



Photo: Venter Mwangera

**Farmers planting maize:** Planting maize early has many advantages. Many farmers who plant before the rains start have noticed a great improvement in the maize yield and income

## Dear farmer,

With the increasing frequency of drought, crop production is becoming quite unpredictable. Indeed, many farmers equate farming to gambling because they cannot tell how the weather will turn out, especially after they have spent a lot of money preparing land, buying seeds, fertilizers, paying for labour and weeding during the production cycle.

This month, all farmers will be planting maize and other crops. But, they do not know whether the rains will delay or come on time and disappear as it happened in the past two years. As a result high crop loss was experienced and farmers had to replant.

Rain-fed agriculture is becoming quite unreliable, especially with the rapid change in weather patterns. There is, therefore, an urgent need to review the way we practise farming in order to adapt to the effects of climate change. One of the practices is to try and harness all the available water through harvesting and proper storage. This ensures availability of water for domestic and small-scale irrigation during lean periods when we have no water.

These measures can be combined with other organic farming practices such as the use of compost, farm yard manure, mulching and minimum tillage practices where any moisture in the soil is conserved for use in the production of the next crop.

Farmers also need to diversify the type of crops they grow to ensure food security at household level. Planting drought resistant crops such as millet, sorghum, cassava, cowpeas and green grams among other crops. Planting a range of crops like bananas, sweet potatoes, beans, peas and fruits like guavas, avocados, oranges, pears among others to balance the family diet. Reliance on maize as the only food crop is the cause of frequent food shortages and hunger.

Food security is one of the priorities the government has put on its development agenda for the next five (5) years. But, going by the previous pledges, we cannot be sure if they will honour this pledge due to budgetary constraints. Farmers should, therefore, utilise the knowledge they have acquired to grow a variety of food crops for their own consumption and for sale.

## Importance of crop rotation in organic farming

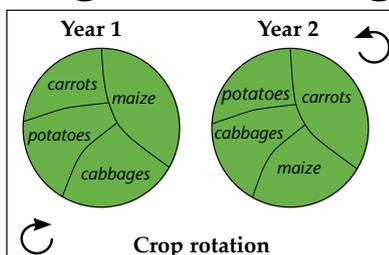
**Peter Kamau** | Most farmers plant the same type of crop on the same parcel of land every year. Farmers justify this practice with claims that they do not have adequate land for crop rotation. What is crop rotation and why should farmers practise it? Crop rotation is the growing of different crops on the same piece of land to avoid exhausting the soil in terms of nutrients and to control weeds,

pests, and diseases. It can also be termed a systematic planting of different crops in a particular order over several years in the same portion of land. (see sketch, right).

### Crop rotation recycles nutrients

Growing the same crop on the same portion of land takes away essential nutrients which cannot be replaced because the same plants take the same nutrients. Leading to depleting of the nutrients from the soil. Farmers can stop the removal of essential nutrients by planting different crops which restore nutrients taken away by the previous crops. For example if you plant beans in a field where maize was last planted the beans will return the nitrogen that was taken away by maize. Hence a balance of nutrients in the soil. Intercropping beans and maize as some farmers do helps to restore nutrients.

Planting of leguminous crops such as beans, peas, peanuts and soybeans that have nodules in their root systems which take nitrogen from the air and fix it into the soil. Such legumes can be rotated with maize, potatoes, tomatoes, sorghum or wheat, which require nitrogen to grow well. If farmers practised crop rotation, they would not need to apply chemical fertiliz-



ers, which damage the soil causing leaching of other important nutrients.

### Crop rotation reduces pests and diseases

Crop rotation and intercropping has other benefits. Different pests and diseases prefer different crops. Crops from the same family such as potatoes, tomatoes, bananas, eggplant, or capsicums are prone to same pests and diseases. If you plant a different crop; for example maize or pasture grasses; you break the pest and disease cycles and deny the pests their food. So, the new crops will keep off pests and diseases. The farmers will therefore be able to eradicate the pests and diseases without using any chemicals which is one of the practices in organic farming.

Many viral, bacterial and fungal diseases such as Maize Lethal Necrosis (MLN), bacterial wilt and smuts can easily be controlled through crop rotation.

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# Plant sweet potatoes to take advantage of the rains

Sweet potatoes are becoming a popular food crop. Both the tubers and vines can be used as food and vegetables. The vines are nutritious fodder for animals. The tubers currently fetch very good prices in the market.

**Amina Day Ojijo** | Sweet potato vine multiply easily and the vines grow quickly. They are both drought and flood tolerant. These characteristics keep the farm green in many seasons.

In our continuing series on growing sweet potatoes, we focus on land preparation and planting tips for growing sweet potatoes.

## Land preparation

Land preparation can take the following steps:

- Start by clearing the fields. This includes removing crop residues or grass (debris).
- Plough and harrow the land.
- Prepare ridges and mounds (sweet potato grow well on ridges and mounds).
- Crop residue is useful in suppressing weeds. Early land preparation is necessary to create a deep loose bed ideal for the growth of tubers.

## Advantages of planting in ridges

- Ridges are recommended because they provide more room for the growth of roots and sweet potato tubers. When growing on ridges mechanization is possible. Also, a farmer can grow more sweet potatoes for commercial purposes.
- Growing sweet potatoes on ridges also helps in soil moisture conservation and reducing soil erosion.
- Inter-cropping sweet potato with other crops is possible in the ridges thus enabling the farmer to diversify and earn more income. Cultivation in mounds is easy, doesn't



Planting sweet potatoes in mounds or ridges increases the size and number of the tubers. The farmer is using double row method

destroy tubers, gives good yields and is extensively practised in many areas growing sweet potatoes.

- It is recommended not to grow sweet potatoes on a flat bed because the resulting yields are usually low.

## Planting materials

Sweet potatoes can be propagated by use of storage root or vine cuttings. Below are some planting steps to follow:

- When propagating by roots, the sets must be robust (healthy).
- The cuttings should not be planted deep into the soil to avoid rotting. These can either be covered with small amounts of soil or left as they are.
- The use of vine cuttings is the recommended practice for both subsistence and commercial production. The vines are preferred to roots for planting mainly because vine cuttings are free from soil borne diseases. It is important for the farmer after harvesting to leave some roots for planting during the next season.

**Planting:** Select clean, healthy vines (free from virus and pests) about 25 - 30cm long to reduce wastage of planting materials.

Pieces from the stem apex (stem tip) are preferred to those from the middle and base por-

tions of the stem. Where planting material is in short supply, middle and base vine cuttings may be used with little reduction in expected yields.

In drier areas with only one main rainy season, the availability of planting material is a problem. Farmers in such areas are advised to keep vines during dry season near water points on a nursery plot or under a shade. Alternatively, farmers can leave some tubers in the soil during the dry season. When the rains come, the vines will sprout and can be used for planting.

## Planting methods on mound seedbed

There are three (3) major planting methods used by farmers in sweet potatoes growing regions:

- These are used to cluster of vines in one spot on the mound. Usually, 4 - 6 vines are planted.
- Use of 3 - 4 vines in single stand are planted at equal distance from each other.
- Use of two (2) vines are planted per stand at equal distant from each other.

The second method is the best compared to the other two in terms of storage, root yield and good quality sweet potatoes. The normal size of the mounds should have a base diameter of 30-45cm. The distance between the mounds should be 1m apart (from the centre of mound to the

next).

## Planting methods on ridged seedbeds

There are two (2) main planting methods on ridges which may be adopted:

- Farmers can either use single row of sweet potato plants in the middle of the ridge at 30cm between plants within the rows. The distance between the centres of the ridges should be 1m apart.
- Farmers can also use double rows of sweet potato plants on opposite sides of the ridges at 30 cm between plants, within rows and 50-60cm between rows.

The sweet potato vine cuttings should be planted at an angle with vine ends towards the centre of the ridge. One-half or two-thirds of the vine cuttings is placed beneath the soil.

## Planting guidelines

The recommended number of cuttings per hectare is 27,000 cuttings/ha or (11,000 cuttings per acre). The depth of planting is 4-6 cm deep to allow for bumper harvest.

## Time of planting

Sweet potato can be planted at any time so long as there is sufficient moisture in the soil. However, it is best to plant sweet potato early in the rainy season so that it will have sufficient water to grow. Where rainfall is biannual, two crops of sweet potato are possible to grow and harvest in a year.

## Manure application

Farm yard manure can be applied to improve soil fertility and structure. This allows sufficient harvest and soil fertility.

## Weed control

Weeds are a problem to sweet potato only during the first two months of growth. Hence early weeding after the vines have sprout is recommended.

*Continues on page 8*

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**Chief Editor** Venter Mwangera

**Editor** Peter Kamau

**Administrator** Lucy W. Macharia, 020 863 21 86

**Editorial Advisory Board** Dr. Sunday Ekesi (ICIPE), Henry Neondo (ASNS), Dr Jane Njuguna (KEFRI),



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# Know how to protect your maize from fall armyworm

Farmers are advised to start spraying their maize crop from two (2) to three (3) weeks after planting. They should use simple biopesticides such as plant extracts to control fall armyworm and other pests.

**Beritah Mutune** | The fall armyworm has the ability to develop resistance to pesticides. It spreads fast and attacks many crops compared to other pests. Spraying of both organic or chemical pesticides when the pest is beyond the third instar (third stage) has very little effect on it.

The adult moth lays eggs inside the plant and only at night. This becomes difficult to detect the pest. The newly hatched larvae also develop inside the plant and within a few days, it moults into the third stage which is very difficult to control. By this time, it is too late to save the plant. Therefore, spraying should be done at the second instar (larvae) stage to kill the larvae. Early pest detection helps the farmer to assess the situation and plan how to manage the pest in order to eradicate it.

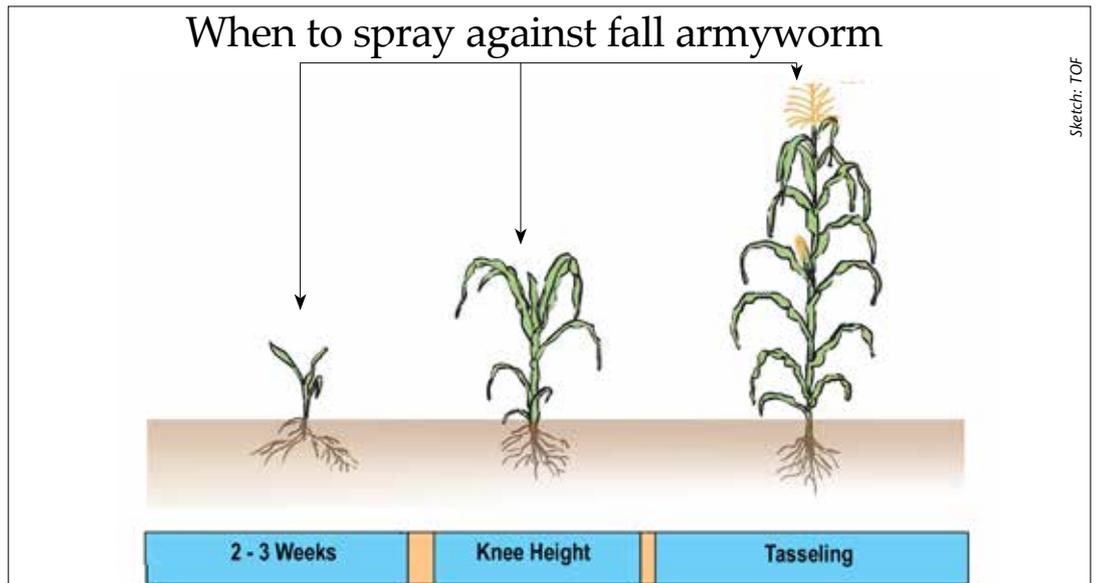
## Monitoring

Monitoring involves observing early warning signs of pest infestation on the crops. Pre-monitoring can be done by setting up

## How to use the knapsack sprayer effectively

Before selecting the sprayer to use, check the label and the guidelines for the pesticide, the recommended application rate, the type of equipment best suited for the application, the style of nozzle and other information for best results.

- Always walk at the same speed used when calibrating the sprayer.
- Always ensure an even walking speed.
- Pump at an even rate while spraying. Hold nozzle at constant height above ground using a string and stone.
- If spraying the entire field, first mark out the plot in swath widths with marking sticks to ensure there is a target to walk to, this will ensure even application.



pheromone-baited traps at the household level.

Surveillance helps the farmers to know when to start applying the pesticides. It is advisable to spray your crops two (2) weeks after planting, at knee height and at tasselling stages (see sketch above). It is also recommended to spray early in the morning or late in the evening and when it is not windy to avoid wastage of pesticides.

In addition, most of the chemicals in the market cannot kill eggs. For the pesticide to be effective, the farmers need to scout in their maize crop and spray when the pest is at the larvae stage. They are also advised to use cheaper and less dangerous chemicals which are effective and are locally available. Most farmers practise farming as the sole source of their income. Any additional operating costs will reduce the anticipated yields and affect their incomes.

## Other pest control measures

- Practise early planting to reduce the pest incidence.
  - Maintain a healthy ecosystem to help in biological control as they harbour parasitoids (natural enemies) and birds.
  - Use of biological control methods such as natural enemies and bacterial insecticides (*Bacillus thuringiensis*) has also been proven to be effective.
- For organic farmers, neem-based biopesticides (*Nimbecidine*) are effective because they have anti-feedant properties and they reduce the capacity of the pest to lay eggs.
- Garlic-based biopesticides are also effective and work the

same way as neem.

- Use of traps can also reduce the male moths and reduce its multiplication.

Finally, farmers should know that the fight against the fall armyworm requires an Integrated Pest Management (IPM) approach where several options

are employed. There is no control method that can work alone. These control measures combined enable a farmer to have few pests which subsequently reduce the damage to the crop.

For more information on natural pest control [http://www.infonet-biovision.org/natural\\_pest\\_control](http://www.infonet-biovision.org/natural_pest_control)

## Natural method to control pests

Farmers across the country last year experienced the damage to their maize crops brought by the fall armyworm (a new invasive pest). As the government rushed to buy and recommend expensive chemical pesticides; most farmers were shocked to discover that the pest did not respond to the expensive chemicals they were using to control the pest.

However, as we advised then, it is a waste of money to use expensive chemicals for the control of fall armyworm. Farmers can keep away the pest by using simple organic plant extracts through proper timing.



litres of water. Dissolve a bar soap into the solution.

- Chop the plants into small pieces and put them into a bucket.
- Fill the bucket with water to the brim and close it completely to stop the air from escaping. Cover the mixture for 14 days.
  - After 14 days, use a piece of cloth to filter the solution if you want to use a knapsack sprayer (this stops particles from blocking the nozzles).
- Dilute the mixture at a ratio of 1 litre of the solution to 100 litres of water.

## Organic plant extract

Here is a simple method to prepare plant extracts to control the pest:

- Get 4 kg of different plants that can kill both pests and provide nutrients to your maize crop. Such plants are chillies, garlic, stinging nettles, tithonia, neem, African marigold, sodom's apple, pyrethrum or lantana camara.
- Mix molasses and EM1 (the two can be bought at your local agrovet shops). Add 5

## How to spray

- Since organic plant extracts do not work the same way as chemical pesticides, ensure you spray your crop two (2) weeks after germination and then two (2) or three (3) times every week to protect your crop effectively.
- Do not wait until you see the damage from the pest to start spraying.
- By spraying regularly, your crop will be protected from all pests including the fall armyworm.

# Plant early to get a healthy maize crop

Planting early always gives your maize a headstart, providing free nitrogen and prevents damage from pests, increasing maize yield and income.

**Belinda Weya** | The month of March is always a busy time for farmers as they start the farming calendar by planting. Despite weather uncertainties, many farmers are already prepared to start planting. In the last two years, the rains have been erratic, forcing farmers who plant early or those who practice dry planting (planting before the rains) experience crop failure. This is the nature of farming. Sometimes, timing may be correct and other times the rains may fail forcing many farmers to replant.

**Dry planting:** Although we do not advise the use of chemical fertilizers due to their negative effects on the soil; farmers who use such fertilizers should not mix the fertilizer with seeds because the chemical fertilizers burn (scorch) the seed if there is no moisture in the soil. This leads to failure in germination. The best practice for farmers who plant early is to plant the seeds alone and later on apply the foliar fertilizers especially organic ones to provide the nutrients required for growth.

**Nutrition:** For the first seven days, maize seed does not require any nutrients as it uses the nutrients within the seed itself. A good practice is to apply fertilizers at the beginning of the third week because by this time, the seed has utilised all the nutrients within itself and also the little nutrients in the soil around it. Many farmers who practise this type of planting have noticed a great improvement in their maize. Other important practices farmers should keep include the following:

**Field selection:** Practise crop rotation to enhance soil fertility as well as to reduce incidences of pest and diseases occurrence. Divide your farm into blocks and rotate crops from different plant families such as maize, beans, potatoes, onions and sweet potatoes. Select a field where maize was not planted in the previous season.

**Variety selection:** Before planting, it is important to buy maize seed that is suitable to your area



To avoid leaching of nutrients organic fertilizer application can be done 2 to 3 weeks (see below) after planting and also at knee height

– (for proper maize seed selection, please refer to TOF March 2017 article). Always buy seed from recognized agrovet shops.

**Land preparation:** Depending on the location, land preparation for the long rain season usually starts in late February. Early rains fall from mid-March. To get a good clean seedbed two or three ploughings are necessary. Ensure you remove couch - grass with folk *jembe*. Good tillage should enhance water infiltration and reduces erosion.



Ensure that rows are dug along contours to minimize soil erosion. Under zero tillage, land preparation involves uprooting all weeds.

**Time of planting:** Planting early helps the germinating seedling to make use of 'Nitrogen flush,' enhance crop vigour and helps plants to protect plants from pest attack. Delayed planting leads to reduced yields because the plants will not get the extra nitrogen and germination will be slow when soil temperatures are low. There is a drop of expected yields of 1-2% every day when planting is delayed.

**Plant population and spacing:** For maximum yield, the spacing of maize is 75 cm between rows and 30 cm between seeds for all areas with adequate rainfall, resulting in a total plant population of 44,000. In the coffee zones, this can be increased to 75 cm x 25 cm giving a total plant population of 53,000 plants/ha. In dry or marginal areas, the recommendation is to increase spacing to 90 cm between rows and 30 cm between seeds giving a total

population 37,000 plants per hectare. The approximate seed rate is 10kg/acre. Over planting of crops leads to competition for light and nutrients. **Fertilisation:** Apply animal manure 30 days before planting and spread it evenly in the planting ridges. Ensure that the manure is well rotten to avoid generating heat which would scorch the germinating seed. Pure ground rock phosphate can be applied to soil or to the compost as a source of phosphorous (whenever you use rock phosphates, add humic acid to speed up the uptake of phosphorus by maize).

**Planting:** Maize is planted on hills or in rows, on flat land or on ridges depending on the soil type. On heavy soils ridging is advisable to improve drainage. The depth of planting is commonly 5-10 cm. Deep sowing is recommended on light and dry soils. The depth of planting should be deep enough to protect the seed from birds, field rodents and prevent seeds from germinating at the fall of light rains. The depth should also be shallow enough to allow the seedling to reach the soil surface before finishing its food reserves.

At planting, place a handful of compost manure in planting holes. Cover manure with soil, place the seed and cover the seed with soil as the top cover.

Under zero tillage, 30% of the soil should be covered with plant residue after planting to reduce water erosion.

**Inter cropping:** Maize does well when intercropped with beans or other legumes. The intercropped legumes are sown at the same time as maize. Intercropped legume should be planted in between maize rows. Recommended legumes for intercropping with maize in Kenya are beans, pigeon peas, cowpeas, soybeans and groundnuts. The benefits of intercropping maize and legumes is that intercropping helps to reduce the risk associated with the failure of a particular crop, reduces the risk of pest and disease attacks, improves soil fertility and contributes to a balanced diet.

**Weed control:** Maize is very sensitive to weed competition during the first 4-6 weeks after germinating. It should be planted as soon as possible after the preparation of the seedbed.

For more information on maize farming <http://www.infonet-biovision.org/PlantHealth/Crops/Maize>

## Recommended spacing and plant population by zone

Zone/growing areas	Spacing	Plants population (Plants/ha)
Tea	75 cm X 30 cm	44,000
Tea/Coffee	75 cm X 30 cm	44,000
Coffee	75 cm x 25 cm	53,000
Maize/sunflower	75 cm x 30 cm	44,000
Sugarcane	75 cm x 30 cm	44,000
Marginal/cotton	90 cm x 30 cm	37,000

# Maintain hygiene to avoid food poisoning

Poor food handling, during preparation, cooking, storage and eating is responsible for food poisoning. Maintaining hygiene can prevent most cases of food poisoning.

**Linah Njoroge** | Have you ever had an experience about food poisoning? For most people who have had, it is not one of the best experiences. Food poisoning can cause very severe and debilitating symptoms or death. Sometimes people have eaten food and later fall sick. Unfortunately, they may not associate the sickness to food poisoning.

Some of the most common symptoms of food poisoning include diarrhoea, nausea, vomiting and stomach pains. If untreated it becomes more severe with signs of feeling weak, fever or chills, sweating and headache. Some of the food poisoning symptoms may appear shortly after eating the contaminated food while others may take a few hours to manifest.

## It is not easy to tell contaminated food

Symptoms of staphylococcus (bacteria) food poisoning usually appear between 1 and 8 hours after eating the infected food. The most common cause of food poisoning is bacteria. However, there are other causes of food poisoning including viruses, chemicals or poisonous metals such as lead or cadmium.

The reason why most people are caught unaware by food poisoning is because most of the time, food that is contaminated with harmful bacteria does not always look, smell or taste bad. However, it is important to know that there are certain foods that are more likely to cause food poisoning than others. These include chicken, meat, seafood, eggs, cooked rice, ham, salami, milk and all dairy foods. Therefore, such foods need to be handled, cooked and stored properly.

## Chicken prone to contamination

It is important to have your meats cooked thoroughly before eating. Otherwise, there is always a high risk of eating meat that is already contaminated. For example, chicken is known to have salmonella if not well cooked and can cross contaminate other foods if



Women prepare food for a public function: Maintaining hygiene in food preparation prevents food poisoning

not handled well. Chicken should also not be kept in the fridge for more than two (2) days. When re-heating chicken leftovers, it's important to make sure it is steaming hot. Re-heat chicken only once.

## Salmonella poisoning

People can get salmonella food poisoning from poor food handling practices at home or in food outlets. Seafood caught in polluted water or eggs from dirty shells, meat or poultry which has been contaminated by poor food handling before it gets to the food outlet can cause food poisoning.

Salmonella food poisoning takes up to 48 hours to develop after the food is consumed. Symptoms include nausea, stomach cramps, diarrhoea, fever and headache which may last between 3 and 21 days. It can cause death in very young, weak and elderly people.

Food poisoning bacteria is known as clostridium, a bacteria found in the soil and in the intestines of animals, including cattle, poultry, fish and humans. It is important to know about food poisoning caused by clostridium bacteria because these bacteria are common in the environment.

## Food poisoning can cause death

Clostridium food poisoning symptoms occur about 12 hours after eating the contaminated food. Symptoms include stomach pains, diarrhoea and sometimes nausea and vomiting. Symptoms last about 24 hours. A severe type of bacteria that has extremely poisonous toxins called *Clostridium botulinum* may cause death

within 3 – 7 days if not properly treated.

## Reduce chances of food poisoning

Food handling is also very important in reducing the risk of food poisoning through contamination. Washing your hands with soap and drying them on a paper towel or with a clean cloth is the best way to stop the spread of bad bacteria when handling all foods. Incorrect food handling and storage can cause contamination with disease-causing bacteria especially in places such as in a factory where it is processed, from the truck in which it is taken from the factory to the shop or food outlet such as canteens or take-away shop or even between the shop and home.

## Food preparation

Since most food has to be prepared before it is eaten, poor handling by people, or unhygienic practices can cause food poisoning bacteria to be deposited on the food. Some of this poor or unhygienic practices include leaving food uncovered and therefore being contaminated by flies, cockroaches, pets and other insects that not only carry germs but also food poisoning bacteria.

## Food handling can cause poisoning

A food handler may contaminate the food through any of the activities such as touching parts of the body. For example, scratching a pimple or picking their nose, touching a sore, pushing hair back.

Sneezing or coughing near

uncovered food is also an easy way of transmitting bacteria. Licking fingers while handling food can also result in these bacteria being passed on to the food as human saliva carries *staphylococcus* bacteria. The most common way that handlers contaminate food is failure to wash hands after visiting the toilet and later handling food.

## High risk food need proper handling

Poor handling of high risk foods is a common cause of food poisoning. High risk foods include raw meat products, chicken, duck and other poultry products, fish and shellfish, eggs and egg products, dairy products (milk, cheese, cream), unpasteurized cow or goats milk and gravies. High risk foods are those which generally need refrigeration and have a high moisture content.

Certain foods will always contain some bacteria and poor handling of these foods may result in cross contamination. Cross contamination is the passing of bacteria from contaminated food to uncontaminated food. Cross contamination can occur when storing or handling food.

## Cross contamination can cause poisoning

For example, if a high risk food such as raw chicken that is thawing in a refrigerator is placed in contact with cooked meat the bacteria from the raw chicken will contaminate the cooked meat.

Cross contamination can also occur during handling. This can happen if one uses the same knife and chopping board for fish or chicken that may have salmonella. Cross contamination can occur by use of the same board and knife used for cutting fruits and foods that are eaten raw like vegetables, ham, tomatoes among others.

The bacteria from the fish will be left on the knife and cutting board and transferred to the food. Correct food handling practices and food storage helps prevent bacteria from contaminating and multiplying on foods. One of the best ways of preventing episodes of food poisoning is by always washing hands before handling or eating food.

For more information on hygiene and sanitation [http://www.infonet-biovision.org/hygiene\\_and\\_sanitation](http://www.infonet-biovision.org/hygiene_and_sanitation)

# Water project restores hope for Ukambani residents

Residents of Mbitini and Nguu Masumba wards in Makueni County faced an acute water shortage for many years. However, an Anglican church project has changed their lives for the better by constructing two dams where they get enough water for domestic use and for irrigating their land.

**Venter Mwangera** | Water is a precious commodity. It supports life on earth. Humans, animals, plants and all other living organisms in the environment cannot live without water. Without water, no life can be sustained on earth. As a scarce commodity, water comes through rain which can be harvested and stored for irrigation, domestic use and for wild birds and animals.

Many regions of lower Eastern in Kenya are semi-arid and suffer from an acute water shortage. The weather condition in the region has been made worse due to the impact of the climate change. In Mbitini and Nguu Masumba wards, Makueni County, water shortage was a severe problem.

## Long queues for water

"Women and children suffered the most. The nearest source of water was a well dug on a seasonal river which was more than 4 hours walk to and from the river. The queues at the river too took more than six (6) hours before one's turn to fetch the water came," says Ms Esther Musili, Executive Director of the Anglican Development Service Eastern (ADSE). ADSE came to the aid of the residents in the two wards.

ADSE received funding from UKAID and USAID to construct dams for harvesting water for irrigation to improve the livelihoods of farmers' groups and residents of the two wards.

## Intervention measures

After ADSE conducted a feasibility study, high poverty levels in the region were revealed. ADSE decided to take measures to alleviate the suffering of the people in the two wards. Ms Lydia Muithya, Climate Change Project Manager, ADSE says, "The project was initiated to provide people with water and impart knowledge on sustainable farming skills."



*Sand dam in Nguu Masumba ward where farmer, Mr Bernard Mbulu among other farmers fetch water for irrigation purposes. More than 11,000 humans and animals besides wild animals and birds have benefitted from this sand dam*

The project made a sand dam in Nguu Masumba Ward and a water harvesting dam on rock catchment area in Mbitini Ward to benefit more than 3,252 people, 6,300 cattle, 11,100 goats and sheep beside the countless wild birds and animals.

"The sand and the water harvesting dams in the two Wards cost at least Ksh 9.8 million to construct. I'm happy when I see smiles on the face of the beneficiaries. Time spent on the road in search of water has drastically decreased," adds Muithya.

## Testimonies of the beneficiaries

Mr Bernard Mbulu is a father of three (3). He struggled to put a meal on the table for his family, "Five (5) years ago, life had lost meaning to me. As a man, I felt inadequate since I could hardly provide a meal to my family. I had land, but, no water to practise any farming activity. Rains were scarce and would fall once in a whole year. Even when it rained, the soil was too thirsty to allow any crop to grow. Look at my land now, it's all fruits and vegetables," he says.

Mr Mbulu is now a successful farmer. As one of the beneficia-

ries of the sand dam project, he practises horticultural farming, poultry, goats, sheep and cattle rearing. "From horticulture farming, I fetch at least Ksh 200,000 in a month. My children are now back to school, my family's nutrition and income has improved and they are happy." He confesses.

## School enrolment grew

A leader from Nguu Masumba ward Chief Fred Kinyae observes that many schools in the ward have seen pupils' enrolment go up and their academic performance improved. "Kwangiti Primary School is one of the schools that have benefitted from the construction of this dam. The school has opened a boarding section for pupils to concentrate more in their studies since water is available." He confirms.

Many pupils stopped going to school because they wasted much time in search of water. They could spend a whole day walking more than four (4) kilometres to fetch water and more than six (6) hours queuing to fetch the water.

Patrick Musyoki and Daniel Kimaili, both Chairmen of Ward Climate Change Planning Committees unanimously agreed that

the best gift both wards received was providing water to the residents.

Ms Ann Nduto, the Administrator for Mbitini ward was full of praise to ADSE for constructing water harvesting dams. "The water harvested has eased struggles for women and children. They used to walk long distances in search of water from a seasonal river and it wasn't enough. Today, look at the glowing faces of women. It is a testimony that their lives have changed for the better." Says Ms Nduto.

## Improved hygiene

A population of more than 7,500 people in Masue ward can now irrigate their land throughout the year ensuring food security for the families.

Ms Nduto revealed that hygiene has improved tremendously; cases of amoebiasis and other water-borne diseases due to an uptake of unclean water are now negligible. "Water from the river wasn't treated. Many families suffered many diseases brought about by drinking dirty water. Today, we can attest that the dispensaries in the ward treat other diseases. But, not water-borne diseases since the water from the dam is clean." The ward Administrator stated.

She reiterated the need for each home to have at least two (2) 10,000 litres' tanks to make water shortage history.

## Donors brought hope to farmers

Steven Mackel a consultant from UKAID said that helping the smallholder farmers with water was an investment worth replicating in other wards to improve the livelihoods of small holder farmer.



*Mr Bernard Mbulu showing off his mangoes grown through irrigation using water from the sand dam*

# Is it possible to eradicate weeds without using chemicals?

How can I control weeds organically?

Dear Farmer,

Weeds are plants that grow faster than crops where they are not wanted thereby inhibiting the growth of crops. Since they are competing for space, water, nutrients and sunlight. Controlling the weeds is therefore important to help reduce the competition. Weeds harbour pests and diseases. Weed management through organic techniques requires those methods that do not use chemical pesticides or affects health of the soil, plants and the environment. Controlling and managing weeds on organic farms focuses on the prevention of the development of the weeds. Prevention aims at keeping new weeds at bay and ensuring those that are already there do not spread or move to other places.

Weed management requires one to be aware of how the weeds grow such as through the seeds or the spread of the rhizomes (roots systems) and stolons (stems). Weeds that grow through seeding should be managed before they flower. This is because once they flower and develop seeds, they may germinate immediately while others stay dormant in the soil before germinating. Some weeds have rhizomes found beneath the soil that develop into new plants and others have creeping stems that form roots at the nodes producing new plants. Some of the methods used to control weeds organically include:

**Mulching:** Mulching inhibits the growth of weeds by ensuring that little or no light penetrates into the soil surface. Since the mulch acts as a barrier on the soil surface, weeds that develop beneath the mulch lack enough light to survive.

**Cover crops:** They suppress the weeds by preventing light penetration to the soil surface. Hence, suppressing weed growth and lowering soil temperatures. Cover crops also compete rapidly with the weeds for space, light, water, and nutrients preventing their development.

**Uprooting:** The uprooting of weeds in a cultivated farm is a common practice used in the management of weeds. The weeds should be uprooted before they start flowering and seeding to prevent seeds from falling on



Farmers weeding a tomato field at a farm in Kenya

the ground. The uprooted weeds can be used as mulch and the poisonous weeds should be buried.

**Minimum tillage:** Minimum tillage of the soil prevents digging up of buried weed seeds that are likely to germinate once they come near the soil surface. This

should be avoided. During the dry season, drips in the drip irrigation systems should be placed near the crop to reduce weed access to water preventing their development.

**Hand weeding:** Weeding manually if done well can elimi-

nate weeds completely. When weeding, ensure that no part of the root system remains in the soil to stop the weeds from sprouting.

For more information on weed control <http://www.infonet-bio-division.org/PlantHealth/Pests/Weeds>

## Soil tests is a routine procedure in all farms

Does my land have to be tested to be certified as organic?

No. If you would like to convert your farm into an organic farm, your farm has to be assessed by an inspector from a reputable and recognized organic certification company. After the assessment, the company will charge the requisite fees for the service after which, they will provide you with the requirements that you need to meet to become fully organic enrol to organic farming.

If you meet these conditions, your farm will be classified as being under conversion from a conventional to an organic farming - a process that takes place for two to three years. During this period of conversion, the farmers can still sell their products as organic. But, they must indicate that their produce is under conversion.

### Integrity expected

During the conversion period, the inspectors from the certification company will visit your farm regularly to ensure that you are keeping to the standards of organic production. The entire process of certification requires trust, seriousness and transparency. If a farmer cheats, for example, by using prohibited products such as chemicals instead of organic remedies in



A KALRO scientist sampling soil

pest control; they lose their certification and their produce can no longer be recognised as organic. The certification company may also lose its licence to do any further certification of organic produce. If they compromise on the quality control measures.

### Soil tests a standard practice

After the conversion period is over, an organic farmer is now considered fully organic and receives a certificate showing his produce is now certified. The testing of soils may be done during the conversion period upon the farmer's request. But soil tests are just part of normal farm management practices for

any farmer, whether they practise conventional or organic farming. One reason why farmers carry out soil testing is to find out if the soil has the right nutrients to support the growth of the particular crop they are interested in.

### Organic practices maintain soil fertility

It is always advisable to carry out soil tests after every two (2) or three (3) years. One reason for doing soil tests is that the crops you plant take away most of the nutrients in the soil. It takes very long for these nutrients to be restored back into the soil. Luckily for organic farmers, the recycling of farm waste combined with crop rotation and intercropping helps to restore most nutrients into the soil. We have always advised farmers to ensure that all crop residue should not be burned or fully taken away to feed animals. Farmers should leave most of the residue on the farm to return the lost nutrients into the soil.

After harvesting the current crop, ensure that some of the maize or beans residue is left in the *shamba*. During land preparation, ensure the residue is either worked back into the soil or left on the surface where it can act as mulch until it decomposes.

Answers by Elkanah Isaboke

## 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.

# Catfish rearing is easy and can bring income

**Charles Kimani** | Fish farming is a lucrative business that has a ready market. Thanks to the growing popularity of fish in the country. The common fish species in the country are tilapia, Nile perch and catfish. For individuals seeking to engage in fish farming, the catfish is a viable option as the species is resilient to harsh climatic conditions and feed on a wide variety of feeds.

### Getting Started

**Pond Construction:** Pond construction is the first step in preparation for fish farming. The pond should be shallow (about 0.5m deep). The bottom should have a slope with a drop of 2cm for every 1m long. The slope should be gentle to achieve proper drainage. It is advisable to engage the services of a professional in setting up the pond.

**Source of water:** The first thing to consider is the source of water. In an ideal situation, the source of water is a natural body such as a river. But, where this is not possible, creative ways of water harvesting such as water pans can be tapped into.

The inflow and outflow should be equal to the pond volume over the period of one



A catfish (above). Feeding fish (Below right)

month. If the inflow is too low, water quality may suffer from oxygen depletion or accumulation of toxicants. Similarly, if the water outflow is too high, large amounts of beneficial algae may be flushed out from the pond. The pond should be full throughout the culture period.

**Soil quality:** Top soil is high in organic material and should not be used to construct pond dykes. Land should be composed of good quality soil, with little or no rocks. Areas with

rocky, gravel, or sandy soil are not suitable for pond construction. The soil should be composed of 20% clay to minimize evaporation.

**Fingerlings:** Catfish fingerlings are available from local hatcheries including the government-run Kenya Marine and Fisheries Research Institute (KEMFRI) and private hatcheries such as the Makindi fish farm in Thika.

**Feeding:** Catfish need to be fed well to achieve the desired weight and to prevent them

from feeding on other fish as they are carnivorous. Fortunately, Catfish feed on a wide range of foods, including: food remains, worms and algae. Protein is the key component when it comes to achieving the desired weight. Feeds rich in protein such as cotton seed cake should also be included.

**Market:** Depending on the production scale, one can sell Catfish in local markets and restaurants. A mature catfish weighing 1kg can fetch Ksh 500 while a fillet is sold for Ksh 700.

### Quick facts on Catfish

- Takes 8 - 10 months to mature
- Can fetch a market price of between Ksh 500 -800.
- Feed on cotton seeds, algae, tilapia, water plants.
- Catfish do well in high temperatures.
- Catfish are rarely affected by diseases.

### Where to get catfish fingerlings

Makindi Fish Farm: 0770 377 783  
Kenya Marine Research & Fisheries Institute. <http://www.kmfri.co.ke>

## Plant sweet potatoes to take advantage of the rains

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After this period, vigorous growth of the vines causes rapid and effective cover-age of the ground surface and smothers the weeds present. Two hand weedings after planting are recommended. First weeding is done within 2 weeks after planting and the second weeding is done two weeks after the first weeding when earthing-up is being done.

In the next series we shall focus on harvesting sweet potatoes, post harvest handling and value addition of sweet potatoes.

**Source: Complete guide on sweet potato farming in Kenya-Helen Omondi Kaundo**

For more information on sweet potato farming <http://www.infonet-biovision.org/PlantHealth/Crops/Sweet-potato>

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