Tree Fodders for Livestock on Smallholder Farms

Feeding trials in Kenya using the tree fodder *Calliandra* as a supplement to local cattle diets have helped to further our understanding of the efficient use of tree fodders. A case study on eight farms, looking at feeding regimes of goats, investigated management practices and levels of production.

Background

The potential contribution of tree fodder to livestock nutrition in developing countries has been widely appreciated and has been the subject of considerable effort in research funded both by DFID and other donors. A study on the effects of fodder from indigenous and exotic trees on the productivity of dairy cows, small ruminants and poultry should further underpin this research. Embu District, on the slopes of Mount Kenya, was identified as a suitable location as its topography would allow a range of impacts to be assessed. Despite the predominant interest in dairy cows, goats are also popular with farmers in this part of Kenya, because of their convenient size and the ease with which they can be sold to generate cash for household needs. They are also traditionally important in fulfilling social obligations. There was, however, little information available on management practices used or the levels of production obtained. A case study was conducted over a full year on eight farms to determine these parameters.

Farmers in Kenya already incorporate tree fodder into their forage cropping systems. This is a three-row intercrop of Desmodium *(to the left), young regrowth of Napier grass and* Calliandra *in hedgerow form.*

Research highlights

A series of feeding trials was conducted to test the value of *Calliandra calothyrsus* as a supplement to typical cattle diets, which are generally based on Napier grass, other fodder grasses or crop residues. In acceptability trials, *Calliandra*-fed cattle averaged liveweight gains of 550 g/day – which are considerably better than normal – and showed no adverse effects from eating the tree fodder. In on-station and on-farm feeding trials with dairy cattle, 3 kg of fresh *Calliandra* foliage (about I kg dry matter) had the same effect on milk yields as I kg of additional concentrate containing 160 g/kg of crude protein. *Calliandra* could be used to replace the concentrate in order to reduce production costs or, when used together with the concentrate, to increase milk yields. Furthermore, the tree fodder appeared to increase the content of butterfat in the milk.

Some of the farmers in the case study were members of goat improvement groups or schemes, while others operated more independently. Some farms had small, local East African goat breeds while others had crosses with exotic breeds such as Alpine and Toggenburg. There was little difference amongst farms in the types of feed given to the goats, although the amounts on offer were generally more than adequate. However, independent farmers tended to give more feed, and this gave their goats greater scope for selecting more nutritious components of the diet than those belonging to 'scheme' farmers. Almost all farmers gave some concentrate (either dairy meal or bran). Tree fodder was little used and there would appear to be an opportunity to study the effects on animal productivity of replacing concentrate with cheaper tree foliage. Interestingly, inclusion of small

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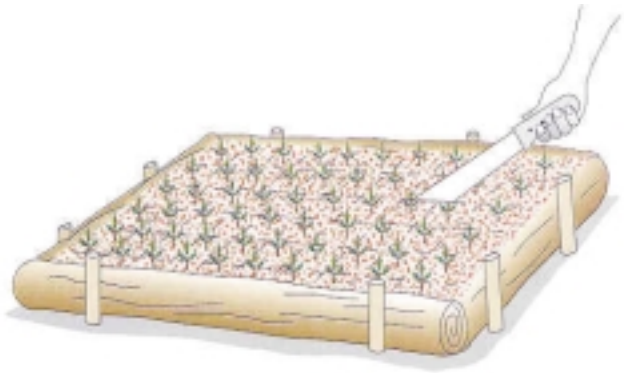
amounts of *Calliandra* in diets for laying chickens proved to be a highly efficient means of improving the colour of egg yolks.

Uptake

The project specifically included the generation of impact through dissemination activities as one of its outputs. Much of this occurred spontaneously because of the participatory nature of the project. In addition, the project hosted more than 1000 visitors, most of whom witnessed project activities through visits to the agroforestry zero-grazing demonstration unit, which was renovated for this purpose. Project staff participated in numerous major farmer meetings, local seminars and training attachments, international courses, and workshops and conferences to bring project activities to the widest possible audience. Project activities were also publicised widely in Kenya through local and national radio broadcasts.

Linkages

Extension services are already promoting technologies based on the project's results which an increasing number of farmers are using. A number of other areas where further research could be of value were identified, including: (a) tree fodder propagation methodologies and management techniques; (b) definition of appropriate utilisation techniques for other fodder tree species such as the naturalised *Morus alba* and the indigenous *Trema orientalis*; and (c) nutritive value of, and feeding systems for, *M. alba* and *T. orientalis*.



A range of dissemination materials for promoting the production and use of tree fodder was also produced by the project. This picture aims to promote root pruning as a means of improving seedling survival at transplanting.

Relevance to sustainable livelihoods

The project has contributed considerably to knowledge on the efficient utilisation of tree fodder and demonstrated effective techniques for on-farm experimentation with dairy cattle. It has provided several simple and effective extension messages for the improved use of tree fodder (especially *C. calothyrsus*) in the diets of livestock. There is subjective evidence of increased financial and human capital among those farmers who have used *Calliandra* for feeding cattle and goats.

Selected project publications

- Roothaert, R.L. and Paterson, R.T. (1997) Recent work on the production and utilization of tree fodder in East Africa. *Animal Feed Science and Technology,* **69**: 39–51.

- Paterson, R.T., Kiruiro, E. and Arimi, H.K. (1999) *Calliandra calothyrsus* as a supplement for milk production in the Kenya Highlands. *Tropical Animal Health and Production*, **31**: 115–126.

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