Maize varieties suitable for the short rains

TOF—Most farmers are about to harvest some of the crops that they planted at the beginning of the long rains in March and April this year. Many are already planning on what to plant during the short rains and most farmers will plant beans as the second crop during the short rains.

The country is likely to have reduced maize yields this year because parts of the country did not get adequate rains in the first rainy season, which is the most critical period for growing maize. Farmers in the affected areas should take advantage of the short rains that are expected in October to December and grow early maturing maize varieties. Due to the unpredictable weather, it is important that farmers choose the right varieties to increase their crop yields and reduce the chances of crop failure. Below we give farmers a range of maize varieties, which can do well with reduced rains and also take a short period to grow:

Medium altitude varieties

Varieties that grow well in medium altitude areas are likely to do well even in high altitude areas during the short rains because they take a short time to mature. Farmers whose maize did not do well can take advantage of the short rains to replant. The following are some of the varieties they can use:

Western Seed Company: WH507, WH505, WH403, WH404 and WH402.
FRESHCO: KH500-33A and KH500-13A.

Dryland varieties

Due to the unpredictability of the weather pattern, it is important that farmers do not plant only the medium altitude varieties. They can also plant dryland varieties. The following dryland varieties are available in the market:

KARI: Katumani composite (open pollinated*).
Kenya Seed Company: DH01, DH02, DH03 and DH04.
FRESHCO: KDV1 and KDV-6 (open pollinated).

* Open pollinated varieties can be planted as seed without having to buy again for two or three planting seasons (see TOF No. 105, February 2014 for more information on maize seed varieties).
Growing the right avocado for the market

There is a big demand for avocados in the local and the export market if farmers can grow the right varieties and use the latest grafting technologies.

Samantha Ayienga | The avocado is one of the most popular fruits, not only in Kenya but also in most parts of the world mainly because of its high nutritional value. Farmers can make very good returns from avocado production if they grow varieties with the right qualities. With the increasing population, the price of avocado fruits remains high regardless of the season. There are also good opportunities for export if farmers plant the right varieties.

Avocados are easy to produce organically because the grafted trees are not prone to many diseases and pests like other fruit trees. Such avocados can fetch much better prices in the international markets bringing more income to producers.

Classification and grafting of avocados

The avocado tree has unique flower behaviour and is classified into two (type A and B) depending on the time its flowers open for pollination. Flowers of type A open in the morning when they are fertilized and close around noon. They remain closed until noon the following day when they open for pollination. Type B flowers open at noon (male stage) and close in the afternoon when they re-open and release their pollen (female stage). In type B avocado flowering behaviour, the choice of Fuerte is important because it sets fruits even without assistance from pollinators such as bees. Fuerte is mainly used as a rootstock (lower part of graft) while Hass is used as the scion (upper section of graft).

Grafting Fuerte and Hass

In Kenya, propagation of avocados is mainly done between the Hass (Type A) and Fuerte (Type B) cultivars to produce avocado fruits suitable for the local market. Apart from domestic use, avocado fruits from these cultivars are used for oil extraction for the cosmetics industry and herbal medicine. The choice of Fuerte is important because it sets fruits even without assistance from pollinators such as bees. Fuerte is mainly used as a rootstock (lower part of graft) to come up with the best cultivars for fruit production, avocado trees are grouped and propagated (or reproduced) according to their flowering behaviour.

Grafting Puebla and Pinkerton

For farmers targeting the export market, the Pinkerton is grafted with Puebla variety. The Pinkerton avocado cultivar becomes the scion while Puebla remains the rootstock. Fruits from this graft are big in size, and some are as heavy as 900g. The fruits are firm and do not spoil easily.

Grafting of these varieties has many advantages for the farmer. To start with, the trees are short in size. They also grow fast, thus reducing the maturity period from 8 to 10 years to about 4 years. Farmers working with these varieties find it easy to reach every type part of the tree when picking avocados and when spraying biopesticides and foliar feeds. The plants can also get adequate sunlight.

Using the low bark grafting method, farmers can plant about 644 plants per acre. To improve the quality of fruits, Pinkerton/Puebla graft can be further grafted with Fuerte/Hass graft. The resulting fruits have high oil content that are good for industrial processing.

Farmers intending to start avocado grafting need to undergo practical training in order to do it the right way. Those intending to grow the above varieties should only buy seedlings from certified seedling producers who are registered with the Horticultural Crops Development Authority (HCDA). The same applies to farmers targeting the export market. A medium size fruit costs Ksh 30 in the local market.

Nutritional value of avocado fruits

(Calories and nutrients per 100g edible portion of avocado).

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Minerals</th>
<th>Vitamins</th>
</tr>
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<tbody>
<tr>
<td>Calories</td>
<td>50-220 kcal</td>
<td>Calcium 10mg</td>
</tr>
<tr>
<td>Protein</td>
<td>0.8 - 4.4</td>
<td>Iron 1.18mg</td>
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<tr>
<td>Carbohydrates</td>
<td>1.2 - 10.0</td>
<td>Magnesium 41.0mg</td>
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<td>Fats</td>
<td>5-32g</td>
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<tr>
<td>Potassium</td>
<td>634.0mg</td>
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<tr>
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<tr>
<td>Manganese</td>
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</table>

Source: USDA - Nutrient Data Lab (1996)
Fleckvieh: Why more farmers want this cow

Flecks need to know that it is only through proper management and feeding of Fleckvieh dairy cows that they can get good returns from this breed.

Peter Kamau In 2011, we featured the Fleckvieh dual-purpose cattle breed and since then thousands of farmers have acquired it. Farmers’ feedback to TOF shows that Fleckvieh is now the breed of choice for many dairy farmers who desire a cow that can be used for both dairy and beef production. Following increasing enquiries from farmers, we would like to highlight the qualities and management of this breed.

Origin of Fleckvieh
Fleckvieh is the second largest dairy breed in the world – and one of Europe’s oldest. Through many years of selective breeding, Fleckvieh has acquired most of the desired traits that farmers want in dairy and beef cows.

Active genetic potential
Fleckvieh cow is durable, hardy and easy to handle even within a small farm. They have excellent feet and legs to move easily even in the most difficult terrain. A mature Fleckvieh has good strength and well-developed body and weighs 650-800 kilograms.

Good milk and meat
Studies show that every 1 kilogram of milk from Fleckvieh contains 4.2% fat and 3.7% protein. The milk also contains Omega 3 fats – which are essential nutrients for human beings.

According to Fleckvieh Genetics East Africa, the company that sells Fleckvieh semen in Kenya and East Africa, Fleckvieh bulls are fast growing and gain muscle at a rate of 1.5 kilograms per day for the first 200 days. When cross-bred with other breeds, the farmer is assured of high quality milk and beef. Under intensive fattening, young bulls reach a daily weight gain of more than 1300 grams (1.3 Kg) per day. In the first 6 months after birth, a bull can attain up to 300 kg with proper feeding and management.

Disease resistance
Compared to other breeds, Fleckvieh owners do not incur huge veterinary bills due to the breed’s ability to withstand some of the common livestock diseases such as mastitis. This is an inflammation of the udder that cuts down milk production. The infection is caused by somatic cells (dead cells) from the bloodstream that end up in milk. With its thick skin, insects such as ticks, tsetse flies and even houseflies find it difficult to suck the blood from Fleckvieh cattle. It is therefore fairly resistant to common diseases such as ECF and trypanosomiasis.

The breed has a more efficient feed conversion rate compared to other dairy cattle. Studies show that the breed can give more milk than other breeds with the same amount of feed. For example, if a Friesian-Holstein dairy cow is given 60 kg of feed, the amount of milk it will produce is equal to what a Fleckvieh cow will produce with only 45 kg of same type of feed.

With good management, Fleckvieh dairy cows can produce between 25-35 litres of milk per day. On second calving, it produces 30-35 litres, increasing this to between 30-40 litres after the third calving. The breed has a consistent milk production throughout the lactation period – this is a big plus compared to other breeds. It produces milk steadily for 305 days a year without any decline. The breed has been known to produce 10,000 litres of milk in every lactation (milking period) with good management.

The best way to house a dairy cow

The productivity of dairy cows depend on proper housing and feeding. Maintaining hygiene and providing adequate space is also important.

Space
Each adult cow needs at least 8 square metres apart from her resting pen. The easiest way is to confine this area in front of the stall.
• All animals must to be able to stand in the shade and shelter under the roof. It must be big enough for a person to stand up and work under it.
• The floor should be made of concrete or hard-packed soil.

Concrete is easy to clean.
• The floor should not be too smooth; otherwise the cattle will slip on it. A rough floor also keeps the hooves short.
• The ground must slope gently towards a channel leading to a manure pit outside the pen for urine and water to flow.
• Each cow must have her own resting box pens or cubicle where she can lie down, chew cud and sleep.

Water
• The shed should be close to a reliable source of clean water. One dairy cow needs between 50 and 180 litres of water every day (5 to 18 buckets).

Milking area
• Provide a separate area for milking with a trough, so the cow can feed during milking.

Maintenance
• Dung and urine have to be swept into the manure pit at least once every day. Keep the pit covered.
• The bedding material must be changed as soon as it is wet and dirty. This is necessary to keep the animals clean and dry and will prevent serious diseases like diarrhoea, foot rot and mastitis (page 7).
• Clean the feeding troughs every time before you put fresh fodder into them.
• The water trough needs to be cleaned and brushed out from time to time.
Legumes improve farmers yield in Kakamega

Planting soya beans in rotation with maize and use of compost has revived exhausted soils that had been depleted by years of chemical fertilizer application. This has increased productivity and income for many farmers.

Peter Kamau | Kakamega County is a high potential area in agricultural production. It is, however, one of the most heavily populated regions in the country, with an estimated population of over 1.6 million people. The land is divided into very small portions averaging 1 acre, that are heavily cultivated to produce food for the large population. This has resulted in depletion of the soil nutrients. Many years of fertilizer use have worsened the situation by increasing soil acidity, which has resulted in low crop yields, and consequently inadequate food and income for many farm families in the region.

Three years ago, The Rural Outreach Programme (ROP), a local organization in Western Kenya embarked on changing the situation. With local partners, the organization started the Integrated Soil Fertility Management (ISFM) Project targeting more than 30,000 farmers in the 6 Sub-Counties of Vihiga, Sabatia, Hamisi, Emuhaya, Lurambi and Butere.

Soya beans introduced

According to the organisation’s Project Coordinator, Ms. Doris Anjawa, the farmers were introduced to soya beans and other legumes like bush beans, lablab and climbing beans as sources of nitrogen to restore soil fertility. The beans also provided a rich source of protein in the family diet.

Soy beans can fix between 18-56kg of nitrogen per acre making it unnecessary to use chemical fertilizers.

Legumes are food and fertilizer factories

John Mukalama and Wycliff Waswa** | Small-scale farmers in Kenya have low crop yields partly due to low levels of available plant nutrients in the soil, especially Nitrogen. Although it is the most abundant part of air around us, it is in a form plants cannot use. Fortunately, Nitrogen from the air can be converted by leguminous plants like beans into a form that is available and usable by plants.

Legumes fix nitrogen from the atmosphere

Legumes capture nitrogen from the atmosphere and convert it into plant protein, which helps build soil fertility. Legumes differ in terms of their abilities to fix Nitrogen and how they adapt to environment and the pest and diseases that affect them. Grain legumes planted in Kenya include soya beans, climbing beans, bush beans, green grams and cow peas as well as forage legumes such Desmodium sp., Leucaena leucocephala, Calliandra californica, Tephrosia, Sesbania sesban, among others.

The most preferred fertilizer used by Kenyan farmers is Diamonium Phosphate (DAP) to provide nitrogen and phosphorus, which are inherently low in Kenyan soils. When repeatedly used, the fertilizer increases the soil acidity over time, which can result in less phosphorus in the soil, decreased microbial population and general reduction in legume yields over time.

In Kenya, however, there is a huge potential of legumes to restore soil fertility, especially in replenishing nitrogen. Experimental results from the International Centre for Tropical Agriculture (CIAT) in collaboration with International Institute for Tropical Agriculture (IITA) indicate that soya beans can fix up to between 46-140 kg of nitrogen per hectare (18.4- 56kg per acre), while climbing beans can fix 46-80 kg of nitrogen per hectare (18.4- 32kg per acre).

They increase crop yields

The amount of nitrogen fixed is so much that it becomes unnecessary to use chemical fertilizer for top dressing a cereal crop planted in the same land the next season, which saves farmers money. For example, rotating soya beans with maize in Butere Western Kenya has shown an increase in yield from 1.2 tons per hectare (0.5 tons per acre) to 2 tons per hectare (0.8 tons per acre), which represents over 67% yield increase.

Use inoculants

Inoculating legume seeds with specific rhizobia (such as biofix) strain can also enhance nitrogen fixation. Farmers in Western Kenya intercrop legumes with cereal crops in many different ways: One line of legume to one line of maize or rice, or sorghum, or two lines of legume and two lines of maize famously called mbili mbili method. Others simply rotate cereals and legumes seasonally.

Legumes control striga weeds

Adding legumes to farming systems has other benefits. These include management of the striga weed through what is called suicidal germination (they initiate striga to germinate but it later dies). Legumes also improve organic matter and water retention of the soil after decomposition. They also help break disease and pest cycles. Trials carried out in Western Kenya by CIAT have shown that intercropping soya beans and Desmodium with maize, rice, sorghum and sugar cane significantly reduces striga and consequently increases yield.

**John Mukalama and Wycliff Waswa are scientists with CIAT-TSBF.

Legumes improve farmers yield in Kakamega

Soya beans can fix between 18-56kg of nitrogen per acre making it unnecessary to use chemical fertilizers.
Trees generate money if well managed

Trees on a farm not only help us reduce greenhouse gas emissions that contribute to global warming, but also generate fuel wood and timber for household use and for sale. Some trees improve soil fertility, provide high quality fodder for livestock and are rich in nectar for bees.

Caroline Nyakundi | With the increasing Kenyan population, the demand for fuelwood and wood for construction has continued to increase over the past two decades. The demand for land for agriculture has also risen significantly, although only 20% of the land in the country is suitable for crop farming. As a result, cultivation of natural vegetation has suffered immensely and Kenya is now forced to import hardwoods (sometimes illegally) that are excellent for timber, furniture and carving industries.

Kenya’s forest cover has increased significantly from 1.7% in 2002 to 5.9% in 2012. This is still below the United Nations’ recommendation of a minimum of 10% forest cover. Farmers have played a key role in planting indigenous and exotic trees in their farms. This is referred to as agroforestry. Agroforestry is a system in which farmers combine trees and shrubs with crops. The combination of agriculture and forestry helps farmers use their land in a more diverse, productive, profitable, healthy, and sustainable way.

The Kenya Forestry Research Institute (KEFRI) recommends varieties of high value trees that can be grown on farms. In the next issue we continue with how to grow Grevillea trees. In TOP No. 107 of April 2014, we highlighted the benefits of agroforestry and how farmers in Mwingi have realized better production in rearing bees and silk moths through planting acacia trees on their farms. In this issue, we highlight how farmers can grow Grevillea tree species on their farms.

Grevillea – a high value tree with many benefits

Grevillea robusta originated from Eastern Australia and is widely planted in high and medium potential zones, up to 3000m above sea level. It grows well in medium loam or light sandy soils but doesn’t in water logged soils. It is very common in farms in the central highlands in areas like Embu, Meru, Muranga, Thika and Kiambu.

Peak flowering is between January and February in South Western Kenya, and between September and December in central parts of Kenya. The tree is pollinated by birds, bats or insects. Its seeds mature after 2–4 months and can be harvested from March-June or December – February in South Western and Eastern regions respectively.

How to sow and germinate the seeds

• Broadcast the seeds thinly and evenly on a well-prepared seedbed (containing sand or a mixture of sand and soil) and covered with a thin layer of sand/soil. It is not necessary to treat the seeds before sowing.
• Spread light mulch (dry grass) over the seedbed to keep it moist.
• Water the seed bed regularly (morning and evening) and checking daily for any emergence of seedlings. Seedlings are planted out when they are 30cm tall (4–6 months).
• Water the seed bed regularly (morning and evening) and checking daily for any emergence of seedlings. Seedlings are planted out when they are 30cm tall (4–6 months).

Grevillea trees grow very fast if planted the right way.

Local names of Grevillea robusta
• Silky oak (English)
• Mukiina, Mubariti (Kikuyu)
• Bolebolea (Luo)
• Wakhuisi, Estichuma (Luhya)
• Kapkawet (Nandi)
• Omokabiria (Kisi)

Seed storage: There are 70,000-100,000 seed per kilogram depending on their origin and the climatic conditions of the ripening year.

Important uses of Grevillea robusta

Grevillea robusta stems are useful for timber (furniture, plywood, veneer) and poles/posts. Other uses of the tree include:
• Production of nectar for bees
• The combination of Grevillea leaves and manure makes good organic material for improving soil fertility.
• Branches are useful for firewood.
• Leaves can be used as mulch for crops.
• The trees act as windbreaks and provide shade to crops.
• Leaf litter can be used as bedding material in livestock zero-grazing units.
• Ornamental – they provide beauty where they are planted.
• Can provide fodder for livestock during the dry season.

In the next issue we continue with how to grow Grevillea trees.

For certified tree seeds and seedlings contact KEFRI on Phone no. 0722 322 140.
In the first year, farmers could clearly notice the difference in various treatments of the demonstration plots. In plots intercropped with certified maize seed and soybean seeds, the yields were much higher with most of the plots recording between 90-100kg of maize. In fields with pure soybeans inoculated with biofix, an average of 90kg of soybean was harvested while in those plots under soybean alone 70-75kg of the beans was harvested.

**Rotation with soybean increased yields**

A significant finding was that in all plots where maize was rotated with soybean, the maize yield increased by an average of 20kg. In the fifth plot, which acted as the control, maize yields remained the same with an average yield of 10kg or less in all the demonstration sites. This showed that planting soybean as an intercrop or in rotation with maize significantly increased maize yield.

**Farmers preferred compost**

Although farmers participating in the trials were encouraged to use lime in order to restore soil acidity, most of the farmers found it difficult to access lime from agroveterinary shops. Instead, they opted to use compost that was readily available in their homesteads. The positive effect of repeated use of compost began to show slightly in the second year, and more prominently in the third year when crop yields noticeably increased.

**Increased earnings for farmers**

Kenneth Madaga, a farmer in Mbale who has a demonstration plot says that he has noticed a remarkable change in crop yields in his 1 acre farm. Previously he only managed to get yields in his 1 acre farm. Previously he only managed to get yields in his 1 acre farm. He has noticed a remarkable change in crop yields in his 1 acre farm. Previ-ously he only managed to get yields in his 1 acre farm. Previously he only managed to get yields in his 1 acre farm. He has noticed a remarkable change in crop yields in his 1 acre farm. Previously he only managed to get yields in his 1 acre farm. He has noticed a remarkable change in crop yields in his 1 acre farm.

**Soya beans improve nutrition**

Besides increasing the production of other crops such as maize through nitrogen fixation, the introduction of soya beans has had a great impact in household nutrition in the entire region. Ms Avaya says that one of the objectives of introducing soya beans was to use its rich source of nutrients to reduce malnutrition specially among children in most of the farm families, which had limited source of proteins.

**Vegetables: A money spinner for Butere mother**

Eglay Amakobe Okello is a mother of eight children living on a 4-acre farm in Butunyi sub-location Butere Sub-County. She belongs to Judea Women’s Group. Eglay used to plant sugarcane, maize and beans, and in the year 2000 Ms Okello’s group joined the ROP training programme, which changed her farming.

**Poor crop yields**

Before joining ROP, Ms Okello used to earn Ksh 10,000 from sugarcane after 18 months. Further, she could only get 1 bag of maize and her family literary starved.

**Increased income**

Today Eglay’s farm is a major source of indigenous vegetables, which she sells along with seeds. The ROP project supports her with marketing. She supplies them to local markets, supermarkets, schools, hotels and neighbours. With income from vegetable sales, she is to educate her children. One of her daughters is now attending a local university. She has put up a house and her family diet has improved.

**Bought dairy cows**

Mrs Okello is able to make Ksh 20,000 every three months, which she uses to pay fees for children. Last month, she made Ksh 35,750 from indigenous vegetable sales. Through savings with the ROP project, she has bought 3 dairy cows and now sells milk to her neighbours. Ms Okello makes high quality compost that has improved the soil and crop yields. Many of her neighbours have learnt from her and have started indigenous vegetable gardens.

“The ROP project has transformed my life completely. I would not be where I am today if I had not joined the project,” she says.
Cleanliness is key to keeping away mastitis

Mastitis is a swelling of a dairy cow’s udder caused by several strains of bacteria mainly of the streptococci and the staphyloccoci family. Mastitis is one of the biggest challenges facing Kenyan dairy farmers today. This is mainly due to the conditions under which many small-scale farmers keep their animals.

In many farms it is common to see dairy cows housed in very dirty sheds where they are forced to lie on their own droppings mixed with urine and turns soggy especially during the rainy season. When the dairy cows live in these conditions, it is easy for the bacteria to gain access to the cow udder through the teat canal especially when the animals lie down to rest.

Mastitis infection causes economic losses of up to 40 per cent in milk production, which is a big loss to the farmer. There are very high chances of infection unless utmost care and hygiene are put in place and continuously observed.

How to prevent mastitis

Mastitis can only be controlled through proper dairy cow management. Dairy farmers can take the following preventive measures:

- Infected cows should be milked last.
- Thoroughly wash your hands before and after milking each cow (this prevents transfer of the bacteria from one cow to another while milking).
- Hot water mixed with a disinfectant should be used at all times when milking.
- A separate clean cloth for washing the udder should always be used to wash the udder before milking.
- The first jet or stream of milk coming out of the udder while milking should always be directed to a container with a dairy disinfectant (do not let any of this milk to spill on the floor of the dairy as it may spread the mastitis-causing bacteria).
- Wash milk container and other dairy equipment thoroughly and continuously.
- Change your cows’ bedding or clean the floor with water daily to keep the cow udders clean.
- Do not treat the infected animal yourself. Always allow a qualified veterinarian to do it.

Clinical signs of mastitis

There are three clinical forms of mastitis:

Sub-clinical mastitis: This type of mastitis is caused by a bacteria called streptococcus agalactiae that is found in dairy cows. It cannot be easily detected because no sign of infection can be seen through visual observation. It is only a laboratory test that can determine if a cow is infected. This type of mastitis is often detected on milk meant for export because the milk has to undergo mandatory laboratory tests before it can be exported. Milk containing the bacteria is rejected.

Mild clinical mastitis: In this type of mastitis, the animal shows distinct changes in the udder which can be detected by touching. The udder becomes hard in one or more quarters of the udder. There are also changes in the quality of the milk coming from the infected animal. Farmers can also detect this form of mastitis by using a strip cup (picture). The milk from such a cow is watery with abnormal colour, which can be pinkish or yellowish due to blood staining. Flakes or clots in the milk can be noticed by the strip cup test.

Acute or severe clinical mastitis: When this type of mastitis affects a dairy cow, the udder is swollen, hard and painful when touched. The milk from the infected cow is yellow in colour with blood clots. It may also appear yellow-green with a foul smell especially if the infection is caused Corynebacterium pyogenes - a pus forming bacteria. The teats may also show signs of injury. The cow produces less milk that is watery or grey in colour.

A simple white fly control method

My tree tomatoes are infested by white flies. What can I do to protect them?

You can control white flies by simply hanging yellow polyethylene paper around your fruit orchard at least 1 to 2 metres high on the fence around the orchard. To trap them on the polyethylene paper you can put any sticky substance e.g. wax on the surface of the polyethylene paper. The white flies will be attracted to the yellow colour but they cannot leave as they get stuck once they land on the plastic paper. Alternatively you can eradicate the white flies in the already affected fruit trees using hydrogen peroxide solution. Buy the peroxide from any chemist, put 20ml hydrogen peroxide in a 20-litre knapsack full of water and spray the trees ensuring you reach all the leaves. You can add 20ml of liquid cooking oil in the solution and spray. You can harvest fruits any time after spraying.

Why do bees occupy hives hung high up a faster than those placed on the ground?

Bees move in swarms at a height of 8 -10 metres and easily occupy hives placed at that height. Bees also occupy hives placed 1 - 2 metres high if the bees spot them. Beekeepers can smear hives with propolis which increases chances of hive occupation. Align the hive in the bees’ direction to improve chances of hive colonization. If a hive takes too long to be occupied, bring it down then clean it with leaves from ocimum kilimandscaricum (mutaa in Kikamba).
Farmers need to adapt to climate change

Musdalafya Lyaga and Elias Ndiritu

In the past, the farming calendar was much easier to predict. From certain types of insects or ants, the farmer could tell when to plant, what to plant and even the health of the soil. Certain birds, frogs and even small animals used to signal the advent of the planting or harvesting season. But now the farmers’ allies are being replaced by destructive pests in the farms.

Plant drought tolerant crops

For farmers, it’s becoming more difficult to know when to plant, or even what to plant. Already this year first season rains have failed in many areas yet again. Farmers can expect increased temperatures and more frequent droughts, floods and storms. As weather patterns increasingly becomes harder to predict, farmers need to understand climate change, and plan for the changing and variable yields, water shortages, and possible increases in pests and diseases. They also need to plant crops that are either drought tolerant or those that can survive in flooded conditions.

Growing maize no longer sustainable

Indeed the argument has been that the majority of the population will have to adapt to different diets especially those from crops that require less rain and those that are drought tolerant such as millet, cassava, sorghum among others and those that mature early such as banana, groundnuts, cowpeas to reduce reliance on maize, which is the main staple in Kenyan diet and which requires a lot of water to grow well.

Farmers are now realizing that reduced yields and changes in rainfall patterns with longer dry seasons and heavier rainfalls that destroy farms are partly due to climate change and the rise in the world’s temperature or global warming. Climate change therefore has huge implications for food security, rural livelihoods and poverty reduction.

Indicators of global warming

The effects of rising temperatures are already being felt across the world, which has serious implications for our health, environment and economy. These include:

- Changes in rainfall patterns with more severe droughts incidence.
- Increased likelihood of extreme events such as flooding, hurricanes.
- Widespread vanishing of animal populations, following widespread habitat loss for feeding of the animals.
- Increased spread of diseases such as malaria in previously cold areas that are now warming up.
- Unpredictable and extreme weather in our environment with delayed onset of the rainy season.

What can the community do?

Many climate change adaptation approaches require collective action. Communities should have collective strategies for coping with climate change like soil conservation, planting trees up with strict measures to protect the environment. If we plant more trees starting today, we shall get more rainfall in five years time and the rising temperatures will be controlled greatly.

What can farmers do?

Farmers need to combine best traditional practices with improved research methods such as planting improved drought tolerant and fast maturing crops. Scientists also working on improving crops such as maize which are drought tolerant and early maturing. Other measures which can help the farmer adapt to the changing climate include restoring soil fertility by planting trees and use of composted manure and organic fertilizers, conserving and harvesting rainwater and good water management practices like use of drip irrigation and other organic and eco-friendly practices.