International Centre for Tropical Agriculture (CIAT)- Uganda Office
Presentation during Bioversity visit to CIAT- KAMPALA

Clare Mukankusi Bean Breeder & CIAT Country Director 19th April, 2018
CIAT AROUND THE WORLD

We work in 53 countries from 21 offices
CIAT in Africa Roadmap 2017-2020
Four themes for impact

Theme 1
Leveraging markets through improved productivity and competitiveness

Theme 2
Agriculture for improved nutrition and health

Theme 3
Transforming farms and landscapes for sustainability

Theme 4
Investment planning for resilient agriculture

Our vision, a sustainable food future
• Strong value chains for beans & forage seeds
• Improving quality, productivity & availability of seed
• Empowering farmers to access information & credit
• Improved beans and forage seeds for more resilient communities
PABRA Partnerships Platform

Donors /Dev Partners
GAC, SDC, USAID, BMGF, IAid, AGRA, IDRC, WB, ASARECA, CORAF, CCARDESA
GOV, NGOs
Platform For Building Partnerships Between And Within Networks And Countries

- Over 500 diverse R&D direct (primary) and indirect (secondary) partners
  - (ECABREN, SABRN & WECABREN, CIAT)
    - NARS
      - Government Agencies
      - NGOs
      - CBOs, Rural communities
    - Farmers (seed producers and on-farm researchers, producers)
    - Commercial private sector
      - Seed companies
      - Processors
      - Traders
    - Service providers
      - Financial services
Governance Structures

PABRA Steering Committee

Funding Partners: (e.g. GAC, SDC, SFSA, BMGF), SROs

ECABREN Steering Committee (ASARECA)

SABRN Steering Committee (CCARDESA)

WECABREN Steering Committee (CORAF/WECARD)

CIAT

Thematic Leaders and Technical Teams

Our vision, a sustainable food future

- National level (coordination of actors and efforts)
- Sub-regional level (3 networks – SC)
- Pan Africa level (PABRA SC)
- CIAT is a partner and overall facilitator (referee and player)
- Transparency
- Ownership of program by partners
- Empower partners to take decisions and responsibilities
- Donor participation at annual PABRA Steering Committee level

National Bean Programs

National Bean Programs

National Bean Programs
PABRA Framework

• 5-Yr regional agenda and priorities
• Comprehensive and covers all/most aspect of bean value chain
• Aligned to national, sub-regional and CAADP priorities
• Basis for planning and execution of collective programmes and activities
• Commonly used in all countries although doing different and relevant activities
• Provide space and entry point for actors or donors to integrate and contribute components at any point/stage
• Integrates projects:
  • Funded through CIAT relevant to beans
• Factors in kind and other partner contributions

**Ultimate Outcome**
- Improved nutrition and health, gender equality, food security, incomes and natural resource base for sustainable livelihoods of resource poor women and men farmers

**Intermediate Outcomes**
- Increased access to cost effective and environmentally friendly integrated stress management options (e.g. for soil fertility and water, pest and diseases) by particularly women farmers
- Increased access to high value bean products targeted to niche markets with a focus on women
- Increased capacity of men and women to participate in technology development, delivery and decision making bodies equitably
- Increased access to new and existing markets and opportunities for both men and women
- Increased response to demands in the bean sector, and utilizing information and knowledge to influence bean policy in a gender equitable manner

**Immediate Outcome**
- Increased access by especially women farmers to improved dry bean varieties resistant to multiple environmental stresses
- Increased access to micronutrient rich bean based products in the diets of vulnerable communities
- Increased access to high value bean products targeted to niche markets with a focus on women
- Increased capacity of men and women to participate in technology development, delivery and decision making bodies equitably
- Increased access particularly for information and knowledge that shapes bean technology development, delivery and influence policy

Our vision, a sustainable food future
Increased access to market and advisory support services for men and women smallholder farmers and SMEs

Increased access to climate smart agricultural technologies, practices and information for bean production (volume and quality)

Increased smallholder farmers’ resilience to climate change

Contribute to poverty reduction among smallholder farmers by reducing food insecurity, increasing incomes, and strengthening climate smart agriculture

Increased income of smallholder farmers many of whom are women and the rural poor involved in the bean trade.

Improved food and nutrition security in a gender equitable and sustainable manner

Increased access to skills, information and knowledge providing enabling environment for bean research and development in PABRA countries

Increased access to bean and dry bean products for consumption among poor households in a gender equitable manner.

Increased access to climate smart agricultural technologies, practices and information for bean production (volume and quality)

Contribute to poverty reduction among smallholder farmers by reducing food insecurity, increasing incomes, and strengthening climate smart agriculture

Increased income of smallholder farmers many of whom are women and the rural poor involved in the bean trade.

Potential outcomes:

- Improved food and nutrition security in a gender equitable and sustainable manner
- Increased access to markets in a gender equitable manner
- Increased income of smallholder farmers, many of whom are women and the rural poor involved in the bean trade.

Immediate Outcome

- Increased access to climate smart agricultural technologies, practices and information for bean production (volume and quality)
- Increased access to skills, information and knowledge providing enabling environment for bean research and development in PABRA countries
- Increased access to markets in a gender equitable manner
- Increased income of smallholder farmers, many of whom are women and the rural poor involved in the bean trade.

Intermediate Outcome

- Increased smallholder farmers’ resilience to climate change
- Improved food and nutrition security in a gender equitable and sustainable manner
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Ultimate Outcome

- Contribute to poverty reduction among smallholder farmers by reducing food insecurity, increasing incomes, and strengthening climate smart agriculture
- Increased income of smallholder farmers, many of whom are women and the rural poor involved in the bean trade.
Roles Of Partners Along The Value Chain (From Lab To Market /Mouth)

CIAT
Biophysical
Social

NARES: Management Scientists

Development Partners, Private and Policy makers

Users

- Joint priority setting
- Joint search for solutions
- Strategic research
- Germplasm conservation
- Catalyzing impact pathways
- Capacity building

- Technology adaptation and policy support
- Catalyzing impact pathways

- Catalyzing links and partnerships to reach users

Our vision, a sustainable food future
Link Research for Development and Impact

RESEARCH
- Breeding & variety development
- Agronomy
- Pest and disease monitoring
- Climate smart agriculture
- Markets
- Nutrition
- Gender
- Impact assessments

DEVELOPMENT
- Widescale uptake
- Extension
- Influence adoption
- Value Addition

Technologies, Innovations, Management Practices (TIMPs)

CIAT / PABRA – Facilitates the link and analyses it

Our vision, a sustainable food future
PABRA Partnership Principles

• To enhance synergy and efficiency
• Building social capital
• Partnership and leveraging comparative advantages of partners
• Strengthen national ownership of programs
• Take advantage of other potential / common actors (seed companies, NGOs)
• Build on NARS bean programs and existing partner networks.
• Linkages with other big initiatives (several seed companies and donor supported)
• Shared responsibility among PABRA members
Partnership in bean variety development: Division of responsibility based on comparative advantage and national interest

**PABRA countries with active Breeding Programs:**
- **ECABREN:** Burundi and Sudan,
- **SABRN:** Angola, SDRC, Lesotho, Mauritius, Mozambique and Swaziland,
- **WECABREN:** Cameroon, Mali, Central Afr Rep, Ghana, Senegal, Togo, Burkina Faso, Guinea, S/Leone, Congo

**Climbing Beans**
- Uganda
- Kenya
- Rwanda

**Snap Beans (French)**
- Uganda
- Kenya
- Malawi
- Madagascar

**Large Red Mottled**
- Uganda
- Malawi

**Dark Red Kidney**
- Tanzania
- Zimbabwe

**Small Red**
- Ethiopia
- S. Tanzania

**Pinto**
- Kenya
- S. Africa

**Carioca (small striped)**
- Ethiopia
- S. Africa
- Malawi
- Zambia

**Large White**
- DR Congo

**Sugar, Tan & Yellow**
- S. Africa

**Elite breeding lines, breeding methodologies, tools, capacity building and backstopping**

**Testing methodologies, understanding genetics etc.**

**Our vision, a sustainable food future**

**Regional Networks/CIAT Strategic Research Backstopping, Technical Support and Capacity Building**

**MAC 44, MAC 70**

**SMR 53**

**NUA45**

**SER125**
Commodity Corridor Approach

- The Commodity Corridor Approach continuous to concretized
- Major bean corridors in Africa have been mapped
- Corridor Approach forming the core of PABRA work
- The Approach continues to receive a lot of interest from various partners, e.g. AfDB, WB, FAO
- The Approach can be applied beyond beans
TYPES OF INTERVENTIONS WITHIN THE BEAN CORRIDOR HUBS

- **Building resilience**
- **Policy**
- **Gender mainstreaming**
- **ICT**
- **Nutrition**

**PRODUCTION HUB**
- Variety targeting
- Seed systems
- GAPs
- CSA

**DISTRIBUTION HUB**
- Aggregations
- Distributions systems
- Exchange services
- Warehousing

**CONSUMPTION HUB**
- Markets
- Processing
- Buying
Strengthening Private sector- led partnerships

• Partnerships expanded in the following areas:

  • Input access- Syngenta, Yara,

  • Integrated pest and disease management- Real IPM

• Private Sector: Corridor Approach
  • Seed production
  • Processors
  • Traders - ICT and Ag- MasterCard Innovation Lab
  • Post harvest handing- GrainPro
  • Product development- Lasting Solutions, Nutreal, Azuri, Farm Fresh
  • AFEX Commodities Exchange Limited, Nigeria - initial discussion
Direct And Indirect PABRA Funding

Donors
- GAC, SDC, BMZ, IDRC, BMGF, SYNGENTA, IRISH AID, USAID etc

Private sector

National Gov’ts

CIAT/PABRA

NARS
- CIAT/PABRA Govts
- Direct grants
- Private sector

Our vision, a sustainable food future
**CIAT Uganda Bean Program Staffing**

- **Three IRS (Plant breeder, Agricultural economist/impact assessment, M&E specialist)**

- **Research Support Staff**: Research Associates: Plant pathologists 1, Plant breeder; 1, Agricultural economist; 1, Database officer; 1); Research Assistants (Molecular biologist; 1); Technical Assistants (Plant pathology/plant breeding; 6); Casual laborers >20 (wages)

- **Support staff**: Human Resources, Executive secretary, Finance officer, Accountant, Drivers (3), Lab cleaner, Security guard

- **PABRA**: Nutritionist (Nairobi), Market specialist (Rwanda), Agronomist (Nairobi), Seed system specialist (Tanzania); Gender specialist (Nairobi), Gender specialist, Climate change specialist, Project Officer, KM and Communication, breeders (Malawi and Ghana)

- **CIAT Global**: Molecular Genetist/Breeder (Andean breeding program), Senior Breeder (Meso American breeding program), Physiologist, Plant Pathologist
BREEDING APPROACH

Shared breeding responsibilities under PABRA:

- CIAT Headquarters breeding program in Colombia
- Regional breeding programs of ECABREN and SABRN
- National bean programs responsible for different types of beans
- Various universities and advanced research institutes (ARIs).

CIAT LAC

Universités/ARI
• Targets seven grain market classes:
  • Red mottled,
  • Small reds
  • Large reds
  • Small whites (navy)
  • Large whites
  • Sugar beans
  • Yellow beans

<table>
<thead>
<tr>
<th>Market class</th>
<th>Countries where the bean types are of high or moderate importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Red Mottled</td>
<td>UG, KE, DRC, TZ, SU, MD, BU, ET, RW</td>
</tr>
<tr>
<td>All. Reds</td>
<td></td>
</tr>
<tr>
<td>Alla. Large Red Kidneys</td>
<td>TZ, KE, RW, MD, ET, BU, UG, DRC</td>
</tr>
<tr>
<td>Allb. Small and Medium Reds</td>
<td>ET, KE, TZ, RW, DRC</td>
</tr>
<tr>
<td>III. Browns</td>
<td></td>
</tr>
<tr>
<td>Illa. Yellow</td>
<td>BU, DRC, RW, TZ, KE, UG, MD</td>
</tr>
<tr>
<td>IIib. Brown</td>
<td>BR, DRC, RW, TZ, KE, MD</td>
</tr>
<tr>
<td>IIIc. Tan/Khaki</td>
<td>TZ, DRC, RW, UG, RW</td>
</tr>
<tr>
<td>IV. Cream</td>
<td></td>
</tr>
<tr>
<td>IV a. Pinto</td>
<td>KE, UG, MD</td>
</tr>
<tr>
<td>IV b. Sugars</td>
<td>UG, DRC, ET, KE, RW and BU</td>
</tr>
<tr>
<td>IV c. Carioaca</td>
<td>KE, TZ, DRC, and MD</td>
</tr>
<tr>
<td>V. White seeded</td>
<td></td>
</tr>
<tr>
<td>Va. Navy (Cam, DRC)</td>
<td>ET, RW, KE, CAM, DRC, and MD</td>
</tr>
<tr>
<td>Vb. Large white kidney</td>
<td>MD, DRC, ET, RW, CM and TZ</td>
</tr>
<tr>
<td>VI. Mixed Colours/others</td>
<td></td>
</tr>
<tr>
<td>Vla. Purples/ Mwezimoja types</td>
<td>TZ, KE and MD</td>
</tr>
<tr>
<td>Vlb. Blacks</td>
<td>DRC, UG, KE, TZ, SU and MD</td>
</tr>
</tbody>
</table>
Breeding Priorities: Multiple Trait Breeding Approach

**Biofortification**
- High minerals content (Iron and Zinc), protein content & quality

**Resilience/cross cutting**
- Drought tolerance
- Low Soil fertility tolerance
- Resistance to existing and emerging pests and diseases

**Must have traits**
- Productivity (high yield)
- Consumer preferences (e.g. acceptable grain type and growth habit)

**Consumer traits**
- Canning quality
- Snap bean quality
- Precooked quality
- Premium priced/demanded grain types
- Cooking time
Trait Discovery

• Identification of new sources of traits (studying genetic mechanisms of trait inheritance)
  • Key diseases (anthracnose, common bacterial blight, bean common mosaic virus, root rots; Fusarium, Sclerotium, Rhizoctonia and Pythium,
  • Major field pests (Bean stem maggot)
  • Fast cooking time
  • Canning quality
  • Drought tolerance (natural environment)

• Molecular breeding
  • Identification of new markers tagging identified resistance
  • Diversity studies (Pathology and breeding)
  • Marker assisted selection (selection of parents)
  • DNA fingerprinting-Sample preparation (LGC)
  • GBS-DNA extraction and shipping (Elshire’s lab, Cornell, IGSS)
Breeding Pipelines

• Bush and climbing bean breeding lines for drought tolerance and high mineral content

• Bush and climbing bean breeding lines with heat and/or drought tolerance

• Bush and climbing bean breeding lines for insect pest and disease resistance
Research Facilities And Capacities

• Seed Storage: well organized cold store (160 SQMT) with stable temperature (15°C) and humidity capable of maintaining viability for more than 2 years
• Three mesh houses with about 500 SQMT
• Fields
• Cooking time platform
• Canning platform
• Pathology and biotechnology lab
• Labels and barcodes are used for seed produced in 2014.
• Accurate seed inventory information exists in BMS
Support to NARS

- Germplasm
- M and E support
- Impact assessment
- Capacity building (hands on training and post graduate studentship)
- Project collaboration
- Backstopping

**Nurseries distributed from CIAT-Kawanda Gene bank 2017/2018**

1. Drought lines: Zimbabwe, Rwanda, Tanzania, Congo, Ethiopia, NaCCRI, Senegal.
2. Yellow Bean Collection: Karen Cichy (MSU)
3. TL3 reference finger printing set (230) : Tim Porch (Puerto Rico)
5. DNA finger printing Panel: IGSS/ BECA Kenya
6. KFRR nursery to NaCCRI.
7. Nutritional Climbers: SARI, MARI, ARI-Uyole. KARLO Kenya
8. NUA lines to Ethiopia.
10. Drought, and low soil fertility lines: Ghana
11. Heat stress tolerance lines: Ethiopia, Ghana, Tanzania, NaCRRI
12. CBB, Nutritional, drought Populations to MSU.

Nurseries received at the CIAT-Kawanda Gene bank 2017/2018;
1. Rust differentials from University of Embu Kenya
2. Nutritional, drought, heat, ALS nurseries from Cali Colombia.
3. SNAP Bean panel from Oregon state university.