

FODDER CONSERVATION USING A MANUAL BALER

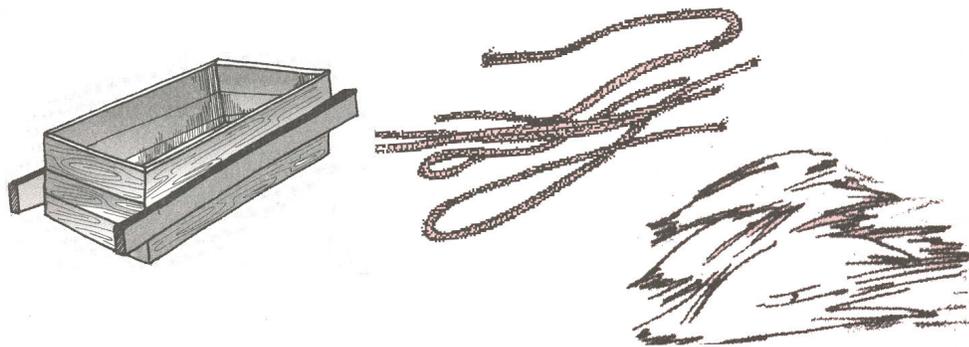
Marginal areas are characterised by many hostile conditions that affect both human and animal populations. The scarcity of food and water is therefore a common problem. The rains fall in the shortest season thus making the availability of water a major problem.

A big problem for farmers in drylands is how to preserve forage during the rainy season to feed animals during the dry months. One way of doing this is by harvesting the forage, drying and baling (compacting) it to make hay.

The process of hay bailing is less complicated compared to silage making. Hay also lasts longer. Both planted and natural forages can be made into hay, but the forages have to be well secured to avoid moulding or overheating. In good sunny weather, well spread and turned forages will be ready for bailing in three days. A simple box baler or the improved mechanical type can be used to make bales.

Making a simple baler

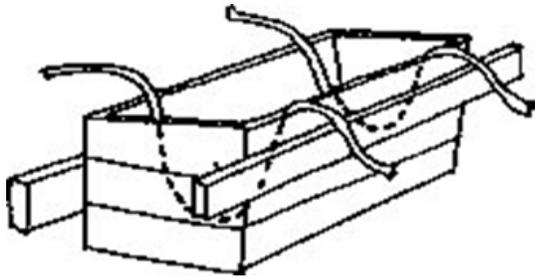
A simple baler is made of a solid wooden box with a hollow bottom. A good size is one that is 100cm long, 50cm wide and 40 cm deep. Other measurements can also be used but the box should retain a rectangular shape and should not be too big. Ropes and some hay (dried grass) are also needed.



Procedure

The procedure for making hay with a simple baler is as follows:

1. Place two pieces of rope or twine across the bottom of the box, through the notches



2. Fill the box with dry grass



3. Compress the grass in the box and bind the hay using a strong knot



4. Bind the hay using a strong knot and lift the box to release the bale



technical note

The improved baler

The improved baler is made of light durable metal. It has a plunger-driven sliding mechanism that multiplies the force exerted by the operator to compact the hay by up to nine times. Some 50-80 bales of 10-16 kg each can be made by two people in a day.

Advantages

- Easy to operate and maintain. Can make bales as compact as those made by a tractor baler.
- Increases the amount of hay that can be stored or transported in comparison with bulky hay. This reduces the unit cost of the hay.
- Increases the use of forages from areas where grazing is not allowed.
- The baler has wheels and can easily be drawn by drought animals or one person.
- The capacity of the baler makes it suitable for use by farming groups. Such groups can also use it for income generation.

Disadvantages

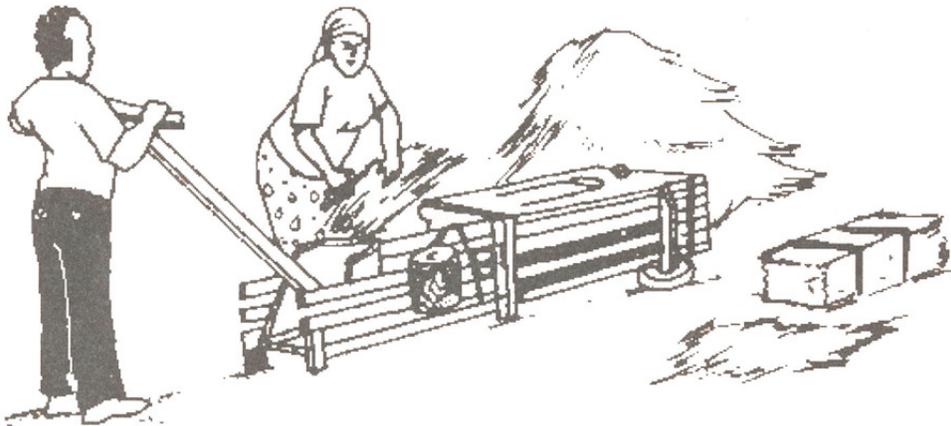
- Too expensive for individual small-scale farmers.
- Can only be constructed by trained artisans.
- Capacity is much lower than that of a tractor baler.
- The bale cannot be bound as tightly as it would be by a tractor baler.

Harvesting forage

It is important to note the quality of forage before deciding to harvest it. Time in this respect is important since it determines the maturity of the forage. A simple procedure can be followed in preparation for baling.

Harvesting

- Harvest forage well during the flowering stage (two months after the onset of the rains). This should be done during the dry spell in the rainy season.
- Spread the forage in the sun and dry it for two to three days, regularly turning it to ensure even drying.
- Pile the forage ready for bailing. Bale the forage immediately, as even a little rain will lead



Operating the equipment

- Place sisal twine in the string compartments and thread through the guiding eyes.
- Collapse the wheels and anchor the baler using the support legs.
- One operator feeds the storage into the receiving chamber as a second compresses the grass using the plunger.
- The plunger pushes forage to the end of the receiving chamber. The bale is held back by a locking fork. The process is repeated until the operator cannot compress the bale any longer.
- Use the twine fisher to pull up the strings and tie the bale.
- Remove the locking fork. Once the pin is removed, the first bale pushes out the next and the process repeats for subsequent bales.
- Remove the last bale by opening the top lid and pulling from the rear.

Storage

Bales should be stacked in a place protected from the sun, rain and pests. This could be on a raised platform covered with grass or a polythene paper. Organic pests repellent such as ash may be used. A bale so stored can be kept for up to six years without losing nutritional value or dry matter. Where there is no shed the bales can be stored in the open in a pyramid shape. However the top bales may be wasted.

Bailing for pastoralists

The improved baler can reduce the distances livestock have to travel for pasture. Using donkeys or camels, farmers can transport the baler as they move with stronger animals to where grass is available. They can then bale the grass and transport it back to watering points to feed weaker or lactating livestock.

How the baler was developed

Three acres of grass were going to waste at the SACDEP - Kenya demonstration farm in eastern Kenya at a time when a bale of hay was selling for up to Ksh. 200. Efforts to find a tractor hay baler locally were unsuccessful. Faced with this challenge, SACDEP, an indigenous NGO, sponsored the development of the first wooden prototype of the improved manual baler at a cost of Ksh. 15,000. At the testing stage, the prototype made 200 bales weighing 9kg each in two weeks. The NGO sold the hay for Ksh. 30,000 making a profit of Ksh.10,000 after deducting Ksh. 20,000 that had been spent on developing the baler and farm labour. The success of the baler motivated the innovators, Steel head Engineering, to commit more time to research. The improved baler was devised after six months of trying out different options. The improved baler was developed by a Kenyan company, Steelhead Engineering, in 1999.

technical note

Fodder Conservation Using a Manual Baler was produced from an excerpt of a manuscript by Aichi Kitanyi of the Regional Land Management Unit, RELMA/SIDA for the Arid lands Information Network (ALIN) and appeared in the [Baobab Journal](#) Number 31, May 2001. Baobab is published by ALIN with support from ILEIA - The Centre for learning on sustainable agriculture. ALIN and ILEIA are members of AgriCultures, a global network of organisations that share knowledge and provide information on small-scale, sustainable agriculture worldwide. Baobab is published four times a year. It is a magazine on small scale sustainable agriculture which is the East African edition of the AgriCultures Network global magazines.

Arid Land Information Network
AAYMCA Building
State House Crescent off State House Avenue
PO Box 10098 - 00100 Nairobi,
Kenya
Tel: +254 (20) 2731557 / +254 (20) 2629761/62
Mobile: +254 728 606 916
E-mail info@alin.net
Website <http://www.alin.or.ke/>

Arid Lands Information Network (ALIN) is an International NGO that facilitates information and knowledge exchange to and between extension workers or informediaries and arid lands communities in Kenya, Uganda and Tanzania. The information exchange activities focus on small-scale sustainable agriculture, climate change adaptation, natural resources management and other livelihood issues.

Practical Action
P.O. Box 39493 – 00623 Nairobi
Kenya
Tel: +254 20 2595 311 /12 /13 /14 /15 /16
E-mail: practicalaction@practicalaction.or.ke
Website: <http://practicalaction.org/practicalanswers/>
 [@PracticalAnswer](#)

Practical Action is a development charity with a difference. We know the simplest ideas can have the most profound, life-changing effect on poor people across the world. For over 40 years, we have been working closely with some of the world's poorest people - using simple technology to fight poverty and transform their lives for the better. We currently work in 15 countries in Africa, South Asia and Latin America.

technical note