Reflections on Bean/Cowpea and Pulses CRSP Research Achievements and Impact on Common Bean Production and Utilization in Central America and Wisdom for the Future

EAP/Zamorano (HC- Inst.)
DGPC/UPR and PSU
CIAT, NARs and NGOs
Bean farmers

Production and Utilization of Common Beans in Central America

>600,000 ha

Emphasis of Bean Improvement in C. America

Diseases:
- Multiple resistant cultivars.
- BCMV and BGYMV (+ BCNMV).
- ALS (most environments).
- CBB and WB (lowlands).
- Anthracnose and rust (highlands).

Pests:
- Leafhopper resistance in some cultivars.
- Pod weevil resistant cultivars from APN lines.
- Resistance to Bruchids (arcelin, tepary): DGPC/UPR Project (CA/C and Angola).
Abiotic factors:
  • Low fertility (N, P and other).
  • Drought (secondary crop).
  • High temperature (lowlands).

Grain quality:
  • Color, size and shape.
  • Cooking time, taste and texture.
  • Biofortification (iron, zinc)- CIAT.

Bean Improvement Approaches

A. Conventional breeding
  • Germplasm (parental selection).
  • Hybridization (recombination).
  • Selection on breeding populations.
  • Methods: Pedigree, SSD, RS, IBC.
  • Advanced lines nurseries (CA/C).
  • On-farm validation and release.

B. Participatory plant breeding (PPB)
  • Improvement at community level: NARs, NGOs, and farmers (PPB- Mesoamerica and CRSP).
  • Two approaches: PPB and varietal selection (PVS).
  • Develop cultivars for specific environments.
  • Improvement of local landraces.
  • Training of farmers/technicians (“learning by doing”).

C. Marker assisted selection
  • Complementary to field/greenhouse evaluations.
  • Diversity of bean germplasm.
  • Selection of parents and improved lines (cultivars).
  • Markers linked to disease resistance (> 15 SCARs).
D. Seed production

- Facilitate dissemination and adoption of IV.
- Maintenance of genetic stocks of regional IV.
- Production and distribution of foundation seed.
- Support formal and local seed systems.
- Description of bean varieties for registration.
- Training of technicians and farmers.
- BTD Project - DGPC.

E. Research network approach

- Bean Research Network (NARs) and PPB - Mesoamerica.
- Continue flux of improved germplasm.
- Testing, validation and release of improved varieties.
- Facilitate dissemination and adoption of IV.
- Training of technical personnel from NARs and NGOs.
- Exchange of germplasm, information and experiences.
- Strategic planning at regional level.

Research Achievements

Improved bean varieties released by CRSP and their partners in CA/C (1996-2011).

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<thead>
<tr>
<th>Country</th>
<th>Conventional</th>
<th>PPB</th>
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<tbody>
<tr>
<td>Honduras</td>
<td>5</td>
<td>14</td>
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<tr>
<td>Nicaragua</td>
<td>7</td>
<td>3</td>
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<tr>
<td>El Salvador</td>
<td>7</td>
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<td>Haití</td>
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Adoption of Improved Varieties (IV)

- Honduras (2001): >40% adoption (TC-75) in two main regions (*Mather et al., Agric. Econ. 2003*).
- Costa Rica (2004): 70% area (42% Bribri, 24% Cabecar and 4% Telire) (*Hernández and Elizondo, Agron. Meso. 2006*).
- Central America: Posters of B. Reyes and J. Beaver.
- Honduras, Nicaragua and El Salvador (2005-11): >120,000 farmers/year received government seed of IV.
- Adoption “Aifi Wuriti”, “DPC 40”, “Tio Canela 75” in Haiti (ACDI/VOCA, FAO, IICA, CIAT).
- BTD/DGPC: 120,000 farmers/3 years.
Recommendations for the (near) future

- Dissemination of available technology (Participatory system approach) to increase benefit for poor farmers and credibility of research programs ….. while new technologies are developed and made available.

- Short term training of technical personnel using modular programs ….. while access to degree training continue to be offered to future leaders.

Bean Research Network- HC collaborator of the CA/C-CRSP project (research plots, annual progress/planning meeting and training)- Multilocation testing for improvement of quantitative traits (yield, diseases, abiotic factors) and greater farmer participation.

Acknowledgements
Do we have to climb all the way to the top?.

Uff...going down is not that easy either!