The Organic Farmer

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Photo: IN

Forest destruction: Illegal logging, charcoal burning and encroachment has drastically reduced forest cover in Kenya

Plant trees to protect our environment

Peter Kamau | We are again in the month of April when most farmers are either planting various crops or weeding. It is also a good time to plant trees to restore the tree cover and protect the environment. For about three decades to date, there has been mass destruction of forests bringing the total forest cover to less the 5 percent. The United Nations recommends a forest cover of minimum 10 percent. Although the government has this as its policy and says that tree cover has increased to 7 percent, the results on the ground tell a different story.

Like other countries, Kenya is hard hit by the effects of climate change. The rain patterns have changed while temperatures have gone up bringing a resurgence of pests and diseases. Further negative effects have increased frequency of droughts and flooding in many countries. Additionally, the increasing population has put pressure on the few trees remaining in our forests on which they depend for firewood, charcoal and building materials. Many landless people have encroached on forests converting huge swathes of land to *shambas*, often cutting down trees to create more land for farming.

But, the most surprising observation is that most Kenyans including farmers do not plant trees. If every farmer decided to plant, for example, 10 trees every year, the forest cover outside the gazetted government forests would increase within a few years. This would ease the shortage of firewood, charcoal, timber, building materials, restoring water in all water catchment areas while reducing biodiversity loss.

Pupils plant trees in their school

In the last few weeks, we have seen renewed effort by the newly appointed Cabinet Secretary for the Ministry of Environment and Forestry, Mr Keriako Tobiko calling for a stop to a further destruction of forests in the country, a move that has led to the interdiction of several forest rangers and officials. As we have said before, corrupt forest rangers have been responsible for the massive destruction of Kenya's forests through protection of illegal loggers, charcoal burners and saw millers who cut down trees and transport them out of forests at a fee. We hope this new effort will reduce the destruction of forests.

Dear farmer,

Kenya's agriculture is at a very critical point. The fact that the government has made agriculture one of its key projects in the next five years is a clear indication that the policy makers have recognised an important role played by the sector. A country that cannot feed itself lacks the self-pride to claim that it is independent. For many years now, Kenya has had to import food to meet its food requirements. The country has all that is required to produce adequate food.

However, there has to be a major policy change in the way the government handles food production. It cannot continue to do things the same way and expect to achieve different results.

The planting season started last month. Yet, many farmers who delivered their maize to the National Cereals and Produce Board (NCPB) cannot buy inputs because the government is yet to release funds to process their payments. This clearly shows lack of proper planning on the part of the government.

If we were to have a drought next year, the same government will spend billions of Ksh importing food. One wonders where the same funds which are unavailable to pay farmers now will come from to import food then.

As we produce food, we also need to take care of our environment. The ongoing rains will wreak havoc on many farms carrying away the top soil, which, is the most fertile soil for food production.

Farmers need training on how to conserve their soils to maintain soil fertility. They should also know that about 70 per cent of chemical fertilizers used in planting maize will be lost through evaporation and leaching of nitrogen, which is an important nutrient during the maize growth phase. That is one of the reasons why we encourage farmers to go for organic fertilizers or foliar feeds which are easily absorbed by crops with minimal loss.

Farmers should also plant trees, because control of soil erosion is one component of environment conservation. Trees planted on sloppy land could also provide firewood and building materials. Statistics show that 255,000 trees are cut down every day across the country. Yet, very few trees are planted to replace them. At this rate, the country is being transformed into a desert.

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There are many ways to add value to sweet potatoes

Many farmers sell sweet potatoes immediately after harvest. But, sweet potatoes can be dried and milled into flour. They can also be cooked in different ways to make them delicious.

Amina Day Ojijo | In our continuing series on sweet potatoes (*Ipomoea batatas*), we focus on harvesting this crop and adding value to increase options of products. Harvesting usually begins three to four months after planting depending on the variety.

Many farmers know that sweet potatoes are ready for harvesting when the lower leaves start turning yellow followed by wilting. To some farmers, the cracking of the soil is an indication of the location of mature tubers.

Sweet potato muffins: *Farmers can make many products from sweet potato flour to increase their earnings*

Harvesting

Many farmers in Kenya practise piecemeal consumption to allow continuous harvest and preserve vines for future planting.

Since the roots spread 4 to 6 inches deep into the soil, harvesting of sweet potato after removing the vines is done by a blunt stick fork or hand hoe. The stick fork is used to loosen the soil (up to 18-inch diameter) to harvest the tubers.

The crop yield depends on the variety, good agronomical practices such as timely planting, weeding and the method of planting. An average yield of 10-20 tons per hectare (5 to 10 tonnes per acre) can be obtained under good management.

Sometimes, complete harvesting is done due to availability of a ready market for the crop.

Harvesting methods

Sweet potato vines can be harvested for use as vegetables two months after planting.

In many rural communities, hand and digger are the commonly and widely practised methods of harvesting sweet potatoes for home consumption and farm gate marketing. When a customer wants to buy sweet potatoes, a farmer goes to the fields and digs out the tubers. This kind of harvesting is demand driven. For large scale farmers, use of tractor-drawn platforms would be the best option to save on time and labour.

The process of piecemeal harvesting can only continue for about three months, depending on the variety and conditions in the farms. After this, any roots remaining in the soil will be prone to attacks by sweet potato weevils or other pests or even start decaying.

Be careful when harvesting

Care should be taken to avoid cutting or injuring the roots. The roots are then lifted out of the ground, separated from the main stem and temporarily left on top of the soil or put directly into a sack for transportation.

The tubers are also dug up using hoes in wholesale harvesting for commercial purposes or when land is being prepared for planting another crop. Whichever method of harvesting is used, it is important that the tubers are free of surface wounds and bruises which may reduce their storage life. Curing can also be done to promote healing of wounds inflicted during harvesting.

Curing and storage

Tubers are cured by subjecting them to temperatures of 27°C-29°C and relative humidity of 85%-90% for 4-7 days and then stored at 13°-16°C. In rural areas,

Continues on page 8

How to make sweet potato chips and flour

Step 1

- Choose undamaged and mature tubers which are three to four months old for the early maturing varieties and five to six months old for the late maturing varieties.

  Choose any variety of the sweet potato tubers.

Step 2

- Wash the sweet potatoes in clean water in large buckets, changing water as frequently as required.
- Do not peel the roots because the peel is rich in nutrients.

Step 3

- Drain the washed sweet potatoes on a raised and perforated rack to dry all the water on them.

Step 4

- Cut into chips the washed sweet potatoes to a uniform size (3-6 mm thick).
- You can slice them manually with a sharp knife or use a manual or motorized chipper to speed-up the process.

Step 5

- Sweet potato chips should be evenly spread on a raised platform, place them on a clean, black plastic sheet to dry under maximum sunshine for about six to eight hours – it is best to do this during the hot and dry season.
- To ensure high-quality chips, solar dryers can be used. A modified solar dryer, called a hybrid solar dryer, has an additional energy source, such as charcoal, and can be used to dry chips. Information on the availability of fabricators of chippers and solar dryers can be obtained from your local extension officer or national agricultural research station.
- Chips should be dried until they are brittle.
- If drying in the open, cover chips with netting to keep off flies and birds.
- Pack chips or continue processing to flour.

Step 6

- Mill (grind) dried chips to flour using the ordinary *posho* mill.

Step 7

- Pack dried chips or flour in strong (thick gauge) black polyethyene bags. Flour can be packaged in 2kg packs for distribution to shops and other retail outlets.
- Label products to a state where they were obtained, date of manufacturing and expiry date (usually after six months).
- Place bags of dried chips or flour in cardboard cartons to protect them from light.

Step 8

- Store in a cool, dry place, preferably on pallets or raised surfaces.
- Flour can be stored for six months.

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 or Biovision Africa Trust (BvAT).

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Stop soil erosion to increase crop yields

Soil erosion takes place in every farm every year. But, its effects are only felt through decreasing yields and open water channels that take away the fertile top soil leaving poor soils that cannot support crop production.

Rachael Wangari | With the onset of the heavy rainfall, bare and loose soil is more likely to be broken down by the raindrops. It makes it easy for the soil to be washed away by the runoff water.

Soil erosion in cultivated lands takes place unnoticed in many seasons. This leads to increased loss of the fertile top soil which is rich in organic matter content.

This leads to an exposure of top soil resulting to reduced water infiltration into the soil, poor drainage and also low soil fertility. The most common form of soil erosion is the splash erosion from raindrops, sheet and rill erosion (rills are small water channels). Rill erosion is more prevalent in maize monocrops where the water flowing through the maize stalks forms micro rills which over time develop into rills on the land.

Photo: TOF

Farming on sloppy land in Sambalat, Elgeyo Marakwet County: *A lot of top soil is washed away when farmers fail to take soil conservation measures*

Factors influencing soil erosion

Type of soil: Loose and very fine textured soil are more likely to be carried by runoff water compared to coarse-textured soil. Hence, knowing proper management practices would best control soil erosion. (*Look out for the next issue on proper control practises of soil erosion*).

Poor ploughing of land: Opening up soil during ploughing leads to the disintegration of the soil particles and this forms fine loose particles that are highly prone to soil erosion. No-till form of planting is highly recommended.

Cropping systems: Cropping systems such as monocrop system (where one crop is planted for many years) mainly for row crop and those that do not provide sufficient soil surface cover, leave the soil exposed to soil erosion. Also, farming systems where land is left bare make the land highly vulnerable to erosion.

- **Farm characteristics:** The slope and the steepness of a farm usually have high chances of soil erosion depending on the slope of the land. Erosion is accelerated with improper tillage practices on lands with such gradients.

Impacts of soil erosion

- Reduced ability of the soil to store and infiltrate water and nutrients. Leading to a decline in productivity of the land.
- Exposure of subsoil, which often has poor physical and chemical properties. This reduces the capacity of the soil to support plant growth. This is because the development of roots is hindered due to the shallow depth of the soil. Exposed subsoil also has a tendency of losing soil moisture rapidly through evapotranspiration.
- Higher rates of runoff, shedding water and nutrients. High runoff is caused by reduced infiltration and percolation rate of water leaving most of the water flowing over the land. The high runoff will also accelerate the loss of nutrients in the soil.
- Newly planted crops are likely to be washed away by the runoff water since they are poorly anchored on the eroded soil. Hence, the unstable roots are easily uprooted.
- Deposits of silt in low-lying areas and water bodies lead to siltation of watercourses and water storages (like clogged dams) as well as a reduction in water quality and quantity.

Sketch: Igah

Well-managed land: *Terraces used in contour farming help to stop soil erosion increasing soil fertility, crop yields and income*

Ways of controlling soil erosion

Cover crops: Planting cover crops as well as ensuring that the soil is not left bare is essential in controlling soil erosion since the soil will not be exposed to the runoff water. Surface cover also reduces the impact of raindrops and the speed of the runoff water. Hence, reduced detachment, movement and deposition of the top soil. A farmer can make use of cover crops or crop residue.

Some of the cover-crops mostly used are the sweet potato vines, legumes such as beans and peas which also help in nitrogen fixation in the soil. These help to reduce the use of nitrogenous fertilizers. Dry material commonly known as mulch is placed on the soil surface. The organic mulches cover the soil reducing further loss of soil through erosion. Examples of crop residue include maize, beans or sorghum stalks among others. Other than preventing soil erosion, the mulches conserve soil moisture and enhance soil fertility when they decompose.

Tillage practices: Zero tillage is the best soil management practice to control soil erosion. It minimizes the use of mechanical tools that are likely to compact the soil leading to reduced infiltration, high surface runoff and increased soil erosion. With reduced tilling of land, most of the organic matter is retained in the soil.

Contour farming: This ensures that the soil structure and infiltration reduces soil erosion. In sloppy land, contour farming is recommended since land is tilled across the slope. Contour farming with hedges slows the speed of runoff water, giving it more time to infiltrate into the soil and reducing the impacts of soil erosion on the land.

Terraces: Terraces are used in controlling erosion in sloppy lands where natural or man-made terraces are used. Natural terraces use grass strips which are planted across the slope and along the contours with the spaces between the strips being cultivated (*see sketch left*). Grasses with fibrous roots are recommended for terracing. An example of such grass is the Napier grass, vetivar grass and brachiaria. Such grasses with fibrous roots hold the soil more firmly.

For more information on soil management http://www.infonet-biovision.org/soil_management

Plant trees to restore our disappearing forest

Every year, farmers can plan to
plant at least 10 trees in their farms
along hedges, boundaries and even
woodlots for those who have space.
after planting, trees need good care
to reach maturity.

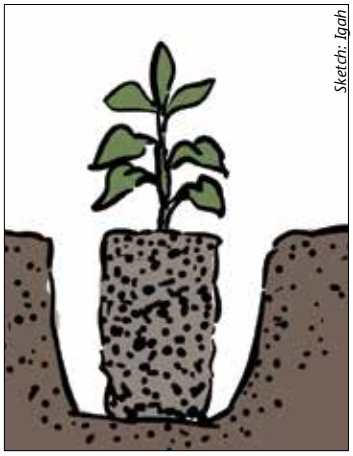
Ian Luvayo | Trees have many uses and that is why it is important to plant them. They can be used as food for both humans and animals, firewood and as shade for both people and animals. For small scale-farmers, growing of trees is important because trees have the ability to stop soil erosion leading to improved soil fertility. Most of the tree species are not easily affected by drought as they use their roots to get water from deep into the soil. They can grow almost anywhere including on hills and rocky places. Trees offer home for wild animals, shade to both humans and animals, regulate the temperatures, shields homes from direct strong winds. Some trees are sources of food and fruits for both humans and animals among other benefits.

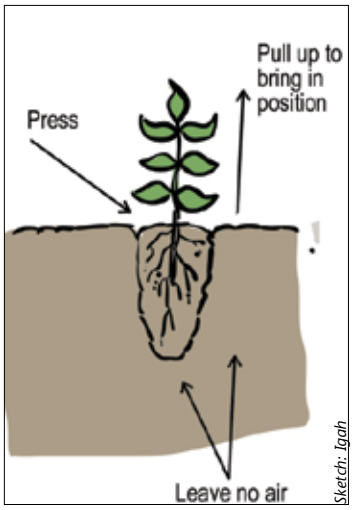
However, tree planting has not been fully embraced because they take time to grow. For fruit trees, for example, they at least take a period of two years before they start bearing fruits.

Agroforestry

This basically means the growing of both crops or pastures and trees in the same field. It has been a common practice for fruit trees to be planted alongside crops or pastures such as tree lucerne. Mixed cropping offers diversity and restores soil fertility. Trees have the ability to draw up water and food using their roots from deep down in the soil while the pastures assist in keeping the soil fertile and cool.

Leguminous trees are the better crops when intercropping. This is because they produce nitrogen to be used by the soil and their leaves can be used as mulch. Trees such as *Acacia albida*, if grown in hot areas should be left to remain in the fields because it enriches the soil. Alley planting (in rows) is one of the systems used in agro-forestry. Here, the trees offer supply of wood, nitrogen-rich mulch for the crops and


Sketch: Igah



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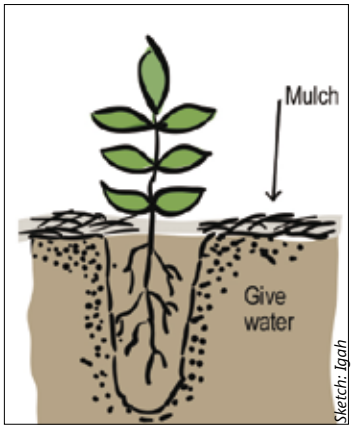

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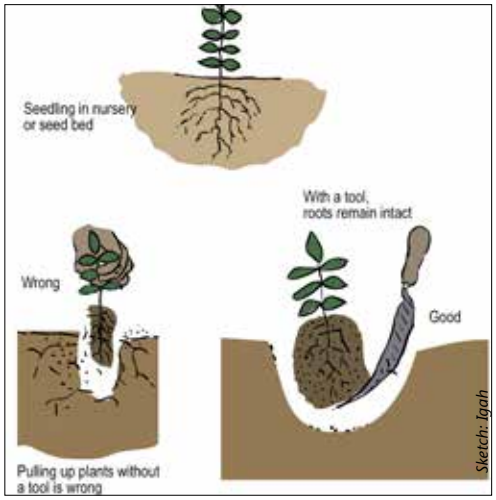

Sketch: Igah

draw up nutrients from deep down the soil profile.

The trees in this system are planted 2-5 metres apart. If it is on a sloppy land, contours can be planted with crops such as pumpkins, bananas and sugarcane in wet areas. Alley-trees should:

- Be a legume, so as to fix nitrogen from the air.
- Grow fast so as to leave lots of leaves.
- Have the ability to regrow (coppice) strongly after being cut.
- Grow from seeds.

After a year, farmers can cut down these trees and use their woods as poles in their farms and their leaves put on the lanes of annual crops. This process is to be repeated after each season. The most promising kind of leguminous trees are; tree lucerne, Sesbania sesban, calliandra and leucaena.

Spacing: Before planting, farmers should know the spacing requirement for each type of tree. When planting, for example, pawpaw trees should be 3 metres apart, mangoes should be 7 metres apart while avocado trees should be 7 - 10 metres away from each other. However, when the trees are young, a farmer can plant crops between the rows.

Digging holes: Dig a hole 60cm square and 60cm deep for about 4 weeks before planting the tree. The hole has to be square to allow the roots to grow towards the corners and spread out in the soil. About 30cm of the top soil should be dug out and put on one side of the hole and 30cm of the bottom soil should also be dug out and put on one side. This is because the top soil has more nutrients and beneficial bacteria that break down nutrients for uptake.

The top soil should be mixed with half a wheelbarrow full of compost or farm yard manure and put into the bottom of the hole with the top soil from another place. Compost or manure should not be used in if it is not well composited as it will burn the seedling. If you use slurry (liquid farm yard manure) it should be applied some distance away from the base of the seedling since it can also burn the young seedling.


Always protect young trees from damage by animals


In dry areas seedlings should be planted in basins to trap water

Trees for animal feed

Leucaena: Leucaena is a bush tree which is very rich in protein for animal feed and can either be eaten off the bushes or dried and stored as hay. It is nutritious for cattle, sheep and goats. However, it is poisonous to other animals such as pigs, chickens, rabbits and horses.

Leucaena does well in hot rainy places and is also drought resistant but, it does not grow in acidic soils. Leucaena tree has a lot of nitrogen which is good for soil fertility improvement. Its leaves can be used as fertilizer.

Woodlots: Farmers are advised to plant many trees in a woodlot. A woodlot is a special place set aside to put up a small forest in a farm. It is later fenced to protect it from goats and other animals. Examples of trees to plant in a woodlot include eucalyptus, cypress or indigenous trees that grow well in poor soils or dry places. Such trees and can be used as a source of firewood, posts or for building purposes. Planting a variety of trees will make the soil healthier rather than planting one type of tree.

For more information on Agroforestry http://www.infonet-biovision.org/agroforestry

Learn ways of preserving food to stop spoilage

You can preserve excess food for future consumption using various methods such as drying, curing, salting, smoking and even heating. Avoid food preserved using chemicals that may be harmful to your health.

Linah Njoroge | Food preservation is a term used to refer to any one of a number of techniques used to prevent food from getting spoilt. Food preservation methods include smoking, drying, pickling, canning, freeze-drying, irradiation (where sharp rays are used to kill harmful bacteria), pasteurization and the addition of chemical additives. Most of the techniques of preservation are meant to extend food shelf-life.

Food preservation can be traced way back to over 5000 years ago and some of the techniques used during the ancient times such as smoking, drying, salting, freezing, and fermenting are still in use today. Food preservation is an important component of the food industry as fewer people are able to eat all the food they produce.

Preserve food by heating

When food is preserved, then it is available for consumers for purchase. Such food can be made available even when it is out of season. Food preservation also prevents the food from spoilage and attack by pathogens (disease-causing microorganisms) such as bacteria and moulds. Preservation also protects the food spoilage through oxidation (combining with oxygen). One common method of preserving food is by heating it to a recommended temperature. This process prevents or retards spoilage because high temperatures kill most types of harmful bacteria.

Curing using salt and sugar

Curing is another method of preserving food that has been practiced for many years. This is where a high level of salinity is used to impair the conditions under which pathogens can survive. Curing can be accomplished in a variety of ways. For example, meat can be submerged in a salt solution known as brine or the salt can be rubbed on the meat by hand. Sugar appears to have similar effects to that of salt in preventing spoilage of food.

Photo: IN

Drying pineapples in a solar dryer: Drying excess farm produce prolongs their shelf life, preventing wastage

The use of either salt or sugar (and of certain other natural materials) is known as curing. A desirable effect of using salt or sugar as a food preservative is the pleasant flavour each compound adds to the final product. Curing is used with certain fruits and vegetables, such as cabbages (in the making of sauerkraut), cucumbers (in the making of pickles), and olives.

Curing is probably the most popular method of preservation of meat and fish. Honey-cured hams, bacon and corned beef. Another form of preservation that was practiced during ancient times and is still very popular now is fermentation.

Fermentation is a natural preservation method

Fermentation is a naturally occurring chemical reaction by which natural food is converted into another form by pathogens. It is a process in which food spoils, but results in the formation of an edible product. A good example of a most popular food that is liked worldwide is cheese.

Fresh milk does not remain in fresh condition for a very long period of time because some pathogens multiply faster than others. However, if well controlled the spoilage of milk can be controlled in such a way as to produce a new product such as cheese. Another product of fermentation is yoghurt and bread.

Chemical preservatives have side effects

There are many types and forms of chemical additives that are designed either to kill or retard the growth of pathogens or to prevent or retard chemical reactions that result in the oxidation of foods.

However, chemical preservatives have side effects. Consumption of some of the additives or chemical preservatives used to preserve food can also be detrimental to human health.

However, food preservation in itself can be a good thing as it ensures that there is food availabile even during off seasons.

Video: https://www.accessagriculture.org/solar-drying-pineapples

For more information on food preservation http://www.infonet-biovision.org/fruit_veg_processing

Photo: IN

Drying tomatoes in a solar dryer: *Many fruits, grains, nuts, tubers and even vegetables can be dried and sold when prices are favourable*

Simple rules to observe when handling food

- Wet the hands before applying the soap.
- Make sure you rub in between fingers and on the front and back of your hands. Remember to clean under fingernails.
- Rinse off with water.
- Dry your hands with a clean towel.
- Always wash hands after going to the toilet.
- Do not smoke while preparing food.
- Minimize the number of times you are touching food during preparation. If possible, handle food with tongs, a spoon or other clean utensil.
- Always cover your face with a tissue or the hands and turn away from the food when coughing or sneezing. Remember to wash your hands immediately after as they may have been contaminated.
- Avoid preparing food for others if you have diarrhoea or a flu.
- Do not leave food uncovered. Cover with a lid, clean cloth or cling film. Wrap to cover all the food.
- Do not let raw and high risk foods come into contact.

Zero-energy irrigation kit enables farming in dry season

The drip irrigation kit is simple to use, easy to maintain and can last longer than kits in the market. Farmers who have used it say they have managed to grow vegetables during the just ended dry spell.

Venter Mwongera | Climate change has altered weather patterns globally and most of the African countries are hit-hardest by the erratic weather patterns. During the rainy season, embracing water harvesting measures and prudent use of such water during the dry season through drip irrigation can be a relief to many farming communities. Irrigation allows continuous crop production throughout the year for both domestic and commercial purposes.

Drip irrigation kit enables a continuous supply of vegetables

More than 500 households of small-scale farmers in arid and semi-arid parts of Kenya have embraced the use of zero-energy drip irrigation kit. The small-scale farmers have experienced water shortage for many years forcing them to devise different ways of accessing water for irrigation.

Some farmers have dug wells from where they draw water. Due to lack of rains, the water table falls forcing farmers to dig deeper to get water. Mr Eric Mutie is a small-scale farmer from Nduni village, Kathiani Sub-County in Machakos County. He has practised small-scale farming for many years. "I have a passion for farming. But, rainfall is no longer predictable and when it falls, it's not enough for crops to grow well. I decided to dig a well to irrigate my land," he adds.

Photo: Venter Mwongera

Mr Mutie inspects the blockage in emitters on the zero energy drip irrigation system in his shamba

Mr Mutie knows the importance of saving and using water economically for maximum returns. "I use zero energy drip irrigation kit to grow my vegetables throughout the year. The drip irrigation kit has emitters that water a specific plant when water is switched on from the tank. Hence, there is no water wastage," he states.

The zero-energy drip irrigation kit is a drip irrigation system that uses gravity to water the crop. "I use less water for irrigation on my small parcel of land and I've vegetables for domestic use and for commercial purposes throughout the year," Reveals Mr Mutie.

How zero-energy drip irrigation kit works

Zero-energy drip irrigation kit is a technology that has emitters fixed at different parts of a water pipe. Once the source of water from where the zero-energy drip irrigation kit is connected is opened, the water flows through the pipe and to the crops through the emitters. The spacing of planted crops is equivalent to the space between the emitters.

Every drop counts

Each emitter waters a crop directly opposite it. This drip irrigation kit allows maximum use of water to irrigate crops leading to less wastage of water for a maximum yield.

"I bought zero-energy drip irrigation kit more than a year ago. To date, I've not repaired any part of it. I use it on a daily basis to water my vegetables for domestic and commercial use. I bought a kit at Ksh 39,000 and it waters 500 plants at once on an ⅛ of an acre. I'm happy about the investment," Mr Mutie says happily.

The zero-energy drip irrigation kit has Four-Way Tank Connector (FTWC) with 4 outlets. It has a sump that has a filter and a cleaning brush for sieving any sediment in the water before it flows through the pipe, to the emitters and to the plants. In cases where small sediments pass through the sump, pipe, to the emitters and clog the emitter and hinders water flow; the farmer can open the emitter and remove the sediments to allow the free flow of water to the crops.

According to Mr Chryspin Afifu, The Managing Director of Liquid Lever Kenya which supplies the irrigation kits says, "The zero-energy kit does not require connection to the electricity to pump water to the plants, no special tools are required, allows for mixed planting and support fertigation using bio-slurry."

"It only requires the tank where the water will come from to be raised one metre (1m) above the ground. Raised gradient allows proper functioning of the kit."

Zero-energy drip irrigation kit requires minimal manitenance. In case of a clog from any of the emitters, the clog is removed manually and water flow is restored. To allow slow flow of the water, the farmer can pull the rubber on the emitter forward and back if a high flow of water is required.

Mr Afifu explains that when the slow flow of water is set, the flow is 300 millilitres per hour per crop. "The farmer is able to calculate how much water to use each day," Mr Afifu explains.

Learnt organic methods from *TOF* Magazine

As an ardent reader of ***TOF*** magazine, Mr Mutie has learnt many farming strategies on how to grow vegetables without using chemicals. "I read from ***TOF*** Magazine how to prepare and preserve manure, natural pesticides to keep mosquitoes and other pests away from my vegetables. I also learnt about nursery preparation. My family now enjoys good health because of eating vegetables grown with no chemicals. Frequent bouts of flu, running nose that were rampant when I used chemical fertilizers to grow vegetables are part of my history," he asserts happily.

Mr Mutie has read ***TOF*** Magazine since 2013. "I borrowed my friend the magazine to flip through just to see what the message was. I've never missed a copy of the magazine since then."

Mr Mutie has already formed a farmers group of about 26 farmers whom he is mentoring to practice exclusive organic farming. "I'd like to subscribe for 11 copies of ***TOF*** Magazine to share with the farmers. I'd like to share the knowledge I've also learned from ***TOF*** Magazine with them. When they learn the various organic farming methods and apply to their farming activities, they will also enjoy a healthy lifestyle like I do and transform their families' health just like my family," he adds.

Contacts: www.liquidleverkenya.com, admin@liquidleverkenya.com

For more information on - www.infonet-biovision.org/EnvironmentalHealth/Water-irrigation

Photo: Venter Mwongera

The photo above shows a Four-Way Tank Connector

The emitters are adjustable from 300ml to 3 litres of waters of water per hour and can be pinched or squeezed to flush out trapped debris

Hygiene in chicken shed can reduce parasites

How can I control external parasites in my chickens?

Dear Farmer,

External parasites may be caused by the presence of rats and mice in the poultry shed. Infested wild birds may also come into contact with the chickens. Another cause of external parasites in chickens is warm and damp poultry sheds which encourage thriving of parasites eggs. This leads to higher chances of the parasites finding their way into the chickens' feathers including the eyes, ears and other parts of the chickens' body. The consequences of the external parasites infestation in chickens are discomfort, loss of weight and anaemia which lead to decline in egg production, growth rate, meat quality and feed intake. Infested birds may appear agitated because of the skin irritation caused by the external parasites.

External parasites can cause decline in egg production, growth rate and meat quality in chickens

Dry bedding a good measure

The most important measure you need to take to control external parasites in chickens is to maintain hygiene in poultry sheds. The dampness in poultry house can be controlled by sprinkling lime over muddy areas which is then mixed with the soil. Damp bedding including the chicken waste should be removed immediately and replaced with fresh, dry bedding. A farmer can do this by drying any grass or sawdust used as bedding under the sun before spreading it in the poultry shed.

Diatomite kills pests

Another control measure is to apply diatomite powder in areas where chickens take their dust baths. Studies have shown that adding diatomite kills external parasites. Diatomite can also be used to control internal parasites in chickens. Farmers are advised to add one teaspoonful of diatomite and add it in each cup of chicken feed. The studies established that chickens fed on diatomite had increased body weight, produced larger eggs with more yolk and albumen.

For more information:

http://www.infonet-biovision.org/AnimalHealth/Chicken-new-animal-welfare-information#simple-table-of-contents-4

Major causes of flower drops in fruit trees

I have a problem with flower abortion in my guava, pears and avocado trees. What could be the problem and how can I control it?

Flower abortion, which is flower drops is a major problem among many fruit growing farmers. There are many causes of flower drops in fruit trees. Fruit abortion may occur even when farmers are doing their best to manage their orchards.

For fruit trees such as avocadoes, flower abortion may be a natural occurence which takes place as the tree gets rid of excess fruits than it can hold to maturity. Natural flower drops ensures that the tree protects itself and the quality of its seed since the immature fruits are all competing for the same food and water.

For all avocado varieties, there are two seasons in a year when some of the fruits drop off naturally. This happens mostly when there is a heavy fruit set. In guavas, self pollination is common and this leads to fruits that are quite weak and may end up dropping off before maturity. Other causes of flower drops include:

Use of chemicals has reduced bee population affecting pollination services in many farms. This is one cause of flower abortion

Excessive or deficiency in nutrients: Too much nutrients accessible to the fruit trees lead to increased vegetative growth, low flowering and fruit setting. Deficiency of boron which is a trace element utilized by plants causes flower drops. Deficiency of phosphorous and potassium especially at almost fruit maturation may cause flower and fruit drops.

Pollination: For any fertilization to take place in fruit trees, they have to be pollinated. Although some fruit trees like guavas may self pollinate, most of the fruit trees depend on bees and other nectar foraging insects, such as carpenter bees, which play an important role in pollination of the fruit trees. Due to excessive use of chemical pesticides by farmers, the bees are destroyed reducing their pollination services. Therefore, this leads to reduced fruit tree pollination and consequently increased flower drops. Planting trees that attract bees foraging for nectar will be of importance in enhancing pollination of the fruit trees in a farm. For proper orchard pollination, a farmer should ensure that they put at least 4 beehives per acre of fruit trees to attract bees that will offer pollination services. Farmers should also ensure that they reduce the use of harmful chemical pesticides in the control of pests and diseases. There are many biopesticides in the market that can be used to control pests and diseases without harming bees and the environment.

Drought: When there is less moisture available for plant uptake, the trees might induce flower drop to stop fruit set as one way of adapting to drought conditions.

Temperature: Areas experiencing low temperature such as the highlands usually slow down pollen germination. Also, periods of low temperatures and overcast skies induce flower drops.

Birds and insect pests: Too many birds and insect pests cause flower drops in orchards. These pests should be controlled during the flowering stage.

Answers by Elkanah Isaboke

For more information on Flower drops (page 7) – link to crop management: www.infonet-biovision.org/crops-fruits-veg

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.

IPM offers the best way to control pests

Musdalafa Lyaga | Managing pests and diseases in your coffee plantation can make a difference between average income and good profit from your crop. Coffee growers continue to face increased costs, reduced coffee quality and pest pressure.

The Coffee Berry Borer (CBB) is a tiny beetle which is amongst the most harmful pests to coffee across the world.

Other pests to coffee

Antestia bugs are also a major pest of Arabica coffee in East Africa. The adult bug is shield-shaped, about 6 to 8 mm long and strikingly coloured dark brown with orange and white markings. They hide in berry or flower clusters. Females lay eggs in groups of about 12 on the underside of the leaves. Newly hatched nymphs are about 1 mm long.

White coffee stemborer

This is another pest that is a threat to coffee production. White coffee stem borer mainly attacks Arabica coffee and can make the cultivation of coffee uneconomical. The larvae feed on the coffee tree bark forming rings and finally bore into the coffee stem, weakening the plant and causing yellowing of the foliage. Infested trees that are less than two years old dry up, and a high percentage of older trees also succumb to the pest.

Photo: IN

The Coffee Berry Borer (CBB)

If the pests are effectively controlled, the coffee yields can improve and lead to an increase to the income.

IPM in coffee farming

Integrated Pest Management comprises several control tactics such as stripping which involves removing berries remaining on the branches. All unripe, ripe and dry berries that remain on the coffee trees after harvesting and pruning are removed.

Photo: IN

A CBB trap on a coffee bush

How the CBB traps work

What is the brocap trap and why is it beneficial to us?

Trapping is the use of attractant traps to capture the CBB colonizing females during their migratory flights. This technique doesn't have a risk of contaminating the environment, it is simple to apply, compatible with other biological control measures and it does not affect biodiversity.

The trapping system remains active for a longer period of time until all the CBB pests have emerged from the berries. This technique enables the capturing of CBB during their migratory flights, which begins with the first rainfall.

How to use the CBB traps

This prevents their subsequent re-dispersion, which would lead them to colonize a new generation of berries. Traps are installed at the beginning of March and removed at the end of June. They work best when placed 3-5 feet off the ground.

The recommended minimum number of traps per hectare is 18.

- Use traps along border locations.
- Do not place traps on trees as this may attract Coffee Berry Borer to some fruits like cherries.
- The traps should be inspected every fortnight and captured Coffee Berry Borer removed. The traps are then cleaned and filled with water to their upper limit.
- It is important to check that the dispensers are working properly and contain enough attractant.
- Integrated Pest Management provides a sound, efficient basis for control, without the risk of contaminating the environment.
- Unlike chemical control which is harmful to the environment, it is a preventive type strategy which controls Coffee Berry Borer before they infest the harvest and cause damage.
- Persistent, continuous and proper use of integrated pest management methods can keep Coffee Berry Borer and other pests under control.

Contact Real IPM, Thika on Tel. 0725806086

For more information on coffee pests and their control http://www.infonet-biovision.org/PlantHealth/Crops/Coffee#simple-table-of-contents-3

Plant sweet potatoes to take advantage of the rains

cont'd from pg.... 2

they can be stored in underground pits or on platforms covered with soil. Unfortunately, during the bumper harvests, farmers often experience great losses after harvesting due to fast deterioration of the produce.

In some farming communities, sweet potatoes are preserved for the dry season by sun-drying to make dried sweet potato chips. The dried chips are boiled and mashed with beans, milled or pounded to make flour. This can be mixed with either millet or cassava flours to make stiff porridge.

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

Dear TOF reader,

We spend Ksh 70 to produce one copy of *The Organic Farmer Magazine*. As a smallholder farmer, we request you to contribute Kshs. 20 towards its production. Below are two charges for those who would like to receive the magazine through an existing distributor or through their postal addresses:

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