

# The Organic Farmer

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Photo: Courtesy

**The magic of cross-breeding:** Dairy cow No. 364 from Makitoshia farm in Malindi which is a cross-breed between Gir breed (50%), Brown Swiss (26%) and Jersey (16 %) has attained one of the highest milk production at 38 litres and has an average production of 22 litres per day. *Page 2, 3 and 6*

## Poverty hinders organic markets growth in EA

**Peter Kamau** | Established organics products outlets in East Africa say the main reason for low consumption of organic products are affordability and pricing over non-organic products. Increasing awareness of the health, nutritional value, taste, safety and freshness of the organic produce compared to products grown using chemicals

can help increase sales.

A consumer survey conducted in the five East African countries of Kenya, Uganda, Tanzania, Rwanda and Burundi reveals that consumers opt for organic products because they are perceived to be free from chemicals and grown on land where environmental health is promoted. The survey was commissioned by IFOAM Organics International.

However most of outlets that took part in the survey indicated that the price, quality of the organic products including their availability and consistency of supply are some of the challenges that face stockists of organic products.

Other challenges that face stockists of organic produce are the origin, credibility and uncertainty of the suppliers. Price and affordability of organic produce also determined the sale of organic produce across the region.

The report shows that decision on whether or not to stock organic produce is mainly the purchasing power of the consumers with most of the buyers comprising the upper and middle income customers. The way organic products are packaged, hygiene and freshness are also factors that consumers con-

sider when making decisions on whether to buy organic products or not. The survey shows that sales are low within the low income groups. Choice of what to stock depended on expiry dates, storability and shelf life of the products.

The survey shows that most shops rely on National Organic Agricultural movements (NOAMs) to identify suppliers and producers of organic goods for purchase.

However, the survey shows that cost and availability play an important role in the purchase of organic products. In 2017, consumers who say they were discouraged from buying because of lack of supply went up to 35 per cent compared to 23 per cent in 2013 and 8 per cent in similar survey conducted in 2006.

The most consumed organic products included fruits and vegetables at 85 per cent in 2017, followed by organic cereals at 44 per cent in 2017 and organic dairy products (meat and meat products). However, there was a slight decline in consumption of these products compared to previous years. New organic products that appeal to consumers include honey, roots and tubers and herbal teas and supplements.

## Dear farmer,

Since we attained independence, The Kenyan Government has maintained the animal breeding policy which we inherited from the British government where only exotic breeds such as Holstein-friesians, Ayrshire, Jersey, Guernsey, Brown Swiss among others are promoted.

However, these breeds were developed for production of milk and meat in temperate Europe and high potential areas of the country or the so called white highlands where the climate is almost similar.

Attempts have been made to cross Sahiwals originally imported from Pakistan with local indigenous breeds at the Kenya Agricultural and Livestock Research Organisation (KALRO) Naivasha, but these animals can only produce milk for three months and are highly temperamental. The Kenya government policy is to produce pure breeds with high milk production. But with the management levels of our small-scale farmers, it has not been possible. At the moment, only 20 per cent of our farmers use AI services.

With only 10 per cent of the country being suitable for the exotic breeds that are promoted by the Kenya Animal Genetics Resources Centre (KARGC, formerly CAIS), there is very little effort to breed animals that can survive in the Arid and Semi-arid regions that covers more than 90 per cent of the country.

With the threat of climate change, we think the time has come for the government to start a breeding programme that matches animal genetics to the various production environments in the country. This will not only have a tremendous effect on livestock production in the country but it would greatly transform the economic situation in our arid and semi arid regions where poverty prevails. Up to now, Kenya is yet to come up with a highly productive breed that is suitable for our dry regions.

A farm in Malindi, which is featured in this issue has shown the way breeding should be done in the country. For 30 years, Makitoshia farm has experimented with all breeds and has come up with the right dairy cows that can cope with the hot and humid coastal climate. There is need to emulate them. We wish TOF readers, partners and donors a merry Christmas and a happy 2019.

### In this issue

Light stimulates egg laying 4



Benefits of finger millet 5

Mango post-harvest care 8

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# Top dairy cattle cross-breeding farm produces

For more than 30 years, Makitoshia farm in Malindi has been testing various cow breeds in an effort to come with a dairy cow that can cope with the hot dry and humid climatic conditions found most parts of Kenya and in the coastal region. The farm's effort has been rewarding.

**Peter Kamau** | At first, a new visitor to Makitoshia farm would be amazed by the look of the dairy cattle herd. A Zebu dairy cow has a big, well-conformed udder that is the same size of Holstein-Friesian dairy cow. This *Bos Indicus* breed is not the ordinary temperamental Sahiwal that you know, it is big in size and it has an equally big udder and body conformation that is quite unique. The same goes for other breeds that take on the look of Ayrshire, Brown Swiss, Fleckvieh and even Jersey breeds.

Situated about 6 km at Kijiwetanga turn-off along the Malindi road, the Makitoshia farm stud is not your ordinary stud (breeding) farm; rather it is the result of more than 30 years of painstaking breeding journey aimed at coming up with a breed that is suited to the high temperatures, humidity and resistance to diseases found in the Kenya coastal climate and ¾ of the country. Yet the animals have attained high productivity just like any of the exotic breeds that you find in some of the best managed dairy farms in the country.

## 30 years of cross-breeding

"We have tried crossing every exotic breed with local indigenous breeds and even hardy breeds of cattle but the results were not encouraging; the crosses simply failed to perform to our expectations. We had started with Sahiwal crosses that we had bought at ADC Kiswani farm," says Patrick Kangwana, the farm manager.

For the last 30 years, the 80-acre Makitoshia farm has tried crossing almost every breed available in an effort to come up with the best breed suitable to the coastal climate and arid parts of the country. They started with cross breeding Holstein-Friesians, Ayrshire, Jerseys, Guernsey and diverse dual purpose breeds amongst others but the breeds could not cope with the climate. Over this period, more than nine generations of various crosses have been recorded.

## Brazil breed proves the best

But their effort began to bear fruit when they imported a Brazilian Zebu bloodline known as the Gir breed, which has transformed the breeding programme in the farm and enabled it to produce the perfect dairy cow that is well-adapted to the coastal climate, "after searching and experimenting with different breeds for more than 30 years, we came across the Brazilian Gir breed by sheer luck," he adds.

## Breed adapted to extreme conditions

The Gir breed which is 100 per cent Zebu which is from the *Bos indicus*, was obtained from CRV *Bos indicus* Animal Genetics Company from Brazil and is reputed to be one of the best breeds developed from the Zebu lines that are perfectly suited to the tropical climatic zones with high milk production potential. It has thin skin coat that is adapted to the extreme heat experienced in tropical areas. The breed is able to convert low quality forage into milk and meat. Like other Zebu breeds including the local Zebu indigenous breeds, the Gir can survive with very little water, outperforming many indigenous breeds found in Kenya and other tropical zones.

## Many generations of cross breeding

By using the hybrid vigour (heterosis) of the Gir Breed, Makitoshia



This bull from Makitoshia farm is called "ARBO." He is descended from C.A Sansao and his bloodline is 50% Gir, 25% Fleckvieh and 13% Sahiwal. He attained 1000kg live weight in 24 months

farm has cross-bred it with Friesian, Ayrshire, Jersey, Guernseys, Fleckvieh and Sahiwals starting with random selection of 4-way crosses, going up to 7 to 8 way crosses. The farm has gone further and imported breeds from Australia and New Zealand. The two countries are leaders in the world in cross breeding with the aim of using locally available pastures or low input system while earning good returns in terms of milk and meat production from their animals without the use of high input systems of feeding which according to research is not cost effective. Other genetics that have been included in Makitoshia farm are from Scandinavian countries such as the Danish and Swedish reds and also the Finnish Ayrshires.

## Farm uses less of the European bloodlines

Although, Makitoshia farm cross-breeding programme has used exotic breeds, Mr Kangwana says that they ensure that these breeds do not exceed 75 per cent of their bloodlines to ensure that the Gir bloodline dominates at 25 to 50 per cent and not less which would dilute its qualities and characteristics in the herd. The results of these cross breeding programme are healthier cows, high fertility levels and less expense in hay or silage feeding costs because the cross-bred cows are better

converters of poor quality forage found in the region into milk and meat.

## Cows give up to 30 litres of milk

From the dairy herd the farm is able to get up to 30 litres from some of their first calvers but since their main aim is breeding and not milk production much of the herd is able to give an average of 15 litres because they are left out to graze without much supplementary feeding.

## More feeding more milk

During the dry and hottest months mainly between January and March, the demand for milk in the coastal region goes up. At this time, the Makitoshia milking herd is fed more intensively on semi zero-grazing and manages to produce an average of 20 litres each and the milk sold to tourist hotels, processors, learning institutions and individuals.

## More productivity with poor quality feed

Due to careful choice of genetics, some of the dairy cows in Makitoshia have been able to attain a lifetime of 80,000 litres, a level equal to the best exotic breeds' in the country with some of

*Continued on page 3*

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# aces cow of the future



"Goroms" has peaked to 37.3 ltrs/day and produced 9330 ltrs in 429 days



"Baldhos" has peaked to 34.1 ltrs/day and produced 6147 ltrs in 302 days



"Figo" has peaked to 28.9 ltrs per day

*C.A Sansao from Brazil- He is the founding sire of Makitsha farm Magic breed crosses and the world's best ever and most expensive dairy Gir sire.*



"Duko" has peaked to 28.2 ltrs per day



"Nyabale" has peaked to 30.2 ltrs per day and produced 8157 ltrs in 427 days



"Nyati" has peaked to 30.1 ltrs/day

the dairy cows achieving up to 14 calvings in their productive period.

"We do not give our animals any dairy meal, commercial hay or maize silage because they are able to eat low nutrient grass forage that is mainly composed of poor grass forage that exotic breed cannot well digest," says Kangwana.

## High demand for breed

Instead of the high quality feed the farm only incorporates maize bran and maize germ in their Total Mixed Ration (TMR) that is mainly fed to the milking herd.

Breeding programmes take time and careful planning and experimentation. As a result, the farm cannot meet the demand for cross-bred cows from farmers

across the country. In a year, they have been able to sell between 30 to 40 cows to farmers from Kenya, Tanzania and Ethiopia.

## Gained recognition

The International Livestock Research Institute (ILRI) and KALRO have shown interest in Makitsha as a model farm from where to train other livestock farmers especially in marginal

areas where farmers keep indigenous breeds that are characterised by low milk and meat production with a view to improving the breeds in such regions to increase milk and meat production and income for livestock farmers and pastoralists.

**Additional reading:** <http://www.infonet-biovision.org/Animal-Health/Cattle-breeds>



# Stimulate egg production by lighting the poultry houses

A chicken's reproductive system is activated by light. Farmers should therefore know when to change lighting to stimulate egg production.

**Simon Mburu** | Egg production in poultry highly depends on intensity of light received by the birds daily, where the light penetrates through the skull, skin and feathers. Light helps stimulate release of FSH (follicle stimulating hormone) and LH (luteinizing hormone) in the pituitary glands. The FSH stimulates production of ovarian follicles upon reaching maturity while the ovum is released by the action of LH hormone.

Commonly birds reared under increased day-light produce more eggs due to increased FSH and LH from the pituitary gland. Also the level of brightness has influence on egg production. Light restriction on growing chicks delays sexual maturity. Hens during cold seasons reduce their egg production due to lack of enough light thus it is advisable to install artificial light in chicken houses. This is in order to maintain laying patterns. For maximum egg production hens require a minimum of 16 hours in light and 8 hours in darkness. During cold seasons artificial lights are installed in coops. Usually a 40 watt bulb can be installed in a 100 square feet.

## To identify good layers

- Large bright red wattles and combs.
- Flexible pubic bones wide apart to allow three fingers to fit between them.
- The vent should be wide, oval, moist and warm.
- The eyes of a good layer should be large, bright, prominent and sparkling.
- Culling (selling off to reduce numbers) in poultry is important to give space for feeding and watering for improved productivity of the birds.

## Light management

Efficiency of lights in poultry house depends on the manner in which the lights are installed, some of the points to note include bulb fixing.

- Light bulbs should not be kept dirty as this reduces the amount of light the birds



Photo:TOF

Chickens need 16 hours of light and 8 hours of darkness per day for maximum egg production

receive, thus they should be cleaned once in two weeks.

- In case of cage system bulbs should be placed in a way the light falls on the feed.
- Bulbs distance should be 1.5 times the distance from the bulb to the bird level.

The most common type of light bulb is incandescent light which is the cheapest or LED lights which use less energy. The lighting should be provided during morning or evening hours or both morning and evening. For maximum egg production, 16 hours light is needed during peak egg production, reducing light during laying period greatly affects egg production.

## Egg handling

The condition of the egg collected directly depends on how well flock is managed.

## Nest management;

- To limit egg breakage, the nest space should be big enough such that in case of flocks with 15 hens there should be

a minimum of four nesting boxes.

- Keeping layers' environment clean and dry will help keep eggs clean. Clean out the nest boxes and add clean deep litter at least every 2 weeks.
- Keep the laying flock in a fenced area so that they cannot hide their eggs.
- Mostly majority of flocks lay eggs by 10.00am. Its best to collect eggs as soon as possible as the longer they stay uncollected the more dirty they will get.

## Proper egg cleaning and handling

- Collect eggs in an easy to clean container like plastic egg flats.
- Do not stack eggs crates too high more than six crates to reduce breakages.

## Sorting and grading of eggs

It's best to sort eggs before you store, sell or consume. The easiest way to sort eggs is through can-

dling them with bright light, this helps eliminate cracked eggs or those with foreign materials such as blood or meat spots.

## How to candle

Hold the egg up to the candling light in a slanting position; you can see the yolk, air cell and albumen. Put the large end of the egg close to candling light, hold the egg between the thumb and first two fingers. From this you can look for any abnormality in the egg.

Identify cracks in the eggs by applying slight pressure to the shell. Cracked eggs should be consumed as quickly as possible.

## Storage of eggs

- Store eggs small end down in an egg carton to keep the air cell stable.
- Date cartons so as to sell old eggs first.
- Store eggs at 10-12 and 70-75 % relative humidity.
- Never store eggs with materials that have odor such as fish as eggs will pick those odours.

While marketing its advisable to size the eggs. Medium, large and extra large. Usually eggs sizes are expressed in grams i.e. Small size-510g, medium size-595g, large-680g and extra large-765g.

**Additional reading:** <http://www.infonet-biovision.org/AnimalHealth/Chicken#simple-table-of-contents-4>



Photo:TOF



# It makes economic sense to produce finger millet

Farmers in Western Kenya have discovered the benefits of this forgotten food crop. They are now investing and reaping its nutritional and income benefits.



*Finger millet is an orphan crop, meaning farmers ignore it but it is an important food security crop because it can withstand drought and it is more nutritious than maize*

**Josephat Mulindo** | Finger millet is a wonder cereal crop for the future. With declining soil fertility and climate change, very few cereal crops are adapted to withstand the test of time. The crop can grow in areas of low soil fertility, can tolerate water stress and has a short maturity period. Besides

these, finger millet is a food and nutrition security and health crop. Its demand can only rise with time. While other cereals experience extreme price variations, the price of finger millet does not change much. The producer price of maize can at times go as low as 6 times less than the producer price of finger millet.

## Requirements of finger millet

To reap the benefits of growing finger millet, farmers need to understand and use the appropriate high yielding varieties with desirable characteristics for the various markets. There are varieties preferred for brewing the opaque liquor (busaa), others for baking purposes while others are for making ugali and porridge.

The producer needs to understand the costs and benefits of producing finger millet to get the producer price right and avoid making a loss or overburdening the buyer with too high a price. The understanding of the market also means the farmer can select the right variety for the market to be supplied.

**Total production cost:** Total price paid for the resources (labour, seed and storage bags) used in the production of finger millet. The figure of Ksh 30,570 is for situations where every resource including labour is commercialized. However, family labor is an important resource in finger millet production meaning that the total production cost is way lower.

**Value of production:** This assumes that the producer price of finger millet is Ksh 100 per Kg. However, this is a conservative figure.

**Production cost per kg of grain:** To produce 1Kg of finger millet, a farmer spends Ksh 54. Since, this is way less than the finger millet producer price of Ksh 100, it follows that finger millet production is a profitable venture.

**Return to labour:** It follows that for every shilling invested in the resources for finger millet production, it generates Ksh 2.04.

**Benefit – Cost ratio:** The cost-benefit ratio of 1.8 implies that engaging in finger millet production is a viable option.

**Conclusion:** Given the adaptable nature of finger millet and its immense benefits, producers have every reason to invest their shilling into its production. It is a viable enterprise.

Variety	Yield (Kg/ha)	Uses
U-15 (Maridadi)	1380	Ugali. Porridge. Baking
KACIMMI 42	1384	Ugali. Porridge. Baking
KACIMMI 72	1323	Ugali. Porridge. Baking
Okahle-1	1425	Brewing
IE 4115	1437	Ugali. Porridge. Baking

The recently released improved finger millet varieties from Kenya Agricultural and Livestock Research Organization (KALRO) and their preferred uses are indicated in the table below;

## Gross margin for cultivating 1 acre of finger millet

Components	Unit	Quantity	Price per unit (Ksh)	Total
<b>Land preparation</b>				
First ploughing	Acre	1	2,500	2,500
Second ploughing	Acre	1	2,250	2,250
<b>Inputs</b>				
Seed	Kg	2	135	270
Manure	Tonnes	2	500	1,000
Planting labor	Mandays	9	250	2,250
<b>Field operations,</b>				
First Weeding	Man-days	13	250	3,250
Thinning	Man-days	13	300	3,900
Second weeding	Man-days	10	275	2,750
Harvesting	Man-days	18	250	4,500
Transportation	Days	1	1,250	1,250
<b>Post-harvest</b>				
Drying	Mandays	6	250	1,500
Threshing	Mandays	9	200	1,800
Winnowing	Mandays	8	200	1,600
Storage in gunny bags	Numbers	7	250	1,750
<b>Total cost of production/acre</b>				<b>30,570</b>
Value of production/acre	Kg	562	100	56,200
Net profit/acre (KES)				25630
Production cost per kg of grain (KES)				54
Return to labor				2.04
Benefit – cost ratio				1.8

Additional reading <http://www.infonet-biovision.org/PlantHealth/Crops/Millet>

# Best animal feeding practices from Makitosha farm

Proper feeding of dairy cows is the secret to improved milk production. Makitosha farm gives some tips on how to feed dairy cows.

**Berita Mutune** | The aim of every livestock farmer is to maintain a high level of management that helps their animals attain their full genetic potential in terms of production. That has been the driving force behind the success of Makitosha farm. The farm has been able to attain up to an average of 25 litres especially when demand for milk in the coastal region increases. The first step in this direction is to ensure the animals are well-housed and live in comfort, free of diseases and are of the right breed. The following are some of the feeding and management practices that enable the farm to maintain a high level of management and productivity:

**Steaming up:** All in-calf heifers and dry cows are well-prepared to ensure they are in top condition before calving down. At about 30 days to calving down, the heifers are socialised with farm workers who are to handle and milk them after calving down.



Photo: Courtesy

*These animals from Makitosha give their highest milk yields during the dry season when they survive on hay from poor grasses and silage conserved in pits during the wet season*

This includes training the new heifers to enter the milking shed with ease, allowing contact with milkers and walking on the concrete surface where they interact with the rest of the milking herd.

The steaming up period should be one month before the calving down date. After calving down, the calves for this breed should be immediately separated from their mothers and fed with at least 3 litres of high quality colostrums (in organic farming practice calves should be allowed to remain with their mother after calving down for suckling and bonding purposes but for traditional indigenous breeds including crosses, farmers complain

that this interferes with milk let down by the mother.

### Boosting milk production

The fodder used in Makitosha farm include natural pastures, green grass and standing hay, Napier grass, maize stalks and silage. These are mixed with forages with a good protein content such as leucaena leaves, gliricidia leaves and stems, cassava leaves and stems, mucuna and other naturally-occurring wild legumes. For the milking herd no commercial dairy meal (concentrate) is given, instead the animals are fed on cotton seed cake, sim-sim cake, maize germ meal and cake,

wheat bran, wheat pollard and molasses. Yeast and mycotoxin binders are also given to improve digestability, reduce heat stress caused by the cow's metabolism and help to absorb unwanted and poisonous contaminants. Other important tips from Makitosha farm include:

- Never attempt to give a cow more concentrate than the roughage (fodder) which is provided (on dry matter basis!).
- A railing can be added to prevent the cows from stepping into the trough and contaminate the feed with urine or dung. It is recommended to spend some time each day watching the cows feeding to sort out any problems you observe as they feed.

Makitosha Farm is not operated in the traditional way but run collectively by a community of 20 families, who both share and divide all responsibility, work and profit among themselves. This very unique management model which started out as mere experiment has proven highly successful and made Makitosha Farm what it is today!

**Additional reading** [http://www.infonet-biovision.org/fodder\\_production](http://www.infonet-biovision.org/fodder_production)



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# Monitor the growth of your heifers regularly

Kindly let me know the raw materials and feed requirements for dairy cow home-made meal starting from a calf, heifers and a mature cow just as you did for chickens.

Dear farmer,

In the ongoing series on feeding of dairy cows (calves, heifers and mature cows), that help answer the above question, we look at the feed requirements of heifers.

To measure the performance of heifers, it is important to know the body weight and height and plot it in a chart. The growth should be such that any increase in weight should be accompanied by a proportional change in height.

## Measurement of heart girth and height

Different dairy cow breeds have different weight and height at different ages. Where a farmer does not have a weighing machine as is common in many small-scale dairy farms, the weight may be estimated based on the heart girth (see sketch) in centimetres. Measure the heart girth using a tape measure and then use the weight conversion table (on the right) to get an estimate of the weight based on the heart girth. The height can be measured using a calibrated piece of timber as shown in the sketch (on the right).

Measurement taken are plotted on chart that shows the expected weight and height at a particular age for particular breed. If the weight falls below what is expected, the heifer is underweight thus underfed and vice versa. Short heifers indicate low protein in their diet.

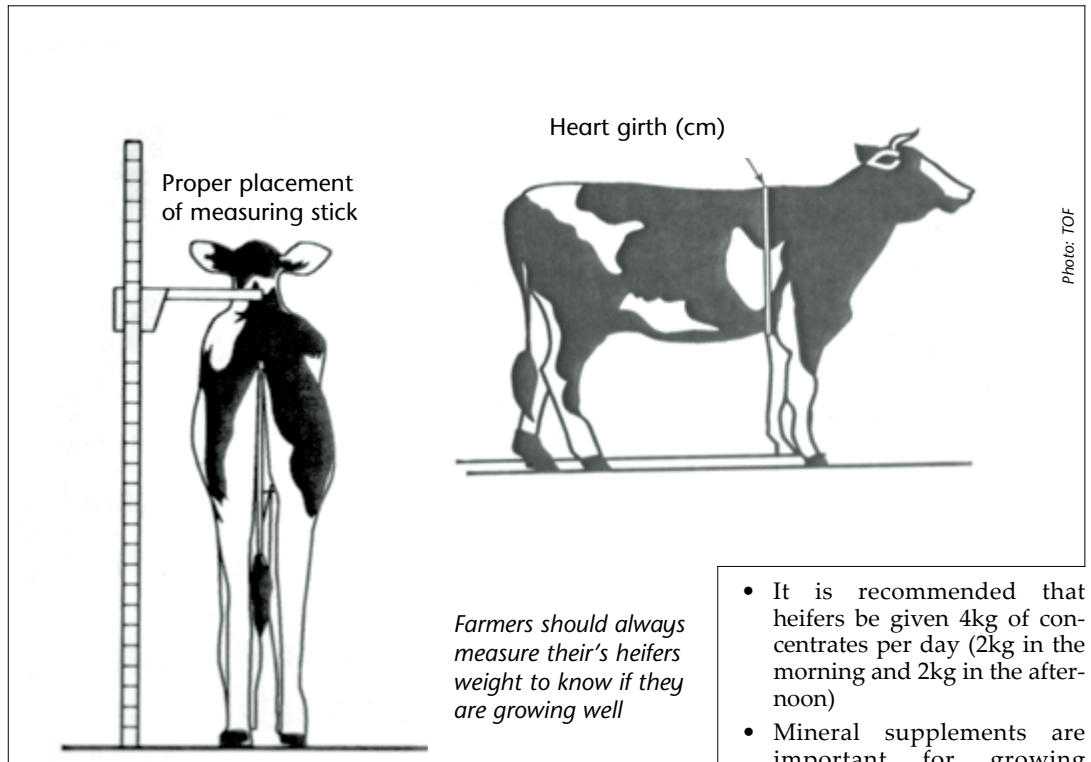
## Do not overfeed heifer

Fat, over-conditioned heifers at the same weight as leaner heifers are normally younger with less skeletal growth. Pelvic opening is narrow. Due to overfeeding the calf is normally bigger, leading to dystocia. Underfed heifers will also require assistance and have a higher death rate at calving than normal-sized heifers.

## Important tips on heifer feeding

Farmers should take into consideration the following heifer feeding tips:

- If you are feeding your



heifers with fodder shrubs such as leucaena, sesbania, gliricidia or other legumes such as Lucerne, purple vetch or desmodium, then they would require an additional dairy meal quantity of 2kg per heifer per day.

- If the heifers are fed on grass forage, then they would require supplementation with concentrates at the rate of 1% of their body weight per day (ie 1-3kg depending

on weight).

- Farmers can give their heifers good quality forage as recommended above and add 6 kg of fresh fodder such as calliandra, leucaena or legumes such as desmodium or purple vetch per heifer per day. However, these fodder shrubs cannot be a replacement for concentrates; rather are viewed as additional supplement that will provide crude protein for growth.

- It is recommended that heifers be given 4kg of concentrates per day (2kg in the morning and 2kg in the afternoon)
- Mineral supplements are important for growing heifers as they need calcium and phosphorus for their reproductive growth and development which has an effect on their fertility.
- Large breeds Holstein-friesians, Guernseys, Jerseys) need more nutrients proportional to their body weight while small-bodied cross-breeds from these breeds usually can do well with lower nutrition levels.

Answers by Elkanah Isaboke



- ◆ Did you know that mango fruit is very marketable?
- ◆ Do you know that you can reduce post harvest losses in Mangoes and make more money?
- ◆ Did you also know that when you eat and drink mango juice you get benefits health wise?

For more information, tune in to RADIO CITIZEN every Monday 11:00am to 12 midday in CHAPA KAZI program



## TOF Rad answers your questions

TOFRadio is broadcast on KBC on Tuesday and Thursday at 7:30pm 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 422 460, email: admin@theorganicfarmer.org

# Proper handling of mangoes at harvest

**Musalafa Lyaga** | Mango is an important source of income for farmers. The fruit has a huge demand because of its delicious taste and its nutritional value. However, a big portion of mango is lost due to poor handling during and after harvest.

If proper care is taken when harvesting, considerable losses can be minimized and better quality fruit will reach the market, ensuring higher returns for the farmer.

It is important for farmers to learn how to handle mangoes when harvesting so as to deliver good quality mangoes to the market.

**The time of harvesting is crucial:** Do not harvest too early, nor too late. Immature and over-mature fruits can present numerous problems during handling leading to spoilage.

The quality of postharvest shelf life of mango fruit is strongly dependent upon the stage it was harvested to develop the most adequate tasty quality and the longest postharvest life. Less mature fruit is usually more sensitive to injury which affects their ripening.

**Harvest timing:** A fruit harvested before it reaches full maturity may not be ripe adequately or in some cases it will never ripen. Such fruits are normally hard and sour. On the other hand, fruits harvested when over-ripe are very sensitive to bruising, decay and to water loss, quality deterioration and would not have a long postharvest life.

The mature fruit is juicy, sweet with a very nice aroma. When harvesting mango fruits it is important to only pick the mature fruits unless you have a market for unripe fruits.

### When to pick mangoes

"There are some buyers who prefer green, immature mango. They say that they make the best chutney. Many people prefer spicing up their food with chutney," says John Mutisya a Resource Centre Facilitator at Biovision Africa Trust (BvAT)

Your mangoes are ready for harvest when you observe a light



Photo: IN

Farmers lose a large proportion of their mangoes due to poor harvesting, handling, transport and storage

creamy yellow pulp. Depending on the variety, some mangoes change from dark to light green when ripe.

The fruits also change in texture during maturation, especially during ripening when it becomes softer. These textural changes are detected by touch, and the harvester may simply be able to gently squeeze the fruit and if it feels soft then it is ready for harvesting.

### Observe hygiene

Mangos like most fruits have a nice aroma as they ripen that can be used to determine whether they are ready for harvest. Before handling fruits, wash your hands with soap to avoid contaminating the mangoes.

To harvest, use a mango picker with a sharp blade to cut the mango from the branch and a net to ensure your fruit does not get to the soil. It is easy to make your own fruit picker; all you need is a pole, sharp blade and a net.

The best time to harvest mangoes is from 9a.m. to 3p.m. to minimize the flow of latex sap from the small stem left on the fruit. Latex is a fluid that looks like milk which comes out when the mango fruit is cut from a stem.

### Be careful when harvesting

Flowing latex burns and stains

the mango skin, making fruits visually unappealing to buyers and exporters, though the mango is not damaged on the inside.

To harvest, cut the fruit from the branch but retain 2-3 centimetres of the stem to drain the latex, and to ensure it doesn't touch the skin of the mango.

### Storage of mangoes

Put the harvested mangoes onto a clean, soft surface like a tarpaulin. Do not place them on the ground to avoid infection, contamination or bruising.

Separate wounded mangoes from healthy fruit because wounded mangoes can spoil the good ones by hastening their ripening.

Then trim the stem, place the fruit upside down on mesh for up to half an hour to allow the latex sap to drain off the fruit. Store mangoes in rigid container-like crates that prevent mangoes from being crushed or from pressing against each other to stop them from getting bruised due to compression.

### How to pack mangoes

Add soft padding to the base of the crates, for example, newspaper, before packing the mangoes. Store the crates in a cool, dry room away from direct sunlight to minimize sunburn loss of moisture and accumulation of dust.

By properly handling your



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mangoes at harvest you will be able to maintain the good quality of your mangoes from harvest until it reaches the markets thus fetch more money from your fruits.

Radio Taifa frequencies for our TOFRadio programmes

TOWN	FM FREQUENCIES	MW(MEDIUM WAVE FREQUENCIES)
Nairobi	92.9 MHZ	
Mombasa	100.8 MHZ	
Kisumu	104.5 MHZ	
Kakamega	104.5 MHZ	
Bungoma	104.5 MHZ	
Eldoret	88.6 MHZ	
Nakuru	104.1 MHZ	
Meru	90.4 MHZ	
Nyeri	87.6 MHZ	
Kisii	103.3 MHZ	
Malindi	90.1 MHZ	
Kapenguria	93.3 MHZ	
Kitale	93.3 MHZ	
Voi/Kibwezi	96.9 MHZ	
Namanga	89.9 MHZ	
Lodwar	88.6 MHZ	
Lokichoggio	89.3 MHZ	
Garsen	93.1 MHZ	
Kajiado	92.9 MHZ	
Kitui	92.9 MHZ	
Lamu	96.3 MHZ	
Maralal		1107 KHZ
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