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# Least-cost rations for sheep fattening: A manual for livestock farmers and extension workers in the West African Sahel

# Least-cost rations for sheep fattening: A manual for livestock farmers and extension workers in the West African Sahel

Version I

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# I Introduction

Sheep fattening is an increasingly important economic activity in the West African Sahel, particularly in and around Tabaski, the Islamic festival of *Eid-al-Kabir* (Ayantunde et al. 2008). The low level of initial investment, rapid turnover rate, the high degree of social acceptance and easy access to the market make sheep fattening extremely attractive to poor farmers, including women. It entails feeding young sheep for a short period, leading to a 30–40% increase in edible carcass yield.

The main strategy is to fatten young, lean male sheep, born on-farm or, more frequently, purchased on the open market, over a two–three-month period. Fattening is increasingly providing opportunities to rural and suburban Sahelian communities to improve household food security and incomes. Sheep farmers traditionally feed their animals with whatever food that is available: feed waste when available and underfeeding in times of shortages. Consequently, growth rates in traditional sheep fattening have remained low and largely unprofitable.

Many studies have been conducted to develop alternative feeding strategies to make sheep fattening profitable. This manual provides simple and tested practical guidelines for livestock farmers and extension workers on least cost ration based on locally available feed resources for sheep fattening. It contains details on feeding and management options that can be applied by small-scale producers. Other key issues addressed in the manual include housing, purchase of feed, general hygiene and the handling of animals.

## 2 Sourcing animals for fattening

Whether the animals are selected from the farmers' flock or purchased on the open market, the following criteria should be carefully considered when selecting sheep for fattening.



- **Animal health:** Health is one of the main criteria guiding the selection of animals. In general, an animal in good health is distinguished by a wet muzzle, smooth hair and its agility. The absence of these signs indicates discomfort in animals. The incidence of *pestes des petits ruminants* (PPR) is quite high in the West African Sahel whenever sheep and goats from different sources are gathered together in the local markets. Animals should be observed closely to prevent infection with PPR.
- **Skeletal frame:** The animals should have a large skeletal frame and good body condition. Lean animals fatten faster. Avoid emaciated animals as their poor condition may not entirely be due to nutritional factors. Emaciated animals often take a long time to recover.
- **Breed:** Identify breeds for which there is the greatest growth potential and high demand in the market. Bali-Bali, Oudah, Ara-Ara and crossbred sheep are generally preferred for fattening in West African dry areas. Bali-Bali sheep are particularly popular during the Tabaski period.
- **Colour:** Select white or bicoloured coated sheep. White coat colour is preferred during Tabaski.
- **Sex:** Although female animals mature earlier than males, females are mostly kept for production, while males are mostly used for fattening. In terms of marketing for religious purposes, male animals are preferable.
- **Age:** Animals can be put on intensive feeding program at any age, usually after weaning. It is advisable to select sheep between 18 and 24 months for fattening. Avoid old animals. A sheep's dentition provide a good indication of its age.



## 3 Feeds and fattening strategies

The major feed resources available for fattening in the Sahelian zones are:

- **Bush hay:** *Andropogon gayanus*, *Eragrostic tremula*, *Pennisetum pedicelatum*, *Digitaria ciliaris*, *Zornia glochidiata*, *Ctenium elegans*, *Schizachyrium exile*, and *Borreria stachydea*
- **Crop residues:** Cowpea hay, groundnut haulm, and millet, maize and sorghum stover
- **Cereal brans:** Maize, millet, sorghum and rice bran
- **Browse plants shrub/tree fodder:** *Faidherbia albida*, *K. senegalensis*, *Piliostigma reticulatum*, etc.
- **Agro-industrial by-products:** Cottonseed cake

Most of these feed resources are seasonal, particularly bush hay, crop residues and shrub/tree fodder. Available at fodder markets, their cost varies markedly depending on the season and market location. Given that feed cost accounts for at least 60% of total fattening operational costs, sourcing cheap feed resources is critical to profitable sheep fattening. Many rural households frequently use crop residues from their farms and brans from processed grains to reduce feed cost. When buying feed resources, farmers should observe the feed properly and bear the following in mind:

1. Avoid mouldy feeds (bush hay, brans and cottonseed cake). It may indicate spoilage and lower quality.
2. In case of bush hay and crop residues, select bundles with more leaves than stem. Leaves are of higher nutritional value than stems.
3. Prominent brown rather than green, colouration in groundnut and cowpea haulms may indicate lower quality.

Observe closely to detect adulteration or physical spoilage of the feeds.



Green colouration shows well-preserved cowpea haulms.



Brownish colour indicates poor-quality cowpea haulms.

## 4 Housing system

Animals should be provided with shelters, not necessarily expensive ones, to protect them from harsh environments. A simple and inexpensive shed, made from locally available materials, such as bamboo or mud with thatched roof, should be constructed for the animals.

The objective in a fattening operation is to convert as much of the feed as possible into body tissue. It is, therefore, necessary to minimize the movement of animals during the fattening period, allowing them only limited exercise. The space required per animal is about 2 m<sup>2</sup> and the shelter should normally be open on one side. Muddy feedlots drastically reduce feed efficiency; therefore, it is necessary to keep the premises dry. Feeding and water racks should be accessible to both animals and the manager, preferably in front of the aisle.





**Feeding and watering troughs:** Feeding and watering troughs should be strong, and easy to clean. Half-cut metal drums or aluminium bowls which cannot be easily damaged are preferred. For large-scale or continuous fattening operations, concrete-made feeders would be advisable. The fattening program should be started after the necessary feed supplies are secured. Underfeeding and incorrect timing are the most common causes of unprofitable fattening activities.



## 5 Feed rations

This involves providing the animal with balanced cheap rations that meet its energy needs, as well as providing the protein and minerals necessary to meet its maintenance and growth requirements. Sheep fattening feed rations should generally contain about 60% forage (roughages) and 40% legume crop residues or concentrate feed. The daily feed ration of roughages, the basal feed, should be made available to the animal *ad libitum*, corresponding to about 3–5% of its body weight. These could be millet, sorghum straw or bush hay. The commonly used legume residues for sheep fattening in West African Sahel are cowpea hay and groundnut haulms. The period of time of profitable fattening should be between 50 to 90 days, depending on feed availability and the animal's initial weight.

Feeds should be properly handled they are being weighed, served and stored in order to avoid wastage. Poor feed handling may reduce the nutritive value of feed. Hay should be stored on cool shaded-racks or in a barn to avoid exposure to heat and rain, while brans and concentrate should be properly stored to prevent termite and rodent attack, and contamination.

## 6 General management tips for sheep fattening

1. Newly purchased animals for fattening should be quarantined for about 10 days during which they are given prophylactic treatment and monitored closely for any signs of disease. If there are signs of disease, such animals should be separated from the rest of the flock. If the disease persists, the animals should be disposed of immediately.
2. Animals should have feed available at all times. If there is no feed left in the morning, feed supply should be increased the following day.
3. Clean all the sheds and dispose of the manure every day to maintain a hygienic environment.
4. Adapt the animals to fattening legume crop residues or concentrate diet over a two-week period by feeding the concentrate after the animals have consumed roughage to provide bulk. Gradually increase the intake of the concentrate every two days, while providing free access to the basal roughage diet.
5. For a profitable fattening operation, feeds should be purchased, when prices are lowest, and stored.
6. Sheep can be either selected from the household flock or bought; in the case of the latter they should be purchased when prices are low. In the Sahel, the price of animals is generally low in the late dry season (April–June) and during harvesting period (September–December). Fattening should be planned to coincide with periods of high demand, such as Tabaski and Christmas.
7. Clean water should be available at all times. Dirty water should be replaced immediately. An inadequate water supply will affect feed intake and consequently animal performance.
8. Cull non-performing animals. Animals that do not respond to intensive feeding should be culled as soon as possible. They can be identified by their poor performance in the initial stages of feeding.
9. Farm records are essential in evaluating and improving the performance of a fattening operation, particularly a large-scale fattening scheme. The format chosen should be simple and easy to understand.

Some available feed resources commonly used in sheep fattening in Niger

*Hibiscus sabdariffa* residue (Oseille)



Cowpea haulms



Sorghum stover



*Alysicarpus ovaliofolus*



*Zornia glochidiata* hay



Millet bran

## 7 Recommended feed rations for profitable sheep fattening

Several on-farm and on-station studies on sheep fattening have been conducted by ILRI in the West African Sahel, mainly in Niger, based on locally available feed resources. The recommendations from these studies are presented below.

Basal feed	Supplement	Duration of fattening	Net benefit (XOF)	Source/reference
Bush hay (dry natural pasture) fed at 40 g/kg body weight	300–600 g cowpea hay 400 g millet bran	60–90 days	XOF 6000 per animal	Hiernaux and Ayuntande 2004
Bush hay ( <i>Zornia glochidiata</i> and <i>Hibiscus sabdariffa</i> residue)	600 g cowpea hay 400 g millet bran	70 days	XOF 7099 per animal	Dangoma et al. 2004
Bush hay (dry natural pasture) fed at 40 g/kg body weight	450 g groundnut haulms	70 days	XOF 1400 per animal	Ayantunde et al. 2007
Bush hay (dry natural pasture) fed at 40 g/kg body weight	600 g groundnut haulms 400 g millet bran	56 days	XOF 2260 per animal	Ayantunde et al. 2008
1.4 kg bush hay	400 g cotton seed cake 600 g millet bran	48 days	XOF 12,512 per animal (sold during Tabaski)	Dangoma et al. 2015



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