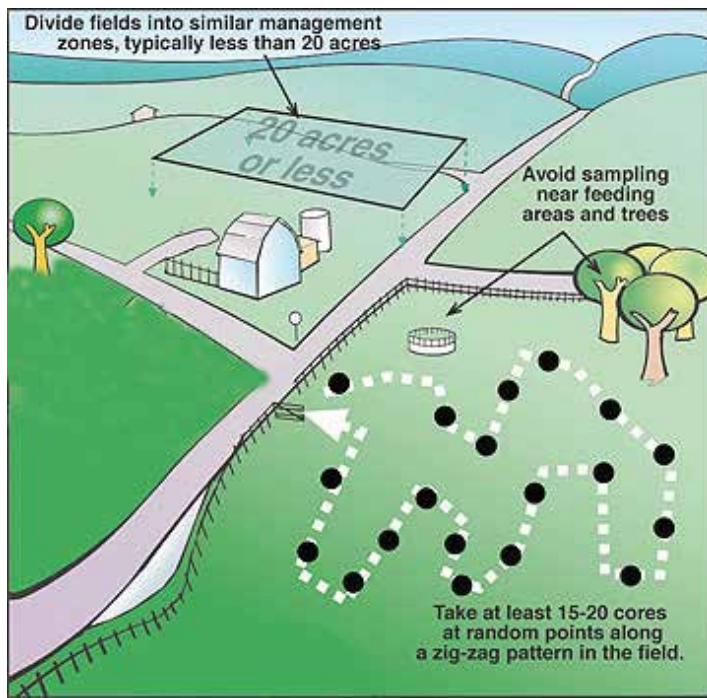
1. Start early in the morning. This gives the best chance of treating the water successfully (getting a green face) several times per day.
2. Open both caps. This means Pour the water in through with black cap.
3. Put it in a position sheltered from wind without shadow throughout the whole day. The transparent surface should face the sun directly. Expose for 2-6 hours.
4. When SOLVATTEN® has been exposed to the sun the water is still green and the treatment is complete\*.
5. You can use the hot water for hygiene purposes. The water can be very hot so handle with care to avoid injuries or burns.
6. SOLVATTEN® can be used for cooking food.

# Soil sampling and testing require skill

We are interested in soil testing and would like to know how much we can contribute for the soil testing collectively as a group.

Soil sampling cannot be done collectively as your group would like to do. To get a representative sample, each of your members will have to take several samples of each block of land in their farms in which they want the soil tested. The samples from each block will then be labeled indicating where the sample has been taken from. The soils will be tested and the results will help you identify what nutrients are lacking, depending on the crop that is grown or expected to be grown on the particular block.

If the intention is to cut the cost of testing the soils, this will not work because every farmer is required to sample each block



whose soil they want tested separately.

## Sample each block separately

Each member will have to take separate samples that are well labelled according to where they have been obtained.

## Send samples

The only way you can cut the cost is perhaps to send one farmer with the samples to Nairobi in order to reduce the cost of dispatching the samples individually. Perhaps to enable you soil sampling correctly you can refer to TOF No 104, of January 2014 (page 5). If you cannot get this issue, you can get in touch with TOF magazine to send the relevant information to you on how soil sampling is done.

# How to keep your birds free of chicken pox

What cures fowl pox in small chicks?

Chicken pox or fowl pox is a viral disease caused by a virus. The disease is common in birds such as chickens, turkeys and pigeons.

**Dry form:** There are two forms

of chicken pox in chickens- dry form and wet form. Chicken with the dry form of the disease have wounds that resemble warts on the parts of the bird's body that have no feathers such as the comb, wattle, ear lobes, eyes and even the feet. This form of the disease is transmitted by insects such as mosquitoes. Birds affected by the dry form of chicken pox usually recover in a few weeks without treatment.

**Wet form:** The second form of chicken pox or wet form is spread if the birds inhale the virus, which causes the bird to form a false lining of the tissue in the mouth, pharynx and the wind-pipe (trachea). Yellowish patches

appear in the bird's mouth. The wet form of the disease is much more serious than the dry form. Fowl pox spreads slowly and a flock may be affected by the disease for several months without visible symptoms. The main symptoms to look for are:

- Affected birds are retarded in growth.
- Laying birds reduce their egg production.
- All the birds have difficulties in eating and breathing.

## Treatment

Like in all viral diseases, there is no treatment for chicken pox once the chicken are infected. If the birds have a strong immune

system, they can survive the disease. The first line of defence against chicken pox is therefore prevention through vaccination and improved hygiene in the poultry sheds. Sick birds should be separated from those that appear to be healthy and provided supportive care to improve chances of their recovery. All layers should be vaccinated. If the mosquito population is high, all broilers should be vaccinated to protect them against infection. Chicks should also be vaccinated from day one through the wing-web method (under their wings). Vaccination offers long term immunity to the birds.

## Some use

3. Fill SOLVATTEN<sup>®</sup> to the top. The face must be red to start. Do not reset if it is already red.

6. Pour out the water through the opening with the white cap.

9. You can use SOLVATTEN<sup>®</sup> for storage of water or pour the water in a thermos if you need to keep it hot. If using SOLVATTEN<sup>®</sup> several times a day you can put the water in a clean closed pot with a tap. Keep the pot away from the floor to avoid contamination.

## Farming Tip

### A simple way to test for moisture in maize

Many farmers are likely to be caught unprepared this season when it comes to harvesting maize if the expected El Nino rains start this month as the weatherman has predicted. This means that farmers who want to save their maize will have to harvest early before the crop has completely dried in the field as they have done before.

All maize should have a moisture content of 13.5 per cent before it can be stored. It is very difficult for farmers to attain this moisture level especially when they harvest while it is raining. Besides, most of the



people in the rural areas may not be able acquire a moisture metre to check moisture levels during storage.

Farmers can use a simple method to check if their maize is dry enough for storage by the use of an empty soda bottle and some salt:

- After drying your maize, put a handful of maize grains and 1/2 handful of common table salt in dry soda bottle.
- Shake the bottle for 2 to 3 minutes. Allow the grains to settle at the bottom of the bottle. If the salt sticks onto the walls of the bottle, this is a sign that the maize has not dried well enough for storage.
- Dry the maize again and repeat the test until no salt sticks on sides of the bottle. The maize can then be stored and there is no danger of it developing mould (or aflatoxins) during storage. Page 1 and 2

## TOF Rad answers your questions

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

### Earn more from chillies through value addition

**Joyce Wambui Mahui** | Do you know that you can earn yourself extra income by adding value to chilli? You can give chilli powder a more pleasant taste and aroma by adding dry ingredients like coriander (*dania*), garlic, ginger, small fish and salt before crushing in the mill.

Across the world, chilli is used to flavour many dishes. In Kenya, the coastal region people are known for their love of chilli in spicing food, the urban dwellers enjoy a spread of chilli in their chips and among the asian communities, chilli is a welcome addition to any food. Even though it is known for its hot spicy flavor, chilli is also a great source of vitamins. Chilli can be used in various forms; fresh, ground paste, sauce or powder.

#### Good income from chilli

Many consumers prefer to have chilli as a powder. Making chilli powder is a good way to make money and it does not require a lot of time to do this. Kenyan farmers can learn from West African business people who are reaping from the chilli powder business.

Alice Agossadou and Bernadette Ekpinda are chilli farmers who sell their products at a market in Cotonou, Benin. Retailers and wholesalers come from very far away to get their supplies. "We pay the children's school fees and other household needs through sale of chillies," says Agossadou. Ekpinda has also benefited from selling chillies: "My son has already finished his studies and is now a teacher through proceeds from my chilli sales." For the several years she has been in the chilli business, Aubierge Djossinou has supplied customers such as restaurants, shop owners and people who frequent her little spice shop in Cotonou, Benin.

#### Ensure chilli quality to retain customers

"It is very important to have a product that does not change, that is of the same quality, the same taste, the same color and that is well packaged," advises Djossinou. If you want to make



Value addition can increase income in chilli production.

chilli powder of high and consistent quality, use only chillies that are of one variety.

Chilli meant for making powder is best harvested without the stalk attached to the fruits because after crushing the chillies these stalks will leave small black particles in the powder.

The quality of the chilli powder also depends on the care you put into it. Therefore, clean the chilli peppers first and remove the rotten ones. Remove any stems that still remain in the fruits.

Although most processors buy whole dried chilli fruits from the market, they sort, wash and dry it before turning it to powder.

#### How to dry chillies before grinding

To obtain high quality chilli powder, the chillies must be very dry. Farmers can dry their chilli in a gas drier overnight. The clean chilli is spread out on trays with mesh so that the hot air reaches the chillies and removes all the moisture.

Check regularly to see if the chillies are dry and change the position of the tray in the drier to ensure uniform drying. You can also dry chilli in the sun. Spread the fruit in the sun on a clean mat. Turn the chillies over every hour to ensure uniform drying. Dry them for five to ten days depending on the weather.

To be sure that your chilli is dry, press some chillies in your hand. Well dried chillies make a cracking sound when you squeeze them.

#### Improving chilli taste

To give the powder more pleasant taste and aroma, some processors add other ingredients to the dry chilli before crushing it in the mill. "We sell two cans of chilli powder, with or without extra ingredients. I add pepper, garlic, dry ginger, small fish and salt, so that it has a nice taste." Says Agossadou,

Apart from taste, salt also helps to better preserve chilli powder. Ekpinda has processed chilli for more than 20 years. "While crushing chillies, we must add salt because it keeps away the weevils and small red insects and the chilli powder will store well, even for a year," she advises. Be careful when grinding chilli. The chilli dust can burn your bare skin and irritate your eyes.

Grind the dried chilli in a mill repeatedly until you obtain a fine powder. The mill should only be used to grind chillies and spices.

#### Package well to maintain quality

In rural areas, chilli is crushed at the mill at night. Before grinding, remove the flour that is still at the mill or it will spoil your chilli powder. After crushing the chilli,

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allow it to cool down completely before putting it into containers. This is to avoid the powder getting moist and mouldy.

#### Maintain hygiene

Hygiene is important at all times. If you are using recycled bottles, wash them thoroughly with detergent, water and bleach and rinse them well. Keep them clean and dry. You can seal the bottles with transparent adhesive cellotape so that moisture does not enter the bottles and spoil the powder. A printed label that shows the brand name and the date of expiration should be added in the container.

Now you can earn from your labour because chilli powder is sold at a good price since not many people have discovered income generation through value addition.

*Additional reporting and photographs by Access Agriculture. To watch or download a video of drying chilli visit their website: [www.accessagriculture.org](http://www.accessagriculture.org).*