

# Pack 111, Item 01

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**Storing dairy fodder for the dry season increases farmers’ income**

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**Notes to broadcaster**

Dairy farming is an important agricultural enterprise in Kenya. It provides milk for consumption, hence improving nutrition, and earns farmers’ income from selling milk and calves. Dairy farming also offers employment in support services, for example, transportation of milk, provision of artificial insemination services, fabrication of dairy equipment, fodder production and trade, and financial services.

This script describes how to store high quality fodder for dairy cattle by making hay and silage during the wet season. During the rains, farmers often have more fodder than they need, and fodder is often wasted or kept in farms until the quality deteriorates. By cutting and conserving fodder, farmers can plant and harvest a second time or put the land to other uses.

This script is based on actual interviews. You could use it as inspiration to research and write a script on a similar topic in your area. Or you might choose to produce this script on your station, using voice actors to represent the speakers. If so, please make sure to tell your audience at the beginning of the program that the voices are those of actors, not the original people involved in the interviews.

You could also use the script as research material or as inspiration for creating your own programming on the benefits of storing fodder. Talk to dairy farmers, agricultural officers, and other experts. You might ask them:

* What is the history of dairy farming in the area?
* What challenges do small-scale dairy farmers face?
* What solutions have they found to address these challenges?
* What added benefit do farmers get by adopting these solutions?

Apart from speaking directly to farmers and other experts, you could use these questions as the basis for a phone-in or text-in program.

The estimated running time for this item, with signature tune, intro, and extro, is 25 minutes.

**Presenter:** Hallo and welcome to your favourite farming program. My name is \_\_\_\_\_.

Dairy farming is a major income earner for farmers in Kenya. Small-scale farmers produce milk for home consumption, and for selling to consumers in the informal market and to processors. They also make money by selling calves and heifers. Milk production fluctuates depending on the availability of animal feed. During the rainy season, there is a milk glut and prices fall. During the dry season, milk supply goes down and prices rise, making consumers feel the pinch. But dairy farmers who have enough feed are happy to earn more.

In this program, we look at how dairy farmers can take advantage of high milk prices during the dry season by storing enough fodder for their dairy animals.

**SFX:**Fade up signature tune, THEN down under presenter.

**SFX:**Sounds of a fodder chopper, mooing of cows and calves.

**Presenter:** I’m in Ndathiine village in Githunguri Constituency of Kiambu County in central Kenya. Mrs. Mary Muchai and her two farmhands are busy chopping Napier grass to feed to her dairy cows. Together with her husband, she keeps dairy cows and chickens, their primary sources of income for more than 18 years.

**Mrs. Muchai:** I was working for a company in Nairobi but left in the year 2000 when the company was about to wind up and payment was no longer regular. I came back home and started dairy farming. I joined a milk processing company called Fresha, and used to deliver seven kgs of milk per day from my two cows.

Milk production was low because the animals were not fed well and they were not really high producers; they were foundation animals*. (Editor’s note:* Foundationanimals *are the cows that farmers choose to start their breeding program. The farmer determines what he or she wants from breeding—for example, high milk production, good temperament, high feed to milk conversion, and tolerance to temperature extremes. Then the foundation animals are served with semen from bulls that have the desired qualities).*

So I saved money from milk sales, took a loan, and bought another animal. I kept doing this until 2008 when I had six cows, and then I focused on improving the quality of the cows through artificial insemination. I keep the good heifers (*Editor’s note: female cattle who have not had a calf*) and sell off the dams (*Editor’s note: mother of a calf*), and I use the money to maintain the animals or meet family needs like paying school fees.

**Presenter:** The division of roles is interesting.In most farms I have visited where both husband and wife are farmers, I find the men drifting towards dairy while women tend to prefer poultry.

**Mrs. Muchai:** (LAUGHING)When we started out, we looked at what interested each of us and we found that I had a liking for cows and my husband likes birds. There is no need to do something you have no passion for. Because I love cows, I take good care of them. Even when there are challenges, I keep at it until things change for the better.

**Presenter:** How much milk do you sell?

**Mrs. Muchai:** At the moment, I deliver 300 kgs of milk to Fresha each day from 11 milking cows. With this, I am able to pay my workers, maintain the animals, and make a profit. I would like to continue expanding the number of animals, but maintaining them on this one-acre farm is not easy.

**Presenter:** This gives an average production of 27 kgs of milk per cow per day. This is quite high for a zero grazing production system and the size of the farm you have. *(Editor’s note: In a* zero grazing system*, cows are provided with all their feed and water. They are confined in a cowshed and do not graze in pastures).* How do you manage to achieve and maintain this?

**Mrs. Muchai:** As you can see, I have Napier grass growing on the lower section of the farm and another two acres leased from neighbours to provide fresh fodder for the animals. But it’s notenough. These animals need much more.

I buy baled grass from farmers in Nakuru between August and November when the prices are low and the grass is good quality. I have established good working relations with some of the farmers there and I am able to get a bale of Boma Rhodes grass to my farm for 150 Kenyan shillings (US $1.50). Sometimes I lease land and grow the grass. But this is difficult because of the distance between my dairy farm in Githunguri and the leased lands in Nakuru, so I prefer buying grass that is already baled.

**Presenter:** What do you consider when planning fodder for your animals?

**Mrs. Muchai:** First is quality, then price, then the quantities needed. I buy between August and November when the prices are low and the grass is green and good quality. After December, the dry season kicks in and the quality of freshly baled grass starts to go down. I have established good working relations with some of the farmers in Nakuru and I can get a bale of Boma Rhodes grass to my farm for 150 Kenyan shillings (US $1.50) and 170 Kenyan shillings (US $1.70) for lucerne. The trick is to start making or buying fodder when there is a lot of green forage available that the animals can eat.

**Presenter:** This means that you can consistently produce milk during the dry season when fodder is scarce and the demand for milk is high and prices are good. How do milk prices compare between the rains and the dry season?

**Mrs. Muchai:** Well, for those of us who deliver to Fresha, the price changes are not that big. It ranges from 32 to 40 Kenyan shillings (US $0.32 – $0.40). But for other farmers, it is huge. During the rains, they sell for as low as 24 shillings per kg. And sometimes, they have no one to sell to at all. But if we are able to keep enough feed for our animals, then we can earn more during the dry season.

**Presenter:** How do you feed the grass to the cows?

**Mrs. Muchai:** We have a motor-driven grass chopper. We could feed the grass directly to the animals, but from experience, we have learned to chop it into small pieces to make it easy to chew and swallow. It eases digestion and reduces wastage.

Before feeding, we soak the dry grass in water and mix it with chopped green Napier grass to make it more palatable and tasty for the cows. At first, we soaked the dry grass in molasses overnight to make it tastier. But when we don’t have molasses, the cows don’t eat the grass!

We mix three bales of grass with one bale of Lucerne hay. We also give the cows a dairy meal supplement and mineral salts, depending on their milk production and weight.

**Presenter:** How do you know that the hay you are buying is good quality?

**Mrs. Muchai:** I buy from reputable farmers who take good care of their grass fields. Good quality hay is leafy and greenish in colour. As I said, hay harvested after December usually has less leaves and is just straw, which is low quality. Good hay also has little or no foreign material in it—meaning that the farm where it was grown was free of weeds. And it has no smell. If it is smelly, then it might have been baled before drying in the field to reduce moisture content. This is not good for the cows. We must make sure we keep the hay in a dry place, away from rain. We have a store, which can take up to 5,000 bales of hay.

**Presenter:** That was dairy farmer Mrs. Mary Muchai of Ndathiine village in Githunguri sharing how she manages to consistently sustain milk production at her dairy farm through the dry season.

Having a successful dairy enterprise requires close collaboration with livestock extension officers and other service providers. Mr. Mathew Muigai is a livestock extension officer in the area, and he joined me on this visit to Mrs. Mary Muchai’s farm. He explains three important considerations in dairy farming.

**Mr. Muigai:** There are three important factors to consider for a dairy farm to be successful. The first is quality management. The second is quality feeding, and the third is quality genetics. Quality management includes all the routine requirements, including housing, to make the animal comfortable and free of pests and diseases. Quality feeding means providing the animal with a balanced diet to maintain key bodily functions such as growth and reproduction, and to support good milk production.

Quality genetics involves improving the genetic potential of the animals in order to produce high volumes of milk. For zero grazing systems like Mrs. Muchai’s farm, it makes economic sense to rear animals that have the potential to produce at least 20 kgs of milk per day. We advise farmers to use semen from certified artificial insemination technicians and providers. Using village bulls does not guarantee improvement of the cow’s genetic potential to produce milk.

**Presenter:** What do you mean by balanced diet? Please explain.

**Mr. Muigai:** A balanced diet includes thebasal diet, concentrates, mineral salts, and clean and adequate drinking water. The basal diet includes fibrous plants known as forages, which include fresh grass, hay, straw, and stover. These feeds take care of the energy needs of the animal and make up the bulk of the diet, from 30-70%, depending on the quality of the feeds. With a good basal diet, a dairy cow should give you up to seven kgs of milk per day without feeding on concentrates. After that, for every additional kg of concentrate, the cow should give you more than 1.5 kgs of milk for every kg of concentrate it feeds on. Farmers should stop further increases of concentrate when there is no corresponding increase in milk production, and when the income from the extra milk doesn’t compensate for the cost of the extra compensate.

**Presenter:** That was Mr. Mathew Muigai, a livestock extension officer in Githunguri.

**SFX:**Sound of motor vehicle starting. Fade up for three seconds then recede. Fade under presenter, then sound of a tractor under presenter.

**Presenter:** I am leaving Mary Muchai’s dairy farm and heading north to the agricultural county of Nakuru, to the grassy banks of Rongai River, to Koisamo village in Rongai Sub-County.

**SFX:**Fade up for three seconds then down under presenter.

**Presenter:** I meet Mr. Frank Chesingei supervising young men loading bales of grass on a tractor trailer. A tractor pulling a baler is finishing up on one end of the farm, with about twenty acres of neatly cut grass. The skies are heavy with rain, and Mr. Chesingei is shouting at the young men to work faster.

**SFX:**Sound of tractor. Fade up then down under presenter.

**Presenter:** Looks like it’s going to rain today!

**Mr. Chesingei:** Yes. But if it can hold for another hour, then we will be good. I will have this batch safely stored and then wait for the cut grass to regrow. If the rains are adequate, I will cut again after four months.

**Presenter:** What kind of grass is this?

**Mr. Chesingei:** I have Boma Rhodes and the local star grass. Not all grasses are suitable for haymaking. Boma Rhodes is good for farmers who raise dairy. We keep the star grass for our animals during the dry Jan-March months. It does well for beef.

**Presenter:** How long has it taken to bale this farm?

**Mr. Chesingei:** The tractor is in good condition, so just one day—we started in the early morning! We left it to dry in the field for one day.

**Presenter:** Why do you harvest grass? Why not let your animals graze freely?

**Mr. Chesingei:** Milk does not fetch good prices here. I used to keep cattle but the returns were not good.The animals fetched more when sold for meat than when kept for milk.

Then a friend from another village told me there is a market for baled Boma Rhodes grass. I tried it and the returns have not been as disappointing as raising cows for milk. We get two seasons of rainfall here: April-August and October-November. We harvest two seasons of grass and only one season of maize. We still have large tracts of land and the demand for grass from dairy farmers in the highlands near Nairobi is high. We sell Boma Rhodes grass for 150 Kenyan shillings (US $1.50) to as high as 300 shillings (US $3) per bale when we store for the dry season. It is good business.

**Presenter:** What does it take to produce high quality hay?

**Mr. Chesingei:** It starts with using good quality seed, ploughing land to a good tilth, early planting, and good field management to ensure healthy and weed-free grass fields. For dairy farming, Boma Rhodes is the recommended grass variety for haymaking in this part of Kenya. It has a higher yield per acre. With good management, one acre yields up to 200 15-kilogram bales. We harvest when the grass is flowering. When you look at the field, you can see a mixture of fully flowered plants and those that are ready to open their tassels. If we want seed, we let it fully flower then harvest seed before cutting the grass.

Because my land is large, I use a tractor to save on time and costs. But you can cut the grass manually using human labour or tractor-drawn cutters.

**Presenter:** How do you tell if the grass is ready for baling?

**Mr. Chesingei:** We usually leave it to dry in the field for two days before baling. The ideal way is to dry it under a roof so that you don’t lose the green colour and nutrients. To check readiness for baling, you pick a stem of grass and try breaking it. If it bends too much without breaking, then it is not yet ready to bale. If it breaks easily, then it is too dry.

**Presenter:** What options do small-scale balers have if they don’t want to sell their grass but instead keep it for later use?

**Mr. Chesingei:** I usually train fellow farmers on how to do manual baling. We use a wooden hay box that is 85 cm long by 55 cm wide and 45 cm deep, and open on both ends. This box produces a bale of about 20 kgs. But if a farmer is keeping the hay for his or her own use, they can make it bigger. You lay the ropes inside the box, put the grass in the box, then tie it with the ropes—and you have your bale of grass. We keep the bales in a storage area to keep them away from rain, direct sunlight, and rodents like rats that can spoil the hay.

**Presenter:** How dry does it get in this area?

**Mr. Chesingei:** It gets very dry from December to the onset of the long rains in April. But we have managed to address the challenge of inadequate grass. When the dry season is harsh and prolonged, a bale of grass can cost as high as 400 Kenyan shillings (US $4). Water remains a big problem for us. We rely on the Rongai River but flower farms and horticulture farming upstream have made the river seasonal and brought lots of suffering for livestock farmers downstream. People are forced to walk their animals long distances to get water. You can imagine a situation where you have no water and you have no grass. It is double trouble.

**Presenter:** Yes, that is a real farmer’s nightmare. At least, by storing fodder, you have solved half the problem.

I thank Mr. Frank Chesingei and wish him well as the skies open. We will take cover in one of his grass stores.

**SFX:**Rain for three seconds then down. Short music interlude.

**Presenter:** Welcome back to the program. We have seen how farmers cope with a scarcity of forage for their animals by baling and storing grass as hay. Other farmers prefer the more nutritious silage.

Mrs. Sarah Makokha is a farmer-trainer at Lengo Agricultural and Demonstration Centre in Eldoret, Kenya, about 400 kilometres north of Nairobi. She is also a dairy farmer. I visited her at her farm in Maili Nne trading centre near the bustling town of Eldoret. She keeps four dairy cows under zero grazing, and describes how she makes silage for her cows.

**Mrs. Makokha:** We make silage for our animals because it is more nutritious than grass, and is a good supplement to our hay and Napier grass. It helps us reduce the amount of expensive concentrates that we feed our cows. We use green maize, which is actually the best crop for making silage because it does not need additives like molasses to quicken the fermentation process. You can also make silage with sorghum, oats, Napier grass, desmodium, or lucerne. We chop and store the crops in airtight polythene bags if we want to use the silage after two to four months. If we want to keep larger quantities for longer, we use the silage pit. Then we can use the material in the silage pit during the dry season.

**Presenter:** The fermentation process prevents the chopped material from decomposing and enables you to keep the fodder for a long period of time. At what stage of the crop do you harvest it for silage?

**Mrs. Makokha:** We cut the maize when the grain is at the milk stage. *(Editor’s note: The grains are at the milk dough stage when you squeeze or crush the grain and milk oozes out. At this stage, the grains have enough water-soluble sugars to make silage.)* If the crop has a lot of moisture, then we let it dry in the sun for one day to reduce the moisture content.

We chop the entire plant by hand or with mechanized choppers to small pieces about one inch long. The small pieces make it easy to compact the material and expel air. Air can cause it to decompose instead of fermenting. As a rule, all animal fodder should be chopped not longer than the muzzle of a cow to make it easier for the animals to chew.

**Presenter:** You talked of additives. Why are they needed?

**Mrs. Makokha:** We normally use molasses made from sugar cane to quicken the fermentation process and give the silage a good taste. We use four kgs of molasses for every 100 kgs of fodder material to be ensiled—meaning to be stored in a container for later use as silage. When we use molasses, the silage is ready to use after one month.

**Presenter:** How do you do the actual ensiling?

**Mrs. Makokha:** We use polythene bags. We fill the bags, compact the chopped material, then tie the opening of the bag with a rope so that air cannot enter. We make sure the bags have no holes to ensure no air enters. When we want to keep larger quantities for the dry season, we ensile them either in a pit or above ground.

**Presenter:** The dairy industry is growing and more farmers want to know how to ensile larger quantities of fodder. How do you make a silage pit?

**Mrs. Makokha:** When we make pits, we do them on the part of the farm that is well drained. The site of the silage pit should not be waterlogged. If water seeps into fodder, then the material will be damaged.

We dig a pit that is one metre wide by two metres long and one metre deep. This holds one tonne of fodder. When we use molasses, we use 10 litres of undiluted molasses and about 21 square metres of polythene sheet. You place 1000-gauge polythene on the floor, sides, and the top to cover the ensiled material all round. In some cases, you add salt to the floor of the pit to prevent ants from encroaching on the ensiled material.

**Presenter:** You seem to be very comfortable with figures. It is not so simple for the small-scale farmers I have interacted with. Can these figures be simpler?

**Mrs. Makokha:** These measurements are what I have here. In Kenya, any farmer who is interested in making silage can be guided by the Sub-County Livestock Extension Officer, who is at the sub-county headquarters.

**Presenter:** How do you feed silage to your dairy cows?

**Mrs. Makokha:** We open the polythene bags, scoop enough, then tie back the bag. If we are feeding from the pit, we open the polythene covering, scoop enough for the day, then replace the cover to keep it airtight. We give silage to the cows at least two hours before or after milking to avoid off-flavours in the milk.

**Presenter:** This has been very enlightening for me, and I trust that our listeners have found it worthwhile. Between hay and silage, where would you put your money?

**Mrs. Makokha:** (LAUGHING). It depends on what a farmer is able to do. My preference is silage. But if I cannot get silage, I feed hay. But that means I must buy more concentrates. And I can only buy more concentrates if the milk price is good.

**SFX:**Dairy sounds (cows mooing, calves, and milking)

**Presenter:** Thank you very much, Mrs. Makokha. Dear listener, we have travelled on a Kenyan fodder journey from the home of Fresha in Githunguri via the pasturelands of Nakuru to the grain county of the North Rift Valley. We have heard what dairy farmers are doing to take advantage of good milk prices during the dry season. They store enough fodder for their cows to eat during the dry season. They cut, dry, and bale their grass. They also preserve high-moisture fodder in the form of silage. They cut, chop, and keep fodder in silage bags or silage pits. You can too.

Thank you for listening.

**SFX:**SIGNATURE TUNE

## Acknowledgements

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**Sources of information**

Interviews:

Mrs. Mary Muchai, dairy farmer, Githunguri, Kiambu County

Mr. Mathew Muigai, livestock extension officer, Githunguri, Kiambu County

Mr. Frank Chesingei, farmer, Rongai, Nakuru County

Mrs. Sarah Makokha, farmer/trainer, Eldoret, Nakuru County

All interviews were conducted in August 2018.