

Box-Baling Forage Improves Profitability of Smallholder Milk Producers

Using farmer-evaluated strategies, a practical and economical method for transporting animal feed material was developed. Box-baling not only reduces transportation costs but also increases on-farm storage. This is one example of how to increase the profitability of smallholder milk production from cows and goats through improved utilisation of cultivated forages and roadside grasses.

Background

Milk production is progressively more important on crop/livestock smallholdings in Tanzania as it increases cash income to women, improves child nutrition and produces manure for crops. However, profitable and sustainable milk production is constrained by the lack of farmer-evaluated strategies on how to make best use of indigenous forages and on how to apply new technologies, developed from on-station research, for better



Manual box-baling of forage reduces transport costs. Farmers are cutting twine used to secure the bale (maize stover) which is compacted by trampling, then removed from the box.

utilisation of forage. With better use of forages, livestock nutrition can be improved, particularly in the dry season when feed is generally scarce. There are a number of options for improving the use of indigenous forage but uptake of research findings has been hampered by the lack of information on economic viability and by the farmers' poor acceptability of these new technologies.

Research highlights

Using Participatory Rural Appraisal (PRA) methodology with smallholder farmers in the regions of Kilimanjaro, Mwanza and Morogoro, the project identified some of the reasons for the low uptake and use of improved technologies. One of the major constraints identified regarding forage production and utilisation was the high cost of transportation. Other common constraints included inadequacies of dissemination, farmer resources, marketing and roads. Based on an analysis of resources available and the technology developed, farmer-

evaluated strategies were developed for increasing milk production from cows and goats through better use of indigenous forages.

Maize stover was identified as the most important feed resource during the dry season. In Kilimanjaro, maize is grown 15–20 km from the homesteads and is stall-fed. The high cost of transportation from the lowlands to upland smallholdings, where the animals are kept, is a major constraint to its utilisation.

Manual baling in a wooden box increased the weight that can be carried in a pick-up truck by 63% and reduced the cost of transport by 33%

when compared with transportation of loose stover. Stripping of leaf, sheath and husk from the stover together with baling increased the pick-up load by 140%. Baling in boxes also reduced on-farm storage space and thus facilitated budgeting of feeds. Labour costs and total costs of handling stover changed with baling. Loose material had the highest cost per kg dry matter (DM) and bales from the medium size box (75 x 50 x 40 cm) recorded the lowest cost per kg DM.

In case studies with six smallholder farmers in Kilimanjaro, data were collected for a dairy 'enterprise budget' – this type of budget ignores fixed costs that cannot be attributed specifically to the enterprise (unlike a whole farm budget), making it more meaningful for smallholder farmers. Manual box-baling of whole stover increased the annual enterprise budget (margin) per 400-kg cow (average live weight of local cows) by 11%. For leaf, sheath and husks of stover the improvement was 22%.

University of Reading
Department of Agriculture
 Reading, UK
 E. Owen

Selian Agricultural Research Institute
 Arusha, Tanzania
 N.F. Massawe

Sokoine University of Agriculture
 Morogoro, Tanzania
 L.A. Mtenga

Livestock in Development
 Crewkerne, UK
 S.J. Holden, S.D. Ashley

Natural Resources Institute
University of Greenwich
 Chatham, UK
 D.L. Romney

Project completed in 1999

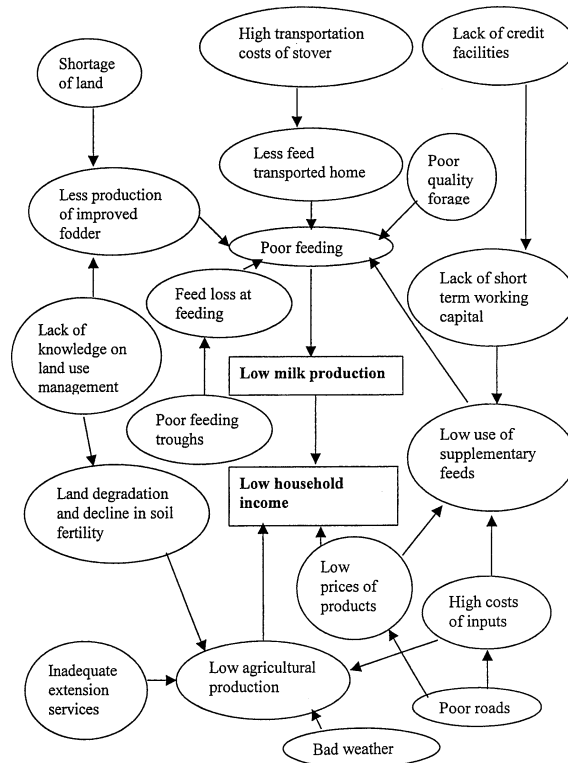
Uptake

Manual box baling technology not only reduced transport costs but also reduced the space required for storage and thus assisted in feed budgeting. The storage and budgeting component associated with manual box-baling could therefore contribute towards reducing the fluctuation of feed offered and, hence, avoid poor animal performance associated with feed fluctuations.

Linkages

The case studies in Kilimanjaro revealed that weeds contribute significantly to the annual supply of feed on smallholder farms. There is, however, a shortage of literature on the use of weeds as a potential animal feed and the project identified a need for basic information on this. In recent research in Kenya, animal performance declined as a result of fluctuations in feed offered. Future investigation into the effects of frequent fluctuations in animal feed offered should complement research on the use of weeds in livestock feeding. The outputs of this research developed by the Livestock Production Programme contribute to the basket of technological options which are now available for smallholder milk producers (Projects R6775, R6993, R7010).

This study also identified the need for stronger linkages to be established



Problem linkage diagram for smallholders in Kilimanjaro.

between researchers, extensionists, policy makers, farmers and other stakeholders.

Relevance to sustainable livelihoods

Utilisation of maize stover will be greatly enhanced by baling the material; this facilitates transport and reduces costs. Meanwhile, increased on-farm storage space from compaction of stover will liberate storage space for other feeds, thus overcoming the fluctuation in animal feed supplies. Livelihoods of resource-poor farmers will improve from the application of this cost-effective appropriate technology to maximise the use of available animal feed resources for increased milk production. Farm and household incomes will be improved with increased cash income to women and improved child nutrition.

Selected project publications

- Masswe, N.F., Owen, E., Mtenga, L.A., Romney, D.L., Ashley, S.D. and Holden, S.J. (1997) Developing sustainable forage utilisation to increase profitable milk production on smallholder farms in Tanzania: approach using Participatory Rural Appraisal (PRA). pp. 23–31. In: *Proceedings of Twenty-third Scientific Conference, Tanzania Society of Animal Production, 1996*. vol. 23. Tanzania Society of Animal Production, Morogoro, Tanzania.
- Massawe, N.F., Owen, E., Mtenga, L.A., Ashley, S.D., Holden, S.J. and Romney, D.L. (1999) Identified constraints to improving forage utilisation for milk production in three locations of Tanzania: approach towards participatory livestock research. pp.161–162. In: *BSAS/KARI Proceedings of International Conference on Food, Lands and Livelihoods: Setting Research Agendas for Animal Science, Kenya Agricultural Research Institute, Nairobi, 27–30 January 1998*. British Society of Animal Science, Edinburgh, UK.

- Massawe, N.F. (1999) Strategies based on Participatory Rural Appraisal for improving the utilisation of forages to increase milk production on smallholder farms in Tanzania. PhD thesis, University of Reading, UK.

- Massawe, N.F. and Owen, E., Mtenga, L.A., Holden, S.J. and Ashley, S.D. (2000) Cut costs of feeding stover. Leaflet. Swahili (18,000 copies) and English (2000 copies). 4 pp. Development Communications Ltd., Nairobi, Kenya.

For further information on the Programme contact:
The Programme Manager
Livestock Production Programme
NR International
Park House, Bradbourne Lane
Aylesford, Kent ME20 6SN
<w.richards@nrnt.co.uk or lpp@nrnt.co.uk
www.nrnternational.co.uk