

Report on the up to date technical equipment for forage conservation and processing

Grass2Cash project report

Introduction

Farms in Kenya are characterised by a wide variation in size, farming approach, environmental condition and state of mechanisation. There is not the 'typical farm' type. Farm types have developed in the different areas due to population density, traditional heritage including colonial times and local conditions. That applies also to the forage producers. Forage production is a more recent activity, which developed in follow of the development of the dairy sector. With the growing of the dairy sector, the demand for feed increased, especially for the dry season.

As feed production while dry season is very low the gap between offer and demand has be bridged by conserved fodder. There are on the one-side crop residues, often of a low nutritional value like dry maize stovers, but the better choice is the planned conservation of forages either as silage or as hay. Both ways of forage conservation is labour intensive and can be eased by technical equipment.

Forage harvesting

Most of the farmers use a panga, their standard tool for cutting the forages. The panga is used for many farming activities, so also for harvesting forages. Even that sickles are locally available and cheap they are not widely spread nor used.

Brush cutters are available in the country, but only a few farms are equipped with them. We found brush cutters on some bigger farms, but often equipped with the wrong blades what makes them less efficient.

It is astonishing that sickle mowers attached to one-axle tractors are hardly known. They are part of mechanisation project in many countries and could be a useful second step in mechanisation efforts. As they are small and easy to manoeuvre, they could also be interesting for service providers targeting medium sized farms.

Forage growing has developed due to growing demand of feed and as an alternative in regions where farmers are faced to increasing challenges in the growing traditional crops as maize. In the Rift Valley and Laikipia 1000s of farmers switched to Rhodes hay production. Normally they do not have own machines and buy in machinery services either from private service providers or from the cooperative which offer harvesting services like mowing, raking and bailing.

The high-end farms are fully equipped and use disc mowers.

Forage processing

In this chapter we look into forage processing, not forage conservation. Forage processing in the meaning of preparation of fresh feed / forage material for feeding. All the forages, being it Napier, Sweet potato vines, Brachiaria, Panicum and others consist of stems and leaves. It is easy to imagine that leafs are more palatable than stems which contain higher percentages of lignin and are harder. If fed in whole, cows tend to select leafs and leave over the stems which results in a modest feed intake and high losses.

How can that be approached? Either forages is harvested very young with a little percentage of stems, or forage is processed before feeding. Normal practice is that forage is cut in pieces of 2-3 cm resulting in a higher intake by the animals and less waste. The feed preparation was generally done by hand in former days, using a panga (machete). This still does apply for many smallholder farming households with 1 -2 cows and is still widely practiced in Western Kenya. This practice is very time consuming, often practiced by women and children and bears a non-neglectable risks of injury.

A panga and a hand hoe are the standard tools used in the small-scale farms. These small-scale farms often still work very traditional with very basic means and the demanding work intensity for feed processing can be looked upon as a limiting factor for further growth of dairy activities.

With growing farm size and better income, farmers use 'sharp cutters' or 'choppers' to do the work. Until a couple of years ago, they were hand driven. With the increasing electrification in rural areas, more and more farms change to choppers with electric engines, with a petrol or even diesel engine.

While in the more advanced dairy farms in the Meru area, every farm (we are working with) has at least one engine driven chopper , in Western Kenya the farms are often smaller, less business oriented and only about 10% own choppers (C. Weber, ILRI, 2019)

Silage making

Silage making was promoted strongly by KMDP, which ended mid-2019, but also by other projects and is meanwhile an integrated part of feed conservation on many farms in central Kenya. Silage making is only possible with technical equipment. The main forage used is maize, followed by Napier, Sorghum and grasses. The minimum technical equipment is a chopper, which is able to crack the kernels of maize respective Sorghum and produces pieces of maximum 3 cm length as well as a drum roller to compact the material. As the machines are only used 1-2 times per year the investment would not be economical for the individual farmer and very little farms own such equipment. There are service providers (e.g. service provider enterprises) who offer the very silage making activities, but also harvesting of the material and the transport to the silage pits.

Some bigger farms in the Eldoret area have invested over the last 3 years in fully mechanized silage production as a commercial activity. These farms own tractors, harvesters, huge silage bunkers and fully automatised bailing machines (see publications on 'maize train', SNV, 2018/2019). The bailed maize silage is used for their own purpose as also sold to dairy farmers all over Kenya. As all this equipment is requesting high investments by the farms, they also offer their services to other farms to amortise better the investment.

Hay making

Hay making is the most common conservation method for forages in Kenya. Nearly every farmer can practice it, if he either grows his forage for hay production or is haying excess production for scarcity periods.

As mentioned before, the farm types vary as varies the technical equipment of the farms. The bulk of the farms are small-scale and their equipment is very basic what also applies for hay producing farms. However, there is the whole range of farms from the basic small-scale to the large fully technical equipped ones.

Small-scale mixed crop-livestock farmers

Limited land availability and a low level of mechanisation characterize small-scale farms. The produced forage is in general harvested to cover the daily feed needs of the animal(s). Forage is

seldom conserved as hay. The little number of small-scale farms making hay use pangas to cut, sticks to turn / rake and simple boxes if they produce bails and do not store the hay in bulk.

Commercial hay farmers

Commercial hay farmers of small to medium size seldom are equipped with machines. They buy in machine services from Agricultural Machine Service providers or from the cooperative in which they are often organized (e.g. Laikipia hay growers association, Rift Valley hay growers association).

Only the very big commercial farms have their own machines like Tractors, disc mower, rakes and bailers.

Conclusions

In Kenya, there is a whole variety of farm with different grades of mechanisation. The mechanisation level of the big amount of the small-scale farms is still very low. When machines are used in the forage conservation and processing, these services are often bought in from service providers.

There is a big market for offering machine services. Especially the market for smaller machine services is not covered at all. One-axle tractors equipped with different machines like ploughs, harrows, sickle mowers and rakes could be an interesting investment.

As land is a limiting factor and increase of production by more land use will come to its limits, productivity on the available land has to be increased. One important element for increased productivity will be a higher mechanisation level.