



Store adequate food for the year

There are conflicting figures on this year's maize harvest. While the government says local farmers will harvest about 30 million bags, International organisations such as the World Food Programme (WFP) that monitor food reserves in region say that the country will harvest only 25 million bags. In this confusion it is important that farmers store adequate food to sustain themselves in hard times. For sure the food prices will go up in the coming year. We need to be prepared.

Vaccine with life-long protection

The disease that has been very expensive to treat has caused huge losses to livestock farmers.

The Organic Farmer | Thousands of cattle in Kenya and East Africa die every year from East Coast Fever. The disease is transmitted by the brown ear tick and causes losses of around Ksh 56 billion in Africa per year. The vaccine was developed by the collaboration efforts between the International Livestock Research Institute ILRI, Kenya Agricultural Research Institute (KARI), the Food Agricultural Organization, the Global Alliance for Livestock and Veterinary Medicine and the government of Kenya.

The cattle should be vaccinated when they are at least one year old. Once vaccinated, cattle are protected for life. Dipping can be reduced but should not be eliminated altogether; it is

recommended that farmers continue with tick control but less frequently to manage other tick-borne diseases.

Now the vaccines are sold in bulks of 40 injections at a price of Ksh 1,000 each. So farmers' groups are advised to cooperate. The ECF treatment cost is about Ksh 6,000 per cow. It is planned that later-on the vaccines can be bought in smaller quantities and single doses.

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High demand for goat milk

TOF | Exotic dairy goats are becoming popular in Kenya. Especially foreign NGOs and institutions supporting small-scale farmers consider dairy goat keeping as a suitable way for assisting farmers' groups and communities. The Dairy Goats Association of Kenya (DGAK) in Nyeri confirms that the orders for goat milk are high, the production is insufficient to meet the daily demand. One litre fetches between Ksh 45 and 50. However, the demand varies from region to region; remote areas are often faced with marketing and distribution challenges.

DGAK is encouraging small-scale farmers to go into goat's milk venture. This boom is supported by the introduction of more productive goats, using



A female Toggenburg dairy goat.

pedigree European bucks like Saanen and Toggenburg (from Switzerland) and the German Alpine. *Pages 4 & 5*

Dear farmers

After nearly eight years, we feel that our magazine should get a facelift. Just as you would buy a new jacket to boost your looks but still maintain your personality, likewise, TOF shall remain TOF: A magazine with useful information, tips and articles for farmers. Sustainable agriculture is good for our environment as well as for future generations.

All that we have tried to do with the facelift is to bring in some new structure - designed to make the articles more pleasant and easy to read, while introducing variety but retaining the same standard in content. Four columns per page allow us a better mix of texts and pictures.

Of course, with the new look TOF we bring some innovations: All lengthy articles come with a section called "facts and figures". This helps to capture the main points at a glance. In the newly introduced section "innovative farmers' corner" on page 6, you can find tips about new technology and simple tools that make work easier on the farm.

There are also other smart farmers' practices, for instance about horticulture and livestock husbandry. Farmers with good ideas are invited to share them with TOF for use in this section.

As you can see below on this and the last page as well, we include the social media, Facebook and twitter. Lastly, we would like to wish all our readers a prosperous new year. *Editors*

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Improve your soil with organic matter *Page 3*



How to achieve a 365-day calving interval

With proper feeding and management, it is possible for your dairy cow to give you a calf every year.

Moses Kandie | The Kenya dairy production system is a comparatively high cost system because of lack of enough land for animals to graze, farmers resort to zero grazing, particularly in the high potential areas with higher population densities. This kind of system requires a 365-day calving interval in order to ensure the maximization of facilities and pasture.

In this regard, one of the aims of a dairy breeder is to produce a calf every year, in 365 days. Another aim of the one-year-calving is to have the cow at peak lactation as much as possible. This means: More milk per cow per year, more calves sold per year, and greater profitability of the farm.

To achieve and maintain a 365-day calving interval the following managerial considerations are important.

Enough rest: Your cow is capable of coming on heat about 45 days after she has had a calf. However, a cow should not be served or be brought to the bull before at least 50 days have elapsed to allow the uterus time to rest and heal from possible injuries suffered at calving. In order for her to calf at the same time as the previous year, allow for not more than 100 days of rest before breeding her again.

Stress free: Cows should be kept in a clean and stress free



Farmers should never mix bulls and cows except at the time of serving.

Photo: P. Kamau

environment, with no disturbances from conditions as bad weather, noise, pests and predators. During the first days after conception, the chances of successful fertilization and implantation of the fertilized ovum into the uterine wall is enhanced if the cow is exposed to as little stress as possible.

Feed them well: This is a simple fact that most farmers tend to ignore. When a cow calves down, a farmer will most likely focus on milk production forgetting that the cow will also need to be served on time to keep the year circle. Without good nutrition, this will not be achieved. Well-fed cows do not have reproductive problems.

Follow a nutrition plan that will allow cows to replenish body reserves depleted by the stress at peak production (pregnancy and milk production).

Feeding a balanced diet (ration and forages) play an integral role in maintaining optimum production and health of your herd. Studies and farmer experience have shown that energy supplementation to cows after calving by using rations with high energy content such as maize, sunflower, cotton seed cake or sorghum, improved conception rates.

Care of calves: Calves are future milking cows. Give them a head start by proper feeding and keeping them free of pests and diseases, thereby reducing death rates of calves. A well-fed calf should achieve a growth rate of at least 400 g/day. This means they will reach a body weight of about 80kgs by the time they are weaned at 12 weeks. Make sure calves get enough milk, fodder, rations and water.

Detection of heat: Have a routine and effective heat diagnosis program so that cows are observed for heat and can be readily served.

Routine inspection: Have a routine herd health program in effect so that all cows are checked to be certain that their reproductive organs are in good condition for breeding. Infections can prevent cows getting pregnant when served.

Heifer mating: Heifers are usually mated at either 15 months to calve down for the

first time at 2 years (24 months). As a rule of thumb, heifers should first be mated when they weigh at least 60% of mature mass. The age at which this target mass is reached will differ depending on level of nutrition (amount and type of feed available) and breed.

Pregnancy test: Have your cows checked for pregnancy 3 months after serving them to be certain that conception has taken place, and if not, heat observation and breeding can be resumed. Excessive long calving intervals will result if cows are not regularly checked for pregnancy.

Milking duration: Milk your cow for 305 days then dry, and steam (prepare her for calving). With proper timing, a 60-day drying period can be achieved. Drying-off dates can be a tough decision with the farmer caught up between carrying on milking to make money, and drying-off to set up for a better start to next lactation.

Information: There are many sources of information now such as magazines, books, veterinarians, discussion groups, field days, etc. Farmers are free to collaborate, interact and share knowledge and experience. One who has tried something and seen it work. In short, seek to learn from those who have made it.

Consult qualified personnel

Your animals need a qualified, experienced and trusted Artificial Insemination technician. You don't want to expose your animals to quacks who can mishandle the cows or cheats who will inseminate with the wrong semen: For example, the farmer pays for their cow to be served with Holstein genetics for the animal to be served Zebu semen.



Photo: IN

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Organic farming maintains soil fertility

Organic methods of production can sustain soil fertility and increase crop yields.

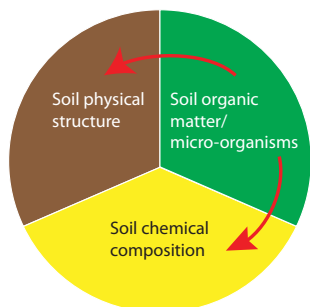
Peter Kamau | Soil is one of the most important resources on the farm, both in crop and even in animal production. Unless farmers take good care of the soil, their crops and even pasture cannot give them the desired yields and income. The problem is that although every farmer wants to get the highest yield possible, they forget that good crop yields can only be obtained if they maintained soil fertility through proper management, which helps maintain the nutrient balance in the soil.

Inorganic fertilizers cause soil acidity

It is now the beginning of the year. Many farmers will be preparing their land in time for planting. But the only input most of them will think about when it comes to soil fertility is the use of chemical fertilizer. But what they may not know is that the use of such fertilizer will only help the crop to grow in that particular season; the use of chemical fertilizer over a long period of time contributes to the build up of soil acidity— many crops including maize, which is widely grown in the country cannot do well in acidic soils, a reason why many farmers record low crop yields despite using increased amounts of fertilizers.

Feed the soil, not the plant

Organic farmers use the maxim: Feed the soil to feed the plant; the meaning of this statement is simple: When farmers build



the soil fertility over a period of time, say 3 years, using organic matter such as recycling of crop residue, compost, liquid manures, crops rotation etc, all the major soil nutrients that are taken up by plants or lost through soil erosion are



replaced naturally thus maintaining soil fertility. Organic farming lays the foundation of soil fertility in all types of soil. The importance of organic soil fertilization is illustrated by the use of the simple diagram given in the first column.

From this diagram it is clear that organic matter is an important part of the soil (crop residue such as maize stalks, bean residue, grasses etc) that includes living microorganisms, control both the chemical composition and the physical structure of the soil. The more organic matter is used in farms, the better the soil becomes. Farmers who add organic matter to the soil every year will notice a gradual increase in crop yields because the organic matter helps increase the nutrient level in the soil, and therefore fertility.

If chemical fertilizers are used year after year, the nutrients balance in the soil is interfered with, leading to a situation where you have more of one nutrient that blocks the others from being taken up by plants; for example, too much magnesium in the soil can block the uptake of potassium while the presence of more potassium can block the release of magnesium for use by plants—in the same way that excess nitrogen can block the availability of potassium and copper to plants.

Avoid use of chemical fertilizers

Since farmers cannot be able to tell what nutrients are missing in their soils unless they do soil tests, the easiest way is to ensure their soils have adequate organic matter at all times. Another option is to avoid the overuse of chemical fertilizers. These practices help to regulate the nutrient balance in the soil when combined with other



Plants that add a lot of nitrogen and other nutrients to the soil. (Photos: TOF)

sustainable agriculture practices such as addition of compost, manure, planting fertilizer trees, crop rotation, intercropping maize with beans and other legumes, planting cover crops and ensuring permanent soil cover to prevent soil erosion. The table below helps farmers decide which material to use to increase soil fertility.



Nutrient content of organic materials

Organic material	Nitrogen %	Phosphate %	Potash %
Cow manure	0.4-0.6	0.2	0.2-0.5
Horse manure	0.5-0.7	0.3	0.6
Goat manure	1.4	0.2	0.3-1.0
Sheep manure	0.7	0.3	0.4
Pig manure	0.5	0.3-0.4	0.5-0.8
Poultry manure	1.1-1.5	0.8-1.3	0.5-2.7
Rabbit manure	1.1-2.4	1.2-1.4	0.6
Boma (mixed animals)	0.7	0.1	0.7
Compost (household)	0.5	0.2	0.8
Grevillea leaves	1.37	0.06	0.64
Bean trash	0.8	0.07	1.57
Banana stalks	0.73	0.18	4.10
Sugar cane trash	0.47	0.06	1.23
Banana leaves	1.3	0.1	1.72
Coffee husks	1.63	0.14	4.45
Sweet potato vines	1.73	0.48	6.63
Leucaena leucocephala	3.74	0.26	3.37
Napier grass	1.97	0.14	3.85
Lantana camara	2.5	0.26	1.93
Tithonia leaves	3.97	0.3	4.6
Cajanus	3.62	0.21	n/a
Jackbean	3.45	0.16	n/a
Crotalaria ('marejea')	4.45	0.16	n/a
Desmodium	3.44	0.15	n/a
Soybean	3.52	0.15	n/a
Lablab	4.02	0.18	n/a
Mucuna	3.56	0.17	n/a
Lima bean	3.79	0.13	n/a
Purple vetch	3.68	0.16	n/a
Groundnuts	3.79	0.18	n/a

Know the requirements of exotic breeds

Without good care and management, even the best exotic breed will not perform well.

Theresa Székely | Whatever exotic cattle breed you keep, you should always remember that these animals originate from a different continent, with different climate, different vegetation, different diseases and parasites, and different management systems. This is the reason why exotic breeds can be less hardy and more susceptible to tropical diseases. Exotic breeds that are kept most frequently in Kenya are dairy breeds, mainly cattle and goats. They are used to improve milk production of local animals through cross-breeding or as pure breeds to get the full advantage in milk production.

No milk without feeding

The genetics of these breeds enable them to produce high quantities of milk. However, they equally require a specific quantity of nutrients to do this. Farmers know well that on very poor soils or with inadequate water supply, even the best high-yielding hybrid maize variety will fail. The same is true for superior livestock breeds: If fed and managed inadequately, you will just see another emaciated creature in your cowshed.

Feeding dry maize stalks



Maize would be an ideal feed for dairy animals, but plant parts must still be green to sustain milk production. Dry maize stalks, the most frequently used fodder for cattle, contain around 5-8% protein directly after harvesting the maize, mainly due to the relatively high protein content of the leaves, but the nutrient level tends to go down until very little of it is left. Not



It pays to feed and tend your dairy cows.

Photo: P. Kamau

Your management is therefore the most important factor when it comes to the performance of exotic breeds.

Feeding a higher protein level

Milk is a protein rich secretion that requires proteins to produce it. Although animals are able to create proteins from other sources than from the proteins contained in the fodder, the protein content of the ration is very important for high-yielding animals. Analysing the protein content of common fodder types usually fed to dairy animals in Kenya, the picture we get is not promising. Tropical grasses, including Napier grass, are often low in proteins, and dry maize stalks provide almost no protein at all (see below). Any grass that has matured and produced seeds has low protein

content. Protein-poor feeds that do not support milk production are the usual diet during dry seasons, yet dairy animals have the potential to produce milk 10 months out of 12 in a year. This potential should not be wasted, or why should you waste a lot of money buying an exotic cow?

Protein rich fodder

After we have learnt which feeds to avoid, we now concentrate on the feeds that can maintain high and quality milk production. They are usually also much richer in minerals and vitamins, compared to low-quality feeds:

- Grass grazed or cut before flowering, while it is still young
- Napier grass well fertilized and harvested when not more than three feet tall
- Hay and silage prepared from grass and other plant material at a young stage
- Green maize leaves
- Leaves from leguminous plants and trees (highly recommended as supplement eg calliandra, lupins, purple vetch, desmodium, lucerne etc)
- Young shoots and shrubs
- Dairy meal, concentrates (see box on the right)

Dairy cows require more effort

The next point is to provide high quality feeds that require additional effort. You have to observe the grass as it grows, cut or graze it when it is still young, collect and feed green maize leaves and leaves from leguminous trees, prepare hay and silage during the rainy season, and to conserve maize stalks and other crop residues immediately after the harvest.

Keeping dairy animals productive is labour-intensive. If you keep them in the same way as your local cattle, they will simply not produce milk. ■

Don't forget water!

Milk consists of almost 90% water. A lot of water is required to produce milk; this may be forgotten in regions where water is not always easily available. Water requirements of dairy animals are highly correlated with milk production levels. A dry cow, for example, needs between 30 and 50 litres of water per day, depending on her size and the climate. A cow in lactation needs about 1.5 litres of water in addition to every litre of milk she produces. A medium-sized cow that produces 20 litres of milk



thus needs 70 litres of water every day (40 l for her own body + 30 l to produce 20 l of milk). If a lactating animal is not offered enough water, milk production drops.

Feeding concentrates

Feeding concentrates and dairy meal as a compensation for poor feed quality has its limitations.

C u d - chewing animals can be seriously affected by high quantities of this type of

feeds, because their digestive tract is specialized for roughage (grass, leaves), and their metabolism can collapse under a wrong diet, in this case too much grains. Concentrates and dairy meals should be mixed with roughage and given in small portions (not more than 2 kg at once for cows), and quantities fed restricted (cows: 6 kg per day).



Keep dairy goats well for good performance

A dairy goat requires less feed than a dairy cow. It is also be highly productive.

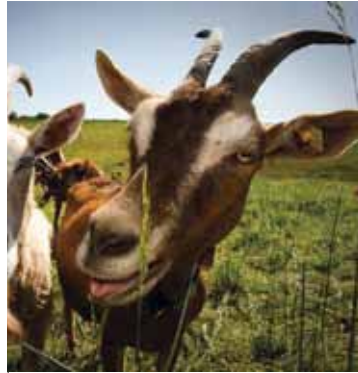
Theresa Székely Dairy goats are ideal for small-scale farmers. From the same area that is required to feed a dairy cow (1 acre of good grassland), you can feed up to six dairy goats. However, dairy goats are exotic breeds that need a high level of management in order to perform well, and the necessity for intensive feeding and regular milking requires the continuous presence of the farmer. Here we concentrate on the feeding aspects.

Feeding preferences of goats

Unlike sheep and cattle, goats are browsers that do not like feeding on what is close to the ground; they prefer feeding from shrubs, bushes and trees wherever they can reach them, from pods, flowers and grass tips. They select whatever appeals to them, ignoring what does not. They prefer a wide range of different feeds. If fed in a cut-and-carry-system, you have to consider this behaviour and offer a range of feeds, or your goats will remain hungry and consequently milk production will be low.

Napier grass alone is not enough

Planting Napier grass for dairy cattle has become a widespread practice in Kenya. For dairy goats, this grass is not a sufficient diet. So dairy goat farmers should exploit the potential for growing fodder to support continuous milk production of their goats. Many species of grass, herbs, shrubs, bushes and trees



Swiss goats: Toggenburg (above) and Saanen (below). Photos: IN

are suitable! Leguminous plants are valuable for dairy animals because they are rich in proteins and minerals. Observe which shrubs and trees in your region that goats like to browse. They can be planted as hedges around your fields and in the compound. They can be cut frequently once they are fully grown.

High feed requirements

The feed requirements of lactating dairy animals are often underestimated by farmers inexperienced in dairy production. Each goat requires 5 to 12 kg of fresh green matter every day, depending on size and milk production. A doe at the peak of milk production will easily eat three times as much as a dry goat. A large dairy goat weighing 50 kg, for example, needs 4 kg of fresh fodder for the maintenance of her own body. And an additional 1.5 kg for each litre of milk she produces. Offering less will reduce its milk yield!

Feed quality

All dairy animals need high quality fodder all the time. When feeding dry feeds to dairy goats, look out for green colour and avoid mouldy material. Poorly fed goats have low milk production, will not come on heat and will usually have only one kid. In addition, resistance against diseases and parasites is reduced. Crop residues should be fed with restriction and have to be supplemented with leguminous fodder, concentrates and minerals – otherwise, the goats will lose weight and stop producing milk.

Dry season feeds

Growing fodder crops, shrubs and trees is not only important in order to offer a range of feeds. It also offers the possibility to harvest, dry and store feeds for dry season feeding. Together

with hay and sufficient water, they help sustain milk production during this critical time. Ensure that you store enough dry feeds. One goat needs 2 to 5 kg of dry feeds per day depending on milk production. For a dry season of 3 months, this would be 200 to 500 kg (or 20 to 50 bales of 10 kg per animal).

Concentrates and minerals

- Mineral salts are essential for goats. Provide mineral blocks in a dry place inside the goat's pen.
- Concentrates should be given to does in the last months of pregnancy and during lactation (milking period)
- Feed them in small quantities at a time (250 g) mixed with green fodder.
- During the last month of pregnancy, up to 500 g can be given per day. After kidding, you may increase feed gradually up to 1 kg per day in the second month of lactation (above 4 litres of milk/day). Then start to reduce

the amount depending on the milk yield.

- Do not feed concentrates towards the end of lactation and during the first dry month.

Goats drink up to 12 litres of water a day

Dairy goats need several litres of clean water daily and need to have access to it day and night. Fasten big buckets to walls or posts. Usually, goats will drink after feeding. In hot weather, with high milk production and when dry fodder is fed to it, a dairy goat may require up to 12 litres a day.

Don't wean the kids to early

Young goats need sufficient milk for a good development. Selling all the milk during the first 2 to 3 months is not a good strategy. Investing it into healthy kids and consequently well performing stock pays better in the long term! Good dairy bucks are also highly sought after. And well-fed and managed dairy does produce plenty of milk for as long as you milk them regularly after weaning the kids.

Additional feeding tips

- It is best to feed dairy goats 3 times a day (morning, noon and early evening).
- If necessary, tie the goats up for one to two hours so they do not disturb each other
- Feed only clean fodder in clean and elevated feeding troughs.
- Hang up some feeds for browsing to be eaten overnight inside the house.

facts & figures

- Enquiries for high quality dairy goats: Dairy Goat Association of Kenya, Karatina Road, P.O.Box 1218 Nyeri, E-Mail: dgak@jambo.co.ke; Phone: 020 219 25 00
- More information is available in TOF module No 14: Goats breeding, kidding, milking and health.
- A pedigree European buck can cost Ksh 25,000, while a cross bred one can cost Ksh10,000. When cross bred with local varieties, they can increase milk production by up to 6 litres per goat per day.

Zero grazing for goats

Although this system is very comfortable for the goat owner, some modifications are recommended to ensure the health and productivity of your dairy goats:

- Instead of the usual narrow, dark and dirty single-cell "prison-like" shelters, construct a protected dry area where goats can rest and sleep. If the floor is not raised, provide simple elevated benches for the goats to lie down comfortably. Each goat



needs 0.5 to 1m².

- Very important: Ensure a well fenced outdoor area where all goats can move freely. Provide at least 3 m² space per animal.



Members of Wangii VSLA Self Help Group with their vegetable bags.

Group work counts

TOF | Very often, we are asked if farmers implement what we train them to do, be it through the articles in our magazine *The Organic Farmer*, in farmer extension training through our three i-TOF information centres. From our follow-ups, it is evident that small-scale farmers practice new ideas they acquire through our training and demonstrations. They are eager to learn and seek new opportunities that can raise their income. This might be a small step, and not all of them might be done perfectly, but at least the farmers have taken the initiative to improve and uplift their economic situation.

The group went into organic farming

A good example of this strong will to fight poverty is the Wangii VSLA Self Help Group in Kakuyuni (Ukambani), which was founded in 2012. Through training, the 31-member group decided to go organic after using chemical fertilizers and pesticides for many years. They realized that the high cost of inputs could not enable them to get a good income from their *shambas*. They decided to change

their farming methods and go organic. They asked the i-TOF centre in Eastern province at Kangundo to offer them training on a number of organic farming enterprises. They learned how to improve soil fertility with compost, how to manage pests and diseases with plant extracts and how to rear chickens.

Marketing together saves costs

They have translated what they learnt into action - with the assistance of the i-TOF field officer Victoria Mutinda. The members plant *sukumawiki* in mound sacks and sell the vegetables together, reducing their marketing costs. The proceeds from this venture allows the group to buy six chickens for each member. When the newborn chicks are three months old, the group sells them at the Tala market for Ksh 400 each.

The group members are proud of their achievement as Florida Ndambuki says. "First, we took the initiative to act, and secondly, we did it as a group. These will motivate us to work even more together in future," she says.

i-TOF Centre

If a farmers' group is interested in training, they should get in contact with our i-TOF Centres directly. The following are the regions where they are located, including their contact addresses:

i-TOF Western Province
 Location: Kamukuywa, Kimilili
 Field officer: Alfred Amusibwa
 Contact: 0724 331 456,
 0738 254 260
 Email: itof7@organickenya.org

i-TOF Central Province
 Location: Gatuto, Kagio
 Field officer: Peter Murage
 Contact: 0724 331 375,
 0738 368 401
 Email: itof2@organickenya.org

i-TOF Eastern Province
 Location: Kangundo town
 Field officer: Victoria Mutinda
 Contact: 0724 331 405,
 0738 254 262
 Email: itof1@organickenya.org

innovative farmers' corner

A drum mixer makes work easier

It is always handy for farmers to have simple tools and equipment that make their work easier and more efficient on the farm. Such equipment can be made by the farmers themselves with the help of a *Jua kali* artisan. An example is a drum mixer; this is a simple drum mounted diagonally between two stands (as shown in the picture right).



When it comes to seed dressing, most farmers use a shovel or a spade. Farmers also go for the spade while mixing animal feeds. A drum mixer can be used for these two purposes since it is a more efficient and convenient method of mixing. It only requires one or two people to turn the drum. When a drum mixer is used for mixing feed or dressing seeds the ingredients are evenly mixed without the problem of having some of the ingredients settling at the bottom or the top as it happens when one uses a

spade or shovel. The only precaution is that farmers should be careful that they do not use the same drum for mixing animal feed and seed dressing. This reduces the chances of poisoning animals or chickens. It is important to have two separate drum mixers for these two functions.

Growing animal feed on a tray

In times of drought or general scarcity of fodder, farmers in South Africa have a new way of producing high quality fodder with the Bioboost feeding system. It is a container-like structure filled with 196 trays (picture 1). On their bottom, the farmer spreads barley seeds evenly, which have been soaked in water for three days. After adding water, the seeds begin to germinate. Chemicals or fertilizer are not necessary, since the sprouts use nutrients needed for growing from the seeds (picture 2). The trays have to be watered several times a day. After six to eight days, the sprouts are ready for feeding to the animals (picture 3). A container with 196 trays can produce 600 kg to 700 kg green fodder per day.



A Biobooster feeding system with 196 trays costs around Ksh 740'000. *Farmer's Weekly* a South African magazine, quotes Gawie Willemsse, a farmer saying that the system will pay for itself within one year.

For more information:
www.biobooster.co.za/

If there is a farmer in Kenya using this system or a similar one, may be self-fabricated, please get in contact with TOF (info@organickenya.org).

Parasites in chickens reduce productivity

How can I prevent parasites in a chickens house?

Mites, lice, fleas and ticks are the most common pests in poultry. Most of these parasites breed in cracks in the chickens houses and hide there during daytime. So the answer to the farmer's question could be very short: Cleanliness and good hygiene in the chicken house, clean litter and regular inspections of both the chicken house and the chickens is the best practice in limiting this problem, detecting the parasites early and implementing measures. Most common treatments are spraying or dusting with pesticides, ashes, and oil. Where the hens do dust bathing, ashes, sulphur powder and diatomite can be used. Since we get similar questions from time to time, it is advisable to look a little bit deeper into the life of these parasites.

Damaging mites

During daytime, mites stay in cracks in the poultry house or other hiding places. At night they crawl back to the birds to suck blood. So a flock may be badly run down without the owner knowing the cause of the trouble. In case of heavy infestation, the birds become *d r o o p y*, pale on the head, and are often restless. Mites can cause anaemia, decreased egg-laying, and damage to bird's skin and feathers. Internal parasites even



Red chicken mite



Wounds caused by mites

invade the lungs and other internal organs of the infested bird. Heavy mite populations can cause death.

Control: Treatment for mites is difficult as they can survive for long periods of time off the chicken itself. A dusting powder for the bird is therefore only part of the solution. The chicken house will also need a thorough cleaning with an appropriate mite treatment solution. Because the life cycle of mites is approximately two weeks, treatment should be repeated every 2 weeks so as to break the cycle of infestation.

Fleas cause restlessness

Fleas are found mainly on the chickens belly. They suck blood from the birds after which they drop and lay eggs in the litter. The eggs mature to adult fleas, which can survive for up to a month without feeding. Flea attacks occur more frequently in humid chickens houses with poor hygiene. Adult birds are often disturbed and spend a lot of time pecking and polishing feathers.

Control: Fleas are fairly easily

Ticks cause skin irritation

Ticks can also infest chickens. They cause anemia, weight loss, decreased egg production and general weakness. The adult ticks hide in crevices during the day and come out to suck blood from the chickens at night. If you suspect tick infestation, go out and get a hen or a cock several hours after dark and examine the skin closely in good light because their bellies swell when they have sucked blood for their nightly meal, they are easy to see.

Control: Ticks are difficult to control.



A tick feeding

You do not treat the chickens; you treat their surroundings. This means spraying housing and treating pasture areas and trimming or removing weeds and debris around poultry housing.



Lice eggs on a feather shaft

Discomfort because of lice

Poultry lice are found on the skin and feathers of chicken; they feed on the blood, dry skin scales and feather parts, causing discomfort. A female louse will lay about 50 to 300 eggs at a time, which she cements to the feather shaft.

Control: To control lice you have to treat the birds directly — treating the surrounding alone does not work. The most efficient and easiest form of treatment is dusting your chicken with a proprietary lice powder. This method will kill any living lice and will need to be repeated 7 days later in order to eliminate any newly hatched "nits" (young lice). It is likely that all your chickens will need treatment. Permethrin, natural pyrethrum, and carbaryl dust are effective insecticides for lice, but it is important to consult a vet for the right treatment.

Some farmers use diatomite powder. They put 1 kg of diatomite in a dishpan-size container and put it in their coop. The chickens bath in it; diatomite kills the lice by piercing their soft bodies, dehydrating them.



A fly laying eggs

treated with flea dusting powder and good chickens housing hygiene. Nests may be protected by putting a few tobacco leaves mixed with ashes.

Treatment is good, prevention is better

Sanitation and cleanliness are the key to the control of these parasites. Sanitation includes cleaning and disinfecting housing facilities and equipment between flocks. Treat the walls, floors, roosts, nest boxes, and the birds simultaneously. When dusting an entire house, be careful to avoid feed contamination. The use of a facial mask is recommended to prevent inhaling this medicated powder.

Don't try to eliminate parasites by spraying your housing with old-time remedies like kerosene or fuel oil. Apart from environment pollution, they also can have toxic effects on your birds

because they can be absorbed into their skin. Complete and

guaranteed prevention of external parasites is unrealistic

because they can be transmitted via wild birds, contact with other infected chickens and rodents that may have access to the chicken house.

But chickens farmers can do more to protect their poultry against these pests in keeping the chickens houses, the nests and the surrounding clean. Cracks in the houses and the floors, where these pests can hide, should be sealed, good ventilation is necessary. Regular inspections of both the chickens house and your chickens is the best way of limiting this problem. If you detect them early, you can implement control measures.



Old office furniture can make comfortable chicken nest. Photo: IN

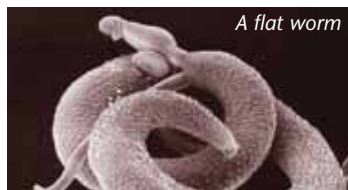
New effort to fight the disease bilharzia

Information and preventive measures are required to eliminate bilharzia in Kenya.

Dominique Jaquet | Thousands of people in Kenya suffer from the human disease called bilharzia, half of them are school children. In Africa over 200 million persons suffer from it, 200,000 persons die every year. This parasitic disease is common in the tropics where ponds, lakes, slow running streams and irrigation canals harbour bilharzia-transmitting freshwater snails. That's why the disease is also known as snail fever. Its scientific name is *schistosomiasis*. It has low mortality rate, but causes chronic illness and, especially in children, impairs growth and the brain's development. To create awareness of this serious disease, one has to understand the life cycle (see graph) of the parasite which is responsible for the disease.

Life-cycle of Trematodes

Lets say, a man is infested by trematodes - the flat worms also



A flat worm

known as flukes, which, cause the disease. The worms live in the intestines and in the blood. The female trematodes lay hundreds of eggs in a day. Some are trapped in body tissue, causing an immune reaction, others find their way out of the human body through the urine or the faeces. As soon as the egg reaches the water (ponds, lakes, slow running rivers and rice paddies), they hatch into tiny swimming larvae (*miracidia*). They swim around until they locate a snail and bore into its body (remember snail fever!). Over a period of three to four weeks, they develop to another type of larvae, *zercaria*. One snail can



Photo: D. Jaquet

Praziquantel distribution in Kenya

Praziquantel is an antihelminthic drug that expels parasitic worms (*helminths*) such as trematodes from the body. The German Company Merck produces tablets containing this

drug in Mexico and donates them for distribution by the World Health Organization. On Friday November 30, the drug was distributed at Mouku Primary School in Kirinyaga.

host thousands of *zercaria* each day.

These parasitic worm larvae (*zercaria*) drill small holes in the human skin and enter into the body. After two to three days, they get into the bloodstream. From the lungs the worms or trematodes go into their favourite host body organ, the liver. In the liver they grow into worms of up to 2 cm long and lay thousands of eggs. These eggs are excreted with urine and faeces. If this is done in standing water, the life cycle of the parasite starts again.

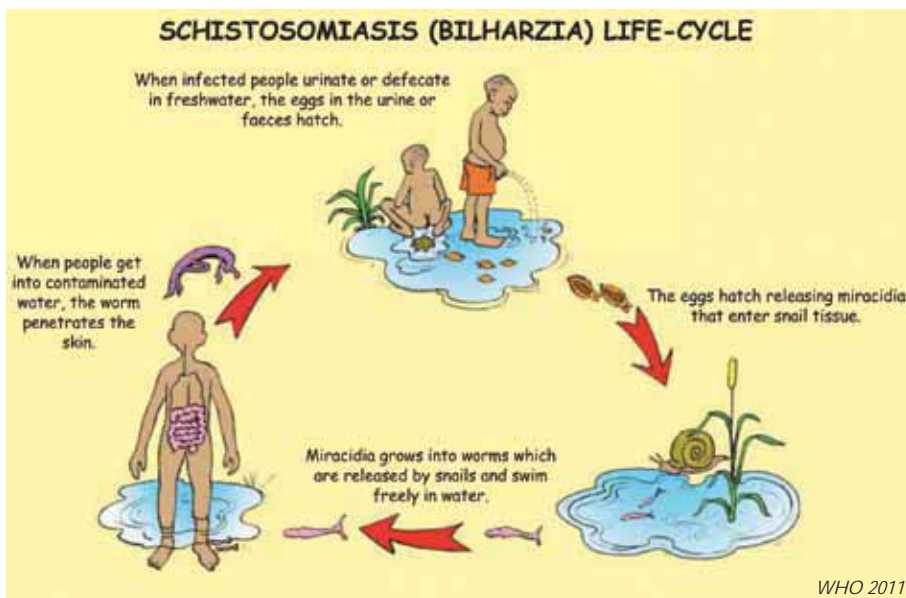
How to fight Bilharzia?

These means that the fewer the people affected by this worm, the lesser the eggs that reach the ponds, lakes and other standing freshwater basins, where they affect children and adults having contact with the water. To prevent the parasite from developing in the human body, the drug Praziquantel helps. It paralyzes and therefore kills



A farmer planting rice in Mwea. Rice paddies are breeding grounds for bilharzia.

parasitic worms, so that they are expelled from the human body. To interrupt the life cycle of the flukes one should avoid urinating and releasing human waste into water reservoirs. To prevent infection, one should avoid contaminated freshwater.



farmers forum

0717 551 129 / 0738 390 715

Sunflower: We would like to visit and talk to farmers growing sunflower. If you are one of them, please get in touch with us on 0717 551 129 or SMS 0738 390 715 or even better, send us an E-mail: info@organickenya.org

buying & selling

Chickens: Our poultry farm deals with dual-purpose chickens like Dorep, Kenbro and our hybrid kienyeji named 'taste yangu'. We sell their chicks as well as their chicken meat. Please call Fundi Wycliffe on 0720 046 770.

Day-old chicks: We sell day old indigenous chicks and improved indigenous chicks at Ksh 100. We also have both manual and automatic incubators for sale. Please call Waf-chick on 0724 669 095 or 0786 669 095.

Eggs and chickens: We have Kienyeji fertilised eggs at Ksh 200 - 400, chicks at Ksh 220-400 Ksh, hens at Ksh 500-700, cocks at Ksh 700-1,000. Please call Steve Gitau on 0733 733 877 or 0722 30 24 46 in Kiserian.

Greenhouses and eggs: In case you want information on size, price, purchase and installation of a quality green house. It will be delivered wherever you want it. Please call Lucas Wahinya on 0724 582 353. We also sell fertile Kenbro eggs at Ksh 20 per egg. Please call 0721 344 852.

Rabbits: For rabbit meat, please call Sungura Kenya on 0734 923 776 or 721 219 092 (big quantities available).

Tomatoes: I have tomatoes for sale. Please call Alice Ndulu on 0725 690 778 or 0720 046 770 or 0750 046 770 or mail to awndulu@yahoo.co.uk.

Sweet potato vines: at Ksh 2 per piece; Varieties: Kemp 10, KSP 20, SPK 004, Bungoma. Please call Judy 0720 832 437 or Ken 0710 350 768.

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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