

# Trees and Cows: An Odd Combination, but a Winning Formula for African Dairy Farmers



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## ICRAF in Eastern and Southern Africa

**C**attle will eat just about anything if they're hungry enough, but they're rarely hungry enough to eat trees. The exception to that rule can be found in Eastern and Southern Africa where dairy cows not only eat trees – they thrive on them.

Technically, the trees are known as “improved fodder shrubs” a term that scientists insist upon, but farmers rarely use. Farmers call them “trees of life,” and with good reason.

With grazing land in short supply, and because of periodic drought, raising animals in East Africa is a risky business that can easily defeat even the most skillful farmer. Fodder shrubs, in contrast, are easy to grow, tolerate drought and improve the farmer's soil by fixing nitrogen from the atmosphere. The trees mature in about twelve months and are then ready to be pruned and fed to cows and goats.

Planting fodder shrubs does not involve cash expenditures or require farmers to take land out of production. Instead, dairy producers substitute small amounts of family labor for cash that would otherwise be spent purchasing commercially packaged feed.

Cost analysis studies showed that Kenyan farmers who plant an average of 500 fodder shrubs have increased farm income by \$95 to 120 per year. Because at least half the farmers involved are women, the funds are typically used to pay for school fees or household improvements. Annual net returns in 2006 totaled some \$8 million per year in Kenya alone.



## Target Tanzania

The processing and marketing of leaf meal made from fodder trees, while common in Asia, is still largely unknown across much of sub-Saharan Africa. In northeastern Tanzania, however, farmers produce and sell leaf meal to traders, who in turn sell it to urban dairy farmers. Among 5,400 dairy farmers surveyed in three districts, nearly 3,300 used leaf meal made from fodder shrubs. According to project economists, more than 1,500 farmers now sell the shrubs to a network of 100 traders. Collectors and traders benefit from the practice during the dry season, when there are few alternative opportunities to earn cash.

For dairy farmers the meal provides a cheap source of protein and nutrients for their cows. Likewise, poultry farmers use the meal because it is nutritious and darkens yolks, making their eggs more marketable. There is great potential for using leaf meal in manufactured feed. The Bayslick Company, Tanzania's third largest producer of dairy cow mineral supplements, uses leaf meal made from fodder shrubs in its product, all of which it buys from local women's groups.

Fodder shrubs can be fed to all grazing animals but are particularly useful as a substitute for commercial feeds. Thanks to fodder shrubs, this Kenyan milk producer had the funds needed to build feeding stalls, a practice that allows her to better manage the family's dairy animals and reduce the environmental damage caused by free-grazing animals.  
Photo: Neil Thomas, World Agroforestry Centre



The results of feeding fodder shrubs to goats can be equally impressive. So-called “dairy goats” produce high quality milk that is easy to digest and can be easily made into cheese for sale in urban markets. Most farmers use the income provided by fodder shrubs to pay school fees and to purchase other family essentials.

Photo: Neil Thomas, World Agroforestry Centre

According to project economists with the World Agroforestry Centre, returns on investment can be quite high. In Kenya, for example, an investment of \$150,000 by the Consultative Group on International Agricultural Research – the CGIAR – resulted in nearly 20,000 farmers planting 4 million shrubs that are generating profits of nearly \$800,000 per year.

Indeed, by the end of 2006, more than 200,000 farmers in five countries had planted 11.2 million fodder shrubs and had demonstrated that growing them greatly increases milk production and quality, reduces expenditures for commercial feeds and improves the overall profitability of their dairy enterprises.

### **The basics of fodder shrubs**

Farmers grow fodder shrubs along boundaries and pathways or in lines to form terraces, a practice that reduces soil erosion, protects nearby watersheds, and provides a source of firewood that can be grown on-farm rather than

collected from local forests and woodlands. Fodder shrubs also supply nectar for bees and free up women’s labor for more productive enterprises. African women are usually responsible for feeding the family’s livestock. Access to a home-grown source of feed saves women both time and energy by eliminating the need to cut and carry fodder over long distances. The practice also helps to contain destructive cattle grazing in nearby forests and woodlands.

Social benefits from the trees are also highly significant. Household milk availability and consumption in areas where fodder shrub projects have been active were shown to rise significantly among family members and among the families of laborers employed on dairy farms.

The extension of fodder shrubs in East Africa, scientists observe, is the end-product of a research-for-development partnership involving some 300 local agencies in Kenya, Uganda, Rwanda, and Tanzania.

Partnership activities help link local organizations across international borders and encourage farmers to adopt improved varieties. The partners also work closely with the US NGO, the Academy for Educational Development (AED), which uses social marketing and communications tools to bring about social change.

Research began in the late 1990s in central Kenya, where the World Agroforestry Centre and the Kenya Agricultural Research Institute began testing improved fodder shrub varieties with farmer groups and promoting their use through extension agencies and NGOs. Since then, the initiative has come to include three international research centers, twelve national ministries and local governmental units, 28 national and international NGOs, 13 private companies, and more than 300 local farmer groups. Financial support for the initiative was provided by a consortium of donors, including the United States and the United Kingdom.

Nine fodder shrub species are currently available for extension in environments ranging from the hot humid coastal lowlands to semi-arid tropics and mountain ecosystems up to 10,000 feet above sea level.

Although small-scale dairy producers are the principal beneficiaries of the new varieties, dairy processors, milk collectors, and seed dealers also benefit. Dairy interests have come to recognize that fodder shrubs reduce the cost of production, greatly improve milk quality, and help stabilize supplies.

The project has also helped seed dealers and nursery operators form their own associations and improve the quality and availability of planting material, thus expanding an important market for small-holder producers.

Participation in the project also helps increase social capital, i.e. the empowerment benefits that accrue when the rural poor begin working effectively together in groups. Thus far, the results have validated the project's strategy for achieving impact at scale.

Lastly, the partnership has shown that policy support is critical to success. Surprisingly, however, the support of local policy makers proved to be more important than that of national policy makers. Studies indicate that local policy makers frequently act as advocates for fodder shrubs and have worked to sensitize their constituents to their utility and value.

Indicative of this is the experience of Uganda where local policy

makers allocated land and funds to help farmer associations establish nurseries and seed orchards. These actions were observed by other communities and helped promote adoption and increased the scope and reach of the program.

As a result, fodder shrub specialists are confident that the approaches used to extend the technology can be used to assist half a million additional farmers – roughly a quarter of the region's dairy producers – to plant and use fodder shrubs by 2010.

At the same time, World Agroforestry Centre scientists and participating national programs are working to increase the

number of available fodder shrub species by screening new indigenous and exotic varieties. Species diversification, scientists say, is important for improving animal nutrition, reducing the effect of pests and diseases and for expanding to new eco-zones including semi-arid areas or cooler, high-altitude areas.

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### Fodder Shrub Publications

Hess, H.D., Tiemann, T.T., Noto, F. Franzel, S., Lascano, C., and Kreuzer, M. (In press) The effects of cultivation site on forage quality of *Calliandra calothyrsus* var. Patulul Agroforestry Systems. [Journal article]

Wambugu, C., Franzel S., Cordero, J. and Stewart, J. 2006. Fodder shrubs for dairy farmers in East Africa: making extension decisions and putting them into practice. Nairobi: World Agroforestry Centre and Oxford Forestry Institute. 169 pp. [Decision Support Tool/Book]

Shelton, H.M., Franzel, S. and Peters, M. 2005. Adoption of tropical forage legume technology around the world: analysis of success. In: D.A. McGilloway (ed) Grassland: a Global Resource. Wageningen Academic Publishers, Wageningen, The Netherlands pp. 149-166. [Book chapter]

Tuwei P.K., Kang'ara J.N.N., Mueller-Harvey I., Poole J., Ngugi F.K. and Stewart J.L. 2003. Factors affecting biomass production and nutritive value of *Calliandra calothyrsus* leaf as fodder for ruminants. *Journal of Agricultural Science* (Cambridge) 141: 113–127. [Journal article]

Franzel, S., Wambugu, C., Tuwei, P. and Karanja, G. 2003. The adoption and scaling up of the use of fodder shrubs in central Kenya. *Tropical Grasslands* 37, 239-250. [Journal article]

