Artisanal silage making through 'service provider enterprises' in Kenya

Introduction

Feed is key for the success of dairy farmers. The productivity of dairy cows in Kenya varies enormously between 1.5 l – 25 l per cow and day. There are different factors that influence the productivity of dairy cows, like the genetics (exotic breeds or cross breeds) or the quantity and quality of the fodder they get. A cow consumes about 50-60 KG of fresh fodder per day and the feeding costs represent about 75 % of the costs for dairy farmers, which shows that the provision of feed is a key factor in keeping dairy cows.

Research shows that the availability of feed depends a lot on the season. In the rainy season, there is normally sufficient animal feed available. Depending on the production scheme the animals are grazed on own or public land or held in sheds and fed there (cut and carry system).

While the dry season availability of fodder is dramatically different, especially for smallholder dairy farmers which own between 2-4 cows and work on an average farm size of up to 2 acre, scarcity of available fodder is frequent. Forage production and conservation is still an exception on most of the small-scale farms, though farmers depend on buying in fodder from commercial fodder and feed producers. The prices for hay in the dry season go up to 220 KES/16-20 kg bale of Rhodes Grass Hay and up to 360 KES for better quality Lucerne Hay. Silage packs of 25 kg are sold at 250 KES.

The high prices for bought in fodder and feed often indicate a not sufficient feeding practice for the animals which 'just survive' and react with a productivity tending to '0'.

Apart of hay making, silage making is another possibility of conserving fodder for the time of scarcity. Silage making is labour intensive and has to be done properly. Different available plant material can be transformed into silage like maize, sorghum, Napier grass, Brachiaria grass, Panicum grass or residues from sweet potatoes or beans. As most of the farmers lack skills and labour force for silage production, there come in the service provider enterprises (SPE).

Experiences with service provider enterprises for silage making:

The idea of service delivery for silage making is already practiced in Kenya, namely by a group of 7 young man, based in Meru county (northeast of Mount Kenya)

The group, as more than 20 others, was trained by SNV's Kenya Market led Dairy Project in growing quality fodder, make silage, manage dairy feed and preserve animal feed.

Since then, they are offering their services to farmers in silage making (mainly maize silage).

The offered service consists in:

- Preparation of the silage bunker and placement of a polyethylene sheet.
- Chopping the raw material.
- Bringing the material into the bunker in layers.
- Adding a molasses-water mixture and compacting each layer before the next layer is added.
- Once the silage pit / bunker is filled, the bunker is closed to prevent air contact of the silage material, which has to undergo a process of anaerobic fermentation.

- Covering the silage material and cover it with a layer of soil for permanent pressure and to keep the air out to guarantee a proper fermentation.

Capacity of the 7 person group: up to 700 tons/month at the cost of 1KES /kg

Average income of the group members: 40000 KES/month

Needed investments:

Item	***KES***
Forage chopper (price range for self-propelled machines)	30.000 (light duty)-170.000(heavy d.)
Forage chopper (tractor driven)	600.000 – 2.000.000
Shovels, forks, wheel barrows (x6)	48.000
7 pairs of wellingtons	14.000
Other small material	10.000

(ev. training costs, if not coming from a dev. Partner)

Data that are more detailed have to be collected in field studies.

Silage making is mainly practiced at the end of the cropping seasons when the maize is ready for harvesting, though it is a seasonal occupation, which does not provide occupation and income over the whole year, but however offers occupation and income generation for parts of the year.

Expanding the silage making services to other types of silage like grass silage (Napier, Brachiaria and Panicum) could offer a more permanent demand for silage services, but up to now the production of forages is not so big that forages are mostly fed fresh or in some scarce cases farmers make hay out of Brachiaria.

This business case is actually practiced in the area east of Mount Kenya and from there down to Thika. CIAT is also in contact with a local company (development oriented) which is engaged in silage making and silage making training in Central Kenya. I am convinced that there is a lot of potential for silage making as one measure to mitigate effects of drought periods, which go along with fodder scarcity and a dramatic decrease of milk production. Especially in the areas with more rainfall and higher air moisture, silage making is a good alternative to hay making. Though the intensive agriculture areas of Western Kenya should be focused for scaling.

The above-described approach is economically interesting for medium scale farmers.

Based on the rainfall patterns and the variable fodder availabilities, farmers should be prepared to bridge different length of fodder scarcity periods. In the Western Highlands of Kenya, this period is about 2.5 months. Based on that estimation and knowing that a cow needs about 30 kg of silage per day to keep up a high productivity, it is easy to calculate the amount of silage, which a farm should produce, and store:

Need of silage fodder on the example of a farmer having 10 cows

30kg silage x 10 cows	need per day:	300 kg
300 kg/day x 30 days	need per month:	9000 kg
300 kg/day x 75 days	need for 2.5 months:	22500 kg

As the kg of maize silage is sold at 10 KES/kg that would represent costs of 225.000 KES (calculated based on the price of packed bricks). We found no information of prices for big quantities. To be verified, but for sure that will be cheaper!

For small-scale farmers the situation presents in a different way: small-scale farmers often only have 1-3 cows and neither the financement nor the space to store bigger quantities of silage. But also for them silage making is interesting to gap the fodder scarcity periods.

The possibilities are divers and

1) Silage can be prepared in pits of 2x2x1 m, which can take up to 1000 kg of chopped fresh material. The other material needed is about 20sqm of polyethylene sheet and 1-2 litres of Molasses. (This approach is recommended by 'farmerstrend' and can be done by the farmers or be part of a service package of the service providers.

One of these units will feed a cow for more than a month if the silage is the only fodder provided. For a period of 2.5 months, two of such described units should be sufficient.

2) Silage preparation in plastic bags/tubes etc.

The existing SPEs were trained by SNV and mainly established within Dairy cooperatives around Meru and Eldoret.

The SPE approach has got a potential for job creation in the rural areas and could be brought to other areas of Kenya, especially to areas which do not offer the best conditions for hay making

Target group	small scale and medium farmers as customers
	Youth groups which are trained for delivering the service
Product	silage making services
Costs	1 KES/ kg (costs for the customer)
Investment	1 week training in silage making for the group members
	(financement through donors or dairy cooperatives)
	Equipment for the service provider enterprise
	(could be prefinanced by Dairy cooperatives, loan schemes, rural banks)

Success factors

- Trained groups offer the service
- The services are of good quality and affordable for the customers
- Dairy farmers book the services and are satisfied with the service delivery
- Service delivery becomes part of the system