Highlights
CIAT in Africa

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Farmers' evaluations and innovations with legume cover crops

The Integrated Soil Productivity Initiative Through Research and Education (INSPIRE) began in 1998 with the main objective of introducing, developing, on-farm testing and disseminating improved soil fertility management technologies to address the alarming soil productivity problems in eastern Uganda.

The partners in the INSPIRE project include, in alphabetical order, Africa 2000 Network (A2N), Appropriate Technology (Uganda), CIAT (including the Tropical Soil Biology and Fertility Institute), Department of Agriculture, District Agricultural Extension, farmers representatives, Food Security and Marketing project (FOSEM), ICRAF, NARO, Makerere University and Uganda National Farmers Association (UNFA).

Use of legume cover crops for improving soil fertility proved to be one of the most viable technologies because of its cost effectiveness, appropriateness, simplicity, and multi-purpose nature in meeting the varied needs of resource poor farmers.

Evaluating legume cover crops (LCC) and biomass transfer technologies

Farmer evaluation of the legume cover crop technologies was initiated with the main objective of providing feedback on the performance of the LCCs and some shrubs introduced or locally available for improving soil fertility. The evaluations were particularly intended to document farmer innovations with the technologies.

Evaluations were made by 21 farmer groups, 60% of whose overall membership were women. Groups responded to open questions, probing questions and matrix ranking. Their criteria for selection of the different species are given in Table 1.

There was no doubt among the farmers that the LCC technologies work and were better than the traditional practice as far as improving soil fertility was concerned. In terms of costs, it was reported that the use of LCC and shrubs offered a low input technology to the farmers, as most of them could not afford use of inorganic fertilizers - especially on low value crops like maize. Farmers, however, observed that the use of LCC and shrubs required a substantial area of land, some of it to be part of which is left under fallow, high labour for clearing and ploughing in the vegetation, and patience in attaining the results.

Table 1. Farmer criteria for selection of LCC and biomass transfer species.

LCC/Shrub	Positive aspects	Negative aspects
Mucuna pruriens	- Improves soil fertility - Suppresses weeds - Produces high biomass - Quick maturing	- Not edible - No good for intercropping - Requires high labour for incorporation - Can harbour snakes and wild cats
Canavalia ensiformis	- Improves soil fertility - Has fodder value - Suppresses weeds - Easy to multiply (high seed production) - Good for intercropping	- Not edible
Crotalaria ochroleuca	- Improves soil fertility - Suppresses weeds - Leaves are used as vegetables	
Crotalaria grahamiana	- Improves soil fertility - Suppresses weeds	- Caterpillars eat the leaves
Tephrosia vogellii	- Improves soil fertility - Controls mole rat	- Has pest problem that eat the pod, hence poor seed formation.
Tithonia diversifolia	- Improves soil fertility - Medicine for malaria & stomachaches - Has pesticidal properties - Fodder for goats	- It is a weed

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Innovations with legume cover crop and biomass transfer technologies

Many farmers indicated that they had tried using the green manure cover crops in new ways besides what the researchers had demonstrated during the trials (Table 2).

Table 2. Farmer innovations with LCC and biomass transfer species.

LCC/Shrub	Recommended management and use	Modification in management and use
Mucuna pruriens	- Use as a fallow crop, and mulch in the following crop - Use as cover crop in banana plantations	- Plant maize after the fallow - Intercrop with maize - Efforts to crush seed to make animal feed - Good feed for goats, cattle and rabbits
Canavalia ensiformis	- Use as a fallow crop, and mulch in the following crop	- Canavalia intercropped with coffee, maize and bananas
Crotalaria ochroleuca	- Use as a fallow crop, and mulch in the following crop	- Leaves used as a vegetable
Crotalaria grahamiana	- Use as a fallow crop, and mulch in the following crop - For intercrop, sow the seeds 3 - 6 weeks after planting maize	- Intercropped with banana - Boundary planting around homesteads - Intercrop with beans to control nematodes - For intercrop, sow seeds at time of maize or sw potato planting - Seed put together w bean seed during sto controls bean storag pests
Tephrosia vogellii	- Use as a fallow crop, and mulch in the following crop - For control of mole rat	- Leaves are crushed, into rivers and strea catch fish - Doubt on its effecti in controlling the n
Tithonia diversiforia	- Use as a biomass transfer species	- Leaves used for tre of stomach ailment fevers

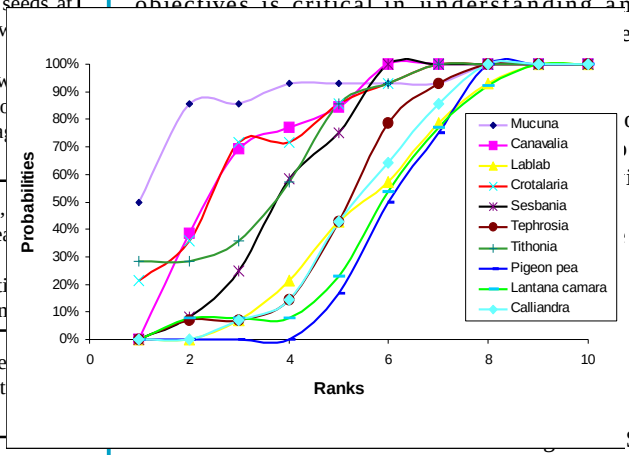
Farmer preference ranking of legume cover crop and biomass transfer technologies

Based on the criteria developed with the farmers (Table 1), a ranking analysis tool was used to define the acceptance or rejection of each technology component.

The probability of acceptance (0–100%) for each species, calculated by summing the probability of the species occurring in a given ranked position, was plotted against the ranking order (1 - 10) and are presented in Figure 1.

The species with high cumulative probabilities, on the left hand side of the graph, have a high acceptability. The species ranked with the highest acceptability are Mucuna, Canavalia and Crotalaria. On the other hand, *Tithonia diversifolia* and *Sesbania sesban* have intermediate probabilities of acceptance. Pigeon pea, *Lantana camara*, Calliandra and Lablab have low probabilities of acceptance, i.e. they lie on the right hand side of the graph, indicating rejection based on the characteristics identified with those species.

Figure 1. Probabilities of acceptance of legume cover crop and biomass transfer technologies.



Conclusions

Understanding farmers' production objectives and the constraints to achieving these objectives is critical in understanding and ents.

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