



Farmers from Nairobi and the Central region learn how to make compost from biogas residue during an education tour of the Real Impact's Kichozi farm in Thika last month. The farm uses biological and environmentally friendly methods to control pests and other plant diseases. During the visit organized by Pelum Nairobi and Central Zone. The group of 70 farmers petitioned the government not to allow GMOs into the country.

Dear farmers,

The beginning of any new year comes with many challenges for farmers, which can be overwhelming. It is also the period when farmers are expected to prepare land for the new season and meet various financial commitments such as paying fees for their school or college-going children. With proper planning, however, it is possible to overcome the problems, plant on time and manage the crop in the best possible way in order to get a good harvest at the end of the season.

It is our hope that farmers will overcome the challenges and be able to produce enough food for themselves and for the country as they have always done even in the most difficult times in the past. The extended rains that continued until December last year have greatly improved the food security situation in the country. They have also saved us the possibility of food shortage that is common in some parts of the country every year. With proper food storage, farmers are assured of sufficient food stocks for their families and for sale.

With this issue of TOF we will have produced 128 issues since we started the magazine back in April 2005. Throughout this period, TOF has provided farmers with a lot of information on organic farming and sustainable agriculture technologies and practices, which if practiced can change agriculture and improve many farmers' livelihoods. Information is power; many farmers who have read and implemented the technologies published in this magazine have made great achievements and boosted their income. They have learnt to make the best use of the resources in their farms to produce nutritious and adequate food and they now live in a healthy environment.

Despite the challenges facing agriculture like climate change and increased subdivision of farmlands into unproductive sizes, farmers need to adopt environmental friendly farming methods and even diversify their activities to improve food production and farm income. This is why it is important for farmers to plan carefully and adopt the most cost effective methods in crop and animal production. This way, they will remain competitive in the market.

Kenya needs to improve capacity to regulate GMOs

TOF - No debate has created great controversy in the Kenyan agricultural sector as that of Genetically Modified Organisms (GMOs). As you read this article, the Kenya National Biosafety Authority (NBA) is in the process of deciding whether or not GMOs should be allowed into the country. Whatever decision the Authority makes, it will have great impact on food safety and the future of agriculture in Kenya.. The reason for the intensive debate is due



Improve capacity to vet GMOs

Even as we oppose the introduction of GMOs into the country, It is important for NBA and other agencies concerned with food safety to ensure that GMO materials being brought into the country are properly assessed by qualified and independent scientists to ensure they do not contaminate our local seed varieties among other side effects, which have already been identified in countries where GMOs have been introduced.

Regulatory authorities in some developed countries such as the European Union's Food Safety Authority (EFSA), have rejected some of the GMOs such as the *Bt* maize that is due for release in Kenya (a prototype of MON 810 *Bt* maize). This maize variety was tested and rejected in all the European Union countries (Directive 2001/18/EC and regulation EC No.1829/2003).

Kenya's regulatory bodies including NBA need to vet all GMO materials intended for introduction into the country. This is to protect its citizens from agricultural input that could negatively affect our health for generations to come.

to the fact that the stakes in this debate are very high.

The principles of organic farming and ecologically sustainable agriculture recommend that farmers should produce safe food that promotes human, animal and environmental health. Any agricultural method that interferes with nature and the natural order of things is not sustainable.

Studies have established that GMOs have the potential to cause short and long term side effects on consumers and the environment. But some GMO proponents have dismissed these concerns and launched massive propaganda campaigns to persuade governments especially in developing countries to adopt the GMOs.

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Take measures to reduce post harvest losses

In Africa farmers lose close to 40 per cent of grains after harvest due to pests and poor storage. However, farmers can reduce this loss by proper drying and use of natural storage methods.

Joyce Wambui | Many farmers lose a large portion of their yields after harvesting because of poor handling and storage practices. It is estimated that farmers in Africa lose 30 to 40 per cent of their crops after harvest due to pests, fungal infections (mould), weather damage, during transportation, drying, threshing and poor storage methods.

In the past, farmers were satisfied with production at a subsistence level, producing only enough food for their families and for seed. But these days, most farmers produce enough for their families and some surplus for sale. The extra income helps improve farmers' standards of living and meet other needs.

The income one can make from farming not only depends on the quantity of produce sold but also on its quality. Hence, it is important that farmers keep their crops such as grains, in the best possible condition until they are sold.

Pests and diseases are the biggest contributors of post



Photo: TOF

Late and poor storage methods cause great loss of maize after harvest.

harvest losses and many who grow cereals have problems storing their maize in the right way. This presents a challenge for organic farmers, who do not use pesticides on their crops.

Pests and disease-causing moulds can be introduced to the granary if the grain or store is infested or if there is dampness in the store. It is therefore important to understand how to handle the produce so that it has minimal chances of disease and pest attack.

Storage pests

The length of time grains remain in store affects its quality. Even though farmers can get better returns after withholding their cereals like maize and beans until market prices are good,

storage for long periods makes it easier for the crops to be attacked by pests and diseases. Such pests include the Larger Grain Borer (LGB), flour beetles, weevils, rats and mice, which eat some of the stored produce and spoil more with droppings, urine and hairs. They are also carriers of disease, including plague, rat-bite fever and Lassa fever. Some species of birds can consume large amounts of grain in the store.

Natural methods for pests control

There are various natural ways of reducing pest attack during storage. Most of these are traditional methods which have been effective for many years.

Adding ashes to the grain

The mixing of ash with threshed grain that is dried well is a popular traditional method of insect control. However, to be effective, large quantities should be added to grain, which should then be shaken or stirred to ensure it is well mixed.

The ashes form a layer over the surface of the grains, which prevents insect attack. It also fills the spaces between grains and acts as a physical barrier, which prevents insect movement and reproduction. Before the grain is used, the ash or dust

must be removed by sieving, winnowing or washing.

Treatment with vegetable oils

Some vegetable oils (like groundnuts, coconut, castor, cotton seed and palm) when mixed with grains provide some degree of protection against insect attack. However, they need to be applied for several months for maximum protection. Except when applied to high value commodities or for small quantities of seed, these oils are relatively expensive if used to protect grains. Although such treatment can be very effective, grain coated with oil is awkward to handle and may be difficult to sell.

Smoking

Maize cobs and whole cereals and pulses can be stored on platforms or in the loft (roof) of the house above a fire. The smoke and heat from the fire may kill insects or drive them out of the grain. The method is not always effective. Some pests such as the Larger Grain Borer (LGB) or *Osama* may not be killed.

Adding dried or fresh plants

A traditional method of grain protection is to mix dried or

Tips for maize storage

- Harvest the maize on time to reduce chances of infestation with insects or moulds.
- After harvesting, it is important to sort out the maize. Remove all rotten maize including the cobs that show signs of weevil infestation, mould or damage by birds. Clean the maize store thoroughly; remove any grains, cobwebs or any material in the store that can harbour pests.
- Maize on the cob should not be stored for long because it is

prone to pest damage, shell it as soon as it dries.

- After shelling, dry the maize in the sun for three to four days to bring the moisture content to around 13.5 to 12 percent which is ideal for storage
- Pack the maize in bags (gunny or PICS bag) and seal well.

Additional information from agricultural and food engineering training and resource materials - on-farm post-harvest management of food grains-by Peter Golob-FAO consultant.

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 and Biovision Foundation.

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Publisher *icipe*-African Insect Science for Food and Health, P.O. Box 30772, 00100 Nairobi, KENYA, +254 20 863 20 00; icipe@icipe.org; www.icipe.org

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Use dry season to prepare fodder planting material

It is not always easy for farmers to get enough cuttings or rootstocks for planting fodder in large portions of land. One way of ensuring you have enough planting material is to establish a nursery, which, serves as a multiplication area. This can be done about 2-3 months before the rains.

Josephat Mulindo | The months of January to March every year are considered dry months in most parts of Kenya. This is according to traditional weather patterns, although there are occasional changes like the just ended El Nino rains. During these dry months crop farmers usually do not have much to do in the farms apart from preparing for the long rains that's usually expected in March and April. For dairy and beef farmers, the dry season comes with fodder challenges; lack of fodder and reducing nutrient content of grasses in the field.

One way of dealing with these challenges is using the dry season to rapidly multiply and prepare planting materials for fodder. Many grasses used in dairy farming are propagated vegetatively using root splits, stem cuttings and stolons (long stems) or rhizomes. These include Napier grass, *Panicum maximum* (Guinea grass), *Brachiaria brizantha* Cv. *Mulato*, and legumes like *Desmodium*. The type of materials to be used for establishment will depend on the grass species, availability of planting material and the method to be used for the establishment.

The following vegetative parts can be used:

Stems: Napier grass is commonly planted using stem cuttings. Cut the whole plant 15-20 cm from the ground. The cut stems are planted with two nodes underground and one node above the ground and at an angle of 45.°

Rootstocks: Part or whole of the parent plant root stock is dug out and split into tufts of three to four tillers and planted. The aim here is to make sure the tillers have roots attached for ease of establishment.

Stolons (long stems): Grasses like *Brachiaria brizantha* have stolons (long stems). While looking for planting material for



Planting cuttings can be propagated in nurseries and then transferred to the field when the rains come.

these grasses, cut stems lying on the ground. These parts of the grass may already have roots, which makes easier establishment. Generally, leafy parts of the plant are not suitable for propagation. It is the stems that produce roots.

Vegetative propagation makes it possible for the planting material to be established in the nursery before being transferred to the field. By establishing the planting material in the nursery first, it enables the farmer to have more planting material within a short time. The nursery bed provides an environment that enables the planted vegetative material to develop roots and shoots. This includes availability of water, which is not available in the dry fields as the farmer waters the planting material directly in the nursery bed.

The nursery, which serves as a multiplication area can be established about 2-3 months before the start of the rains, during which the planting material will be needed. The area required for the nursery establishment will depend on the size of land to be planted. A 250 square-metre nursery should provide enough planting material for one acre of land.

Setting up a *Brachiaria* nursery

Identify and fence off the site where the nursery will be established. Make sure it is close to a water source to make watering of the nursery easy. Plough the area and mix, top loam soil, cow dung and sand in the ration 10:5:3 wheel barrows respectively.

The mixture can also be potted in polythene bags and grass cuttings with viable roots and buds planted. In places which are hot and have high

temperatures, a shed can be constructed to reduce the loss of water through evaporation and transpiration.

Water the nursery or potted plants twice in a day (morning and evening). Sprouting of the cutting starts within 3 weeks and in 10 weeks time they are ready for planting in the main field.

Benefits of preparing the fodder nursery

The advantage for the farmer is that by the time the rains resume from early April, the planting material will have established roots and ready to be planted in the field. For community organizations, this method can help them solve the challenge of giving fodder planting material to their farmers. Through this method, a lot of planting material can be prepared in a small area and given to farmers immediately the rains start. As such, less labour is needed to prepare large numbers of seedlings in the nursery compared to the open field. Also, managing planting material in the nursery is easier.

Boma Rhodes is a popular pasture grass

Rhodes grass is very important pasture. It produce large quantities of feed for grazing livestock and making hay or silage. All varieties of these, grass are edible and are readily eaten by livestock, goats and camels; even when very mature when the grass is coarse and its quality low.

A good establishment of these pasture grasses will ensure consistent high milk production around the year especially if the pasture is well-managed. Pasture can be established anywhere as long as there is adequate water and the seed quality is good. Boma Rhodes is the

most common in Kenya.

How to manage Boma Rhodes grass

Land preparation: Plough the land towards the end of the rainy season for previously cropped land. Plough again during the dry season and harrow to control the weeds. On virgin land, it is advisable to plough 3 times and harrow twice in order to obtain a good seed bed.

Sowing: Early sowing at the onset of the rainy season is important. In areas with two rainy seasons, sowing is preferably done during the short rains to eliminate annual weeds. Then the seed is sown on a fine, weed-free seedbed. It is advisable to plant pasture on land which has been cropped for two or more years. Seeds should be sown close to the surface in order to get in contact with moist soil so as to promote quick germination.

Planting: Grass seeds should not be buried deeply into the soil as they may not be strong enough to push through the heavy topsoil. The seeds can either be broadcast or drilled in rows of 20-30 cm apart. Mix the seeds with sawdust, rough sand or phosphate fertilizer for even distribution. If mixed with fertilizer, planting should be done immediately to prevent scorching of the seed by the fertilizer.

Small-scale farmers can do hand sowing in smaller pieces of land where close supervision is possible. For large-scale farms, use of wheat planters is recommended for effective sowing. Immediately after sowing, the seedbed should be compacted to increase germination by improving contact with the soil. This can be done by use of tree branches or even trampling by feet in small plots.

Know more about Foot Pad Dermatitis in poultry

Foot Pad Dermatitis is a common problem of chicken reared under intensive housing systems but farmers ignore it due to lack of knowledge.

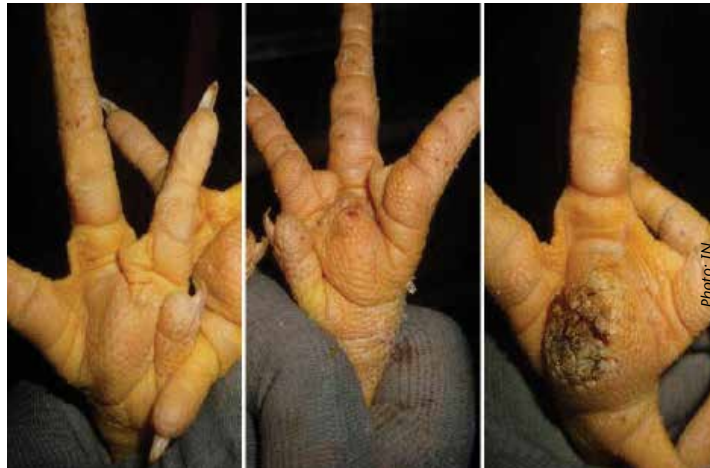
William Ayako | Foot Pad Dermatitis (FPD) also known as foot burn is a common condition amongst commercially reared turkey poults (young turkeys) and broilers. It is also known to affect layers and indigenous birds depending on the housing system. In indigenous chickens, cocks are the most affected due to their heavy weight. It causes the skin of the foot pad to become hard and scaly, often developing horn-like pegs with an abnormal look. The foot pad can become swollen, frequently splitting. In the centre of the lesion (wound) the epidermis (skin) separates, and is often totally necrotic (the wound becomes infected). The affected birds usually limp due to the painful effect of the lesions.

FPD affects farmers' income

If not treated, sick birds bring loss to farmers and decrease their income. FPD leads to reduced bird activity and movement. The birds do not eat normally, grow slower and are more susceptible to other disease infections. FPD dermatitis also leads to loss of business income due to reduced birds' meat quality – for example, wounds in the breast and legs result in throwing away of the affected parts.

What causes FPD?

Several factors contribute to



Symptoms of Foot Pad Dermatitis disease.

FPD. These include drinker design, diet composition, temperature and humidity in poultry house, litter type, litter quality and quantity; and health of the chicken's digestive system. In the absence of wet surrounding, FPD may not develop even though other factors may be present. However, it is known that wet litter (chicken beddings that have more than 30 percent moisture) is associated with increased incidence and severity of FPD in broiler and turkey houses.

Design of water drinkers

The design of your drinkers and how they are used affects the moisture content of the litter and the level of FPD incidence in the flock. Waterline height and water pressure must be managed correctly to prevent spillage that makes the floor wet. Water line height that is too low or pressure set too high will lead to wet floors. Line height that is too high or pressure set

too low will restrict water intake and thus feed intake and lower growth rate. Water quality is also important because water that contains lots of particles or has a film will cause nipples to leak, resulting in wet floors.

Diet and nutrition

In addition to wet litter, nutrition and diet may also contribute to FPD. Research findings have revealed that the incidence of FPD in young turkeys is directly caused by the high levels of soybean meal in the feed.

Temperature and humidity

Temperature, humidity and ventilation play an important role in keeping litter dry and reducing the incidence of FPD. While FPD can occur on relatively dry litter, it is usually associated with damp, wet and caked litter. Ventilation helps keep the litter dry. However, ventilation during cold season is especially challenging because

it is expensive to heat the house while ventilating with cold air from the outside.

Litter

The poultry litter (beddings) act like a big sponge that absorbs moisture in the chicken house. Proper ventilation removes excess moisture and prevents this "sponge" from becoming saturated and forming cakes. Litter that is at least 4 inches deep has a large absorption capacity, which helps to minimize the occurrence of FPD. The litter must always be kept dry.

Stocking density

Stocking density is basically the weight of livestock that is present on a given area at any time. High stocking density in broiler house is associated with high incidences of FPD.



How to control FPD

Good litter management is very important in the control and prevention of FPD. Proper ventilation to maintain the right temperature and humidity in the poultry house helps keep the litter dry.

It is important to remove and replace caked up litter from the poultry house. The litter quantity in the poultry house floor should be 4-6 inches thick. Practise good poultry feeding by providing the right amounts of proteins such as soya beans for good litter quality. The use of synthetic enzymes and amino acids is good for keeping the litter dry.

Overstocking of broilers in a house is not good - always ensure the right number of poultry is kept - floor space of 4-5 square feet per bird. Drinkers should be placed at the right height and a reasonable distance and distribution to avoid overcrowding of birds at the time of drinking- do not put the drinkers at one corner in a poultry house. Use the right type of drinkers to avoid water splashing on the litter and wetting the floor.



Hygiene in the poultry shed is the major cause of Foot Pad Dermatitis (FPD) disease.

Enjoy the health benefits of *sukumawiki* vegetables

Sukumawiki is traditionally viewed as a vegetable for the poor or struggling Kenyans. But did you know that *sukumawiki* is one of the top ten “superfoods” in the country? The vegetable has immense health benefits for consumers.

Dr Peter Mokaya | Most people consider *sukumawiki* (or kales) as a poor man’s food or a food of last resort. I have good news for you and especially, for organic farmers who consume organic *sukumawiki*.

Sukumawiki is one of the healthiest and most nutritious plant foods in existence. Kale is loaded with many beneficial compounds some of which have powerful medicinal properties. *Sukumawiki* is a member of the cabbage family like broccoli, cauliflower, and collard greens.

Health benefits

Sukumawiki has powerful antioxidants

Sukumawiki (kale) contains high amounts of a powerful antioxidant called quercetin, which is found in smaller quantities in other green leafy vegetables. It also contains high amounts of vitamin C, although most of this is destroyed when the *sukumawiki* is overcooked. The vegetable is also rich in flavonoids and poly-



Photo: TOF

phenols, all of which are powerful antioxidants.

Antioxidants are substances that help neutralize harmful free radicals in the body, which cause damage and result in degenerative diseases, including cancer, and speed up aging. Scientific studies have shown that antioxidants are anti-inflammatory, which means they prevent and reduce pain and swelling. They are also anti-viral and anti-depressants, and help in protect-

ing the heart and reducing blood pressure.

Did you know that a bowl of *sukumawiki* contains more vitamin C than an orange? Now you know.

It can bring down cholesterol

Sukumawiki can help lower cholesterol: The bad cholesterol, also known as LHD, can increase the risk of heart diseases. Consuming *sukumawiki*, ensures the bad cholesterol is lowered while increasing the good cholesterol, also known as HDL, and hence protects the heart from heart diseases and other blood vessel diseases (Cardiovascular diseases).

It is rich in vitamin K

Sukumawiki is a very rich source of Vitamin K. Vitamin K is an important nutrient: It is critical for blood clotting. The vegetable is one of the world’s best sources of vitamin K, with a single raw cup containing almost seven times the recommended daily amount.

The form of vitamin K in *Sukumawiki* is K1, which is different to vitamin K2 which is found in fermented soy and other fermented foods. K2 is also found in some animal products.

It has cancer fighting substances

Sukumawiki contains numerous cancer-fighting substances:

Cancer is a terrible disease, characterized by uncontrolled growth of cells. *Sukumawiki* is loaded with compounds that are believed to protect against cancer. These include, sulfaphane, a substance that has been shown to help fight the formation of cancer at the molecular level. Several recent studies have confirmed the association. Kale also contains indol-3-carbinol, another substance that is believed to help prevent cancer.

It is full of essential vitamins and minerals

Sukumawiki contains a very high content of Beta-Carotene: It is often claimed to be high in vitamin A, but this is actually not correct. Beta-carotene is an antioxidant that the body can convert to Vitamin A. For this reason, *sukumawiki* can be an effective way to increase your body’s levels of Vitamin A.

Sukumawiki is a good source of minerals, some of which many people are deficient in. It is a good, plant-based source of calcium, a nutrient that is very important for bone health and plays a role in many body functions. It is also a good source of magnesium - this may protect one from Type 2 diabetes and heart disease. *Sukumawiki* also contains some potassium, a mineral that helps maintain electrical functions in the body’s cells. Adequate potassium intake has been linked to reduced blood pressure and a lower risk of heart disease. One advantage that *sukumawiki* has over other leafy greens like spinach, is that it is low in oxalates, substances found in some plants that can prevent minerals from being absorbed. The availability of these minerals and nutrients makes *sukumawiki* a special food.

Sukumawiki is very low in calories and yet provides high amounts of fibre and water that make one feel full and prevents overeating. It also contains small amounts of protein and fibre. It therefore helps reduce weight.

To gain the full benefits of *sukumawiki*, consumers should avoid eating *sukumawiki* grown using chemicals. They should eat organic *sukumawiki*.

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

Sukumawiki is packed with essential nutrients

A single bowl of *sukumawiki* has the following nutrients:

A single cup of raw kale (about 67 grams or 2.4 ounces) contains the following:

- **Vitamin A:** 206% of the RDA (from beta-carotene).
- **Vitamin K:** 684% of the RDA.
- **Vitamin C:** 134% of the RDA.
- **Vitamin B6:** 9% of the RDA.
- **Manganese:** 26% of the RDA.
- **Calcium:** 9% of the RDA.
- **Copper:** 10% of the RDA.
- **Potassium:** 9% of the RDA.
- **Magnesium:** 6% of the RDA.

Also, it contains 3% or more of the RDA for Vitamin B1 (Thiamin), Vitamin B2 (Riboflavin), Vitamin B3 (Niacin), Iron and Phosphorus.

The above is with approximately 33 calories (which is good for your health), very little carbohydrates, some useful



Photo: JN

fiber and some protein. *Sukumawiki* contains very little fat, but a large portion of the fat in it is the omega-3 fatty acid, also called alpha linolenic acid (ALA).

To gain the full benefits of *sukumawiki*, consumers should avoid eating that grown using chemicals; free from pesticides and other harmful synthetic chemical products. Eat organic *sukumawiki* - It is safer and healthier when it grown organically.

TOF has lit my journey to success in dairy farming

Rtd Senior Chief Josiah Arende Ngoje and his wife Mary Auma Ngoje incur very small cost in producing feed for their dairy cattle. The couple has been reading TOF magazine for the last 10 years. Using innovative ways of collecting and preserving maize and rice stalks, they have succeeded in their dairy farming enterprise.

Caroline Kwamboka | Josiah Arende, a retired Senior Chief of Central Kamagambo location, in Migori County and former teacher, and his family started reading *The Organic Farmer (TOF)* after the magazine's editor Peter Kamau visited him. He was impressed by Arende's work and put him in his mailing list (his achievements were featured in *TOF Issue No. 09, January 2006*) when he had just won a soil and water conservation/dairy award. Then he started receiving 30 *TOF* copies, which he shared with farmers in his area. Now he receives 170 copies for distribution to schools, farmers groups and churches in parts of Migori.

Arende reads the magazine every month, especially articles covering dairy and poultry farming. Calf rearing is a passion



Rtd. Senior Chief Josiah Arende Ngoje with his wife Mary Auma next to their hay store at their farm in Rongo.

of his, which he learnt from *TOF*. He also learnt more on how to improve his cows' milk production using locally made feed. Feeding cows on dry matter is something he learnt after visiting dairy farmers in Kiambu county who were making hay and silage.

"We did not manage to do this well but we discovered that that the dry matter was very good and the animals liked it.

I learnt that green Napier grass has too much water and the cows do not drink much water after eating it. But on eating dry matter, the cow gets very thirsty and drinks a lot of water," he adds.

He has 3 cows, 1 Friesian (Airo)

and 2 Ayrshires (brown Millicent and Achieng) – but milks the Friesian, which yields 23 litres and the Ayrshire, 26 litres per day. On a typical day, he feeds the cows with dry fodder comprising maize stalks and rice straw adding some dried calliandra leaves, dried under a shade and crushed using an electric pulveriser. The cows are provided with the feed throughout the night to eat at their convenience.

After milking at around 4am, the cows are fed on green matter 24kg Boma Rhodes grass, which is cut for the three cows and a calf (called mwalimu-a Friesian/Ayrshire cross). The grass does not have a lot of water like Napier and so the cows drink a lot of water, which is always made available. The cows are allowed to rest until about 2pm when they are given more dry matter.

During milking time at 6pm, the cows are given about 2kg of dairy meal per day; however those producing less than 10 litres yield per day are not given dairy meal. But for any amount above 10 litres, about 1kg of dairy meal is given for every 10 litres but when the cows dry up (and are in-calf) they are not given any dairy meal to control the unborn calf's weight which creates problems when calving down. Arende sells the milk to Rongo Dairy at Ksh 42 per litre.

The secret behind Arende's success

"There is one secret that our communities do not take seriously – some of our men whose wives take care of their animals take all the money and leave their wives without any. Yet they are the ones who feed, water and milk the cows and later take it to the milk collection point. They get demoralized and will not take

care of the animals since there is no compensation for their labour. I would advise our men to let their wives handle the money and make decisions on the proceeds for example, like buying farm inputs and sharing the profits. This is why I have beautiful animals. My wives take care of them.

He says that proper feeding is very important in ensuring high milk production. This also helps the animals withstand diseases, especially tick-borne diseases which are very common in the region. The cows do not walk long distances to graze and therefore produce more milk.

"It doesn't help matters if you have the best breed of cattle... if you do not take care of them well, they will not give optimum production," he adds.

Arende sprays the animals every fortnight to get rid of ticks. They also deworm them every four months and ensures that they are vaccinated by vets against diseases like nagana that is caused by tsetse flies. Attending regular trainings and field days helps him and his family update their knowledge on dairy farming.

Cleanliness is a must

He says that cleanliness in the zero-grazing unit is extremely important. "The zero-grazing unit is the cows' bedroom should never be left with cow dung as this encourages bacteria that cause mastitis. Dishes and milking cans should be washed well and dried in the sun. The cows are regularly scrubbed with a detergent, brushed and sprayed with acaricides to control parasites like ticks," he advises.

Arende trains other farmers and advises that when a farmer wants to buy a dairy cow, they should buy directly from a well-known farmer, so that it is easy to follow up in case of any problems. He also advises farmers to go with a vet to confirm whether the animal is healthy or in-calf. "You should be careful especially if a farmer is selling a good looking cow, which has been high yielding. Go for heifers which are 3 to 4 months in calf to give it time to adjust to the new environment," he adds.

Final words: Do not expect quick results. Dairy farming is exciting but needs a lot of patience.

Rt. Chief Arende can be contacted on 0722-248 533 for training or supply of dairy calves. ■



...with his cows in the homestead.

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...reduce losses

fresh parts of plants with grains before storage. Leaves are added more frequently but roots and seeds may also be used. Leaves may be steeped in water to produce a dipping solution or spray. They may be dried and powdered and simply mixed with the grain, or they may be added fresh to sacks of grain.

The most common plants used to protect grain are neem, pepper and *Dalmanium Pyre-*

thrum (Tanacetum cinerariifolium) extracted from pyrethrum. These are also useful in the control of mosquitoes as a domestic fly spray. Cypress, eucalyptus leaves and *Lantana camara* leaves can also be used for this purpose. Dry the grain at approximately 80-90 °C for 3 hours or more to reduce the grain moisture to about 12-13%. Grain that has dried well snaps open when bitten.

Celery requires good care to grow well

I bought some celery seeds from a dealer in Nakuru and tried to plant them, but they did not germinate. Kindly let me know the right way to grow them.

Celery takes a long time to establish. This is why it is best to grow it during the long rains. The crop is difficult to grow in certain climatic conditions but after germination, celery can grow into crisp, delicious stalks if provided with the right conditions. Celery requires moist soils that have adequate amounts of nitrogen. If you plant at the beginning of the rains, and give the crop good care and attention, you will be successful.

Celery seeds are better planted in pots or germination trays indoors and later transplanted outdoors after germination. This method seems to work better than planting the seeds outdoors where germination is slow or difficult.

How to grow Celery

Climate: Celery grows best in moderate climatic conditions. In most parts of Kenya, it can be grown between April and August. Farmers should plant celery in a place with adequate sunlight or part shade. Avoid planting celery in windy areas because a strong wind will damage and dry out the plant - it is advisable to plant the crop in an area protected from winds.

Soils: Celery has shallow roots and requires adequate amount of water and nutrient during its entire growth phase. It grows best in well-drained organic soils. Add a half wheelbarrow of compost (well-rotted) per square metre and mix it with the soil. This will help improve drainage and retain soil moisture around the root zone. Spread a handful of organic fertilizer evenly. Earth-up the soil to improve drainage and water it well, then leave it for a week before planting the seedlings.

Planting: If growing celery from seeds, soak the seeds in warm water for 24 hours to improve germination. The celery seeds take 2-3 weeks to germinate. Do not bury the seeds; simply sprinkle them over the germination trays or pots and slightly press them into the soil surface. Water the seeds lightly and keep the soil moist until the seeds germinate. Then remove them gently and plant them individually in pots. Fertilize them using organic foliar feeds.



Photo: IN

At about 6 weeks, the celery seedlings will be big enough for transplanting into the main garden outside.

Spacing: Celery seedlings require a spacing of 20-25cm in a block.

Management: Keep celery well-watered to avoid moisture stress. Celery requires good nutrition to grow well. Apply organic foliar feeds every two weeks. Also, apply mulch to keep the soil moist at all times and help reduce weed competition for nutrients.



Photo: IN

Blanching: Dark-green celery is bitter in taste; to remove the bitter taste, celery stalks can be wrapped with thick newspapers around the stalks, leaving the leaves to stick out at the top. If wrapped this way, the stalks will be pale in colour and sweet to taste. Wrap the stalks for 2 to 3 weeks.

Harvesting: Celery bunches can be harvested whole after 14 weeks. You can also harvest individual stalks as you need them, leaving the rest to be harvested later.

How do I apply diatomite on my grains to protect them from pests?

Farmers across the world have used diatomite for decades to control pests. Diatomite is a powder made up of fossilised microscopic plants called diatoms. The fine powder contains millions of small particles which have very sharp edges. When diatomite's sharp edges come into contact with an insect or a parasite, their protective coating is pierced, causing the insect to dry out and die. This makes diatomite an excellent and natural pesticide that does not have side effects on consumers. Diatomite can be mixed with maize, wheat, barley, wheat, oats, beans, rice, sorghum at a rate of ½ kg (500g) for every 90kg of grain (mix thoroughly).

Diatomite is safe for both humans and animals. Cereals preserved with diatomite can be stored for up to 4 years or longer without damage as long as they are kept in a cool dry place that has no rats or mice. Grain that has been treated with diatomite has to be washed and dried before cooking or milling. The only limitation for farmers is that diatomite is not available in most agrovet shops in the country but farmers' groups can come together and purchase the powder and share among themselves.

Diatomite is sold by African Diatomite Industries in Gilgil town along the Nakuru-Nairobi road. Interested farmers can contact African Diatomite Industries (ADL) on 0723 760 402.

Farming Tip

Chop your hay to improve feed intake

During the dry season, farmers use hay as the main feed for their dairy cows. However, many farmers may not know the best way to feed hay to their animals in order to gain maximum benefit and nutrients from it. The practice in many farms is to give the animals unchopped hay. Although this method is convenient for the farmer, chopping or grinding hay improves the digestive process in a cow's stomach because it becomes easier for the bacteria responsible for digestion to colonise the feed and break it down faster and efficiently. This enables the

cow to eat more and therefore produce more milk.

Farmers should know that the quality of hay you feed your dairy or beef cow determines the feed



Photo: IN

intake. The percentage of voluntary feed intake of dairy cow is normally between 0 to 5 per cent - this means that if the feed quality is very poor the cow will not eat

it and therefore the intake will be very low. If the feed is of very good quality, a cow can take up to a maximum of 5 per cent of its body weight. For example, a cow weighing 450kg in weight should take 10kg of dry matter - therefore the feed intake for this will be 2.2 per cent. Fodder such as Napier grass should be mixed with hay or dry fodder in order to improve the feed intake. The addition of molasses also helps improve palatability. A bale of hay (size 90cm x 55cm x 48cm) weighs 25-30kg depending on the type of fodder you give your cows (this is enough to feed one dairy cow for two days).

TOF Rad answers your questions

TOFRadio is broadcast on Milele FM at 8:45pm on Sunday, and KBC on Thursday at 8:45pm. 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.

Earn more by adding value to groundnuts

Joyce Wambui Mahui | Groundnuts are the most popular nuts in Kenya. Kenyans love their groundnuts roasted, boiled or even ground to make stew. Many African communities believe that groundnut is the wonder drug for male potency probably due to its rich protein and edible oil content.

Farmers, even those living in areas with poor soils, appreciate the numerous benefits of growing groundnuts. The opportunities of growing groundnuts are immense. Groundnuts like many other members of the legume family are most often intercropped with maize and other cereals like sorghum and millet. Legumes are important in adding nitrogen to the soil.

Depending on different varieties, an acre of land can produce up to 12 bags of groundnuts which can take 3-4 months to harvest. A kilo of groundnuts is now retailing at a minimum of Ksh 200 in Nairobi, which means the crop is increasingly becoming an important source of income for farmers.

A farmer can make even more money at the farm by adding value to the groundnuts. There are many ways of adding value to groundnuts. In many areas of Western Kenya and Luo Nyanza, farmers sell roasted and boiled groundnuts in the market place. Groundnuts can also be mixed with sesame to make delicious biscuits. Another way of adding value to groundnuts is by making peanut butter, which is becoming a popular enterprise. Perhaps one of the reasons for its popularity is the



Peanut butter

fact that Kenyans are becoming more conscious of what they consume and are opting for healthier options to accompany their bread. Home-made peanut butter provides a healthier alter-



native to the commercial kind produced in factories, as homemade peanut butter is free from preservatives and other additives.

Sorting

To make peanut butter, first sort out the groundnuts. It is important not to use all the nuts from harvest. The reason for sorting is to get rid of any unwanted materials such as rotten nuts, insects, dirt or any other foreign material. Even though this is a difficult process, sorting guarantees good quality, fine texture and even nice taste of the peanut butter.

Roasting

After selection of the good quality nuts, they are then put on a pan for roasting. Make sure they are spread out to ensure even roasting of the nuts. Roasting removes any excess moisture and gives the nuts that additional crispy and crunchy flavor. By removing excess moisture, roasting enhances the shelf life of the peanut butter.

If desired, you can roast with vegetable oil for about 10 minutes until they are lightly covered in the oil. It is advisable to remove the pan from the fire and gently shake the groundnuts after every 2 minutes or so to prevent burning. The roasted nuts are then allowed to cool for about 10 minutes and the outer cover is removed.

Blending the groundnuts

For best results, start by blend-

ing the groundnuts when they are still warm for a minute or less then check the mixture. You do not have to use very complicated milling machines if you are serving a small market and even a simple blender can serve the purpose.

The mixture should begin to look more creamy and more



like that peanut butter you want after a minute of blending. Continue blending the mixture until it is to your desired consistency. At least 3 minutes of milling should be enough to have a good mixture. Caution: This peanut butter will never look as creamy as the kind from the shops. This is because it is less refined.

Peanuts have their own natural sugar and salt, then there is usually no need to add more. But if your customers prefer it with a little sweetener, try natural honey or brown sugar to create a distinct taste that will not only meet the standards of your customers but also enable



0717 551 129 / 0738 390 715

Hay: Boma Rhodes at Ksh 300 and barley hay at Ksh 200. Within Nairobi and Kiambu counties. Contact Peter on 0721 629 913.

Friesian and Ayrshire heifers: In Ol Kalao, Nyandarua. Contact 0732 744 284.

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you to compete favourably with others who are in the same business.

Place into an airtight container

Package the peanut butter in different sizes of jars ensuring they are tightly sealed. Using air tight containers ensures there is no contamination and the peanut butter maintains its freshness. Store in a refrigerator for a day or two so that it settles into peanut butter paste. Peanut butter can easily be stored for more than a month before sale. The shelf life of homemade peanut butter is shorter than commercial ones. ■