

Protect your maize from this disease

Maize farmers should use clean seeds, practise crop rotation, and scout the crop regularly for pests.

The Organic Farmer | Anxious farmers have enquired from TOF what they should do to avoid the threat of the devastating Maize Lethal Necrosis disease, which, in some maize growing regions, led to heavy losses in 2012. Of course, there are alternative crops to maize for instance cassava or even sweet potatoes. But maize is Kenya's staple food; a planting season without maize is for most farmers unimaginable.

For us to effectively combat this pandemic, it is important to take into consideration one characteristic of the disease: It is rarely spread through seeds, but transmitted through pests such as thrips, stem borers, root-worms, flea beetles and other insects. It is nevertheless advisable to buy certified maize seeds for planting on your farm. If you use your own maize for seeds, avoid the one from the crop harvested last year.

Preventive measures control the disease

Crop rotation: Plant the maize on a plot where there was no maize crop for two to three consecutive seasons. Thoroughly clear the farm of weeds since they can host some pests.



A responsible farmer checks the maize fields for signs of disease

Check the maize regularly: If you notice a maize plant with any of the symptoms associated with the disease, uproot, burn or bury it deep into the soil, otherwise the disease will spread. At the same time, scrutinize the plants regularly for pests.

Fight the pests: It is important that you fight the pests as soon as you discover any of them. They transfer the disease from one plant to the other, from one area or farm to the next. As a measure of precaution, you may spray the maize with plant extracts or neem products to avoid any attack by pests.

Make the soil fertile: When dressing fertilizers to strengthen the plants, apply manure, compost, basal and top



dressing fertilizers to strengthen the plants. Healthy plants develop resistance to diseases and pests. ■

Local chicken neglected



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Dear farmers

Rarely is there a profession that requires as much planning as that of farming. Whatever farmers engage in today, the results become evident some months later. The quality of seeds you use determine, to a great extent, the quality and quantity of the yield; the bull's semen you choose in AI will determine the level of improvement of your local breeds. And the quantity and quality of feed for your cattle influences the milk production of your cows.

The most useful and important planning tool is record keeping. Of course, this can be a boring task after a long day's hard work on the *shamba*: Writing down the costs for seeds, fertilizers and labour and compare these expenses months later on with the proceeds when selling the maize or the crates of tomatoes. Equally, it can be an arduous task to note carefully the expenditure for animal fodder, concentrates, leaks, veterinary services etc., and to record for each day the litres of milk your cows are producing. Proper record keeping needs a lot of discipline.

But it nevertheless pays. Records communicate to you if you are making profits or losses; they enable a careful examination of the existing resources and possible expansion. They allow you to discover wrong decisions early enough and to avoid the same. For sure, one does not need to go for computer courses like Lucy Gichinga did, (see page 5). A simple exercise book that costs Ksh 35 will be sufficient for record keeping. You only have to do it in order to reap its benefits!

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Beware of fake seeds

TOF | Farmers are worried about faked maize seeds. It seems that cheating is going on in a big way. One farmer called us telling us a lorry full of seed bags with labels of a seed company was downloaded and the bags handed over to farmers that near Kakamega during the night! We can only advise farmers to be cautious when buying this planting season.

Fed up with fake seeds, Rachel goes it alone.

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Management leads to success

TOF | Small-scale farmers are eager to have high breed cattle. But they should not forget that dairy production is 20% genetics and 80% management. Ensure there is good quality feeds, sufficient clean drinking water, a clean environment including a well constructed shed and careful handling. Pages 4 & 5.

Improve soil quality for a good maize harvest

It's never too late to learn. Applying the principles of organic farming, I have tripled my maize yield!

Peter Kamau | Planting maize is still a big challenge to farmers across the country. Many farmers cannot understand why they continue to get a poor harvest despite applying the best crop management systems possible, especially in maize production. Unknowingly, a number of factors are to blame for the decline in maize yields. Among these are acidified soils due to overuse of chemical fertilizers, monocropping, seed quality and general lack of proper crop management.

Like many small-scale farmers, I used to get as few as 10 bags per acre of maize in my 3-acre maize farm in Njoro, Nakuru county, until I decided to practice what I always advise farmers in this magazine. Like all other farmers, I never cared about the recycling of crop residue or even crop rotation. But in the year 2009, I decided to change the way I was doing maize production.

In 2008 I had put part of the farm under a bean crop, while preserving the previous year's maize stalk residue on the field. This crop residue had earlier been ploughed back into the soil. My intention of planting beans was to help enrich the soil with nitrogen. Then, the performance of the legume was not very impressive and I only managed to get 4 bags per acre due to lack of rain.

No chemical fertilizer

The following year (2009) I rotated the beans with maize. For fertilizer, I decided to use rock phosphate instead of DAP; rock phosphate does not contain nitrogen but it is an excellent source of phosphorus and other nutrients, however, it is a slow release fertilizer and one has to use it when mixed with humic acid (for this, one can use



Humax from Juanco Company or Black Majik from Lachlan company whose addresses are provided below) to enable it to release nutrients.

After planting, I continued supplementing the nutrient levels in the maize with foliar fertilizers, repeating application in parts of the farm where I noticed nutrient deficiencies. I noticed a substantial change in the maize, which was now healthier than the previous years. At the end of the year I managed to harvest 18 bags of maize, a considerable increase in maize yield from the 10 bags of maize I obtained before.

Organic inputs improve soils

I continued with the practice of recycling the maize stalks in 2010. This time, I planted beans on the entire farm. Before planting, I inoculated the beans with rhizobium, a nitrogen-fixing bacteria, supplied by Mea Company Ltd.

I dressed the beans before planting, with Turbo Seed and Vitazyme and Eco-T (Turbo Seed is a highly concentrated fertilizer that has both macro and micronutrients while vitazyme is an enzyme that provides an environment in which plants can take up nutrients from the soil for rapid growth, Eco-T is an organic compound that suppresses fungal diseases (all these are obtained from Lachlan company), beans require a lot of care because they are prone

to many pests and diseases. To control pests, I used nimbecidine (a neem based biopesticide from Osho Chemicals company). Despite a drought spell beginning June to August, I managed to get 15 bags of beans from the 3 acres.

Crop yields started increasing

In the year 2011, I retained the bean residue in the soil but once more planted maize using

rock phosphate mixed with Black Majik as the main fertilizer. I followed this with foliar feeds to supplement the fertilizer and practised good crop management such as weeding at the right time as well as pest control. This time, the maize yield per acre increased to 22 bags. This to me appeared to be the best yield since 1983, when we first planted maize on the farm. But my real break in maize production came last year when I managed to get slightly more than 30 bags per acre.

I had prepared the land early in February last year and then planted late in April. This time I dressed the maize seed with Turbo seed and vitazyme. I planted the maize the same day as recommended. Three weeks later, I applied half a bag of rock phosphate per acre while spraying foliar feeds to supplement the nutrients, especially nitrogen. By August last year, we were already preparing for a bumper harvest from the look of the maize in the field. ■

The secret to my success

I would like to share with my fellow farmers the secret to my success over this period. To begin with, many soils are so depleted to an extent that they can no longer give any meaningful crop yield, this is especially so in maize producing areas. Maize is a heavy feeder and it requires a lot of nutrients to grow well and give a good yield. I have had to build soil fertility for three years through recycling of crop residue and crop rotation the beans helped fix nitrogen while the crop residue retains water and also organic matter, which releases more nutrients into the soil for uptake by the crop.

Secondly, I have been careful in the use of fertilizers. I opted for rock phosphate instead of acid-inducing DAP chemical fertilizer. Rock phosphate and organic matter in the crop residue reduces acidity in the

soil allowing a crop such as maize to grow well.

Correct use of fertilizer

Thirdly, I only dressed my maize seeds with some little fertilizer at the time of planting. This is because the germinating seed does not require fertilizer as it uses nutrients that are stored within itself. The roots that develop use the small amount of fertilizer that was used to dress the seed. At three to four weeks, seeds will have developed a root system that can now take up regular fertilizer applied to the crop. Most farmers apply fertilizer at planting. The fertilizer is then leached in excess rains to a depth where the plant roots cannot reach it.

Organic Inputs: Vitazyme, Turbo seed, Black Majik-Lachlan (K) Ltd, 020 207 3912, 0722 209 474; Humax, Phosgard-Juanco Ngong Rd, Ngong, 020 208 87 54, 0722 207 805.

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Enhance productivity of local chickens

Local chickens have become adapted to free range survival. More care improves their potential.



Maurice Rangoma | On average, each household in Kenya keeps about 10 chickens, mainly for domestic consumption. This number has overtime remained constant, for various reasons: The birds do not get drinking water regularly; many farmers are not bothered about controlling diseases such as New Castle Disease (NCD) and coccidiosis. As a result, many birds die while others are lost through predators, since farmers live with the chicken in their houses, releasing them to scavenge during the day. On average, a farmer loses between 15 to 40 percent of their stock annually due to these easily controllable challenges.

Local hens lay a batch of 10 to 12 eggs then they become broody and sit on the eggs. This is repeated 3 to 4 times a year. The hatchability varies from 80 to 90%. The chicks hatched are not cared for. Only about 2 to 3 percent reach maturity. Under these conditions the annual output of a flock of 10 chickens can be estimated roughly at 200 eggs and about 17kg of meat.

Better management

This performance can be tre-

mendously improved by applying simple management practices:

Feeding: A few handfuls of maize or other available grains and clean drinking water are essential for extra production of eggs and meat. Egg production increases when chicken eat more and feed on good quality feeds. A kilogram of maize is cheaper than a kilogram of eggs or meat and therefore a few handfuls of the former a day leads to profits.

Housing: Chickens like to be protected, to be sheltered and to be fed. They need a clean well-ventilated place to roost with laying nests (one for every five birds) and clean litter. The shelter should be closed at night to protect the birds from wild animals. If a hen has a protected place to retire to for the night, eggs and day old chicks will not

be lost in the bush.

Suppression of broodiness: The next step to increase egg production is to suppress broodiness. Broodiness is a natural behaviour and in fact the main cause of low egg production; it has been eliminated in hybrid birds by breeding and selection. Nearly half of the lifetime of a good laying hen is spent sitting on the eggs and brooding her chicks. To get rid of broodiness a hen should be isolated by putting it in a small cage without litter; the cage is fixed

somewhere above the rest of the flock. Feed and water should be provided. After 3 to 4 days, the broodiness will normally have disappeared. Note that this is the best way. Most local measures are much too harsh and often counterproductive. For example; immersion in water or the pulling out of the vent feathers causes stress such that egg production stops completely.

Rearing chicks: The hatchability of local chicken is good because for every 10 to 12 eggs, 8 to 10 day old chicks appear. But usually within 2 to 3 weeks nearly all of them disappear due to predators and poor management. The chicks could be kept alive by protecting and feeding them. This means constructing or adding a day-old-chick shelter and a small fenced-off run for chicks and mother hen. The chicks should be fed on mashed maize put in a feeder where grown birds including mother hen do not have access. In addition they should be able to scavenge as they cannot be healthy on maize alone.



Regular vaccination and disease control is important

A good number of local poultry farmers believe that these fowls are not affected by some diseases, such as fowl pox and fowl typhoid. But these diseases affect the local chicken just as they do the exotic birds, causing losses for the poultry keeper. Even more devastating are diseases that go unnoticed by the farmer. Such diseases reduce the vigour of the birds, their growth

rates, feed efficiency, egg production and eventual profits.

In prevention, a sound knowledge of poultry keeping and hygiene is very important. One of the first rules of hygiene is recognizing a sick bird and establishing an accurate diagnosis. Healthy birds are constantly active, bright and alert whereas sick birds will stand half-asleep at the corners of the house, with

their feathers ruffled up, their heads drawn into their wings and the tail drooping.

In poultry management, the farmers effort should be focused on prevention through observance of high hygienic standards and vaccination as the damage is already done when the birds are infected. Coccidiostats are very effective in controlling coccidiosis and should always be available especially in rainy weather. Regular disinfection of chicken housing is recommended to rid it of pests and parasites and other disease causing organisms.



Respiratory problem symptoms: Watery eyes, swollen sinuses, sneezing and difficult breathing.

Vaccination against the following diseases is recommended

Type of vaccination	How administered	Schedule
Mareks disease	Injection	Day old
Newcastle disease	Intra nasal (drop)	At 2 or 3 weeks
	In the eye (drop)	At 18 weeks and at 6 months
	Drinking water	Same
Fowl typhoid	In drinking water	
Intramuscular	At 8 weeks and at 6 months	
Fowl pox	Wing web method	At 18 weeks

Pests and parasites

External pests such as lice, fleas, ticks and mites suck the blood of the birds and cause weaknesses plus a drop in egg production. Disinfect the poultry house and treat the affected birds with sprays or powders. Soft ticks (*kitungu*) are a special problem

for poultry keepers in Machakos and Kitui counties. The best prevention of this is to construct a poultry house with smooth walls as well as applying acaricides and insecticides.

Worms cause a wide range of problems to the birds and can best be controlled by regular deworming. **MR**



Do not expect much from your cows, if they are not given sufficient fodder, water and care.

Planning is the key to success

Successful dairy farmers know that dairy production is 20% genetics and 80% management.

Wesley Ngeno | I have met many people who want to start dairy farming, but do not know from where to start. Usually, they think of buying an animal first. Consequently, they save money, shop for the animal, pay for it and eventually the animal is delivered to the farm. That is the moment when frustration sets in, as usual the animal does not live up to its genetic potential for milk production.

For many small-scale farmers, by the time a dairy cow is introduced to the farm, the farm is not yet ready to receive a dairy animal. For a dairy enterprise to be successful and economically rewarding, the farmer must ensure that the basic infrastructure and necessities are in place before bringing animals to the farm.

According to the East Africa Dairy Development manual (see facts & figures), any dairy cow must get the following basic requirements:

- Good quality feed and clean drinking water.
- Good health, without injuries.
- Clean environment including a well constructed shed.
- Friendly and careful handling, which reduces stress on the cow.

Without fulfilling these essential requirements, the farmer would not be taking good care of the dairy cow and should thus not expect the animal to produce enough milk. The quality and quantity of the milk produced depends on the observance of the four basic needs listed above. As my AI technician usually says, successful dairy farming is 20% genetics and 80% management. Treat your animal well and it will reciprocate by being productive.

Planning, planning, planning...

A dairy farmer should meticulously plan their farm to cater for the needs of their animals in order to optimize milk production. This includes the number of animals they want to keep as well as identifying the amount of fodder required to feed the cows throughout the year, climatic conditions notwithstanding. The farmer should also forecast how fodder will be provided including providing a timeframe for its planting, harvesting and storage.

A plan is a great management tool as it guides what is to be done to achieve the set goals and helps to monitor progress made. A farmer without a plan is like a person starting a journey without a destination in mind. You will end up nowhere, or at worst, where you started; with no animals and no milk. The animals will end up using your scarce resources while giving you very little benefit. In short, it does not make any economic sense!

Need for a balanced feed

My dairy enterprise changed for the better the day I understood the relationship between feeding, milk production and income. If a dairy cow is fed on poor quality feed, then it will definitely give little milk.

Quality fodder: Find out which fodder crops do well in your region. Fodder sustainability is highly dependent on the success of the fodder planted and managed on your farm. Assuming that you are a small-scale dairy farmer who cannot afford irrigation, you should make maximum use of rains to conserve and stock fodder for use during the dry season. It is advisable that you plant as much fodder as you can during the rainy season. Encourage your neighbours to plant

some too, so that you can later buy from them. Napier grass, Boma Rhodes, Sorghum, maize, lucerne, desmodium, sunflower are the main types of fodder that do well in most parts of Kenya.

Sufficient quantities: Know the quantity of fodder that is sufficient for each of your cows. This will help in approximating the quantity of fodder to plant and conserve. On average, a mature dairy cow weighing about 400 kg, in a zero grazing unit is able to consume about 12 kg of dry matter per day. An empty feed trough is an indication that too little was given to the animals. Remember, if your animals lack enough feed, they will show it by their emaciated look and also punish you with low milk yield. As a rule of the thumb, make sure 15-18% of the total feed or ration given to your dairy animals is protein.

Manage fodder production well: Many dairy farmers shy away from planting fodder due to the high cost of fertilizers and seeds. But out of experience, a dairy farmer can utilize animal manure to plant and manage good fodder. Napier grass is one such fodder. If properly manured, a small farm, can provide fodder for your cows throughout the year.

Keep the fodder clean: Store the fodder in a good place, away from direct sunlight, rain and other dangerous weather elements as well as termites. The fodder should be well wilted to prevent poisoning. Farmers can make some judgments about the quality of forage from its appearance, smell and texture. Fresh forages, those with more leaf than stem, that are dark green and which feel soft are likely to be of better quality compared to those that are mostly composed of hard and or woody stem and have yellowish leaves as well. Avoid feeding your cows on forages with mould, which is poisonous. ■

No records? A walk in the fog!

Record keeping is important but often neglected by many farmers. Such farmers see it as an additional activity, which, according to them, has little connection to income on the farm. However, without proper records, a dairy farmer will not know how much income the farm gets and how the animals are performing. How will a farmer determine when to serve his cow, if he does not know the number of days from the day the cow calves down?

A serious farmer keeps farm records. The records do not have to be complicated. They can be as simple as a farmer wants them to be. However, it is important to consider adhering to a standard method. These records should be clear, concise and accurate.

Important records in a farm

Production: These figures show the yield of milk in kilograms per cow per day over a period of 305 days, which is the standard duration of one lactation.

Breeding: It records the farm's breeding program and breeding activities for each animal. There are four essential dates a producer must record on an individual cow to improve reproductive performance: Calving date, heat dates, breeding dates, conception date or date heifer confirmed pregnant and, of course, the name of the bull and its characteristics.

Feeding: These figures show the kind and amount of feed given to the animals on the farm, integrated into

Milk Production Record

Date	Litres morning	Litres evening	Total litres	Cost
Total				

Milk production per cow

March 2013	Cow 1		Cow 2	
	am	pm	am	pm
1.				
2.				
3.				
Total				

Expenses per month

Date	Item	Where bought
	Dairy meal	
	Mineral salts	
	Fodder	
	AI services	
	Veterinary costs	
	Deworming	
	Milk transport	
	Maintenance costs	
	Total	

Lucy, an innovative dairy farmer

Farmers can improve their income by adding value to their products; record keeping is a must.

Philomena Nyagilo | Lucy W. Gichinga is a small-scale farmer in Kihara area Gachie Division, Kiambu county. She has embraced modern farming techniques and treats her dairy farming as a business. No doubt, Lucy is innovative, is hard working and has set targets, which she strives to achieve with a ferocious determination. "In farming business, you need to identify the type of farm enterprise that fits your passion, your interest, your family situation and the resources at your disposal," she advises.

When Lucy began her dairy farming in 1999, she had only two Friesian cows that were zero grazed on her 2-acre farm. Later, in 2004, she realized that she was neglecting her cows and decided to work full time on the farm. At the same time, she began to look around for a market in which to trade her dairy products. "Producing anything, before identifying a market, results in selling the product at a throw-away price," adds Lucy. She has learned her lesson, as she says. "Every actor in the agricultural sector needs to make a profit, but the margin should be comparable to both the farmer and the middlemen. If latter is to make a profit, it should not be at the expense of the farmer, as this will not favour sustainable economic development," counsels Lucy.

Value addition pays

Lucy's efforts and hard work changed the situation on her farm. Ten years later, she has 37 Holstein/Friesian dairy cattle and currently milking 10 of them, the average milk production per cow is 22 litres at the moment, in total about 220 litres of milk per day. Lucy has rented a shop at Gachie shopping center, where she sells her milk and milk byproducts directly to the consumers. On average, she needs about 350 litres of milk every day. To meet this demand, she buys milk from other farmers and adds value to the milk, in various forms:

- 80 litres of her milk are used for preparing tea. A 250ml cup goes for Ksh 20. All the tea prepared is consumed by evening; quite a good number of tea cups



Photos: P. Nyagilo

Apart from making her main income from milk, Lucy Gichinga also grows indigenous vegetables such as managu (black night shade) saga (spider plant) and Terere (amaranth) which she sells in Gachie.

are sold to local workers who additionally buy a *mandazi* or a *chapati* in her milk bar.

- In a day she sells 30 litres of yoghurt, a litre goes for Ksh 120.
- 50 litres of milk are used to prepare "Mala", (fermented milk) one litre goes for Ksh 80.
- About 120 litres of fresh milk daily are sold at Ksh 50 per litre.

Lucy knows exactly how much profit she makes. "Some years back, I went to school to learn how to work with a computer," she quips laughingly. "For me, it was a hard task, I would have preferred to work on the *shamba* instead of sitting at a computer," she adds. "But it was necessary to learn how to keep proper records. Now I can see the benefits: I have a clear picture of the costs for feeds including concentrates and labour and income through selling milk and milk products from my farm."

Sufficient fodder ...

Lucy gives her cows a total mixed ration of dry matter, minerals, dairy meal and maize germ, which is a by product of maize. She grows Napier grass on her farm. She cuts and lets it wilt to reduce water content. The feeding troughs are never empty and her cattle look healthy and active. "They have unlimited access to clean drinking water," she says.

... and improved breeds

Apart from managing fodder to ensure that it never runs out, she is convinced that she can improve the quality of her animals

with a consistent breeding plan. The profit she makes from the milk sales allows her to buy high quality semen. "Each calf born is of better quality than its mother," Lucy explains. "To achieve this, I work with my veterinary officer to identify the traits to be changed, based on the cow's shape and udder."

Lucy is convinced that a farmer who considers dairy farming as a business should be prepared to invest in good quality cows, proper housing, follow good management practices, including feeding with quality fodder. Dairy farming as a business should be managed professionally: Good record keeping routine and balanced feed and considering milk production per cow. Well-maintained books of accounts will help the farmer balance the figures and establish expenses and incomes. Farmers with little or no knowledge on bookkeeping cannot be able to quantify their profit.



Gichinga's healthy cows. She sells various products in her milk bar in Gachie.



Photo: P. Nyagilo

the feeding schedule.

Health: When done well, these records show the health conditions of the animals and are important in selection of animals for breeding and culling those with health problems. It also shows the schedule of vaccinations and other management practices like deworming, and the cost of such practices.

Marketing: These figures show the commodities and the quantities sold per unit and in total. These records together with expenses make it possible to calculate the profit made by the enterprise. To get a correct picture of the income, expenditure and profits (or losses); everything of value in the dairy farm and all transactions involving payments and receipts of money must be recorded.

Milk Consumption	Home Consumption	Sales litres	Value Ksh

	Cow 3		Remarks
	am	pm	

	Price	Remarks

Rachel prefers traditional maize

Once bitten twice shy! After buying fake maize seeds, Rachel Wanjiku Kamau (Kambata) decided to rely on her own.

Dominique Jaquetmet | Strolling among the peasant farmers' farms in Kambata area near Murungaru, one's attention is captured by the colorful flowers that decorate the path through Rachel Wanjiku Kamau's *shamba*. This day, she is busy selecting seed for the next planting season. On the ground is a small pile of carefully selected maize cobs representing different maize varieties. Later on, Rachel will thrash the topmost and bottom part of the cob. Only the biggest cobs in the middle remain on the cob. These will be used as seeds in the following year.

Passionate organic farmer
Just like so many organic farmers do, Rachel is eager to show the visitors her huge compost heaps, properly covered with grass. The industrious farmer is a regular reader of TOF magazine and obviously practices organic farming with passion. That is why she has decided to use her own maize seeds instead of buying them from Agrovet shops.

Rachel says she had been planting the local seeds for as long as she can remember. Five years ago, she started mixing them with hybrid seeds from Agrovet outlets with the aim of developing her own maize variety. Every year, the cobs she harvested increased in size. She thus selected the biggest and healthiest cobs and kept them away for the next planting season. At the moment, she is proud that she has never had



Rachel Wanjiku Kamau

any problems with diseases on her maize - at least not as long as she can remember. Rachel is convinced that the local varieties are stronger, more resistant to pests, diseases as well as unfavourable weather conditions.

Low harvest from fake seeds

Last year, as usual, she bought a bag of hybrid seeds to mix with her own. Unfortunately, at harvest, she discovered that most probably she had been sold fake seeds. The maize cobs from those seeds were smaller, compared to the ones from her local seeds. This is when she decided to stop buying hybrids and also resolved to exclusively rely on her own improved local varieties. She can sell them at a slightly higher price than the hybrid ones; she knows that many small-scale farmers in the neighbourhood prefer the local maize since they are tastier compared to foreign ones. Rachel grows *Katumani*, *Githigu*, *Mukuyu* and a red one of which she doesn't know the name. ■



Many farmers prefer local varieties because of the better taste.

Photos: D. Jaquetmet

innovative farmers' corner

A farmer with a sharp eye

How a small-scale farmer in Sultan Hamud discovered the value of *Leucaena diversifolia*

The Organic Farmer | "After planting my cassava near a leucaena bush, I noticed that the cassava tubers were wonderfully big," reports Anna Malonza, a small-scale farmer in Sultan Hamud. "Why?" she asks TOF in amazement.

Without doubt, Anna is a keen observer. Her question points to one principal effect of the bushes that belong to the group of the so-called fodder trees. The most common ones are *Leucaena diversifolia*, *Sesbania sesban*, *Gliricidia sepium*, *Cajanus Cajan*, and *Calliandra Calothyrsus*. Most of them are familiar to the local people in the regions where they grow.

These bushes have two major uses:

1. **Soil improvers:** Since all these bushes are able to fix nitrogen from the air, they improve the soil fertility, enrich it with nitrogen and enhance the influx of rainwater. They are deep rooted and transport nutrients and moisture from deep down to the root's network under the soil surface, so that crops nearby benefit from these bushes. No wonder, that rice farmers in Asia plant these bushes in hedges between the rice paddocks. Their leaves provide high valuable mulching material, which improves soil fertility and stabilization, that way feeding the crops nearby. This explains Anna's discovery in her cassava crop. The fodder crops can also be used as a shade tree over coffee, they can be grown in dense rows as a living fence and support vine crops such as pepper and passion fruit.

2. **High value animal fodder:** With their foliage, these fodder trees provide high quality low-cost fodder for cattle and goats all year round. Because most of them are leguminous plants, their leaves are rich in protein and an ideal feed supplement of grasses and crop residues. Important: They should not be fed in higher proportions than 30% of the diet as they contain substances, which can interfere with animal health. ■



Leucaena diversifolia



Sesbania sesban



Calliandra Calothyrsus



Cajanus cajan

All these bushes are extremely tolerant to regular defoliation through cutting or grazing once established. Even more: Unless fodder trees are regularly cut, they will not produce sufficient leaves for fodder. All of them are quite tolerant of prolonged dry periods because of their deep roots. ■

Boost plant growth with top dressing

Why should I invest so much labour and time spending days applying manure or compost to growing plants when I can use chemical fertilizers and finish this top dressing in a few hours? A Farmer in Kimilili.

This is an interesting common question. To some extent, with a logical reasoning behind it. But let us discuss in detail the problem of top dressing.

Growing plants need a lot of nutrients; the stronger they grow, the better they are able to resist pests and diseases. Even if the land has been well prepared and enriched with compost or manure before planting, it is advisable to add support nutrients after emergence of the crop. This process is called top dressing. Heavy feeders especially tomatoes, maize and cabbage do much better with additional nutrients during the growing period. Farmers going fully organic by choice or those who cannot afford to buy chemical fertilizers, use manure or compost for top dressing. Without doubt, applying manure or compost around the stems of the growing plants or on their side is hard work; which explains why many farmers prefer chemical fertilizers as they are easier to handle. Whichever method you use: When applying top dressing, choose cloudy days; the soil should be moist as in that condition it is more nutrient absorbent.

Jacob goes the safe way

Jacob Githinji is a farmer near Nyeri town. He describes himself as an organic farmer; he never uses chemical pesticides and treats his pest-infested animals with plant extracts. It is only when it comes to top dressing that he deviates from fully organic agriculture. Some years ago, he heard of a proposal from an agronomist who suggested a mixture of conventional and organic farming. Jacob followed this advice. He mixes NPK with well composted manure, but only 10 percent of the volume of NPK as advised on the label for one acre of land. "The NPK assists the plant immediately, while the compost fertilizes the soil for a longer term," Jacob explains. "I know, this is not strict organic, but my yields since then have doubled."



Top dressing is hard work, but it pays if done properly.

Additionally, you can improve plant growth through crop rotation! In doing so, we have to consider that some vegetables such as tomatoes, corn and cabbage are heavy feeders, whereas others for example kale, root and bulb vegetables and herbs are light feeders. Other crop types like beans and legumes provide nutrients to the soil. When planning your crop rotation thus, try and plant heavy feeders, followed by light feeders and then nutrient builders in the third year to restore soil fertility (see page 2).

Material for top dressing

Compost: Well-composited, enriched with manure, is an ideal plant booster. It contains and stores a wide range of nutrients and micro-elements important for plant growth, it retains and stores water, making it available to the plants over a longer period of time. It also improves soil structure and resistance to rain and wind erosion.

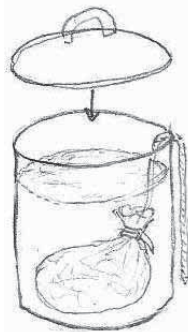
Manure: It is one of the best nitrogen (N) sources in organic farming, and it also provides phosphorus (P) and potassium (K). As some risks are associated with fresh manure application, it is better to compost animal manures before using them on the fields. Of course, fresh manure is high in soluble forms of N (nitrogen). But due to the high concentration of ammonium, it can cause "burning" of crops. So fresh manure should be used only in moderate volumes. To avoid nutrient losses of this scarce fertilizer, apply it when the soil is moist, and work it in lightly. Again: It is much better to plan ahead and to prepare a lot of composted manure for top dressing.

Slurry: With its high content of ammonium-nitrogen, slurry is

an ideal plant booster during the growing period. It fertilizes the soil around the plants quite fast and efficiently. You may need to dilute the slurry.

Liquid manure

Plant boosters in liquid form are easier to apply. Suitable liquid feeds are made from manures, plants, animal wastes and rock minerals. These are basically the same materials that are used in feeding the soil, but in a different form. Organic liquid feeds should never be used as an alternative to good soil care and management, but as a supplement. They are short-term measures to improve growth. Liquid top dressings can be made with manure (see sketch above) or with special plants. To avoid surprises, it is advisable to test the liquid on two or three plants before you apply it on the whole field.



Comfrey: This plant, high in potash, nitrogen and phosphate, is an ideal booster of heavy



feeders such as tomatoes. Steep three kg of chopped comfrey leaves in 45 litres of water; cover with a lid and let stand; use

it undiluted after three to four weeks.

Nettle: nettles can make a well-balanced fertilizer, especially when they are cut when young. They contain the highest levels



of major nutrients (nitrogen, magnesium, sulphur, and iron). Steep 3 kg leaves in 30 litres of water, cover with a lid and let stand. Use it after two to three weeks.

Foliar feed

When nutrients are obtained from the soil, they first pass through the root system and then travel through the stem before reaching plant cells. In contrast, nutrients from foliar fertilizers pass through cracks and/or stomata openings in the cuticle of the leaf and directly enter plant cells. Foliar fertilizers supply plant cells with nutrients more rapidly than the soil. Thus, foliar fertilizers can provide a quick way to correct nutritional deficiencies.

The above-mentioned liquid manures can be used as foliar feed. However, due to the risk of foliage burn, you need to dilute the liquid at a ratio of 1 : 20. And again: Try the foliar feed first on a few plants and observe carefully how they react!



Tithonia improves the soil

Tithonia is one of the most effective green manure plants as it decays quickly and grows in many regions in Kenya. Chop the young shoots before flowering and incorporate them into the topsoil (3 to 5 kg / square meter) 1-2 weeks before planting or transplanting a vegetable. Tithonia produces a lot of biomass and contains high amounts of nitrogen and considerable amounts of other nutrients.

Kenya set to reintroduce DDT

TOF | The Kenyan Ministry of Public Health is disclosing its intentions to reintroduce one of the most controversial pesticides, DDT, for use in public health (indoor spraying). The ministry considers DDT as the only efficient way of eradicating malaria. The chemical is still used in some African countries in public health while it is banned worldwide for any other use, for instance in agriculture. DDT is highly disputed because of its devastating side effects: It remains in the environment for a long time, and before it breaks down, it accumulates in the fatty tissue of mammals poisoning humans and wildlife causing cancers, birth defects and fertility problems.

Malaria is caused by Plasmodium parasites. The parasites are spread to people through the bites of infected female Anopheles mosquitoes, which bite mainly between dusk and dawn. According to the World Health Organisation (WHO), in 2011, an estimated 660,000 people died of malaria. Most deaths occur among children in Africa. Those affected are mainly countries with no or inefficient anti-malaria programmes; for instance, the Democratic Republic of Congo and Nigeria combined account for over 40 percent of the estimated total of malaria deaths globally.

Mosquitoes develop resistance

In the 1950s and 60s, the WHO tried to eradicate malaria worldwide with a massive DDT spray program. While the program helped to control malaria in many places, wiping out malaria completely with DDT was an unrealistic goal. One of the many reasons for the failure of this ambitious effort was resistance to DDT among malaria-carrying mosquitoes. Resistance was identified in Africa as early as 1955, and by 1972 nineteen species of mosquito worldwide were resistant to DDT.

The problems began when DDT was used increasingly and in huge amounts in agriculture to eliminate insect pests, accelerating the emergence of resistant mosquito populations. Because of its risks, DDT was banned in the 1970's. There are fears that DDT, intended for public health use, may be diverted to illegal agricultural application. Even if this would not be the case, the reintroduction of DDT is controversial as the so called DDT-conflict in northern Uganda between 2008 and 2011 demonstrated.



Water puddles are breeding places for mosquitoes. Mosquito nets are safe if well maintained.



Thousands of small-scale farmers managed to improve their income through the export of organically produced fruits and vegetables. After a large scale indoor-spraying with DDT in some districts, products from these regions were banned from being exported to Europe, with the farmers losing their markets and income.

Alternative methods

According to the WHO, malaria mortality rates have fallen by more than 25 percent globally since 2000, and by 33 percent in the WHO African Region. In early February 2013, Kenya got an award from the African Union for its courageous fight against malaria. With the reintroduction of DDT, the gains would be lost.

There are alternatives to the chemical control of malaria, with the so called Integrated Vector Management methods (IVM), which uses for instance natural products such as Bacillus thuringiensis, pyrethrum, neem, apart from quite a number of repellents. 90 percent of mosquito breeding places are man-made, those are, for instance, puddles around the houses and on the shamba, which should be dried out; or open wells, which have to be covered. In addition, the use of bed nets is indispensable – they should not be kept in the cupboards or cut and used for curtain nets.

The fact that malaria control without the use of DDT is very well achievable has been established in Malindi: in a joint project between icipe, KEMRI and Biovision Foundation the cases of Malaria diagnosed in the clinics and health centers between 2002 and 2009 have been reduced by 64 to 79 percent.



farmers forum

0717 551 129 / 0738 390 715

Boer and Kalahari goats breeds wanted: I am keenly looking for these goat breeds. I highly appreciate your kind effort if you can assist me locate any of these breeds. Please call Daniel, 0728 364 844.

Solar incubators wanted: I am looking for a Solar incubator for indigenous poultry farming. Do you know any information about a type that has been used and tested in Kenya? Please call John Kihara, johnkhr@yahoo.com, 0722 507 112.

Ten turkeys for sale: Prices range from Ksh 1,500 to Ksh 2,000, call Geoffrey Wang'ombe, 0729 240 699.

Passion fruit seeds wanted: I am interested in buying seedlings or seeds of sweet yellow passion fruits. James, 0724 412 461.

Animal feed mixer wanted: Any one with an animal feed mixer for sale? Grace Wainaina, 0737 760 440.

Oyster mushroom for sale: I have oyster mushroom for sale in Kericho town. Margaret, 0722 279 368.

Cabbages for sale: We have 5,000 cabbages at Sirikwa Molo and are looking for a market. Call Samson Sugutt, 0720 981 071.

Super Gro for sale: At Ksh 5,000. Please call Betty Ndubi, 0722 460 525.

Strawberry plants for sale: I am strawberry farmer anybody interested in buying plants? Please call Richard Kariuki, 0723 772 437.

Cacia seedlings 'muvesi' for sale: We are selling cacia in bulk. Please call

Ngach Maina, 0712 084 492.

GSD Puppies for sale: Please contact George Otieno, ottygus@gmail.com.

Kienyeji chicken wanted: Do you have mature kienyeji chicken in Nairobi? Please call Michael Khakina, 0710 911 026.

Two disc plough wanted: I Need a 2-disc plough of Massey or Nardi serviceable but used. Tony Murgor, 0721 804 664.

Bees wax wanted: If you have bees wax please contact Kui Muniyua, 0725 743 105.

Indigenous chickens wanted: I am looking for breeds of indigenous chickens to start a poultry project in Kisii. Please contact Raymond Nyaata, 0723 967 053.

Fodder crops for sale: I have calliandra, trichandra, lucerne, sesbania sesban, purple vetch, sweet lupin, leucaena. Both seeds and seedlings. Prices range from Ksh 100 to Ksh 3,000 per kg for seeds. Please call Mary, 0722 694 802.

Readers: In April, *The Organic Farmer* magazine will be eight years old. The editors are looking for farmers who have read TOF since April 2005. Did TOF changed your way of farming? Did TOF improve your livelihood? Please send us an SMS, we will get in contact with you, thank you.

what others are doing

In this section we provide our farmers with additional information about what other institutions in the field of agriculture (production, marketing etc).



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Farmers interested in detailed information on sustainable agriculture or organic farming can visit the infonet-biovision website at www.infonet-biovision.org. It provides information in the four main topics plant, animal, human and environment health. Those with no internet access, can order the infonet-biovision CD at TOF office.