



Farmers in Kenya lose up to 75 per cent of their onion crop due to pests and diseases. Many however, do not know that the onion varieties they choose may be responsible for their losses. Some onion varieties are more prone to diseases because of their colour and shape. (Page 3)

Support agriculture to develop the economy

TOF - Agriculture supports more than 80 per cent of the Kenyan rural population. It also accounted for about 27.3% of the value of goods and services produced in Kenya last year (GDP). Small scale farmers, however, continue to face serious challenges especially in production and marketing. This is mainly due to lack of knowledge on important practices and technologies that can sustain agriculture, lack of access to markets for their produce and over-reliance on



rain for their farming enterprises.

The 2015/2016 national budget aims to revive agriculture by focusing on subsidizing farm inputs, supporting mechanized and irrigated agriculture, improving animal genetics and vaccine production and expanding strategic food reserves.

Empower small-scale farmers

There has been an effort to develop the 1 million-acre Galana-Kulalu irrigation scheme for production of maize and other cereals. From experience, such mega projects take time to implement and may not help small-scale farmers directly. What farmers need urgently are subsidized inputs particularly seeds and fertilizers quality and adequate extension services, value addition or processing facilities and ready

markets for their produce. Indeed, from the experience of the Biovision Farmer Communication Programme, of which TOF magazine is a part of, farmers' inputs can be easily obtained if farmers are provided with affordable credit and trained on how to produce and preserve their own seeds.

Agriculture can develop economy

With proper planning and adequate support, the agricultural sector can comfortably contribute more than half of the GDP. Increased production would promote development of agro-processing industries that would create employment to youth in rural areas through increased production of raw materials and in the urban areas where manufacturing industries are located. It is sad that after 50 years of independence we are still exporting raw materials and buying the same as processed good from developed countries at much higher prices.

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Dear farmers,

If various reports appearing in local research institutions and the media are correct, Kenyan consumers of fresh produce, mainly fruits and vegetables are increasingly getting exposed to dangerous chemicals used to control pests and diseases. The situation is really worrying if you consider that there is currently no regulatory body in the country with a capacity to vet all fresh produce being sold in our markets.

We have now come to a situation where the only produce one can trust is that which you have grown yourself. This is not always possible especially for consumers who live in towns where there is heavy pollution and no space for agricultural production.

Experts attending a phytosanitary workshop in Nairobi last month expressed concern that Kenyan consumers are exposed to very high levels of chemical residues in fresh produce, which pose serious health implications that may be responsible for an increase in preventable diseases in the country.

The main problem is that farmers are using high levels of chemicals in crop protection because most of the pests attacking food crops are becoming resistant to available chemicals. Desperate farmers facing serious pest invasion in their crops are forced to increase the dosage of chemical pesticides to control the pests. Others have resorted to using dangerous chemicals such as Triatix® which is used in cattle dips to control ticks. Farmers use the acaricides to kill stubborn pests such as whiteflies and *Tuta absoluta*, a new pest that is ravaging tomatoes in the country.

A well-organized campaign by consumer lobbies could help educate farmers and encourage them to set up producer associations that use safe methods in production of fresh produce. Such produce can then be labelled as certified organic and special market stalls established in every town where consumers can buy chemical-free or safe food. It is time consumer lobbies and other actors worked actively to sensitize farmers on ways to produce safe food for the country.

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Use tithonia: A source of natural fertilizer

Farmers can save a lot of money by using tithonia which is found in plenty along the road sides and farm hedges. Tithonia improves soil fertility and can replace chemical fertilizers.

Peter Kamau | Most farmers know tithonia for its yellow flowers but are unaware of its benefits to the soils. They consider it a weed and menace and so usually clear it before planting. Widely distributed along farm boundaries, *Tithonia diversifolia*, a shrub in the family Asteraceae plants, is a rich source of nutrients for all crops. It is used in many parts of the world to enrich the soil. Scientific studies have shown that five tonnes of tithonia leaves, when chopped and incorporated into the soil, can produce 159kg of nitrogen, 10kg of phosphorus 18kg of calcium and 22kg of magnesium. This is enough to cover 1 hectare (2.5 acres) of land. Research has also

shown that the plant contains 80 per cent more phosphorus than legumes.

The easiest way to use tithonia is to add it into compost where it is mixed with dry plant material. Tithonia feeds soil microorganisms with phosphorus and nitrogen. Farmers can also slash or chop its young green foliage and work it into the soil at the time of land preparation and even at weeding time. Tithonia can therefore be used in place of expensive chemical fertilizers, which damage the soil when used improperly.

Tithonia ability to decompose faster therefore makes it excellent green manure. Concentration of nutrients is highest in younger plants before they flower. Tithonia can be also be used to make plant extracts for top dressing.

How to make liquid manure:

- Chop tithonia leaves, stems and flowers.

- Add water at a ratio of 1 part in four parts of water.

- Let it stand in a tightly covered container for at least 7 days.

- Use it within 5 days, diluting it with equal amounts of water.

- Test the dilution in one plant and wait a day. If the plant shows signs of scorching, add some more water.



Other uses

Fodder: used as feed for a variety of animals, such as cows, goats and fish.

Fuel: Tithonia is used by some farmers as a source of firewood.

Medicine: Several studies have shown that an infusion of leaves is used as an anti-malarial medicine, to ease constipation, stomach pains, liver pains, indigestion and sore throats.

Pesticide: it's known to contain chemicals that have biological activities against insects such as termites.

Ornamental: It is sometimes planted as an ornamental plant.

Boundary or barrier or support: It is used for live fencing and boundary demarcation.

Environmental services: Tithonia can be used for soil erosion control as it forms dense stands that reduce the impact of rain on soil and run-off water that carries away the soil. It attracts beneficial insects such as bees and wasps, which are important in crop pollination. The transfer of tithonia foliage back to the fields, therefore, supports the cycling of nutrients within the farm and landscape.

Growth: Tithonia has the ability to grow fast and decompose quickly when worked into the soil, thereby releasing nutrients for the use by crops. Tithonia also grows wildly and therefore requires little or no attention from the farmer.

Tithonia



Other useful plants



Marigold



Neem



Stinging nettle



Lantana camara



Garlic



Chilli

Tithonia can be mixed with other plants with medicinal properties to make a strong foliar fertilizer that can provide nutrients for healthy plant growth and protect crops from pests and diseases. It is also good fodder for cattle, goats and sheep.

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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Choose right onion varieties to avoid viral disease

Due to their colour and shape, some onion varieties tend to attract thrips, which are the major vectors for IYSV disease. Kenyan farmers have lost up to 75 percent of their onion crop due to the disease.

By Peter Kamau | Are you an onion farmer and you have failed to get good yields from your onion crop due to a strange disease? Research now shows that the seed varieties you have been buying for planting could be susceptible to Iris Yellow Spot virus (IYSV) disease, which is transmitted by thrips. Farmers should choose the right seed varieties for planting to avoid attracting thrips which carry the disease. IYSV can damage onions and cause great loss of income for onion farmers.

Research also shows that onion farmers in Kenya lose up to 75 per cent of their crop but many of the farmers do not know that the onion varieties they choose are responsible for their losses.

Thrips attracted by onion colour and shape

Due to their colour and shape, some onion varieties tend to attract thrips, the major vectors (or carriers) of IYSV that devastates most onion varieties. According to a study conducted by scientists at ICIPE and the Department of Plant Science and Crop Protection at the University of Nairobi titled *Resistance to Iris Yellow Spot Virus and onion thrips among onion varieties grown in Kenya* (S. Subramanian, R.K. Biriithia and others, 2012), camouflage and shape of the onion is the first line of defence against the insect-transmitted viral disease.

The Iris Yellow Spot Virus

Symptoms of IYSV disease

Symptoms of Iris yellow spot virus on onion include yellow to straw coloured lesions (wounds) on onion leaves and stalks. Dry, elongated lesions or flecks may resemble thrips injury. Lesions may be diamond shaped (this occurs rarely on leaves, more commonly on scapes). Late in the season, infected seed stalks and leaves may fall. Plant vigour and bulb size are also reduced including the onion yield.



An onion plantation affected by IYSV disease: The disease can damage up to 75 per cent of an onion crop. It has no cure.

(IYSV) is transmitted by *Thrips tabaci*, which burrows into the layers of the leaves of the onion plant. The pest saps the from the plant and passes on the virus that causes IYSV.

Common local onion varieties tested

In the study conducted by ICIPE scientists over two seasons, five varieties of onions commonly planted by Kenya farmers including Red Pinoy, Red Creole, Green Bunching, Texas Grano and Bombay Red varieties were planted in nursery beds for 7 weeks and later transferred into the main experimental field. All the necessary conditions for proper growth were maintained to keep them free of other diseases.

In the experiment, all the five varieties had different leaf colour, leaf cross-section, shape and leaf erectness. The varieties were divided into three groups based on leaf colour, glossiness and erectness. Red Pinoy, Green bunching and Red Creole varieties had blue-green, non-glossy and erect leaves. Texas Grano variety had green, glossy and prostrate leaves while Bombay Red variety had a light green glossy and erect leaves. The five varieties showed different resistance levels to both thrips *tabaci* and IYSV.

Texas grano and Bombay red resistant

The Red Pinoy variety had the highest number of thrips per plant while the Texas Grano and Bombay Red had the least in both seasons. Among the five onion varieties, Texas Grano was least affected by the disease in both

seasons. In season 2, Bombay Red variety showed no much difference in disease incidence to Texas Grano. The varieties with a semi-circular shape in their cross section were more infested with thrips and had high levels of IYSV disease than those with a circular cross-section.

In both seasons, Texas Grano variety produced the highest marketable onion yield than all the other varieties screened. The Red Pinoy and the Red Creole were found to be more susceptible to the damage caused by thrips and IYSV. Among the five varieties tested for resistance to *Thrips tabaci* and IYSV, only Texas Grano and Bombay red were found to have moderate resistance.

The reason why Texas Grano showed resistance to onion thrips could be its shape and structure; the two innermost leaves exposed the onion thrips to unfriendly environmental conditions and also their natural predators. Onion thrips look for narrow spaces on plants such as the leaf sheaths where they live

and reproduce.

Green colour repelled thrips

The green colour of Texas Grano variety leaves also plays a major role in its resistance. This can be explained by the high number of thrips found in Red Pinoy, Red Creole and Green Bunching varieties which have blue-green non-glossy leaves. The Texas Grano and Bombay Red which have green glossy leaves had less number of onion thrips and lower rate of disease incidence.

The pest *Thrips tabaci* is more attracted to blue colour than the green colour. This is one of the reasons why there was a large number of onion thrips and a high IYSV damage in Red Pinoy, Red Creole and Green Bunching onion varieties. The study established that leaf colour is a key factor that determines the level of onion thrips and damage by Iris Yellow Spot Virus. With this information, we hope farmers can select the right onion varieties to grow to improve their production and income.



Scientists make new findings on maize disease

Scientists now say that seed, soil and certain crops like sukumawiki have a role to play in the epidemics of Maize Lethal Necrosis Disease (MLND). Farmers are advised to choose carefully the crops they rotate or intercrop with maize to avoid spreading the disease.

By Peter Kamau | It has been discovered that the Maize Lethal Necrosis Disease remains in the soil after maize crop has been harvested. The soil can pass on the disease to the next maize crop that is planted in the same field.

In a research paper: Maize Lethal Necrosis Disease (MLND), an emerging threat to maize-based food security in Sub-Saharan Africa, it has been found that up to 70% of the maize seeds planted in soils contaminated with the Maize Chlorotic Mottle Virus (McMV), that causes MLND, were infected with the virus. The study was done by George Mahuku (IITA, Tanzania), University of Minnesota, Ohio State University, International Centre of Insect Physiology and Ecology (ICIPE), Kenya Agricultural and Livestock Research Organisation (KARLO) and others.

Although viruses have previously been known to survive in living plant material, new research findings show that McMV can survive in the soil. The virus can remain in the soil for up to 49 days after the maize has been harvested. Therefore, any maize replanted in the same field can easily be infected because the disease-causing virus would still be in the soil. This is one of the reasons why it has become difficult to break the disease cycle in the affected maize growing areas in the country. Farmers who continuously plant maize in their shamba have a higher chance of their maize being infected than those who practice crop rotation.

In East Africa, farmers need to carefully select the crop to use for intercropping or rotating with maize. For example, other thrips that infest maize and other crops like sukumawiki (kales), cabbage and onions can transmit Maize Chlorotic Mottle Virus, causing MLND. Therefore, intercropping maize with these crops can spread the disease to maize. Rotation of maize with such crops can also result in higher concentration of thrips, which can transmit the virus early in the season (the pupa of thrips usually remain in the soil until the next season).

How to identify the disease

The disease is caused by a combination of two viruses; the Maize Chlorotic Mottle Virus (MCMV) and the Sugarcane Mosaic Virus (ScMV). These viruses can spread from one crop to the other through infected seeds, contaminated soils and vector insects. Farmers can identify the disease through the following symptoms:



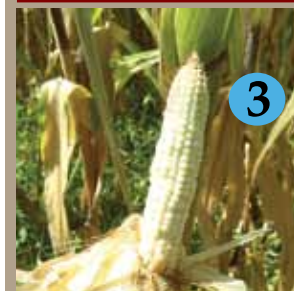
1. In young seedlings of maize, the upper maize leaves start yellowing and later dry up, turning brown in colour from the mid-rib towards the edge of the leaf (leaf margin).



PHOTOS: ICIPE

2

2. Later in maize at knee height, the upper leaves appear brown in colour and later the stem and the nodes turn brown



3

3. As the maize matures to cob development stage, the cob shrinks and does not bear any grains.



4

4. In some cases the maize plant may appear stunted.

How to control the disease

Below are important measures that farmers can take to get rid of MLND in their farms and reduce its spread to new areas.

1. Destroy all volunteer maize (maize that was not planted but grew in the farm), weeds or other unwanted crops in the field where you intend to plant maize. These may harbour the disease or insect pests that can spread it

to your new maize crop.

2. Farmers are advised to use only certified maize seeds - these have pesticides that protect the crop from disease.

3. Early and uniform planting of the crop in a maize growing region can prevent the buildup of the disease and its transfer from the old plants to the young ones. Farmers usually plant maize at different times

such that there is maize at different stages of growth. When this happens the disease is easily transmitted from the older crop to the younger maize, which leads to a continuous infection of maize and persistence and spread of the disease in the affected and new areas.

4. Farmers are advised to inspect their crops everyday basis for signs of the disease. If you notice any of the signs (mentioned above), uproot the infected maize and bury it to prevent the disease from spreading to the rest of the maize. Spot spraying of these plants with symptoms before uprooting can also help prevent disease spread by killing the thrips.

Use bio-pesticides like Amblytech C and Nematech (from Dudutech Ltd.- +254 (20) 2020859) or Thripex (from Koppert Biological systems-Mobile: +254 724256524). Botanical pesticides (plant extracts) sold commercially are also good options - Nimbecidine EC (Osho Chemical Industries Ltd. +254 726880480/733880480) and Neemraj Super 3000 (Amiran (K) Ltd - +254 719 095000).

5. Before and during maize growth, ensure that your maize field is clean and free of weeds that can act as hosts to insect pests. The pests carry the disease-causing viruses, and transfer the disease from plant to plant.

Forage grasses such as Napier, which are grown around the maize farms, can also be infected with the virus. It is therefore, important to carefully monitor these grasses for symptoms similar to MLND in maize. Remove all infected plants.

6. Protect young maize crop with bio-pesticides to control pests such as thrips, maize beetles and aphids, which can spread the disease.

7. Infected maize plants, which have not yet formed cobs and are not rotten can be composted as manure or used to prepare silage for use as cattle feed. However, rotten parts of maize need to be completely destroyed as they can cause mycotoxin poisoning to the animals fed on them.

Currently, scientists in CIMMYT and KALRO are working on resistant or tolerant maize hybrid seed, which will help in preventing spread of the disease while ICIPE is working on ways of controlling the pests.

Get more information on Bio-pesticides and plant extracts available in the market from TOF No. 108, May 2014 (pg. 4).

Health benefits of organic, free range eggs

Eggs from organically reared chickens are more nutritious. Eating organic eggs also reduces exposure to antibiotics, hormones and chemicals that are usually added to commercial feeds to make chickens grow faster.

Dr. Peter Mokaya | When is an egg considered as organic? An egg is considered organic if the chicken is only fed organic feed. This means it will not have accumulated high levels of pesticides from the grains and antibiotic residues, which are part of the common feeds for commercially raised egg laying chicken.

Are eggs good for health or do they cause heart disease and increase cholesterol levels in our bodies?

Recent research has shown that there is a false belief that eggs are bad for your heart. The fact, however, is that eating eggs, on a daily basis, may prove to hold numerous nutritional and health benefits, especially decreased risk of heart disease.

Infact eggs are nutritional 'powerhouses' and contain almost every essential vitamin and mineral needed by humans.

Many health benefits

Egg yolks, which have in the past been viewed negatively, are one of the few foods that naturally contain vitamin D. They also contain the carotenoids, lutein and zeaxanthin also found in Celery, (see *The Organic Farmer*, No. 120 May, 2015). The yellow and orange carotenoids (also found in carrots and colorful fruits and vegetables) reduce the risk of cataracts and age-related muscle degeneration. In addition they are a good source of choline, which is essential for the smooth functioning of all cells in the human body.

A key benefit of consuming organic free range eggs is that you avoid or minimize your exposure to antibiotics and synthetic hormones which may be harmful to your endocrine and hormonal system. Toxic pesticides, like glyphosate, an organophosphate, found in most grain feeds has been classified by the World Health Organisation (WHO) as a type 2A carcinogen (cancer causing).



Organic chickens in Mbeere Sub-County, Kenya: Organic chickens require adequate space or run where they can feed and move freely.

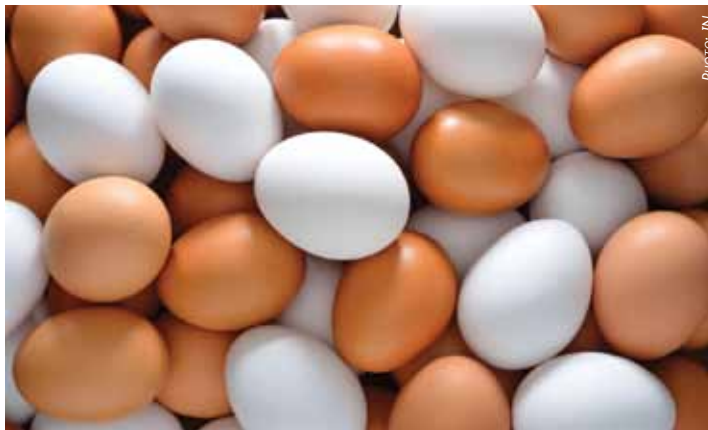
Eggs reduce risk of heart disease

Is there proof that eggs do not increase bad cholesterol in humans? Yes. Although egg yolks are relatively high in cholesterol, research has proven that dietary cholesterol from eggs has less effect on cardiac risk than saturated fat, which is found mostly in red meat and dairy products. In fact, one study showed that after eating organic eggs for six weeks, there was no effect on the total cholesterol or LDL (bad cholesterol) in those who ate eggs.

Another study done in 2009, showed that the proteins in cooked eggs are useful in lowering blood pressure. This certainly supports the view that eggs should be part of a heart-healthy diet.

Eggs have good cholesterol

The body needs the good cholesterol in organic eggs for proper working of the brain function and nerves. Eating yolks, especially from organic eggs, is a great idea for a number of other health benefits. It does not increase your cholesterol levels as is commonly feared.



Organic eggs are relatively inexpensive. Aside from making sure you are purchasing free-range organic eggs, there are a number of additional guidelines you should follow to ensure your eggs are of the best quality.

How do you know your eggs are organic and what is their shelf life?

- It is recommended that you purchase your eggs from an organic farmer directly, as much as possible. In this way you can be certain of the quality. If you cannot find a farmer to sell you eggs directly, then organic eggs from the market would be your next best option.

- If you can, contact the farmer or company providing your healthy eggs and find out what they are feeding their chickens. Once again, an egg is considered organic if the chicken was only fed organic food and will not have high levels of pesticides from the grains (mostly those grown using pesticides) fed to typical chickens.

- Although many eggs are advertised as having omega-3 they may not be as good as they are leading you to believe. Some farmers may use flaxseed or color additives to increase the omega-3

fats and yellow color, they won't be as beneficial as those fed on the chickens seaweed or kelp, which have the far more beneficial DHA and EPA (the two forms of omega-3).

- It is advisable to keep the eggs in a fridge. The shelf life for an unrefrigerated egg is around 7 to 10 days. When refrigerated, they can stay fresh for 30-45 days. Keep this in mind when purchasing eggs from your local organic farmer or organic outlet/grocery store. As much as possible reduce the shelf stay of your eggs by eating them within a month of purchase, if refrigerated.

What is the best way of cooking and eating eggs?

Eggs are best eaten as poached (boiling in water) or soft-boiled. On the other hand, microwaving or scrambling your eggs is one of the worst ways to cook them as it oxidizes the cholesterol in the egg yolk, which may in fact harm your health.

Another way of consuming healthy eggs is eating them raw. If you can stomach it (I know some people who can!), organic eggs, from chicken raised in a natural safe environments, can be eaten raw; that way they preserve all their rich nutrients, natural enzymes and vitality. Consuming raw eggs, if they are safe from salmonella, also saves one from taking supplements for these incredible antioxidants when you can get the nutrients for free from eggs.

Ideally, if you consume raw eggs, one should not consume the raw egg whites without the yolks as raw egg whites contain avidin (a type of protein), which can bind to biotin, which is vitamin B7. If you cook the egg white the avidin is not an issue. However, if you consume them with raw egg yolk (whole egg) there is more than enough biotin in the yolk to compensate for the avidin binding. However, caution should be exercised by pregnant women when eating raw eggs, if one chooses to eat eggs that way. This is because biotin deficiency is a common concern in pregnancy and it is possible that consuming whole raw eggs would make it worse.

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Kitchen gardens are important for food security

By **Alessandra Grasso and Musdalafa Lyaga**

Many counties in Kenya have resources to produce highly nutritious food, yet food and nutrition insecurity is still a problem.

A community-based organization (CBO) - Sustainable Income Generating Investment (SINGI), working closely with Biovision Farmer Communication Programme-Outreach Project and The Ecological Organic Agriculture Initiative (EOA) is helping farmers deal with food and nutrition insecurity by providing capacity building trainings to farmers groups in Matayos Sub-County, Busia County.

SINGI extension workers comprising of William Buluma, Pamela Otieno, and Bonventure Buluma, demonstrate various ecological organic agricultural technologies and methods.

One such technologies, is the kitchen garden technology. Kitchen garden technology allows households to grow various nutrient-rich food crops with local resources under challenging circumstances like acidic soils, drought, and erratic rainfall, among others.

Through demonstrations, SINGI extension workers have shown farmers how to test and confirm the usefulness of improved cultural methods like



Group members work together in their demonstration plot.

organic farming, how to handle and manage different kinds of soils and crops and how to test new and improved varieties of agricultural crops and animal breeds. They have also shown the larger community new farming technologies and

methods like the kitchen gardening.

Farmer groups adopting organic farming

Esikoma Ushirika Self Help Group has embraced organic ecological agriculture and is

working to improve soil fertility and water conservation by practicing many crop management technologies. These include multi-cropping, companion planting, agro-forestry, ecological pest management, animal husbandry, and kitchen gardening technologies.



Mandala kitchen garden.

The growth and popularity of kitchen gardens has been the partnership between SINGI and Bioversity International, to implement the Biodiversity for Food and Nutrition (BFN) Project. This is a five-year multi-country project working to strengthen the conservation and sustainable use of agricultural biodiversity. It has created awareness of biodiversity for dietary diversity, built capacity of households to grow, process, and preserve various highly nutritious foods. Farmers have been motivated to use organic ecological methods to protect their environmental and ensure food security.

The SINGI extension workers working in collaboration with experts from Kenya Agriculture and Livestock Research Organization (KALRO), the Ministry of Agriculture (MoA). Through their effort, they have reached over 4,000 small-scale farmers in Matayos Sub-County.

The work of SINGI is exemplified by the achievements of Esikoma Ushirika Self Help Group, a group of thirty farmers in Matayos Sub-County who united to learn, share, and practice new agricultural techniques and methods on a 30m X 30m demonstration plot.

Alessandra Grasso is an MSPH Candidate 2015, International Health- Human Nutrition-Johns Hopkins Bloomberg School of Public Health.

A cheap method to control pests in maize

Controlling pests in maize at the growing stage is important in reducing damage to maize, which reduces the yield. Some of the pests that are very common in maize at the early stages of growth include stem borers, chaffer grubs, bollworms, thrips and aphids and beetles.

Instead of buying chemicals to control these pests, farmers can make their own pesticides at home using pepper and ash. Scientists have discovered that a mixture of ash and pepper is much more effective than using some of the chemicals, some of which cost a lot of money. Farmers can buy pepper powder in the market if they do not grow it in their gardens. The last three insect pests are believed to be vector of MLND.

How to make an ash-pepper mixture

- Buy ripe pepper or pick ripe



ones from your own garden.

- Dry the pepper and make a powder by either grinding or pounding, then remove the big particles
- Sieve cold wood ash from the fireplace
- Get 1 gogoro (2kg tin) of ash from the fireplace.



- Mix 1 gogoro of ash with 5 teaspoonfuls of pepper powder.
- Mix the pepper and ash properly.
- Put the mixture in a used pesticide container that has small holes at the top. (Sketch above)
- Apply the mixture from the container by shaking it once into

each plant funnel.

If you do not have an insecticide container you can use your hands to apply. A pinch of the mixture applied to every plant is enough – but remember to wash your hands after application.

When to apply

For good pest control with pepper and ash mixture follow the following guidelines:

- Plant early at least 2 weeks before onset of the rains.
- Look for pest damage every 3 days, starting from the second week after plants emerge in the lower drier areas, and 3-4 weeks in medium and high altitude areas like Trans-Nzoia and Uasin Gishu.
- Apply the mixture after you see a few holes on the leaves.
- If you see more holes later, then apply the mixture again.

Source: Dr Margaret Mulaa - KALRO

I would like to grow vanilla on my farm

I have heard about vanilla and would like to try vanilla farming. Please provide more information on how to start.

Vanilla is the fruit of the planifolia (fragrans) orchid or the tahitensis orchid. There are only two of 35,000 species of vanilla that bear edible fruit (the vanilla bean). The vanilla flowers open briefly only part of one day during a month-long flowering and require hand pollinating to produce fruit. The best time for planting is during the rainy season. Six to nine months after the vanilla bean appears, the green pods are harvested by hand and cured.



Photo: JN

Climatic requirements

The vanilla vine is a tropical plant that requires a warm and humid climate. The temperature must be as even as possible. It cannot do well in cold areas as well as in areas with extreme heat. Even

though a few weeks of drought help in flowering and the maturity of the beans, the plant requires regular heavy rainfall. A light shade offers the best condition for the plant to grow well. Because of its need for heavy rain, the vanilla plant grows well



on light well-drained soils.

Unpredictable market

In Kenya, vanilla does well in coastal region. Farmers in Nyeri have tried growing it but TOF has not established whether they have been successful or not.

However, vanilla is grown in a much larger scale in Malindi.

The major constraint in vanilla production is the market. At times vanilla prices can be very high but this may fluctuate to the extent that farmers are not able to recover their production costs.

We would not advise farmers to grow vanilla mainly due to the marketing problems unless you are in a position to process and sell it locally. As we have mentioned above, vanilla opens its flowers only one day during its growth phase and that is why the farmer has to do hand pollination, other wise the plants will not produce the beans - it is therefore a difficult crop to grow. The region where you come from may also not be suitable for vanilla production. We would therefore advise you to explore other crops that have a ready market and which can give you good returns.

What can I do to save my cabbages?

Due to the heavy rains experienced last month in Nyeri, the leaves of my cabbages have become partially dry. Since they are almost maturity, what should I do to regain their green colour?

Your cabbages may have been affected by disease called bacterial black rot. Black rot is caused by a bacteria known as *Xanthomonas campestris* pv. Cabbages at any stage of growth can be affected by the disease. When it rains, water splashes on the leaves of the cabbage plant from infected soil infecting them with the bacterial. Apart from rainwater, farmers using sprinklers may also face the same infestation as the water that has come into contact with the soil comes into contact with cabbage leaves.

Infection comes from the soil

Run-off water, blowing of loose leaves or handling of infected plants can also transfer the bacteria to the cabbage crop. The bacteria first enter the plant through small pores on the edges of the leaves. They can also enter through the root system through wounds made by pests or chewing insects, to the cabbage stems and eventually into the cabbage head.

The drying you see on the leaves will continue causing the

cabbage leaves to shrivel and eventually turn black. If it is wet, other pathogens like the soft rot bacteria can affect the cabbage leaves and head resulting in rotting (a foul smell may be emitted). There is little you can do when the disease reaches this stage because the cabbages will not be easy to market.

Control measures

There is no treatment for black rot. Farmers are advised to practise crop rotation for a minimum of two years and to use disease-free seed. However,



Photo: Infonet

copper sprays can reduce the spread of the disease if detected early.

Although it may be difficult

to restore your cabbages, you can remove affected cabbage leaves and keep the field clean to stop the disease from spreading.

Farming Tip

Use chicken manure to fertilise your crops

Chicken manure can add a lot of nutrients to your soil if properly prepared and used in your backyard garden. It contains higher nitrogen and phosphorus compared to other farmyard manures like cow dung.

To prepare chickens manure for use as a natural fertilizer, ensure it is well covered once you remove it from the chickens house. This preserves nitrogen that would otherwise escape into the air if it is exposed to the sun. Mix it well with other waste matter such as ash from the kitchen, add other organic matter such as fruit peelings, vegetable and other kitchen



Photo: JN

waste such as eggshells, plant leaves, green maize stalks, bean residue, wheat, sorghum or grasses. Keep turning it until it breaks down completely.

When the chicken manure is well composted you can now spread it in the garden at the rate of 2.3 kg in an area of 1m x 1m until the entire garden

is covered. Never use fresh manure on growing plants as the nitrogen in it is too strong and will burn your plants; it also encourages unbalanced growth.

You can also allow your chickens to roam freely in your garden. In this way they will fertilise it with their droppings, which will further build the fertility of your soil as they eat new sprouts, dig the ground and pick insects. To prevent them from damaging your crop, let them into the garden just an hour before it becomes dark. However keep them away if the crop is young.

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.

Enhancing banana farming by adding value

Joyce Wambui Mahui | Banana is one of the most abundant fruit crops in East Africa. The continuous availability of the harvested fruit all year round makes it one of the most attractive sources of income for farmers.

More than 10 million tonnes of bananas are produced in East Africa with most of it grown by small-scale farmers. In Kenya, banana is mostly grown in Central, Eastern, Western, and coastal regions.

Excess production is sold in the local market either as plantains for cooking or ripe banana fruits. Unfortunately, farmers continue to experience great loss of bananas due to poor post harvest handling and transportation.

Bananas can, however, be processed to expand their marketing value. Some of banana value addition methods are very simple and can actually be done at the farm kitchen and the income from the sales can be very rewarding.

Making banana flour

Bananas can be processed to make banana flour. The banana flour has great potential for commercialization due to its numerous uses and health benefits. The banana flour can either be fortified or used as it is to make nutritious porridge and when mixed with other flours it can make a variety of dishes such as chapati, mandazi and banana cakes.

Processing Method

- Remove green bananas from the bunch.
- Slice into small pieces with the peelings so as to maintain the nutrients in the peels.
- Sun-dry on the rack, until 10% moisture content is achieved. You can test by gently pressing the cuttings.
- Mill and sift
- Package and store in a closed, dry place.

Banana Jam

Over ripe bananas should not go to waste any more. With the most basics of equipments,



Photo: TOF

a farmer can turn his or her bananas to a sweet and enjoyable jam. Bananas with sweet taste, fine flavour and texture can be processed into excellent jam right in the farmer's kitchen, both for domestic and commercial use.

Processing Method

- Mash the bananas and put in a heavy saucepan with lemon juice, and honey.
- Heat the mixture until it simmers over medium heat and then turn to low. Simmer for 20 minutes, stirring every five minutes or so.
- Turn off the heat and let it cool until it is cool enough to taste.
- Let the jam cool completely to room temperature - it will thicken up as it cools.
- Package and store in the fridge for a week or less.

As a farmer, you can experiment with various flavours like vanilla, cloves or cinnamon depending on the tastes of your customers.

Banana Juice

Kenyans enjoy drinking fruit juices. But getting a good affordable juice that is not full of chemicals can sometimes be a difficult task. Banana drinks can be very tasty, refreshing and healthy.

Processing Method

- Put ripe sweet bananas into a blender.
- Add milk.
- Cover blender and run it on low for 10 seconds.
- Put orange juice into a small bowl or a cup.
- Add honey to the cup.
- Stir to mix them well.
- Add the honey mixture to the blender.
- Cover the blender and run it on low for 30 seconds.
- Package and store the juice in dry cool place

Bananas can also be processed into other products like biscuits, sweets, wine, crisps, beer and sauce.

This can earn farmers more income and satisfy different tastes of consumer who do not like raw bananas. To improve their bargaining power farmers should be organized into growers associations. Establishing factories to process bananas into various products; improvement of infrastructure to ease transportation of bananas.

There is need for government and other stakeholders to provide affordable credit facilities to empower the various actors in the banana agribusiness. There is also need for laws and policies that support value



0717 551 129 / 0738 390 715

Beehives for sale: We make beehives for sale. Interested farmers can make orders on any quantity they require. The following are prices for various hives: Langstroth Ksh 4,500, Kenya Top Bar Hive Ksh 3,800, Stingless bee hives cost Ksh 400 and Ksh 1,500 depending on size. Interested farmers can call Stephen on 0734 371 557.

Liquid organic fertilizer: Seaweed extract with over 60 nutrients. Ideal for all crops *sukumawiki*, wheat, tomatoes, chillies, potatoes, fruit trees, Napier grass, tea, coffee, beans and others. Quantity 1-4 liters. Contact 0721 96 09 49 or 0734 020 982. Email: bweru@gmail.com

Fruit seedlings: We have fruit seedlings for sale. Grafted Apple mango at Ksh 150 per seedling, grafted Avocado at Ksh120, grapes at Ksh 300, grafted purple passion at Ksh 300, tree tomato at Ksh 50, pawpaw at Ksh 50, breadfruit at Ksh 500, tangerines at Ksh150, peach at Ksh 300, Pomegranate Ksh 150. Call 0714 118 794.

Seedlings: Garlic and sweet bananas in Karatina. Contact 0723 900 051.

Ducks for sale: I have 40 ducks for sale, 20 adults ranging from 5kg-8kg and 20 chicks 0.8kg-2.5kg. Karanja Mungethu, 0713 362 299, Kitale.

Turkey chicks wanted: I would like to know where I can buy 5 turkey chicks Age: 51 day old to 1 month old; Breed: Broad breasted bronze or broad breasted white. Call Agnes on 0722 409 869, Nairobi.

Silage tubes for sale: We have silage tubes for sale. We also conduct train farmers groups. Call Star Rays Education Centre Tel. 0721 245 443.

addition of bananas and other agricultural produce. Further scientific research is also needed to control banana ripening process to reduce post-harvest losses. The Government should ensure that there is no exportation of raw bananas but instead processed products which would earn maximum profits.

To watch a video of a women's group success in processing banana flour, visit Access Agriculture website www.accessagriculture.org.