

The Organic Farmer

The magazine for sustainable agriculture in East Africa



Nr. 89 October, 2012

Dangerous chemicals in use

Farmers are using hazardous chemicals to control pests in their tomatoes at an alarming rate.

The Organic Farmer

Tomato production can be quite profitable to farmers. Indeed, when there is limited supply, prices shoot up immediately, meaning good profits for farmers. On the other hand tomato crop is also prone to many pests and diseases.

One problem that arises from the use of the common chemical pesticides to control pests is that the pests tend to develop resistance within a short time.

Desperate farmers have devised their own ways to control the pests. It has come to our attention that most of them in several parts of the country are using Triatix to kill whiteflies, thrips and spidermites in their tomatoes. This tick-control chemical is allowed for external apply on animals only, but by far not for vegetables which are sold to unsuspecting consumers.

There are many other hazardous chemicals in the market, such as Dimethoate, Furadan, Gramoxone and even DDT. Because of their poisonous effect, they have been banned by the government; but many agrovet shops still stock them. These chemicals pose a serious health risk when they accumulate in the human body. In the long term, they can cause chronic diseases that are now common in many parts of the country, such as cancers, abnormal growths, diabetes and even incurable allergies.

Apart from their effect on human health, the chemicals seep into ground-



water, contaminating it. They destroy essential microorganisms that maintain soil health and kill beneficial insects that pollinate our crops and control pests naturally.

Sustainable pest control methods

There are environmentally safe methods for pest control. These include the use of natural enemies of these pests such as parasitic wasps, predatory thrips, lacewings, rove beetles and even lady birds. If farmers stopped using chemicals, these beneficial insects can control these pests naturally. If the pest infestation is too high, farmers can use biopesticides that are harmless to control stubborn pests such as the ones shown on *page 8*.

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Dear farmers,

For the last three years, we have had The Organic Farmer field officers, training farmers in three regions in Kenya; that is Kangundo (Ukambani), Gatuto/Kagio (Central) and Majengo/Kimilili (Western) under the i-TOF project. The field officers, Victoria Mutinda, Peter Murage and Alfred Amusibwa from Ukambani, Central and Western regions respectively have so far trained more than 20,000 farmers in soil improvement, preparation of plant extracts, cattle, goat and chicken rearing and many other topics in the wide field of sustainable agriculture. The demand for the training is quite high and the extension officers are always fully booked.

When it comes to agribusiness, many farmers in the i-TOF project areas know how to get additional income using new methods they have learnt. Small-scale farmers earnings and self-reliance has increased after the trainings as you often read in this magazine. For us, this is an encouraging feedback; we can see that our efforts are beginning to bear fruit.

Networking among farmers is yet another success of this project: More and more farmers' groups, have successfully transferred the knowledge they have acquired from i-TOF trainings to other farmers' groups through exchange visits. During these visits, they share experiences, are eager to learn from each other and are willing to explore ways of working together.

Above all, farmers are beginning to realize that they have to organise themselves and to cooperate- for mutual benefit. In other words: The i-TOF training has initiated a process, which will help strengthen small-scale organic agriculture in the long term. The establishment of the Infonet-Biovision Resource Centres in various parts of the country will strengthen this initiative.

Of course, we would like to see this process growing faster; since we know that small-scale farmers need to articulate their common interests much more than they are doing right now.

"Unity is strength," this motto, as we quoted in one of the first editions of this magazine, is still valid today.

Harvest early to save your maize

TOF - A lot of maize is lost before harvest due to negligence by farmers. There exists a belief across all farming communities that maize should only be harvested when the leaves dry up and turn brown; due to this, the maize stays long in the shamba and starts rotting - especially when it rains before it is harvested.

According to the latest weather forecast reports, the short rains are expected to be heavier than normal this year; and are expected to continue into December. Farmers who planted their maize in April should ensure they harvest before November to reduce losses. *Page 4*



Fight spider mites and thrips with bio-control agents. *Page 3*

Five out of every 100 heifers are infertile

Of all animals, heifers are the most neglected in many farms, which affects their health and productivity.

The Organic Farmer

When a calf grows into a heifer, it requires proper management to ensure it grows into a healthy, productive cow that is able to produce a good milk yield and also produce healthy calves. Such a heifer ensures improved productivity and an increase in income for the farmer. Farmers should be able to know the problems that affect heifers and which eventually interfere with their normal growth, fertility and productivity. Some of these problems are outlined below:

Heifer infertility

A heifer that does not conceive after being served several times may be infertile. Infertility can be caused by a number of factors. It occurs in about 5 out of every 100 heifers. Infertility in heifers can be caused by genetic defects such as the heifer that has both sexual organs (hermaphrodite). Some heifers have a uterus that is not developed.

Another cause of infertility in heifers is the inability of the ovaries to produce viable eggs. Blocked fallopian tubes can also be a major cause of infertility in heifers. Most infertile heifers look very healthy and farmers try every trick to make them conceive but very little can be done to such heifers. Infertile heifers with congenital defects are called "free martins" and the only way out for the farmer is to sell them for meat.

Infectious diseases: A number of infectious diseases can cause infertility in heifers; brucellosis, trichomoniasis and even a big bout of East Coast Fever (ECF) can cause abortions. Many other infectious viral and bacterial diseases can affect the fertility of heifers, such heifers will fail to conceive or even abort after conception.

Use of infected bulls: Many village bulls suffer from infectious diseases, some that are sexually transmitted. For example, a bull that has brucellosis can pass the disease to a healthy heifer or even a milking cow if it used to serve the animals. Farmers who use bulls for serving their animals face the danger of disease transmission from bulls to their heifers and even dairy cows. The

diseases transmitted this way cause abortions in infected animals. This is why it is advisable to use AI services at all times to prevent disease transmission by bulls.

Cystics ovaries (*Corpus Luteum* or yellow body?): This occurs when the egg-shell in the ovaries forms a corpus luteum (a cyst or growth). If the ovum released into the uterus is not fertilized corpus luteum persists and the animal cannot conceive.

Infected Uterus: An infected uterus cannot hold a fertilized egg (embryo). This prevents conception. Irrigation of the uterus is done to create the right conditions for conception.

Since farmers cannot be able to distinguish most of the problems mentioned above, they are advised to seek the services of qualified veterinary doctors if their heifers fail to conceive after several attempts to serve them. Some farmers often sell heifers that have failed to conceive to other unsuspecting farmers.

All farmers are advised to seek the services of a qualified veterinary surgeon whenever they want to buy a heifer. The Veterinary surgeon will evaluate the heifer and advise if it has any defects before committing their money into buying a heifer. A veterinary surgeon will check important



reproductive aspects of the animal such as the diameter of its pelvis and its positioning, the shape of the udder, the birth canal or if the cervix or fallopian tubes are blocked. He will also advise on other management practices such as deworming to ensure the heifers remain healthy during conception.

The way to feed your heifers

A growing heifer requires a balanced diet, this means that heifers should be given adequate forage and concentrates. Heifers need close observation especially after they are weaned (withdrawn from milk), lack of adequate feed after the withdrawal of milk can lead to stunted growth.

The main problem that hinders the healthy development of heifers is neglect by farmers. Most farmers tend to concentrate more on milking cows at the expense of the heifers. The earlier the heifer is taken care of, the better the chances of it growing into a healthy and

productive cow.

Separate heifers

When heifers of separate ages are fed together the older and stronger ones dominate in feeding, pushing the younger and less strong ones aside, the younger ones therefore get little feed to eat. Heifers should therefore be grouped according to age or sizes eg weaner (those that have just stopped taking milk) yearlings, bullying heifer (those that are about to be served or breeding heifers) and in-calf heifers.

In the next issue we look at the feed requirements of a heifer.

The Organic Farmer is an independent magazine for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. The Organic Farmer is published monthly by icipe and distributed free of charge to farmers.



The reports in the The Organic Farmer do not necessarily reflect the views of icipe.

The Organic Farmer is sponsored by BioVision, a Swiss-based foundation for the promotion of sustainable development. www.biovision.ch

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The better option in plant protection

Biological control uses living organisms to control pests and diseases in crop production.

Theresa Székely

It is more than 120 years since a large Australian ladybird species was introduced in California to fight scales in citrus plantations, with huge success. Since then, biological control has been continuously developed further, in Kenya e.g. through ICIPE, and is widely used in commercial crop production. Several companies produce and sell biological control agents in Kenya. One of them is Real IPM in Thika, a Kenyan company formed in 2004. It employs about 140 staff and also exports its products to other African countries and overseas.

A handful of products

"Our goal is to design affordable pest management programmes for all growers and in all crops, which are able to reduce pesticide applications and at the same time improve crop quality and yields", says director Louise Labuschagne. She explains the concept of the company's programme. It is based on successful commercial bio-pesticides. These are beneficial micro-organisms (fungi and bacteria) and mites that are combined to give effective protection against a wide range of common pests and diseases.

- Two predatory mites are used to control thrips and spider mites in greenhouses and in the field.
- A beneficial soil fungus (*Metarhizium*) affects pests including mealybugs, thrips, whitefly, leafminers, fruit flies, weevils.
- Another soil fungus (*Trichoderma*) kills nematodes, protects crops from soil borne diseases such as wilts, blights, and root rots, and acts as a bio-fertilizer by improving root development, uptake of phosphorous, and crop yields.
- A beneficial soil bacterium (*Bacillus subtilis*) acts as a fungicide controlling powdery mildew (e.g. in peas, onions, pumpkins, melons, wheat), and rusts (e.g. in beans).

All biological control agents undergo studies for eco-toxicity: The tests have shown that there is no negative impact on the environment and that there are no toxic effects to farm animals or humans. Biological control is the ideal strategy for farmers to reduce the use of toxic pesticides.

Successful greenhouse production

Greenhouse production is associated with increased disease and pest pressure. Small-scale farmers often end up with repeated crop failures. But biological control works very well in greenhouses; it seems that the main problem, disease and pest accumulation due to



Phytoseiulus persimilis and Amblyseius cucumeris, two predatory mites bred by Real IPM. They are not even half a millimetre small, but can control pests effectively.

lack of crop rotation, can be largely overcome. Many customers using biological control methods are running large greenhouses.

Large-scale farmers only?

Commercial growers from the export horticulture and flower industry are the main customers of Real IPM.

"Exporters have to follow international standards that restrict the use of pesticides. And due to their professional background they are easy to train. We do not sell our products without a training which gives the necessary understanding and skills to apply our methods in the most effective way", says Louise Labuschagne.

But what about the millions of small-scale farmers in the country, can they also benefit from this method that does not expose farmers, their families and con-

sumers to health risks? Louise Labuschagne: "We would actually like to reach out to small-scale farmers, also because they are a large market. We are trying, but we have not yet found a manageable way to do this, and the best way to work with groups." (See box below)

Customer satisfaction

To see how biological control works in practice, we spoke to farmers who are experienced in it. Clement Munene, an agriculturalist who manages several farms for AAA growers, is one of them. Their main produce are export vegetables and flowers in greenhouse and open field cultivation. Munene is a passionate advocate of biological control. "At the moment, we use 40% biological products and 60% chemicals. Our next target is 50% / 50%."

"Crops look happier"

"Our crops look happier since we use biological control", he says. The company also contracts small scale farmers. He says that limitations for small-scale farmers are equipment and technical skills. "We recommend our farmers to use those products that are easy to handle. *Trichoderma*, for example, is easily available and a very effective biofertilizer that improves root



*Sukumawiki grown with *Trichoderma* (left) and without *Trichoderma* application (right).*

growth. These products work and are friendly to farmers, consumers and the environment. And costs are comparable to those of chemical pesticides."

Bio-pesticides are available from The Real IPM Company, Lachlan Kenya Ltd, Juanco SPS Ltd, Dudutech (K) Ltd, Osho Chemical Industries Ltd, Amiran (K) Ltd, and others.

Farmers require training on IPM

Training costs

Effective application requires training. To cut costs, training and products for small-scale farmers are provided to groups. It is assumed that farmers of one group have similar problems in their crops. Groups should be well-organized, and members committed and focused. Innovative farmers can get training to enable them to work as advisors, in sales, professional application service etc. Info: The Real

IPM Company, Thika, 0725 806086 / 020 2113226, Email: office@realipm.com

Technical knowledge

Most small scale farmers lack the equipment for effective application of biological agents, but also technical knowhow. Storage of living organisms is tricky and some are challenging to apply. Some agents are best applied with drip irrigation. Greenhouse farmers are therefore a good target group.

Know when to harvest

In many farms, a large proportion of maize is lost due to late harvesting and poor storage.

The Organic Farmer

Storage of maize is still a big problem for a majority of Kenyan farmers. Most farmers harvest late when the maize has started rotting and then store it poorly, leading to more damage on this cereal crop that almost every family in the country relies on for food. Maize that is harvested late is prone to many risks such as getting damaged by pests, rotting or aflatoxin poisoning.

When is the right time to harvest maize? Not many farmers ask themselves this important question. The process of maize harvesting is done in the same way all over the country; all farmers cut the maize, mostly in November and December, then put it in stakes and wait. The waiting period from the time the maize is cut and staked, to the time farmers start the actual harvesting is often the most risky period, when a large percentage of the maize gets damaged.

When to start harvesting

Experts on maize production advise farmers to start harvesting immediately the maize grains harden (around September and October). The farmer can check the hardening by slitting the maize husk and pricking the grains in the maize cob using finger nails in the normal way they check to find out if the green maize has matured. Another method is to check the colour of the silk at the tip of the maize cob; if the silk has turned its pinkish colour to black, then the maize is ready for harvesting.

Harvesting maize after it has hardened has its own risks: The farmer should dry the maize thoroughly before storage to avoid the danger of aflatoxin poisoning. During the harvesting process, the maize should not be thrown on the open ground because this also increases the risk of aflatoxins and pests. After drying, the maize should be stored in well-ventilated stores for further drying before it is shelled.

Plant in April, harvest in October

Some maize varieties open their maize cobs (ears) early, this opening allows in pests such as weevils and water, which cause rotting and damage to the maize while it is still in the shamba. Apart from rotting, the maize grains acquire a yellowish colour. Harvesting early reduces this risk. If farmers did proper timing, no maize should be in the *shamba* by November if it was planted in April as is the case in all maize growing areas in the country. This way, a lot of maize that often goes to waste can be saved.

Tips for maize storage

- After harvesting, it is important to sort out the maize. Remove all rotten maize

including the cobs that show weevil infestation.

- Clean the maize store thoroughly, remove any grains, cobwebs or any material in the store that can harbour pests.

- Maize on the cob should not be stored for long because it is prone to pest damage; shell it as soon as it is dry.

- After shelling, dry the maize in the sun for three to four days to bring the moisture content to around 13.5 to 12 per cent which is ideal for storage.

- If the farmer intends to store the maize for long it is important to apply a good pest powder. Most of the powders in the market are no longer effective in control of pests such as the Larger Grain Borer (LGB) or *Osama*.

- One of the best methods of preservation is the use of diatomite powder. Since diatomite is not available in agrovet shops yet, farmers' groups can come together, collect money and send one of them to Gilgil Diatomite Industries near Gilgil town. A bag goes for Ksh 1,500. Apply ½ kg of diatomite for every 90 kg bag of maize. Diatomite can preserve your maize for up to 5 years.

A simple moisture test for maize

Moisture in maize is very dangerous as it can cause aflatoxin poisoning or rotting. Since farmers do not have facilities to test moisture levels in their maize, they can try this simple and cheap method:

- Put a handful of maize grains and a ½ handful of common salt in a dry soda bottle.

- Shake the bottle for 2-3 minutes. Allow the grains to settle. If the salt sticks onto the walls of the bottle, it is a sign that the maize is not adequately dry.

- Dry the maize again and repeat the test until no salt sticks on the side of the bottle. If there is no salt stick on the bottle, then the maize is dry and it can be stored.

Aflatoxin in maize is

Maize that is contaminated with aflatoxin is a major risk for the health of people, especially children.

The Organic Farmer

Farmers who want to consume and or sell healthy maize should harvest it early enough and dry the grains properly. This is, for the time being, the only way to avoid contamination by aflatoxin, a very poisonous mould that grows on maize that is poorly stored. Food quality and safety issues resulting from aflatoxin contamination present a serious challenge to programs designed to improve nutrition and agricultural production. **Even worse:** Aflatoxins is caused by a fungus known as *Aspergillus flavus*, a highly toxic, cancer-causing agent, which suppresses the body's immune system, retards growth and causes liver disease and death in both humans and domestic animals.

The UN World Health Organization (WHO) estimates that literally, billions of people in the developing world are chronically exposed to aflatoxins. Aflatoxins cannot be easily seen or identified, and infected maize that looks normal could actually be infested with high levels of the fungus that produces the poison.

Harvest early and dry well

The *Aspergillus flavus* fungus invades and infects developing maize grain in the field before harvest, especially when the maize remains too long in the field; that's a reason why maize should be harvested early. The fungus affects mature grain during harvest and in storage as well. In stored maize, the fungus can develop further through improper grain drying and unhygienic storage practices. Pre-harvest contamination with aflatoxins is aggravated by drought stress and elevated temperature during seed maturation. Damage through broken grains and holes drilled by pests such



It is advisable to dry your maize before storage to avoid aflatoxins infection and rotting.

s dangerous



After maturity the maize cob opens exposing it to aflatoxins, rotting and pests (above). Even healthy looking maize may have aflatoxins (below).



as weevils, allow the fungus to invade seeds in the stores as well as in the field.

Biological control of aflatoxin

Scientists in the US have tested several pre- and post-harvest strategies to reduce risk of aflatoxins contamination. They have discovered a biological method that controls aflatoxins development. Naturally, the fungus *Aspergillus flavus* consists of toxigenic strains that produce aflatoxins and other harmless ones, that lack the capacity to produce aflatoxins. So they spray the maize with strains that are not poisonous. The harmless strains of the fungus compete with the poisonous one, blocking them from colonizing maize, thereby reducing aflatoxins production on grains in the field and in storage. This breakthrough technology, already widely used in the US under the commercial name Aflosave, reduces aflatoxins during both crop development and post harvest storage, and throughout the value chain.

Scientists from the International Institute of Tropical Agriculture (IITA) in Ibadan (Nigeria) have found a wide variety of useful *Aspergillus flavus* strains in African maize varieties, which can be used by maize growers. Results in Ibadan show that the aflatoxins content in maize could be removed by 95 percent. In Kenya, KARI is working on the search for beneficial strains which can fight the aflatoxins contamination in Kenyan maize. The results should be released by the end of this year.



Greens are good for chickens' health

Poultry farmers can save money if they planted green forage for their birds. This improves their meat and egg quality.

The Organic Farmer

Farmers who rear free-range chicken can improve their flock if they planted a lot of greens for their birds and turn the chickens run (free range area) into a poultry forage source. This practice will reduce feed bills and also provide the chickens with a healthy, varied diet. Chickens need plenty of greens to boost their health, and growing greens for the flock is a good way to make sure they get the nutrients they require.

This practice provides the chickens run with high valuable manure and is an indirect pest control method, since the chickens are very industrious when it comes to catching insects, particularly fruit flies. Greens also supply chlorophyll, one of the reasons free range eggs have such a deep yellow colour.

A chickens area allows the farmer to rotate the green forage with chickens by excluding the birds from areas where green forage crops are growing. Dividing the chicken run into sections through fencing them off allows time for the plants to establish. A larger poultry forage system can be combined with an orchard, simply by placing in extra plants for chickens forage amongst the fruit trees. The fruit trees will need to be well established before the poultry is introduced to the area, to prevent damage to young trees. Maintain the number of poultry at a level where a continuous groundcover is always present. If the chickens clear all the forage leaving the ground completely bare, then you have too many birds for the area and you need to reduce them.

A number of greens are available

Do not underestimate the sheer quantity of forage chickens can eat. It is a good habit to always give them the outer leaves of any big, leafy vegetable you have harvested from the garden such as *sukumawiki*, cabbage, sweet potatoes etc. If you really would like to save money instead of spending it in buying feeds, you should plant forage. Just fence off

some areas and let the plants grow. Good forage for chickens includes the following:

- Comfrey is easily the best herb to grow for chickens.
- Arrowroots.
- Nasturtium: This plant has antibiotic properties and not only acts as a dewormer for chicken; they attract pests as well, which would otherwise attack *sukumawiki*, cabbage, beans etc.
- Coriander is high in vitamin A and K.
- Dill is good for respiratory health.
- Marjoram is believed to stimulate egg laying.
- Mint (all kinds) work as an insecticide and rodent repellent.
- Oregano combats infections.
- Parsley is high in vitamins, believed to stimulate egg laying
- Fat hen (*chenopodium album*) got its name because it was used for fattening poultry; it as well known as pigweed.



Chickweed



Coriander



Comfrey



Nasturtium

Planting roses for daily bread

Innovative farmers can earn money even with a small plot of land, as Kepha Amulabu does.

The Organic Farmer

The Twajijenga Self-Help Group in Kimilili is an active farmers' group. After the members got some training from Alfred Amusibwa, our *I-TOF* field officer, they started new activities to increase their income, such as tree nursing, aquaculture and livestock keeping.

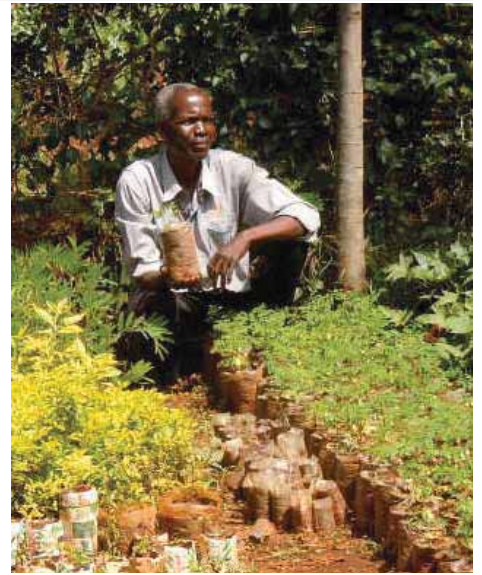
In many of these activities group member Kepha Amulabu had too little land, to participate. How could he grow enough fodder for a cow or goats on a plot that does not even measure half an acre, and on which he was expected to plant maize for his family's consumption? He had settled in the area just a few years before and could not afford to buy a bigger shamba. However, as a widower and father of eight children, two of them still attending school, he had to find ways to improve his financial situation. Finally, he decided to give it a try and specialize in tree nursery because a nursery does not need a lot

of space and can be started with a very small investment.

Planting gardens pays well

So, Amulabu started growing all kinds of trees and shrubs: Neem, roses, mangoes, fodder trees and many more. At first he had some trouble finding a market for his trees because the farmers were not aware of how much they could gain from them. But thanks to his patience and awareness creation by several NGOs that promote agro forestry in the region, he started getting more and more customers for his seedlings. On top of that, property owners in the area discovered the value of trees and his expertise in trees and flower production. Just recently, he was awarded a contract to plant trees for a garden owned by one of his customers. Such contracts earn him good money, and allows him to pay school fees and meet other expenses for his children.

The only challenge he is facing is that he cannot grow the trees all year round because of the dry spell between January and March. He is planning to drill a borehole, which can help him irrigate the tree nurseries during the



dry season. After learning about the benefit of legumes, Amulabu has put his farm under a variety of legumes and green manures; this has resulted in improved soil fertility. His crop yields have increased as a result.

Amulabu's success is a lesson for farmers with small parcels of land; if one is innovative, they can still earn a good income and even do better than those with large parcels of land.

Letter to the Editor

Reform the dairy industry to help farmers

Dairy farmers are frustrated by the milk market dynamics and the rapidly escalating investment costs. The frustrations range from poor milk prices, high production costs, poor quality concentrates and general exposure to exploitation and or swindling. It is quite unfortunate that the dairy farmer in Kenya has no reliable market for their milk. They have to keep on migrating from one buyer to the other in search of better prices.

Liberalized but not regulated

Since the liberalization of the dairy sector in 1992 and consequent preparation of various draft bills to regulate the dairy sector, the government seems to have lost control of the sector and this has in turn subjected the farmer to serious problems.

Liberalization was introduced with a view to promoting competitiveness as well as boost milk prices, but so far the government through the Kenya Dairy Board (KDB) has not been able to solve this problem.

Owing to its nutritional value, milk has proven to be a valuable component in human nutrition. However, we experience malnutrition in various parts of the country while, ironically, the same commodity is being wasted for lack of market on the other part of this nation. This shows a poorly structured marketing strategy and uncertainty in the industry. Milk buyers range from processors, to small-scale milk vendors (SSMV), hoteliers and also direct whole

milk consumers.

Milk pricing unfair to farmers

However, there exists a pricing battle among the buyers since some go for comprehensive milk processing and packaging while others sell unprocessed milk. One cannot understand why milk processors pay lower prices than the local vendors since the products they extract from milk are earning them a fortune in the market. Milk vendors buy the commodity from farmers at between Ksh. 28 and 40 and put a margin of Ksh 5 to Ksh 10 per kilo and have no strict grading checks.

Processors making huge profits

Most processors are offering between Ksh 23 and Ksh 30 after recovering their procurement costs. After processing and extraction of various products such as yoghurt, cheese, butter and ghee, the milk is sold at between Ksh 42 to Ksh 50 for a half litre packet in the retail market. This tells us a litre of milk can fetch between Ksh. 70 to 96 for the processor.

It can therefore be argued that the farmer is getting less than 40% of the total proceeds contrary to the government regulation, which recommends that at least 70% of milk earnings goes to the farmer.

Production cost has gone up

Dairy inputs are way too expensive to even sustain a small dairy project. A 70 kg bag of dairy meal was less than Ksh 1,000 in 2006 and its now selling at around Kshs 2,000 based on the stan-

dard you want. Securing an AI service is quite expensive and also any small treatment of a dairy is leaves the farmer cash strapped.

The quality of some animal feeds is so poor; one wonders whether KEBS does any quality checks on feed manufacturers. The Kenya Dairy Board (KDB) seems to have failed in its mandate as a regulator even after its restructuring.

Processors operating like a cartel

The processors seem to take advantage of failure by KDB to set standards in the industry and have merged to form a federation to force all farmers to sell milk to processors and not the informal market. This in turn will limit farmers' market choices and give processors the power to jointly determine the prices they give to the farmer through this cartel.

The transporters are also enjoying a good business since they charge Ksh 4 per litre of milk up from Ksh 2 in 2003 when they were said to make 260% return on investment (*The post liberalization agenda; working paper No. 1, 2003*).

The bulk of all these sentiments stops with the farmer and unless the government takes strict measures the dairy industry will not grow in tandem with the broader national goals (MDGs and Vision 2030). The earlier action is taken on this matter, the better for all of us in this critical industry – including the malnourished child in drier and marginalised areas.

F. K. Wachira, farmer in Kirinyaga

Chickens need a variety of feeds

If we look at the number of questions we are getting per week, the ones on chickens are in the majority. We would like to inform our readers, that interested chicken farmers can get the TOF module No. 20 about chickens. Send us a SMS with the keyword "Chickens module" and do not forget your address. We shall send the four-page module to you. **tsz**



Which combination of a home made meal is suitable for my birds?

What type of feeds do I need to give in plenty, in terms of good nutrition?

Can I feed my birds on termites and chaffer grubs?

Feeding of indigenous chickens can be a tricky issue. In theory chickens should have a well-balanced diet. About two thirds of the ration should consist of carbohydrate rich feeds (grains like maize, sorghum, millet, etc). One third should be protein rich feeds for good growth and egg production (from cooked beans or other legumes, *omena* (fish), sunflower cake, cotton seed meals, soya, '*busaa*' waste/dregs/*machicha*).

Insects, termites, worms and other small creatures are the best protein source for chicken, but unfortunately, they are difficult to provide in the requested quantities (about 20 big worms per day, or a cupful of termites for each bird). Do not mix brans or husks from cereals into poultry meals, because this kind of cellulose-rich material cannot be digested well by chickens.

Since it is not very easy and cheap to buy the ingredients for an adequately compounded chicken feed, indigenous chickens should be allowed to run around the homestead to pick insects and other edible feed that can provide them with what they lack for proper growth.

Any meals, whether home made or bought, should be complemented with greens (for vitamins and good yolk colour) and minerals (like calcium and phosphorous to be able to form eggshells).

Chicken need sand

What do birds find by eating sand?

The reason why birds need small stones in their diet is that they don't have teeth for chewing food. Instead, they have an organ called gizzard which is a part of a bird's stomach. The strong gizzard muscles, together with sand and small rocks act like a mill that grinds or 'chews' solid food before it is digested.

Feed them continuously

How many times should I feed my birds on a daily basis?

Chicken have a small stomach and

digest quickly, so they need to feed continuously. Especially layers need to eat and drink a lot in order to produce eggs. Make sure your feeder and water containers never run out of chicken mash. Feed the birds at least in the morning and also in late afternoon to make sure they don't have to go to sleep with an empty stomach.

Indigenous chickens

Why does organic farming promote the production of indigenous birds?

Keeping high yielding hybrid chicken needs intensive management and high investments into birds, feeds and housing structures. Conventional layer

Mboga kienyeji

Why are indigenous vegetables more expensive than ordinary vegetables?

Production of indigenous vegetables is a typical niche production that has not yet been commercialized to a large extent. Yields are usually moderate, and sale of this highly perishable produce needs good organization. The high nutritional value of indigenous vegetables is appreciated by customers and promotes a good price on the market.



Well prepared soil

Why should the soil media for establishing some of the indigenous vegetables prepared fine and others rough?

Seedbed preparation is depends to seed properties. Small seeds and seedlings that grow very delicate roots require finer soil texture. Large seeds establish better in rough seedbeds, because the surface of fine beds dries out faster, making germination of large seeds which need more water to establish less successful.

and broiler feeds are often mixed with synthetic antimicrobial substances which organic farming wants to avoid. Keeping indigenous chicken is seen as less demanding and more in line with natural animal husbandry, but can be just as profitable.

Clean chickens houses

What subjects chicks to early death?

Chicks are very delicate creatures. Cold temperatures during the first 3 to 4 weeks can be fatal. Clean, parasite-free housing is central. Permanent chicken houses need to be disinfected before the chicks hatch, because mites can easily kill small chicks during the first days.

Improve soil fertility

Does organic farming give more yield than use of synthetic fertilizers?

What makes composts fertilizers to be better than synthetic fertilizers?

The advantage of organic techniques lies in their beneficial long-term effect they have on the soil. Animal manure, compost, mulches and green manures add organic matter to the soil, which improves soil structure and water and nutrient retention, and builds up soil fertility in general. Together with a good rotation and good water and weeding management, this will increase yields over time. The effect of synthetic fertilizers can be very disappointing in poor soils low in organic matter. Soils where only mineral fertilizers have been used over years tend to be acidified and may also respond poorly to synthetic fertilizers. Such soil needs to be improved using organic methods for better results.

Milk & garlic

What is the role of milk /garlic solution for which I was advised by one of my fellow farmers to give them to my birds?

Garlic could have a beneficial effect against internal parasites. The milk may just be added to make the chicken more willing to ingest the garlic because many chicken like milk (it is rich in proteins).

Natural pesticides against pest

TOF-Tomatoes have become one of the most popular crops that most farmers rely on for their income before the late maturing crops such as maize matures. Unfortunately tomatoes are also one of the crops that are prone to pest pressure throughout their production cycle.

Apart from tomatoes, the other crops most affected are potatoes, beans, sukumawiki, peppers, spinach and even cabbages. The increase in the level of infestation is mainly due to the reduction in the population of natural predators. When farmers use chemicals, they not only kill the pests but also the beneficial insects or predators that control the pests naturally. This is why the pest pressure has increased in many farms today.

Use plant extracts

The most common pests that farmers find difficult to control are whiteflies, thrips, red spidermites and aphids. These pests damage between 20 and 30 per cent of the crops mentioned above. Pests such as whiteflies and thrips are very difficult to control once they have established themselves in a growing crop. So the first line of defence against these pests is to use preventive measures.

But instead of using chemicals, farmers can easily control these pests using plants extracts, which do not kill predators and which also enable the plants



Apart from plant extracts, beneficial insects such as Lacewing (above), Ladybird (left) can control pests naturally.

develop natural immunity to infections. Preparing plant extracts: A farmer can use a number of plants to prepare plant extracts e.g. African marigold, chillies, garlic stinging nettle, black jack and pyrethrum. Chop all the plants into tiny pieces and put them into a half full 200-litre drum. Fill the drum completely with water and mix vigorously. Cover the drum completely to make it airtight. Add 4 litres of EM1 and 4 litres of molasses. Allow it to ferment for 7 to 10 days. Strain and put 200ml of the plant extracts into a 20-litre knapsack filled with water. Spray your crops at least three times a week. The extracts can protect your crop against all pests and even diseases, apart from promoting healthy growth.

Incubators and chickens for sale: We are selling home-made cardboard box chicken incubators, heavy breeder chicks (parents over 3 kgs in weight), fertilised Kenbrid and Kenbro eggs, white guinea fowls and Kuchi cocks. Soon we will have our own home-bred chickens. For Enquiries contact Eden Poultry Farm, Mombasa. Call Grayson Tel: 0723229636 or Email: edenpoultry-farm@gmail.com.

Water melon production: We install drip irrigation systems for water-melon production. Please contact me at wanyoz@gmail.com. +254725812827.

Incubators: We sell electric incubators, with a capacity of 60 eggs. The incubators consume less power (about 115w). One unit goes for Ksh 14,000. Contact Faith Nyawira 0721 395 149, 0788 511 800.

Complaints over incubators

In our TOF Nr. 70, of March 2011, we featured an article on Kaki Village Enterprises, who make egg incubators. However, many farmers who bought the incubators have complained to TOF that the company has failed to offer after sales service while calls to the company go unanswered. We would like to advise all farmers that they should be very careful when buying incubators. They should only buy incubators that carry warranties from reputable companies to avoid such problems.

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iAfya's Mama Fatuma explains... **How to protect yourself against Malaria!**



Drain stagnant water. It provides suitable conditions for mosquitoes to breed.



Avoid getting bitten by mosquitoes. Use mosquito repellents to keep them away.



Sleeping under a mosquito net is highly recommended but treating the net with long lasting insecticide is even better.



Children under the age of 5 years are at high risk of getting Malaria. They should always sleep under mosquito nets treated with long lasting insecticide.

Look out for a **NEW** series in the next issue on: **PREGNANCY!**



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