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**Abstract:** The common bean is sensitive to many biotic and abiotic constraints. To enhance farm productivity, farmers need to have access to and use bean production practices that combine seed of improved varieties as well as integrated soil fertility management (ISFM) and integrated pest and disease management (IPDM) technologies. This poster describes efforts and achievements by the Pan Africa Bean Research Alliance (PABRA) in the development and delivery of IPDM and ISFM technologies to improve bean productivity across sub-Saharan Africa. Over 50 crop management technologies, IPDM (36) and ISFM (23) have been tested on-station and on farm in different PABRA countries, including: pest/disease tolerant varieties, staking techniques for climbing beans, botanical pesticides for storage pests, intercropping, varietal mixtures, pesticide application, organic and inorganic fertilizers, tithonia, manure amendments, N-P-K application, and integrated management options for major diseases, bean stem maggot and bean bruchids. A two-pronged approach was used to increase access to ISFM/IPDM technologies which involved; i) a deliberate promotion and delivery of improved varieties and ICM technologies as a single package, and ii) the harnessing of enabling policies (including input support systems) to deliver ICM technologies to bean farmers. The combined use of new stress tolerant varieties and improved crop management practices led to yield increases of 65% (Ethiopia) to 400% (DR Congo). The two-pronged approach led to the delivery of ICM technologies to 4.9 million farmers during 2009 – 2011. In countries where the approach was either not feasible or used, progress has been slow and there was limited access to ICM practices by farmers. There are ongoing efforts to improve access to ICM technologies under those circumstances.

## Participatory Technology Development and Delivery

**Testing of promising technologies:** Several IPDM/ISFM technologies were tested on-station and on farm in different PABRA countries. They include but are not limited to: use of quality seed of improved varieties, staking techniques for climbing beans, botanical pesticides management of storage pests, intercropping, varietal mixtures, pesticide application, organic and inorganic fertilizers, etc (Table 1). Several technologies have been validated with farmers e.g.: Tithonia and manure amendments; N, P and K application, staking options for climbing beans; ISFM treatment combination on snap bean; and integrated management options for major diseases, bean stem maggot and bean bruchids (*Zabrotes subfasciatus*). Testing of the technologies takes place both on station and on farm with the involvement of farmers who are the end-users.



Staking options being tested in Rwanda



Testing the use of *Rhizobium* inoculum (Biofix) to increase N fixation in Kenya (courtesy KARI-Thika)

**Technology Delivery:** The delivery of improved integrated bean production technologies to farmers is a knowledge intensive, expensive, and a slow and tedious process. Two approaches were utilized to increase access to ISFM/IPDM technologies;

**1) A deliberate promotion and delivery of improved varieties and complementary technologies ICM technologies as a single integrated package:** Partnership among different players has been key in the dissemination of these technologies. In the bean growing regions of Ethiopia, about 30 different partner organizations representing research, extension, CBOs, NGOs, farmers' union, seed companies/private farms and individual seed growing farmers worked in close collaboration in the delivery of improved bean varieties (based on foundation seed provided by the national bean research program to primary partners) and integrated bean production technologies.

**2) Advocacy and harnessing of enabling policies (including input support system) to deliver ICM technologies to bean farmers:** Agricultural policies which are conducive to increased bean productivity were implemented in a number of PABRA countries (e.g. Ethiopia, Rwanda, Malawi, S. Tanzania) by the government extension workers, NARs and other PABRA partners to promote ICM and disseminate improved seed along with complementary ICM technologies.

**Table 1. Technologies tested or validated 2009-2010 in some PABRA countries**

Technologies being tested/validated	Country
Staking techniques	Rwanda, Burundi,
Botanicals pesticides (Tephrosia, Neem, etc)	DRC, Tanzania, Uganda
Inorganic pesticides	Tanzania
Diseases management in the intercropping systems	DRC, Ethiopia
Combination varieties and supplementary pesticides	Ethiopia, Tanzania, Uganda
Organic (Tithonia, FYM) and inorganic fertilizers	Burundi, DRC, Tanzania, Sudan, Zambia
Optimum spatial arrangements and population densities for different seed sizes and growth habits of common bean:	Ethiopia
N inoculation and P- fertilizer	Kenya,
Crop rotation	Zambia

**Table 2: Farmers accessing ICM technologies ( 2009&2010) in some PABRA countries**

Country	2009/10	2010/11	2011/12	Total
DRC – East	154770	235210	305870	695850
Ethiopia	154163	170853	226040	551056
Rwanda	168490	292842	326790	788122
Uganda	118590	145697	158370	422657
Lesotho	63900	100400	0	164300
Malawi	276302	199043	201150	676495
Mozambique	34800	61400	0	96200
Swaziland	11500	14290	0	25790
S-Tanzania	174018	184269	215760	574047
Zambia	395810	257210	131040	784060
Zimbabwe	36100	50050	58460	144610
Total	1588443	1711264	1623480	4,923,187



Use of mineral P-fertilizer at planting in Kenya

## Achievements

- Joint promotion of improved seed and ICM technologies has contributed to increased farmer access to seed of improved varieties, ISFM and IPDM technologies (see Table 2).
- Farmer access was greatly facilitated by enabling policies recently implemented in countries such as Rwanda, Ethiopia, Malawi among others.
- In countries where similar technology delivery strategies were not used progress has been slow and there has been limited access of ICM practices by farmers.
- So far, 4.92 million HHs have accessed IPDM/ISFM technologies, 51% of them being women (Table 2).

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- All partners (private, public, civil society and farmers) who are making concerted efforts to increase bean value chain profitability.