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## Farmers, beware of poor quality feeds

**Peter Kamau** Kenya has gone through a severe maize shortage in the last four months. As a result, prices of maize flour have risen from an average of Ksh 115 up to Ksh 165. Likewise, animal feed prices have gone up because feed manufacturers mainly use white maize and its by-products to make feeds. Poor quality feeds mainly affect dairy, poultry and pig farmers.

Our research has established that due to the maize shortage, feed manufacturers have

resorted to their usual practice of adulterating feed to maintain their profits. This has reduced the quality of feed, causing farmers huge losses.

### Poor quality fishmeal

Analysed feed samples taken to local analytical laboratories show that most of the feed makers add mainly sand and excess lime to the ingredients. Laboratory tests done at KALRO stations show for example that fishmeal, which is supposed to have a crude protein content of 40 to 54 per cent instead has 17 per cent crude protein. On further analysis, the samples have been found to have a lot of ash insoluble acid. This means that the feed makers add sand to the ingredients to increase weight (quality fishmeal such as *omena* has a crude protein content of between 50 to 54 per cent).

### Manufacturers add excess lime

Tests done on soya cake reveal some feed makers add yellow maize bran to change the colour. Most of the manufacturers add excess lime to poultry, livestock and pig feed besides maize germ to increase weight. Lime is also added to maize germ for the same purpose. Instead of using rice polish as recommended, some feed manufacturers use rice husks and add lime for the



Feed ingredients at a store in Nakuru

feed to attain the correct weight.

### No feed quality regulator

Dr Joseph Akai, an animal nutritionist says, the addition of sand and lime does not help the animals because these pass through the animal gut undigested, leaving the animal undernourished. Adding, "Due to lack of maize, some of the feed manufacturers use maize germ and broken wheat without adding *Non-Starch Polysaccharides* (NSP) degrading enzymes; the enzymes which help to break down and ease the digestion of the feed by animals."

Apart from the Kenya Bureau of Standards (Kebs), Kenya does not have a regulatory authority for animal feeds. ***We will provide more information on feed quality in the coming issues of TOF magazine.***

Dear farmer,

Kenya will have a new government in place soon. As usual, there are many expectations from Kenyans. No one will want to see the affairs of the country run in the same way as they have been. Kenyans expect to see major changes in all sectors of the economy. Agriculture is one such sector. For a long time, the agricultural sector has been given very little attention; with farmers getting a lot of empty promises by successive governments.

The consequences of this neglect have been very dear to the country. This year for example, the country has been forced to spend close to Ksh 5 billion to import maize to plug last year's production deficit; such a large amount of money could have been saved or put to better use for instance in assisting farmers to produce more food for the country through irrigation or credit schemes.

The neglect of the agricultural sector has seen a major decline in production and provision of essential services to our farmers. Our agricultural research institutions such as KALRO are now in a shambles. Our farmers lack extension services that can help them increase production and income.

Except for a few services provided by the civil society and the private sector mainly in training and input supply, farmers have been left on their own. This is clearly demonstrated in the outbreak of major diseases such as the Maize Lethal Necrosis (MLN) a few years ago and the invasion by the fall armyworm in maize growing areas this year. The government seemed clueless on what needed to be done to control these calamities, which have led to big losses to farmers and food shortages in the country.

There is an urgent need to do a major overhaul of the agricultural sector in the same way the government has done in the education sector. To do this, people appointed to key posts in the Ministry of Agriculture Livestock and Fisheries should be carefully vetted to ensure only the competent ones and those committed to reforms in the sector are appointed.

A good team at the helm would drive reforms and put in place a dynamic system for monitoring, evaluation and forecasts in all agricultural sub-sectors, which would help the country address issues of food security, development of value chains and quality control. These reforms would help increase production and enable agriculture play its rightful role as a key driver of the economy.

### In this issue

Grapes production 2 & 3



Brachiaria for Push-Pull 4

Yams as cash-crop 6

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# Diversify your sources of income by growing grapes

Grapes are a high value crop that could earn farmers very good returns since there is a ready market for table grapes in Kenya. However very few farmers grow them.

**Margaret Kimani** | Grapes are some of the most popular fruits grown in many parts of the world because of their high nutritional value and good market prices. They are mainly used for making wines and also for home consumption (table grapes). Grapes are a very rich source of vitamins A, C and K including minerals such as iron, copper and manganese which are important in human health. Grapes can be grown in the home kitchen garden or just in the backyard for family consumption.

Grapes are a high value crops that can earn farmers very good returns if well-managed. There is a ready market in Kenya because very few farmers grow them since it can be grown in many parts of the country. Grapes require good management to grow well and bear good tasty fruits that many consumers like. Apart from home consumption, grapes are mainly used for wine making by companies that do commercial grape production.



Red grapes in vines



A maroo grapevine: Most grapes in Kenya are imported from South Africa and Egypt

## Climatic requirements

Grapes do better in warm climate with high temperatures that enable the fruits to ripen. They are grown in many climatic regions in the world especially in countries where there is a well-developed wine making industry.

**Soils:** Grapes do well in deep, well-drained soils although they can grow in a range of soil types. Farmers are advised to till the land twice and harrow it at least three times to make the soil fine.

**Planting:** Planting material can be obtained from seeds or just cuttings (*farmers should only buy planting material from certified seed nurseries*). Farmers are advised to plant grapes at the right time, preferably in April.

**Spacing:** While planting, a spacing of 3m x2m is required. Farmers should plant grapes with other tree crops such as mulberry or guava fruit trees to offer the grape vines support as they grow. A trellis system (*structure or framework for support see opposite page*) should be set to train and support the grape vines as they grow. One reason that grapes are planted together with mulberry and guava fruit trees is to offer support and also reduce bird damage to grape

fruits. The grape fruits are tucked inside the leaves of these trees to protect them from bird damage. When planting, the planting rows should run from North to South in Kenya and East Africa in order to expose the grapevines to as much sunlight as possible for growth and ripening to take place.

## Facts

One grapevine can produce between 20kg to 30 kg in one year. One acre can accommodate 660 grapevines at the spacing of 3m by 2m. A punnet of grapes costs Ksh 600 to Ksh 1000 per kg in super markets.

**Fertilizer and manure application:** Grapes are deep rooted. Therefore, require limited fertilization. However, if the soil fertility is poor, addition of compost and rock phosphate is advisable to balance the nutrients to ensure they grow well. Apply the rock phosphate in a circle, 4ft away from the base of the vine. If the plants are weak, do fertilization every year (200g per vine) at the beginning of the long rains.

Organic fertilizer application, which is rich in nitrogen and ammonium sulphate should be applied after the vines have blossomed (flowered) or when the grapes are about ¼ inch across.

Add zinc to grapevines since it helps to stimulate many functions that leads to stunted shoots and leaves resulting in reduced yields.

Fertilizer application should be done in April under Kenyan climatic conditions. Nitrogen fertilizers should be applied after pruning to encourage leave growth. For phosphate fertilizers, the farmer can add 200g per vine at the beginning of the long rains.

**Pruning:** As the grapevines mature, pruning is necessary to give the plants more vigour. Snip (cut off) excess vines and thin the leaves to enable the plants to start fruiting and to avoid unnecessary competition for nutrients. Deep pruning of the leaves and vines can help to promote fruiting. The pruning should be done once in the first and the second year. Cut back the weak branches. Pruning enables the grapes to develop a deep root system that enables the vines to remain strong and more productive. Grapes usually go dormant after pruning. The farmer can enhance dormancy by stopping watering.

## Types of pruning

**Spur pruning:** In spur pruning, the first and second buds are usually removed since they cannot produce flowers and be able to fruit. Later (when the grapes produce more buds), the farmer can prune most of the buds and leave up to 4 buds.

**Cane pruning:** In the cane pruning method, the farmer leaves 5 to 7 buds.

## Pests and disease management

Birds are a major problem in grape production. They peck the grape berries and damage the fruit causing serious losses to farmers. To prevent such damage, farmers can use bird netting to keep them away. Another method as described above is to plant grapes with other plants

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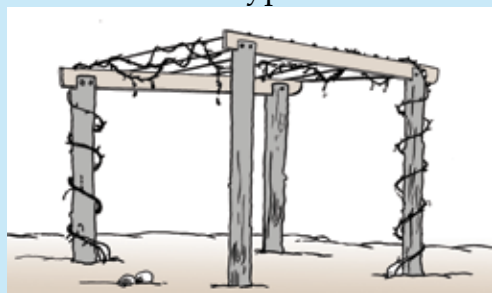


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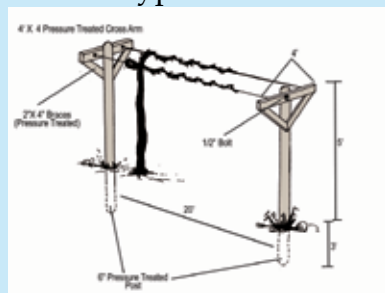
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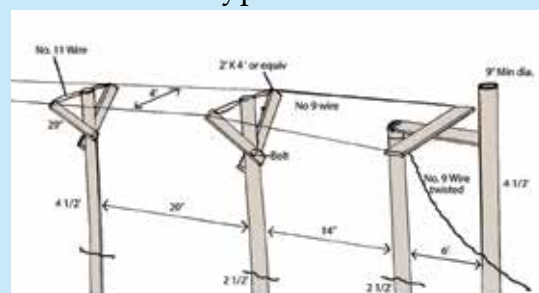
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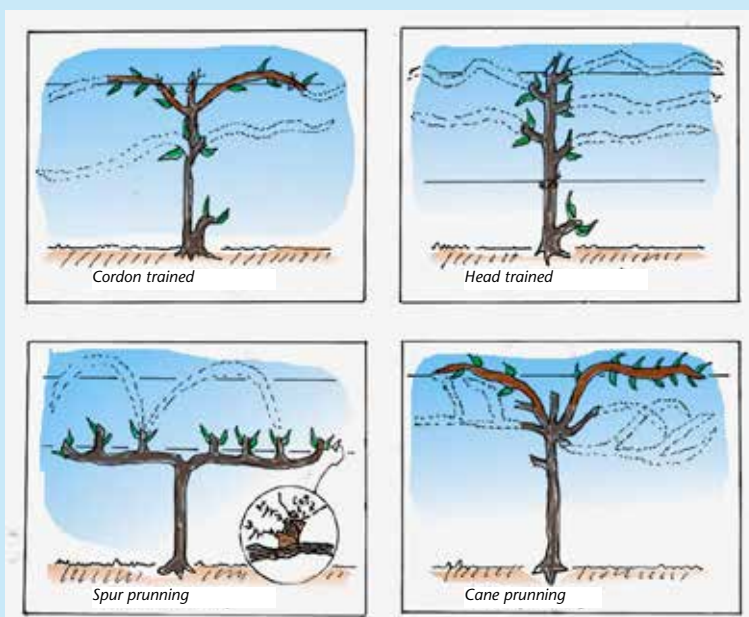
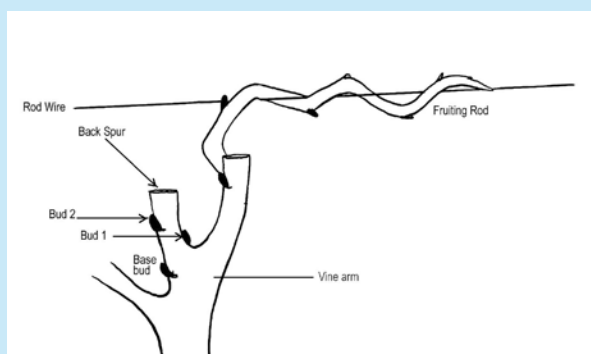
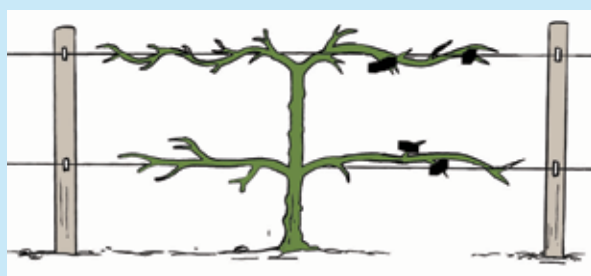
T - type of trellis



Y - type of trellis



Different ways of training and pruning grapevines in a trellis system



Illustrations by Igah

and hide the fruit bunches under the leaves to avoid bird damage.

**Diseases**

Diseases mainly occur in cold areas or during the cold season. Some of the common diseases that affect grapes in East Africa include the following:

**Botrytis (grey mould):** Botrytis occurs when fungi spores develop on leaves.

**Anthraxnose:** Grapes can also be affected by anthracnose. Treatment is the same as other fungal diseases like botrytis, powdery mildew etc.

**Powdery mildew:** Grapes affected by powdery mildew have white powder-like splotches (marks) on the leaves, stems and grapes. Powdery mildew affects grapes in all parts of the world, both in dry and wet conditions. Powdery mildew kills leaves making it difficult for trees to set fruit. A well-managed canopy can help to control the disease. Farmers can also apply baking soda mixed with water to prevent infection on grapevines. Powdery mildew can also be prevented by application of copper-based fungicides such as copper oxychloride (this is allowed in



A grapevine affected by Anthracnose (organic production).

**Downy mildew:** Symptoms of powdery mildew include light green spots scattered across the leaf. The spots appear greasy and are commonly referred to as oil spots. Downy mildew can be controlled using copper-based fungicides such as copper oxychloride (apply every 7 days).

**Bunch rot:** Berries affected by bunch rot appear soft and watery. In areas with high humidity, grape berries are covered with a grayish growth of fungus mycelium. Tightly clustered grapevines are more prone to this disease. Canopy management can prevent the development of bunch rot disease in grapes.

**Harvesting**

Grapes mature after three years. Harvesting can be done when the grapes attain the required sugar

content. Harvesting of grapes in Kenya is usually done between January to March. In large farming operations, a special instrument called a refractometer or hygrometer is used. For small-scale farmers the easiest method they can use is to taste the grapes to find out if they have attained the required sugar levels for the market.

Each variety of grapes has its own taste or flavour, so farmers must know what the varieties they grow tastes. Ideally, all grapes should be sweet and not too sour when ready. The best time to pick grapes is when they are at their sweetest. Later on, they begin to shrivel showing they have overripened and may deteriorate and become unmarketable. Farmers can also use the following methods to determine if their grapes are ready for harvesting:

**Look:** Look at your grapes carefully, they should be full, have deep colour all round. Green grapes will lighten and almost turn yellowish. Sometimes, grapes may attain the right colour even if they have not ripened. If they have the right colour but not sweet, it may require another 1 to 3 weeks to develop their full

sweetness.

**Feel:** Slightly press the grapes with your fingers- they should be plump, thick and feel like they are full of juice. If they have attained this state, it means they are ready for harvesting.

**Seed Colour:** Just like apples, seeds of ripe grapes turn from white to tan to brown.

Farmers should pick grapes on a warm sunny day as they are likely to have the highest sugar content and will store better if they do not have any surface moisture.

**Storage:** The ideal temperature for grape storage is 0° C - 2° C. To prevent moisture loss, it would be advisable to store grapes in plastic wrappers. Never wash grapes before storage because a lot of moisture will damage their quality. Before eating grapes, hold them in cool running water to rinse them. Then drain, dry and enjoy them. Grapes can be easily stored in a refrigerator for up to two weeks. Do not mix grapes with other fruits such as apples, kiwi or pears.

Farmers interested in grape seedlings can buy them at KALRO Thika Tel.0726 586 408 Or Nature Green Farmtech Tel.0714 118 794. A seedling goes for between Ksh150 - Ksh 300.



# Brachiaria is better than Napier in push-pull technology

Small-scale farmers who have adopted the Push-Pull technology are now using brachiaria grass in place of Napier grass to control stemborer and increase crop yields.

**Amina Day Ojijo** | Africa has a great potential for not only feeding its rapidly growing population, but also the rest of the world. Kenya continues to experience tremendous growth in agricultural productivity as researchers; extension services among other stakeholders working closely together continue to help farmers adopt improved farming technologies. This is essential in the reduction of hunger, poverty and enhancing food security.

The re-introduction of brachiaria grass back to Africa by CIAT has given an opportunity to small-scale cereal farmers in Kenya who use the Push-Pull technology to control pests; a challenge that has been largely responsible for low yields experienced by many cereal farmers.

## Need to increase farm productivity

The staple foods in the Kenya diet are cereals such as maize, beans, millet or sorghum. However, in spite of availability of a number of cereal varieties with improved yield potential, the productivity of staple cereal crops remains low, around 1t/ha ( 11 bags per acre). Every year there is a critical shortage of cereals in many small-scale farmers' households, leading to high grain prices, hunger, undernourishment and widespread poverty. Significant yield gains can be made by addressing the constraints facing productivity of the cereal crops such as maize, which is the staple food in Kenya.

## Causes of poor crop yields

The stemborer, parasitic striga weeds and poor soil fertility are the three main constraints to improved production of maize. Losses caused by stemborers can reach as high as 80% in some areas and an average of about 15-40% in others. Losses attributed to striga weeds on the other hand range between 30 and 100% in most striga infested areas, and are often worse by the low soil fertility that is common in these regions.



*Brachiaria is now commonly used in Push- Pull technology due to its good qualities such as tolerance to drought*

## Chemical stemborer control expensive

The soils are highly degraded due to continuous cropping with limited or no external organic inputs to improve soil fertility. When striga and stemborer infest maize farms together, farmers often lose their entire crop. Scientists have reported that crop losses caused by stemborers and striga weeds amount to about Ksh 700 billion annually, affect-

ing mostly the resource poor subsistence farmers.

Control of stemborers using pesticides is not only expensive and harmful to the environment, but is also ineffective as the chemicals cannot reach deep inside the plant stems where stemborer larvae reside. Preventing crop losses from stemborers and striga weeds, and improving soil fertility in Eastern Africa alone can increase

cereal harvests enough to feed an additional 27 million people in the region.

This is one reason why small-scale farmers need to adopt a sustainable methods of pest control to reduce pest and striga damage by adopting the Push-Pull technology that controls both the pest and parasite. Below we show farmers how the Push-Pull method works and its benefits. (*See box*).

## How the Push-Pull technology works

A conservation agricultural approach known as 'Push-Pull' technology has been developed for integrated management of stemborers, striga weed and soil fertility. Push-pull was developed by scientists at the International Centre of Insect Physiology and Ecology (icipe), in Kenya and Rothamsted Research, in the United Kingdom, in collaboration with other partners. The technology is appropriate and economical to the resource poor farmers in the region as it is based on locally available plants, not expensive external inputs, and fits well with traditional mixed cropping systems in Africa.

### Maize yield increased

The technology has been known to increase maize yields from about 1 t/ha to 3.5 t/ha ( 5.5 -1.7 bags per acre) achieved by intercropping cereals like maize with a repellent plant, such as desmo-

dium, and planting an attractive trap plant, such as brachiaria grass, as a border crop around this intercrop.

Stemborer females are repelled or deterred away from the target cereal crop (push) by the repellent plant such as desmodium while they are simultaneously attracted (pull) to the trap crop brachiaria, leaving the target crop protected.

Desmodium roots produce a chemical that suppresses the germination of striga seeds. This combination provides a new method of striga control in the soil through efficient suicidal germination even in the presence of plants from the grass family.

### Desmodium and brachiaria control pest

Desmodium is a perennial cover crop (live mulch) which is able to exert its striga control effect

even when the host crop is out of season, and together with brachiaria grass protect fragile soils from erosion. It also fixes nitrogen, conserves soil moisture, enhances insect abundance and diversity and improves soil organic matter, thereby enabling cereal cropping systems to be more resilient and adaptable to climate change while providing essential environmental services, and making farming systems more robust and sustainable.

When farmers adopt push-pull using brachiaria, they not only achieve a dramatic and sustainable increase in cereal yields, but they also spend less time weeding their crops, and obtain year round fodder for their animals.

Source: [www.push-pull.net](http://www.push-pull.net)

For more information on push pull farming technology please visit <http://www.push-pull.net>



# Eat the right food to maintain a healthy heart

The heart is one of the most hard working organs in your body. Some foods can cause the build-up of bad fats in blood vessels in and outside the heart muscles, cutting off blood supply which can cause heart attack stroke or heart failure.

**Linah Njoroge** | Non-Communicable Diseases (NCDs) are the leading cause of death compared to all other diseases. The World Health Organisation (WHO) estimates that NCDs will cause 73% of global deaths and 60% of the burden of disease by 2020. In Kenya, NCD accounts for more than 50% of total hospital admissions.

When we mention heart disease or condition, most people think about heart attack. Heart disease or better described as cardiovascular diseases generally refers to several conditions that affect one of the most hard-working organs in our bodies, called the Heart. It involves either the narrowing or blocking of blood vessels that can lead to various outcomes such as heart attack, chest pain or stroke.

## How the heart works

"Artificial fats and change of natural diets lead to increased cases of heart diseases. In the Western countries, heart diseases had increased to 80% but later decreased to 40% after they adopted the use of natural foods," Says Dr. Robert Mathenge, Interventional Cardiologist at Nairobi Hospital.

The heart is a muscle that works without a rest. As long as it is well cared for; it continues to function from birth to death. To understand heart diseases, we need to be familiar with the different types of heart related conditions which include coronary artery disease, arrhythmia, cardiomyopathy and heart failure.

Each of these conditions has unique symptoms, treatment and management. However, there are certain commonly known symptoms that have tell-tale signs that one may be having a heart related condition. We know that coronary arteries are normally responsible for blood flow to the heart muscle, thus allowing it to beat.

## Bad fats block blood flow

The danger of this is that if the cholesterol builds up, which



Highly processed foods are to blame for increase in Non-Communicable Diseases (NCDs)

hardens inside the artery forming a plaque. The plaque may crack and block your artery cutting off the blood supply to part of your heart.

Since blood carries oxygen, any part of the heart that is cut off from the blood flow quickly gets damaged due to lack of oxygen and can have serious consequences and even death.

**Angina pectoris:** Sometimes the heart can experience spasm or narrowing of these arteries and this can be due to several factors including a build-up of fat and cholesterol (a sticky plaque that makes it harder for the blood to flow through them). Once this happens someone will complain of intense pain on the left side of the chest radiating down the left arm. This pain is experienced after physical effort, stressful situations or intense emotion although this condition is reversible and fortunately does not leave permanent damage to the heart.

## Causes of heart failure

The fourth and most serious

cardiac or heart related complications is heart or cardiac failure which may occur as consequence of the heart's inability to pump necessary volume of blood.

It is well known that our lifestyle including the food that we eat, exercise and other habits like alcohol and smoking may affect our health. Diet has a great influence on the function and condition of the coronary arteries.

Another condition caused by cholesterol is complete obstruction of the coronary artery or one of its branches. This condition is irreversible and leads to severe damage to the heart muscle and tissue. The obstruction of the coronary artery can be due to progressive narrowing and hardening of the artery or the formation of blood clot inside the narrowed artery. This causes stoppage of blood flow to the heart.

**Palpitations:** Another heart related condition is where there is alteration in the heart-beat rhythm which is felt as a palpitation. In some instances, depending on how serious the

heartbeat alteration is, it can lead to a heart failure or cardiac arrest if the heart's ability to efficiently pump blood throughout the tissues of the body is compromised. Although in many instances, these palpitations may be unknown, there are certain factors that promote it such as food allergies. If toxic substances are released as a result of the allergic reaction.

**Stimulants:** Stimulants that are normally in beverages such as coffee, cocoa, alcoholic beverages and tobacco can also alter the heart rhythm. A hyperactive thyroid gland causes hormonal imbalance and may affect the heart rhythm.

## Eat the right food

A diet that is poor in plant based foods and rich in saturated fats is one of the causes of narrowing and hardening of the arteries. Lack of physical exercise and tobacco also can have the same effect. A deficiency in magnesium and other nutrients can result in tendencies of spasm or contractions of the muscles.

It is clear that the type of food one eats can either cause heart attack or prevent it. In fact, after a heart attack, it is important to be on a special diet for proper rehabilitation and to reduce the risk of new crisis. We now know that there are many causes that may lead to heart failure and some related to the food we eat.

Excess fluid in the body that may be as a result of increased salt consumption or related to poor kidney function.

As a result there is greater blood volume which require the heart to put more effort to pump and thus making it fatigued.

Eat natural foods, get involved in physical activities to reduce chances of heart attack.



Eating more fruits and vegetables promotes a healthy heart

## Tips to health heart diet

- Eat at least five portions of fresh fruit a day.
- Eat at least one fresh vegetable salad a day or plenty of other cooked green leafy vegetables.
- Eat whole grain bread instead of white or highly refined bread
- Reduce salt and sugar consumption.
- Avoid tobacco and excess coffee.
- Perform physical exercise for at least 40 minutes three times a week.



# Growing yams improves food security and income

Many communities have abandoned yams production for maize and other cereal crops. But yams are nutritious and can grow even with little rains and limited management.

**Venter Mwongera** | Yams are a rich source of vitamin C, boosts the body's immunity, fastens wound healing especially to people with diabetes and strong bones, besides other vital nutrients required in the body. "Yam is a crop rich in nutrients including Vitamins A, B, C, and potassium which are crucial ingredients to strong bones, teeth and a booster to body's immunity," says Ms Linah Njoroge.

Ms Njoroge, who is also a former head of nutrition, Kenyatta National Hospital. The crop is mainly grown in West and Central African Countries. Though it is an orphan crop in Kenya, it provides the families with an additional source of livelihoods besides providing healthy meals. In Kenya, small-holder farmers in Central and Eastern regions grow yams on their small parcels of land and reap a bumper harvest not only for their domestic use but also for commercial purposes.

## Sale of yams has boosted a farmer's income

"For the last five (5) years, I have run a business venture of yams, arrowroots, cassava, bananas and pumpkins and my family's income has improved. Yams are hard to find. But, their demand and prices are high compared to other crops I sell," says Mr John Mwangi a businessman in Ongata Rongai, Kajiado County.

Mr Mwangi says that depending on the size of the yam, the buying price at the farm is between Ksh 50 to Ksh 120 a piece. The retail price ranges from Ksh 100 to Ksh 180 a piece. "When I purchase a sack of yams at Ksh 3,000, I make profit of Ksh 4,000 from the same compared to the profits made from the sale of arrowroots and cassava," he confesses.

## High demand for yams

Mr Mwangi reveals that yams have different colours, but, the demand is the same irrespective of the colour. "I've customers who place their orders even before I get the yams from the farm. The demand for yams



A yam vine: Yams can grow with limited water and management

continues to grow each year and most of my customers are middle class. Majority of my customers are above 45 years," he emphasises.

"From the sale of these scarce crops, I pay school fees for my

kids, I have built a home, I have dairy cows and goats among other investments I have made. For a period of five years, yams have changed my family's income," he says adding, "transport cost from Nyeri, Meru and



Mr John Mwangi, sells his yams at Ongata Rongai open air market.

Murang'a where I get yams to Ongata Rongai is high. Transport costs lower my profit. I'd like to grow yams in my farm to increase the quantities for sale, ensure continuous supply to my customers for increased income," he adds. Mr Mwangi is among more than 700 yams, arrowroots and cassava traders whose experiences are the same. They operate in Muthurwa and Ongata Rongai open air markets respectively.

## How to plant yams

Yams can be consumed by both humans and livestock. To grow yams, a farmer can source for seeds or tubers which are planted in mounds. Harvesting of yams can start three to five (3-5) years after planting. To allow proper growth of yams, below is a procedure to successfully plant and grow the crop:

- Clear the land.
- Dig a hole that is one foot (1ft) deep. This is to loosen up the soil and allow the easy development of the yam's root structure.
- Pour manure mixed with the soil into the hole.
- Plant the yam seed or tuber six inches (6 inches).
- Dig three (3) similar holes with 10 inches apart.
- Put a propping tree at the middle of the four (4) holes. This propping tree will support the vine of the yams as they grow.
- Apply continuous water supply to allow growth of healthy crops.



Yam vines require support and propping to benefit from sunlight

- Once the yam crop has attained maturity, spread ash at the base of the yam tuber to keep away the pests like ants.

According to Mr Stephen Nchebere, a successful yam farmer in Tigania West, Meru County, "Management of yams is demanding. But it is very rewarding. Once yams mature, the income is sustained throughout the year."

Mr Nchebere has grown

yams for over 10 years although in small-scale. But he enjoys the returns from the crop. "I grow yams to provide my family with healthy food. I also sell to the business people to earn an income.

During the harvesting season, I harvest between 30 to 50 yams from one plant. I also harvest tubers from the same yam tree to replant."

Farmers can get yam tubers from fellow farmers and the best season to plant the crop is during the rainy season. For more information on yams, contact TOF on the cell phone number: 0715 422 460.

For more information on growing yams <http://www.infonet-biovision.org/PlantHealth/Crops/Yam>



# How to make an A-frame for soil conservation

I would like to make contours on my sloping land to stop soil erosion. Can you advise me on the best method to make the contours? Jackson

Dear Jackson,

Farming in sloppy areas can be a challenge to farmers due to the large amounts of soil lost through soil erosion and in case of the occurrence of the landslides. Every year thousands of tonnes of soil are lost during heavy rains as most of the top soil is washed away. One of the methods you can use is to make contours using an A-frame. Below we will show you how to make one and how to use it.

## Making an A-frame

One does not need to have expensive soil surveying equipment to locate the contour lines of the land. The A-frame is a simple and practical instrument, which can easily be made by the farmer using locally available materials. It can be used to locate the contour lines of the land.

## Steps in making the A-frame

Assemble the following materials:

1. 3 wooden bamboo poles 1.5 inch diameter (2 of which should be 2.1 inch long and one about 1.2 m). A tough string for tying a nail.
2. Tie or nail the two longer poles at one end, about 10 cm from the end. Make sure they are securely fastened. These will make the legs of the A-frame firm. Make notches on the points of contact so that the poles will not slip.
3. Spread the legs and brace with the shorter pole to make a figure "A". Tie or nail the crossbar (about 10 cm from each end) to the middle of the legs of the "A". The crossbar will support the legs of the frame and will serve as guide in making the level ground position.



Farming in slopy land without terraces leads to loss of top soil (above). Terraces prevent soil loss and maintain soil fertility (below).



4. Tie one end of the string to the point where the two legs of the A-frame are joined.
5. Tie the other end of the string to the rock or any object for weight. The rock should be heavy enough so that when it is suspended, it will not sway with the wind. The rock should hang about 20 cm below the crossbar.

## Calibrating the A-frame

Locate a reasonably level ground and place the A-frame in an upright position. Mark the spots where the legs (A and B) touch the ground. Then mark the crossbar where the weighted string passes.

## Mark 1

Reverse the position of the A

frame's legs such that leg A is exactly on the same spot where leg B was and vice-versa. Again, mark the crossbar where it is crossed by the string.

## Midpoint

- If the two marks exactly coincide, this means that you have found the midpoint on the crossbar and that the A-frame is standing on level ground.
- If the two marks are separate, make another mark at the midpoint between them.
- To check the accuracy, move one leg around until the string passes the level point of the crossbar. Mark the point where the adjusted leg touches the ground. Reverse the placement of the legs of the A frame. If the string passes

the same point, the level position has been located.

- Check calibration from time to time.

## Marking the contour lines

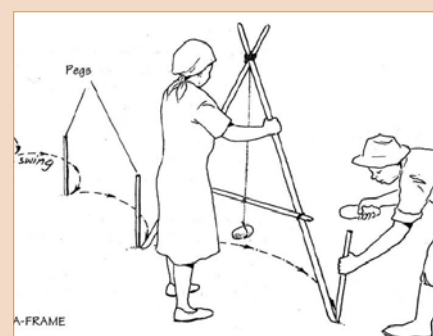
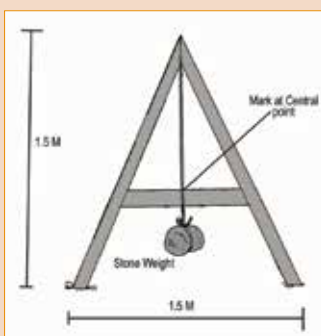
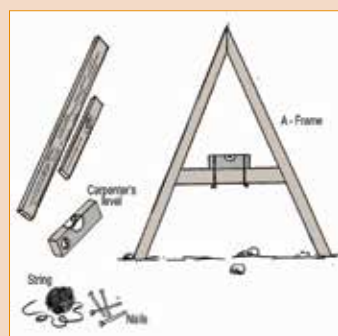
- Cut tall grasses and remove other obstructions so that you can move about easily. Two people will make the work much faster and easier. One will operate the A-frame while the other marks the located contour lines.
- Begin near the highest point. Drive the first stake at the boundary of the area and position the left leg of the A-frame beside and just above it.
- Adjust the right leg such that the weighted string passes through the midpoint of the crossbar. (This means you have found the contour.) Mark this point by driving another stake just below the right leg of the A-frame.
- Move the A-frame to the right by placing the left leg on the spot where the right leg previously was. Adjust the other leg again until the string passes through the midpoint mark. Again, mark this with a stake. Follow this procedure until you reach the other side of the field.
- Repeat steps 2-4 until you reach the bottom of the hill. The vertical distance between contour lines should be 1.5 m (the actual distance varies with the slope of the hill), which can easily be determined as shown in the figure on this page.

## Height

After the contour lines have been determined, some of the stakes will be astray from the general curve of the contour line.

*Answers by Elkanah Isaboke additional information by Peter Murage.*

For more information on soil conservation <http://www.infonet-bio-vision.org/EnvironmentalHealth/Introduction-soil-conservation-measures>





## TOF Rad answers your questions

TOFRadio is broadcast on KBC on Thursday at 8:45pm and Mbaitu FM on Friday at 8.30pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondence to the radio program. Send your questions and comments via SMS 0715 916 136.

### Dry your groundnuts well to stop aflatoxin contamination

**Musdalafa Lyaga** | Many farmers continue to ask how they can manage aflatoxins in groundnuts during drying and storage.

In western region of Kenya, groundnuts are a favourite source of protein and a major source of income for small-scale farmers. However farmers continue to realise less than 50% of the yield potential especially with major losses experienced during post harvest.

#### Poor storage to blame

When groundnuts are poorly managed during storage, they develop an invisible poison called aflatoxin which is dangerous to humans and animals.

Contaminated pods have darkish or grey spots. Inside the shell, the bad groundnuts may be mouldy green, and have a bad smell, and a bitter taste. There may be a blackish green mould on the groundnut.

#### How aflatoxins develop

Aflatoxins are caused by moulds in the soil. The moulds grow more when it is humid and hot. When groundnuts are harvested too late especially during the rainy season, the pods split and let in moulds. Mould spreads from the diseased pods to the healthy ones by contact when mixed.

The mould has seeds, called spores, which can germinate on the pod, grow into the groundnut and spread inside the grain.

#### How to avoid aflatoxin contamination

The primary objective of curing or drying is to achieve a rapid but steady drying of pods in order to avoid aflatoxin contamination. The contamination can be



Proper drying and sorting of groundnuts prevent aflatoxins development. Sorted groundnuts (inset)

avoided by harvesting in good time and allowing harvested groundnuts to dry in the sun for 6-7 days, taking care to cover them if it rains.

**Drying:** For good storage and germination, the moisture content of the pods should be reduced to 6-8%. The correct drying or curing of the harvested groundnuts is very important as poor curing can help induce fungal growth (producing aflatoxin contamination) and reduces seed quality including groundnuts meant for consumption. Marketing such groundnuts is also a problem while germination of seeds affected by mould is also poor, which can affect the subsequent season's crop.

#### How to keep your groundnuts healthy

It is important to separate the good pods from the small,

broken and diseased pods. The damaged pods can be poisonous and should not be eaten or fed to your animals.

The best way to dispose the damaged groundnuts is to burn them and the burying the ash.

#### Avoid drying groundnuts on bare ground

When drying the groundnuts on a tarp or on a canvas, make sure to stir them several times a day. This ensures uniform drying-the canvas keeps your groundnuts off the ground and protects them from dirt, aflatoxin contamination and other impurities.

#### Solar driers more effective

For hygiene purposes and to ensure even drying of the groundnuts, you can also use a solar dryer. This does not have to be expensive. You can even make your own solar drier using locally available materials like wooden poles, sticks, wire mesh and a plastic sheets. Leave the plastic open at the ends, so that the wind can blow over the produce.

Storage of healthy groundnuts should be done in woven bags in a cool, dry place. Store the groundnuts on wooden platforms or on pallets so that they do not touch the floor. It is important that the bags don't touch the walls or they will get moist.



Groundnut production in a large-scale farm

**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.

**Jersey Heifer wanted:** I would like to buy a healthy Jersey Heifer preferably incalf for 5-6 months. Call 0722 357 918.

**Fleckvieh bull for sale:** I am selling a 1½ year old Fleckvieh bull. Call 0726 434 521.



**TOF Magazine Readers Whatsapp Group:** Would you like to join other TOF magazine readers WhatsApp group send your full name and County to 0715 422 460.

#### Protect groundnuts from rodents

Once all this is done, the final threat to your groundnuts is rodents. It is important to control mice and rats because they are dirty and can easily spread diseases. They can also easily damage the bags and expose the pods to moisture.

#### Maintain quality

The quality of groundnut is determined very much at the farm level. Good growing, harvesting, drying and storage on-farm will ensure that the pods/seeds are marketable. A buyer will, in particular, be looking for: Varietal purity (at least 95%), low moisture content (7-8%), high shelling percentage (above 55%), low level of damaged pods/kernels (less than 17%) and no aflatoxin contamination.

*(For farmers interested in growing groundnuts, certified seeds can be obtained in agrovet shops (most agrovet shops in Western Kenya stock them) Farmers can also buy groundnut seeds from Kenya Seed Company depots near them. Read more on ground nut production in TOF Number No. 126 of January 2016)*