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On-farm trials validate CIAT improved bean cultivars on marginal soils

The Green Revolution in rice and wheat has been criticized as developing technology for high-value cash crops of the export-oriented farmers in the fertile lowlands. Meanwhile experiment station technology could not be adopted by small farmers in the mountainous marginal soil areas who supply the domestic staple foods market. However, CIAT successfully tested promising bush and climbing bean accessions using traditional and minimal input cultural practices on small farms in a mountainous, marginal soils region of Colombia.

The CIAT-sponsored project was conducted by Robert Hudgens in Restrepo, Colombia, in collaboration with the Colombian Federation of Coffee Growers and ABOCOL, a private fertilizer company, with active farmer participation. When the farmers planted the introduced varieties using the traditional methods, yields were consistently better than the local cultivar, Radical, Table 1. Moreover, when traditional cultural practices were modified slightly to produce an acceptable minimum input technology package for small farmers, yields of the introduced semi-climbing beans rose 144% while bush bean yields rose 33%.

These results were achieved by increasing the planting density of beans within the rows and the density of intercropped beans and maize. Additionally adjustments were made for some of the most limiting production factors: a mixed fertilizer was applied at planting to compensate for phosphorous deficiency and diseases were chemically controlled.

Table 1. On farm yields (kg/ha) of bush and climbing beans at Restrepo, Colombia with two systems and two levels of technology.

		Monoculture		Association	
Bean	Color	Traditional	Improved	Traditional	Improved
Bush beans (means of two trials)					
P459	Black	1,807[1]	2,291	707	2,073
P302	Black	1,589	2,439	750	1,663
ICA Tui	Black	1,711	2,331	652	1,664
P524	Cream	1,698	2,032	836	1,476
Calima	Red	780	1,086	452	576
Climbing beans (means of two trials)					
P525	Black	1,176	1,570	624	1,048
P259	Brown	678	1,431	351	672
P364	White	1,021	1,324	369	832
Radical	Red	389	682	304	227

Robert Hudgens and a Colombian farmer examine results of a CIAT cultivar tested in the on-farm trials.

The study also reaffirmed that bean color must also be considered in addition to selection for yield in minimum technology packages for small farms. The highest-yielding beans in the study were black-seeded, but red-seeded beans are widely preferred in Colombia. Therefore, there is a limited market and a large price discount for the small farmer who plants non-red beans. The only red-seeded variety which significantly outyielded the local cultivar in the study was Calima, a bush bean variety developed by the Instituto Colombiano de Agricultura (ICA). Therefore, Calima has been chosen as a red-seeded parent in the CIAT bean breeding program. Calima will be used for production of high-yielding, color coded germplasm material for national breeding programs and clean seed production to meet the Colombian market demand.

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