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Factsheet

HOW TO MAKE SILAGE ON SMALL FARMS

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Ensilage or silage making is one way of storing feed materials for use later by animals. It is a fermentation process which takes place in the absence of air. Acids, especially lactic acid produced by the fermentation process preserve the feed materials. Silage is the name given to the preserved feed. Any moist feed material (water content 65-75%) can be ensiled. Such materials would include green forages (e.g. King grass, Elephant or Napier grass, Taiwan grass, sugar cane, Gliricidia and Leucaena) and agro by-products (e.g. cassava, citrus pulp, banana and sweet potato.) For most small ruminant farmers, forages are the usual materials ensiled.

Equipment

The principai pieces of equipment used to make silage are a container called a silo and harvesting and chopping implements.

Silos

There are different kinds of silos. These include metal or plastic drums (barrels), wire basket and pit silos. Others are concrete tubes, trench, bunker, heap or stack silos and plastic bags. Drums, concrete tubes and plastic bags are used in the same form as they are acquired. Plastic bags, however, must be strong, Flimsy bags puncture easily which will allow air and water to enter and cause the silage to spoil.

Wire Basket Silo

A wire basket silo is made by shaping 1-1.5m (3-4ft) wire mesh or chain link into a cylinder. Bamboo splits or similar pieces of wood are interwoven between the spaces in the mesh/link to give the basket support. The basket is lined with plastic sheeting before packing the forage.

Stack Silo

A heap or stack silo can be formed on any parcel of level ground or on a concrete slab. This type of silo has no

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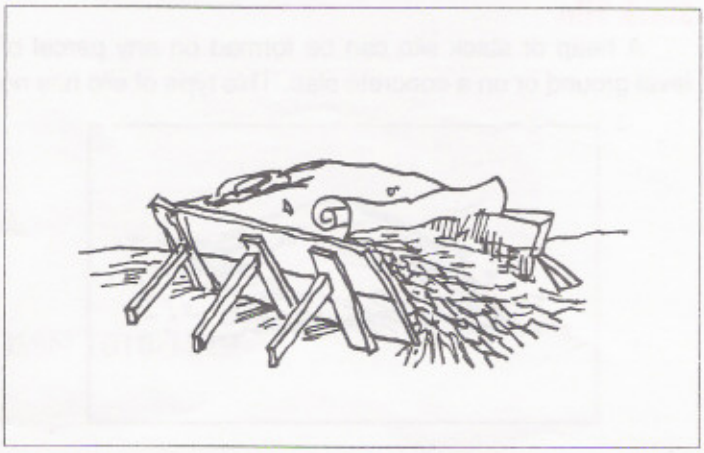
rigid walls; the stacked material defining the shape and outline of the silo.

Pit Silo

A pit silo is a silo of any shape dug in the ground. Like a trench silo it should be located on high ground or on well drained soil. A bunker silo has the same features as a trench silo except that it is constructed above ground. This is the preferred type of silo where the water table is high.

Bunker Silo

Pit, trench and bunker silos should be constructed with a narrow width, about 1-2m (3-6ft), to help reduce the surface area of silage exposed to the air at the time of feeding. This will minimise losses due to spoilage caused by heating and mould growth. The depth should also facilitate easy removal of silage for feeding. A depth of 1m (3ft) is adequate. The walls of these silos should be smoothened with clay bricks, concrete blocks or plastic sheeting in order to prevent the formation of air pockets while compacting the material. These three types of silos should also be constructed with a slope to ensure good draining of effluent. Drainage is further enhanced by providing a sand/marl base to a depth of about 10cm (4in). A similar sand/marl base should be provided for the wire basket, concrete tubes and the heap/stack silos.



Harvesting and Chopping Implements

Cutlass (machete), scythe and sickle-bar mower are the implements normally used to harvest the forage for ensilage.

In order to ensure good compaction and the removal of air pockets from the silo the materials should be chopped into smaller pieces 20 – 40mm (0.75 – 1.5 in) before ensiling. Chopping can be done with a cutlass on a log or with a manual or a motorised chaff cutter. The size of the chopped forage made by most chaff cutters is usually adequate for ensilage.

Additives

Additives are ingredients added to feedstuffs during ensilage so as to enhance the quality and palatability of the silage, and ultimately the productivity of the animals. On small farms molasses and poultry litter may be used as additives (Table 1).

Molasses should be added at the rate of 6-10% of the fresh weight, while poultry litter can be added at the rate of up to 30% of the fresh weight of the forage.

Table 1. Effect of poultry litter as an additive on the quality and productivity of king grass silage

Item	King grass	King grass+ 15% poultry litter
pH	5.4	4.7
Dry matter (%)	28.0	32.7
Total N (% of DM)	1.5	2.0
Lactic acid (% of DM)	2.6	2.9
Duration of trial (d)	105.0	105.0
Initial liveweight (kg)	14.6	14.2
Final liveweight (kg)	30.1	33.3
Daily liveweight gain (g)	148.0	182.0
Silage intake (kg/d)	1.9	1.8

Note:- Lambs also received a supplement of agro by-products ration at the rate of 2% of their body weight.

Six steps to making good silage

STEP 1

Harvesting and Wilting

The first step in making ensilage is to harvest the forage in the field. The forage should neither be too young nor too old. If forages are harvested regularly then 6-8 weeks regrowth for grasses and about 12 weeks regrowth for gliricidia and leucaena are recommended. After harvesting the forage is wilted. Wilting may be effected by harvesting the forage in the morning and leaving it in the field until the afternoon. Alternatively the forage may be cut in the evening and left in a pen or open-sided shed overnight.

Forages to be harvested

STEP 2

Chopping

Next the wilted forage is chopped into small pieces. At this stage it may be necessary to estimate the weight of the forage that would form a layer in the silo for the determination of the amount of molasses and/or poultry litter to be added. One cubic metre (27 cu ft) of silo will store about 400kg (880lb) of forage.

Cutting King grass with a chaff cutter

Modified lawn mower forage chopper

STEP 3

Filling the silo

The next step is to pack the chopped forage into the silo.

Packing forage in silo sacks

STEP 4

Compacting

When sufficient forage has been packed into the silo to form a layer, the material is then compacted using a roller or just by stomping on it.

Compacting forage in the silo

STEP 5

Incorporation of additives

After each layer of forage is compacted the molasses and/or poultry litter is sprinkled on the layer. The required amount of molasses should be mixed thoroughly with an equal volume of water to ensure an even spread and also to prevent "spot burning" of the forage.

Molasses is used on compacted forage

STEP 6

Covering and sealing the silo

Packing, compaction and incorporation of additives are repeated until the silo is completely filled, after that the silo should be covered and sealed to prevent air and water from entering. Plastic sheeting is usually used to cover the silo although banana leaves may also be used. Finally the cover is weighted down with wood, concrete blocks, sand, soil or preferably old tyres.

Remember to cut holes in the side walls of the tyres to prevent rain water collecting and forming stagnant pools in which mosquitoes will breed.

Feeding the silage

The fermentation process in the silo is normally completed within three weeks of ensiling and the acids produced will preserve the silage indefinitely as long as the silo remains sealed. The silage can therefore be fed anytime after three weeks of ensiling.

Once the silo is opened the surface that becomes exposed starts to grow moulds and such mouldy parts should not be fed to animals. To minimise spoilage due to mouldiness the silo should be opened only sufficiently enough to remove one day's requirement of silage.

The daily requirement depends on the number, classes and physiological status of the animals, as well as the use of the silage either as the only source of forage or a supplement to pasture grazing.

For example the voluntary consumption of fresh silage by dry and non-pregnant adult female sheep and goats, and also lambs and kids raised indoors is about 8% of their body weight. This increases to about 15% of their body weight during late pregnancy and early lactation. In practice about one-and-a-quarter times the calculated amount is offered free choice.

There are some precautions to be taken when feeding silage. The acids of the silage can cause digestive disturbances. Hence sucking lambs and kids should not be fed silage. For older animals silage should be introduced gradually in small amounts over 4-7 days.

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