

## Fodder shrubs for improving incomes of dairy farmers in the east African highlands

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### Introduction

Smallholder dairying is an important enterprise in the highlands of east Africa. Farm sizes average 1–2 ha and zero-grazing, cut-and-carry systems predominate. Inadequate protein reduces milk production and forces many farmers to spend scarce cash on commercial dairy meal supplements. In 1991, on-farm trials on fodder shrubs were started in Embu District as a collaborative venture of the Kenya Agricultural Research Institute, the Kenya Forestry Research Institute and the World Agroforestry Centre. *Calliandra calothyrsus* was released to farmers in 1995 and was followed by *Leucaena trichandra*, mulberry (*Morus alba*) and *Sesbania sesban*. Farmers produce seedlings of calliandra and trichandra in nurseries, while mulberry is planted using cuttings. Farmers plant the shrubs in hedges along field and farm boundaries, on contour bunds and intercropped with napier grass. Within 1 year after planting, shrubs are ready to be pruned for feeding livestock. Most farmers cut them at a height of about 1 m to ensure that they do not shade the adjacent crops (Franzel *et al.* 2003).

### Extent and benefits of fodder shrubs

About 30 K farmers have planted in Kenya, 23 K in Uganda and several thousand in Tanzania and Rwanda. These are minimum numbers, as they include only areas where we have reliable estimates. Most of these farmers feed shrub leaves to stall-fed, improved-breed dairy cows, others feed to improved-breed dairy or meat goats, or to local-breed cows and goats. From sample surveys, depending on the area surveyed, numbers of trees/farmer vary widely; averages range from 30–924. Seed quantities produced and distributed are not known as most seed flows through the informal sector. Beginning in the second year after planting, a farmer with 500 calliandra shrubs can provide about 6 kg of fresh fodder leaves/dairy cow/day, earning an additional US\$62–122/year. The 53 K farmers with fodder shrubs in Kenya and Uganda have circa 250 shrubs each; total net benefits are thus about US\$2.438 M/year. In addition to milk production, other benefits from fodder shrubs include improved animal health, wood for fuel, seed sales, improved manure, bee forage for honey production and stakes for vegetable production. Environmental benefits also are significant because many trees are planted along contour bunds, reducing soil erosion and fixing nitrogen.

### Factors in achieving successful adoption

(1) Demand for fodder shrubs by farmers is high, mainly because the shrubs save cash and need only small amounts of land and labour. (2) Market access is relatively good in the areas where adoption has occurred. (3) Participatory methods were used to design fodder shrub technology. Most on-farm trials were designed and managed by farmers, encouraging other farmers to innovate. (4) Partnerships between researchers and extension services build local organisational skills and knowledge and help reach large numbers of farmers. (5) Dissemination through farmer groups, instead of to individual farmers, economises on extension resources and ensures greater farmer-to-farmer information exchange and dissemination. (6) Institutionalising Ugandan project activities into local government development plans helps to mobilise communities and create a sense of ownership among beneficiaries. (7) The species promoted are fast-growing and easy to establish and manage. (8) Partners giving livestock to farmers require them to plant fodder shrubs as a precondition.

### Factors slowing adoption

(1) Extension services and NGOs are often unfamiliar with agroforestry practices and lack planting material. (2) Fodder shrub practices are relatively knowledge-intensive and training is required intermittently over long periods, *e.g.* at planting, managing and at harvesting/utilisation time.

### Future fodder shrub technology

Because intensive livestock production is increasing rapidly in the east African highlands, the future is promising. Facilitating projects are needed to promote sustainable community-based seed production and distribution and to train extension staff in fodder shrub management. Research is needed also to diversify tree species and identify suitable species for semi-arid areas and high-altitude areas. There is also potential to include fodder shrub leaf meal in commercial feeds.

### Reference

FRANZEL, S., WAMBUGU, C., TUWEI, P. and KARANIA, G. (2003) The adoption and scaling up of fodder shrubs in central Kenya. *Tropical Grasslands*, **37**, 239–250.