

Photo: IN

Through selective breeding, farmers can introduce desired genetic traits into their dairy cows such as improved milk production, disease resistance and adaptability to specific climatic conditions among other traits. This eventually leads to higher productivity and income for the farmer. Page 4 and 6

How to improve the quality of dairy cows

TOF - Kenya dairy farming sub-sector is growing at 4 per cent every year, contributing 14 per cent of the agricultural Gross Domestic Product. This means that more farmers have joined the sector to cash in on the good returns from milk sales across the country. Increased milk production is needed to meet the needs of the rapidly growing population especially in our urban areas.



scale farms ranges from 5 to 10 litres in a day depending on the region. Some small-scale farmers who have adopted modern production technologies are getting as high as 30 to 40 litres in a day; this is what every dairy farmer

To keep pace with the increasing demand for milk and its by-products, farmers need to improve the quality of dairy cattle they keep. They have to continuously upgrade their animals in order to produce more milk and even meat. The days when farmers used to keep many animals for social prestige are long gone.

Adopt modern dairy farming

To succeed in dairy farming, farmers need to adopt the latest technologies in animal production. This includes proper use of Artificial insemination (AI) services in order to introduce the best traits in their milking herds such as the amount of milk a single dairy cow can produce in a day.

The average milk production per animal in most small-

scale farms should aspire for.

Few animals registered

Kenya has more than 1.7 million head of cattle. Out of these, only 800,000 are registered under the Kenya Stud Book (KSB) which registers all graded cows in the country. Of these only about 500,000 are actually being upgraded. This shows that more than 1.2 million cows are yet to be upgraded because some farmers still rely on the traditional methods of live-stock keeping. Many of these farmers still use village bulls to serve their cows while those who use AI services do not keep any records. In this and coming issues of *The Organic Farmer* we will educate farmers on steps they need to take to upgrade their dairy cows. Page 4

Dear farmers,

Last month, *The Organic Farmer* visited farmers in the four Counties of the North Rift namely Elgeyo Marakwet, Uasin Gishu, Trans-Nzoia and West Pokot. It was very encouraging especially to see how farmers are putting into practice various technologies that we have featured in the magazine. Among maize producers, the incidence of the Maize Lethal Necrosis (MLN) diseases seems to be reducing, which shows that the Kenya Plant Health Inspectorate Service has improved the inspection of seed, which was one of the main causes of the spread of the disease in most parts of the country. Except for the yellowing of maize caused by the leaching of fertilizers due to heavy rains, this year's crop looks healthy and unless the weather changes abruptly, farmers should be able to get a good harvest.

In most of the farms we visited during the trip, farmers have put to very good use the information we have been giving them in soil conservation, fodder establishment, dairy farming and poultry rearing among others. This will continue to encourage us to provide even more new upcoming technologies that will help them diversify crop production, improve dairy farming and income.

However with the devolution of agriculture to the counties, it is now easier for the county governments to identify priority areas where they can direct resources to accelerate agricultural development in their regions. Since independence, all decisions including the allocation of resources were centralised. Minimal attempt was made to develop infrastructure such as roads, industries for value addition or even assistance to farmers in terms of training and credit.

The counties now have very good development strategies, which if put into practice will not only transform agriculture and enable farmers to earn more, it will also enable the devolved units to generate more revenue that can be used to provide other services such as roads, health, education, medium and small-scale industries that will provide employment to the youth. But this will only be possible if the counties can reign in corruption, which is the biggest threat to development of the new devolved units and the country as a whole.

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Adopting push-pull as a farming technology

It is important to ensure the land is cleared, ploughed and the soil broken down until it is fine.

Joyce Wambui | Over the years, push-pull farming technology has been addressing critical concerns of small holder cereal and livestock farmers. These farmers face many challenges including poor soils, managing pressure of pests and striga parasitic weeds (nicknamed the witch weed), poor yields, and low milk production due to shortage of high-quality livestock fodder.

Establishing a push-pull plot

- It is important to ensure the land is cleared, ploughed and the soil broken down until it is fine.
- Using pegs and ropes, measure the first plot of 21m x 21m. A push pull plot can be as small as 10m x 10m, or as big as any *shamba*.
- Use a string to measure and ensure you have a square. Put pegs at opposite sides of the square at intervals of 75cm each.

Planting Napier grass

- Select healthy Napier grass for planting. Do not plant



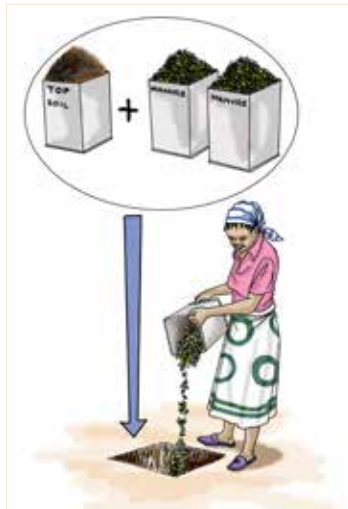
Napier grass that has stunt disease. *Ouma* and *South Africa* varieties are the best varieties of Napier grass for use in Push-pull because they are resistant to Napier stunt.

- Dig holes along the demarcated lines ready for plant-



ing. Dig holes at each peg on border of the marked plot.

- Apply 2 handfulls of well



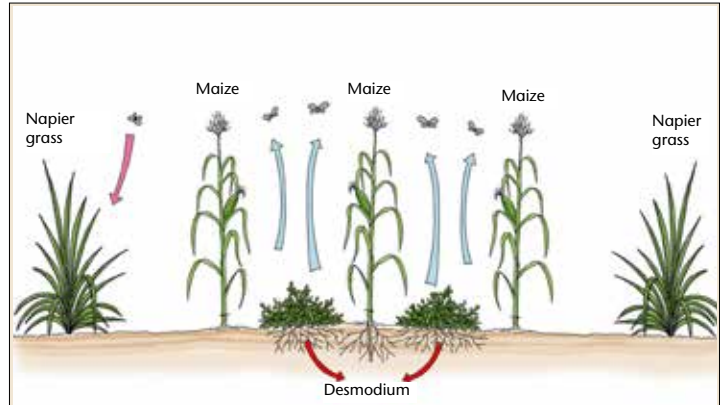
decomposed farmyard manure in each hole.

- Place a three node cane into each hole at an angle of 30° to 40° all facing one direction.
- Cover with soil ensuring that two nodes of the cane are well covered.
- If you are using root splits, place them upright into the planting holes and cover the soil.

Repeat the same process for the second and third rows, ensuring that the rows are 75cm apart and 75cm between the plants within the rows.

Weeding and crop management

Early weeding is very important for the successful establishment of a push-pull plot. Carry out the first weeding when the maize is 3 weeks old, and second weeding when maize is 5 weeks old. It is important to distin-



Planting desmodium

- Mix 300g of silver leaf desmodium seeds with fine dry sand; in the ratio of one part desmodium to two parts dry sand.
- Drill desmodium in the furrows at 75cm row-to-row distance. Then drill farmyard

manure along the furrows, mix with soil using a stick, without covering or disturbing the furrow.

- Plant maize in between desmodium rows.

After planting the maize carefully check the germination.

guish between desmodium and weeds.

Harvesting Napier grass

Harvest the Napier grass one row at a time, starting with the inner row. Give the harvested row time to grow before har-

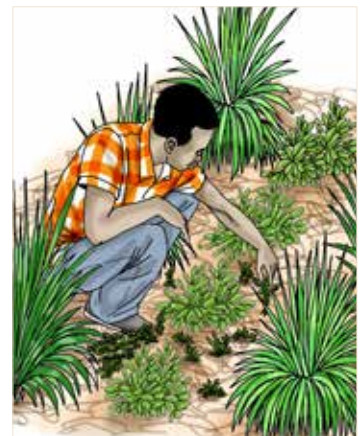


vesting the next row.

Harvesting Desmodium

You can harvest desmodium seeds for future use or for sale. Wear polythene over your clothes to prevent the pods sticking on your clothes.

Thresh desmodium seeds on a stone using old rubber shoe.



Winnow the threshed seeds.

- Harvest desmodium after harvesting maize from the field. During the first season, do not harvest desmodium until it has established well. Trimmed desmodium will regenerate for the next planting season.
- Do not allow livestock to graze in your push pull field after harvesting maize because direct grazing destroys desmodium and Napier grass.

Farmers can get desmodium seeds from Kenya Seed or any KALRO centre near them.

The Organic Farmer is an independent magazine produced monthly for the East African farming community. It promotes organic farming and supports discussions on all aspects of sustainable development. The articles in the *The Organic Farmer* do not necessarily reflect the views of ICIPE nor Biovision Foundation.

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Using football to promote health among slum youth

A pilot project is working with 500 youth in Mathare slum area in Nairobi where various football skills are linked to environment and health risk factors that affect them. The youth also learn organic farming methods for food security and nutrition.

Musdalafa Lyaga | Football is the one activity that unites people of different ages, gender, social and cultural backgrounds. It is uniquely effective and affordable for promoting good health, while fighting hunger and poverty especially among the youth.

Sporting activities linked to health risk factors

In Kenya, a pilot project with 500 youth is being run in cooperation with the Mathare Youth Sports Association (MYSA). MYSA is a self-help youth programme linking sports with environmental clean-ups, AIDS prevention, leadership training and other community service activities involving approximately 20,000 young people in the slums of Nairobi.

'Football for Health' is an '11 Health' programme that improves children's knowledge, attitudes and behaviour towards diseases. Eleven simple messages on prevention, all based on scientific facts and linked to a specific football action, are practiced by youth group in eleven 90-minute sessions. The first half is called 'Play Football' and inducts a specific football skill. The second half is called 'Play Fair' and informs about the specific health issues and teaches children healthy behaviour that introduces healthy ways to protect themselves.

Youth transfer skills to families and peers

Biovision Farmer Communication Programme (FCP) Outreach team has been working with one of MYSA's teams known as Moreno, a slum football team where participating youth are shown how they can use their environment to improve their nutrition and food security. The young people share it with their families and peers.

Started with kitchen gardens

Ms. Njeri Kinuthia, Biovision



Njeri Kinuthia (centre in beige T-shirt) shows Mathare Youth Sports Association members how to make portable garden for production of organic vegetables at the Mathare slums in Nairobi.

Training skills imparted on slum youth

Health message	Football skill	Risk factors influenced
Play football (physical exercise)	Playing football	High blood pressure, cholesterol, body mass index, physical inactivity
Respect girls and women	Passing	Unsafe sex
Protect yourself from HIV	Heading	Unsafe sex
Avoid drugs and alcohol	Dribbling	Use of alcohol, tobacco
Use treated bed nets	Shielding	Malaria
Wash your hands	Defending	Poor sanitation and hygiene
Drink clean water	Trapping	Contaminated water supply
Eat a balanced diet	Building fitness	Under and overweight, inadequate fruit and vegetable intake
Vaccinate yourself and your family	Shooting	Inadequate health protection
Take your prescribed medication	Goalkeeping	Inadequate health protection
Fair play	Teamwork	Family and social support



Farmer Communication programme Outreach Officer has taught one of the team members how to set up kitchen gardens. The initiative started with an indoor sessions where Ms. Njeri had a discussion with the team on different urban farm activities that can be implemented in the slum areas. The topics included

poultry, rabbit keeping and kitchen gardening. The group chose to start with kitchen gardens, with support from a farmer training video they learnt how to set up a kitchen garden.

Biovision Africa Trust donated kitchen garden sacks, farm manure, soil, kale and spinach seedlings to the team. With the help of the outreach officer, the team planted their first kitchen garden within the grounds of MYSA Resource centre as a demonstration plot.

Project to be expanded to other slum areas

It is hoped that this technology will be replicated in different slums in the country as it is not costly and does not need a lot of space yet the yields can be enough to feed a family, in this way enhancing food security in the slum areas.

Biovision Africa Trust intends to support and promote the Moreno team's eleven popular players as Youth ambassadors in organic farming.

Prof. Dr Jiri Dvorak the chief medical officer of FIFA is spearheading the "Football for Health" initiative, a football-based health-education programme. The programme was launched in the context of the Football World Championship in South Africa in 2010. It was then extended to Namibia, Botswana, Zimbabwe, Malawi, Mauritius and Kenya.

For more information: Check out a new article by Fuller CW, et al, British Journal of Sports Medicine 2011. You can watch this video FCP Youtube channel www.youtube.com/watch?V=UEaVO2K3JI

Contact: MYSA 0708 11 92 27

Use locally bred semen to improve dairy cows

Most dairy farmers prefer buying semen from foreign bulls. The offspring (daughters) of these bulls usually have poor milk production, shorter calving and milking periods and are prone to diseases and pests since they are not adapted to local environment conditions.

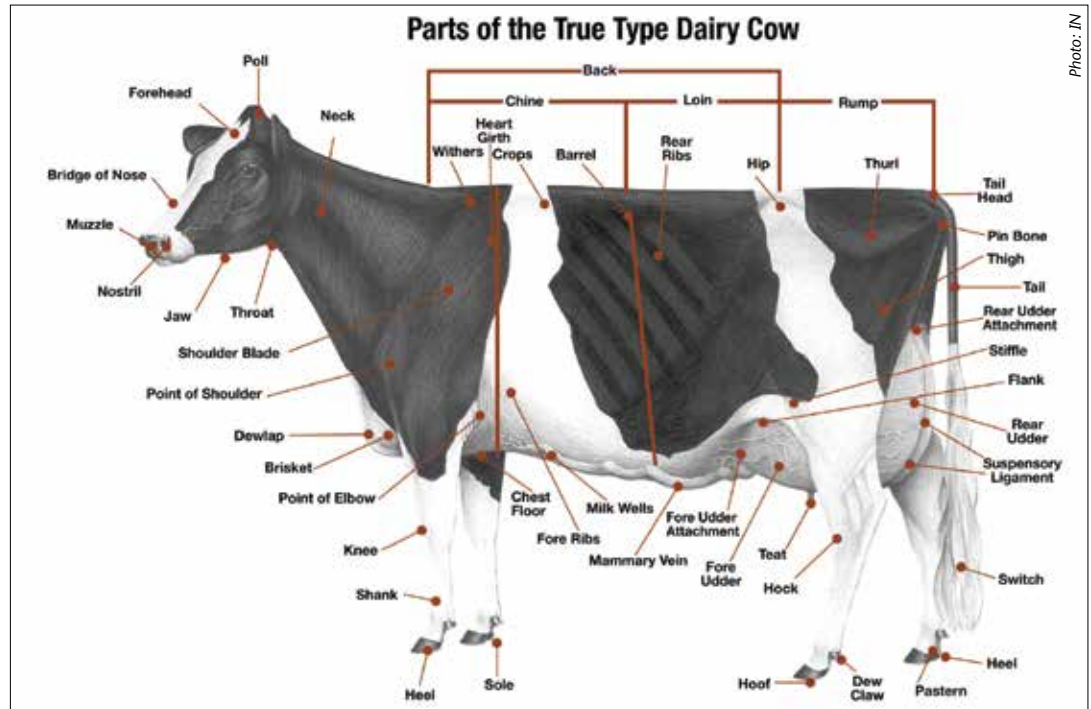
Peter Kamau | Many companies and even individual farmers are now selling imported semen to small-scale farmers who have little knowledge of animal breeding. Farmers should be very careful where they source Artificial Insemination (AI) services to avoid being cheated into buying breeds that may not meet their expectation. In order to have the best dairy cow breeds, farmers should upgrade their dairy cows by first registering them with the Kenya Stud Book (KSB). The KSB can then identify a qualified dairy cow inspector near you who will assess your dairy cows and identify the suitable cows that are good for upgrading.

Preference for imported semen

Most farmers choose to serve their dairy cows with imported semen with the hope that the high quality foreign bulls will eventually breed high quality animals that will produce more milk. Indeed most farmers are willing to pay more money for renowned international sires (bulls) to serve their animals with the best genetics in the world for the same reason.

But many of these farmers can confirm that cows from the foreign genetics often do not yield as much as they are made to believe by the suppliers of these genetics. Some of the farmers complain that such animals have less milk yields and their lactation period is shorter compared to local breeds.

The reason for the low production and shorter lactation period of dairy cows served with foreign sourced genetics is mainly due to that fact that the offspring (daughter and son) of the foreign breeds are not well adapted to tropical climatic conditions. These breeds are better adapted to temperate climatic regions and environment. Due to poor adaptability to local cli-



When upgrading a dairy cow, inspectors look for particular traits in the animal as shown (above). They then start the upgrading process by selection of bulls (sires) with the desired traits to serve the cow and its daughters until they reach the pedigree level.

matic conditions, such animals are even more prone to diseases and even pests (such as ticks which cause diseases like East Coast Fever or (ECF), heartwater and babesiosis).

Should Kenyan dairy farmers therefore stop using foreign genetics? The answer to this question is no. If you check breeders catalogue from the Kenya Animal Genetic Resource Centre (KAGRC) formerly Central Artificial Insemination

Service (CAIS), you will notice that most of the sires (bulls) used by the centre have bloodlines of world renowned bulls.

What happens, however, is that the bulls at KAGRC are obtained from breeders in various parts of the country who import their semen from the best bulls in the world and serve their dairy cows. The breeds are then upgraded through selective breeding (see box below) until they reach the level of pedigree

or pure breed. KAGRC then buys the young bulls from the breeders and then cross-breeds them with other pedigree cows from other breeders to come up with high quality breeds that are better adapted to local conditions, have a longer lactation (milking) period, have more resistance to diseases, among other traits desirable in a dairy cow. In this way, local farmers are assured of improved milk production and income. ■

How do you upgrade your cow?

Selection of dairy cows for breeding purposes has to be done very carefully by a qualified inspector. The inspector first identifies a cow which is called the "foundation cow". The farmer then goes through an AI catalogue to identify a pedigree bull with the characteristics that they want e.g. a bull that sires cows with high milk production, good udder placement, a good pregnancy rate and which has no history of birth complications. The "foundation cow" has to be registered with the Kenya Stud Book (KSB). When the foundation cow comes on heat, it is then served with another sire (bull) with similar characteristics or even better than the first one.

The daughter of this "foundation cow" should also be registered at birth as "Intermediate cow." When the daughter of the

"intermediate cow" comes on heat, it is served with semen from a different pedigree bull of the same breed. When serving their animals, farmers should always take care not to use semen from the first bull which served the mother as this will lead to inbreeding. The granddaughter of the foundation cow is known as the "appendix" which is also registered with the KSB and served with semen from a high quality pedigree bull of the same breed. Finally, the great granddaughter of the foundation cow becomes a pedigree. The breeder can now maintain



the pedigree line by continued use of high quality bulls from KAGRC. Farmers interested in acquiring training can contact the KSB on the address given below:

The Kenya Livestock Breeders Organisation Tel. 051 221 6996, 0702 251 249, Nakuru.

Email: info@klbo.co.ke website: www.klbo.co.ke

Read more on page 6

Eat the right foods to avoid lifestyle diseases

Many lifestyle diseases like High Blood Pressure and diabetes can be avoided if people grow and eat nutritious food in the right amounts.

Dr Peter Mokaya | Non-communicable diseases (NCDs) or chronic diseases are common in most parts of the world. Obesity, diabetes, cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and others are the leading causes of death in the world.

Organic farmers and consumers need to know how to prevent and manage these diseases because they are costly to manage especially for low income people who do not have the ability to pay for the high medical costs. In some developing countries, for example, care for diabetes alone consumes as much as 15% of the national health care budget.

Medicare involves costly consultations with health professional and doctors who treat the affected people, eventually leading to heavy costs to families and the society. Chronic diseases affect both the rich and the poor but they can be managed through consumption of healthy food that is grown organically.

Affordable and cost effective solution

Getting to know the best foods to eat when you have diabetes and or heart problems, for instance, is very much encouraged. It is very important to keep blood sugar levels well-controlled and blood pressure within the normal range. Households should therefore aim to eat foods that help prevent health complications. These foods include:

Fish: Fatty fish is one of the healthiest foods on the planet. All types of fish have immense health benefits, including Omega 3 fatty acids, lean protein



and Vitamin D.

Cinnamon: Cinnamon is a popular spice with potent antioxidant activity. Several studies have shown that cinnamon can lower blood sugar levels and improve insulin sensitivity. Research has also shown that cinnamon can help lower levels of bad fats in the body and may be effective in the management of type 2 diabetes.

One should, however, limit intake of cassia cinnamon, the



type found in most grocery stores, to less than 1 teaspoon per day since it contains coumarin, which is linked to health problems at higher doses. On the other hand, ceylon ("true") cinnamon contains much less coumarin.

Eggs: Eggs provide amazing health benefits. In fact, they're one of the best foods for keeping you full for hours. We have discussed the health benefits of eggs, especially organic eggs, in previous issues of *The Organic*



Farmer Magazine (see TOF No. 122, July 2015) eating organic eggs regularly may also reduce your heart disease risk in several ways. Eggs decrease tissue inflammation, improve insulin sensitivity, increase your good cholesterol levels and reduce "bad" cholesterol. The benefits of eggs are primarily due to nutrients found in the yolk rather than the white.

Turmeric: Turmeric is a spice with powerful health benefits. Its active ingredient, curcumin, can lower tissue inflammation and blood sugar levels, while reducing heart disease risk. Curcumin may also improve kidney health in diabetics. This



is important, as diabetes is one of the leading causes of kidney disease.

Nuts: Nuts are delicious and nutritious. All types of nuts contain fibre and are low in digestible carbohydrates, although some have more than others. These include groundnuts, cashew nuts, macadamia nuts and almonds. For the locally available nut varieties such as groundnuts, a handful per day is usually enough. It can



be eaten in bits as mid-morning and mid-afternoon snacks, with tea or with plain water.

Broccoli: Broccoli is one of the most nutritious vegetables. It is considered a super food due to its many nutritional and health benefits. A half cup of cooked broccoli contains only 27 calories and 3 grams of digestible carbohydrates. Studies in diabetics have found that broccoli may help lower insulin levels and protect cells from harmful free radicals produced during metabolism.



Extra-Virgin Olive Oil: Extra-virgin olive oil is unrefined oil which is extremely beneficial for heart health. Its unrefined nature retains the antioxidants and other properties that make



Photos: IN

it so healthy. The oil contributes to reduction of high blood pressure. Be sure to choose extra-virgin olive oil from a reputable source, since many olive oils are mixed with cheaper oils like corn and soya. Be particularly careful and keep away from the GMO corn and soybean by products.

Garlic: Garlic is a delicious herb with impressive health benefits. Several studies have shown it can reduce inflammation, blood sugar and LDL cholesterol in people with type 2 diabetes. It may also be very effective at reducing blood pressure. One



clove of raw garlic contains only 4 calories and 1 gram of carbohydrates.

In addition to the above foods, there are other foods with numerous health benefits which include sweet potatoes, finger millet, yams, fruits, vegetables and herbs such as rosemary, thyme and stinging nettle. These will be covered, in future articles.

For more information contact the article author: Dr. Peter Mokaya, Director and CEO, Organic Consumers Alliance (OCA), Website: www.organicconsumers.co.ke Email: Peter.Mokaya@organicconsumers.co.ke or Mokaypm@gmail.com

Eco-camp owner promotes organic farming

Visitors to Plover's Camp are introduced to ways they can contribute to environmental conservation through recycling of organic and solid waste.



Mr Kariuki has used recycled plastics and electronic waste to create beautiful works of art that attracts visitors to his eco camp.

Veronica Wamiti | Five years ago, Wachira Kariuki, a farmer from Mwihoti village, in Murungaru location of Nyandarua County attended the World Environmental Day that was being commemorated on 5th June 2010 where he learnt that all polythylene and plastic can be collected and recycled to make a Solid Waste Park to reduce environmental pollution. Having learnt this, Kariuki decided to take action immediately. He started collecting waste plastics and polyethylene material around his home and village, Murungaru Market Centre and even travelled as far as Naivasha, about 50 kilometres away to collect solid waste material that are plenty in Naivasha flower farms.

Using his experience as a volunteer with the Friends of Kinangop Plateau for Biodiver-

sity Conservation and a tour guide, Kariuki started converting the solid waste material into beautiful works of art and established Plovers Eco Camp on his 1/2 – acre piece of land where they are displayed.

Centre attracts many visitors

“My idea was to set up a camp that would host bird watchers, anthropologists, botanists and cultural tourists who visit the resource rich Nyandarua County for its unique eco-tourism products,” he says.

Being a tour guide and a curator at the Kinangop Cultural Mini Museum, Kariuki's tourism package addresses social economic issues, environmental conservation, creativity and innovation.

So far, he has hosted more than 300 visitors who include students from the University of Nairobi, McGill University of Canada, the Kenya School of Government, officials from the National Museums of Kenya, Nature Kenya, primary and secondary school students from Nyandarua County.

Visitors learn organic farming

The Biovision Resource Centre at Murungaru Trading Centre has been a major source of his training material. It is from the centre that he has learnt various technologies that he has put into practice in his camp. Visitors to the camp can sample or buy organically grown vegetables such as kales, spinach, tomatoes, an assortment of fruits such as the tree tomato, sweet potatoes and Irish potatoes. Tourists also learn the benefits of organic farming through practical sessions. Biovision extension staff are always at hand to create awareness on the benefits of organic farming and its contribution to biodiversity conservation.

The training at the eco-camp has led to the transformation of many visitors and even local farmers especially on the way they view solid waste and environmental conservation. Farmers visiting the camp have gained practical tips in water harvesting, use of plant extracts to make biopesticides, fungicides and foliar feeds which they replicate in their own farms. ■

How to register your dairy cows with the KSB

To upgrade your dairy cows, you have to apply for registration with the Kenya Livestock Breeders Organisation (KLBO). We provide the registration process below:

- The dairy farmer or company fills the Kenya Stud Book application form, which gives details on the breed of livestock kept, your contacts, physical location of the farm. In the form the farmer has to give a name or code through which their animals will be known and identified (also known as the pre-fix form).
- When the KSB approves the herd prefix, specific letters (of the Alphabet) are issued to the prospective breeder. The breeder fills in the application for livestock registration form for each animal to be registered and contacts KSB or breeders society they wish to join for the inspection of their animals.
- The duly filled application forms are then forwarded to KSB, which after approval issues a registration certificate.
- The farmer then pays a minimal fee for each animal (see table below) to be regis-

tered depending on the class, breed and sex.

After registration of dairy cows with the KSB, farmers have also to register with the Dairy Recording Service of Kenya (DRSK). This is the country's milk recording centre. Registered breeders have to do a systematic measurement and recording of daily milk yield of all their registered animals. This also includes a consistent sampling of the milk for quality analysis, all of which are summarised in the form of reports at the end of a lactation period. The following are the functions of the DRSK:

- It collects and collates (exami-

nation and analysis) lactation (milk production) data from registered farms.

- It prepares lactation certificates of registered dairy cows.
- It prepares herd average reports.
- It maintains and avails relevant production data to the Bull Purchasing Committee for purposes of contract mating scheme.
- To avail relevant information or data to the Livestock Recording Centre for purposes of progeny testing (evaluation of genetic merit of insemination bulls) and recruitment of dams for contract mating.

The Service also offers advice to farmers on good livestock management practices through its extension service.

Advantages of registering dairy cows with KSB

- Milk records reports help guide the farmers on monitoring the performance of

farm management.

- They help the farmer to make decisions on selection, culling (selling of unwanted animals, insurance claims, feeding and breeding).
 - Registered animals fetch better prices in the market.
- Consistency in breeding and milk recording guarantees, ownership of pedigree without having to buy expensive pedigree dairy cows from other farmers.
- Owners of registered dairy cows can be contracted by the Kenya Animal Genetic Resource Centre (KAGRC) to supply pedigree bulls and also progeny testing scheme (evaluation of daughters of registered bulls for quality control purposes).
 - Registered farmers can take their animals to exhibitions, field days and the Agricultural Society of Kenya (ASK) and KSB shows where prospective buyers can view and give better prices than that offered in the market.

- Farmers also benefit from increased production in terms of milk and meat.

Elkanah Isaboke

Read more on page 4

KSB charges for dairy cattle breeds

Grade/Class	Cost
Pool (Cross breed) cow	Ksh 200
Foundation cow	Ksh 250
Intermediate cow	Ksh 300
Appendix cow	Ksh 300
Pedigree cow	Ksh 400
Dairy bulls only pedigree	Ksh 1000

NB: The charges are made once in the lifetime of an animal.

Controlling banana weevils and nematodes

How can I control and eradicate weevils and nematodes in a banana plantation?

Weevils and nematodes are some of the pests that cause banana yield losses and a decrease in bunch weight. Farmers need to know how to control them to get good harvest.

Banana weevils

Adult banana weevils are brown in colour before emergence but they later turn black a few days later. Female adults lay their eggs in scars they make at the base of the banana plant. A female weevil can lay up to 200 eggs during its lifetime which is usually two years. Eggs hatch and become larvae after 6 to 8 days incubation period. The tiny larvae are white with brown heads. They feed and eat their way into the corms and banana pseudostems where they make tunnels, which is the most destructive stage of this pest. After 14 days in the tunnels, the larvae develop into pupa which feeds on rotting plant material.

Symptoms: The symptoms of banana weevil infestation include:

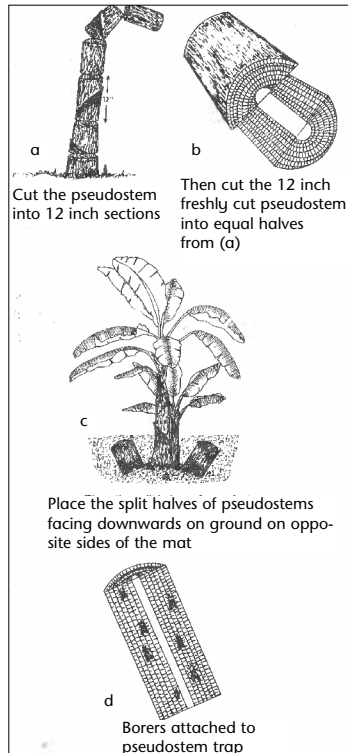
- Tunneling in the corm (root zone) and the pseudostem.
- Pseudostems snaps at ground level.
- Yellow leaves on stunted plants with weak stems.

Nematodes

Nematodes are tiny worms (usually less than 1mm long) that cannot be seen with the naked eye; they feed on the root and corm. They lay their eggs in banana tissue. In the tropics the life cycle of the nematodes is usually 30 days. Symptoms of nematode infestation include the following:

- Extensive primary and secondary root damage of the outer layers of the banana pseudostem.
- The outer layer of the banana has wounds that are red on the edges and which extend to the central part of the banana root and stems.
- Gall (or abnormal growth) on the root system of the affected banana plant
- Nematode infested banana plants tend to fall off.

Banana weevils and nematodes are easily spread when farmers transfer young banana plants infested with weevils and nema-



todes into new fields to expand their banana plantations.

How to control weevils and nematodes

Break cropping: In banana farms infested with weevils and nematodes, farmers can grow crops that do not host weevils and nematodes such as sweet potatoes; this can clear the pests from the field after 1½ to 2 years. Bananas can then be replanted again.

Intercropping: Mixing banana crops with other crops such as legumes minimizes weevils and nematodes movement. Inter-

cropping also prevents soil erosion and restores soil fertility. Do not intercrop with a crop such as sweet potatoes to avoid competition for nutrients.

Cleaning planting materials: Since weevils and nematodes are mainly located in the roots and corms (rot zone) of banana plants, farmers can remove roots and pare (cut off) the corms to a depth of 0.5 metres. All affected parts of the banana plant (scarred sections and the weevil tunnels) can also be cut off.

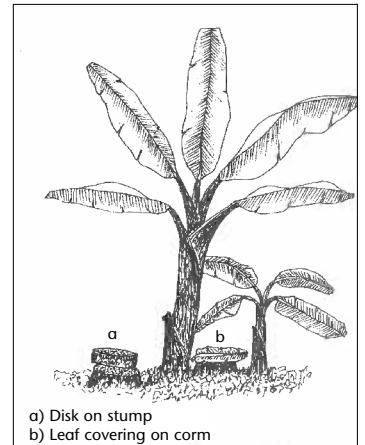
Other measures

The pest infestation can also be controlled by the following measures:

- Immerse the suckers and corms in hot water (50°C) for 20 minutes.
- Sterilise the suckers and corms in a solarium (a room roofed with transparent material such as polyethylene or to expose material to sun's rays) for 20 minutes.
- Dip the pared suckers and corms in a biopesticide for 24 hours.

Deep planting: Weevils prefer to lay their eggs on the corm at ground level. To discourage weevil egg-laying, the corm should be planted at least 60cm deep so that only the leaf sheath of the suckers are at ground level. This also reduces the emergency of too many suckers.

Weevil trapping: While adult weevils do not themselves damage banana plants, a single



adult female can lay up to 200 larvae hatching eggs in two years, which can cause serious damage to banana plants. Since adult weevils are strongly attracted to freshly cut pseudostems and corms, these plant material can be cut and left on the ground near the bananas at all times. Farmers can use split pseudostem pierces, disk on stump or ground or leaf covering on the corms.

Trapping helps to keep the weevil population low especially when it is done continuously. It also helps to lengthen productive life of the plantation.

Harvest hygiene

The pseudostem of harvested bananas should be cut down at corm level. Soil should then be placed on the cut surface to reduce weevil attraction to it. The pseudostems can then be used for traps, livestock fodder or mulching (cut them into small dried pieces).

Answers: Elkanah Ondieki ■

Farming Tip

How to avoid potato pests and diseases

With the spread of the Potato Cyst Nematode (*Globodera rostrchiensis*) across the country, it is important that farmers take preventive measures to control the spread of the pest in their farms. The first step all commercial potato growers need to take is to be extremely careful where they get their planting material (seeds). Reports from KALRO and the Kenya Plant Health Inspection Service (KEPHIS) show that almost all seed production units, private seed producers and even companies inspected in a survey conducted two years ago are affected by the pest. Farmers therefore need to exercise extra caution when buying seed in future. Below are

some of the measures they can take to control the spread of the disease in the farms:

- Start practising crop rotation to reduce the number of pests in the soil.
- Use your own potato seed if it is still giving good yields.
- Diversify to other crops that are not from potato family.
- Reserve a part of your land for future potato production. This is not possible for farmers with small parcels of land.
- Use a lot of manures in potato production since it contains a lot of parasitic fungi some of which feed on the pest, reducing its population. Healthy potatoes resist pest infection.

- Never buy potato seeds from neighbours as this can transfer diseases or nematodes into your farm.

- There is no known biopesticide or nematicide that can control the PCN pest, so farmers should not fall prey to unscrupulous business people promising them that they have products that control the pest.
- It is difficult to tell which potatoes have the pest because it lives in the soil.

Through these practices, farmers can stop the spread of diseases and dangerous pests such as the PCN into their farms.

TOF Radio answers your questions

TOFRadio is broadcast on KBC on Thursday at 8:45pm and Mbaitu FM on Friday at 8.30pm. Tune in and listen to farmer experiences and expert advice on agribusiness and eco-friendly farming methods. On this page, we respond to some of the issues raised by farmers in their correspondence to the radio program. Send your questions and comments via SMS 0715 916 136.

How to improve milk quantity and quality

Maintaining hygiene during the milking Process ensures clean milk which does not contain dirt, soil or other contaminants that spoil milk quality. Farmers should always ensure their milking equipment are thoroughly clean and sterile.

Musdalafa Lyaga | Dairy farming is an important source of food and income for many households especially in the rural areas. For farmers to make good money, it is important for them to produce good quality milk and in large quantities. However milk can easily be spoilt or made dirty hence buyers will not buy milk from the farmer resulting to huge losses. Milk can be spoilt when a sick person milks the cow, if you use dirty milking utensils or if the teats or udders are dirty or infected.

Discard all milk from sick animals

If the cow is on treatment with drugs, the milk should not be used until after the end of the withdrawal period for that treatment. Always seek advice from a veterinary officer. According to Ms. Judy Gicharu, a dairy farmer from Njoro, consistency in timing of milking is key in enhancing milk production.

Says Ms Githoro, "In order to get the most from your dairy investments, make sure the timings of your milking are consistent. It is very important to milk your cow the same time. Whether you do it in the morning or in the evening or three times in a day, make sure that those times are specific times. The other important measure is to remember to disinfect the cow's teats so that the cow can be able to give you good quality milk and prevent infections."

Avoid milking if sick

Mr. Peter Macharia, a dairy farmer from Kiambu, Central Kenya observes that increased income in dairy agribusiness especially for farmers who handle milk starts with preparation.



"First I make sure that I am not suffering from any diseases that might contaminate the milk while milking. Such diseases may include running nose, fever causing running sweat, coughs, especially if you are using your hands to wipe. Then I wear clean clothes and cover my head. This way no hair or dirt can get into the milk."

When hand milking your cow, you will need;

- Warm water
- Two clean hand towels for each cow
- A clean milking can
- A clean milk bucket
- A strip cup
- Milking jelly
- A sieve
- Disinfectant

Relax the animal

Before you start milking, make sure that the animal is not in distress. Farmers have different ways of relaxing their cows. "For my cow to produce milk, I give it a good mix of feed or dairy meal. I know what she likes," explains Macharia.

- Sit or squat in a position that



A dirty udder will contaminate your milk

will allow you to quickly move away if the cow becomes aggressive.

- Wash the udder and the teats gently with a towel and clean warm water to encourage milk let down.
- Use the other towel to dry the udder and the teats to prevent water from mixing with the milk. Be gentle when drying the udder to avoid irritating the teats.
- Apply milking jelly to lubricate the teats
- Squeeze the first drops of milk from each teat one at time into a strip cup. This way, you can easily check for unusual colour or presence of clots, which might indicate that the cow is suffering from mastitis.
- Do not mix the first few strips of the milk from each quarter with the rest of the milk because this milk has a high amount of bacteria and it will contaminate the rest of the milk.
- Place the milking bucket underneath the cows udder.
- Use both hands to milk and choose diagonal teats for ease of milking although some farmers prefer to milk adjacent teats.

- Squeeze the base of the teats after gently gripping each teat between your extended thumb and first finger so



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Organic vegetables for sale: We have Turnips, radish, kales, spinach and amaranthus. Also selling Improved KARI indigenous day old chicks, mature chicks, eggs, cocks and meat. Located at Kinangop, contact Veronica Kimotho - 0720664984

Potato crisps for sale: We make potato crisps for sale in shops, kiosks or any outlet contact Mr. Francis Njuguna - 0725444341

Tree seedlings for sale: All indigenous and exotic varieties, contact Zachary Mwangi on 0716319097

Tree tomatoes for sale: Tree tomato fruits, pepino melon fruits and seedlings. Contact Waweru Ngundo 0728657941.

Silage tubes for sale: We sell silage tubes, improved KARI chickens, day old chicks. Farmers in Western and North Rift, call Star Rays Educational Centre, Nangiri 0721 245 443.

that the teat feels your palm as you squeeze down.

- Squeeze to push down the milk while maintaining your grip on the base of the teat so that milk does not flow back into the udder.
- Make sure that you strip all the teats so that they are completely empty. This is to prevent the cow from getting mastitis. Mastitis is an infection of the udder.
- When you finish milking dip the teats in a teat disinfectant to prevent infection, some farmers prefer to use medicated milking jelly instead of the teat disinfectant. Teat disinfectant and the medicated milking jelly are easily available from your local agrovets shop.
- Measure and record the milk from each cow separately in order to keep proper records of the production of your cows.
- Sieve the milk into a milking can to remove any dirt that may have gotten in during milking.
- As soon as possible, safely transport the milk to the market or to the milk collection centre unless you have your own cooler.

Remember good milking habits and good hygiene will make you get high returns from your milk. After milking all the cows, clean the utensils using clean warm water and soap or disinfectant and leave them to air in a clean dry place. ■