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## Integration of on-station and farmer participatory evaluation of multipurpose legumes—a case from Cauca , Colombia

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**Key words :** *Leucaena diversifolia/trichandra* , tropical forage legumes , farmer participatory research

**Introduction** The hillsides of Latin America are among the most fragile areas of the world . At the same time they are inhabited by the poorer parts of society , compounding the combined effects of resource degradation and poverty . Stress tolerant forages , in particular legumes , can enhance sustainability of agricultural production systems , primarily through the improvement of animal production and resource conservation but also via agro-industrial use and firewood production (Schultze-Kraft & Peters , 1997) . In spite of their obvious benefits , adoption of forage legumes has been limited , due to the use of inappropriate germplasm , lack of participation of farmers in the variety development process and/or bottlenecks in seed supply to farmers . To address these constraints , the present study integrates on-station with Farmer Participatory Research . Fast growing legumes as feed and green manure , and shrub legumes as feed supplements and mulch are attractive alternatives as they can be fitted into existing crop-livestock systems .

**Materials and methods** The work is being conducted in the Cauca region of Colombia , characterized by 1600-1800 mm/yr rainfall , and up to 4 dry months . The topography is mountainous with slopes up to 50% . Soils are , in general , well drained , moderately to highly acid , with mostly low base content and high CEC . A stepwise procedure is followed where the diversity in germplasm collections of potential species is assessed on-station and by early feedback from farmers through organized visits . Selected materials are then assessed in different locations in farmer conditions using Farmer Participatory Research methods such as preference ranking , open evaluation and logistic regression . In this work , the potential of fast growing legumes to be utilized as green manure to increase crop production is assessed together with farmers . Farmers also identified the niche for shrub legumes . Thus , the on-farm assessment of the annual/biannual forages *Vigna unguiculata* CIAT 9611 (Cowpea) , *Canavalia brasiliensis* CIAT 17009 and *Lablab purpureus* CIAT 22759 , which can exploit temporary and spatial niches not occupied by crops , is complemented with an exploration of the diversity of the world collection of *Leucaena diversifolia* and the very closely related *L . trichandra* (50 resp . 11 accessions) .

**Results and discussion** *Participatory evaluation of fast growing legumes as green manures* In the assessment made by farmers , cover (58 %) was the most important criterion across the green manure species and the fallow control , followed by biomass (52 %) , pest tolerance (47 %) , germination (35 %) , growth (23 %) , color (23 %) , flowering time (17 %) , early growth (17 %) , and production (11 %) . Accordingly , species selection in this phase could be defined by indicators for establishment and stability . For the succeeding maize crop , grain yield , plant height , stem diameter and leaf color are the criteria most important for farmers to evaluate the green manure effect of legumes . A regression analysis was done showing diverse ranges of farmer acceptance and rejection in relation to the green manure effect on maize . As fallow had no green manure effect on the subsequent maize , it was consistently rated as having low acceptance . Canavalia , probably a result of its high biomass contribution , had the highest acceptance followed by Cowpea , with Lablab having intermediate acceptance .

*Assessing the diversity of Leucaena diversifolia and L . trichandra* DM yield and forage quality of the 61-accession collection of *Leucaena diversifolia/L . trichandra* was highly variable , with a range from 113-423 g/plant DM (SD 208 g/plant) in the wet and 8-129 g/plant (SD 64 g/plant) in the dry season . CP content varied between 21 and 25% (SD 4 %) and IVDMD between 41 and 71% (SD 7 %) . Based on the results available so far , accessions CIAT 17248 and CIAT 17249 appear to be of particular interest as they combine good DM yield (304-329 g/plant and 103-107 g/plant in the wet and dry season , respectively) and forage quality (23-25% CP and 60-70% IVDMD) .

**Conclusions** The approach of integrating Farmer Participatory Research with on-station research is proving an efficient way for the development and uptake of technological options suited to farmers' conditions . Genotype x Environment studies with the selected *Leucaena* accessions and efforts to facilitate farmer based seed production are expected to further enhance uptake of multipurpose forage options .

### Reference

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