



High level visitors including the The Biovision Ambassador and World Sports Champion Simone Niggli-Luder (left), President of Biovision Foundation Dr Hans Herren (2nd left) discuss a point with scientists during the launch of Organic and Conventional farming systems comparison trials project at the KALRO Thika Research station in 2007.

Dear farmers,

For more than ten years now, we have promoted organic farming and sustainable agriculture with the belief that it is still the best and the most reliable method of food production that will ensure the world's population has safe and adequate food. Sustainable agriculture has the capacity to restore our depleted soils while conserving the biodiversity which stands the risk of loss through unsustainable methods of food production, overexploitation of forests, water resources, chemical pollution by industries and even the emergence of invasive species of weeds that are difficult to control. Indeed it still remains the best method that can reverse the effects of climate change. Currently studies show that close to 4 billion people are affected by unsustainable use of the available natural resources.

Despite these challenges, governments in many developing countries including Kenya are doing little to stop the impending catastrophe. Instead they have continued to work with multinational corporations that are responsible for some of the effects of climate change and pollution in exchange for aid.

Small-scale farmers can change this scenario if they can adopt organic farming systems, which offer the best solutions to the problem of climate change. Organic methods promote the recycling of on-farm resources, which reduce the need for use of external inputs such as chemical fertilizers, pesticides and herbicides that deplete the soils, pollute the environment and cause water pollution.

An organic farmer can create a small paradise in their own farms by planting trees, conserving and building soil fertility, recycling waste and practicing simple methods of water conservation. Of course these practices require some extra labour but the pay off in terms of improved production of safe food, human and environmental health is much bigger in the long term.

It is quite gratifying that farmers have put into practice some of these practices, which shows that the information we give is beginning to have a big impact among small-scale farmers in the country. Climate change is currently the greatest threat to food security in Africa and the world. The best way to mitigate its effects is to encourage more farmers to adopt sustainable methods of food production.

Organic-conventional farming trials findings released

TOF - For a long time, there has been debate on the benefits of organic compared to conventional agriculture. Now the doubts will be put to rest with the release of the partial results of the long-term field trials that have been going on for the last nine years, which are aimed at providing the first evidence-based results of the two approaches of agriculture in Kenya and the rest of Africa.

Research to serve small farmers in Africa

With our services to farmers, *The Organic Farmer* magazine TOF, communication outreach, Infonet-biovision.org and TOF Radio we shall use the results of the study to continue providing relevant and reliable knowledge and practical advice to the farmers in Kenya and rest of Africa. The study findings shows that, if a conventional small-scale farmer starts to apply good organic farming principles, yields will grow, soil health will improve and they can reach the same production of yields on the same farm as compared to a farmer who uses a high input conventional system.

Research to help policy formulation

The trials, which are being conducted in Chuka, Meru South sub-County and KALRO-Thika were started in March 2006 and are expected to take 10 to 20 years for conclusive findings to place debate on the benefits of organic farming and conventional on a rational basis. The results will also guide policy formulation and encourage dialogue on the merits of organic agriculture in developing countries.

The results of the trials that were released on June 28th last month at KALRO, Kandara, Muranga County have been a combined effort of key research institutions led by the Research Institute of Organic Agriculture (FiBL) Switzerland, The International Center of Insect Physiology and Ecology (icipe), the Tropical Agricultural Soil Biology and Fertility of CIAT (TSBF-CIAT), The Kenya Agricultural and Livestock Research Organisation (KALRO), and the School of Environmental Studies of Kenyatta University (KU). The research is being funded by Biovision Foundation of Switzerland, LED-Leichtenstein Development Service, The Swiss Agency for Development and Cooperation (SDC) and the Sustainable Fund. Other partners involved in the trials are the Kenya Organic Agriculture Network (KOAN) and the Kenya Institute of Organic Farming (KIOF).

Beneficiaries

The beneficiaries of the project include farmers, marketing organizations, trading companies, consumers, agricultural NGOs, extension services, national and international research institutions, County and National governments and development agencies.

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Farmers in rural areas benefit from iCow in

Since Benard Ndiema learnt about the *icow* information service, he has used it to train about 1300 farmers in Trans-Nzoia County, which has enabled them upgrade their dairy cows, leading to improved milk production and income.

Peter Kamau | In June 2011, Benard Ndiema, a dairy farmer from Kinyoro in Kitalale scheme in Trans-Nzoia County attended a breeders show at Jamhuri Park in Nairobi. In one of the stands he came across iCow, an information service that offers advice to farmers through their mobile phones. An attendant at the stand took him through the range of services offered by the mobile phone service, including tips on how to improve the productivity of their dairy cows and fertility management.

Being a livestock keeper, Ndiema was impressed by the range of information he could get through his mobile phone from the service. He immediately registered 3 of his 15 dairy cows with the service to receive updates on their reproduction cycles including additional information on their health and management.

Experienced trainer

The information has not only enabled him to improve his dairy production, but has also made him to become an ambassador for the service and trainer of individual farmers, farmers groups and dairy cooperative societies in his region. Using the information from iCow service, Ndiema is also a member of Meebot Dairy Farmers Cooperative. He has become one of the most experienced farmers in Kitalale scheme. He is consulted by farmers when it comes to dairy, poultry, pig, rabbit farming as well as organic farming and related sustainable agricultural crop production practices.

A one-stop shop for dairy cow information

Farmers using the service can monitor the fertility cycle of their dairy cows, for example, they can tell when their cows are about to come on heat, which feeds to give when they calf down in order to boost their milk production, dairy cow breeding tips or how to rear and get a good market price for their cows. Information is available on nutrition, immunization, prevention and management of various diseases that affect dairy



Benard Ndiema with his dairy cows at Kinyoro, Kitalale Scheme, in Trans-Nzoia County. He has used the iCow application service to train hundreds of farmers.

cows and other animals, including where they can get qualified veterinarians to treat their animals.

Uses iCow information for training

Farmers can also manage to

keep milk production records and even sales, "iCow is unique in that it is a one stop shop for all information a farmer may need for their dairy herd management," says Ndiema. He says that for his farmer training service, he downloads the information from his mobile phone and puts it into hardcopy, which he later uses for reference during training. He also makes handouts for farmers who would like to keep the information for reference. His main target groups are dairy farmer producers and marketing societies in Trans-Nzoia County.

Enabled farmers to get credit

Apart from using the *iCow* information platform, The VI Agroforestry Project provides dairy farmers in the Meebot Cooperative Society with monthly copies of the TOF magazine. It is from one such TOF magazine (TOF No. 109, June 2014) that members of his group came to learn about



Su Kahumbu trains farmers on iCow mobile application at Kamirithu in Limuru. Many farmers who have subscribed to the service have benefited from increased milk production and income.

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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Information service



...ia County. He has used iCow mobile

he adds.

Improving poultry production

Due to lack of electricity in many households, farmers engaged in poultry farming cannot buy incubators. Ndiema has introduced a method where good broody hens are selected and given false eggs made from avocado seed (the hard inner part) to sit on until the farmer has enough eggs, which are then given to the broody hens to sit on. Through this method, farmers are able to hatch up to 100 chicks in 21 days.

Many farmers trained

Mr Ndiema has a busy schedule for training. He attends field days, Agricultural Society of Kenya (ASK) shows and is often invited by farmers groups from various parts of the county to train farmers on dairy farming and even crop production. Through him, many farmers have come to learn organic farming practices such as compost making, preparation of plant extracts and post harvest storage to reduce loss incurred through poor methods of cereals storage. He is crusader against the use of chemicals for pest control, which he blames for the killing of pollinators within the farm environment and many other side effects.

Easy and cheap to subscribe to iCow service

Ndiema has acquired much of the information he uses to train farmers from the iCow platform and *The Organic Farmer* magazine, which his groups receives on a monthly basis. Does he use a lot of his airtime to download information from the iCow service? "I do not even notice the cost because it costs only Ksh3 to receive an SMS from the service. He has encouraged many other farmers to subscribe to the service to benefit from the information it provides. So far he has trained more than 300 farmers within Kitalale scheme and more than 1000 from other dairy cooperative societies within the county.

More than 56,000 farmers have subscribed to the iCow service across the country.

Contact: www.icow.co.ke

Customer Care: 0704400000

Email: info@icow.co.ke

FB: <https://www.facebook.com/iCow-202595246499773>

how farmers can get credit from microfinance institutions to enable them engage in various income generating activities. Immediately after reading the article, he together with 30 members of his farmers' group approached Juhudi Kilimo, a micro-finance institution that offers credit to small-scale farmers and traders involved in agribusiness enterprises. They started making savings with the institution and thereafter qualified for loans. Five years down the line, members have received a total of Ksh 6 million in loans. They have bought better breeds of dairy cows to replace their low yielding indigenous cows, which have increased milk production and income.

TOF complements iCow information service

After receiving SMS alerts Ndiema uses information from iCow and *The Organic Farmer* to train farmers on feeding, housing, fodder establishment and conservation, silage making, use of dry maize stalks to prepare dry season fodder for their cows using urea and molasses in fodder preparation. "The training on feed making has especially helped many farmers. Already 4 farmers have mastered the art of feed preparation and are training others which will drastically reduce the amount of money they spend on concentrates for their dairy cows and even poultry feeds,"

Mobile service changing farming in rural areas

Su Kahumbu, the founder of the iCow information service is not new to organic farming in Kenya. She is one of the pioneers and crusaders of organic farming in the country, having started as an organic farmer in Tigoni Limuru back in 2003. Later on she put up one of the few organic shops in Nairobi in the year 2008 and even answered questions related to organic farming in *The Organic Farmer* magazine for several years. From her experience in organic farming and the general situation of agriculture in the country, including challenges posed by climate change, it was clear to her that farmers needed more information.

Low mobile call charges helped launch icow

In 2011, the cost of mobile phones including airtime charges had drastically gone down owing to competition between mobile phone service providers such as Safaricom, Airtel, Yu mobile and even Telkom Kenya.

Easy to reach farmers through mobile app

"Due to these developments, the mobile phone became the cheapest method through which one could reach farmers. I therefore decided to develop the iCow, an SMS-based farmer information service in partnership with Safaricom to enable me to reach as many farmers as possible. Many farmers do not have access to television, computers and other technologies. Besides, information aired through the radio cannot be recorded and used as reference, this is why we decided to use a simple SMS service to communicate with farmers and help them improve production," she says.

Since then iCow has grown to become a major source of agricultural information to farmers.

How does iCow work?

A farmer can subscribe to iCow by dialing *285# and following the instructions given in the menu. From here farmers can search for the information they need, which is sent to them in form of SMS. Other products offered by the iCow information

service include the following:

Mashauri tips

Farmers who subscribe to Mashauri tips receive 3 SMSs a week. Mashauri tips has five features:

1. **Mashauri Cow-MC:** This feature gives information on best practices in dairy production, calf management, diseases, vaccinations, milking hygiene, feeding, fodder production, cattle breeds, breeding, markets etc.
2. **Mashauri kienyeji-MK:** These tips cover best practice in kienyeji chickens rearing, pests and diseases, feeding, hygiene, vaccination and welfare.
3. **Mashauri broiler-MB:** Tips on broiler production, pest and disease control, feeding hygiene, vaccinations, slaughtering and packaging.
4. **Mashauri layers:** This tips cover best practices in layers hen production, housing, vaccination, feeding, hygiene breeds etc.
5. **Mashauri mix:** The tips feature all aspects of agriculture and livestock production, cows, pigs, goats, sheep, chickens, maize, beans, tomatoes, potatoes, sorghum, millet, cabbages, fruits, soil fertility management, soil testing, pollinators, pests and diseases.

iCow Kalenda

The iCow Kalenda helps farmers adopt best practices to improve production and reduce risks and potential economic losses. The Kalenda has information on management of cows, heifers calves, kienyeji chickens, layers and broilers. Farmers subscribe their animals to the iCow kalenda based on their date of birth, date of hatching or insemination- they will then receive real time information in the form of SMS tailored to the specific animal or bird flock. The information includes vaccinations, feeds, hygiene, diseases and general management.

Smart farm tips

Smart farm tips allow farmers to access all information regarding livestock and crop production. Farmers do not need to subscribe to access this information and it is available at all times day and night.



Care for your calf for good milk production

A calf is your future cow. If well fed it will grow into a healthy high milk yielding dairy cow that will give you a good income in future.

Joyce Wambui | It is very important for a dairy farmer to consider three key issues in order to raise the desired number of healthy, fertile, productive future members of their dairy herd. These key issues are; keeping calf mortality to a low level, maintaining good calf growth and maintaining good calf health.

Feeding of the calf

Feeding management should be directed at addressing nutrient requirements and encouraging rumen development. It is important to develop a feeding program with the aim of switching young calves to alternative feeds as early as possible so that more milk can be available for sale. However, the diet must be able to promote health and growth.

Calf Feeding Programs

Feeding during first week

At birth, the calf has low immunity and therefore must be given colostrum. The colostrum has antibodies that protect the calf against diseases and their absorption is highest within 12 hours after birth and very low after 24 hours.

Calves should be allowed to suckle colostrum from their mothers. If the mother dies at calving or is unable to produce



milk due to some condition, artificial or frozen colostrum can be used.

Artificial colostrum can also be a good source of nutrients for a new born calf, an example composition of artificial colostrum: one egg (protein source) + half litre fresh warm water + half litre whole milk (source of lactose and milk protein) + one teaspoonful castor oil (energy) + one teaspoonful of cod liver oil (energy).

Feeding during 2nd week to one



A calf should always be provided with feed and clean water

month:

Calves should be fed milk at approximately 10% of their body weight and should be fed at body temperature. Commercial milk replacers can be fed at this stage if they are available and are cheap as they would result in increased profits to the farmer and increase milk for human consumption.

The milk replacer should contain 22% protein (if all protein is from milk sources) or 24% when some plant protein is included. The calf should be introduced to high quality pre-starters at this time.

Calf feeds

Preserved colostrum

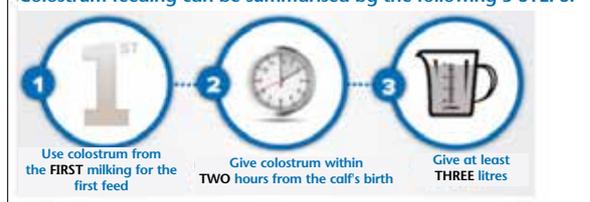
High yielding cows may produce more colostrum than the calf can consume which can be preserved and fed later. The colostrum can be preserved by several methods. The most ideal is freezing but this may not be possible in small-scale farms without electricity supply. In such cases, the colostrums may be preserved through natural fermentation (storing at room temperature).

Before feeding the preserved colostrum, it should be mixed with warm water at the ratio of 2 parts colostrum to 1 part water.

Milk replacers

These are commercial products manufactured to resemble milk and are mostly used when there is no milk to feed the calf if the cow is sick or if it has died during calving.

Colostrum feeding can be summarised by the following 3 STEPS:



They are also used when demand and price of milk is high. Preserved colostrum should be used as much as possible before a farmer decides to use milk replacer. Milk replacers are always of lower quality than whole milk and should only be fed if they are cheaper.

Pre-starter

A pre-starter is a high quality calf feed, which should be low in fibre and is almost similar to milk replacer and is usually fed during the second and third week. It is fed in a dry pelleted form or as a meal. It should be used early to stimulate calves to eat dry feed to enhance rumen development.

Rumen development takes three weeks after the calf starts eating a handful of dry feed.

Calf starter

The starter contains slightly higher fibre content compared with the pre-starter. At this stage the calf is consuming little milk and is in transition to becoming a ruminant.

Roughage

Calves should be offered only high quality forages early in life and supplemented with concentrates (calf starter). If hay is used, it should be of high quality, fine texture and mixed with legumes. If they are on pasture, it would be best to always graze calves ahead of adults to control parasites. Some of the common roughages

offered to calves are sweet potato vines and freshly harvested and wilted Lucerne.

Water

Calves should be offered fresh water in addition to milk. Lack of drinking water slows down digestion and development of the rumen, and hence the longer it takes before calves can be safely weaned. Between three weeks and weaning, calves' water consumption usually increases and should be available all the time. This programme should result in growth rate of approximately 400-500 grams per day.

Weaning

Weaning is the withdrawal of milk or milk replacer and the calf becomes fully dependant on other feeds. Traditionally, most dairy calves are weaned based on age, 12 weeks being the most common. Early weaning is possible if more milk is fed and calves introduced to pre-starter and starter early in life.

To minimise stress, weaning should be done gradually. The twice a day milk feeding should be reduced to once a day then to once every other day to allow the calf's digestive system to adjust to the new diet. Criteria that have been used to determine weaning time include when calf attains twice the birth weight, when the calf can consume 1.5% of its bodyweight of dry feed and age of calf.

Early weaning (5 to 8 weeks) may be adopted to reduce the milk feeding period and labour required for calf rearing. This will require a specific feeding program using low levels of milk and high energy, high protein concentrates, preferably pelleted to stimulate rumen development. Liquid milk or milk replacer is reduced from 3 weeks of age to encourage the calf to consume and maximize intake of dry feeds.

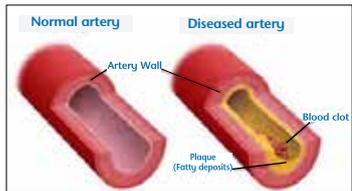
With proper management, the calf can live a healthy, fertile life and provide a high lifetime milk yield. Generally, heavier, well developed heifers become pregnant earlier, produce more milk during their first lactation, and live a longer life and perform better.

Source: Ministry of Livestock Development-Dairy Farmers Training Manual By Prof. Charles Karuku Gachuri, University of Nairobi; Ms. Margaret Nyawira Lukuyu, Kenya Agricultural and Livestock Research Organisation and Mr. Camillus Ahuya, Animal Resources Consultants Ltd

Eat less fat to reduce the risk of a heart disease

In order to maintain a healthy lifestyle, it is advisable to avoid excess consumption of animal fats which are high in cholesterol that builds up in the blood vessels leading to heart diseases and related complications.

Tyson Wachira | Fat is the most concentrated source of food energy, or calories. Fat contains over twice the amount of calories in weight compared to carbohydrates or proteins. Fat accounts for 34% of the total calories in an average diet. High-fat diets have been found to be a major cause of atherosclerosis, a disease of the arteries characterized by progressive thickening and hardening of the arterial walls, and certain types of cancer. Fats, platelets, and other debris block arteries and could eventually close them if they are consumed in large quantities over a long period of time. Fats can also provide too many calo-



ries, which could lead to obesity.

Fats should be consumed in moderation in a healthy diet. We do require some dietary fats because they provide the essential fatty acids needed in the human diet. Fats can be classified into either saturated or unsaturated. Saturated fat is high in hydrogen and is found primarily in animal products and tropical vegetable oils. Saturated fat tends to raise the cholesterol level in the blood. Because of their molecular structure, unsaturated fats contain less hydrogen. They can be classified as monounsaturated or polyunsaturated. Neither type of unsaturated fat raises blood cholesterol levels. Polyunsaturated fat is more liquid than saturated fats and it is commonly found in plant products such as maize, soybean, and cotton seed oils and sunflower seeds. It is also found in fatty-fish that is high in oil such as tilapia and salmon. Monounsaturated fat contains less hydrogen than saturated fats and can be found in olive, peanuts, canola and avocado oils.



Sources of saturated fat in our daily diet

For better health and the prevention of disease, you should consume less saturated fat and less cholesterol, which is found mainly in animal products. It is advisable to consume a mixture of polyunsaturated and mono-unsaturated fats.

Food sources of fat

Saturated fats are found in animal products and many dairy products as well as coconut oil, palm kernel oil, and palm oil. Some of the unsaturated fats in vegetable oils are made more saturated by the process where liquid unsaturated fat is converted to a solid saturated fat by the addition of hydrogen (hydrogenation) in the presence of a catalyst. Hydrogenated fats are polyunsaturated fats that are hydrogenated through food processing. An example of hydrogenated fat is margarine made of vegetable oil. Commercially prepared and processed foods made with vegetable oils or with unsaturated fats such as butter and lard (pig fat) can also be high in saturated fat. Soft (tub) margarines are less hydrogenated than the sticky forms and therefore contain less saturated fat. Consumers should always use unsaturated fats in their diet to reduce cholesterol levels in their bodies.

How to reduce fats in your diet

There are several useful tips that will help you to reduce fat in your diet.

- Reduce your intake of red meats, such as beef, pork, and

lamb and and go for smaller portions of fish, poultry, and lean cuts of meat that are lower in total fat.

- Remove the outer skin and fat from chicken meat before eating it.
- Roast, bake, boil or simmer meat, poultry or fish rather than deep frying them. You should avoid fried foods, especially deep-fried foods, since they are very high in fat.
- Cool meat or poultry broth until the fat becomes solid. Then remove the top layer with a spoon before taking the broth.

- Be careful with processed foods and fast foods, which are not only high in fat but may also contain coconut oil or palm oil, which are among fats containing highly saturated fats.
- Reduce your intake of dairy products by replacing whole milk with one percent or skimmed milk in puddings, soups and baked products. Eating cheeses that have less than five grams of fat per about 500g such as low fat cottage cheese.
- Substitute plain low fat yoghurt or blender whipped low fat cottage cheese for sour cream or mayonnaise.
- Read labels to choose products that are low in saturated fats and total fat content. Avoid commercially prepared and processed foods made with saturated fats or oils.
- Steam, boil, stir-fry, with herbs and spices instead of fatty sauces, butter, or margarine.
- Try flavoured vinegars or lemon juice on salads, or use smaller servings of oil-based or low fat salad dressings.
- Use vegetable oil in place of solid shortening, margarine, and butter whenever possible.
- Limit egg yolks to one serving when making scrambled eggs. Use additional egg whites for larger servings. Limit total egg intake to two or three per week.

Sources of unsaturated fat in our daily diet



Know the best time to inseminate your cow

Most farmers serve their animals when it is too early or too late which results in failed conception.

The Organic Farmer | Good timing in serving a dairy cow will determine the success of conception. Timely service also ensures that a cow's calving cycle is attained which is good for the productivity of dairy cows. Most farmers serve their dairy cows too early or even too late due to lack of knowledge on when is the right time to serve their animals, resulting in failed conception. This can be avoided if the farmers are well informed on the tell-tale signs that a dairy cow shows when she is in need of service.

The fertility of a dairy cow is very important. It affects the number of calves born and the total milk produced during the entire life of a cow. Good fertility improves a dairy farmer's income. A cow's fertility is determined by the number of calving intervals- this is the period between two successive calvings (births or calving down). A healthy cow should give birth after every 365 days, or every year.

The calving interval is divided into two periods: The calving-conception period (the period the cow gets pregnant) and the conception- calving. So a dairy farmer should pay much



Proper timing for AI service is very important for successful conception

attention to the cow between calving and conception period. The farmer should ensure that he serves the cow at the right time to increase the chances of the cow conceiving. The cow should be properly fed with a balanced diet of carbohydrates, proteins and minerals.

It is important to point out that a poorly fed dairy cow cannot come on heat at the expected time because its body may not be in good condition for conception. Diseases associated with the animal's reproductive system may also interfere with conception. A farmer may also fail to notice heat signs in a dairy cow which results in failure when the cow is served too late or too early. Below we repeat some useful hints that the farmers should observe in order to reduce conception failure.

Important tips for farmers and AI service providers

The following tips can help farmers and inseminators avoid conception failure:

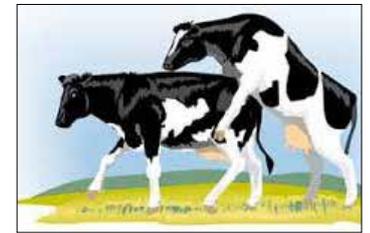
- If a cow shows heat signs in the morning, let to be served in the evening, if it starts showing signs of heat in the evening, then it should be served the next morning (this is called the AM-PM rule).
- Always maintain the records of each animal eg date of birth AI records, name of bull used to serve the cow and date at age of service, number of services, calving, calving intervals etc.
- Avoid using village bulls to serve your cows in order stop transmission of venereal diseases, always separate the bull from the cows the cows to avoid inbreeding.
- Do not throw away the empty semen straw after use preserve it for future reference and to avoid inbreeding.
- For AI service providers, always keep your nitrogen cylinder tightly closed to stop the liquid nitrogen from escaping (a dried cylinder will kill the semen or make it unviable)
- Always let the semen to thaw for 15 to 30 seconds before serving the cow.
- Load the insemination gun correctly to avoid losing the semen.
- Use one semen straw per cow, some inseminators have been found to use one straw for two different cows to save on semen- this is illegal and can lead to failure of conception.
- Farmers should insist to be given the straw that has been used to serve their cow. The straw has the name of the bull used and its code- which can help the farmer in record keeping.

tail is bent away from the vulva. The animals should be inseminated immediately it shows these signs.

After heat

At this stage the cow continues sniffing the other animals and is also sniffed at. However it refuses to stand when being mounted. A clear mucus is evident from the vulva. All heat symptoms cool down rather suddenly.

Very often only a few of the above signs are clearly visible. For instance, when the weather is warm, the cow will not be very active and there may be a secretion of mucus indicating



Signs of an animal on heat

The time during which a cow is on heat can be divided into three phases: The early heat, the standing heat and after heat. During each of these phases, the cow shows specific signs that the farmers should know.

Early heat

An animal on early heat tends to sniff other animals. It is also sniffed by the other animals. It tends to mount other animals but walks away when mounted. The cow is usually restless and



keeps on looking around while making noise. Its vulva (lips of vaginal opening) is slightly swollen, moist and reddish. It is also extra attentive. When the animal shows these first heat signs, the farmer is advised not to inseminate (serve) the cow at this stage.

Standing heat

A cow is said to have standing heat when it shows all the signs already mentioned above. At this stage however, the vulva is swollen and deep red and there is a flow of clear mucus from the vulva (vaginal opening). It forgets to eat and its milk production goes down. The cow's



that the animal is still on heat. At this stage it is too late to serve the animal and this may lead to failed conception. In tropical countries such as Kenya, the period during which the farmer can detect heat in a cow is very short. The visible heat period lasts only for between 11-12 hours for grade cattle. This means that the farmer has to remain alert and observe their cows closely to notice any heat signs. Observing the cows during the morning milking and also in the evening can help the farmer to detect heat. A farmer who keeps good records of their animals can also predict when the animal is about to come on heat- this can help them serve the animal at right time.

If the animal bleeds from the vulva two days after the end of the heat period, then it will come on heat in the next 17 - 25 days. Normally a cow will show the first heat within 3-4 weeks after calving. If the dairy farmer kept proper records, it is always easy to predict when the animal will come on heat again. The best time to serve a cow is between 45 to 90 days after calving. Any insemination done before 45 days after calving gives a lower chance of pregnancy. On the other hand any insemination given in 90 days after calving results in birth intervals of over 1 year, so it is important that the farmer selects the best time between 45 and 90 days for their dairy cows.

Causes of flower abortion in yellow passion fruit

Kindly publish in your next issue the information on the cause of flower abortion in sweet yellow passion fruit, which is a problem to many farmers in Fort Ternan location, Muhoroni Sub- County. Dalmas Opondo-Fort Ternan



There are many reasons for flower abortions in passion fruits. But most important step you can take to help you identify the cause of the problem is to seek the services of an extension officer especially one with good experience in horticultural crops in your region.

The yellow passion fruit does well mostly in lowland areas with high temperatures. If planted in highland areas, there is always a problem with slow flower setting and even flower abortion leading to failure in production of fruits. The other likely causes of flower abortions are below:

Deficiency or excessive nutri-

ents: Availability of too much fertilizers can lead to increased vegetative growth but poor flowering. Too much compost application can also contribute to vegetative growth at the expense of flowering and fruit setting. Boron deficiency can also lead to flower drops. When it is still young passion fruit responds very well to phosphorus application. As it matures, it is important to apply some potassium and phosphorus.

Pollination: For any fertilization to be successful pollination has to take place. Bees and other nectar foraging insects such as the carpenter bees play an important role in cross-pollination of passion fruit flowers. Due to use of chemical pesticides in many farms especially those growing vegetables such as tomatoes, many bees are destroyed by the chemical spraying of such crops, in this case reducing their pollination services. One way to encourage

pollination by bees is to plant trees that attract bees foraging for nectar.

Water: Passion fruit has shallow roots. It needs adequate water. Inadequate water especially at the crucial flowering stage can lead to flower drops. Lack of water can result in tiny fruits that are not marketable. Too much water is not suitable for passion fruit production; this is one reason why passion cannot do well in low-lying, water-logged areas.

Temperatures: Low temperatures especially in highland areas can slow down pollen germination. Periods of low temperatures and overcast skies can cause flower drops. This is one reason why the production of yellow passion is not recommended for highland areas.

Birds and insect pests: Too many birds and insects pests can also cause flower drops in passion fruit orchard, they therefore be controlled mainly at the flowering stage.

The importance of foliar feed in crop nutrition

How long does the Fermented Plant Extracts (FPEs) foliar feeds take to be absorbed into the system of the plant?

Foliar feeding is a method of feeding plants with fertilizers through the leaves. When you apply foliar feed to a plant, the nutrients or essential elements are absorbed through the plants's stomata (tiny holes in plant leaves that take carbon dioxide and remove excess oxygen from the plant) or epidermis (the leaf surface). Although the stomata takes in nutrients faster, the leaf surface absorbs all the foliar feed applied. Plants or crops are also able to absorb nutrients through their bark. In experiments performed on foliar application in plants, it has been found that some elements such as phosphorus and potassium are absorbed at the rate of 12cm per hour.

It supplements and balances nutrients

Foliar feed application is used mainly as an additional feeding to plants to balance nutrients of some of the major and even minor nutrients, plant hormones such as those from sea weeds (Kelpack), biostimulants and other beneficial substances that enhance crop nutrition. Fermented plant extracts if well prepared have been found to

increase crop yields, resistance to pests and diseases, drought tolerance and even crop quality in terms of taste and texture. There is also evidence that a periodic foliar feeding will increase the activity in the leaves, increasing chlorophyll (green substance that helps plants make food using carbon dioxide) production and photosynthesis (the processing of nutrients for plant use) which drives increased water and nutrient uptake from the soil.

Foliar feeds absorbed faster

Research has established that foliar feed application can be 8 to 20 times faster than fertilizer application through the soil. However in organic farming and even in conventional agriculture,

foliar feeds cannot replace direct application of fertilizers to the soil as part of general soil fertility management. In organic farming, the most common term used to emphasize the importance of organic fertilizer is "feed the soil to feed the plant,"- this means that the primary source of feeding the plant should be through the soil- organic farmers are always encouraged to build soil fertility as the first step in crop production.

Less nutrient loss

Foliar feed application cannot replace soil fertility management but it helps address the immediate needs of the plant. Organic farmers should apply organic fertilizers through the soil including regular compost-

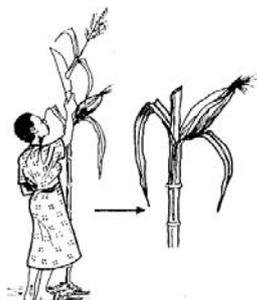
ing in order to help build soil fertility. One benefit of foliar feed application is that it is not affected by leaching during heavy rains, so the plants are able to take up all the nutrients supplied as opposed to fertilizers applied through the soil which lose some of their nutrients through leaching and soil erosion.

FPEs should be applied as many as three times in a week during the growth phase of their crops to ensure their crops have enough nutrients and to keep away pest and diseases; one reason for regular use of FPEs is that they work slowly against pests and diseases while their concentration may not be as high as that of chemical fertilizers, pesticides and fungicides.

Farming Tip

Get quality fodder from your growing maize

Many farmers who planted their maize in mid- March have their maize almost ready to set in cobs. If you have dairy cows, goats and sheep, you can supplement their feed with the leaves from the maize. Three weeks after the maize cob has produced silk (the soft dark-brown growth at the tip of the maize cob). Every week, you can remove one leaf from each maize plant, starting from the bottom



going up. Do not remove the leaf directly below the cob and the one above it. Using this method, you can harvest 450kg to 600kg of high quality and nutritious feed per acre of maize. After the maize grains in the cob reach soft dough stage (milky stage), you can cut off the upper part above the maize plant- this part produces even better feed for your animals and it does not affect grain quality.

TOF Rad^o 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.

Fish require quality feed for healthy growth

Fish farmers can easily increase fish production by providing fish with adequate and balanced feed at all times.

By Musdalafa Lyaga | Most communities in Kenya enjoy eating fish. It is an important source of animal protein. Fish provides food, generates income and remains a crucial part of many rural livelihoods especially those living in the Western and coastal regions of Kenya and even parts of central Kenya where many farmers have put up fish ponds.

Many urban dwellers are now constructing fish ponds to take advantage of the growing urban populations. The reason is that fish farming is neither demanding nor costly to set up and maintain.

To have a good fish harvest, feeding and controlling the quality of water is key. To understand the dynamics of fish feeding, a farmer needs to ask these key questions- which are the natural available sources of fish food in pond water? How do you stimulate natural food production for fish and how can you supplement the natural feed for fish?



Use natural or formulated feed

Fish can be fed from both natural and formulated feed. Natural feed include small floating plants like algae known as plankton (algae or fish food) and small animals like worms and insects in the water.

The colour of the water indicates the availability of plankton



Photo: IN

in the water. When the water is green it means there is food for the fish but when the water is clear it indicates scarcity of food for your fish.

It is easy to check whether your fish have enough feed. This can be done by putting your arm in the water. If you can clearly see your arm in the water, it means there is not enough feed. You can also put pond water in a clear glass. If you see twenty to twenty-five tiny creatures then it is an indication that your fish has adequate feed.

Control run-off water

With heavy rains, run-off water easily washes into the ponds when the banks have no ground cover making the water muddy.

This can mean trouble for the fish farmer because the tiny free floating plants also known as plankton needs sunlight and nutrients to grow. When this plankton receive sunlight, they grow and release oxygen into the water. But if the pond water is muddy, it blocks sunlight and the plankton cannot grow or produce oxygen.

Managing your fish pond

To mitigate against mud washing into ponds, grass can be planted around the pond to hold the loose soil. If your pond is big, you can plant trees on the banks. But be sure they are suitable for fish culture so that they do not shed leaves on the water. It is important to seek advice from an Agricultural extension officer in your locality on the

ideal trees which grow in your area and can also give you an additional income.

Use lime

If your pond water still gets muddy, add diluted lime in the

water. Soak the lime for twenty four hours and sprinkle it in the pond. The lime makes the mud to settle at the base of the pond. The tiny free floating plants are crucial in producing oxygen for the fish in your pond. When you see the fish gulping in the surface, it means they lack oxygen. You can add oxygen by circulating water with a pump.

Apply manure

Apart from sunlight, plankton also needs nutrients. You can apply manure in the water to help plankton to grow. Put manure in a sack and tie both ends tightly then submerge the sack in the water. Keep monitoring the colour of the water and if it turns dark green remove the sack immediately. Make sure not to over fertilise your pond for this will block the sunlight and there will be less oxygen available for the fish. In that case, pump additional water into the pond to supply oxygen to the fish.

Fish can also be given supplementary feed in addition to the natural organism in the water.



farmers forum

0717 551 129 / 0738 390 715

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 Veronich 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, Nangili 0721 245 443.

Such feed is important especially when there is no enough plankton or when you want to produce more fish. One such example of feed you can formu-



Photo: TOF

late at home include a mixture of milled maize, milled rice and soya bean oil cake.

Give them feed balls

The ingredients can be mixed with water and made into balls then dried. To hasten fish growth, you can throw these feed balls at particular points in the pond. The fish will learn where to find the feed thus little of the feed is wasted. Dried feed balls break much slower and helps reduce waste.

It is advisable to buy the feed from the shop because the ingredients are mixed in appropriate ratios and in some cases multinutrients are added to the feeds.

With well-managed good quality water and feed, you can significantly increase your profit from fish culture. ■