

The Organic Farmer

The magazine for sustainable agriculture in Kenya



Nr. 56 January 2010



There is a high demand for good quality dairy cows.

(Photo PD)

A big step for small-scale farmers

More than 7,000 small-scale farmers benefit from a new lending system, 80,000 more are on the waiting list.

The Organic Farmer

John Maina Nguru acquired a Friesian cow through his membership in a micro-leasing system, which we explain on pages 2 & 3. The initiative to support small-scale farmers was launched in 2006 by Swisscontact, the Swiss Foundation for Technical Cooperation, as a pilot project in Makueni. Within no time, the idea has spread to Muranga, Kirinyaga, Meru, Bomet, Kisii, Kitale and Wundanyi in Taita Taveta.

80,000 applications

Up to now, assets worth Ksh 146 million have been handed over to small-scale farmers, in form of cows, dairy goats, chickens, beehives and motorpumps for drip irrigation. More than 80,000 small-scale farmers have applied for consideration in this micro-leasing system; the majority of them are on the

waiting list for a high yielding dairy cow. The only problem is the lack of such cows, since no farmer with a good cow wants to sell it.

The micro-leasing system considers the farmer as a reliable partner and farming as a business: All the leased assets are not given for free. The small-scale farmers on the other side, majority of them being women, confess that this system has improved their livelihood. The lease repayment performance rate is 98 percent.

Véronique Su, the East African representative of Swisscontact and founder of the micro-leasing system, is proud that her initiative has spread so fast. Future plans are set to focus on pastoralists and camel holders. "I am happy to see how well this project works," declares Véronique Su. "For me it is a clear sign that we need to use modern methods to support small-scale farmers, since they are willing to improve," she adds. *Pages 2 & 3*

Composting becomes popular

Our TOF-office gets an average of 10 questions per week about compost, either through mail, SMS or telephone. This is a good sign. It seems that more and more farmers are changing to organic or at least to more natural farming practices, and prefer to feed the soil with compost instead of chemical fertilizers. Due to this interest, we answer to some of the most common questions. *Page 8*



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Dear farmers,

Something is seriously wrong with the local seed industry. Although research institutions often come up with new high quality varieties that can boost production and farmers income, the seeds are not available in the market. One good example is the climbing beans developed by KARI, which we highlighted in the July 2009 issue (Nr. 50). Immediately farmers read the article, we were swamped with enquiries on where they could buy the seeds.

It is then that reality struck us: There are no seeds in the market! This is because KARI's mandate is to produce basic seed. We were told that seed companies are supposed to do the multiplication of seeds for sale to farmers. The main problem, as we have so far discovered, is that the local seed industry is monopolised by a few companies. Such firms are, in most cases, unwilling to multiply seed developed by research institutions such as KARI; instead, they prefer to develop their own varieties. A visit to most of their stores reveals that all these companies do not stock popular bean seed varieties preferred by farmers.

But research institutions such as KARI cannot escape the blame. Nowadays, everyone is talking about farming as a business. If this claim is to be taken seriously, a premier institution such as KARI should explore ways of commercialising some of its operations, for instance seed multiplication. This move would ensure that farmers benefit from new seed inventions as soon as they are developed. With the government's assistance, the institution can set up a commercial entity whose main function would be seed multiplication and sale to farmers. Alternatively, there are many farmers willing to produce seeds. Such farmers should be provided with basic training on seed production.

Seed production is a sensitive activity that could have serious implications on the country's food security. It should not be left to a few monopolies, whose interests may not be in line with the government's objective of boosting food production. To meet the needs of the swelling population, it is important to ensure that farmers have access to all seed varieties and in adequate quantities. Otherwise promises to increase food production are all but empty words aimed at pleasing donors.

How can a farmer get a high yielding cow?

The micro-leasing scheme allows small-scale farmers to acquire high yielding dairy cows.

The Organic Farmer

Did you know that one can lease a cow? And what does leasing actually mean? Before we answer these questions, we need to explain the origins and the idea behind the cow-leasing project.

The idea of a Swiss banker

When a Swiss banker Véronique Su in 2005 took over as the East African Regional Director of Swisscontact, a Swiss Foundation for Technical Cooperation, she assessed the situation of Kenyan agriculture to find the best way farmers could be assisted. She immediately realised two problems: 1. Most of the small-scale farmers could hardly afford to buy a high yielding dairy cow. 2. For the majority of small-scale farmers it is difficult to get credit from banks, since most of them either lack security in form of title deeds, or they fail to meet additional conditions set by credit institutions.

Véronique Su came up with the idea of a micro-leasing-system for small-scale farmers, some kind of renting-system. In western countries leasing is quite common and mostly used

for purchase of motor vehicles or big machines. Supported by a donation from a big Swiss bank, Swisscontact started the micro-leasing system in 2006 as a pilot project in Makueni, in cooperation with the K-Rep Development Agency as the implementing partner.

Easy to handle

How does this micro-leasing work? And, what is the difference between it and a normal SACCO or bank loan? Let us explain it with the example of a small-scale farmer, owning 3 1/2 acres land, one cow and enough fodder for feeding two more cows in his zero-grazing unit. Let us call the farmer Isaac.

1. Isaac applied for a leasing contract. The K-Rep Development Agency visited Isaac's farm and agreed to lease him a cow after an assessment. He fulfilled two conditions: He is already a responsible cattle holder, and he is member of a registered farmers' group.

2. A few weeks after an intensive training, Isaac signed a contract. He got a cow, a pregnant one, valued at of Ksh 42,000, and with the balance of Ksh 8,000 he bought a second hand chaff cutter. After a few weeks, the cow gave birth, and he started selling 18 litres of milk to his neighbours every day.

In simple terms, it means that under the micro-leasing system, the farmer normally does not get money, he gets an asset, in Isaac's case it is a cheque for buying the dairy cow, and Ksh 8,000 in cash for the chaff cutter. The cow starts giving an income within a short time. This shows the difference between micro-leasing and a SACCO or bank loan:

- Isaac does not have to provide security for the loan; he does not have a title deed since the land belongs to his father.
- The cow acts as the security to the lender, in this case the K-Rep Development Agency, which bought the cow. If Isaac cannot repay the cow and the interest as agreed in the contract, the lender will just come and take away the cow. Concerning the Ksh 8,000 for the chaff cutter: The colleagues in the farmers' group guarantee this for Isaac.
- If it were a SACCO or a bank loan, it would require a lengthy legal and administrative process to recover the loan if the farmer fails to repay it.
- Isaac's farmers' group acts as guarantee, and advisor.

The financial issues

3. Under the micro-leasing contract, the farmer has the benefit of a grace period of up to three months. After this period, the farmer has to begin repaying the cost of the cow at an interest



rate of 16 percent, 2 percent below the current bank rates. The farmers can also choose, if they want to repay in 9, 12 or 18 months. Isaac chose 12 months and the possibility of a grace period of one month. So he began to refund in the second month. He could afford to do it, since the cow gave 18 litres of milk daily (earning him around Ksh 450 a day).

His repayment plan looks as follows:

Price of the cow & the chaff cutter	Ksh 50,000
Interest rate for 1 year 16 %	8,000
Insurance (to pay only once) 5 %	2,500
Total amount	60'500
Isaac has to pay per month	5'000

That means: after 12 months he will have repaid the cow and the chaff cutter and will therefore own the cow:

- When the lease is fully paid, the K-Rep Development Agency will formally hand over the cow to Isaac.
- Since all farmers are given a cow which is already pregnant, Isaac will have a double benefit: the cow and its calf.

Covered risks

4. As we have seen in the table above, Isaac has to take an insurance cover for the cow and also for himself, according to the contract.

This means that all the risks to both the micro-leasing company and the family of the farmer, are covered:

- If anything happens to Isaac, the company gets paid the outstanding amount of money; Isaac's family can retain the cow and the calf.
- If the cow gets sick and has to be slaughtered or dies, the insurance pays the damage.

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“Now I can send my children to good schools”

Like for John Maina Nguru, leasing a cow has increased the earnings of many small-scale farmers.

Peter Kamau, Makuyu

John Maina Nguru, a member of Gakungu Arimi Self Help Group, had two Friesian dairy cows. He had always wanted to have at least 4 dairy cows that could help him increase his income. He lives on a 3-acre rented land, he therefore could not qualify for a loan from any bank or any financial institution.

But luck came his way when he met the conditions for the micro-leasing system of the Juhudi Kilimo Company (see article on page 2). From the Ksh 50 000 he was given, he bought a Friesian dairy cow worth Ksh 39,000. From the three Friesian cows, he gets 42 litres of milk during their peak periods which he sells to milk vendors, restaurants and civil servants.

More earnings

Nguru says the additional cow has brought a big difference to his earnings. “Every day I make an average of Ksh 1,000. I have managed to take my wife back to college. I have also transferred my children from public schools



John Nguru has completed his repayments and now owns this dairy cow (Photo TOF)

to private schools where they can get better education. If it was not for the leased cow, I would not have managed to do all this”, he says.

In December, Nguru finished repayments for the leased cow, which has also produced a calf. He now plans to

take another lease cow, to buy a chaff-cutter and expand his zero grazing unit and rent more land for growing fodder. “The demand for milk is so high in this region, and I want to take advantage of this to increase my earnings further,” he says.

Leasing system a benefit for women

For many years, women have been a neglected a lot when it comes to development issues. But the situation seems to be changing rapidly. In most rural areas, women are increasingly becoming involved in many projects aimed at raising their income to support their families. It all started with merry-go rounds, where they would come together, raise a lump sum of money which would be given to each of the members on a rotational basis. Later on, micro-credit institutions and even NGOs and churches came in with the same goal of assisting women in rural and urban areas.

The micro-leasing system, now run by Juhudi Kilimo (see article on page 2)

therefore came as a blessing to many women. Nelly Njoki, the Juhudi Kilimo manager in Mt. Kenya region explains why this system is so popular with women. “Many of them do not own the land on which they live. Unlike men, women do not have title deeds,” she says. “Getting credit from commercial banks for them is out of question. The number of female headed households is also increasing due to problems such as HIV and increasing divorce cases,” Nelly Njoki adds. It is therefore not surprising that in the micro-leasing system, women outnumber men by a ratio of almost 1:2, when it comes to the number of those who have benefited from asset financing.

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... and good training

5. When applying for a lease, Isaac was a little bit unsure how he would manage such a high yielding dairy cow and the financial burden. But the company took him through an intensive training that equipped him with all the knowledge he needed.

That means: Swisscontact and the K-Rep Development Agency built up a network of collaborators including extensionists from the Ministry of Fisheries & Livestock Dev., who are dealing with the farmers:

- They train them on how to manage the finances
- They advise them on correct cattle holding (feeding, housing & veterinary care).

A success story

With this micro-leasing system, small-scale farmers can not only lease cows, they can also get dairy goats, chickens, beehives and water pumps for irrigation. In the meantime, the K-Rep Development Agency has founded a private company, Juhudi Kilimo, which has taken over the micro-leasing project under the same conditions as the founder organization.

Juhudi Kilimo Company Ltd, Head Office K-Rep Centre, 7th Floor Wood Avenue, off Argwings Kodhek Rd, PO Box 10528 - 00100 Nairobi, Kenya, Tel: +254 020 396 000

Strict rules in organic farming

Dairy cow management is quite a challenge to many farmers. A dairy cow requires utmost care and attention with respect to housing, feeding and management. In the region I visited, when doing this article, it was evident that many farmers are yet to observe basic hygiene and housing requirements in zero grazing.

Although most of the units have a concrete floor, the sheds are constructed in a way that does not allow proper drainage of urine, water and washing of animal sheds to ensure they are clean and comfortable. Some of the units are so small that the animals have very little space for movement and rest.

This forces them to lie on their own droppings.

Space for movement

Landless zero grazing is not allowed in organic farming. In organic farming, animals should always have adequate space for movement and rest. Lack of adequate space causes stress to animals, and their milk production is also affected. Adequate space allows the animals to express their normal behaviour. The farmer should ensure animals have fresh air, water, feeds and natural daylight. Natural bedding such as hay or dry grass should be provided in the rest area. **Peter Kamau**

Garlic production can earn you more

Most of the garlic found in Kenya's markets is imported. Local farmers lack information on how to grow it.

By Kennedy Masibo

Garlic is a high value horticultural crop in the onion family. Farmers in most parts of the country can be able to grow it and considerably increase their income because garlic has a good local market. It is mainly used as a food flavouring and for medicinal purposes. Garlic has anti-feedant (insect stop feeding), bacterial, fungicidal, insecticidal, nematicidal and repellent properties.

Garlic is effective against a wide range of disease-causing pathogens and insects at different stages in their life cycle (egg, larvae, adult). This includes ants, aphids, armyworms, diamond-back moth and other caterpillars such as the false codling moth, pulse beetle, whitefly, wireworm, beetle, mice, mites, moles, and termites as well as fungi bacteria and nematodes. Garlic can kill beneficial insects as well. Therefore it should be used with caution.

When growing garlic for pest control, it has been recommended avoiding use of large amounts of fertilisers. This is because heavy doses of fertiliser reduce the concentration of the effective substances in the garlic.

Not common crop

Very few farmers grow garlic mainly due to lack of know how and experience on its production. This is one of the reasons for the poor quality of locally produced garlic; another reason is the stiff competition from China (see box below). Very often, farmers sell the garlic even before it has matured and cured properly (hanging and drying in controlled light). Exploitation by middlemen is another big problem; farmers who grow garlic rarely sell it directly in the market; they have to rely on brokers.

Climatic requirements

Garlic can grow well at an altitude of between 500-2000 metres above sea level. The right temperatures for garlic are between 12-24 °C. Extremely high temperatures are not suitable for garlic production. Excess humidity and rainfall interferes with proper garlic development, including bulb formation. The crop is grown in low rainfall areas where irrigation can be practised, especially in early stages when the plant requires enough water to growth. Adequate sunlight is important for bulb development. Garlic develops its flavour depending on sunlight conditions during growth.



Well cured garlic bulbs ready for market

(Photo TOF)

Soils: Garlic requires a fertile, well-drained, light soil. Clay soils should be avoided since they lead to poor bulb development. Soil pH should be between 5.5 to 6.8. Deep soil cultivation is important to ensure rooting depth. Farmers should seek for advice on the garlic varieties suited to local conditions to ensure they get good yields that meet market requirements.

Planting: Garlic is vegetatively propagated. That means that the farmer has to plant individual cloves separated from the main bulb. Very small cloves should not be used. The larger the cloves, the more the space required for planting. The cloves should be planted in upright position. The bulbs intended for use as seed should be stored at 10 °C and a relative humidity of 50 -56 per cent. Stored bulbs should be fumigated and continuously inspected to ensure they do not rot.

Spacing: The crop is grown on raised beds or on ridges at a spacing of 30 cm between rows and 15 cm between the plants, giving a plant population of 15,000 to 20,000 per hectare. The normal seed clove requirement is 500-700 kg per hectare. Closer spacing within the rows is possible; but disease risks are

also high when garlic is planted too closely; bulb formation is also affected when the cloves are near each other. The cloves should be planted at 2.5 cm deep in well-firmed, but not compacted soils.

Kenyan farmers have devised their own method of determining whether their clove seeds are ready for planting: They cut a cross-section of a clove to see if the inner leaf is developing. Its colour and appearance help them determine if the cloves are ready for planting.

Manure application: Garlic does well if well-composted manure is ploughed in before planting. Top dressing with liquid manure should be done regularly at the beginning of 6 - 8 weeks and increased during bulb formation. The field should be weed free to ensure garlic does not compete for nutrients with weeds.

Disease control: The most common diseases are purple blotch, downey mildew, rust and bulb rot (white rot). They can be controlled through long crop rotation, improved drainage and use of copper based fungicides such as copper oxydchloride, which is accepted in organic farming.

Competition from China

The tendency to produce the same crop is so common that Kenyan farmers rarely want to grow crops that fellow farmers are not planting. Apart from the obvious benefits of controlling diseases and pests in choosing various crops, farmers can earn extra income from crop diversification. Farmers in areas with suitable conditions for the production of garlic can

reap great benefits from this produce. The retail price of one kilogramme of locally produced garlic is Ksh 250 in supermarkets, but imported garlic from China sometimes floods the market bringing down prices to Ksh 200. Due to lack of supply and lack of quality garlic from local farmers, local supermarkets and retail outlets prefer to buy imported garlic from China.

With drip irrigation, every drop counts

Drip irrigation is the best option for farmers to become independent from rain.

Anja Bengelstorff

Drip irrigation is a very efficient method of watering plants. Drop by drop, the water flows through a special pipe to very small outlets called emitters, in this way watering the soil around the plant roots – hence the name “drip irrigation”. Water is applied close to the plant so that only the soil immediately surrounding the plant receives a very limited volume of it. That means: No water is wasted as runoff or lost by moving down through the soil too quickly for the roots to absorb it. Compared to the water sprinkler systems or to furrow-irrigation methods, drip irrigation can achieve 90 – 95 percent water efficiency.

Drip irrigation is becoming popular with farmers in drier zones because it is efficient in use of water. The technology has been further simplified and requires low water pressure to operate. The drip pipes are very flexible and can be modified to suit different lengths of rows or plot sizes.

Use the right system ...

The choice of irrigation method depends on geographical characteristics of the site, the amount of water available, the quality of the water and



Photo: P. Lütjeholm

Grow vegetables with the bucket drip kit

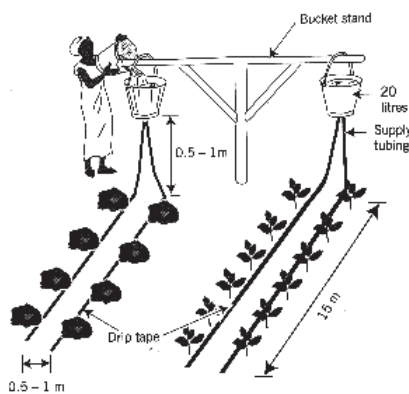
The simplest drip system in use by many small-scale farmers for production of vegetables is the “bucket kit”. The standard bucket kit system consists of two drip lines placed 0.5 metres apart on a bed with a width of one metre (see sketch). A bucket is placed on the stand at one end of the bed and connected to the drip lines.

This bucket kit systems can irrigate 10-20 square metres, depending on the length of the drip tube and plant spacing.

The tapes are connected to a 20-litre bucket mounted on a stand, one metre above the vegetable bed, so that gravity provides sufficient water pressure to ensure even watering for the entire plot size. The bucket system enables a farmer to grow vegetables using 30-60

litres of water daily during the crop growing season.

A bucket kit system comprising of two 15-metres long drip lines can be used to grow 50 plants such as tomato, egg plant and similar crops requiring a spacing of 60 cm along the plant rows; 100 plants of spinach, cabbage, kale, pepper and similar plants requiring space of 30 cm along the plant rows; or 300 plants of onion, carrot and similar plants requiring a spacing of 10 cm.



Bucket irrigation system with two drip lines. (RELMA Technical Handbook No. 24)

The bucket should be filled in the early morning and in the late afternoon to supply 30-60 litres of water to the crop every day. The actual amount of water depends on crop water requirement and rainfall. In very dry areas and during the dry season 60 litres of water will be required per day.

Water

In our series on water, *The Organic Farmer* underscores the value of this neglected resource. In the February 2010 issue, we will feature agro-forestry.



soils, as well as the amount of money a farmer can invest. As one can see on this page, there are drip irrigation systems for nearly all budgets.

Many advantages...

- More efficient use of the water available
- Uniform and higher crop yields since one can maintain the soil moisture at an optimum level
- Reduced labour costs since a farmer has only to fill the bucket or the water tank

... and some hurdles

- To install a drip irrigation system costs money.
- You need clean water since the outlet units use a special mechanism to control the pressure that forces the water to come out in drip form after one planting season it is good to rinse the drip lines (the water pipe with the outlets).
- If a drip irrigation system fails, the plants are affected because the low water volume does not allow water storage in the soil for the plants.

Drip systems for cash crop

Larger systems exist, and farmers can choose depending on their scale of production and availability of cash. The following drip irrigation systems are developed as kits by KARI (See address on page 6).

Drum kit

The drum system is a combination of several bucket systems but modified to use a water supply from a 200-litre drum instead of a 20-litre bucket. The drum kit is a gravity flow kit that comes complete with a filter, sub main, drip lines, connectors and a 200 litre plastic drum. The system irrigates a 9m x 15m plot. Designed to irrigate 500 plants (60cm x 30cm spacing). The drum should be elevated 1m above the planting surface by constructing a stand made from local material. Such a system requires about 100-200 litres of water a day, depending on the environment and crop.

Costs (including a drum): Ksh 9,000 (KARI product code: 1002)

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Drip irrigation



farmers forum

020 445 03 98 0717 551 129 0738 390 715

The 1/8 acre kit

This system, also called a family drip irrigation kit, comes with a filter, sub main, drip lines (12mm) connectors, end lines. The system irrigates a 15m x 30m plot. It can irrigate 2,500 plants (60cm x 30cm spacing). The system works with 1m tank pressure head. A 920 to 1000 litres tank is sufficient if direct piped water connection is not available.

Costs: Complete with 920 -1000 litre tank: Ksh 9,000 (Product code: 1004)

The ¼ acre kit

This drip irrigation kit is delivered complete with filter, sub main, drip lines (12mm), connectors etc. The system irrigates a 30m x 30m plot and can irrigate 5,000 plants (60cm x 30cm spacing). The system works with 1m tank pressure head. Preferable tank size is 920-2300litres.

Costs: ¼ acre drip irrigation kit complete with 1000-litre tank: Ksh

47,500 (KARI product code 1006), with a 2300-litre tank: Ksh 50'000 (code 1007)

For More information contact: KARI Irrigation and Drainage Research Programme, (KARI NARL) Waiyaki Way, P.O.Box 14733 Nairobi Tell/fax: (020) 4 444 250; Cell- 0722 764 751, 0722 397 750, ask for Isaya Sijaji or Esther Muriuki. Email: irrigation@iconnect.co.ke



A home made water tank

Support for organic farmers' organisation

In the November issue, Su Kahumbu proposed the launch of an organisation for organic farmers. About two dozen farmers called us to support Su Kahumbu, others wrote to us. Here are some of their responses:

Farmers need to work together

I have been reading TOF publications from a friend, for slightly over six months now. I have been moved by Su Kahumbu's article in the recent issue (No. 54), on the need for organic farmers to work together. I stand to be counted with Su's vision and mission for the organic farmers. I have been practicing organic farming on my 2-acre plot for well over ten years that is without using conventional fertilizers and pesticides. I therefore, have first hand experience and witness that it works.

I would, consequently, request Su to arrange and inform me how stakeholders shall go about forming the organisation that will advance and protect the interests of the organic farmers in our beloved country. John Githinji Ngondu, Box 280 – Othaya, Tel. 0722 635751 / 0733 299945

We also need training

Greetings from Maeni Co-operative Society. We thank you for *The Organic Farmer* magazine we have been receiving up to now. We also appreciate the suggestion of Mrs. Su Kahumbu of setting up an organization to cater for the interest of small-scale farmers with

low membership fee of Ksh 10 Ksh 20 as you proposed in the November 2009 TOF magazine.

Secondly, we also congratulate you for *i-TOF* centres that have been opened in some parts of the country. We request if you could consider opening up one in Kimilili, for local farmers, as that nearest centre is in Kakamega District. We are regular readers of your magazine therefore we need more information through the extension workers from the *i-TOF* centres. Yours faithfully, I. S. MBULE. 0735 016 202, Secretary

I support a farmers' organization

First thank you for November 2009 issue of *The Organic Farmer* magazine, which I have received. The following are my reactions on the same: Su Kahumbu's plan to bring organic farmers together is a well thought out idea and should be supported at all costs. Please, I need some information on methods of preparing silage for the dry seasons. Can you please send me the material on the same? Otherwise I thank you very much for your positive response. Keep it up.

Samson O. Akungu, Waringa estate farm, Box 360 Bondo, Tel.0734 563 629

Useful addresses

We have been receiving questions from farmers on where they can buy various organic inputs and tree seedlings. Although some of the organic inputs such as diatomite are already available in agrovet shops near our 4 *i-TOF* centres, only farmers near the centres have access to the inputs. Below we provide you some of the inputs and where you can buy them.

Diatomite

African Diatomite Industries P.O. Box 32 Gilgil, 20116, Kenya Tel. 0722 277 120

Mijingu rock phosphate

MIPCO East Africa P.O. Box 53822, 00200 Nairobi-Kenya Tel.0720 817 072

Tree seedlings

KEFRI P.O. Box 20 412, 00100 Nairobi Tel. 0722 801 539, 0722 157 414, 0734 251 188

Fruit tree seedlings

Benjamin Lugano Tel. 0733 990 374
NOTE: Most certified tree seeds and seedlings can also be obtained from nurseries run by the Kenya Forest Service and KEFRI stations in almost every district.

Regulations on use of water from public sources

According to the Water Act 2002 of the Republic of Kenya, any individual who wants to use water from a natural water body like a river or a lake needs to apply for a license to do so. Those licenses can be obtained from WRMA, either in Nairobi (see contact details below) or its sub-regional offices. The issuing of a permit is supposed to take 21 days.

The permits are classified into classes A, B, C and D, according to the amount of water to be used. Small-scale farmers who, for example, farm on a 0.5 acre plot, might need, depending on the crop and the season, 20 cubic metres per day. In class A which provides for up to 50 cubic metres per day, no fees are charged. However, a water metre must be installed before using water from a river or lake in order to control

the quantity. Even though the extraction of up to 50 cubic metres of water a day are free of charge so far, a permit must be obtained.

In response to the growing scarcity of water in Kenya, local bodies like the Lake Naivasha Water Resource Users Association, a development of WRMA, encourage water users to acknowledge the serious situation and pay Ksh 2,000 per month for a class A permit, particularly in areas where water scarcity has reached an alarming level. The money, collected by WRMA, is used by the associations to manage the country's scarce water resources. **AB**

WRMA (Water Resources Management Authority) in Nairobi, NHIF Building, Upper Hill, Tel. 020 – 272 99 46, www.wrma.or.ke

Please, do not use diesel on soil



I uprooted a portion of Tea Plantation to start Horticultural farming as a way of enterprise diversification, but I later realised that the soil is so poor and cannot support any crop due to over use of agrochemicals for many years. Another problem I am facing is the slow rate at which tea stumps/roots are taking to decay. I was advised to apply used lubrication oil mixed with diesel to accelerate the process. Please advice on these two issues (Ruth Munene, Farmer in Gitugi)

We just hope you did not follow the advice of applying diesel on your tea plot! All petroleum-based products are highly toxic to the soil and are considered to be the soil pollution of the worst kind. Even small amounts of Diesel make the soil lose its natural fertility, and its biological activity may not recover for many years. As soil microorganisms are killed, decomposition processes will be extremely slow instead of being accelerated. In contaminated soils, seeds may not germinate, and seedlings may die. Plant growth and yields can be drastically reduced. Our advice is to remove polluted soil spots quickly, if this is still possible, and to avoid growing crops for human consumption for several seasons.

Improve the soil quality

Concerning the generally poor soil, the situation is difficult to judge. A soil test could help you to analyze what is wrong with your tea plot. If you just used mineral fertilizers up to now, the soil might be poor in organic matter. In this case, all measures which can increase soil organic matter will be

beneficial. This is what you should do:

- Start preparing compost on a regular basis, and add livestock manure to the soil or to the compost if you can.
- A very effective way of providing organic matter is green manuring, preferably with leguminous plants like desmodium, crotalaria, mucuna, purple vetch, or whatever is available and doing well in your region. Green manure crops are not harvested but are slashed and incorporated into the soil while they are still green. If your soil is very poor, the effect will be worth the labour!
- Another option is repeated addition of thick layers of chopped Tithonia prunings or chopped prunings from trees and shrubs like Leucaena, Calliandra, Sesbania etc. If you plant them along the field borders, you will always have them ready at hand in the future.
- The second best solution is planting Napier grass, preferably with the "Tumbukiza"-method, as it disturbs the soil only moderately. If you sell the harvest, this could provide at least some income.
- If you have animals, you could also establish a pasture for some years. If not overgrazed, pastures have a beneficial effect on soil fertility.

Note that it will take time to recover soil fertility, just as it takes time to reduce it and to deplete the soil. We suggest that you give the soil some rest of at least one year before you start cropping and harvesting again. In the meantime, a combination of the suggested measures will build up soil life and promote decay of the tea roots too. **THS**

Climbing beans

I would like to grow climbing beans. Where can I get seeds?

KARI developed this variety of bean but they can only produce basic seed. Seed companies, who multiply seeds for sale to farmers are not willing to do so. Due to the increased demand for this variety all seeds in stock in KARI

Embu were bought last year. (See the editorial on p. 1)

Avocado leaves

Are avocado leaves good for dairy cows? John Ndegwa, Kitale
You can feed avocado leaves to dairy cows. But they will only accept them, when there is no or only few other fodder.

Charcoal earths contain good soils

Why is it that soils that have been used to burn charcoal provide a perfect environment for raising seedlings or good for nursery establishment?

Where charcoal is being produced, the heat of the process actually disinfects the soil, destroys all diseases and pests, and creates a weed free environment. In addition, usually a layer of wood ash is left behind. It contains all the minerals which were accumulated by the trees to build their trunks and branches.

Also organic matter which is not completely burnt during charcoal production falls on the ground and is left on the place, enriching the soil and binding nutrients. All this together is just ideal for raising healthy seedlings. What you observed is absolutely accurate. Charcoal production is becoming one of the most destructive human activities that contributes destruction of our remaining forests. Kenya's forest cover has been reduced from 10 per cent to less than 2 per cent. The increasing urban population has led to a big demand for charcoal which is the cheapest source of energy for the rural and urban population. Apart from depleting our scarce forest resources, charcoal burning is wasteful since the charcoal kilns are not properly made. **TOF**

When cows eat clothes, soap...

My cow eats plastic wastes, clothes. What can I do to arrest this problem? (Jecinta Mutugi, Farmer in Gichugu).
When animals lack essential minerals such as calcium and phosphorus in their diets, they develop strange habits such as feeding on clothes, rags, bones, soap etc. This is a sign that the body is lacking particular nutrients. The habit stops immediately you provide the nutrients through licks or feed that contains the minerals. Ensure your animals are provided with salt licks at all times. Be careful when buying mineral licks because there are many types of licks in the market but only a few are of good quality. There are a number of plants that contain a good source of minerals; these include Amaranthus, spider weed, pumpkins, stinging nettle (Thabai in kikuyu) Oxigenum sinnathium (conge in Kikuyu) and black night shade are very rich in both calcium and phosphorus. These plants can be chopped mixed with animal feeds or dried and made into powder and applied on animal feed to balance the mineral content in the feed. (Many farmers may not have read the answer we gave before. I think it is ok to give an answer).

What kind of nutrients are found in compost?

Farmers are really getting interested in compost. In this article, we answer the most common questions we receive.

Teresa Székely

Synthetic fertilisers contain specific quantities of elements e.g. DAP may have 20: 0: 38. How do we know the quantity of elements that are contained in compost manure?

This is indeed a good question, and there is no straight forward answer. The nutrient content of composts can vary extremely, because it depends on many factors like the material used, composting duration, composting method etc. Compost consists mainly of plant material and animal manure (which is usually nothing but digested plant matter). The composting process breaks this material down and stabilizes it in the form of humus. Compost therefore naturally contains all nutrients required for plant growth including Nitrogen (N), Phosphorus (P), and Potassium (K) but also many other important elements like calcium, sulphur, magnesium, iron etc. All these nutrients are bound to the humified organic matter and are released to plants only gradually. There are some rules of thumb for the content of N, P, and K in composts:

- Poultry, pig manures and urine from all creatures are rich in nitrogen. Adding these materials to the compost heap enriches the compost with N. It is not a stupid idea to urinate on the compost heap!
- The older the compost, the less nitro-



gen it contains as some of it is lost over time.

- Poultry manure is rich in phosphorus. Adding poultry manure and rock phosphate to the compost enriches the compost with P. P does not get lost as easily as N.
- Wood ash, goat and sheep manures, poultry and cattle manure and there-

fore all composts which are prepared with them are rich in K. K easily washes out with rain.

Keep sun and rain away

Usually, nitrogen is the problem, and we would like to explain this a little further. In a natural environment, nitrogen is only stable as N₂. This is a gas, and the air you breathe consists of 80% nitrogen gas. Unfortunately, this gas cannot be used by plants. All forms of nitrogen which can be taken up by plants and can be found in the soil, in manures, or in the compost tend to transform and to disappear. They are either washed out with water in the form of nitrate, or they go back into the air as ammonia and N₂. This is why compost and manures should not be exposed to rain and sunshine. You may now also see why leguminous species are so important: With the help of specific bacteria, they can take nitrogen from the air and convert it into a form which can be used to build up plant material.

Composting recycles and stabilizes at least a part of the nitrogen which is present in all plant material and animal manures. Compost does not have the high concentration of nitrogen synthetic nitrogen fertilizer has. But it is most essential in another way: Compost enriches the soil with organic matter. Organic matter retains and stores nutrients including nitrogen, supplying them to plants over many seasons.

...and some more questions on compost!

Turning: *Why do we turn compost during preparation?*

Turning compost manure ensures that the material is evenly mixed and can decay evenly, resulting in a uniform and easily applicable product. If you don't turn the compost, some parts of it may be too dry or too woody, and these parts will not be ready for use together with the rest of the heap. When you turn the heap you will also easily see whether the material is too wet or too dry, giving you a chance to correct this.

A heap: *Can we prepare compost in a hole deeper than 2 feet?*

There is actually no problem with holes of any depth, except that it may be difficult first of all to dig the hole and secondly to turn a heap at the bottom of a deep cavity and thirdly to get the material up when it is ready. But it should also be said that in a dry hot region, using a deeper hole would actually be the ideal place for compost, as it would be protected from the sun and thus from drying out!

Ants: *Can ants consume/destroy our materials in the compost?*

They certainly may consume some of the good things you are putting there, and they will digest it too, which is actually what you want: The breaking down of any organic material is a process very similar to digestion. Ants sometimes like compost heaps, especially if they are not too moist. They do not do any harm and will usually disappear when you turn the heap. If you want to get rid of them com-

pletely, turn the heap frequently, and keep it wetter than usual. Some aggressive ant species also feed on worms, and if you have worms in the compost, it may be good to get rid of the ants.

Fertilizer: *Can we use both inorganic fertilizer and compost manure on our farms?*

Inorganic fertilizers like urea, NPK, DAP are produced synthetically and are not used in organic agriculture. There are several reasons for this: Their production requires large amounts of energy. They are highly concentrated and have adverse effects on soil fertility and the environment, if over-used. In organic farming, we do not rely on single nutrients, but soil organic matter is regarded as central for plant nutrition, as it improves soil structure, promotes soil fertility, and stores nutrients. In poor soils it is important to increase organic matter content by using compost and manures, because using inorganic fertilizers alone will decrease soil fertility. For phosphorus, there is a very good organic alternative: Rock phosphate. K can be provided with wood ash. Both can be added to the compost. Nitrogen is more of a problem. In "Integrated Resource Management" farming system, a combination of organic and conventional techniques are used and some nitrogen fertilizer like urea is added to the compost at planting or to plants with high nitrogen requirements.