

The Organic Farmer

The magazine for sustainable agriculture in East Africa



Nr. 75 August, 2011

Fish need balanced diet

Through strict observation while feeding fish, the farmer can easily monitor their growth. Farmers can increase the productivity of fish ponds by providing them with supplementary feed. Page 3



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Dear farmers,

Livestock farmers in Sub-Saharan Africa face a lot of challenges. On one hand, they cannot export their livestock products to other parts of the world. This is due to the fact that the continent is yet to get rid of some of the devastating diseases that remain endemic in the continent many years after the same diseases were eradicated in the developed countries. Trade in livestock products such as beef is a multi-billion enterprise in the rest of the world. One can only imagine the immense benefits livestock farmers in Kenya and the rest of Africa can gain if the region is declared free of these diseases.

One reason for this state of affairs is the fact that donors such as the World Bank withdrew support to the livestock sector two decades ago. The support to this sector was very crucial in the control of transboundary diseases, breeding and the entire animal health delivery system across the continent. Vaccination programmes were reduced, artificial insemination services were privatized and cattle dips that were run by the governments given back to inexperienced livestock rearing communities to run. The entire infrastructure set up for animal health services has collapsed.

The result of all these changes is the resurgence in animal diseases that were under control or near total eradication such as East Coast Fever, Trypanosomosis, Contagious Bovine Pleuropneumonia Foot and Mouth disease etc. Livestock farmers are in a state of resignation and do not know what to do.

There was hope when the government created a Ministry for Livestock Development back in 2003 that finally some of the problems facing the sector would be addressed. Unfortunately, the veterinary services are understaffed. Besides, very limited funding is given to the ministry except during disease outbreaks. The result is that farmers for instance are expected to pay Ksh 600 to have their animals vaccinated against ECF – not many can afford these services.

The livestock sector contributes 13 per cent of Kenya's GDP. It provides sustenance to 90 per cent of the people in arid and semi-arid areas. Assistance to the sector is therefore very important to the country's economy.

War against the CBPP disease

TOF - An estimated 1.4 million pastoralists face hunger and starvation due to the impact of the prolonged drought in Northern Kenya. The failure of the short rains in 2010 and the resulting eight-month dry season (July 2010 through March 2011) have led to a steady decline in herd sizes and conception rates; livestock mortality rates are up by 15 percent above average in most pastoral areas. Distances to water points have doubled by between 30-40 km in many areas, and conflicts have occurred over scarce pasture and water resources. Concentration of livestock in rapidly decreasing resources

has increased susceptibility of livestock to contagious diseases.

One of them is the Contagious Bovine Pleuropneumonia (CBPP). The disease could be eradicated through a sustained vaccination campaign in which the whole herd is vaccinated. This is the biggest challenge facing cattle owners in Northern Kenya. Another one is access to vaccination and veterinary services. A dose of CBPP vaccine costs only Ksh 3; but farmers cannot buy it directly. Only the department of veterinary services can carry out the vaccinations; but in this case farmers have to pay Ksh 30 per cow.

Debate on GMOs is not well informed

Many Kenyans including farmers do not understand the raging debate on whether or not to import genetically modified maize (GMO) to feed starving people in the country. The maize is meant to fill the gap created by the prolonged drought in most parts of the country before the next harvest.

What is GMO?

A genetically modified crop is one whose genes have been altered to make it produce more yields, resist diseases, pests or even drought. The process is achieved through various techniques of genetic engineering.

Although there is no scientific research undertaken to ascertain the side effects of eating GMO foods so far, there is need for this type of research to ensure GMOs do not pose danger to human health or even the environment. Right now, all the talk about the effects of GMO maize is just politics since there is no concrete scientific evidence to support some of the allegations made by proponents of and those against GMOs. Indeed Kenya lacks the capacity to do this kind of research. There are various biologically safe methods of improving crop yields.



Bamboo trees can play a very important role in Kenya's afforestation and conservation efforts. Page 4



A cheap brooder for your growing chicks

Keeping chicks warm during the night is costly to farmers. A simple brooder solves the problem

Hilary Mwenda,

Joseph Msanii from Matunda, Uasin Gishu, together with some of his colleagues are passionate about poultry keeping, but keeping the chicks warm has been a problem for them. With the rising feed prices, an addition of charcoal or kerosene into the budget reduces their profit margin.

A cheaper option

However, the farmers' group got inspiration from *Chepkube*, a specially modified chamber where food is placed after cooking to keep it warm, which is common in households of people from the Kalenjin community. An article in the 2010 July issue of *The Organic Farmer* magazine about an oven for cooking and brooding also fired their imagination. They decided to combine and improve the two ideas and came up with a better version of the two.

Cooking heat keeps chicks warm

"When cooking, the jiko emits a lot of heat which if not saved is lost, we had to look for a simple way of saving the heat and use it later in the chick brooder to provide warmth for the chicks," says Joseph Msanii. "The frame of the brooding chamber is made of wooden and metal bars that form the cooking area. Iron sheets on the upper part help to trap the heat and transmit it to the lower section because of their ability to conduct heat. Bricks are used for the walls and roofing done with mud used as mortar to hold the bricks together.

When cooking, the heat emitted is trapped in between the roof and the floor of the brooder. This heat is retained and saved for later use. If a farmer cooks three times in a day, the heat produced is enough to keep the chicks warm the whole night. On the wall where the jiko is built, a hole is made through, so that when there is sunshine, the farmer allows the chicks to go out through it.

Brooder makes work easier

The opening is covered at night in order to preserve the heat. On the outer side of the wall, there is a resting area for



A home-made brooder (above). Energy that would otherwise be lost after cooking is used to keep the chicks warm. A fireplace with chick brooder under construction (below).



the chicks commonly referred to as a trapezium, made up of wood and wire mesh with a door at the top. The trapezium protects the chicks from predators. "Before I acquired this brooder it was really hectic," says Sabina Ngare a farmer in Matunda, "I had to heat water and put it in bottles and then place them in baskets together with the chicks to keep them warm. But now with this brooder, keeping chicken has become so easy, all I have to worry about is what to feed the chicks." "The newly improved version serves as a jiko, with three cooking places and just under it is the brooding chamber for

the chicks, which in this case acts as the brooder.

The brooder differs with the oven incubator we featured earlier (TOF Nr. 62 July 2010) because it is only used to keep the chicks warm. It is not meant for hatching.

The farmers' group has managed to make 11 brooders since the start of the project. According to those who are already using this brooder, the brooder has drastically reduced the cost of buying charcoal or using electric heaters to keep the chicks warm.

For more information you can contact Joseph Msanii on 0702 878 679

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Fish grow well with proper feeding

The productivity of fish ponds can be increased by providing the fish with supplementary food.

Zipporah Ndulu

Manufactured fish feeds are not widely or readily available in East Africa. Exceptions exist where larger commercial operations such as TamTrout produce their own feeds for their own fish and may have excess quantities available for sale. Where manufactured feeds are available, they might be found in one or more of the following forms: Meal, crumble, dry sinking pellets, moist sinking pellets, and floating pellets.

Some recipes for feed

Cottonseed cake 37%, Wheat bran 57% Freshwater shrimp (*Caradina spp.*), 6% Vitamin mix minimal.

This is one of the different diet formulations that have been tested at Sagana Aquaculture Centre.

Some farmers are successfully using feeds they have mixed for themselves. Examples of mixes that are easily prepared and economical to use include:

- Mixture of 76% rice bran and 24% fish meal
- Mixture of dried freshwater shrimp (*Caradina spp.*) and maize bran, sometimes with some omena meal added.

Feed processing usually includes a number of steps, including grinding, mixing, binding together, fat coating, drying/cooling, crumbling, and bagging. In the East African region, most on-farm feed preparations are made in small quantities, using improvised machinery that is operated



Fish farmers harvesting fish from a pond.

(Photo TOF)

either manually or mechanically, with outputs of not more than five 90-kg bags daily.

Feed ingredients can be ground manually. The ingredients are then mixed in a hand-operated mixer. After preparation, feeds can be made into pellets using a pelleting machine.

How to feed the fish

To begin with, throw out small amounts of feed at a specific time of the day and observe the response. After the fish have accepted the prepared feed and learned when and where they will receive it from, they should become very enthusiastic feeders. Normally fish take about 15 minutes to consume the food.

You should be prepared to reduce the amount of feed per day when one or more of the following occur:

- Fish are clearly not consuming their normal amounts of feed
- Water temperatures are noticeably higher than normal for the time of year
- Dissolved oxygen levels are low

All of the above may occur simulta-

neously when you are nearing the end of a production cycle, especially if the planned harvest time is during the hot months.

When to feed your fish

Keep the following points in mind when feeding your fish each day:

- Tilapias have small stomachs and often browse all day long.
- The best time to provide supplementary feed is between 10 a.m. and 4 p.m., when the water temperature and dissolved oxygen are reasonably high.
- It is advisable to feed from the same position and time each day for each pond. The fish soon learn when and where they can expect a good meal.
- The feeder must be a reliable and dedicated person.

Feeding by hand has benefits

Some of the ways fish feed can be offered to fish include:

- Broadcast the feed into the water as you walk along the pond bank.
- Place the feed on a feeding platform or table under the water.
- Use a demand feeder, which releases fish food when the fish bump a lever.
- Use an automatic feeder, which releases or broadcasts feed at predetermined times.
- Neither the demand feeder nor the automatic feeder requires that an attendant be present at feeding time, but both need to be refilled regularly and periodically checked to be sure they are operating properly.

One benefit of feeding by hand is that the farmer has the opportunity to observe how well the fish are feeding, as well as how fast they are growing. Healthy fish usually eat enthusiastically, and any deviation from enthusiastic eating suggests that a problem may be developing.

The following are some reasons why fish such as the Nile tilapia may not feed as well as expected.

- The water is too cold.
- The dissolved oxygen level is too low.
- The fish may have died.
- The fish are ill.
- The feed is very heavy and sinks so fast you do not see the fish eating it.

How much feed do the fish need?

It is important to estimate how many fish fingerlings you have in your pond to properly calculate how much feed to give them. When you prepare the pond for stocking, keep a record on how many fish were stocked, and make

frequent observations of the pond to know whether or not some fish have died.

A look at the table below will help you understand the amount of feed your fish require:

Time since stocking	Assumed size of fish (grams)	Amount to feed per day*	
		Wheat bran	Pelleted diet (26% protein)
1-2 (months)	5-20	1g/fish	1g/fish
2-3 (months)	20-50	1-3 g/fish	1-2g/fish
3-5 (months)	50-100	3g/fish	2g/fish
5-8 (months)	100-200	4g/fish	3g/fish
8 or more	Over 200	5g/fish	3-4g/fish

*Using supplementary feed, e.g., bran and a diet of 26% protein (Source: Sagana)

- The feed rations shown in the above table can be used for ponds stocked with tilapia or ponds with both tilapia and catfish (polyculture).
- The rations can be fed all at once or divided into two equal portions given in the morning and in the evening.
- For better feeding efficiency, weigh a representative sample of your fish every second week, using their actual weight to determine the amount to feed rather than an assumed weight.

Bamboo can transform the environment

Bamboo trees can protect the soil, purify water, provide firewood and used to make many products.

Peter Kamau

Although Kenyan farmers know and plant many types of trees, very few of them plant bamboo, yet the tree is one of the most valuable among the tree species in the country. Bamboo can play a very important role in Kenya's afforestation and conservation efforts. The tree grows three times faster than eucalyptus trees, reaching maturity in only three years. It can be harvested after every two years for up to 40 years.

Some species of bamboo can grow at the rate of 1 metre a day. Besides, the tree can be put to many uses because of its many good qualities; it can be used for building purposes, bamboo shoots are a source of food, other parts of the trees can be used to make floor tiles, baskets, boats, bridges, brushes buckets, charcoal, furniture, roofing toilets, toothpicks as well as water pipes. Edible varieties of bamboo are available locally.

It can prevent soil erosion

The bamboo roots form a network of roots in the soil, therefore binding it and preventing soil erosion especially in steep slopes and riverbanks where soil erosion is greatest. The abundant foliage that dry and fall off create a thick humus layer that enriches the soil. Studies done in Kenya and South-east Asia have shown that natural bamboo forests have excellent water purification qualities, which also help improve soils. The roots help prevent the soil from being washed away by run off water during heavy rains.

It absorbs carbon

Some species of bamboo absorb as much as 12 tonnes of atmospheric carbon dioxide per hectare- the tree is therefore very important in addressing some of the effects of global warming and climate change. At the household level, bamboo can provide a valuable source of firewood and charcoal. It yields more than 7000 kilocalories of energy, half the yield from the same amount of petroleum. Farmers can also plant bamboo species that have large thorns along the fences for security purposes.

Planting Bamboo trees

The first step in production of bamboo involves the selection of planting material. The planting material may come in form of seeds or wildings (seeds collected from the forest). Bamboo trees take a long time to flower and produce seeds. Flowering intervals may range from 40 to 80 years and when the seeds are finally produced, they are only viable for a few days before they die.



A Nigra bamboo bush (top). An edible bamboo shoot (middle) and bamboo cuttings in the nursery (below).



Farmers should therefore be careful when buying seedlings from hawkers or vendors.

Collecting seedlings

Bamboo seedlings growing wild in forests can be collected and used to start a bamboo plantation. The seedlings can be collected in a few areas in high mountains such as Aberdare ranges, the Mau and Mt Elgon. The seedlings, often found in young clusters can be scooped using a spade and taken to a nursery and planted in polythene bags. The roots should not be disturbed during the transportation and planting.

Vegetative propagation

Bamboo can be propagated vegetatively. This offers a better source of planting material. A section of the root system of the bamboo (rhizome) is cut and planted but farmers should take care not to damage the roots, buds and rhizomes. Culms (bamboo stems) can be cut and planted. Multiplication of seed from bamboo stem is faster than wild seedlings and root cuttings.

Varieties available in Kenya

There are many varieties of bamboo that can be grown in Kenya. Below we provide farmers with a number of common bamboo species including their qualities and uses.

Yushania alpina: An indigenous species that grows in mountainous areas in Kenya. It is mainly found in Aberdares, Mt Elgon and the Mau ranges.

Dendrocalamus giganteus: This is the largest bamboo species in terms of size. It can grow well in highlands and other wet areas in the country. It has edible shoots.

Dendrocalamus Asper: A giant bamboo species which is mainly used for weaving, making pipes, fencing and basketry. It has edible shoots.

Bambusa vulgaris "vitata": An exotic species found mainly in lowland areas such as Machakos. It is mainly used in papermaking, poles and handicrafts.

Bambusa hamiltonii: A fast growing species from China. It is used in the construction industry and has edible shoots.

Nigra: A species of bamboo that has good water purification and filtration purposes. It grows well in highlands and wet areas.

Pseudosassa Japonica (arrows): An exotic species mainly planted in water catchment areas. It has water conservation and purification qualities.

Farmers interested in buying any of these bamboo species can contact KEFRI Tree Breeding and Silviculture Centre Muguga P.O Box 20412,00200 Nairobi, 0722 157 414, 0722 801 539.

The only way to fight CBPP is vaccination

It is a devastating disease that is becoming a threat to cattle holders in Sub-Saharan Africa.

The Organic Farmer

Contagious Bovine Pleuropneumonia (CBPP) is one of the most devastating diseases that affects cattle throughout most of sub Saharan Africa. The disease affects both pastoralist and mixed crop-livestock systems, but its impacts are greatest in pastoralist areas. CBPP outbreaks should be reported immediately to the veterinary services.

The mortality rate is variable, rarely exceeding 50 per cent, and depends on a range of factors such as age, breed, nutrition, presence of other infections or infestations and the type of management. Lactation yields of infected cows are reduced by up to 90 per cent; meat production is affected through reduced growth rates of infected animals.

Although CBPP was once found worldwide, it was eradicated from most continents by the mid-20th century. By the 1970s, the disease's incidence also began to decline in Africa. It was introduced into Africa in 1852 through an imported bull from the Netherlands. However, CBPP recently made an alarming resurgence in around 25 African countries, including Kenya. The disease is a serious threat to livestock production in Sub-Sahara Africa, apart from the economic losses: It has negative implications on regional

and international trade in animal and animal products. It has prevented the majority of African countries from getting access to highly profitable markets in the developed world.

A study carried out some years ago in 12 countries in Western, Central and Eastern Africa (including Kenya) estimated the total annual economic cost of CBPP at around 2 million Euros per country (Ksh 200 million). During the latest outbreak in Tanzania in the 1990s, 250,000 cattle died – with direct losses estimated to be over 50 million US dollars.

Difficult to eradicate

The most efficient method to eradicate CBPP, which has proved effective in Europe, North America and Australia, is the stamping out policy: Control was achieved by eliminating the whole cattle herd population wherever the disease was detected, with compensation of the stockowners.

Only Botswana has managed to eradicate the disease by this method; for most other African countries it is not feasible, for a variety of reasons (e.g. lack of money for compensation, understaffed veterinary services, dif-



A CBPP-infected cow.

ficult movement control etc.). So the most cost-effective method to control the trans-boundary disease is by quarantine, coupled with preventive vaccination; unfortunately, there are no other control methods. The problem today is not so much the type of vaccines as it was some years ago; today, the vaccine T144 has proved its efficacy (see box) It is cheap and saves on costs.

The difficulties begin with the efficient conduct of a vaccination campaign respectively the strategy and logistics for implementation of the vaccinations:

- To be effective, vaccination must target 100 per cent of cattle within a geographically defined area.
- Since the incubation period may be

Continued on page 6

Animals can carry the infection for two years

Contagious Bovine Pleuropneumonia (CBPP) is caused by a bacterium called *Mycoplasma mycoides* var. *mycoides* small colony. Transmission from animal to animal occurs from direct, close, repeated contacts between diseased and healthy animals in shared night accommodation or at water holes, cattle dips, markets and common grazing areas; usually, nomadic herds can be a CBPP reservoir since they may contain many chronically infected animals. The causative agent is present in liquid droplets in the breath and in urine; air-borne transmission appears possible over distances up to 200 metres. Sheep and goats are resistant to the disease.

Affected animals have difficulty in breathing due to damage of the lungs and lose condition. The earliest signs are a sudden onset of fever to 40° C or more and, in milking cows, a drop in milk yield. Sick cattle tend to isolate themselves from the herd and stop eating. Severely affected cattle typically stand with their head and neck extended and forelegs apart, and breathe through the mouth. All ages

of cattle are susceptible; young cattle develop painful joint swellings which appear like lung infections. Many cattle show no disease signs despite being infected, and others recover quickly after a transient mild disease, yet they can carry infection for as long as two years and may be responsible for passing on infection at a later date.

One dose costs Ksh 30

The most widely used vaccine is T144, produced by the Kenya Veterinary Vaccines Production Institute in Nairobi/



Joint-swellings: A symptom of CBPP

Kabete, a government institution. The production per dose costs Ksh 5. But when the governmental veterinary services are doing the vaccination, they include transport, staff allowances etc., so one dose costs about Ksh 30. Only veterinary personnel are allowed to buy and administer the vaccine (see page 1).

Many farmers prefer using antibiotics in treatment of CBPP, since this is a cheaper method for them. Information on the benefits of antibiotics are contradictory. Some scientists, cattle holders and community animal health workers in various African countries argue that effects of the disease can be reduced by at least half when an appropriate antibiotic treatment regime is used for sick animals. However, other scientists consider antibiotics as ineffective in controlling CBPP and dangerous. According to them, antibiotics slow the progression of the disease in a herd, but they are ineffective in chronically affected animals. Even worse: They can hide the clinical signs of CBPP in a herd, allowing the disease to spread even faster. *TOF*



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Learning how to make compost

Members of Arise and Shine Farmers Self-Help Group in Matunda division of Lugari district are taken through the steps of compost making during an i-TOF training session.



Using biological method to control pests

South African farmers are using predators imported from Kenya to control the red spider mite and thrips; two of the most stubborn pests that damage vegetables and flowers. If not controlled on time, the two pests can drastically reduce production or even wipe out an entire crop.

Many pests have become difficult to control because they develop resistance to most of the chemicals. Besides farmers using chemicals are increasingly finding it difficult to export their produce due to strict rules that have been put in place by major importers of fruits and vegetables. The European Union for example has set the minimum residue level for all produce

imported into the union. The use of predatory mites has been found to be very effective in Integrated Pest Management (IPM) systems because they help reduce the amount of toxic chemicals used during production. The predators, *phytoseius persimilis*, *amblyseius (neuseius) cucumeris* and *amblyseius carlifornicus* have been found to reduce infestation to manageable levels once released into infested crop fields. However, the predators are effective in certain environmental conditions. *Phytoseius persimilis*, for example works well in humid greenhouses. They are obtained from Dudutech, a company in Naivasha that rears beneficial insects for control of pests. *Farmers weekly*

Answers in brief

Liquid manures in *tumbukiza*

How do we apply these fertilizers in crops planted using a system like tumbukiza/ 5 seeds or 9 seeds in a hole?

Usually you plant 9 seeds, but ensure that you add good compost to the soil in the hole. Apply the liquid manures around the base of the plant but not too near the stem. Liquid manures can be applied as often as possible depending on their availability because the growing plants are continuously in need of such nutrients such as nitrogen for healthy growth.

Manure in maize

How can I apply liquid fertilizers on plants like maize, targeting each plant on a larger portion of land?

Targetting each plant needs more work, but is more efficient.

Bat manure has high value

Since bats' manure, Guano, is the best, should we keep them?

tsz - If you have a good source of bat manure, make use of it! The best way would be to mix it into your compost or manure pit. Remember: All animal droppings are valuable as fertilizer for plants. But you will also need quite considerable amounts to fertilize your crops with them.

Hens & cocks

Since one cock is supposed to serve 10 hens, in case of less hens, is the cock affected reproductively in any way?

tsz - This is certainly not a problem for a cock. The most natural flock size seems to be one cock and five to six hens. Cocks are already happy and perfectly reproductive even with only one hen (but they may get on the hen's nerves).



Improving dark clay soil

Can I modify dark clay soil by drying it first and later mix it with rotting organic matter to come up with an organic fertilizer?

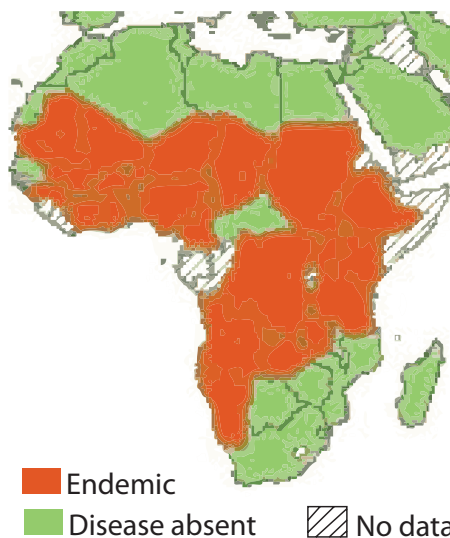
tsz - Rotting organic matter can be seen as a fertilizer, because it contains most plant nutrients. However, its concentration of the 3 macronutrients N, P, K is rather low compared to inorganic fertilizers. The most important effect comes from the organic matter itself, which improves soil fertility. If you mix organic matter with clay soil, you will reduce its fertilizer effect even further. A mixture like this would be very good for seedbeds or potted seedling production. As a fertilizer, it would just not contain sufficient plant nutrients.

>>> from page 5: CBPP eradication through vaccination

as long as six months, vaccination must be repeated, initially at short intervals of six months and thereafter annually. This long-term perspective needs a wide awareness campaign within the cattle rearing communities.

- The vaccination of animals must be maintained until evidence of CBPP eradication is demonstrated by structured surveillance.

Such a huge eradication program is only successful through an intensive collaboration between veterinary service providers and cattle owners. Because of the nature of the disease, any delay can result in widespread dispersal of infection complicating and greatly increasing the costs of any control measures adopted.



Using soap in making plant extracts

Why are we discouraging the use of products with traces of chemicals and yet we call for use of soap in making of the plant extracts?

Is it advisable to use soap and yet it is made from the factory with ingredients such as preservatives with traces of poisons, which is against the rules of organic farming?

Apart from soap in making a plant extract fermented pesticide, what else can we make use of to replace soap particles?

tsz - Soap is a relatively natural chemical and its application is allowed in



organic farming. Traditionally, it is produced by mixing liquid plant or animal fats with a strongly alkaline solution (usually lye = sodium or potassium hydroxide). The chemical reaction is called saponification and has long been used for this purpose. It seems that almost 5000 years ago, soap was produced in Babylon using ashes and cypress oil or sesame seed oil.

Soap has a property that reduces the surface tension of water. By adding some soap to watery extracts, the solution will not form drops that just roll away from the leaf surface, but spread and stick to the plant more effectively, making the pesticide more effective. We do not know of any cheap and easily available substance that has the same effect.

But you are right, not any soap should be used. Omo for example is simply toxic to plants. Use the ordinary natural soap bars (*kipande soap*) such as *jamaa*, *kasuku*, *ushindi* etc., which do not contain harmful compounds.



Tithonia

... as medicine

Since animals feed on Tithonia leaves, can I prepare a fresh solution of it and give it to my animals to boost their health? Anne Mafumbo, Bungoma.

You may try it, but be aware that the effect is very uncertain. Second, it will not help animals that are already sick or in very poor health. It may also be easier to feed any plant directly. You may even let the animals decide whether and how much to feed from particular plants. They usually have a good instinct and know which feeds are good for them and which are not.

... as vegetable?

Is it possible for me to use tithonia leaves as vegetables because of the soft green and tender parts of it? Jane Songa, Bungoma

We have never heard of preparing and using Tithonia as a vegetable, and there is probably a reason for this. We advise you to be careful when eating anything that is not used as food traditionally.

... as feed

Can Tithonia be used together with leguminous fodder tree leaves to make a feed formulation?

If you harvest young Tithonia shoots and dry and store them carefully, they will be a very good feed supplement if offered together with grass or hay. You may use tithonia in the same way as leguminous fodder plants such as calliandra, leucaena or desmodium. Tithonia leaves may not be as rich in proteins, especially if you use older shoots. Make sure to feed only small quantities of all of them (20 - 25% of the total ration).

Banana stems are poor fodder

Is there any way one can add value to banana stem and give as feeds to animals? Since they are available in high numbers: Could they help to withstand drought during water shortages? Chebukwabi CBO dam group

tsz - It is a good idea to make use of available resources on the farm, and it is absolutely possible to feed banana stems to livestock. However, banana stems have high water content, and they are very poor in protein, so they will not contribute to milk production of dairy animals or to growth of young animals. They are also low in energy and minerals. They may therefore help to get over a difficult period, but not more. If given the choice, animals will prefer banana leaves to stems. You also mentioned value addition. This

usually includes some kind of conservation, which might be a problem. Due to the high water content, banana stems tend to rot quickly. The water has to be extracted as fast as possible to prevent this. You could try to chop the material into small pieces, sun-dry it, and store it in a cool, dark place. Let the animals decide whether they like such a preparation.

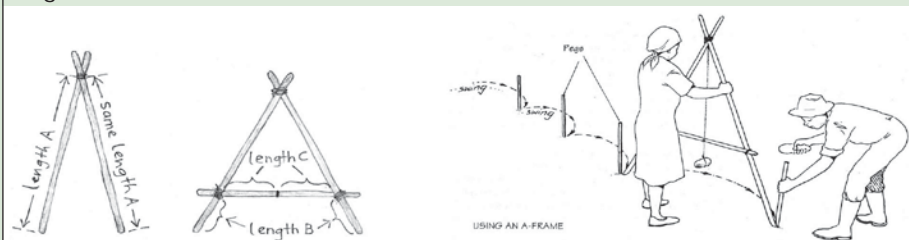


Contouring with an A-frame

What is the measurement of the two poles of an A-frame making letter A? And what is the measurement of the pole crossing the two poles?

You can make them as long as you like, both need to be at the same length; I would make them 2.50 m, so

that they can be moved well. The pole crossing the two poles can be 1.50 m; take care that it is fixed at the same distance from the bottom of the poles (see sketch: length B), and that you mark exactly the middle of this timber crossing the two poles (see sketch length C)



Compost without manure

What will I do if I do not have manure and I would like to make a compost?

tsz - Animal manures are very good for compost making because they provide the nitrogen that is necessary for efficient rotting of the compost. But compost can also be prepared from plant material only. Make sure to add enough soft, green material (e.g. weeds), and make use of leguminous plants, because they are rich in nitrogen. If available, you can enrich your compost with rock phosphate, a very good phosphorous source for organic farmers. Some farmers also add EM1 which can support the rotting process.

The organic solution to clay soils



Clay soils crack during dry season (left). Organic matter improves clay soils (right).

I would like to practice organic farming but my farm has clay soil. When it rains, it becomes waterlogged. Last year I harvested only 5 bags of maize from 2 acres. This year, I have not planted anything. I would like to know how to deal with this problem, do we have soil amendments or conditioner that can improve the soil? "Joseph Nderitu, P.O. Box 1797, 30200 Kitale

pk - Any healthy soil should allow movement of water and air within it. The problem is that clay soil does not allow any movement of water and air because it is compacted; if the plant is unable to get air and water in its root zone, it cannot grow properly. When it rains the soil swells up because it cannot drain away the water. The first step you should take is to drain away the excess water.

Add organic manure

After this is done, collect enough organic matter (a layer of 6-8 inches of organic spread across the entire farm is adequate). Work the organic matter or compost into the soil. You can get organic matter from well-rotted manure or well-prepared compost. When you add the organic matter you create air spaces between the soil particles, this will not only improve the drainage, it also makes the soil more workable in future.

Another benefit of adding organic matter into the soil is that other soil microorganisms, including earthworms feed on the organic matter; this helps in decomposition of the organic matter. The earthworms help to open up the soils while increasing the amount of air in it.

What minerals are deficient in clay soils? Which crops can do well in this type of soil? Clay is very rich in nutrients. But the only problem is that it is not suitable for agriculture since it is so compacted that plant roots cannot penetrate. Since the soil is compacted, it is not possible for air to circulate. No microorganisms can survive in a soil without air.

Clay rich in nutrients

Clay soils are known to have more plant nutrients than any other soils. The reason for this is that particles that make up clay soils are negatively

charged. They therefore attract and pick up positively charged particles such as calcium, potassium and magnesium but the potassium in most clay soils may not be adequate. You can amend potassium deficiency by adding some of the fertilizers in the market such as muriate of potash, potassium sulphite or NPK if you are farming conventionally. Alternatively, there are many organic fertilizers and foliar feeds that can correct potassium deficiency. But the most important thing to do now is to improve drainage in your shamba and also the soil structure by adding enough quantities of organic matter that will improve its structure.

Improve it gradually

Improving your clay soil will require quite a bit of work but the good news is that the work you do will gradually improve the structure of the soil and make it easier to work with. You will have to do much of the work at the beginning. Then keep on adding organic matter every year.

The first step you will have to take is to decide how much area you want to improve. Since getting adequate compost and related organic matter to cover 2 acres of land is not easy, the best option is to divide the land into blocks divided by trenches that will also drain out the excess water. You can then open up the other blocks later depending on the amount of organic matter and labour you can get.

Into how many portions can I divide the trenches? And how deep should they be to solve this problem?

Divide each acre of land into 4 blocks. Then dig two trenches in form a cross (one running down the slope and another across the slope). You also have to dig another trench all around the *shamba*, assuming that your neighbours also have clay soils which will allow water into your shamba. As concerns the depth, we would recommend that you dig the trench until you reach the end of the top layer; the second layer is called the plinthite. The soil in the plinthite layer is dark-brown and is full of stones. Stop digging the trench deeper when you get to the plinthite.

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Nandi flame wanted: This is Peter Benner from Mond Trading Company in Canada. We are looking for farmers who can harvest or gather 3 kg of the Nandi flame leaves or flowers? I need this in dried form. Please contact Peter Benner, Mond Trading Co. 556 Queen Street West, Toronto, ON. M5V 2B5 Canada monteagle@webhart.net