Highlights
CIAT in Africa

Farmers' evaluations and innovations with legume cover crops

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The Highlights series summarises research results and policy implications from the work of CIAT and its partners in Africa

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.

LCC/Shrub	Positive aspects	Negative aspects
Mucuna pruriens	Improves soil fertility Suppresses weeds Produces high biomass Quick maturing	Not edible Not good for intercropping Requires high labour for incorporation Can habour snakes & 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	Pests eat pod hence poor seed formation
Tithonia diversifolia	Improves soil fertility Medicine for Malaria & stomach aches	It is a weed

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

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 fertilisers - especially on low value crops like maize. Farmers, however, observed that the use of LCC and shrubs required a substantial area of land, part of which is left under fallow, high labour for clearing and ploughing, and patience in attaining the results.

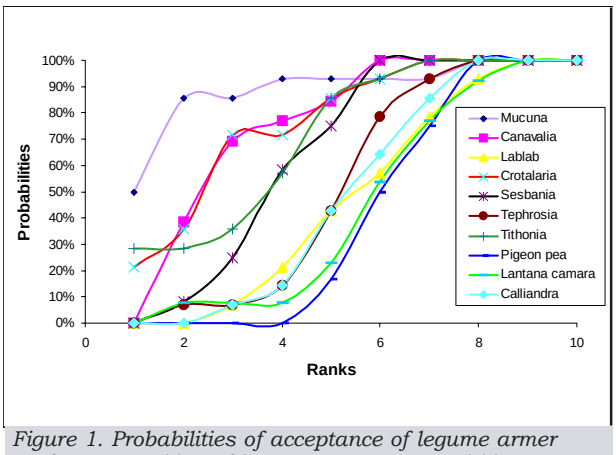

Figure 1. Probabilities of acceptance of legume armer preference ranking of legume cover crop and biomass transfer technologies

Innovations with legume cover crop and biomass transfer technologies

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

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.

Conclusions

Understanding farmers' production objectives and the constraints to achieving these objectives is critical in understanding and determining their information requirements. Once the technology options have been identified, farmers' criteria for accepting or rejecting a technology becomes crucial to its targeting and adaptation in new situations. Empowering farmers in experimenting with options provides faster feedback that improves research design in an iterative research cycle.

LCC/Shrub	Recommended management & use	Modification in management & use
Mucuna pruriens	Use as a fallow crop & mulch in following crop Use as cover crop in banana plantations	Plant maize after the fallow Intercrop with maize Crush seed to make animal feed Good feed for goats, cattle & rabbits
Canavalia ensiformis	Use as a fallow crop & mulch in following crop	Intercropped with coffee, maize & bananas
Crotalaria ochroleuca	Use as a fallow crop & mulch in following crop	Leaves used as a vegetable
Crotalaria grahamiana	Use as a fallow crop & mulch in 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 times of maize or sweet potato planting Seed put together with bean seed during storage controls bean storage pests
Tephrosia vogellii	Use as a fallow crop & mulch in following crop	Leaves are crushed, poured into rivers & streams to catch fish May not be effective in control of mole rat
Tithonia diversifolia	Use as a biomass transfer species	Leaves used for treatment of stomach ailments & fevers

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

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