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Fodder trees and shrubs in the Ethiopian highlands: Service and product functions

Kindu Mekonnen| Melkamu Bezabih | Getnet Assefa| Aberra Adie| Million Getnet Gebreyes | 7-8 June 2022| Nexus hotel- Addis Ababa, Ethiopia

Fodder trees and shrubs:

- Are trees and shrubs that serve as important supplementary feed sources for livestock on top of providing various product and service functions in different agro-ecologies/ farming systems of Africa and other continents.

Types of fodder trees:

- Leguminous and none leguminous
- Fast growing and slow growing
- Exotic and indigenous
- Highland, mid-land and low land
- Palatable and less palatable

Leguminous trees and shrubs:

- Trees and shrubs that have high value in terms of biological, ecological, and agronomic contributions.
- Legumes fix atmospheric nitrogen from the atmosphere and add to the system through symbiotic associations with nitrogen-fixing rhizobia.

None leguminous trees and shrubs:

- Trees and shrubs that don't fix and add nitrogen to the system. Some trees and shrubs scavenge nutrients and recycle nutrients into the system.

Examples of potential fodder trees across different Agro-ecologies

Scientific name	Common/local name	Geography/agroecology
Cordia africana	Wanza/ዋንዛ	Mid to highland
Croton machrostachys	Bisana/ብሳና	Midland
Ficus thonningii	Chibha/ችብሃ	Midland
Dombeya torrida	Wulkifa-Danisa/ውልክፋ/ዳኒሳ	Highland
Buddleja polystachya	Anfar/አንፋር	Highland
Hagenia abyssinica	Koso/ኮሶ	Highland
Erythrina abyssinica	Korch/ኮርች	Midland
Ensete ventricosum	Enset/ እንሰት	Mid to highland
Chamaecytisus palmensis	Tree lucerne/tagasaste	Highland
Sesbania sesbana	Sesbania	Midland
Cajanus cajan	Yergib Ater/የእርግብ አተር	Low to midland
Calliandra calothyrsus	Calliandra	Midland
Acacia spp	Acacia/ግራር	Low-mid-highland

D. torrida

F. thonningii

Fodder tree and shrub species in the highlands:

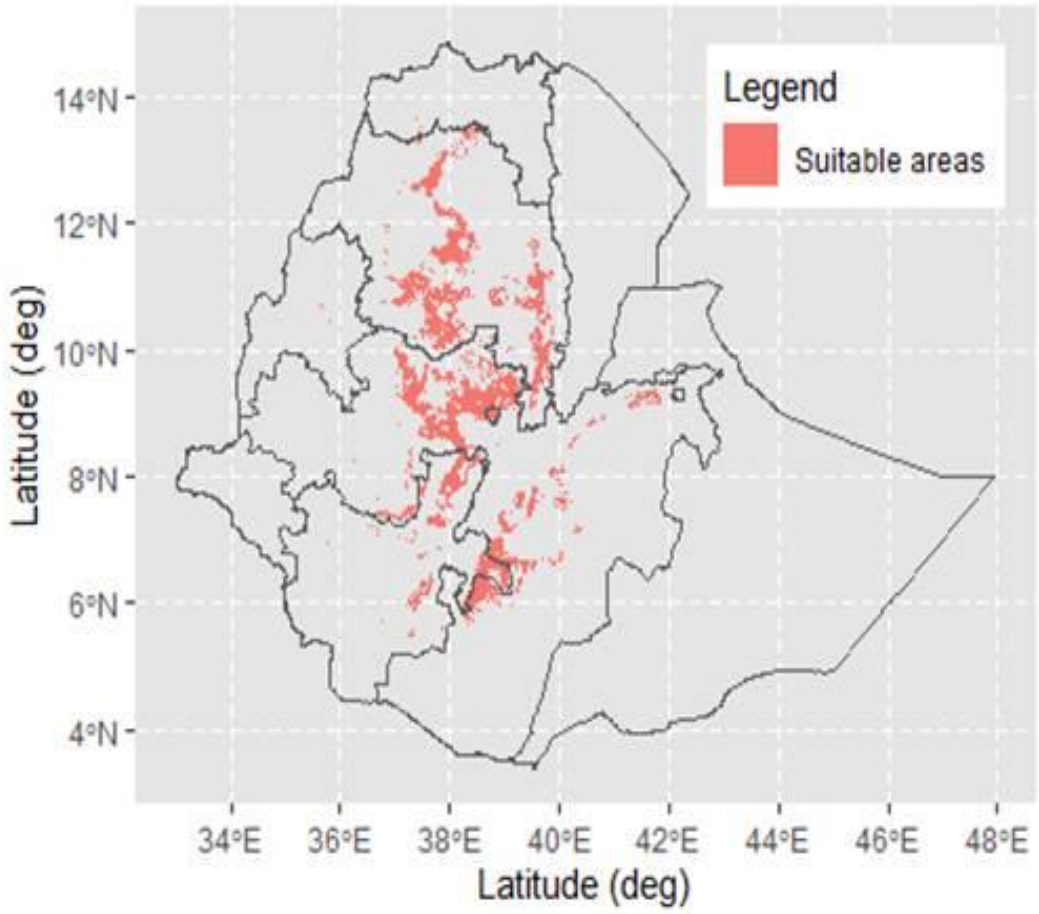
- Diversity of fodder trees specifically leguminous-indigenous/native - fast growing species are limited.
- Tree lucerne is one of the fewest leguminous and fast-growing exotic species adaptable in high altitude areas.
- Africa RISING project has managed to undertake action research on tree lucerne with more than 250 farmers in Amhara, Tigray, Oromia and SNNP regions.
- The tree is native to Spain and exotic species to Australia, Ethiopia, South Africa, Rwanda and New Zealand.

Service and product functions of tree lucerne:

- Produce high biomass (7-10 t ha^{-1} dry biomass)
- Fodder (foliage contains 17-22% crude protein and digestible OM (>= 70%).
- Fuel (high calorific value), apiculture and poultry feed
- Contributes to erosion control and improve soil fertility
- Useful for land reclamation, nutrient recycling, and C-sequestration
- Nitrogen fixation (fixes up to 100 kg N ha^{-1})
- Provides shade and are compatible when intercropped with crops

Growing ecology:

- Adaptable for use from 2000 to over 3000 masl of the Ethiopian highlands.
- Rainfall requirement: 350-1600 mm.
- Soil should be well drained.



Based on the preliminary suitability mapping results, tree lucerne (TL) can be grown on *125K ha of land*, which can produce *a dry matter of 1.0 -1.25 million t* y^{-1} .

Establishment:

- Sources of seed- local collection and from seed suppliers
- Seedling raising- private, community and government nurseries
- Seedling production systems: bare rooted and container systems.
- Seed treatment: Seeds of tree lucerne require scarification or immersion in boiled water for a minute.

Management of tree Lucerne:

- Regularly spot weeding around the seedling.
- Protection against livestock trampling and browsing- Fencing.
- Mulching/manure helps to retain moisture and suppress weeds.
- Watering at early stage of the plant improves survival and growth.
- A cutting height of 1 m to 1.5 m provides good biomass.
- The plant can be harvested 2-3 times per year depending on growing niches and management practices.

Utilization of tree lucerne:

- Reaches as animal feed within 9 months after planting.
- The foliage of tree lucerne can be fed green or wilted or preserved in the form of hay and used as needed.
- Supplementation of 1 kg of dried tree lucerne leaf to a lactating dairy cow can give up to 1.2 Lts of extra milk.
- Supplementation 300-400 g of tree lucerne hay to a fattening sheep is adequate to achieve a daily body weight gain of 70 g.

Important tips:

- Tree lucerne plays an important role in bridging seasonal feed shortages and serve as a protein supplement to enhance the feeding value of local feed resources.
- Survival and productivity of tree lucerne can be improved if we protect planted seedlings from browsing, mulch during dry periods, practice clean spot weeding and apply organic fertilizers at early growing periods of the plant.


Thank you!