

# The Organic Farmer

The magazine for sustainable agriculture in Kenya



Nr. 53 October 2009



## Water, scarce and valuable

People take water for granted when there is plenty of it. In Africa, almost 90 per cent of the drinking water available to human beings is used for agriculture. When water becomes scarce, agricultural activities are affected – and thus the livelihoods of millions of people. The

current drought should be a lesson to farmers that water is a critical resource in our lives. With this issue, TOF is starting a series of articles on water. How can farmers cope with challenges in the efficient management and conservation of this valuable resource? *Page 5*

## Dear farmers,

We are sure that each one of you has experienced first hand how crucial water is as a resource for agricultural activities. And of course, all of you know what disaster the lack of water can mean to your farm and to you.

Water is becoming an increasingly scarce commodity. It doesn't rain as much as it used to anymore. The rainy seasons have shifted, and sometimes can't even be called "season" anymore. Almost every year now, Kenya experiences floods while at the same time, certain regions of the country don't see a single drop of rain for years. Agricultural activities have become more unpredictable and thus risky than ever before.

We cannot blame this on the global climate change alone. An uncontrolled growing population needs more and more water. Careless deforestation, the destruction of centuries-old water reservoirs like the Aberdares, badly leaking water pipes, destruction of rivers through sand collectors, or flood irrigation. At the same time we need more water than we can afford. To make things worse, we are now exhausting the last remaining water sources. When extracting this water, our policy makers do not have any idea how to protect water catchment areas in order to conserve the little water resources. Upto now the country has no idea on where to get this valuable commodity to meet future water requirements for the increasing population.

When it comes to agriculture, the situation is critical. Farmers need to think seriously how to conserve and manage the diminishing water resources to sustain food production. This is not the first time that our magazine encourages you to use this important resource wisely. We have in the past introduced and explained various methods of water collection and management, and most farmers know them. What we do not understand is, why more of you are not willing to put these ideas into practice. Is it lack of understanding or money or fear of doing some extra work?

There are many farming practices that help to conserve water such as covering the soil, planting trees, cheap and water efficient irrigation systems e.g. drip irrigation: We will bring you all these technologies in the coming issues of The Organic Farmer. Farmers like other business people have no choice but to be innovative, as this is a matter of their survival.

## Breeding problems persistent

*Lack of training opportunities for farmers and inbreeding affect the quality of dairy cows in the country.*

### The Organic Farmer

Cattle inbreeding is still a big problem in the country. At the same time, more farmers are seeking training opportunities in order to acquire the necessary skills needed to improve the quality of dairy cows. In particular, there is a huge demand for training on livestock breeding. The other cause of the problems in the Kenyan dairy industry is the reluctance by small-scale farmers to do record keeping which leads to inbreeding. More than 75 percent of the 3.4 million dairy cattle in the country are owned by small-scale farmers, but



only 50,000 cows have been registered and graded by the Kenya Stud Book.

Although more than 90 percent of the dairy cattle in the country are bred using Artificial Insemination (AI) methods, most small-scale farmers do not understand what inbreeding is all about. Inbreeding occurs when two closely related animals are mated. Most farmers do not care about the quality of semen served to their dairy cows. If a farmer does not keep the code name of bull whose semen is used to serve their cows, AI service providers often end serving cow's daughters with semen from their father bulls, causing inbreeding. Experienced farmers avoid inbreeding by keeping AI service records of all their animals, showing the dates when the animals were served and by which bull.

*See pages 2 and 3*

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# Farmers discover the benefits of breeding

*Increased awareness and higher milk prices encourage more farmers to upgrade their dairy cows.*

## The Organic Farmer

Most Kenyan farmers have started realising the benefits of animal breeding, leading to a thirst for training in order to upgrade their dairy cows. More small-scale farmers want to improve the productivity of their animals and prevent inbreeding. There are two reasons for this:

- Many articles in *The Organic Farmer* magazine have aroused awareness on the benefits of having good quality cows.

- The ever escalating prices of milk encourage so many dairy farmers to seek training services from breeders and even buying improved breeds or are at least eager to upgrade their cows using the latest breeding methods.

### Lack of qualified personnel

However, the country still lacks adequate skilled personnel to train farmers. According to James Karanja, a Director of the Kenya Dairy Board, who is also a Friesian-Holstein breeder, the quality of dairy cows owned by the small-scale farmers has been very low – leading to low milk production due to lack of basic skills of animal breed-



ing. The problem became worse following post-election violence in parts of the Rift Valley province last year; a large section of dairy farmers lost their breeding stock during the unrest. The loss of dairy cattle and earnings from milk sales is estimated at Kshs 20 billion over the violence period. Having lost their dairy cows, many farmers are yet to restock. Even for those farmers who are restocking, the AI services are still costly (Ksh 600 per animal). This forces most of the farmers to go for village bulls whose quality is undefined.

### High demand for training

According to Karanja, the biggest problem now facing the dairy industry is lack of trained breeders who can offer quality training to scores of small-scale farmers seeking breeding services to improve the quality and productivity of their dairy cows. The only other organization offering training is the Kenya Livestock Breeders Organisation (KLBO), but it has only one extension officer who is only able to train 200 farmers every month.

Overwhelmed by the demand for more knowledge, James Karanja has been travelling every week to various parts of the country where he trains farmers on how to upgrade their stock. He says that he has been able to train an average of 30 farmers in a week. Karanja says more farmers who have read or heard from fellow farmers about the importance of livestock breeding have booked appointments for training. Among the areas he has covered so far include Uasin Gishu, Elgeyo Marakwet, Kericho Nyeri, Narok, Nyandarua, coast and Eastern provinces. He says the training programme identifies 5 farmers in each region who are trained and encouraged to train other farmers at a small fee. But he has to make a regular follow-up to verify that the trainers are doing their work prop-


erly and inspecting animals according to established standards.


### Neglected animal husbandry

A big dilemma facing the dairy industry in the country is that farmers have been left on their own when it comes to animal husbandry. Since the privatisation of veterinary services following the withdrawal of donor aid in the early 90s, the government has given little support to small-scale farmers in the dairy sector.

Currently, it allocates a paltry Ksh 600,000 to the Kenya Livestock Breeders Organisation to cater for its running costs. The US Agency for International Development agency USAID is working with the Kenya Dairy Board through the Land 'O Lakes organization which is aimed at improving the dairy sector. But very little funding has been allocated for the training of small-scale farmers on breeding; a large sum of this money is spent to cover administrative costs. With many new farmers expressing interest in upgrading their dairy cattle, there is an urgent need for an organisation that would come in with additional funding to train more breeders at the community level, who will train more farmers in every region in the country. With such a kind of support the dairy industry will increase milk production and thus a higher income for farmers.

A German AI company has offered 30,000 straws of high quality semen to help farmers who lost their dairy cows during the post election-violence. The semen is being sold to farmers in the affected regions at Ksh250. But this is a drop in the ocean, considering the large number of farmers who require training and affordable AI services. Farmers interested can contact James Karanja Ndungu, P.O.Box 157, 20107 Njoro, Cell. 0733 555 621 or KLBO P.O.Box 478 Nakuru, 20100 Tel. 051 2216996 cell. 0723 379 048

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## How to prevent inbreeding

Inbreeding can be reduced considerably if farmers observed a few simple rules:

- Always maintain records of each animal's date of birth, AI records such as the name of the bull whose semen was used to serve the cow. The date and age at service, number of services, calving and calving intervals are also important.

- Avoid using village bulls whose quality is not known. They can also transfer venereal diseases to your cow. If you keep bulls, separate them from the cows at all times to avoid mating.

- Try and register your graded animals with the Kenya Stud Book (this is a secretariat that maintains records of all graded animals and breeders in the country. A registered animal can be sold at a better price because its pedigree is already known; some of the pedigree animals produce as much as 40 litres of milk in a day and can fetch as much as Ksh 250.000 in the market).

- Do not throw away the semen straws after your animals are served. You can use them for future reference.

All straws are labelled with the name and code of the bull from which the semen was obtained.

- Always use semen from high quality bulls whose potential is already known. Using semen from known service providers such as CAIS will help improve your cows' pedigree, milk production health and accelerated growth rate.



## Selective breeding

Upgrading dairy cows is a process that requires expertise. This is how it is done:

- A dairy cow with the right quality of a selected breed has to be identified by a qualified inspector. It is then served with semen from a pedigree bull. The cow is then registered with the Kenya Stud Book as a "foundation".

- The calf which the foundation cow gives birth to is called the "intermediate".

- When the intermediate stock heifer comes on heat, it is served with semen from a different pedigree bull of the same breed. The calf which the intermediate heifer produces is called the "Appendix".

- When the appendix comes on heat, it is again served with semen from another pedigree bull of the same breed. Finally the calf produced by the appendix is now called the "pedigree".

An experienced breeder can maintain the pedigree line by continued use of semen from quality bulls locally and abroad. Each of the animals from the foundation to the pedigree has to be registered with the Kenya Stud Book.



An improved Holstein-Friesian calf

## Brucellosis affects people and animals

*Vaccinating young animals against the bacterium Brucella abortus can protect both people and their animals.*

### The Organic Farmer

Brucellosis has become a common disease in Kenya. Indeed, many people simply call it the "milk disease". This shows that at least they have an idea where the disease originates from, namely from our animals suffering on Brucellosis (caused by the bacterium *Brucella abortus*). The disease is transmitted to people if they drink unsterilized milk (not properly boiled) or eat meat from infected animals. One can also be infected through close contact with the animals' secretions.

Symptoms include fever or flu-like feeling, restlessness, muscular pains, sweating at night, tiredness, lower back and joint pains, meningitis or heart-valve infection. People infected with brucellosis can be treated using antibiotics which have to be taken over several weeks. Infected people should always consult a doctor for proper diagnosis and treatment.

### Spreading of Brucellosis

The bacteria which cause Brucellosis are spread from an infected animals around the time of calving or abortion. It can be introduced to your cows when they lick or sniff fluids from the birth canals of infected animals which are permanent carriers. Infected bulls can become infertile. Cows can get the disease from bulls when they smell or lick fluids from its sexual organs. Heifers get the disease when developing in the uterus. The most common clinical signs of cattle infected with the bacterium *Brucella abortus bovi* are high incidences of abortions, arthritic joints and retained after-birth.

Few things are important to know:

- Cows can carry the disease throughout their life and pass the disease causing bacterium to other animals.

- The disease cannot be cured.

- Upto 80 percent of heifers or cows infected for the first time can abort. If the calves are not aborted they are born weak and cannot grow normally.

### Vaccination controls brucellosis

Since the disease cannot be treated once the animals are infected, the best way to prevent it is through vaccinations. Vaccinations against brucellosis can only be done in calves at the appropriate age. Calves vaccinated at 4-7 months followed by 3 other vaccinations which help to boost their immunity can be protected against the disease throughout their lifetime. All new animals should be tested



before being allowed to mix with the herd.

In Kenya and other developing countries, there is a tendency to treat only those diseases that often kill our animal herds; this is one reason why most farmers would not bother to test their animals for Brucellosis. But the cost to the farmer is high especially when the disease is transmitted to people or when they lose their valuable calves through abortions. The disease is difficult to control in Africa because of the uncontrolled movement of animals and presence of scavenger birds that spread the disease from one area to another.

NOTE: Others animals such as goats, sheep and even dogs can be infected and pass the disease to people. Scavenger birds and animals can also spread the disease.

# A surplus of vegetables? Then dry them!

*Drying products from your shamba is a clever way of coping with hard times.*

## The Organic Farmer

Drying of vegetables and fruits is the simplest method of preservation and is used all over the world. However, for good results and quality, some basic rules must be followed.

### Sun drying

Sun drying is used for products which are not sensitive to direct sunlight like dry beans, nuts or coffee: they are protected by solid coats or shells. Cereals consist mainly of starch which is also not sensitive. These crops can be spread directly in the sun.

### Air drying

Most fruits and vegetables should be protected from direct sunlight, because it affects their quality, taste and colour. A product which looks nice and tastes good can always fetch a better price!

The simplest method is air-drying in the shade of trees, under a roof or in a well-ventilated room. But in the shade, the drying process is slow, and fruits and other juicy material may go mouldy before they are dry.

### Solar food dryers

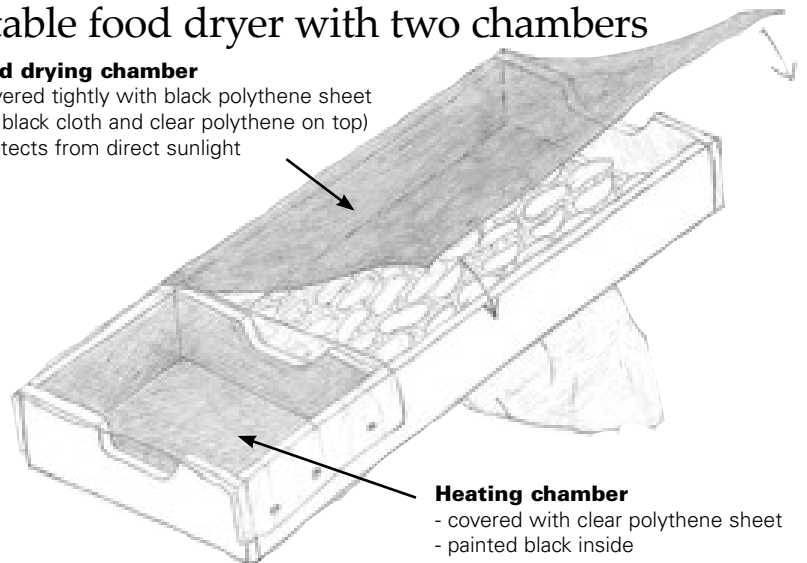
In solar dryers, sun heat is accumulated and the drying process is much faster. Such driers consist of a box with black walls or a black cover absorbing the sunlight and trapping the heat inside. The material for drying is placed inside the box.

You may at first want to experiment with a simple dryer (below), and (above right) you find the solar dryer with two chambers. If you have good market opportunities and higher quantities to dry, you may want to construct a larger and more professional solar dryer.

## Portable food dryer with two chambers

### Food drying chamber

- covered tightly with black polythene sheet (or black cloth and clear polythene on top)
- protects from direct sunlight



When you place the dryer in the sun, the heating chamber should be at a slightly lower level than the drying chamber. Since hot air goes upwards, the heated air can flow upwards through the openings shown below into the drying chamber and out again on the top, this way drying the food in the drying chamber.

The height should be around 20 cm, but you may determine other measurements on your own. The larger the dryer, the more space you have for drying your vegetables. Place the product on some kind of grid (but avoid metal as it contaminates) and make sure the black cover does not touch it.

## Preparation of fruits and vegetables

Fruits like mangoes, pawpaw, guavas and bananas should be ripe, but still firm. Wash them thoroughly, peel and remove the seeds if necessary, and cut them into uniform pieces.

If you dip them in a solution with lemon juice (1 part juice, 4 parts clean water), they will retain their colour for a longer period of time.

Vegetables with hard, thick leaves (like kale and cabbage) should be washed, chopped, then dipped in salted boiling water for 2 minutes and drained before they are spread on the tray in thin

layers. The same can be done with green beans, but do not chop them.

### Drying time in the solar dryer

Drying time depends on size and water content of the pieces. Tomato halves may need 2 to 3 sunny days, while tender leafy vegetables or herbs may be dry within hours.

All dried products must be packed in clean bags and stored in a dry, dark and cool place. Moisture, heat and light will promote deterioration.

*Additional information by Njeri Kinuthia*

## Drying system with one chamber

- First you need a tray or frame with a stable bottom which is also permeable to air. You may of course use several trays. You could build a frame like the one below and prepare the bottom with clean thin sticks:
- When you have filled the product into the tray, place it on a piece of corrugated metal roofing, or even on a roof, if you can reach it easily. The metal must have a gentle slope.

- Cover the tray with a piece of clean black cloth. You may need to place a few sticks across the frame to make sure the cover does not touch the product.

- On top, stretch a clear polythene sheet or cover with window glass. Make sure the wind can not blow both the cloth and sheet away. The upper opening of the tray must be left free for the moisture to escape.



## General rules for drying food

### Ventilation

Air must be allowed to circulate. Fresh air must reach the product while moisture must be able to escape the drying area.

### Hygiene

Clean processing protects the consumers and is essential for the durability of dried products.

- All trays, cloth or areas which are used for drying the product have to be clean. Wash, scrub, rinse well and dry before using them.
- Always wash and dry your hands and any tools like knives, chopping boards or pots carefully.

# Making better use of water resources

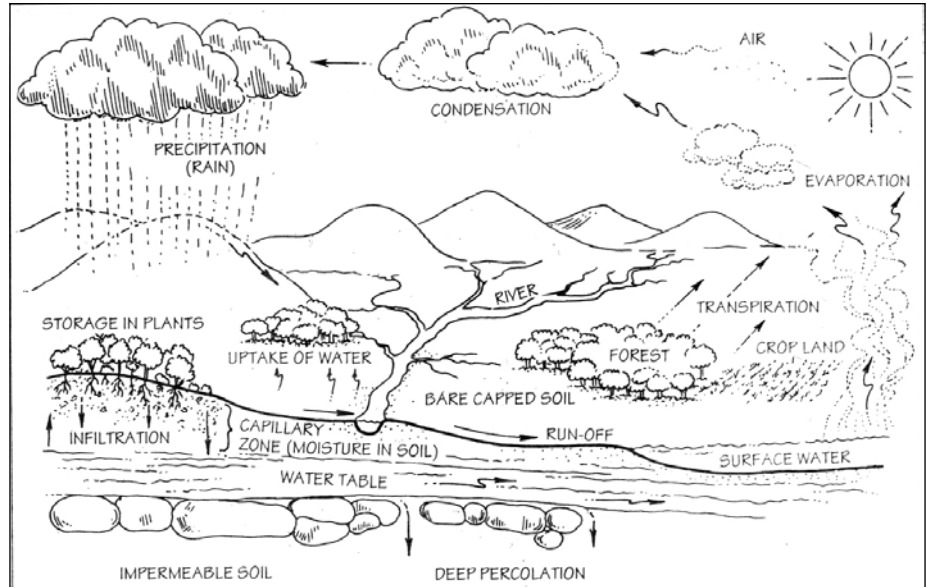
*Sustainable use of the available water resources is the only way to save this diminishing resource.*

**Anja Bengelstorff**

Nobody is more dependent on rain water than a farmer. The current drought has led not only to crop failure, but it reduced power generation and even domestic water supplies in most parts of the country. The water shortage should be a lesson to all, that due to climate change, we are going to have more serious water shortages if we do not manage our water resources well.

Kenya is classified by the United Nations as one of the countries with chronic water scarcity, it can only supply about 647 cubic metres per person, far below the 1000 m<sup>3</sup> per person set as the mark for water scarcity in the world. Yet we are busy destroying water catchment areas such as the Mau complex, Aberdares, Cherangany hills, and Mt Kenya through human settlements, deforestation and soil degradation. Rapid population growth will complicate the situation, further depleting the remaining water resources in a few years.

Apart from meeting our domestic



water needs, nowhere else is water so important than in agriculture. Food production is the largest consumer of water in the world. More than 70 per cent of water we use from rivers and groundwater sources goes to agriculture, about 10 percent is used for domestic consumption and 20 percent in industries. Unless the available water resources are used in a sustainable way especially in developing countries such as Kenya, then we face a crisis of unimaginable proportion. Farmers can greatly contribute to water conservation if they understood where water comes from and the process through which it moves through the environment- this is called the water cycle, which is described above:

### Understanding the water cycle

When sunlight strikes water, whether in a lake, river or even moisture on the earth's surface, the water turns into vapour and rises into the atmosphere in a process called evaporation. Plants

also release water vapour through their pores (holes on leaf surface) when the sun strikes their leaves sending the vapour into the atmosphere in a process called transpiration. When the vapour reaches a certain height in the atmosphere, it condenses into liquid form which forms clouds that later fall in droplets as rain.

The water moves across the land's surface as run-off, some of it penetrating the ground where it is stored. This water cycle affects the patterns, practices, quantity and even the quality of the water we use for all purposes. The major sources of water we use for agricultural production comes through the following processes:

**Surface water:** This supplies water to plants indirectly through evaporation, condensation and rainfall, or directly when tapped and channeled for irrigation purposes.

**Rainfall:** Rain falls on plants directly and filters down or penetrates through the soil to the plant root zone and continues to replenish ground water supplies.

**Moisture:** These are tiny droplets of water that are formed on any surface either by transpiration or condensation. Moisture nourishes plants by availing water that promotes plant growth.

**Groundwater:** Groundwater accumulates underneath the soil at various depths. The water moves up through the soil profile just in a process called capillary action and is taken up by plants.

Managing the water cycle involves processes that protects available supplies and reduces water losses; this is called water conservation. The other process that helps increase the amount of water available for our use is called water harvesting. The way water is

Continued on page 6

## Water

In this issue, *The Organic Farmer* starts a series of articles on water. For a proper understanding of this highly valuable, but often neglected resource, it is important to know the water cycle, as is shown on this page. In the November-issue, we talk about water harvesting.



Water catchment areas like the Mau Forest or the Aberdares that supply water for the surrounding lowlands are lifelines for humans and animals alike, as well as for farming. When trees are cut, water runs off over the surface of the land, washing away

nutrients and minerals found in the soil. Trees instead break the run off. They "catch" rain water on their leaves, needles and roots and store it - for their own growth as well as the supply of rivers, streams and groundwater sources.



conserved and harvested is called water management. Managing the water cycle in a farm has to be done in the right way as it can affect the water supply both positively or negatively.

#### **Balance between water intake and off-take**

The way a farmer balances between rainfall, evaporation or transpiration determines the amount of water available for better crop production. When rainfall exceeds evaporation and transpiration, the crops will have adequate water for proper growth since the root zone will have adequate water. When evaporation and transpiration exceed rainfall, the water available for plant growth is decreased. In analysing water needs for agriculture, evaporation and transpiration rates are very important. Run-off and percolation also affect the amount of water remaining in the root zone. The main objective of water management in sustainable agriculture is to make maximum use of run-off, percolation evaporation and transpiration.

One way of increasing the amount of water available for agriculture is to reduce the loss of water through transpiration. For example one hectare of maize can lose as much as 37,500 litres of water in a day or 1,900,000 litres per growing season through transpiration. However, establishing a mixture of crops and trees creates a micro-climate where the moisture produced (transpiration) is used by nearby crops. Raising seedlings in shady places protected from wind also prevents loss of moisture. In the next issue we will show other methods of water conservation for crop production.

#### **The cost of El Nino**

A World Bank report released almost a decade ago after the 1997/98 El Nino rains followed by La Nina drought in the year 2000- 2001, shows the country lost at least 14 percent in each of these years. At the moment the loses are much higher considering that water resource degradation has intensified. Lack of investment in water resources cost the economy even more. It shows that droughts and flooding would not be so severe if there was better access to water supply through more surface water storages such as earth dams and more groundwater development in arid and semi arid areas (ASALs).

Dear editors,

A short while ago I read a report from the German Heinrich Böll Foundation "Study on the Impact of High Food and Factor Prices on Kenyan Farmers" from April 2009. I think it would be of interest to my fellow farmers if you would publish the conclusions of this report. Thank you. Anthony Otieno, farmer  
*Dear Anthony, we have gone through the report, and agree with you. We hereby publish its conclusion. Some parts have been adapted to enhance clarity. The Editors*

### **Do farmers benefit from high food prices?**

Countries that rely on imports to meet their food requirements may, in future, have to reorganize their trade and national marketing systems to ensure they are self-sufficient in food production, if at all they want to avoid escalating and unstable global food prices. Countries such as Kenya which, in normal years, are almost self-sufficient in food production are highly influenced by their domestic food production, national market structures or failure of the government.

Yet, besides the global trends with their enormous influence, country-specific factors seem to limit the possibilities for farmers to benefit from higher food prices much more. As long as staple food marketing is to a certain degree controlled by cartels or monopolies with high market power, weak institutional governance and corruption, economic activities of farmers might depend much more on domestic agricultural policy reforms than on global food price developments.

Meanwhile, farming households are already diversifying their incomes in Kenya as elsewhere. A clear trend to more off-farm and more non-farm income for rural households can be observed. Furthermore, household investments are not directed towards farm improvement or "farming as a business". This shows that rural households with opportunities divert from agricultural activities, because they are not seen as promising avenues for the future. The stagnating productivity of African small-scale farms might be a cause and a reason for this phenomenon.

#### **Investing, but not in agriculture**

Yet, the need for food production increases. We can only expect a reaction towards investment in agricultural production or productivity, where price increase took place; if it mainly takes place at the level of traders and millers, little production impetus can be expected. Moreover, further evidence is needed on future food price projections. So far, it is not clear whether the trends on commodity world markets were "just" unusually volatile during the past 18 months due to unusual domestic and international circumstances or whether they were indicating a longer term increase in real food prices. On the other hand, decreasing food prices make it better for poor consumers. But this might put producers in a situation of "agricultural treadmill".

But even if prices stabilise, agricultural production remains an economic activity with a number of other risks. One of them is the weather which might gain more importance in the forthcoming years due to climate change. The argument of price incentives for producers doesn't seem to materialise soon for small-scale farmers in Kenya or elsewhere in Sub-Saharan Africa. The assumption is that "As product prices climb higher, so too is the producer encouraged to invest in higher agri-inputs" This, as formulated by many observers, has in the short term not proved to be right.

#### **Needed: better infrastructure**

Higher prices can theoretically mean incentives to producers; however it is not prices but profits that count. The challenges will be to translate higher food prices into motivators for lasting investment in rural areas and sustainable agricultural production in order to achieve food security for all – producers are also consumers.

This study couldn't find evidence that high food prices alone will provide incentives for smallholders to intensify their production in the medium term. From the Kenyan experience it is much more likely that farmers would respond to more reliable, affordable and available services for inputs and to improved rural infrastructure. Secure access rights to productive resources such as land and water and a reduced volatility in input and output markets seems to be much more important for rural incomes than temporarily high prices.

## Choose the right material for compost

I am planning to make compost but the only material available is a fern called "ruthiru" that decomposes very slowly. Do you think it will have decomposed in 3 months? Tel.0716 913 127

I would like to make compost manure and the only material available is a fern specially called 'ruthiru'. It decomposes very slowly. Are the conditions of the compost heap able to break it in a period of 3 months as TOF wrote once? 0716 205 540

It is important to use well-decomposed compost as organic fertilizer because it releases the required nutrients to your crop. While preparing your compost make sure that you include all the material you can get. This can include animal manure, crop residue, kitchen and other household waste such as wood ash, potato peelings etc. It is also important that you include particular plants such as tithonia (*kiruru* in kikuyu) which contain a lot of plant nutrients. All kinds of legume leaves such as those from soya beans, desmodium, lablab (*njahi*) etc. can be added. Avoid using material from only one plant as you want to do with the ferns. You may use it in thin layers if you want to be sure that the compost is ready within three months.

For quicker decomposition, add comfrey (*mabaki*) leaves which help speed up decomposition. However the use of Effective Microorganisms (EM1) greatly improves decomposition. The EM1 should be mixed with water and sprinkled on the compost after every layer of material used (EM1 is available in most agrovet shops throughout



the country). Ensure your compost is always moist but covered to protect the nutrients from the sun or rain. Farmers should know that the different material used in compost making can also be mixed without affecting its quality including decomposition; some farmers prefer arranging the material in layers first and then mixing the different layers while turning it the - the result is always be the same.

For use of fern, I would just give it a try. You could make a separate heap using larger amounts of the fern and observe what happens. You will then be able to judge when you will have to set up the fern compost heap before the next planting season.

### Donkey droppings are good for manure



I am a farmer in Yatta and I keep three donkeys on my farm. Can I use their droppings as organic manure on my shamba? 0737 603618

You should! Like all animal waste, donkey droppings give excellent organic manure. Fresh droppings should however be used with caution, because delicate plants may be affected by their high content of ammonia.

The best manure you can get is when you compost the droppings for some months. I would just collect them continuously under a shaded spot and add any vegetative matter and some household water from time to time to keep the heap moist. This manure can then be used for all crops and is especially good for vegetables. Tomatoes in particular will do well with this fertilizer.

## ...answers in brief

### I need tree seedlings

Where can I get seedlings for moringa oleifera, tissue culture bamboo and Muiri indigenous tree? Charles Macharia, Ol Kalou Tel. 0721 814 717

You can get seeds and seedlings for these trees from the nearest forestry station in your area. If they are not available, you can try the Kenya Forestry Research Institute (KEFRI) at Muguga, they have seeds for most of the indigenous and exotic tree species in the country. Contact: 0722 157 414, 0734 251 188, 0722 801 539.

### Organic coffee

Please advise me on how to grow coffee organically and where to sell it. John Muchangi. Tel 0725 338 255

It is possible to grow coffee organically. Some farmers, including companies, are already doing it. We will publish a series of articles on organic coffee production later in the year, from which you can get the details on how to grow organic coffee.

### Eucalyptus saw dust

How can I use eucalyptus saw dust? Tel 0710 623 867.

Saw dust has many uses on the farm. Most farmers spread it in the animal or even chicken shed where it mixes with farm yard manure. When this waste material is well-composted, it can provide you with very high quality compost. Some energy-saving jikos also use saw dust which reduces the cost of buying firewood or charcoal especially at this time when everybody is talking of conserving our remaining forests.

In Rwanda, sawdust is now the only authorised source of energy for making bricks, a sector that consumes huge amounts of energy. However, this commodity is highly sensitive to humidity, and its heating power is weaker than that of wood or charcoal. Strict regulations for tree felling introduced in Rwanda in 2005 as part of a campaign against deforestation have fuelled a search for other less expensive energy sources such as saw dust.

### Grevillea tree for fodder

How do I prepare fodder from grevillea tree? Paul Njuguna Kirere 0724 600 491

Grevillea leaves can be used as fodder for livestock by cutting into small pieces that animals can be able to chew. But farmers should know that the fodder from Grevillea leaves is of low nutritional value compared to that from fodder trees such as calliandra, Sesbania, Lucaena or gliricidia which have a higher protein and mineral content.



## Harvest early to avoid losses

*A lot of maize in the country will rot in the fields or be destroyed by pests if farmers do not harvest early.*

### The Organic Farmer

With the threat of El nino rains hanging over us like a cloud, many maize farmers across the country must be facing a real danger of losing their precious crop. As we have said many times before, a sizable portion of the maize crop is lost every year when farmers make the wrong timing for harvesting their crops. When you delay to harvest your crop, there are two things involved: You either lose your crop due to rotting or early pest infestation.

Research shows that farmers in Kenya and most countries in Sub-Saharan Africa lose between 15 and 50 percent of their maize crop due to these two problems. And this is one of the questions that many farmers ask themselves: When is the right time to start harvesting the maize? When there is little threat of the rains, most farmers cut their maize immediately the stalks turn brown and the maize cobs face downwards; this is especially so when there is little or no rains. After staking the maize, it will take three weeks or even a whole month before they start harvesting. When farmers do this, they tend to expose their crop to early pest infestation. Maize should be harvested as early as possible to avoid the losses.

Dr. George Ombakho, the chief maize breeder at the Kenya Agricultural Research Institute (KARI) Kitale, advises farmers to start harvesting their crop as soon as the grain hardens. Another important sign that maize can be harvested is when the silky flowering at the top of the maize cob turns black. One other important advice he gives farmers is that different varieties of maize reach maturity (dry down stages) at different times. The farmer should check for these signs and start harvesting. But this does not mean

that farmers cannot harvest early. Dr Ombakho gives the example of contracted seed growers who harvest their maize as early as August when most of the maize is too wet with a moisture content of 37 per cent and still manage to dry it to a moisture level of 12.5 per cent. Although most of the seed growers use machinery to dry the maize to the required level for storage, small-scale farmers can still be able to do sun-drying and save maize from decaying in the fields due to the wet conditions. Farmers can also take the following measures to ensure they reduce post-harvest losses during the harvest season:

**Drying Maize:** Maize should be properly dried after harvest to ensure that it does not develop mould that is responsible for the growth of aflatoxins, a dangerous fungi that can kill both people and animals. To test if your maize is dry, put a handful of grain and a handful of salt in a dry bottle. Shake for 2 or 3 minutes and allow it to settle. If the salt sticks to the side of the bottle, this shows your maize is not dry. You should put it in the sun again to dry. Repeat the same process until there is no salt sticking on the walls of the bottle. Store the maize if it is dry.

**Sorting:** Remove all cobs that are already damaged by pests and the rotten ones before storage. Always shell your maize before storage. Unshelled maize is easily attacked by pests.

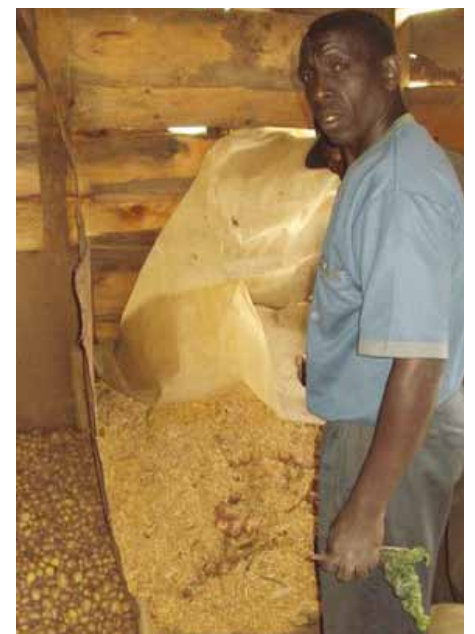
**Apply diatomite:** Since weevils including the Larger Grain Borer have developed resistance to all pesticides in the market, using of ½ kg of diatomite for every bag of maize can preserve it for as long as the farmer desires. Mix thoroughly. The diatomite kills all insects by piercing their bodies and dehydrating them. Diatomite is harmless to humans and animals.

**Storage:** Maize stores should properly cleaned before storage to remove crop residue that can harbour pests. It should also be well ventilated to allow air circulation.

## Saw dust can prolong potato storage

Potato storage is one of the most challenging undertaking for farmers. Just like vegetables and fruits, potatoes are one of the most perishable farm products and farmers have to sell or eat them after a short time after harvest, if exposed to light potatoes turn green and acquire a bad taste. Nyakairu Farmers Group members in Kinungi, Naivasha, had faced this problem for many years. They would try to preserve the potatoes in his store by covering them by use of dry grass to prolong their shelf life, but the potatoes would not last the desired period. However three years ago one of them Githenya Kariuki decided to try saw dust. He applied it on the floor of his store to ensure the potatoes did not come into contact with the floor. After this, he sorted out the potatoes to remove all the bruised, the rotting ones and those that had already been infested by tuber moths. He later covered his potatoes fully with saw dust to stop light or moisture from getting into the potatoes.

Githenya observed that the potatoes stayed longer than they had lasted using other preservation methods. For the last three years now, all the group members have adopted the saw dust method. The use of saw dust is so efficient that nowadays we can store our potatoes for as long as three or four months, sometimes until the next harvest", says Githenya. He says this method of potato storage has enabled them store and sell to local market long after the other growers have exhausted theirs. The can now store potatoes until market prices are favourable.



Nyakairu farmers' group members show how they store potatoes using saw dust