



Photo: TOF

Daniel Kahura from Nguirubi village Ndeiya, Limuru sub-county puts out his beans to dry: Farmers all over the country are currently harvesting. Crop residue produced after harvesting can be conserved and used as fodder. Page 8

Dear farmers,

The issue of Genetically Modified Organisms (GMOs) continues to cause great concern among the farming community in our country. Two months ago, the Kenya Agricultural and Livestock Research Organisation (KALRO) and The African Agricultural Technology Foundation (AATF) sought the approval of the National Biosafety Authority (NBA) to release the first GMO maize into the country. By the time you read this TOF issue, a decision will have been made on whether or not to allow GMOs into the country.

One critical question that needs to be answered is: Does Kenya really need GMOs to increase food production and what are the implications?

Food insecurity is a product of many factors, such as poor quality of the soils, lack of farm inputs such as certified seeds and fertilizers and credit for small-farmers, rapid population growth, climate change among others. The arguments put forward by supporters of GMOs do not convince nor explain how GMOs will tackle such problems.

The new GMO maize that has been recommended for introduction to farmers is meant to control the stalk borer. There are, however, safer and environmentally friendly methods of stalk borer control such as the Push-Pull method. When combined with other Integrated Pest Management (IPM) strategies, Push-Pull can effectively control pests in maize. Use of GMO maize is, therefore, unnecessary. Allowing its introduction in our farming systems without carefully considering its pros and cons, and not consulting adequately with key stakeholders, may be one way of facilitating entry of other GMO crops into the country.

The consequences of allowing GMOs in Kenya are far reaching than most people imagine. GMO maize for example, transfers its traits into all other maize varieties in the country through cross pollination. This means that the local or traditional and hybrid maize varieties are likely to be contaminated. In addition, foreign companies will dominate the local seed industry, the health risks associated GMO maize varieties notwithstanding. TOF would like to urge farmers and other agriculture sector stakeholders to stop the introduction of the GMO maize until their safety can be established through solid research.

Production costs too high for maize farmers

TOF - There is a sharp increase in the costs of hired labour and machinery in maize production making it difficult for small-scale farmers to get good returns from the crop. The high costs have denied the benefits that small-scale farmers would have gained from provided government fertilizer subsidies.

A study conducted by Tegemeo Institute, an agricultural policy arm of Egerton University, shows that the costs of hiring land, tractor and labour have risen to the



maize growers in the country. In Trans-Nzoia County, the cost of weeding has increased by up to 63 per cent, forcing farmers to use expensive chemical herbicides to control weeds.

The study notes that farmers cannot get the expected benefits from fertilizer subsidy because farming expenses such as hiring land and paying for other inputs, significantly increase the cost of production.

The government is advised to consider other options such as assisting farmers to practice irrigation to produce the desired yield even in difficult climatic or weather conditions. The report recommends further that government should transfer the fertilizer subsidy to the private sector which has a better input distribution network.

Maize irrigation better

The research shows that farmers can make a profit of Ksh 8,495 per acre through irrigation instead of relying on rain fed agriculture where they get Ksh 5,003 from the same land: "Irrigated farming comes with high output, high income and high profit in comparable fields. Under irrigation, there is potential to produce two or three crops in a year," says Dennis Otieno, a researcher at the Institute.

extent that most farmers are no longer making any profit from growing the crop.

Weeding too costly

The study: *Assessing cost of maize production in Kenya: Implications for food security and household income*, (July 2015) reports that weeding alone takes 36 to 53 per cent of the total labour cost for small-scale farmers, who account for 75 per cent of

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Feed rabbits well to make them productive

Farmers can conserve fodder during the wet season when it is in plenty and use it during the dry season to feed rabbits.

Joyce Wambui Mahui | When managed and marketed well, rabbits are among the most productive animals on the farm. A healthy female can produce up to 30 rabbits in a year. Many people enjoy rabbit meat products such as kebabs, sausages and samosas because they are very tender, tasty, rich in protein and have less fat than do other meat such as beef and pork. Many rabbit farmers keep rabbits because they need relatively little space and time to manage, and therefore earn them money quickly.

Rebecca Majdro, a farmer from Benin in West Africa, who trained in fruit juice processing and other products found herself with no capital to start the venture after her training. She decided to start rearing rabbits to get herself capital. The money she gets from rabbit sales has financed her other ventures.

In the wild, rabbits eat leaves, seeds, roots and tubers to meet their daily dietary needs. To help the rabbits to grow well and multiply quickly, it is important



to feed them well. As we approach the dry season, it is important to note that rabbits eat little in hot weather.

Give them high protein feeds to ensure fast growth and vigour.

Since leaves and wild plants may not satisfy all the needs of your rabbits, you can feed them enough quantities of wild plants such as leaves from recently har-



vested ground nuts, tubers and carrot leaves. A well-fed rabbit will sleep next to its leftover food, showing you that it has had enough.

Malnourished rabbits are more susceptible to disease like scabies. A rabbit with scabies usually has sores on its body, legs and ears. It often scratches itself and becomes frail.

"With scabies, rabbits do not eat well. Therefore they grow more slowly and have fewer babies, so you earn less money," says Ms Rebecca Majdro. You should supplement the fodder with concentrate feed. Concentrate feed is a mixture of feed that gives rabbit proteins, energy, minerals and vitamins.

To make concentrate feed you can mix whole maize, wheat bran, roasted soya beans, lime or diatomite, chopped cassava tubers, and salt. Maize and wheat bran provide energy while soya beans provide protein. Eggshells provide calcium, but they have to be roasted and crushed before being mixed with feed.

Salt gives flavour and stimulates the appetite

If you are just starting to rear rabbits, it is easier to buy feeds from the shop. Complement the feed with herbs to help the rabbits digest their feed. Everyday, give them 250g to 300g of feed to female rabbits with babies, and 120g to a pregnant female. Give 100g to a breeding male and 20g to 100g to small rabbits according

to their age. Rabbit pellets are also available in most agrovet shops.

"To rear rabbits, you need fodder. Even if you give rabbits concentrate feeds, you must also give them fodder, otherwise they will experience digestive problems," observes Armand Tobossi, another rabbit farmer in Benin.

According to Ms Majdro, the leaves of certain trees such as *Moringa oleifera* stimulate rapid growth in rabbits.

"Moringa contains more vitamins and proteins than do many plants. It also helps with digestion and provides immunity against disease," adds Ms Rebecca Majdro.

Dry wet fodder before giving it to rabbits. This will prevent the animal from getting diarrhoea caused by parasites on the wet leaves from dew or rain. In addition, drying allows the forage to lose water which prevents bloating (swelling of the stomach due to accumulation of gas).

Some fresh leaves help to treat rabbit diseases. Leaves from guavas and pigeon pea can treat diarrhoea. Neem and veronionium leaves prevent common stomach diseases in rabbits such as coccidiosis.

Depending on the season, finding forage may be difficult. During the rainy season, forage is abundant but in the dry season it may be a little difficult to find because all plants have dried up. Mr. Armand suggests that now is the best time to

collect fodder from farmers who have just harvested. You can request them for the leaves of ground nuts and beans that they left after harvest and store them in a dry place. Concentrate feed and its ingredients must also be kept dry. Improperly stored feed develops germs that cause stomach diseases in rabbits.

As concentrate feed is often powdery, it can affect rabbits' lungs if they breathe it in. Add water before giving it to the rabbits. Says Cristophe Djamon, "When rabbits eat this powdery feeds, they inhale dust which causes breathing problems. Mix the feeds with water and put it into a granulating machine to make it into pellets. Those who do not have this machine can use feeds from the shop but they must add a little water and stir before they start giving it to the animals," he adds.

Provide adequate water

Like other livestock, rabbits need water. Make sure that they have clean water all the time. Troughs should be heavy enough so that the rabbits do not step on them and spill the water. Some feeders are specially built to avoid spillage. Mrs. Majdro advises: "In a trough with feeder holes, the young rabbits can feed through the bottom holes. The mother rabbit eats through the top hole as her head cannot go through the smaller bottom holes. In addition, the rabbits cannot put their feet in the trough and spill the food. So the young rabbits eat very well and so does their mother."

Rabbits like routine

Choose a time that suits you to feed them. Once you have decided on the time try to keep the routine everyday for this reduces stress in the animals. Well-fed rabbits are very productive and they can earn you good returns.

Additional reporting by Access agriculture. You can watch a training video on rabbit feeding from www.accessagriculture.org.

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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Prevent diseases and pests in sweet potatoes

Farmers can control major pests and diseases in sweet potatoes using environmentally safe methods.

The Organic Farmer | Pests and diseases account for the most loss in the sweet potato growing areas in Kenya, especially in the drier areas of the country. Sweet potato diseases can be divided into three categories; leaf and stem, tuber and post harvest, and viral diseases.

Leaf and stem diseases reduce yields by limiting photosynthesis through reduced area, thus affecting the transportation of nutrients to the roots. In Kenya, storage pests and disease are not a big concern because harvested tubers are not stored for long; instead they are sold and consumed shortly after harvest. However, field sanitation should be given careful attention so that pathogens are not transported together with the tubers for storage or to the market.

Below are the important sweet potato diseases and pests that affect the tubers:

Aphids and white flies

Aphids destroy growing plants by sucking sap from growing shoots. The signs of aphid infestation include creasing, cupping, and downward curling of young leaves. During heavy infestation, plant growth is greatly reduced, which compromises the eventual yield. Aphids are the biggest transmitters of viral diseases in sweet potatoes as they move from plant to plant. Their control results in lesser diseases attack.

Other crops like legumes, cucumber (cucurbit family), and cotton should not be planted with sweet potato or closer to a sweet potato farm. The greatest impact that aphids have on sweet potato is the spread of the viral disease.

Sweet potato Feathery Mottle Virus

White flies sack juices from the leaves of plants. Huge population of whitefly populations on sweet potato causes the yellowing and necrosis of infested leaves. This pest is also responsible for the spread of viral diseases, and has a wide range of other plant hosts found in sweet potato growing areas such as Irish potato, tomato, cassava, cotton and tobacco.



Proper management of sweet potatoes can keep away pests and diseases, increasing yields and income for farmers.

To control aphids and white flies, avoid practices that reduce populations of predators such as ladybird beetles, lacewings (*Chrysoperla sp.*), and syrphids. These 'farmer friends' help reduce aphid populations. In case of heavy outbreaks, farmers tend to apply insecticides; however, these should be used with great caution since they reduce natural enemy populations and can contribute to further aphid outbreaks. Farmers can use plants extracts or Nimbecidine® (a neem-based biopesticide from Osho (K) Ltd Radiant®, Tracer® and Delegate (Lachlan Ltd), and Met 62 (Real IPM Ltd.).

Sweet potato weevils

Sweet potato weevils attack both the leaves and tubers of the plant, though they prefer to feed on the tubers. The adult weevil lays its eggs onto the leaves of



the plant. When the eggs hatch, the emerging grubs feed inside the vines.

Adult sweet potato weevils feed on the epidermis (skin) of vines and leaves. Adults also feed on the external surfaces of storage roots, causing round feeding punctures. The developing larvae of the weevil tunnel in the vines and storage roots, causing significant damage. Feeding inside the vines causes malformation, thickening, and cracking of the affected vine. In response to the damage, tubers produce a toxic chemical, which

makes the tubers inedible, and usually discoloured.

To reduce infestation, plant sweet potatoes only on land where the crop has not been grown in the past 2 years. You can also earth up the soil around the crop every 4 to 6 weeks in order to control weevil build up. Plant deep rooting varieties so that the weevils do not reach the growing tubers. Avoid cracks in the soil that provide routes for the weevil to get to the tubers. In places with clay soils, irrigation helps prevent or reduce soil cracking. Do not keep the crop longer in the farm when it is ready for harvest. Store properly as weevils can also attack the tubers while in storage.

Sweet Potato Feathery Mottle Virus (SPFMV)

This disease is transmitted by aphids, with very little signs of the diseases in the leaves and vines of the plant. If present, they appear as faint, irregular chlorotic spots occasionally bordered by purplish colour. The visibility of symptoms on the leaves and vines is dependent on the susceptibility of the variety, degree of stress, growth stage, and strain virulence. Increased stress can lead to symptom expression, whereas rapid growth may result in symptom remission. The major symptom on the tubers are the external necrotic lesions (wounds) or internal corking on certain varieties.



It is difficult to control this disease because of the lack of symptoms on leaves and stems. It is possible to transfer the disease material from one season to the following one. It is important to use planting material of a mature crop so that its tubers can be assessed for the presence of disease. Avoid the use of infected plants for planting material. Practice good hygiene by keeping the farm clean to prevent spread of diseases and keep pests under control.

Sweet Potato Sunken Vein Virus (SPSVV)

This disease is spread by white flies and may also be carried on from one season to the next through infected cuttings. It causes stunting and color change in leaves (usually reddening or yellowing) depending on the potato variety. Symptoms may also include mild vein yellowing, some sunken secondary veins and sometimes swollen veins on leaf surfaces.

On its own, the SPSVV causes small losses in yields, but it can combine with SPFMV to cause



the Sweet Potato Viral Diseases (SPVD), which can result in complete loss of yield. The main ways of controlling the disease are avoiding use of diseased plants as sources of planting material and removing and destroying by burning infected plants.

Sweet Potato Virus Disease (SPVD)

This is a lethal disease that can wipe out entire farms of sweet potatoes. The disease causes plants to become severely stunted and the leaves become small and narrow (straplike), often with a distorted edge. Puckering, vein-clearing, and mottling (spots or patches) may occur. The mottling is often pale so that the whole plant may appear chlorotic (pale, yellow, or yellow-white appearance).

Sweet potato farmers should avoid using diseased plants as sources of planting material, and use of resistant varieties.

Bacterial infections in sweet potatoes will be covered in the next issue.

Raise bull calves and sell them for meat

Dairy bull calves can generate income for both dairy and beef farmers. Farmers, however, need good planning to manage them. Intensive feeding is necessary for successful beef production.

Josephat Mulindo | A number of TOF readers have asked if it is possible to start a beef enterprise using bull calves from dairy farms. Beef farming is a profitable venture because of the huge demand for beef which is currently not being met through local production. Farmers can raise or buy calves or weaners, then feed and fatten them for slaughter.

The enterprise is particularly suitable for the dry mid-altitude and dry transitional zones like Machakos, Makueni, Kitui, Taita Taveta, Elgeyo Marakwet and Baringo counties. It is also an alternative agribusiness enterprise especially for farmers who lost their maize crop due to Maize Lethal Necrosis Disease (MLND) in the moist transitional zone like Kisii, Bomet, Nandi, Trans-Nzoia, Kapenguria, Eastern part of Bungoma (Kimilili and Tongaren), Murang'a, and some parts of Embu and Meru Counties.

How to raise bull calves

Usually, farmers keep cattle either for milk or beef, or both. Dairy cattle breeds like Friesian, Ayrshire and Jersey are usually reared for milk in intensive systems. In Kenya, the majority of small-scale farmers keep these breeds under zero-grazing or semi-zero grazing units.

Some of the breeds that are bred specifically for beef include Boran, Sahiwal (and its crosses) and Fleckvieh. These do well in arid and semi-arid areas because they are tolerant to the harsh conditions, including tick-borne diseases.

Fleckvieh is one popular dual-purpose breed that has come into the market. It is possible to raise bull calves for meat, either as part of the dairy enterprise or as a separate enterprise. Usually dairy farms do not keep bull calves for long periods because they consume milk that would otherwise be sold or consumed at home and compete with heifers for care and management.

Many farms, therefore, dispose-off bull calves in different



A Friesian-Fleckvieh calf: The breed is good for milk and meat.

ways, depending on the economics and type of production.

These include:

- Selling the bulls after birth
- Slaughtering them after birth, although the market for veal (calf meat) is not yet developed in Kenya. Those who slaughter them at birth usually do so to feed their dogs.
- Rearing them as beef steers.
- Rearing them as possible future sires (bulls kept for serving cows).

The decision to either sell off or keep bull calves is based mainly on the cost of rearing them - the price of milk versus disposal price and the genetic value of future sires. Most of the bull calves in Kenya found among dairy farmers are not of high genetic value because the farmers are still improving their animals. Bulls from well established dairy farms with pedigree animals would cost more.

Planning for beef production

Good planning and preparation are essential for successful beef production. Firstly, it is very

important to ensure adequate fodder is available for your animals throughout the year. Secondly, you need to know where you will get bull calves and what ages they will be - the younger they are, the more delicate they are likely to be and the more care they will need. Thirdly, determine the desirable finishing weights, as this will affect the need for housing and water, and expertise needed to successfully run such an enterprise.

The right age

Young dairy bull calves are usually disposed from 2 days old to 1 month old. When sourcing for bull calves make sure you negotiate for friendly rates, especially if they are still young because you will need to feed them with milk for at least 2 months or use milk replacers. Unless you have a steady supply of milk, it is advisable that you get calves aged 2 months and above, although you may pay more - sometimes their cost can be worked out according to the number of litres of milk they have consumed. Buy older calves that have had enough

colostrum, which builds the immunity of the calf.

Housing

When the calves arrive at the farm, isolate them into an area where you can observe them closely for two weeks. This enables you to prevent the spread of diseases. As a standard practice, house calves in individual stalls until they are 2 months old. Afterwards, separate calves according to weight to make feeding and management easier. Give them milk or milk replacer for those that are yet to be weaned, calf pellets for those which have been weaned or are close to weaning, and plenty of fresh water and feed.

Health program

Calves get easily stressed, so handle them with care. Have a veterinarian on standby for new calves, to advise on diseases to vaccinate against in your region and also recommend appropriate program for internal and external parasites. Ticks and resultant East Coast Fever (ECF) are one of the greatest threats to young calves.

Marketing

If the bulls were from pedigree cows, they grow faster (similar to cross breeds, which exhibit hybrid vigour). You can sell them for slaughter at 18-24 months. Bulls from foundation animals take longer to reach market weights of at least 300kgs. As for the market, local butcheries provide the best outlets unless a farmer has enough numbers to seek for markets in other towns.

Approach a butcher who can slaughter the animal and pay based on carcass weight. Dairy-beef animals fetch lower prices because compared to traditional beef breeds like Boran, they have lower carcass yields because of higher bone-meat ratio. Finishing off with high quality forage and supplements helps reduce this ratio.

Caution

One challenge in starting any beef farming enterprise is the availability of enough calves that have been weaned from milk. A farmer must make sure such a venture has the adequate supply of calves to start with. Calculate the cost of buying and raising calves versus the projected income to get estimates of the likely net income. ■



Eat fish to enjoy its many nutritional benefits

Fish is a major source of omega-3 fats which the human body needs but cannot produce. Fish can also provide your body with vitamin D. It is good for the brain and can help reduce the danger of heart attacks and stroke.

Dr. Peter Mokaya | Consuming fish and fish products is encouraged as fish contains many healthy fats in addition to being a source of high quality protein which are critical for good health. Tilapia, Nile perch and "omena" are the common fish types found in lake Victoria, the largest fresh water lake in East Africa. Kingfisher and other salty water fish are found in the Indian Ocean, while trout fish is found around the Mt. Kenya region. Tilapia and mudfish are the common types of fish bred in many small holder fish farms in Kenya.

Fish are the main source of omega-3 fat, also called docosahexaenoic acid (DHA), which is a healthy fat that most people do not get enough of these days. Did you know, for example, that approximately 60 per cent of your brain is composed of fats—25 per cent of which is DHA? Omega-3 fats such as DHA are considered essential because your body cannot produce them, so you must get them from your daily diet.

Recent research shows omega-3 supplementation can help reduce inflammation in people with chronic kidney disease: Chronic inflammation is a characteristic of most chronic diseases such as diabetes, cardiovascular disease, arthritis, cancer, among others.

Benefits of eating fish

Eating fish has many benefits. They include the following:

1. Fish is high in important nutrients that most people do not get enough of.

Generally speaking, all types of fish are good for you. They provide many nutrients such as high-quality protein, iodine and various vitamins and minerals. However, some fish are better than others, as the fatty types of fish considered the healthiest. Fish also have the fat-soluble vitamin D, a nutrient that most people are deficient in and which functions as a steroid hormone in the body (these are substances that help



Tilapia: Fish has many benefits for people if eaten regularly.

in proper body function). Fatty fish are also much higher in omega-3 fatty acids. To meet your omega-3 requirements, eating fatty fish at least once or twice a week is recommended.

2. Fish may lower your risk of heart attacks and strokes.

Heart attacks and strokes are some of the most common causes of premature death everywhere in the world. Fish is generally considered to be among the best foods you can eat for a healthy heart. Not surprisingly, many large observational studies have shown that people who eat fish regularly seem to have a lower risk of heart attacks, strokes and death from heart disease.

3. Fish contains nutrients that are crucial during development

Omega-3 fatty acids are absolutely essential for growth and development, especially in young children. Omega-3 fatty acid is particularly important, because it accumulates in the developing brain and eye. For this reason, it is often recommended that expecting and nursing mothers eat enough omega-3 fatty acids. However, there is one problem with recommending fish to expectant

mothers. Some fish are high in mercury which, ironically, are linked to brain development problems especially for the neurological system of the developing baby. For this reason, pregnant women should only eat fish that are low in the food chain like trout, omena and salmon. Avoid fish and seafood all together, if you are unsure of the source.

4. Fish may increase grey matter in the brain and protect it from age-related illnesses

As we grow older, aging of the brain is normal. But there are serious neurodegenerative diseases like Alzheimer's disease. Interestingly, many observational studies have shown that people who eat more fish have slower rates of brain deterioration which is manifested as loss of memory, forgetfulness and age-related depression.

5. Fish is the best dietary source of vitamin D

Vitamin D has received a lot of attention in recent years. This important vitamin actually functions like a steroid hormone in the body and yet more than half of most population is deficient in it. Fish and fish products

are the best dietary sources of vitamin D. Some fish oils such as cod liver oil, are very high in vitamin D, providing more than 200% of the recommended intake, in a single tablespoon. If you don't get enough sunshine and don't eat fatty fish regularly, then you may want to consider taking a vitamin D supplement.

6. Fish consumption is linked to reduced risk of autoimmune diseases including Type 1 diabetes.

Autoimmune disease occurs when the immune system mistakenly attacks and destroys healthy body tissues. A key example is Type 1 diabetes, which involves the immune system attacking the insulin-producing cells in the pancreas. The Omega-3 fatty acids help reduce symptoms associated with such illness.

7. Fish may help prevent asthma in children

Asthma is a common disease that is characterized by chronic inflammation in the airways. Unfortunately, rates of asthma have increased dramatically over the past few decades. Studies show that regular fish consumption is linked to a 24% lower risk of asthma in children, but no significant effect has been found in adults.

8. Fish may protect your vision in old age

A disease called macular degeneration is a leading cause of vision impairment and blindness, among older individuals. There is some evidence that fish and omega-3 fatty acids may provide protection against this disease.

9. Fish may improve sleep quality

Sleep disorders have become incredibly common worldwide. There are many different reasons for this (such as increased exposure to blue light) but some researchers believe that vitamin D deficiency can also disrupt sleep.

What are the other sources of health fats other than from fish?

Other sources of healthy fats, preferably organic, include, olive oil, coconut oil, butter, peanuts, macadamia and cashewnuts, free range eggs, avocados and organic meats.



Women group goes organic through TOF

After reading *TOF* magazine, Maua Women Group has started passion fruit production and diversified into indigenous vegetable seed production.

Nellie Wambui | Maua Women Group was formed in 2008 by 16 members, 14 women and two men. The group is registered by the Department of Culture and Social Services, and aims at improving the members' welfare by working together to improve farming activities. The group receives *TOF* magazines each month delivered to them by Biovision FCP field staff at Gilgil Farmers' Resource Centre. From articles in issue No. 100 and No. 101 of 2013 that featured passion fruit production, the group decided to practice what they read about the crop from the magazine.

Planted yellow passion

The members obtained seed-



Maua women group members working in the group demo plot.

lings and planted sweet yellow passion which are doing well and they are about to make the first harvest. The group coordinator Mr. Kagiri says, "I make frequent visits to Gilgil Resource Centre to get information which has helped the group a lot. The officers visit us often to train us on different farming practices. We find organic farming so interesting because one uses locally available materials and the returns are impressive. The Resource Centre ensures we get *TOF* magazines every month which are helping the group to get knowledge on different farming technologies."

Selling indigenous vegetable seedlings

The group also grows indigenous crops like sweet potatoes and local vegetables such as

black night shade (managu). In partnership with another group, the Seed Savers Network, they have built their group's capacity to produce and process seeds for various crops. They are currently supplying the rest of the village with seeds for black nightshade and so far they have sold seeds worth Ksh 22,000. They grow the plants, then harvest, process and sell the seeds at Ksh 800 for a glassful.

Set up seed banks

Their customers include other farmers' groups and individual farmers. The seeds are normally in high demand and sometimes they are not able to meet the demand despite saving the seeds in a seed bank. They also conserve other indigenous crops like cassava, cowpeas and sweet potatoes. Each group member has a dairy goat from which they get a continuous supply of sufficient organic manure to apply on their farms to improve the soil fertility.



continued from page 2 ► **Eat fish**

What are the health and environmental risks associated with consuming fish?

Unfortunately, most of the fish in the market is too contaminated to eat on a frequent basis. Most water masses in Kenya and elsewhere are contaminated



Harvesting fish in a pond.

with mercury, heavy metals, and agricultural chemicals, including organophosphate pesticides and glyphosates, which have been classified by WHO as cancer causing in humans. As a result of these toxic chemicals and contaminants, caution should be exercised when consuming fish - know the source of the fish and how it was reared to ensure safety and avoid the contamination.

So what is the way forward with regard to consuming fish and fish products?

While debate is still on-going within the scientific circles as to what can be defined as "organic fish", I recommend that one continues taking fish, in moderation, but try and ascertain the source of the fish and how it was farmed. The best way is to buy fish in fish farms located in



A fish farm in Njoro, Nakuru: Know the source of fish you eat.

safe environments where there is less pollution from run-off water farms from chemicals.

As the consumer, if you cannot confirm that your fish source is from a clean, unpolluted source and that the risk, to your health and the environment outweigh the benefits, there are safer alternatives as outlined earlier in this article. The good news is that these alternative sources of omega-3 fats are readily available and affordable. Researchers need to do more to ensure

that consumers are provided with information on chemical residue levels in fish from fish farms, rivers, lakes and oceans to ensure they are safe and do not pose health risks to consumers.

For more information, contact Dr. Peter Mokaya, Director and Chief Executive Officer, Organic Consumers Alliance, at peter.mokaya@organicconsumers.co.ke or Mokay-apm@gmail.com. Also check their website at www.organicconsumers.co.ke

Methods used to control striga in upland rice

How can control striga on my upland (NERICA) rice crop?

TOF has received complaints from farmers to the effect that their uplands rice (NERICA) fields are getting infested with Striga weed. This is unexpected especially for farmers who are changing from growing maize to rice. Striga is a weed that thrives in soils that are nutrient deficient, especially those with low nitrogen levels. Its seeds can remain in the soil for a long time and its germination is triggered by the right conditions, including the presence of cereal crops. The following methods can be used to control striga in rice farms:

Legume-rice rotation: Growing rice after legume crops have been grown in the same field can reduce the need for nitrogen mineral fertilizer, increase soil



Striga weed in a rice field reduces yields and income for farmers.

organic matter, and improve rice plant health because some of the legumes can control soil pests such as striga and nematodes. Legumes like soya bean and ordinary beans can be used in rotation with upland rice.

Hand weeding: One effective

way to control striga weeds is to uproot, although this may be cumbersome in large pieces of land. For rice, the first weeding should be done thoroughly within the first 3 weeks after germination. The second weeding should be done before panicle

initiation. This is around 7 weeks from emergence. Manual weeding to remove and burn the weed ensures that it does not continue to increase its seed load in the soil.

Companion crops: The use of desmodium in the Push-Pull technology is another way of managing striga. Desmodium is a legume that fixes nitrogen and discourages the growth of the weed. It also provides a protein fodder for cattle. Striga tolerant rice varieties are not yet available and so the proposed management options can help farmers reduce the ferocity of striga in their farms. Good soil fertility, particularly high levels of organic matter, ensures healthy and vigorous crops, which can overcome infestation. The use of compost and farmyard manure helps improve the organic composition of soils.

Ways that farmers can use to keep moles away

What is the solution of keeping away moles from my farm which are destroying my banana and cassava?

Moles can be troublesome, especially to farmers with tuber crops such as cassava, potatoes or any other crop because of their destructive behaviour. There are a number of methods that farmers can use to keep moles away from their farms:

Using castor plant (red variety): In organic farming, TOF promotes safe methods of mole control. Moles play an important role in improving the soil structure - when they create tunnels in the sub-soil, they facilitate air circulation and water penetration thus reducing waterlogging, and supporting soil organisms. Moles also feed on a wide range of insects. To reduce their damage to crops, farmers can place chop castor oil plant leaves and seeds and place them in the tunnel. Moles do not like the smell of castor plant especially the red variety, they will therefore move away to areas where they cannot cause much destruction.

Stinging nettles: A mole's skin is very sensitive to some plants such as stinging nettles. All a farmer needs to do is to cut the nettles and plug them into the mole tunnels in the same way as the castor oil plant. When the moles come into contact with stinging nettles they cannot withstand the stings and will immediately move away.

Tephrosia plant: To keep away from your *shamba*, plant tephrosia along the boundaries at 1-metre intervals. After about 12 months the areas surrounded by tephrosia will be free of moles. Once the mole rats are gone, you can reduce the tephrosia plants. You should take care when working with tephrosia as it is a poisonous plant; you should wear gloves when handling the plant. Tephrosia also encourages the proliferation of nematodes wherever they are planted; so you should avoid planting it where you intend to plant crops such as tomatoes, potatoes, capsicums or beans.



Root rot nematodes may cause high infestation of nematodes in crops such as beans and tomatoes.

Mole catcher: Some areas have a large population of moles such that some of the methods we

have suggested above may not completely eliminate them. In your farming area, it is not difficult to find a person experienced in catching moles using traps. Moles catchers are very experienced and know the mole habits and movement. With some incentive such as encouraging them by paying for every mole caught, they can drastically reduce the problem within a short time.

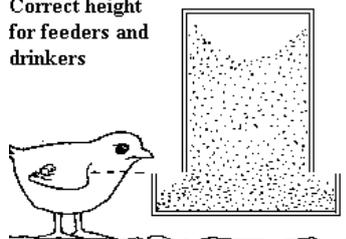
Farming Tip

The right way to feed your chickens

It is recommended that a farmer should adjust the height of the feeding pans and drinkers for proper feeding of chickens. This is mainly because when left at their feet level, chicken will naturally scratch the floor and soil the water and food. This leads to wastage and could promote harmful microorganisms in water. In return this will also increase the farmers cleaning work.

The most ideal height is that of the bird's back (as shown in the sketch). Poultry farmers have to pay attention and adjust their feeders and waterers to

Correct height for feeders and drinkers



reduce feed wastage especially when using mash feeds (chickens tend to sort feeds with their beaks as they look for preferred food particles). Poorly set waterers will wet the floor and the farmer has to keep drying many times.

Both feeding and watering

facilities need to be placed in such a way that a bird will not have to travel further than 3 m (10 ft.).

Birds have no big stomach; so their water retaining capacity is very low. They must drink freely and often they require 0.9 to 1.4 kilogrammes (2 to 3 lbs) of water to efficiently utilise 0.45 kilograms (1 lb) of feed. The water source should be low in minerals and particularly low in salt as excess salt leads to watery droppings and consequently wet litter. The feeding equipment should encourage the chickens to stretch.

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.

Maize stalks is good fodder for dairy goats

Green maize stalk has a crude protein content of 8.8 per cent while dry one has 3.7 percent. Green maize stalks can therefore be a rich source of protein for dairy goats.

Joyce Wambui | Even though maize remains one of the major staple food crops in Kenya, its stalks (the green leaves and stalks) left after harvesting the grain are not used well as animal feed. Most maize farmers focus on grain production and may not think much about the benefits of the stalks - many prefer the cobs being harvested at full maturity thereby leaving the maize stalks too dry. This removes nutrients and makes the maize stalks less edible for animals like cattle, sheep, goats and pigs. Dry maize stalk has about 3.7% crude protein as compared to 8.8% in green maize stalk.

Green maize is worth more

Green maize offers attractive returns in the market. A farmer who harvests green maize can sell it at a higher price. In addition the farmer has the benefit of fodder which can be conserved and feed their animals during the dry season.

For farmers who keep dairy goats, the green maize is like gold for them because goat keeping is now providing more additional income to the farmer who has both crops and animals. The maize stalks are a great addition to the dairy goat diet. Unlike cattle, dairy goats are easy to manage even on a small piece of land. The goat milk fetches a higher price compared to cow milk. One litre of goat milk fetches Sh70 at the farm gate while cow milk averages at Ksh 35.

Proper feeding makes dairy goats productive

For dairy goats to produce a lot of milk, they need proper feeding. Well-fed goats grow faster and give birth twice a year with a higher chance of



A lot of maize fodder can be conserved on-farm and used to feed goats and other livestock during the dry season.

producing twins. By giving them enough fodder every day, you can meet some of their energy, proteins, vitamins and minerals needs. Fodder can include grass, maize stalks and other crop residues as well as leaves of bananas, shrubs and trees. Goats need a lot of water and good mix of enough feed. A thirsty or hungry goat will often bleat without stopping.

Other feed for dairy goats

Some plants stimulate milk production more than others as some farmers from Mwigito village in central Kenya have noted.

"In my experience, the most important fodder feed that stimulates a lot of milk is banana stem mixed with sweet potato vines. After harvesting the banana stem, I chop it properly then dry it well. I take sweet

potato vines, chop and mix them properly with some grass to make it a little dry. When goats eat the mixture they give me a lot of good milk", says Teresia Muthumbi.

Another farmer from the area, John Gitonga says he gives his dairy goats grevillea tree leaves. "The tree provides proteins especially when mixed with maize stalks and banana stems. With these feed the goat produces good quality milk."

Leaves from cow peas, beans, calliandra and grevillea trees are rich in protein and are good for milk production. Other good sources of proteins are soya bean meal, fish meal, and cotton seed cake. These can be found in animal feed outlets.

Points to remember

Dry the harvested fodder for about three days before feeding it to the goats to prevent them from getting diarrhoea. If a goat gets diarrhoea, give a mixture of wheat flour and water because wheat flour is sticky and



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will stop diarrhoea.

As milk is mainly composed of water, you should supply clean water at all times in a clean trough. Goats are very clean and will not drink dirty water or with droppings in it. Water helps goats digest the fodder better hence giving more milk. Regardless of the number of goats you have, correct feeding can keep them healthy and able to produce milk and kids for many years.