

*PN-ACM-358*



# Feed Resources for Ruminant Livestock



ILRI Slide Series

**International Livestock Research Institute**

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## Preface

Inadequate feed during the dry season is a major constraint to ruminant productivity. In sub-Saharan Africa human population is increasing rapidly, forcing farmers to use grazing areas for arable farming. As a result, smallholder farmers in sub-Saharan Africa have integrated livestock into their cropping systems. For the crop-livestock system to operate efficiently, farmers need to give special attention to feeding the animals. This slide series presents the various sources of feed in the Ethiopian highlands as a case study.

This series is developed for young animal scientists with BSc or MSc degrees. It can also serve senior animal scientists by providing slides for seminars or lectures in educational institutions. The series is made up of slides and a booklet that contains pictures and text.

I acknowledge Woizero Menbere W/Giorgis for the photographic work. I acknowledge Ms Anne Marie Nyamu for editing the text of the booklet and the staff in the ILRI Publications Section for design, layout and printing.

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Training Materials Specialist

## **Feed resources in sub-Saharan Africa**

This is a slide set on 'Feed Resources for Ruminant Livestock', which is part of a series produced by the International Livestock Research Institute (ILRI). Livestock in sub-Saharan Africa are dependent primarily on native grasslands and crop residues; however, feed resources are gaining importance. This slide series provides a general overview of feed resources. It is intended to enable you to:

- list feed resources for livestock
- use feed resources to improve the nutrition of cattle, sheep and goats.

1.



## Grassland

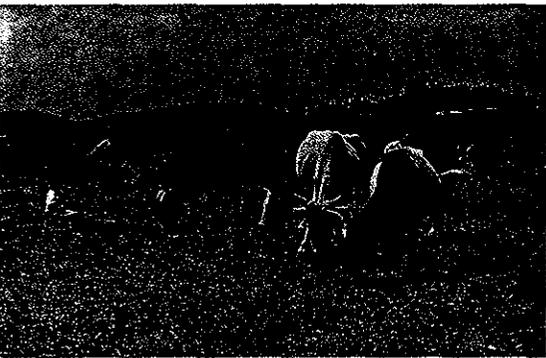
1. A flock of sheep grazing in Debre Zeit area, Ethiopia. Natural pastures are an important source of feed for sheep and goats in sub-Saharan Africa. The productivity of sheep and goats on pasture is affected by the quality of the vegetation.

2.



2. A zebu cow grazing natural pasture at the end of the rainy season in the Debre Zeit area, Ethiopia.

3.



3. A herd of cattle grazing along the roadside in Debre Zeit, Ethiopia. When there is a shortage of feed, farmers graze their animals on marginal land.

## Fodder crops

4. A farmer in the highlands of Ethiopia cutting Napier grass to carry to feed his livestock. Napier grass (*Pennisetum purpureum*) is an important fodder in sub-Saharan Africa. Farmers grow this grass to feed their livestock.

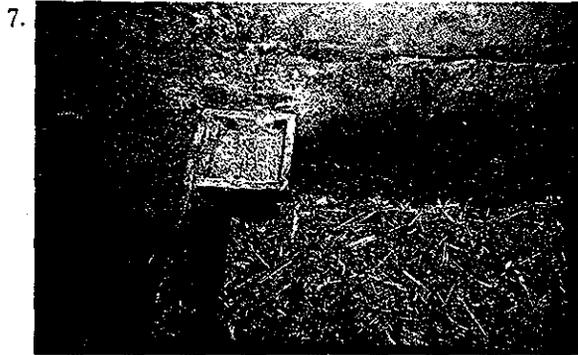


5. The BKO hybrid, cultivar BH660, which produces high leaf biomass, at ILRI Research Station in Debre Zeit, Ethiopia. Farmers grow maize to feed to their ruminant livestock.



6. Lablab (*Lablab purpureus*) grown at the ILRI Research Station in Debre Zeit, Ethiopia. Legume fodder, when fed to ruminant livestock, provides high protein supplement to the straw feed.





7. Farmers chop fodder and feed it to their livestock. Chopping eases chewing and increases palatability of the fodder.



8. A zebu cow in a zero grazing unit eating chopped fodder.



9. Chopping sugar beet at the ILRI Research Station in Debre Zeit, Ethiopia. Fodder beet is handy to feed if available and economically feasible. Other products can be chopped and fed to ruminant livestock.

10. Lablab intercropped with sorghum. Farmers intercrop legume fodder and their food or cash crops. The cereal crop will benefit from the fertility added by the presence of the legume. This gives the farmer a source of feed for his livestock and food and/or income from the sorghum.

10.



11. Alley farming in Nigeria. Intercropping fodder trees and crops is widely known as alley farming. The crops are grown in between rows of trees. In this case the farmer has cut the trees and used their leaves as livestock feed and the wood as fuel for domestic needs.

11.



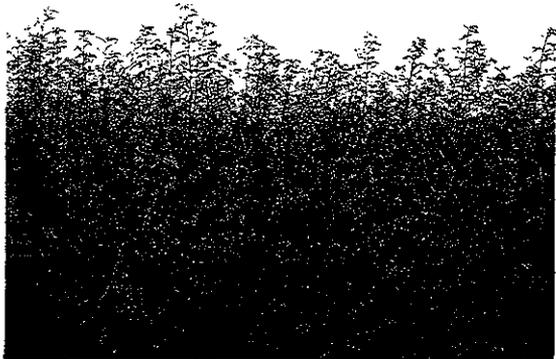
## Fodder trees

12. Tagasaste (*Chamaecytisus palmensis*) at the ILRI Research Station in Debre Zeit, Ethiopia. Many tree species are used for fodder, e.g. *Sesbania sesban*, *Calliandra* spp, *Gliricidia sepium*. Fodder from trees is especially useful during the dry season when it is used as a supplement to the roughage or hay.

12.



13



13. Scientists at the ILRI Research Station in Debre Zeit, Ethiopia, evaluate *Sesbania sesban* accessions for digestibility, maturity type, leafiness, antinutritional factors, tolerance and yield.

14.



14. *Acacia angustissima* (in the foreground of the photograph) after cutting.

15.



15. *Leucaena* sp grown for seed at the ILRI Research Station in Debre Zeit, Ethiopia. Farmers harvest seeds from fodder trees to propagate them.

16. Goats feeding on *Leucaena leucocephala* at the ILRI Research Station in Debre Zeit, Ethiopia. Farmers can allow their livestock to graze fodder trees.

16.



17. Sheep feeding on *Leucaena leucocephala* at ILRI Research Station in Debre Zeit, Ethiopia.

17.



18. Livestock under a *Faidherbia albida* tree in a farmer's field. When fodder is scarce, especially during the dry season, livestock rest in the shade of *Faidherbia albida* and eat the pods that fall from the tree. Farmers also cut branches so that the animals can eat the leaves. The tree, being a legume, provides protein supplement. The manure from the animals increases the fertility of the soil and hence the crop grows better under the tree.

18.



19.



19. A woman from the Ethiopian highlands stripping leaves off the fodder tree *Sesbania goetzei*. Leaves from fodder trees can also be fed dry to ruminant livestock. The leaves are stripped off the trees before drying, facilitating storage of the fodder.

20.



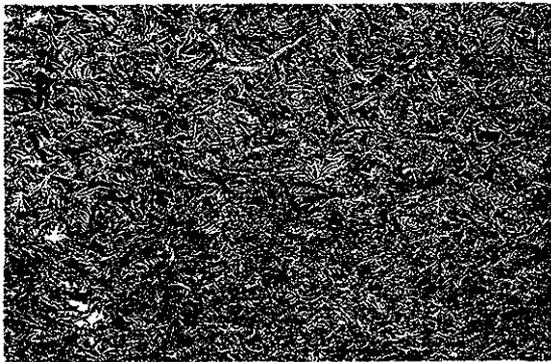
20. A group of women in the Ethiopian highlands stripping the leaves off fodder trees. Note the sacks where the stripped leaves are kept.

21.



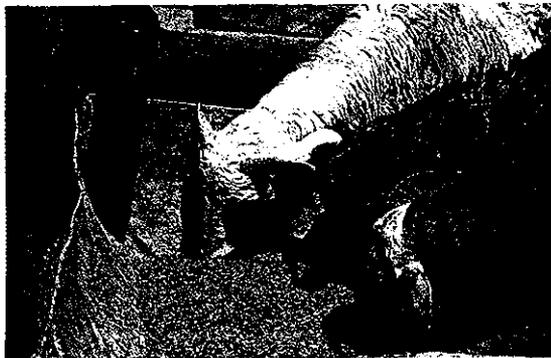
21. A farm labourer from the coastal area of Mombasa, Kenya, stripping the leaves off branches cut from a fodder tree.

22.



22. *Leucaena* leaves drying in Debre Zeit, Ethiopia. Sun drying is the most practical way of drying leaves of fodder trees.

23.



23. Sheep feeding on dried *Leucaena* leaves at the ILRI Research Station in Debre Zeit, Ethiopia.

24.



### Crop residues

24. A field of a mature crop of wheat at the ILRI Research Station in Debre Zeit, Ethiopia, ready for harvesting. Farmers harvest the grain in their food crops and the remaining parts of the harvested plants are fed to livestock.

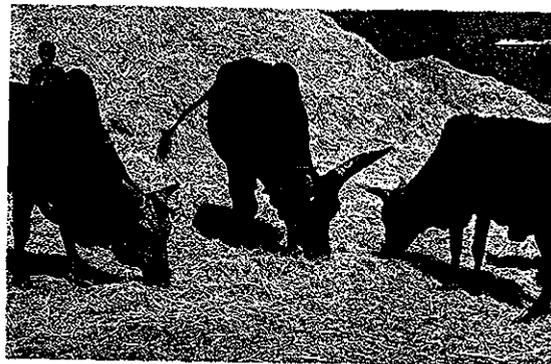
25. Wheat straw remaining on the ground after harvesting. The residues remaining after harvesting are an important feed source for livestock for many farmers.

25.



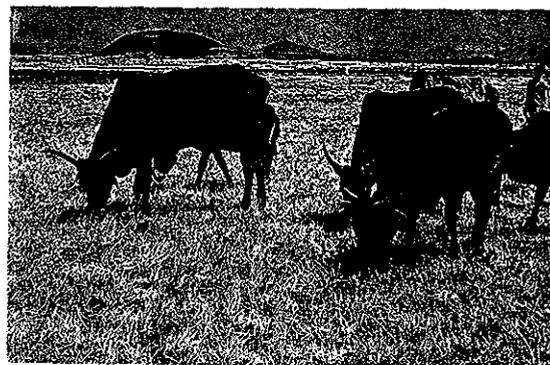
26. Zebu cattle feeding on wheat straw in a field in Debre Zeit, Ethiopia. Note in the background the heap of straw that the farmer will later store.

26.



27. Cattle feeding on the stubble of wheat in the Ethiopian highlands. Sometimes the stubble remaining after harvest is used to feed livestock.

27.



28.



28. A mature crop of teff (*Eragrostis tef*) at the ILRI Research Station in Debre Zeit, Ethiopia, ready for harvesting. Teff is one of the staple foods in Ethiopia.

29.



29. A farmer in the Ethiopian highlands harvesting teff.

30.



30. A farmer in the Ethiopian highlands threshing his teff crop. Farmers in the Ethiopian highlands place harvested teff in heaps. The heaps are left to dry and then the grain is threshed.

31. Cattle in the Ethiopian highlands being led by a farmer to thresh teff. The heaps in the background contain teff that is not yet threshed.



32. A vendor selling teff straw in Addis Ababa, Ethiopia. Farmers who do not keep livestock or who have excess teff straw sell it.



33. A farmer from the Ethiopian highlands collecting maize cobs to feed to his livestock. Farmers use various kinds of crop residues.



15

34.



34. Cattle in the Ethiopian highlands feeding on maize stover.

35.



35. Farmers also feed straw to cows kept in sheds or zero-grazing systems.

36.



### Conserved fodder

36. Oat-vetch mixture is cut at the ILRI Debre Zeit Research Station, Ethiopia, so that it can be conserved and fed to livestock. Vetch is a legume and thus increases the amount of protein in the feed.

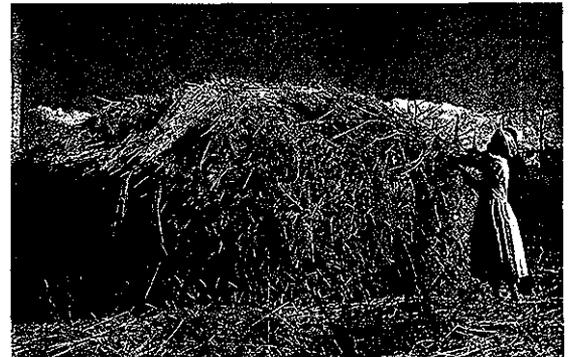
37. Farmers in the Ethiopian highlands collecting maize straw and placing it in heaps to be fed to livestock at a later date.

37.



38. Farmers harvest oats and place it in heaps to dry for threshing. The straw is used to feed livestock.

38.

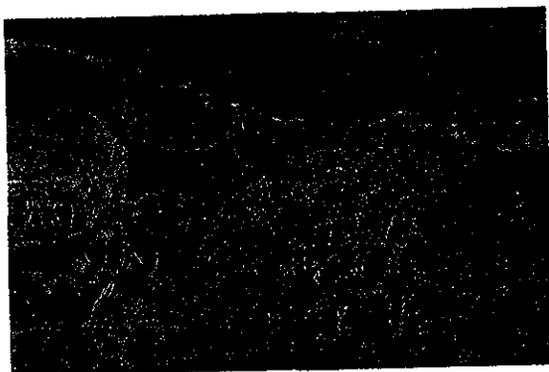


39. Straw bales made at the ILRI Research Station in Debre Zeit, Ethiopia. When facilities are available, straw can be made into bales for easy handling and storage.

39.



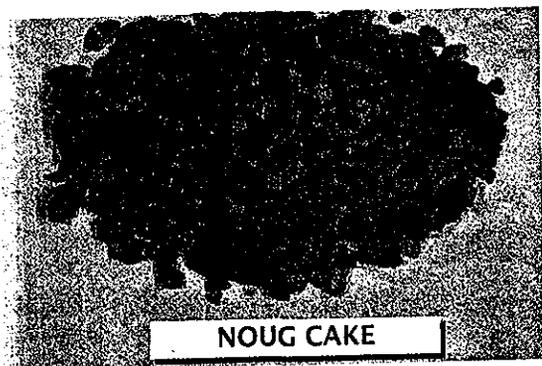
40.



## Industrial by-products

40. By-products from industry represent a good source of materials that can be used to feed livestock. They usually supplement other feed. When cotton seed is pressed to extract oil, cottonseed cake is a by-product. Cottonseed cake, when available, is high in protein and therefore is an excellent supplement to other feed for ruminant livestock.

41.



41. Noug cake is another example of a feed source used as protein supplement in Ethiopia. It is a by-product of oil extraction from the seeds of *Guizotia abyssinica*.

42.



42. Wheat bran is a by-product from the wheat milling industry. Livestock owners also use it as a feed supplement.

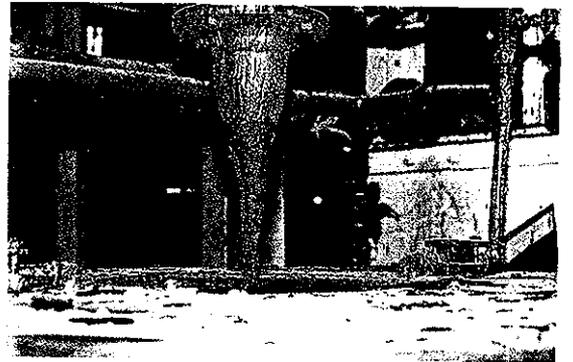
43. Cattle feeding on wheat bran.

43.



44. Sugar factories produce dried sludge, molasses and bagasse as by-products. The most commonly used by animal owners is molasses. It is a thick dark brown liquid that contains 50-65% sugar with little protein or water. It is thus a high energy feed.

44.



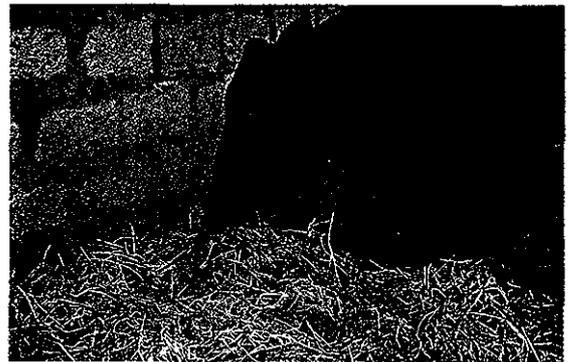
45. Mixing molasses with wheat bran at the ILRI Research Station in Debre Zeit, Ethiopia. Farmers mix various feeds.

45.



46. Cattle feeding on straw mixed with molasses. The animals find the straw more palatable when mixed with molasses.

46.



47. Cattle feeding brewery by-products. When beer is made, the residues are the spent grains and yeast. Livestock readily accept these as feed.

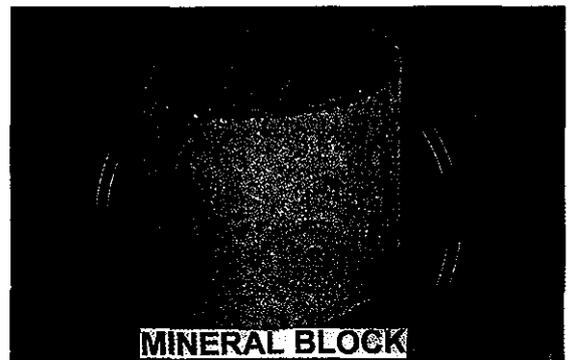
47.



## Minerals

48. It is good practice to supply livestock with their mineral requirements. The animals enjoy licking mineral blocks.

48.



49.



49. Cattle feeding on a mineral block at the ILRI Research Station in Debre Zeit, Ethiopia.

50.



50. When mineral blocks are unavailable, farmers can use bone meal mixed with table salt.

## Recommended reading

- Church D.C. and Pond W.G. 1982. *Basic Animal Nutrition and Feeding*. Second edition. John Wiley and Sons Inc., New York, USA. 403 pp.
- MAFF (Ministry of Agriculture, Fisheries and Food). 1975. *Energy Allowances and Feeding Systems for Ruminants*. Technical Bulletin 33. HMSO (Her Majesty's Stationery Office), London, UK.
- Osuji P.O., Nsahlai I.V. and Khalili H. 1993. *Feed Evaluation*. ILCA Manual 5. ILCA (International Livestock Centre for Africa), Addis Ababa, Ethiopia. 36 pp.