

The Organic Farmer

The magazine for sustainable agriculture in East Africa



Nr. 91 December, 2012

Bad start for many fish farmers



Farmers should acquire knowledge on fish farming and identify where they can sell fish before they start.

The Organic Farmer

A lot of farmers who rush into fish farming without adequate skills have ended up with empty ponds and heavy losses. Fish farming requires that farmers undergo training and seek advice from fisheries experts on where to locate the ponds and about general fish management.

Why farmers fail

The government selected and trained a few farmers under the Economic Stimulus Project (ESP) on how to rear fish. However, other farmers went in digging ponds, using poor quality liners and started fish farming without any knowledge on fish production. Nowadays a lot of ponds remain unused in many

farming areas.

Good pond liner material should be UV-treated Low Density Polyethylene (LDPE) with a thickness 0.5 mm. They are expensive; a liner covering a pond measuring 300 m² goes for Ksh 100,000. Farmers went for cheap liners that cannot even last for three years. Many of them, desperate to start fish farming went for second-hand liners used in greenhouses used by flower companies in Naivasha, some of which contain pesticides that kill fish when used in pond construction. The liners tear easily causing the leakage in such ponds. An alternative method for farmers is to make earthen ponds (See pages 4 and 5).

Identify market first

But before they start production, farmers need to do thorough research on where they can sell the fish after they mature. It is not wise to produce so much fish and then start looking for market.

TOF on the web

For farmers who have access to the internet, it is possible to get a free copy of *The Organic Farmer* magazine at www.organicfarmermagazine.org

Farmers can also get additional information at www.infonet-biovision.org

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Be patient

Over 200 farmers' groups have requested to be put in our mailing list in order for them to receive TOF. We appeal to them to be patient until we get funds to increase the number of copies.



Using home-bred bulls

Some farmers prefer using their own bulls to serve their cows. This may save them the expense of paying for AI services. But the use of home-bred bulls has its own problems unless they are managed very carefully. Our picture show a bull from CAIS. See Page 3

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Dear farmers,

We have always advised farmers against the practice of planting what they see others growing. This tendency, or "copy cat" farming is to blame not only for the poor prices of agricultural commodities in the country, but it also shows lack of willingness or ability to try new ideas.

Apart from this practice, Kenyans and indeed farmers in Africa have acquired a habit of rushing for new ventures just because one farmer makes good money from it; fish farming is one of them. However, many farmers have failed in this venture because they dug fishponds and started fish farming without undergoing any training or acquiring the right skills on how it is done (see articles pages 4 & 5).

Success in farming or any other undertaking requires careful evaluation and timing. A thorough market survey to determine the viability of the venture, including knowledge of the particular activity, is also important.

There is an unlimited potential in agriculture, but very few farmers have exploited the opportunities to raise their income. The secret is to survey the market, identify niche products that few farmers are producing, acquire the appropriate information on their production, maintain quality and consistency in supply. At the same time it is important to have a fallback position, for example, by diversifying into a range of products and doing value addition where possible.

Luckily there is a new crop of youthful farmers that are now ready to do farming in the modern way. They have embraced technology and have ventured into areas that other farmers avoid such as production of seeds, herbs, improved indigenous chickens, pig keeping, modern dairy farming, agroforestry and the like. The farmers are making good money in this ventures and perhaps hold the future of how agriculture is likely to be in Kenya and Africa as a whole.

As we approach the new year, farmers need to think seriously where they want to be in order to make farming a worthwhile venture and not an occupation for those in society who have nothing else to do.

We wish all farmers a Merry Christmas, a prosperous and bountiful New Year.

The pumpkin with the shape of a pear

Butternut squash is healthy, can be grown in a small space, and has a good market.

The Organic Farmer

Butternut pumpkin is a underestimated crop despite its many qualities. The large pear-shaped, golden-yellow pumpkin fruit belongs to the Cucurbitaceae family of field pumpkins, it grows easily, can be stored for up to three months, gives delicious food and is rich in vitamin A. You will also benefit from potassium, vitamin C, manganese and a large dose of fibre if you eat butternut.

It requires less space than other horticultural crops - pumpkins are considered to be among the most efficient of vegetable crops when evaluated on nutritional yield in relation to land area and labour needed to grow them. Dried seeds of butternut squash are a source of protein. It's long shelf-life and small size make it especially attractive to traders.

Butternut thrives in warm, fertile soil, so add fertilizer or compost when planting. Choose a location that will have full sun and allow a lot of space for the vines. Each hill should have 3 feet of space around it. Plant 4 or 5 seeds in a small hill (3 to 5 cm deep), and thin down to 2 or 3 when they sprout.

Water after planting and then every two to three days until germination. However, do not saturate the ground, as squash grows best in moderately moist soil. Since they like rich soils, feed them regularly with liquid manure. To store for a longer period of time, allow butternuts to cure out in the sun after harvesting for a couple of dry afternoons before putting them into storage in a cool dry place with good ventilation.

Beware of pests ...

There are some rules which should be considered:

- Do not grow butternuts near crops such as pumpkins, potatoes or maize
- Practise crop rotation
- Scout carefully for damaging beetles and diseases
- When you spray against pests, do it in the late afternoon or early evening

Aphids, Whiteflies, fruit flies: Neem products can control these pests, there are neem products in the market which are allowed in organic farming e.g. Nimbecidine®.



Striped cucumber beetle

The Epilachna beetle: Also known as the African melon ladybird, this pest is a problem only when the plants are small. This beetle is a vector of butternut mosaic virus and can be controlled with neem-based pesticides.

Striped cucumber beetles: These attractive beetles should be removed by proper scouting because they damage the leaves and are responsible for fungal spread. Neem-based pesticides are effective against the larvae.

... and diseases

There are some rules for the fight against diseases such as mildew and viruses.

First of all: Control insect pests. A sustainable approach of controlling aphids

and the above mentioned beetles is important to prevent them reaching the crops and transmitting viruses.

- Use certified disease-free seeds
- Plant resistant varieties, if available
- Practice crop rotation with non-cucurbits
- Destroy volunteer cucurbits (those that remain after you have harvested)
- Remove infected plants (disinfect hands and tools with 70% alcohol after contact with infected plants)
- Destroy affected crop residue after harvest
- Do proper weeding
- Spray with sulphur based organic fungicides, which provide good control

Tasty food recipes

Butternut soup

You need the following ingredients:

2 medium butternuts, 2 medium Irish potatoes, 2 medium onions, 50g butter/margarine [4 tablespoons], 7 ml medium curry powder ([¼ teaspoon-optional])
40 g corn flour [4 tablespoons]
Pinch of ground nutmeg [optional]
4 medium sized tomatoes
750 ml boiling water [3 cups]
500 ml milk [2 cups]
7 ml salt [1 ½ teaspoon]

Procedure

Peel the butternut squash, scoop out seed and dice the butternuts. Peel and chop the Irish potatoes, onions and tomatoes. Cook lightly the chopped onions and tomatoes in the butter/margarine. Add the curry powder and fry the mixture lightly. Add the butternut and potatoes and cook the mixture for a while. Add the flour and nutmeg and stir-fry lightly.

Add water, milk and salt to the butternut mixture. Boil with the lid on, over moderate

heat, soft stirring the mixture occasionally, then puree or blend until smooth. Serve the soup hot, or you may garnish it with finely chopped parsley and serve it with roast beef, chicken, lamb or slices of bread.

Mashed butternut squash

You need these ingredients:

2 medium butternuts, 6 medium Irish potatoes, 2 cloves garlic, Pinch of nutmeg [optional]
20 g butter/margarine [2 tablespoons]

Procedure

Halve the squash and peel off the skin using a sharp knife, scoop out the seeds, then cut the flesh into even-sized chunks. Peel the potatoes and wash together with butternut chunks.

Bring 1 inch of salted water to boil in a large pot; add prepared butternut chunks, potatoes and garlic and steam for 15-20 minutes or until tender, adding more water to the pan if necessary. Mash the vegetables till fairly smooth. Add ground nutmeg and margarine. Serve hot with beef, chicken or lamb.

Source: Youth Agro-Environmental Initiative

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Publisher African Insect Science for Food and Health (icipe), P.O. Box 30772, 00100 Nairobi, KENYA, Tel: +254 20 863 2000, icipe.org, www.icipe.org

Editors Peter Kamau, Peter Baumgartner

Administrator Lucy W. Macharia



Layout In-A-Vision Systems (k), jameswathuge@gmail.com

Advisory Board Nguya Maniania - icipe, Charles Kimani - farmer, Wangige, Joseph Mureithi - KARI, Henry Kiara - ILRI, Christian Borgemeister - icipe, Sunday Ekesi - icipe

Address The Organic Farmer, P.O. Box 14352, 00800 Nairobi, KENYA Tel: +254 20 251 92 33, 0738 390 715, 0717 551 129, info@organickenya.org
www.organicfarmermagazine.org

Select a good bull to improve your herd

Farmers who use bulls for breeding purposes need to be careful on the qualities of the selected bull.

John Cheburet

A good dairy farmer is one who knows that his milk business is dependent on his ability to make sure that the next generation of animals is always better; that means they must also be interested in breeding. For a dairy farmer, breeding is essential to increased milk production, and to acquire better characteristics that will enable the cow to produce more milk over a longer duration of time. A dairy cow is kept to produce milk, therefore select bulls that have positive ratings for milk production. A dairy farmer would want to keep fewer cows producing more milk.

While farmers are advised to use Artificial Insemination (AI) to serve their animals, many farmers in rural areas still use bulls to mate their dairy cows and heifers. Therefore, the choice of the bull is perhaps the most important decision you will make in your farm. Bulls are expensive to maintain, so a dairy farmer's first choice should be AI.

However, it is still possible to use bulls, but as a rule, make sure you source the bull from a reputable private farm or government-breeding farm like the Agricultural Development Corporation (ADC). You don't want to bring a bull with no records into your farm or one whose parentage is not known. Go for pure breeds. If you cannot get a pure breed, then go for one with at least half dairy blood so that you are sure that the daughters will have better milk production.

How long will the bull be kept in the farm? It is advisable that you let him sire two calves per mature cows in your herd before you remove him from the farm so that he does not mate his daughters. This will be inbreeding, which will diminish the quality of your herd.

For farmers who besides dairy, also sell bulls for beef, using high quality bulls improves the quantity and carcass value of the bulls sold for slaughter.

Breeding objectives

- Boosting longevity;
- Improving production traits
- Perfecting your herd type
- Improving mastitis resistance
- Selecting the most reliable proven bulls
- Maximizing profit

Three types of bulls

As a farmer, it is important to know and identify the type of bull you wish to have based on its breed and your breeding plan. There are three types of breeding bulls that you must decide between:



Boran



Sahiwal



Holstein-Friesian



Jersey



Ayrshire



Simmentaler-Fleckvieh

- **Terminal** - a bull that is used to increase weights and growth in calves, and is used only if you wish to sell all of your calves while still young for beef.
- **Maternal** - a bull that is used for producing replacements. The qualities of this type of bull should be less on increasing weights and growth but more on improving the quality of your herd in terms of mothering and milking abilities, calving ease, and calf vigour.
- **Rotational** - the bull is suitable for both maternal traits and production of calves for the meat market. It can also be used for cross-breeding.

Selection criteria

Here are some features and information, which will enable you to select a good bull that will improve your herd;

- Make sure it is not lame, but looks strong so that it serves properly,
- Check out the coarseness of the hair about the head, face and neck of the bull. The hair shafts should be coarse in appearance and touch. Looking closely you will notice the hair per square inch is moderate in amount. Note also the hair is generally all in a downward direction except over the eyes.
- The shoulder blades (scapula bone) of the bull should be loose and movable to the point of seeing the blade rotate above the spine bone by as much as 1/2 inch as he walks. If the spine bone rises above the shoulder blades when the bull is standing it would be classified as a low fertility bull. If you lay a straight edge across the bull's shoulders the straight edge should touch the two shoulder blades and the spine bone at the same time. The same is true for cows.
- It is mandatory that both testicles are exactly the same size, shape, length and degree of firmness with a well-developed epididymis at the bottom of the testicles. The epididymis should be the same firmness as the testicles. Smaller bulls tend to have smaller scrotal circumferences than big bulls.
- A good dairy cow has strong legs and good hooves. Preferably, bulls breeding good hooves and strong legs should be used in a dairy herd.

It is also advisable that all bulls on the farm must be castrated or kept away from heifers. Remember, you may have a good bull, but unless other bulls in the farm are not castrated, then your breeding plan might be messed up. Prevent outside bulls from coming onto your farm and mating with your cows.

Disadvantages of using bulls

Farmers should know that infected home-bred bulls can transmit diseases e.g. brucellosis, TB and other infections to your dairy herd. AI semen is preferable because it is screened against these diseases and other qualities. Bulls should never be mixed with dairy cows.

Fish farming requires knowledge and passion

Many farmers who have gone into fish farming without training have ended up with empty ponds.

Peter Kamau

Samuel Mwangi, a farmer from Ndun-dori location in Nakuru North is disappointed. Together with fellow farmers from his village, they watched a TV programme on fish farming aired by one of the local TV stations three years ago. The programme got them thinking about how they could dig fishponds and start fish farming and make money like the farmer they had watched in the TV programme. Nakuru town, with a big population would be their main market for fish.

Farmers used poor material

With abundant water in the village, they decided to dig fishponds for each of the members in turns. They named the group the Ten Fish Farmers Self Help Group. The farmers went to Naivasha town and bought used polythene sheetings, used them to line the ponds, and stocked 1000 fish fingerlings in each.

Mwangi says everything went on well until they started noticing something unusual. "We realised that the fish had not grown to market size after maturity. My neighbours had more serious problems: Their ponds could not hold water for long, because as they walked into the ponds to get fish, the polythene sheeting would tear off, causing water seepage."

Maina Kamau, another farmer in Nyahururu says he made a fishpond and bought fingerlings from a farmer in Rongai, Nakuru, but they all turned out to be tadpoles that grew into frogs. They croaked the whole night making it difficult for him to sleep. He has drained the pond and he has given up on fish farming altogether.

Successful fish farmers

Most farmers introduced into fish farming as part of the government funded Economic Stimulus Programme (ESP) four years ago have managed to go into fish farming and are making good profit in fish sales. The programme, which was allocated over Ksh 4.5 billion between 2009 and 2011 managed to put over 300 fishponds in 160 constituencies in the country by June 2011. The aim of the project was to produce food, create employment and generate income, particularly for the unemployed Kenyan's and the associated households, through sustainable fish farming enterprises.

... inexperienced farmers failed

Following the launch of the project, hundreds of farmers who were not part of the project dug their own fishponds and stocked them with fish. Politicians came in and demanded that fish farms be established in particular areas of their constituencies - regardless of whether



the sites were suitable for fish farming. Due to lack of knowledge on how to construct fishponds, selection of the right type and size of fish to stock including general management, a majority of farmers who set up such fish farms without consulting fish farming experts, failed to turn them into successful enterprises. As a result, some of the farmers have abandoned fish farming altogether.

Farmers need skills

Fish farming can become a good source of additional income for farmers if it is done in the right way. It requires a lot of technical knowledge, which farmers can only acquire through proper training and correct information from the right sources before they can start. The best source of fish farming information is from fish farming experts in the Ministry of Fisheries Development. Below we give farmers some of the information and skills they need to have before going into the enterprise.

Water: Availability of enough quantity of clean water is one of the most important factors in fish production. Water flowing by gravity is cheaper for a fish farmer. The water should be available throughout the year. It must be free from pollution by pesticides and related chemicals.

Type of fish: The type of fish to be produced depends on the market, climate and whether it is actually possible to grow it in fish farms. Tilapia is one of the most common type of fish that the market in Kenya prefers. Other types of fish include trout, common carp and some ornamental fish like olanda, koi carp and goldfish.

Climate: Different types of fish do well in different climatic zones. For example, tilapia and African catfish require warm water of more than 25 °C; their growth is very slow in altitudes of more than 1600

If you stock monosex fingerlings (male or female only), you get bigger fish (above). Mixed sex fingerlings produce small-sized fish (below) due to overpopulation.

Photos Peter Njuguna



metres above sea level because water is cold at that altitude. The average temperature for best performance of these types of fish is 28° C. Such temperatures are found in lowland areas. In areas with lower temperatures, ponds with larger surface area can help keep the water warmer.

Trout fish require cold temperatures of less than 18°C for proper growth and below 10°C for hatchery production. Such temperatures are common in higher altitude areas. The water must be adequate, clean and fast flowing.

Production site: The production site should be in a region suitable for a fish farm. The site should be well drained and protected from floods. The soils should be suitable for construction of a pond and the proposed production system. The fishponds require a large land area with a gentle slope as compared to fish tanks and raceways. It will be more cost effective if the land does not cost much. A large pond area allows for a greater natural production. For tilapia production one hectare of pond space can produce 8 to 10 tonnes of fish every year if the pond is well managed.

Cut costs by using mud to make fish ponds

If well designed and constructed, earthen fishponds can last longer than those made using plastic liners.

The Organic Farmer

One of the persistent problems facing fish farmers is how to stop the loss of water from their fishponds (see page 1). Farmers who cannot afford to buy UV treated Low Density Polyethylene (LDPE) with a thickness of 1/2 mm can overcome this problem if they adopt an alternative method of making earthen ponds. They can hold water without the use of liners. This method needs some experience and labour, but if properly done, the mud keeps the water in the pond. Here we give a step-by-step instructions but farmers must consult fisheries experts before making their fish ponds.

You need

1. Red soil without stones (murrum)
2. Agricultural lime
3. Water
4. Fishpond area measuring 300 m²
5. Labour

Process

Since different farmers may want different sizes of fish ponds we recommend the following measurements:

- Mix the lime with red soil at the rate of 1: 20
- Mix the lime and red soil thoroughly, then add water to make a fine, sticky and thick paste similar to the one used to make mud houses.
- Stick the paste on the surface, the bottom and the sides of the pond. The paste should be 4 inches in thickness.
- To smoothen the surface of the pond,



Mixing soil with lime (left). Preparing mud for plastering (right).

Photos: ACORD



Mud is spread (left), a thin mud paste is smeared and water added to avoid cracking (right).

mix the red soil and the agricultural lime and water into a thin paste at a ratio of 1:5, (again a fisheries expert may help here) and smear it over the surface to eliminate all spaces that might have been left during the initial plastering.

- Ensure the surface does not dry by continuously sprinkling with water as you smoothen the surface of the pond.

- Make sure you do not step on the completed area of the pond as you work.
- Fill the pond with water to the brim immediately you finish plastering and keep on monitoring the water level.

NOTE: Agricultural lime is used because it has double advantages of making the soil sticky, beside making the pond alkaline and more conducive to fish.

Important tips on how to manage fish

The fingerlings should be sourced from a reputable breeder. Many farmers stock mixed sex tilapia, but this may not be the best because they normally breed early and very fast and overpopulate the pond. The fish cannot grow to the suitable market size because of overcrowding. Fish that is small in size cannot attract a good market. The market size in Kenya is normally above 200 g.

Feeding is important

Farmers who want to avoid this problem of overcrowding are advised to stock monosex (males only) Tilapia fingerlings. These grow to good market weight fast because they cannot breed in ponds and are harvested all at the same time. For instance if a farmer stocks 1000 fingerlings in a 300 m² fishpond, and feed them well, they will normally mature after the 6th to 10th month depending on the water temperature and management. The market price ranges from between Ksh 250 to 300 per kilo, therefore a farmer can easily make an income of Ksh. 90,000 in a year.

In fish pond farming, some protein comes from the algae in the fishpond (resulting from proper pond water fertilization) and the rest from external feeding with supplementary feed concentrates with about 26% crude protein.

For most fish, feeding twice a day is sufficient – at about 10 am and 4 pm. If it is done earlier than 10 am in the morning, the water is a bit cold and oxygen levels are low so this is not a good time to feed the fish.

If you feed at the same time and at the same place in the pond every day, the fish will learn to come for the feed.

Challenges

- Poor handling of fish is a major cause of both bacterial and parasitic infections.
- Transporting of fingerlings/fry (very young fish) from one place to

another without proper care can spread diseases and parasites.

- Over crowding of fish in a pond.
- Pollution due to high levels of ammonia parasites causes fish deaths in large numbers. Human faeces may be a source of gut parasites especially for common carp.
- Damage of fish by predators lead to secondary bacterial or fungi infections. The predators especially birds and mammals play an important role in life cycles of certain parasites.

Approx month after stocking	Assumed size of fish	Amount of wheat bran per day	Pelleted diet (26% protein)
1-2	5-20 g	1 g/fish	1 g/fish
2-3	20-50 g	1-3 g/fish	1-2 g/fish
3-5	50-100 g	3 g/fish	2 g/fish
5-8	100-200 g	4 g/fish	3 g/fish
8 or more	Over 200 g	5 g/fish	3-4 g/fish

Feeding rates for tilapia or tilapia/clarias polyculture.

Smart decision by banana farmers pays off

Fed-up with middlemen, a farmers' group now takes their bananas to the market, boosting their income.

The Organic Farmer

After a long suffering from the middlemen, who used to exploit them, many banana farmers in Kirinyaga have decided to sell their products collectively as one strategy of eliminating middlemen. A good example of the encouraging initiative is the Koroma Fresh Growers Self Help Group. It was formed in 2003 with 120 Members; the main target was to invest in banana production. As the membership increased, they opted to split the group into two in order to have a manageable unit.

Tissue culture bananas

In 2009, the Catholic Diocese of



A member carries a banana bunch

Murang'a introduced tissue culture bananas to the group to increase their production and attain both quality and quantity. By then, the group planted 7,000 seedlings in the first phase and 20,000 in the second phase, totaling to 27,000 plantlets within a period of one year. Today the group has a total of over 50,000 banana plants that bring a good yield.

By the time they started harvesting, the group encountered some frustration from middlemen who used to buy their produce at a throw away price; for instance, a bunch of bananas weighing 60 kilogram was marketed at Ksh 200 to Ksh 300, but they did not have any other option. Today, the same bunch is being sold at Ksh 1,020.

Learning from other groups

The decision to sell directly to the market was reached after several visits to successful groups in Muranga and Meru. The Koroma Fresh Growers Self Help Group identified one collection centre offered by one of the members. Before they made that decision, they identified a potential buyer and negotiated the price which was then Ksh 15/kg. Currently, farmers are selling banana bunches at Ksh 17/kg.

Banana sales take place twice a month. The market is open for non-members from the area. Unlike middlemen who would estimate the weight, the banana



Member display bananas during a market day

are properly weighed using weighing scales, the payment is done immediately after the weighing exercise is concluded. Members and non-members are deducted a certain amount which is used to cater for the office operating costs at 50 cents/kg of weighed banana for members and Ksh 1/kg of banana for non-members; each farmer earns between Ksh 20,000 to Ksh 100,000 per month; this regular income has improved the livelihood of the farmers tremendously.

Now, with the backing of the i-TOF Central field officer, Peter Murage, the Koroma Fresh Growers Self Help Group is eager to learn more about compost making in order to get high and good quality banana yields. The members now practise mulching, value addition as well as poultry keeping as part of diversification.

Corrections on our heifer article TOF Nr.90, November 2012

In our article on heifer feed in our November 2012 issue (Nr. 90), we erroneously gave the feeding programme for heifers in Europe; we have since learnt that most of our local breeds are smaller in size than those in Europe and America. The correct feeding for local heifers is given in the table below.

Other corrections are as follows:

•If a farmer is feeding fodder shrubs such as leucaena, sesbania, gliricidia or legumes such as lucerne and desmodium, then they would require an additional dairy meal quantity of 2 kg per cow per day.

•If a farmer has put the heifers on grass forage, then they would require supplementation with concentrates at the rate of 1 % of the their body weight per day (1-3 kg depending on weight)

•Farmers can give good quality forage as recommended above and can add 6 kgs per cow per day fresh of fodder shrubs such as calliandra, leucaena or legumes such as desmodium, purple vetch etc. A farmer should not use fodder shrubs and legumes to replace dairy meal or any other component of the cow's diet, rather it is viewed as an additional supplement. This will provide crude protein

Body weight	Dry matter intake (kg)	Crude protein (%)	Net energy (Mca/day)
100	3.0	12.4	0.47
150	4.0	11.0	0.63
200	5.0	10.3	0.79
250	5.9	9.8	0.93
300	6.7	9.5	1.07

Daily nutrient requirements (Dry Matter basis) of local small breeds (mature weight = 450 kg).

Source: Dr Ben Lukuyu



and phosphorus (P) for optimum reproductive development (fertility).

Steaming-up: It is recommended that farmers give 4 kg of concentrates per day (2 in the morning and 2 in the afternoon)

•Mineral supplements are important for growing heifers as they need calcium (Ca)

•As far as feeding is concerned we consider large breeds to be pure-bred cows (Friesians, Guernsey's, Jerseys) Due to their genetic make-up, it is important for them to be given more nutrients as they have higher nutrient requirements. There is a very thin line in terms of feeding between these breeds. Small (bodied) breeds (cross-breeds of the above breeds) are usually improved cross-bred cows. Their genetic make-up can cope with lower nutrition levels.

Increase cow's milk yield with good fodder

My cow feeds well but does not give good returns in milk production, what could be the problem?

What exactly does the cow require to produce enough milk?

Milk yields depend on many factors. Check your management according to the following list and improve it where necessary.

Feed quality: Dairy cows need high quality feeds, which provide nutrients in the required proportion. Grass and plant material that is grazed or cut after flowering, hay prepared from such material, and crop residues are poor in protein and minerals. A dairy cow cannot produce a lot of milk from them.

Feed quantity: A dairy cow of 500 kg needs up to 75 kg fresh quality green matter every day. For her own body maintenance, she needs around 30 kg of it, and with every additional 3 kg she can produce a liter of milk.

Dairy meals and concentrates: They are offered to cows that produce more than 15 litres of milk, and for cows that are fed on low quality feeds. However, it is not advisable to feed more than 6 kg of dairy meals per animal and per day as this can disturb the digestive system of a cow.

Supplements: Mineral licks need to be offered to all cows as green fodder

does not contain them in sufficient amounts.

Water: A cow needs around 40 litres of water for her own body, and for every liter of milk around 1.5 litres in addition. If fed on dry feeds like hay, even more water is required.

Lactation stage: Milk yield declines steadily and naturally around 3 months after giving birth.

Health status: Diseases or parasite infestation will affect milk yields. In this case, a veterinarian should do a check-up.

Breed: Cross-bred animals can be unpredictable concerning milk yield. If you think your management is excellent yet the cow does not produce more than 10 litres even in the first three months after giving birth, use artificial insemination and take good care of female calves, providing 3 to 4 litres of milk every day during the first 2 to 3 months. This will almost certainly



improve the milk yield of the daughters of your cow.

Concrete is easy to clean

Why should I build my dairy house with a floor that is made of concrete?

Concrete does not absorb liquids and can be cleaned easily and kept dry, which prevents foot diseases and other problems connected with dirty and muddy housing.

The roughness of concrete also helps to keep the hooves short and reduces sliding and injuries.

The right metals for food storage

From which type of iron sheet is a metal silo for grain storage made?

The best type of metal for food storage is that made of either stainless steel or aluminium. The two metals do not corrode or affect the food stored in them.

Aluminium metal has some corrosion but this is in small quantities that do not affect the food items stored in aluminium containers. However aluminium is low in strength, it wears and tears easily and therefore cannot last long.

Stainless steel is strong and is less reactive and stays longer. But the only disadvantage for stainless steel is that it is too expensive such that many people cannot afford it.

Can I use an ordinary iron sheet for making my own metal silo for grain storage? If not why?

No, the corrosion rate for iron sheets is too high and it may not last long. Iron sheet material is subject to rust, which can affect the quality of food stored in it.



Making feed ration for your pigs

How can I come up with a simple formulated feed ration for pigs?

A ration refers to feed. It is a combination of different feedstuffs (ingredients) indicating how much of each ingredient has been used and the nutritive value it is contributing. A complete ration therefore contains all the nutrients needed in proper proportions. Thus, the quality of a ration will depend on the quality of the ingredients used.

In any ration every ingredient used makes up a certain percentage of the mixture. The total mixture will add up to 100%. What determines the contribution of nutrients by a certain ingredients in a ration is its percentage inclusion and concentration of the nutrients.

Farmer rations

Own farm rations can help to reduce the cost of feeding the pigs considerably, however feed mixing must be done thoroughly and analysis of samples may

become necessary from time to time. Comfrey and velvet beans can be used to supplement purchased feed as follows:

- Comfrey 20%, velvet bean 20%, cereals 60%

Pre-conditioning velvet beans

- Soak the beans in cold water and leave it overnight
- Clean the beans in clean water the following day
- Boil the beans for 1 hour
- Rinse in cold water
- Dry in the sun
- Pound in mortar or grinding mill
- Mix 25% velvet bean powder with 75% cereal.

Alternative feed preparation:

- Commercial pig feed 20%, grown fodder/ swill 80%. This reduces up to 20% of feed costs.

NOTE: In one of the next issues, we will give farmers additional feed formulations for pigs.

Farmers get income from stevia

TOF - Quite a number of our readers want to know where they can get stevia seedlings. The species *Stevia rebaudiana*, a South American herb and used as a natural sweetener for centuries, is widely grown for its sweet leaves. Stevia has zero calories and is 25-30 times sweeter than sugar.

Peter Murage, the TOF field officer in Gatuto/Kagio, talked with Joseph Oparo, who is the field officer of Natural World Limited, Kirinyaga region. This private company gives out stevia seedlings to farmers, especially the ones who have formed groups.

They collect the dried stevia leaves and pay the farmers Ksh 150 per kg dried leaves. Natural World Ltd. operates from Juja where they have nursery for stevia seedlings; they sell the leaves to a factory, which produces stevia sweetener for people suffering from diabetes and the healthy conscious consumers.

Farmers get the seedlings free of charge after signing a contract with Natural World Ltd. The company is considering selling the seedlings due to the



increasing number of farmers who want to plant stevia. The price to be charged is not yet decided. Farmers who need more information can contact Joseph Oparo on 0720 079 737.

For further enquiries contact:

NECOFA-Kenya,
Neema Plaza, Opposite Stadium
P.O. Box 819 Molo Kenya
Postal Code: 20106
TEL. +254 (0)51 721048
MOBILE: +254 715 639 223

You can also get useful information at www.steviakenya.com

Agricultural Finance Corporation,
Development House, Moi Avenue Nairobi,
Tel: +254-020-317199/ 3272000
Fax: +254-2219390 Mobile: +254-725-576
869/+254-725-580 007/+254-724-253
521/22 Email: info@agrifinance.org
Website: www.agrifinance.org

Peacock chicks wanted: I am interested in buying a pair of peacock chicks. Brian Sonko, Eden Poultry Farm, Mombasa 0723 229 636

Land for sale: Half an acre of land for sale off Nyeri-Nyahururu road, Kieni West, Kiawara District Headquarters. Amenities available include water, electricity, access road, approx 1.5 km from the highway. Price Ksh 300,000. Contact Julius Kanyoni on nyumbaitu@yahoo.com.

Drip irrigation Kits: We have drip irrigation kits for sale. Paul Nyuny Njuguna. Call 0729 247 250 Nairobi.

Passion fruits for sale: I have passion fruits for sale. I can supply 120 kg per week. Joan Cherono 0710 500 587.

Tree seedlings for sale: I sell moringa, pawpaw and seedlings from all other types of trees. Moringa powder is also available. Call Joseph Kathibe Ndathi on 0713 777 741

Piglets for sale: I have 20 piglets for sale. Moses Gacanja 0722 281 127.

Eggs and chicks for sale: I have improved Indigenous chickens eggs. An egg goes for Ksh 25 and a chick for Ksh 90. Clement Mwangi 0720 347 187, website: clemchicken.kbo.co.ke.

Indigenous chicks and incubators: We sell day-old indigenous chicks at Ksh 100, manual and automatic incubators from Ksh 20,000. Walchick 0724 669 095, 0786 669 095.

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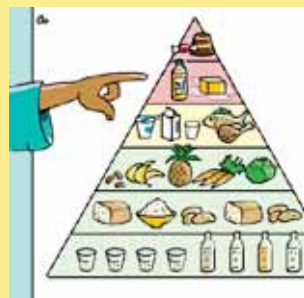
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Even if you have cravings, avoid unhealthy fast food. Balanced diet will always give your body proper nutrients.



Drink enough water, eat lots of fruits and vegetables. Make sure that you eat enough carbohydrate like bread, rice or potatoes.



Lead a healthy lifestyle. Avoid alcoholic drinks or smoking.



Take medicine that has been prescribed by a doctor or a health worker.



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