The Organic Farmer

The magazine for sustainable agriculture in Kenya

biovision

Nr. 55 December 2009

Tomatoes can now be grown organically in a greenhouse (Photo TOF)

Huge interest in greenhouses

(TOF) There is a growing interest in greenhouse farming. Our rather sceptical article in the October issue provoked a huge feedback.

The biggest hurdle is that greenhouses require a heavy capital investment which is far beyond the ability of most small-scale farmers. On the other side, the greenhouse technology has attracted the interests of banks. Another tricky point for organic farmers who do not use chemicals is the danger of diseases in greenhouse crops. But a new range of organic biopesticides, fungicides and organic fertilizers are already in the market.

Now there is a real danger. It seems that all greeenhouse farmers are rushing to grow the same crop as their fellow neighbour: Tomatoes. When they flood the market, the prices go down and farmers earnings are blown in the wind. Diversification in the range of crops in greenhouse production very important because of the huge investment involved. *Pages 2 & 3.*

No fodder, no milk

Most cows owned by small-scale farmers are underfed. The result is a low milk production. How much fodder does a dairy cow need in a day? And what type of fodder? *Page 8*

in this issue

Addresses please!

We receive requests through SMS and e-mail from farmers who want to get copies of *The Organic Farmer* magazine. We can only consider them under the following conditions:

Farmers have to prove that they are genuine farmers' groups; they should therefore send us a copy of their registration certificate together with such details as number of members, their full address complete with telephone numbers of the contact persons.

For farmers who want to get copies of various articles, do not send SMS' containing only the keyword, "silage" for instance; we may not have the time to call you back to request for details of your full address. With regard to our free service, it is a minimal sign of courtesy that farmers indicate their full name and address.

NOTE: Farmers often complain that e-mails sent to us are not answered. Some months ago we informed you about our new e-mail address; here it is again: info@organickenya.org

Dear farmers,

The year has now come to an end. When we look back at the many articles we have done in the past twelve months, we have seen some very positive response from the farmers, who not only took our advice, but have gone ahead to practise what we have reported in the various articles in the magazine. A good example is the biogas article we carried in February. It provoked an overwhelming feedback from the farmers. The same response has come from farmers who read our article on greenhouse farming recently.

This shows that small-scale farmers are ready to adopt new technologies and ideas that help them improve production and income. It is encouraging to note that farmers and farmers' groups are able to take initiatives without assistance from the government and even NGOs.

We shall continue to support our fellow farmers in this initiative, with our magazine, with the TOFRadio (every Thursday evening at 8.15 pm, and with the input and information centres of The Organic Farmer, *i-TOFs. This new service is a big success, as you can read on page 6. In getting closer to the farmers, the i-TOF programme has made it possible to offer solutions to some of the problems that face small-scale farmers through intensive training by our extension workers.*

It has not been a particularly successful year for farmers due to the prolonged drought that led to crop failure and livestock deaths. We hope that farmers will take advantage of the current rains to plant early maturing crops in order to improve their food stocks in the coming year.

Finally, our heart goes out to the Internally Displaced Persons (IDPs) who are still suffering in transit camps two years after they were thrown out of their farms during the post-election violence at the beginning of last year. Although these people had been promised resettlement and some money to sustain them, to date, many of them have not received a cent. It is really shameful that a country like Kenya cannot find a solution to such a small issue as the resettling of the IDPs. We hope that something can be done to ensure that these people are resettled so that they can resume a normal life.

We wish all farmers a merry Christmas and happy new year.

TOF P.O. Box 14352, Nairobi 00800, Tel: 020 44 50 398, 0717 551 129, 0738 390 715, Email: info@organickenya.org

Farmers can now buy greenhouse starter kits

Farmers have discovered the benefits of greenhouses. To build one needs capital and ambition.

The Organic Farmer

Greenhouse farming is becoming one of the most popular agricultural enterprises among farmers in the country at the moment. As we mentioned in our September 2009 issue of *The Organic Farmer*, farmers now want to grow high value crops that give them quick returns for their investment. Under optimal conditions, growing vegetables and fruits in a greenhouse can give the farmer up to ten times what they would get if they did the same in an open rain-fed field. The changing climatic conditions have brought very unpredictable rainfall patterns and frustrated many farmers. This explains why they opt for alternative methods of generating income; for them, the greenhouses seem to be a way out of the dilemma.

No loans without security

The biggest problem for farmers is lack of start-up capital. To put up a greenhouse requires a lot of capital. Most farmers cannot overcome this hurdle unless they get support in form of credit from a bank or their local Savings and Credit Cooperatives (SACCOs). The only other institution offering credit is the Agricultural Finance Corporation (AFC) which lends only to farmers with five or more acres of land.

A greenhouse made using local materials

Getting loans is not a big problem for farmers with title deeds or any other security such as household goods, a car or even a permanent residential house. Equity bank has a special credit facility for those who want to set up greenhouses. The farmers have to present their bank statements for the last two seasons. A detailed business plan showing the inputs required for the entire investment, including the expected crop yield and earnings, should be provided. The bank assesses the business plan and inspects the security and immediately disburses the loan, as long as the farmer meets all the conditions.

The cost of a greenhouse

Farmers can put up a greenhouse using locally available materials for the framework. But the construction needs a person with some technical knowledge on this specific task. The use of local material reduces the costs; the proceeds from savings can be used to buy other important inputs such as the plastic sheeting or seeds.

A number of companies are already selling entire kits for greenhouses, including the irrigation system. It is easier for farmers who can raise enough capital to buy these kits because they come as a complete package.

One rather good value kit is produced by Amiran Kenya Ltd, a company based in Nairobi. This kit can cover an 1/8 of an acre (500 square metres) and goes for Ksh 139,600. The cost of the farmers kit does not include technical assistance, labour, seeds, organic inputs and other incidental costs (see table below).

The Amiran Farmer's Kit (AFK) is designed in a simple way. It comes with steel structures for the framework of the greenhouse, the cover and a high roof that provides adequate space for crops to grow as required. The kit has a drip irrigation system, a collapsible water tank, a knapsack sprayer including seeds of various crops such as tomatoes, specially suited to a greenhouse environment. Farmers who purchase the kit are trained on every aspect of greenhouse management, pest control, environmental health and safety.

Agro-Tunnel International, another company based in Kitale has a similar kit at the same cost.

Budget for a Amiran greenhouse (1/8 acre) used under ideal conditions

Item	Costs Ksh
Farmer's kit	139, 600
Labour (technical and support staff	24,000
Seeds	10,000
Biopesticides, organic fungicides and foliar feeds	20,000
Miscellaneous costs	5,000
Total costs for the greenhouse	198, 000
Income from 1,000 plants *	400,000
Gross profit margin	202,000

* Estimates: 1000 tomato seedlings planted, each plant produces 10 kg during its lifespan, 1 kg is sold @ 40 Ksh

NOTE: Organic inputs are available at Lachlan (k) Ltd (*See page 3*).

Farmers interested in the construction of a greenhouse can get more information from the following companies:
- Amiran (K) Ltd P.O. Box 30327, 00100 Nairobi, Tel. 020 824 840 -9 or 0725 647 924, e-mail: eva@amirankenya.com.
- Agro Tunnel International Tel. 0720 560 727, 0722 360 311 Kitale, Kenya e-mail: agrotunnel@gmail.com.

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TOF gave Zipporah the greenhouse idea

Innovative farmer, Zipporah Itinga, manages organic tomato production in a greenhouse.

Peter Kamau, Kamulu

Zipporah Itinga always wanted to grow her crops the organic way. But she lacked information on how to do it. But luck came her way two years ago when she came across *The Organic Farmer* magazine and visited our offices. From the various articles in the magazine, she has acquired a wealth of knowledge on organic production. Last year she read an article that featured a company that was selling a range of organic inputs suitable for organic farmers and immediately contacted them.

Organic production programme

The company, Lachlan Kenya Ltd introduced to her a range of products that can be used in place of chemicals and which produce better results. At the same time, her husband, Francis Itinga had learnt about a tomato variety that could be grown in a greenhouse and which matures in six months. The couple had already lost their six dairy cows to diseases and also abandoned French beans production in their 10-acre farm in Kamulu in the outskirts of Nairobi. After reviewing their options, they decided that growing tomatoes in a greenhouse was the best way to go.

Technical back up

Zipporah Itinga once more approached the company for advice on how she could do it organically. Lachlan Ltd. was interested and promised her that in some kind of a trial, they would provide the necessary technical back up through every stage of tomato production using their organic fertilizers, fungicides and pesticides. The company offers free technical service to all farmers who buy their products.

Organic inputs

Itinga put up a 16 by 60 metre greenhouse with 3500 plants last August. She later spread tonnes of compost in the greenhouse. Afterwards, technical personnel from the company helped her to sterilize the soil in the greenhouse and the nursery, using Bioxx 5000. This is a broad spectrum soil drench. It kills all pathogens that attack crops in the soil while sparing beneficial organisms.

Later the soils were inoculated with the product Eco-T. It contains beneficial fungi that control fungal diseases, and fortified with bio-stimulants. Black majick, a soil conditioner that helps to balance the soil pH and reduce acidity, is also added during early soil preparation. After planting, TwinN for nitrogen fixation and Aton A to Z, an organic foliar feed with amino acids and trace elements are added. To ensure sustainable quality yields, Biocure, a crop protection product, is applied at intervals of two to three weeks for the entire growth cycle to control pests and nematodes.

All these products are certified by the British Soil Association, an internationally recognized certification body, and Ecocert of South Africa. Another advantage is that these products are cheaper when compared to chemical pesticides and herbicides.

Mrs Zipporah Itinga tending her crops

Drip irrigation saves water (picture above), the ropes support the plants during fruiting (picture below). Photo TOF

Greenhouse sanitation

Mrs. Itinga also uses plant extracts and ash to repel pests and to increase potassium levels in the soil. No plants in the tomato family such as potatoes, capsicums or eggplant are planted near the greenhouse to avoid disease transfer. Anybody entering the greenhouse has to dip their shoes in a disinfectant solution to prevent any contamination that can introduce diseases to the crop. When The Organic Farmer visited the farm, Itinga and her daughter, who also has been trained in organic farming were busy tending the healthy and succulent tomatoes that she expects to start harvesting in a week's time.

"I have always wanted to avoid the use of chemicals when growing crops." Mrs. Itinga says. "This is after learning that most of the chemicals are responsible for most of the diseases that affect our people. I knew it is only the farmers who can change the quality of the food in the market. I am happy to grow food that is healthy," she adds.

Any farmer interested in greenhouse organic production can get more information from Zipporah Itinga Tel.0722 739 025 or Lachlan (K) Ltd P. 0. Box 494, Nairobi, 00100, Tel. 020 207 39 12/3/4 or 0722 209 474.

Proper air circulation in a greenhouse is very important. (Photo TOF)

Record keeping is a must for breeders

Lack of records contribute to the declining quality of the Kenyan dairy animals.

The Organic Farmer

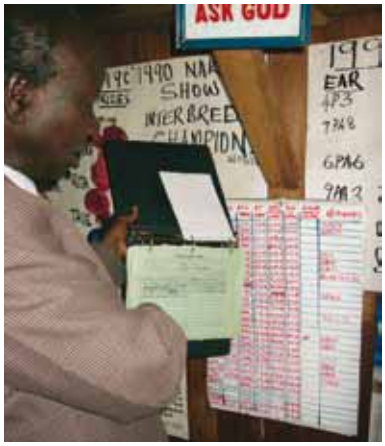
Farm records are part and parcel of the management system in any farm. They help the farmer to know how the various activities on the farm are performing. For those who keep dairy cattle, farm records are an important guide for any farmer who wants to keep essential details of their dairy animals. They can help farmers track the history of their dairy cows right from birth to calving, lactation for breeding and general livestock management purposes. Records of individual animals, their milk production, health, feed usage and other essential details can be kept for future reference and use.

The records are useful and can be used to improve the production of the animals. The records must therefore be kept in a way that they can be retrieved and used to help make important decisions regarding each of the animals. Farm records must be done in a simple way that anybody including the farm workers can understand. Farmers can use dairy farm records to improve and compare the performance of different animals on the farm. They can then decide if they want to keep the animals or even dispose them of.

A farmer who has maintained records of each cow will know when it was born, its daughters, the bulls whose semen was used to serve it, how much milk the animal produced in a day, how many times the animal fell sick, the type of disease and treatment that was given. From this history, a lot of information about an animal and its progeny (future calves) can be obtained. These can help the farmer to recall the quality of a particular cow or bloodline. The information can also be used by other farmers who buy the breed or even breeding societies.

Record details of each dairy cow

Most farmers have very limited knowledge on the importance of maintaining records. Do not trust your memory. A lot of facts will be forgotten within a short duration, making it difficult to



know figures and facts that can help you know about a particular animals and its young ones two or three generations down the line; written records can help you remember these.

Simple records can go a long way in assisting farmers to know the fertility and qualities of their animals. For those who want to upgrade their herds and produce high yielding dairy cows, record keeping where all details on the animals are provided, is a must. Breeding societies require that farmers maintain proper records of each of their dairy cows. The animals are registered with Kenya Stud Book (KSB), this is a secretariat that maintains all records of graded animals in the country. Farmers are required to keep records of daily milk production of each registered cow and the records sent to the Dairy Milk Recording Services of Kenya (DRSK).

Very few animals registered

Research shows that out of 3.3 million dairy cows in the country, only 5 percent are registered with the Kenya Stud book. This means that there is a lot of inbreeding going on without the knowledge of the farmers, which is to blame for the declining quality of dairy cows in the country. Farmers should also ensure that all their graded animals are registered with the Kenya Stud Book. An animal whose records are registered fetches a higher price in the market because its quality is already known and can be proved through its records.

Semen straws contain very vital information such as the name and code of the bull whose semen was used; the farmer only needs to show the straw to the AI provider, who will then choose the right semen to avoid inbreeding.

Farmers interested in keeping dairy records for purposes of upgrading their animals should get into contact with The Kenya Livestock Breeders Organisation (KLBO) P.O. Box 478 Nakuru, 20100 Tel.: 051 2 216 996, Cell: 0723 379 048.

Animal records are more difficult to make compared to other farm records. Below we provide you with an example of a dairy cow record sheet and the details that must be included it for personal information and the KSB recording service.

Prepared by: :KLBO
: Tel: 051 221 6996

TATOO
REGISTER

BREED .....
BIRTH WEIGHT ..... KG

NAME	BORN	HOW DISPOSED	REASONS FOR DISPOSAL

SIRE..... { SIRE.....
DAM.....

DAM..... { SIRE.....
DAM.....

BREEDING RECORD

WEIGHT AT FIRST SERVICE .....KG
AGE AT 1ST SERVICE .....DAYS

AGE AT CONCEPTION .....DAYS
AGE AT CONCEPTION .....DAYS

HEAT DATES	SERVICES BULL	P/D DATE	GENITAL EXAM	DATE TO DRY OFF	DATE DUE TO CALF	DATE CALVED	CALF SEX	CALVING NO.	REMARKS INTERVAL

Dairy cow breeding records are only issued to farmers who have registered their dairy cows with KSB. The picture left shows a breeder with his dairy cow breeding records.

PRODUCTION RECORD

LAC	AGE	Kg MILK	B/F%	Kg B/F	DAYS	LAC	AGE	Kg MILK	B/F%	Kg B/F	DAYS
1						6					
2						7					
3						8					
4						9					
5						10					

GENERAL HEALTH RECORD

DATE	DIAGNOSIS	SYMPTOMS	TREATMENT	REMARKS

VACCINATIONS

DISEASES	DATE	DATE	DATE	DATE	DATE	DATE	DATE
FOOT AND MOUTH							
BRUCELLOSIS							
RINDERPEST							
ANTHRAX/BLACK QUARTER							
RIFT VALLEY FEVER							

DE-WORMING

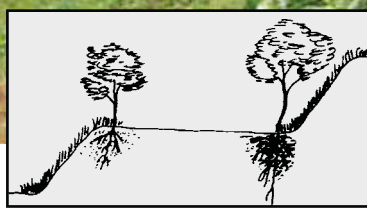
TREATMENT	DATE	DATE	DATE	DATE	DATE	DATE	DATE

Use proven methods to conserve water

A lot of water can be conserved in the soil for crop prodution and to avoid loss through runoff.

Anja Bengelstorff

Crops need moisture to grow well. A lot of moisture can be retained in the soil if the farmer employs appropriate methods of water conservation on the farm. These methods ensure that as much water as possible is arrested and allowed to seep into the soil where it can be taken up by crops during the growth phase; otherwise that water would be wasted as run-off. In sloppy land for example, a lot of water is lost because it flows away by gravity. In flat land, water logging can be a problem, if drainage channels are not made and water flow regulated and used by crops. Farmers should ensure that the available water is conserved and used for crop production. There are various methods that farmers can use to conserve water for these purposes.



Terraces expand usable land and help collect water for your crops. The picture shows terraces in Rwanda.

Planting on terraces

Terraces are usually put in place as soil and water conservation measures on slopes and hills. They provide flat areas of land that can be planted with crops. Grasses, trees and shrubs can be planted on the ridges to stabilise the ground. They also provide leaf mulch and protection from wind for crops; trees and shrubs are useful products for firewood, fuel, building poles or fodder.

Trees can be planted on the ridge or at the back of the terrace. If the tree is planted at the back of the terrace, it will get all of its water requirements. If a tree is planted on the ridge of a terrace, it will be on drier ground but the leaves will spread around more evenly and provide more nutrients for crops. Trees can be planted in both locations if the terrace is wide enough. The type of tree or hedge used will vary according to the site it is planted on and what products or services you wish it to provide. If the aim of the terrace is to stabilize the soil, trees and shrubs with strong root systems should be planted. These will be able to withstand the movements of soil and water.

Water

In our series on water, *The Organic Farmer* underscores the value of this neglected resource. In the January 2010 issue, we will feature drip irrigation systems.

Water remains in pits

Tumbukiza ("throw all in") pits have revolutionized fodder production and improved soil fertility. Huge pits, 60 – 90 cm in diameter and 60 – 90 cm in depth are filled with trash, vegetative matter, farmyard manure and topsoil, then fodder crops, preferably Napier grass, are usually grown. Some farmers apply 20 litres of water per hole per day during the dry season. The organic material in the pits retains the water, enabling the Napier grass to grow rapidly and yield one cut per hole per month. Thus, if a farmer owns one cow, he needs 30 pits; these, when watered at a rate of 20 litres per day, will provide enough fodder for the cow for the month. At the end of one cutting cycle (30 days), the fodder has grown enough to allow for the next round of cutting.

Contour vegetation strips hold water

In traditional systems, lines of grasses, stones, crop residues and other organic debris are placed along hillsides to control water and soil erosion. Contour vegetation strips are living barriers of trees and shrubs which are planted along the contour lines of a slope, bands 0.5-2m wide, or strips simply left unploughed to be colonized by grasses or weedy shrubs This method requires little labour. These lines of vegetation can serve the same purpose and can also provide useful products such as food, fuel, building poles or fodder. There are many factors to consider when building contour strips as bad design can lead to even more severe erosion. The effectiveness of the strip depends on the type of tree planted, the spacing of the trees and the width of the strip, the steepness of the slope, the amount of rainfall and the type of soil.

The advantages are that the strips can provide additional nutrients and organic matter into the soil. This can be increased by using nitrogen-fix-

Continued on page 6

>>> from page 5

Water

ing plants. In addition, excess vegetation can provide food for animals. These can be allowed to browse through the strip to feed on crop remains after harvesting. However, contour strips can take up land, which could be used for crops. Instead of trees and shrubs, grass strips can provide an alternative and are effective in reducing runoff and erosion.

Windbreaks or shelterbelts

A shelterbelt, or windbreak, is a barrier formed by trees and shrubs strategically planted to reduce the speed of wind in order to protect agricultural lands, people, animals and buildings. They can also be used to support sand dune stabilisation. Shelterbelts are most successfully introduced in areas where there are high wind speeds or prevailing winds for long periods, or where the soil

A well maintained windbreak is made-up of small, middle and high tree; the wind can pass through.

A poorly managed windbreak: The trees block the wind totally. The wind whirls behind the windbreak, it spoils the soil surface and vegataion behind the windbreak.

is dry for a large part of the year to protect loose soil. Shelterbelts are made up of strips of trees, shrubs and grasses planted in single or multiple rows. Ideal species are those that are bushy and withstand harsh environmental conditions such as hot or cold winds, salt-laden winds, wind-borne sand or drought.

Evergreen species are recommended unless trees and shrubs are in full foliage during the period of winds. Grasses and herbaceous plants can be planted at the base of the shelterbelt to protect the wind from eroding the surrounding soil. The shelterbelts are sited on the upwind side of the land to be protected and are most effective when planted vertical to the prevailing wind direction. Sometimes large areas are protected by several parallel shelterbelts. Research shows that wind speed is reduced on both sides of the barrier.

Winbreaks need maintenance

The advantages are that physical damage to soils, crops, pasture and animals is reduced, the temperature of soil and air behind shelterbelts is modified, moisture loss is reduced, the leaves from the shelterbelt can help fertilize the fields and soil erosion can be prevented. Among the disadvantages, again, is that the space the shelterbelt takes up reduces the overall land available to the farmer. Also, the trees that make up the shelterbelt may compete with crops for water and nutrients, leading to decreased production. Shelterbelts need continual maintenance to ensure maximum efficiency.

farmers forum
020 445 03 98 0717 551 129 0738 390 715

*i-TOF*s become more popular

Increased demand for training courses offered by the i-TOF extensionists.

The Organic Farmer

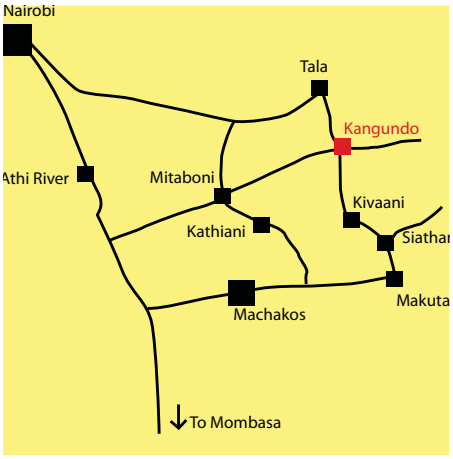
Three months ago, we started the *i-TOF* programme, the four input and information centres of *The Organic Farmer* magazine. The *i-TOF*s in Kangundo, Gatuto, Majengo/Buyangu and Baraka/Molo have served farmers very well in offering training and access to some of the organic inputs that may not be easily available. Our extension workers are overwhelmed by the demand for training services from farmers in areas surrounding the four centres.

This huge interest has brought another problem: Farmers from as far as two or three hundred kilometers away from the *i-TOF* centres have also been calling the extension workers. They are requesting to be trained on various topics on sustainable agriculture.

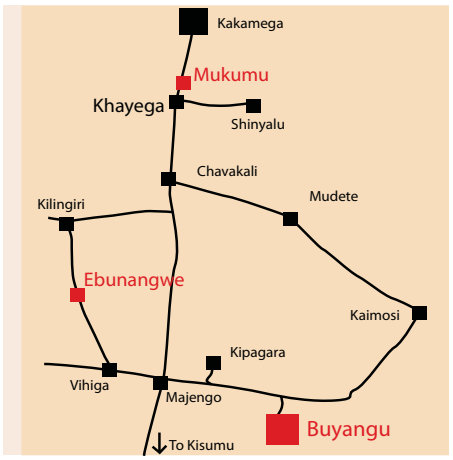
Unfortunately, this is not possible. At the moment our financial resources are limited; we cannot be able to serve farmers beyond the project areas as shown by the maps below. Just now, we are discussing the possibility of farmers' groups from far off places meeting the transport, food and accommodation costs for the extensionists. Since the training is free of charge, these farmers are only expected to facilitate our extension worker to reach them and offer the training. A final decision will be made by the end of January 2010.

Extension workers fully equipped

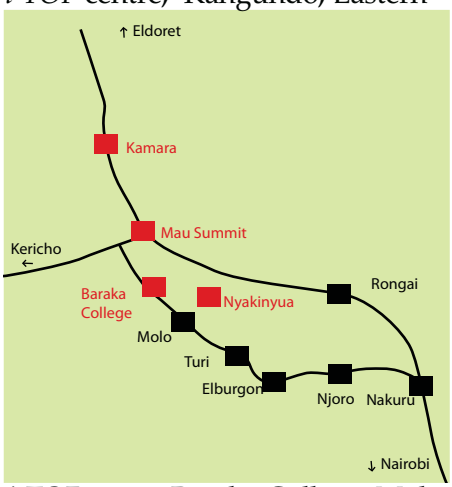
Our extension workers are fully equipped with information material on every aspect of agriculture. They have also been given a small laptop computer through which they can access the offline version of the infonet-Biovision website. If a farmer has a disease or pest problem, all they need to do is to take a sample of the affected plant to the extension worker. He will then use the computer to identify the problem and also give a solution. In addition, the centres have all issues of *The Organic Farmer* magazine from when we started publication of the magazine in April 2005 to the present issue, including books on various topics that cover every aspect of farming. Through the centres, we try to offer farmers a forum where they can come together and share their experiences and ideas on how they can improve their farming practices, yields and even income.



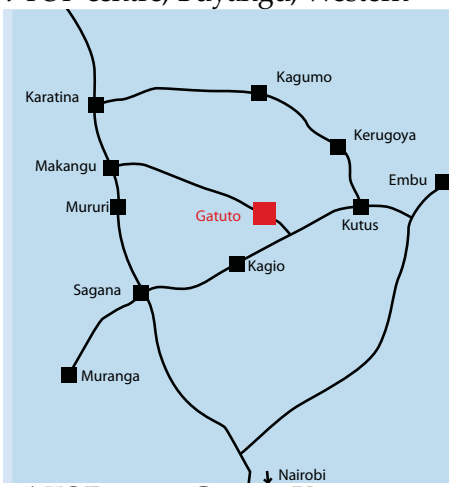
i-TOF centre, Kangundo, Eastern



i-TOF centre, Buyangu, Western



i-TOF centre Baraka College, Molo



i-TOF centre Gatuto, Kerugoya

Managing the eye worm disease

My cows are suffering from eye worm disease. What can I do?

The eye worm disease is an infection of the eyes of livestock with Thelezia species of worms. Thelezia are thin white worms up to 2 cm long. It is known to affect cattle, sheep, dogs, horses and donkeys, camels and buffaloes. It is distributed all over the world but mainly occurs in tropical countries. The disease may affect one or both eyes of the animal.

The infection is spread from host to host by the house fly and other similar flies when feeding on the infected eyes. The larvae of the eyeworm develops inside the housefly to a stage where it again comes out as a by product of waste. When the housefly lands on the eye of an uninfected animal, the eyeworm is again transmitted to the animal and the process continues. The worms can be seen with naked eye but a veterinarian should be consulted to confirm the presence of Thelezia.

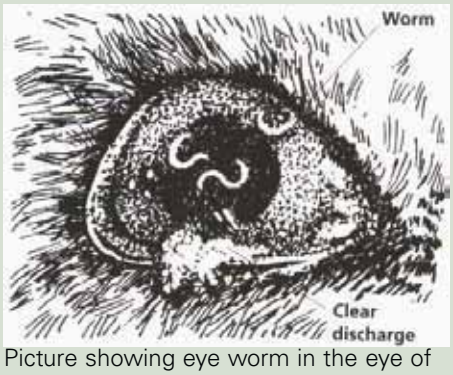
Clinical symptoms

The worm infection has no clinical signs but:

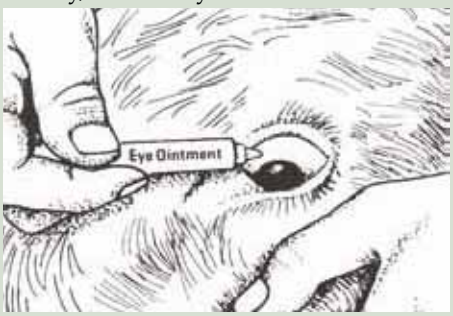
- There are excessive tears and a clear liquid comes out of the worm, which may sometimes become grey, white or yellow; in severe cases, there may be inflammation, and pus can be seen on surface of the eye.
- The animal will try to avoid bright light.
- The eyelids often stick together.

Treatment

- Treatment is possible with topical application of levamisole which can as well be administered by mouth. Treatment with ivermectin is also effective.
- Put 1% solution of levamisole or ivermectin directly into the eye.
- - It is also advisable to apply antibiotic eye ointment if the discharge is cloudy, white or yellow.



Picture showing eye worm in the eye of an infected animal



How to apply eye ointment into the eye an animal

Prevention and control measures

The condition is not life threatening and there is little we can do to control houseflies which transmit the infection. When you observe these symptoms in an animal, it is always advisable to consult a veterinarian for treament.

William Ayako

Bananas need good management

Which chemical can you advice me to use to stop my bananas from aborting? (Kinyua Maringa, Farmer in Gichugu).

Failure of bananas to produce fruits may be due to by a number of factors. Lack of crucial nutrients during growth may be a major cause. Like any other plant, bananas require good management. The farmer should always ensure adequate compost is applied on the areas surrounding the base of the plants (mat). Apart from compost application, bananas require mulching to conserve moisture and maintain soil fertility. Mulch can be obtained from the chopped banana leaves and spread around the base but not too near the base as this may increase the growth of unwanted roots. You can be able to monitor the fertility levels of your banana plant by simple observation of the stems of the plants; after one year, the stem of the younger plant (daughter) should be larger in diameter than the main stem (mother) plant. If the stems of both stems are similar in size, this is an indication that soil fertility is declining. The farmer should ensure more compost is applied to increase fertility levels. The best time to apply compost is when the two stems are equal in size. Make sure that there are only two or three plants in every mat by continuous removal of new suckers. This helps the growth of new plants that may lead to competition for the available nutrients.

...answers in brief

Compost is always good for the soil

How many planting seasons can the compost last in the soil once applied? (Joselyn Karimi)

As part of good organic farming practise, compost should be applied every planting season. This helps to replenish nutrients in the soil which are taken away by the previous crop. Ensure the compost is well-decomposed to make it release all the nutrients to the soil and for the crop to be planted.

Various plants for plant extracts

Can the FPE (Fermented Plant Extract) be sprayed on coffee plantation and Napier Grass? (Joselyn Karimi)

Plant extracts can be used for any crop or even fodder crop. The farmers should ensure that the FPE is well balanced in terms of plants used in its preparation to ensure it contains those plant that have both nutrients and pesticidal properties. Try to make it complete by adding EM and molasses to activate microorganisms in the solution; it becomes more effective.


Tithonia

Correct use of diatomite

At what intervals do I apply diatomite in my Livestock?

Diatomite is of great benefit to animals when it is mixed with animal feed. When given feed containing diatomite your animals will benefit from about 14 trace minerals that make up diatomaceous earth. The following are the recommended amount that you can use.

Cows/donkeys: 30- 60 g per day
Sheep/goats/pigs: 15 g per day

Chickens or other poultry: You need to weigh the feed and add only 2% of that weight with diatomaceous earth. Wet the feed slightly to ensure animals do not inhale the dust because it can irritate the lungs and cause harm to the animal.

Can diatomite be given to a pregnant heifer? (Graziella Maria, Farmer in Gichugu)

Yes, you can mix it with the feed in the same ration as given above.

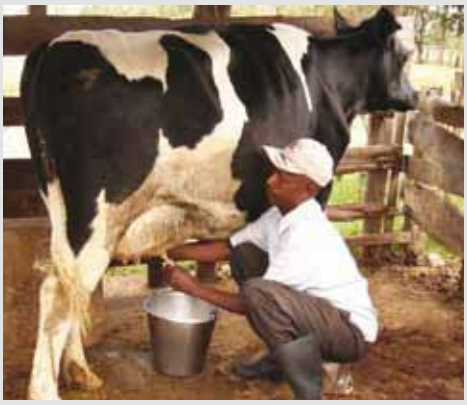
How many animals can I feed from my *shamba?*

Animal husbandry needs careful planning; a badly fed cow has a low milk production.

Theresa Székely

The main limitation for a cattle holder is usually the amount of fodder he can provide on a regular basis. The most important question for a farmer keeping animals is: Do I have enough fodder and water available throughout the year, including the dry season?

Cattle need a lot of feed. One good dairy cow (pure Guernsey or Jersey) needs at least 5 tons of dry matter from fresh or dried grass per year (see box below). This is 25'000 kg of fresh Napier grass, or about the amount you can grow on around one acre of land. Provided you practise a very good fodder grass management or interplant the grass with legume fodder plants like desmodium, you will still need 0.75 acres to feed this cow well. On two thirds of one acre, you will be able to grow enough fodder to feed an improved local cow which yields around half the amount of milk (3000 litres per year) of a Friesian cow.



More milk with quality fodder (Photo PD)

Basic cattle diet: grasses

Grasses are the basic diet of all cattle. Their quality of feeds depends mainly on the stage at which they are harvested. They give the highest yield when they are cut at a medium stage, but the best fodder quality is achieved when they are cut at an earlier stage of maturity. Fertilizing (with manure for instance) also contributes to quality. The best grass for cut-and-carry is Napier grass, but Naivasha star grass, Bermuda grass or Elephant (guinea) grass are also good.

When Napier grass is well managed and cut frequently, it is of high nutritional value. To farmers with dairy cows, using the "tumbukiza" method is recommended as it gives the highest grass yields, especially during the dry season (*see page 4*). It requires some work, but because Napier grass can stand in the field for 3 to 5 years, the effort for the digging is well invested labour!

Important: enough water

Water is required for all body functions and must be provided at all times. All creatures will die from lack of water quicker than from lack of any other nutrient. A cow needs:

- 40 to 50 litres of water per day for her own body
- 1.5 litres of water for every litre of milk produced

Only well-fed animals can earn you a profit

A small animal will obviously require less feed than a large animal. But the amount an animal feeds depends also on the quality of the feed: From good feeds, an animal consumes higher amounts.

A cow requires a certain feed quantity just to keep her body weight. For milk production, she needs additional forage: About 3 kg of fresh grass for each litre of milk. As her milk production increases, so does her forage intake.

A lactating dairy cow may therefore eat more than three times the amount of fodder which is necessary during the time she is dry!

There is one important reason why a farmer should never keep more animals than they can feed well and keep healthy: An animal which is not fed and kept properly has also very low milk and meat production – if any at all. In other words, an underfed and suffering animal will cost you more than you can earn from it.

Breed	Live weight (kg)	Milk production per year (kg)	Average forage intake per day (kg fresh matter)	Forage intake (ton/year dry matter)	Land for forage for one cow (acres)
Pure Friesian	650	7500	100	6 - 7	1 - 1.5
Pure Guernsey Pure Jersey	400-450 kg	5000 - 6000	65 - 75	5 - 5.5	1
Crossbreed, Improved local breed	350 - 500 kg	2000 - 4000	40 - 60	3 - 5	0.5 - 1
Beef breed Boran,Sahiwal	350- 400 kg	up to 2000	35 - 40	3	0.5

Low cost protein sources

Fodder trees

Tree crops provide dairy farmers with high quality low-cost fodder, mostly during the dry season. As most of them are leguminous plants, their leaves are high in protein. They are therefore an ideal feed supplement for Napier grass and cop residues. They should not be fed in higher shares than 30 percent of the diet though, as they contain substances which can interfere with animal health.

The most common fodder trees are leucaena and calliandra. It is estimated that three kg of fresh calliandra has the same effect on milk production as one kg of dairy meal. Other good fodder trees include gliricidia, tree lucerne, and mulberry.

Legume fodder crops

Legume fodder crops enrich the diet of cattle with protein needed for milk and meat production. They are rich in calcium; they also grow on during the dry season when good feeds become scarce. Legumes should be allowed to wilt before feeding, and must be mixed with non-leguminous fodder to prevent bloat. Green manure crops such as purple vetch, mucuna, clitoria, or canavalia can also be used as fodder.

Lucerne (*Medicago Sativa*)

Lucerne is considered the 'King of Fodders' because it provides ruminant fodder of the highest quality. Protein and calcium levels are high including milk and meat production when lucerne is added to the fodder.

However, lucerne does not grow well in acidic soils, and where sub-soils are too acidic (pH below 5.5), lucerne cannot be grown at all. In areas where lucerne has never been grown before, a rhizobium inoculant needs to be added to the seeds.

Lablab purpureus

Lablab can be intercropped with maize, sorghums and millets. It should be sown about 28 days after the main crop to avoid cereal yield depression from competition. When fed together with maize stalks or other residues, lablab improves the dry-season diet of cattle.

Desmodium

Desmodium has a long growing season and grows well together with grasses, in a pure stand or as a cover crop under fruit trees, bananas or coffee. Like for lucerne, addition of rhizobium inoculant may be necessary.