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Hans H. Ruthenberg Award for Graduates 2004

Christoph Reiber, “Potential and constraints of cowpea (*Vigna unguiculata*) in Honduran hillsides – A farmers’ assessment”

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Summary

Deteriorating soil fertility, low crop yields, food shortage and inadequate supply of animal feed in particular during the dry season are some of the problems faced by poor smallholders in the central-northern Honduran hillsides. To address these challenges CIAT investigates the potential of various multipurpose forages for improving smallholder production systems.

In this context cowpea (*Vigna unguiculata*) was identified as a promising multipurpose legume that can play an important role for human nutrition, animal feed and soil improvement. Cowpea is the most important pulse and staple crop in West and Central Africa, with similar importance as the Phaseolus bean in Central America. While in other parts of Honduras cowpea has been cultivated since the time of the first settlers, in 2002 different cowpea accessions were introduced to farmers of the Yorito area. These materials were tested at different altitudes.

The objective of this research is to assess the biophysical and socio-economic opportunities and constraints of different cowpea accessions for integration into smallholder farming systems.

Considering theories on adoption and diffusion of innovations (with special focus on cover crop technologies) and the hypothesis of this work that 'the further use of cowpea depends on its relative advantage compared to common bean (or other crop innovations), the following research questions are addressed:

1. What are the most severe problems perceived by farmers?
2. What is farmers' perception of the potentials (benefits/opportunities) and constraints of cowpea?
3. Which accessions are the most promising?
4. What is the potential for adoption and diffusion?

Both in their fields and during participatory evaluations structured interviews based on a standardized questionnaire were conducted with all farmers in the Yorito area experimenting with cowpea. The questionnaire focused on the experience farmers had so far had with

cowpea (and other "new" crops), on the management of the trials and on the perception of differences (advantages and disadvantages) between cowpea and common bean. During group meetings the taste of different cowpea accessions prepared in different forms and the seed appearance (both consider common bean) were evaluated and ranked. Important crop characteristics (e.g. yield, taste, resistance) were ranked using the matrix ranking method. Farmers' perspectives and assessment criteria were complemented by formal measurements (yield, biomass).

In order to be able to better assess cowpea acceptance and its potential for adoption it was crucial to focus not only on cowpea itself but also on experiences with other 'new' multipurpose leguminous crops (acceptance, constraints and diffusion status), general objectives of farmers, farmers' assessment criteria as well as its complementarity with common bean.

The following results were obtained:

1. Most severe climatic and agricultural problems perceived by farmers are:
 - Increasing temperatures, decreasing predictability and increased variability of rainfall distribution. Drought, storms and heavy rains tend to become more extreme.
 - Decreasing soil fertility and increasing presence of pests and diseases in common bean. This leads to food insecurity for farmers living in the hillsides possessing no or only little (infertile) land and who can't afford buying inputs and/or food.
2. Farmers' perception of the major potential (advantages) of cowpea is the high drought tolerance, low disease infestation, good taste, yield, biomass production and the high acceptance of the green edible pods. Mainly due to its multipurpose use and its similarity to common bean cowpea was assessed as better than other crops like soybean (*Glycine max*), mucuna (*Mucuna spp.*), pigeon pea (*Cajanus cajan*), dolichos (*Lablab purpureus*) and canavalia (*Canavalia ensiformis*).
3. Major constraints (disadvantages) of cowpea were the low adaptability to altitudes above 1500 m.a.s.l. and problems due to 'pulgón' (*Aphis craccivora*), leaf-cutter ants (*Atta spp.*) and rabbits.
4. The most promising accessions for grain production were FHIA, IITA 716 and CIDICCO 2; for biomass production as feed and green manure cv. Verde Brasil and IITA 637/1; suitable dual-purpose accessions were CIDICCO 1, CIDICCO 2, CIDICCO 4, IITA 284/2 and IITA 9611.
5. Farmers are still in a trial and evaluation stage. They continue to test different accessions on a small scale. Cowpea has a number of characteristics that can facilitate adoption at a larger scale and diffusion. It matches farmers objectives, it is rather complementary than substitutive, has the potential to remove bottlenecks (food scarcity (esp. March-June), low soil fertility, lack of high quality feed) and farmers regard cowpea as a feasible option to improve their livelihoods.
6. Due to its relative advantages compared to common bean concerning disease and drought tolerance, less input requirements and high biomass production to increase soil fertility and reduce danger of soil erosion, the combination of cowpea and common bean can contribute to increased short-term as well as long-term food security.

Based on the above listed aspects, the potential for adoption and diffusion of cowpea is high, mainly as a complement to common bean.

It is recommended that in order to facilitate further adoption the organisations involved (e.g. FIPAH, DICTA and CIAT) continue to work with farmers in conducting participatory research on cowpea, supply information on its importance and its management (cropping methods, integrated pest control) and look for varieties (not excluding other multipurpose leguminous species) that are more resistant to pests, more tolerant to cold, waterlogging and shade, and mature evenly.