Biovision Africa Trust

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Dear farmer,

Confirmed cases of the novel Covid-19 pandemic continue to rise and we urge you to keep following the government's regulations, to help contain the dreaded disease.

The current rains, though welcome for farmers, have also caused a lot of destruction. We empathise with the affected families and urge the government to promote soil conservation efforts such as planting trees that can reduce the effects of heavy rainfall.

In this edition, we focus on various pests and diseases that are common during the rainy season and advise you how to control them.

Also, learn how to harvest, cure, and store your onions so that they remain fresh for a period of five to eight months.

Discover the advantages of using banana flour in your dishes and its nutritional and health benefits.

Herbs and spices have high nutritional and health value. Learn about the different kinds of herbs you can grow to supplement your diet and your income.

During this period, when you are confined at home, do not just get bored. Instead, try and start your own kitchen garden. It will provide food for your family and keep you busy, exercised, healthy and also highly entertained. Enjoy the read!

From the editor

[SOURCE: ACDIVOCA.ORG]

How to harvest and store your onions for good profits

Even as Kenyan traders and farmers cry foul, one thing is certain - onions from the neighbouring country may be smaller, but they are well- cured, making them last longer

By Clifford Akumu

Protests rocked little known Kiawara Market in Nyeri County, last year, when some traders targeted their counterparts who were selling cheap onions from Tanzania.

It was not an isolated case. Onions from Tanzania have long found their way into Kenyan markets and sell quickly, causing local farmers to suffer huge losses due to lack of a market. Even as Kenyan traders and farmers cry foul, one thing is certain - onions from the neighbouring country may be smaller, but they are well- cured, making them last longer.

Tanzania also enjoys a lower cost of production compared to her northern neighbour Kenya. Several traders at Wakulima and Gikomba open-air markets in Nairobi confirm the appetite for Tanzanian onions.

In Kenya, though we produce large-sized onions, farmers have often neglected the curing process. Curing involves removal of the tops and covering the bulbs to protect them from excessive heat from the sun or any form of moisture.

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Use of banana flour

With increasing diet and lifestyle-related diseases, many people are becoming more health conscious and embracing healthy eating habits. *Pg. 5*

Harvesting and storing onions for good profits

Continued from page 1

- *The curing process begins a week before harvesting by withholding water and partially severing the roots with a spade to allow the thick, moist necks to dry hence preventing rot.*
- *When the leaves dry and turn brown, pull the onions by hand or with a garden fork. Moisten the dry soil lightly a day before harvesting.*
- *Loosen the soil around each bulb before lifting it to avoid damaging your onions. Damaged onions rot quickly.*
- *After lifting the bulbs, leave them on the ground to dry for a few days and cover them with foliage to prevent sunburn. You can also spread them out in a dry, shaded, warm and well-ventilated area.*
- *The bulbs should dry outdoors for two to 10 days until their skins are papery. Drying them indoors will take about two weeks.*
- *When the neck of the cured onion is tight and the outer scales are dry, cut the tops back with a garden pruner to about one inch and clip the shriveled roots.*
- *Bulb onions should be stored in a cool, dry, well-ventilated place away from fruits like* apples, avocados or pears, as these fruits produce ethylene gas, which interrupts the onions' dormancy. Store them in a hanging mesh bag where possible. Well-cured onions can be stored for 5 to 8 months.

NB: Sweet varieties do not store well and should therefore, be used in a few weeks.

For more information on onion farming, visit https://www.infonet-biovision.org/PlantHealth/Crops/Onion

Prof. Zeyaur Khan, Principal Scientist and leader Habitat Management Programme at ICIPE (pictured) says that so far, 250,000 farmers have embraced push and pull technology in Sub Saharan Africa (SSA) where it has proven worthy in the management of Fall Armyworm (FAW) besides farmers controlling of striga and stem borer, have fodder and improved soil fertility.

Push-pull technology helps Homa Bay farmers control pests in their shambas

"Due to the technology, I work less and harvest more. I can now feed my family, pay school fees and meet my other bills, using the proceeds from my farm," Mr Lawrence Odek, Homa Bay farmer

By Duncan Mboyah

Push-pull technology is a system that controls farm pests through planting crops that repel pests 'push' and those that attract and trap the pests 'pull' keeping them away from the main crop.

Sorghum and maize, for example, are often attacked by the maize stalk borer. To control the pest, one can plant desmodium (to repel) in between the maize and Napier grass (to trap the pest) on the edges of one's farm. This prevents the pest from attacking the maize crop.

The technology has helped farmers to increase yields and control numerous pests without using chemicals and pesticides. Farmers in Homa Bay County are all smiles, thanks to the technology, which was introduced 20 years ago by scientists at the International Centre of Insect Physiology and Ecology (Icipe).

At the time, farmers struggled with Striga weed and stem borers, which caused low farm yields. The technology, offered to them a solution that was not only less labour intensive, but is also cost-effective. Mr Lawrence Odek, a 78-year-old farmer in Lambwe East Location, embraced the technology in 1998. The farmer, who grows maize, and millet and rears livestock, says it has been rewarding.

"Due to the technology, I work less and harvest more. I can now feed my family, pay school fees and meet my other bills, using the proceeds from my farm. I also sell any excess produced," he said, in an interview with TOF magazine.

All he does is splash and plant seeds instead of the deep ploughing that he previously practised. His farm is 75 per cent under push-pull technology. He uses Napier grass, Mulato, and Desmodium to inter-crop. In one of his push-pull plots measuring 45m by 50m, Mr Odek harvested four-and-a-half bags of maize last season.

He feeds his cows using inter-cropped plants such as desmodium and bracharia. His cows provide milk for sale and also for his family.

"Initially, finding desmodium seeds was challenging, but thanks to Icipe, they are now readily available," Ms Flor-

The technology has helped farmers to increase yields and control numerous pests without using chemicals and pesticides

ence Keya, another farmer from the same area, attests to the benefits of using this technology.

"I used to have perennial crop failures that would force me to seek food from relatives, until I adopted this technology," said Ms Keya. The 58-year-old almost abandoned farming due to pests that forced her to purchase chemicals frequently.

She said that since 2015, when she adopted the technology, her harvests have been increasing without any fertiliser and pesticide use. "I met Icipe's Prof Zeyaur Khan, principal scientist, and leader, habitat management programme, five years ago at a workshop. To date, despite not using pesticides, my farm gives me good yields," she noted.

Ms Keya, who plants maize and beans, advocates for the technology, because she harvests more cobs of maize under the push-pull technology. She plans to expand the acreage under the technology. Mr Samuel Sana, a farmer in God Jope Village in Lambwe Valley, said the technology was about farming smart instead of farming hard.

"I no longer work hard but I farm smart. I don't weed, I just plant and the desmodium does the rest of the work," he said.

Mr Sana heard about the push-pull technology during a field day where Icipe researchers educated farmers on the technology. He immediately planted silver leaf desmodium and Napier grass but his crops failed due to drought.

About 250,000 farmers have embraced this technology in sub-Saharan Africa (SSA). In western Kenya, more than 100 farmers practise it and the number continues to increase. The technology has helped many farmers to manage the Fall armyworm (FAW), the stem borer, and control Striga. It has also led to increased fodder and improved soil fertility

"I then planted green leaf desmodium and mulato II in 2014 and got a bumper harvest," he recalled. The youthful farmer revealed that the same year, he sold fodder, earning an additional Ksh25,000. "Initially, I would harvest about one-and-a-half bags of maize due to Striga and stem borer. Today, I harvest three bags of maize," he added. His farm serves as a training centre for farmers, where field days and weekly trainings are conducted.

"I have three plots on the push-pull and I plan to increase them," he said.

Push and pull technology, he said, improves the economy of smallholder farmers, who are unlikely to get loans. Using income from his harvests, Mr Sana, the holder of a diploma in Business Management from the Kenya Institute of Management (KIM), started a private primary school, Jikaza Academy in 2016. "About 250,000 farmers have embraced this technology in sub-Saharan Africa (SSA). In western Kenya, more than 100 farmers practise it and the number continues to increase," said Prof Khan. "The technology has helped many farmers to manage the Fall armyworm (FAW), the stem borer, and control Striga. It has also led to increased fodder and improved soil fertility."

For more information on push-pull technology, visit https://www.infonet-biovision.org/PlantHealth/Crops/Maize

All about thrips

By Emmanuel Atamba

Thrips are small insects that range in size from 0.5 to 14 mm. Because of their size, they are difficult to spot, let alone identify them. There are different types of thrips and it is important to identify the one in your garden before taking action. Some thrips feed on other insects, which could be advantageous in reducing the pest population. Others feed on leaves and young buds, affecting plant growth and development. Despite their small size, thrips can be destructive and transmit crop diseases. In tomatoes, for instance, they remain the biggest vectors for the tomato-spotted wilt virus.

Identification

Symptoms of thrips infestation may include presence of streaks, a silvery speckling, and small white patches. Thrips leave their faeces on leaf surfaces, which appear like black specks. High levels of infestation cause stunting and damage flowers and fruits. Some of the damage you might see could also be a result of viral infections spread by the pest. Regular monitoring is important for early detection and gives you a better chance to manage the infestation. Thrips can be detected on plants by shaking the leaves and flowers on top of a white piece of paper.

Natural control methods

a) **Avoid planting next to host crops**: If possible, avoid planting host crops side by side. Do not plant tomatoes next to onions, garlic, or cereals, as these crops tend to harbour thrips that could lead to greater attacks. Avoid fields near greenhouses where cut flowers are grown, as flower plants serve as hosts for the tomato wilt virus and thrips.

b) **Maintain good field hygiene:** Weed regularly and mulch well. This controls thrips as it destroys their breeding spaces. Light ploughing destroys up to 80 per cent of the pupae, while flooding helps destroy pest eggs and pupae.

c) **Traps:** Using yellow or blue sticky traps, available from most agrovets, is an effective way to trap and kill adult pests. Thrips are attracted to bright colours and, therefore, will be attracted to yellow or blue stickers. You can also make the stickers at home using sticky glue and bright coloured materials.
Pheromone traps can also be purchased at agrovet shops, if needed.

d) **Using neem or soap spray:** Spraying the affected crops with neem oil and soap helps to reduce pest population by suffocating the pest and protecting the plant surfaces. Neem oil also contains a natural insecticide azadirachtin, which kills the pest when ingested. Application should be done every two weeks until the number of pests reduces to an acceptable level or eradicated. Avoid applying to ready vegetables or three weeks before harvesting as the spray will alter the safety and taste of the produce.

For more information on thrips, visit: https://www.infonet-biovision.org/PlantHealth/Pests/Thrips


[SOURCE: PIXABAY.COM]

Controlling common pests during rainy season

The onset of the rains is always good news for farmers. However, they also present the biggest challenge of pests that invade not only our homesteads, but also, our farms

By Dennis Rapongo

Here are some of the pests that occur during the rainy season and how to control them:

Snails and slugs

These creatures like moist environments and increase in numbers during the rainy season. They cause damage to our crops and are sometimes vectors of diseases such as bilharzia.

Control:

Use of salt: Salt can be sprayed on the snails or around the farm. Salt deactivates the snails by dehydrating them.

Use of ash: Snails and slugs move well on moist places and surfaces. When ash is sprayed it desiccates them and makes the surfaces dry, making it hard for them to move.

Crushed eggshells: If you have a crop on your farm, you can put crushed eggshells at the bottom of each crop. The shells have sharp edges that cut or damage the snails that try to climb onto the crop.

Hygiene: Farm hygiene is also key. Get rid of any unnecessary debris on the farm, as they form moist surfaces that create a good environment for snails and slugs.

Alcohol: Snails are attracted to the smell of alcohol. Place containers filled with alcohol at intervals between your plants. The snails will glide in and drown in the alcohol.

Millipedes

They are commonly called "thousand-legged" creatures because of their numerous pairs of legs. Millipedes like moist places and cause a lot of damage, especially to tubers such as sweet potatoes and Irish potatoes.

Control:

Debris: Remove any debris and crop remains or vegetative heaps, which form good hiding grounds for millipedes;

Excess water: Ensure that your farm is well drained by draining all excess water and keep the farm clean.

Use of salt: Spread it around the farm. It dehydrates the millipedes, killing or deactivating them.

Termites

These social insects become more active and come when it rains. They love moist surfaces, as it makes it easier for them to build termite hills. They are a nuisance and can feed on any wooden substance and crops.

Control:

Mix one kilogramme of ash with half-a-kilo of pepper and 20 litres of cow urine. This concoction will clear termites from the farm.

Avoid over-mulching. A lot of debris provide a feeding and hiding place for insects. Reduce the debris and vegetative remains on your farm. Ensure good farm hygiene.

For more information on pest control, visit https://www.infonet-biovision.org/natural_pest_control

Use of banana flour gaining popularity

It has been used for ages in many parts of Africa and Jamaica, especially for people with stomach problems and pains

By Mary Mutisya


[SOURCE:STOCK.ADOBE.COM]

With increasing diet and lifestyle-related diseases, many people are becoming more health conscious and embracing healthy eating habits.

They are using more organic and whole-food products, and avoiding sugary foods and wheat products, which have been linked to non-communicable diseases such as cancer, diabetes, and arthritis.

One area that is expected to grow is use of alternative flours that are gluten-free and sourced mainly from fruits and vegetables. These could replace the traditionally highly priced wheat flour. Banana flour is one such flour that is increasingly gaining popularity.

The use of flour made from unripe green bananas is not new. It has been used for ages in many parts of Africa and Jamaica, especially for people with stomach problems and pains. The production of banana flour is easy and can be done at home. Below are the steps:

1. *Harvest the bananas while still green.*
2. *Peel and sun dry them or use an oven until crispy dry.*
3. *Grind or mill into a fine powder using a mortar and pestle or a mechanical grinder.*
4. *The end product is usually a mildly sweet product that is very versatile and can be substituted in any recipe that needs an all-purpose wheat flour.*

Compared to other flours, the production loss from bananas is relatively low. To make a kilogramme of banana flour, about 8kg to 10kg of green bananas are needed.

Nutritional and health benefits

Unlike ordinary wheat flour, banana flour is gluten-free and can be used safely by people who suffer from celiac diseases (an immune reaction to eating gluten, a protein found in wheat, barley and rye). Its natural sugars are low since raw bananas are used. The rate at which glucose from the bananas is released into the blood is also slow, ensuring that there is no sudden rise in blood sugar levels when consumed. This helps maintain blood sugar levels, which is critical in the management of diabetes and other lifestyle diseases. Another advantage of using banana flour over traditional wheat flour is that it is rich in resistant starch (starch which is not easily digested) and also acts as a food for beneficial bacteria in the digestive system.

> **One area that is expected to grow is use of alternative flours that are gluten-free and sourced mainly from fruits and vegetables. These could replace the traditionally highly priced wheat flour. Banana flour is one such flour that is increasingly gaining popularity**

This helps to keep the digestive system healthy, thus protecting the body from many illnesses.

The amount of potassium in banana flour is higher compared to that of commonly available alternatives. Potassium is essential in the regulation of body fluids, muscle contractions and nerve signals. The flour can also be used to tackle diarrhea. It has many health benefits, is affordable and easily available.

For more information on banana farming, visit https://www.infonet-biovision.org/PlantHealth/Crops/Bananas

Grow herbs and spices to improve health and diversify income

There has been an increase in the demand for herbs and spices both locally and internationally, as people recognise their high nutritional and health value

By Lilian Maina

Herbs and spices are fragrant plants that have medicinal or culinary value in their leaves, stems, roots, flowers, bark, or seeds. They are easy to grow, and most occupy less space in the garden. Once established, a majority require little attention to flourish. They can be sold to supplement a farmer's income.

There has been an increase in the demand for herbs and spices both locally and internationally, as people recognise their high nutritional and health value. It has also been noted that herbs' and spices' prices do not fluctuate like those of other produce. Some herbs and spices that farmers can grow to earn an extra income:

Thyme
This is an evergreen perennial herb with many branches, tiny leaves and little pink flowers. It is packed with essential oils, minerals and health benefits. Thyme is mostly used in food flavouring, medicinal and for ornamental purposes. It is believed to have antibacterial, antifungal and insecticidal properties.

Garlic
This annual herbaceous plant grows underground as a bulb that encloses cloves in a paper-like skin, which is removed to get to the pale yellowish edible flesh. Garlic is used fresh or dried for flavouring food. It also has antibiotic properties.

Lavender
A perennial herb with bluish-purple flowers that has a lovely scent. Its buds and flowers are used to extract essential oils, food flavouring and scent for body and home products.

Dill:
This is an annual aromatic herb with green feathery leaves. It is a good source of fibre, Vitamin A, C, iron and calcium. Dill helps deal with loss of appetite, fever and colds, genital ulcers, renal colic, neuropathy, and kidney disease, etc.

Flaxseeds
These come from the flax plant, which grows to about two feet. They are rich in fibre, omega-3 fatty acids and reduce the risk of diabetes, cancer, stroke, heart and liver diseases. They are available in the form of seeds, oil, capsules or powder.

Rosemary
A perennial herb with needle-like leaves and tiny white, purple, blue or pink flowers, that can be grown as a hedge. Rosemary produces a fragrance that repels mosquitoes and flies. It can be used in juices, tea and to add flavour to roasted potatoes and meats. It contains antibacterial and anti-fungal properties and helps to improve digestion, increase blood circulation, and strengthen the brain and memory. (Picture of rosemary)

Fennel:
This herb is grown for its flowers and seeds. It has thick stalks, feathery leaves and bright yellow flowers. The flowers and seeds are used in soups, salads, fish dishes and tea. The seeds, if chewed after a meal, aid in digestion and can be incorporated in baked goods and drinks.

Parsley
Its leaves, seeds and roots are used to make medicine. It is taken by mouth for bladder infections (UTIs), kidney stones (nephrolithiasis), gastrointestinal (GI) disorders, constipation, diabetes, cough, asthma, and high blood pressure. A biennial herb with bright green feather-like leaves, it has a fresh light scent and can be used in soups, salads and in vegetables. It is low in calories yet rich in vitamins A, C and K. It also strengthens immunity.

Mint (Mentha)
Has over 20 species, whose distinctions are unclear and hybridisation occurs. Peppermint, for example, is a hybrid between water-mint and spearmint. Mint grows and spreads fast and has a pleasant aroma. It is added to recipes due to its strong flavour. It improves bowel movement and repels bugs in the field.

Sage
Sage is a perennial herb, whose fresh or dry leaves are used in soups, sauces and meat dishes. Oil extracted from the leaves and flowers is used to flavour alcoholic drinks and as a perfume. The plant grows to a height of between 40cm and 70cm. It has a dense arrangement of woody stems with silvery-green leaves, produces white, blue or pink flowers and can live for up to 20 years.

Sesame
This tall herbaceous tropical plant is loved for its oil-rich seeds, which can be classified as a spice and are a good source of fibre and Vitamin B. It aids in the formation of blood cells, lowers cholesterol and blood pressure, supports healthy bones and reduces inflammation.

Chamomile
This is a herb that has a few varieties. The German chamomile is sweet-scented, with tiny leaves and flowers that have a hollow cone-shaped receptacle with tiny yellow disk-like flowers covering the cone. Dried chamomile flowers are used to make chamomile tea, which reduces menstrual pains, treats diabetes, lowers blood pressure and helps with sleep and relaxation.

Lemon grass
This herb has a tall stalk with a lemony aroma and a citrus flavour. It is used in treating stomachaches, high blood pressure, convulsions, common cold, fever and joint pains, etc. These herbs are just a few in a pool of many such as basil, chives, ginger, chilies, coriander, capsicum, paprika, cinnamon, etc, that a farmer can grow to diversify their crop production. When grown large scale, there is a ready export market in the European countries that farmers can take advantage of. Herbs have also over the years gained popularity in the local markets such as Ngara and City Market in Nairobi.

Location	Frequency
Nairobi	102.7
Kakamega Bungoma Busia	91.5
Malindi	106.3
Location	Frequency
Webuye	95.9
Garissa	88.7

Location	Frequency
Taita	107.4
Narok	102.3
Nyeri	105.7
Machakos Makueni Kitui	93.8
Meru	105.1
Marsabit	88.3

Location	Frequency
Nakuru Gilgil	104.5
Kisii	91.3
Kisumu	105.3
Mombasa	105.1
Kericho	90.5
Eldoret	91.1

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How to control papaya mealybugs

Pawpaws require rich, well-drained soils and relatively low humidity. They are good income earners and are widely consumed in Kenya. However, they can be attacked by pests one of which is the Papaya mealybug

By Beritah Mutune

What are these pests and and what are their physical characteristics?
They will attack your pawpaw trees, leaving them looking unattractive and could easily make them impossible to sell. Papaya mealybugs *Paracoccus marginatus* are flat, oval or round disc-like insect pests that suck sap from tender leaves, petioles and the fruits of affected plants.

They have a wide range of hosts- one of which is the pawpaw. This fruit grown by many farmers is a favourite for mothers weaning their babies.

Severely attacked plants will have leaves coated with honeydew, on which sooty mold develops, eventually causing pre-mature dropping of leaves and fruits. The signs and symptoms of an attack include:

- *Stunted growth;*
- *Yellow and deformed leaves. Fruits and leaves may drop early and attract ants;*
- *Sooty mold due to fungal establishment of sugary honeydew excreted by the insects may also attract ants. The sight of many ants around the crop should alert the farmer of a possible mealybug attack;*
- *Heavily infested plants will have a whitish cotton-like mass of insects covering the fruits and leaves.*

Management and control:
Mealybugs can be controlled using biopesticides or natural enemies such as ladybird beetles, botanicals, soap sprays, and also observing good agronomic practices.

Use of biopesticides
The efficacy of Campaign an M. anisopliae isolate ICIPE 69–based bio-pesticide, commercialised by the Real IPM Kenya, has been demonstrated against P.marginatus in laboratory and field trials.

Attract ladybirds
Ladybirds feed on mealybugs. Therefore, it is important for farmers to attract them by ensuring friendly conditions on farms that encourage the bugs to thrive.

Neem spray them
Farmers can add neem oil to water and spray the leaves and stems of infested papaws. This will also discourage future infestations.

Use of homemade remedy
Mix one garlic clove, one small onion, and a teaspoon of chili powder and blend together. Add a litre of water and let it sit for about an hour. Stir the mixture and spray it on the infected plants.

Isolate the infected plant
Farmers must move the infected plant away from the rest of the plants, when they find mealybugs on their papaws. If left together, the infestation will soon spread to the other plants in the field.

Avoid over-watering and over-fertilising
One of the common reasons for a mealybug infestation is over-watering or over-fertilising the plants. Mealybugs particularly like plants growing in a nitrogen-rich soil. Therefore, water and add fertiliser only when necessary.

Wash mealybugs off your plants
An easy way to rid your plants of mealybugs is to knock the insects off your plants by spraying water on them with a high-pressure nozzle hose. It will neither kill nor get rid of them completely, but it may minimise the infestation, making it more likely that your plants will survive. You can also manually remove them.

Cut off the infected plant parts
If a specific plant part is heavily infested with mealybugs, cut it off to avoid further spread. Do not throw the stem or leaves in the compost pit. Destroy the stem by burning. Finally, inspect your plants every day to make sure the bugs do not rebuild their nests.

For more information on papaya, visit https://www.infonet-biovision.org/PlantHealth/Crops/Papaya

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