Grain Market: A Pull for Seed Businesses across Bean Corridors in Tanzania

Speakers: Dr. Eliud Birachi, Louise Sperling, Gaudencia Bakilile, Dr. Geoffrey Mkamilo, Dr. Jeff Ehlers, and Jean Claude Rubyogo

Introductory Remarks: Robert Bertram
Opening Remarks

Robert Bertram
Chief Scientist, Bureau for Resilience and Food Security, USAID
Speakers

Dr. Eliud Birachi
Market Value Chains Specialist, PABRA

Louise Sperling
Coordinator, SeedSystems.org

Gaudencia Bakilile
General Manager, G2L Company Limited
Speakers

Dr. Geoffrey Mkamilo
Director General, Tanzania Agriculture Research Institute (TARI)

Dr. Jeff Ehlers
Programme Officer, Bill & Melinda Gates Foundation

Jean Claude Rubyogo
Alliance Global Bean Programme Leader & Director, Pan-Africa Bean Research Alliance (PABRA)
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FEED THE FUTURE SUPPORTING SEED SYSTEMS FOR DEVELOPMENT (S34D)

December 17, 2021
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December 17, 2021
Presentation Overview

1. Introduction, Objectives, Rationale, Study Design
2. Results from the yellow grain market survey
3. Lessons learned and implications for strengthening grain trade systems
Yellow Bean Grain Market Pull

Part I: Introduction, Objectives, Rationale, Study Design
The Alliance of Bioversity International and CIAT (Alliance) is a member of the CGIAR Consortium and has common bean as one of the major focal commodities.

In Africa, the Bean Programme is member of the Pan Africa Bean Research Alliance and bean research work is carried under PABRA.
YB Study Objectives and Approach

1. Understand the importance of the Yellow Bean corridor (Tanzania, the region)
2. Understand capacity of traders and seed networks
3. Show position of released varieties in the market
4. Assess demand for yellow bean seed and grain
5. Identify opportunities for enhancing sectoral efficiency through policy and practice that work across national boundaries.
6. Guide public and private investments in the yellow bean seed demand grain and supply
Beans in Tanzania: Rationale/importance

• **1.2 million tons per year (2018)**, contributing to nutrition (and food security protein, minerals, calories)
• Number **one** bean producer in Africa and **seventh** globally
• **More than 40% traded** and 25% of the traded amount is exported to more than 8 countries in the region
## Major bean market types and their importance in Tanzania

<table>
<thead>
<tr>
<th>Types</th>
<th>Production area (ha) 2018</th>
<th>% total beans area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Large red mottled for domestic and export market</td>
<td>365,344</td>
<td>35</td>
</tr>
<tr>
<td>2. Medium round yellow beans for domestic and export market</td>
<td>340,000</td>
<td>32</td>
</tr>
<tr>
<td>3. Sugar bean mainly export but increasing local market</td>
<td>221,876</td>
<td>22</td>
</tr>
<tr>
<td>4. Others: Purple (Kablanketi), small white, etc</td>
<td>121,961</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,049,181</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

- YB: Second, but with rapid growth due to its increasing market demand and SHFs response!
Why this yellow bean study?

Yellow bean is most traded bean type but with limited information on its production and trade.

Potential implications on seed supplies system and other possible investments remain unclear.
Study Background

• **Sample:**
  - A survey of more than 340 traders (grain and informal seed)
  - 12 regions in Tanzania (wholesalers, exporters, aggregators, and retailers)
  - Production, distribution and consumption hubs; Survey conducted in July/August 2019

• **Partnership:**
  - Co-led by Tanzania Agricultural Research Institute (TARI) and PABRA (Alliance of Bioversity International and CIAT)
  - Implemented under the Supporting Seed Systems for Development activity (S34D) funded by the Feed the Future Initiative through RFS and by USAID through BHA.
Yellow Bean Grain Market Pull

Part II: Results from the yellow grain market survey

December 17, 2021
How yellow bean flows nationally and regionally

- 340 grain traders handled more than 40,000 MT value at US$ 27.6 million annually

- Across borders to 8 countries: to DRC, Uganda, Rwanda, Burundi, Zambia, Malawi and Kenya and others. Exports estimated at 17,322 tons valued at USD 11.8 M (about 15% of the traders)
Yellow bean trade in key hubs, US$

- Yellow bean trade is vibrant across the Tanzania, but the production and consumption hubs stand out clearly.
# Trade Value and Prices of Yellow Bean Sold July 2018 - July 2019

<table>
<thead>
<tr>
<th>Traded varieties</th>
<th>Traders (N)</th>
<th>Value (USD)</th>
<th>Retail Prices (US$)/Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selian 13</td>
<td>153</td>
<td>4,737,843</td>
<td>0.81</td>
</tr>
<tr>
<td>Uyole 16</td>
<td>48</td>
<td>10,921,894</td>
<td>0.75</td>
</tr>
<tr>
<td>Njano gololi (Masindi yellow)</td>
<td>44</td>
<td>3,316,540</td>
<td>0.65</td>
</tr>
<tr>
<td>Njano Uyole/ Uyole 98</td>
<td>16</td>
<td>676,500</td>
<td>0.66</td>
</tr>
<tr>
<td>MOORE 88002</td>
<td>23</td>
<td>1,668,493</td>
<td>0.72</td>
</tr>
<tr>
<td>Non-clustered</td>
<td>64</td>
<td>2,654,553</td>
<td>0.70</td>
</tr>
<tr>
<td>DNA not taken</td>
<td>95</td>
<td>3,631,070</td>
<td>0.77</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>443</strong></td>
<td><strong>27,606,896</strong></td>
<td></td>
</tr>
</tbody>
</table>
Gendered analysis of yellow bean trade

- **Women dominate yellow bean retail trade; men dominate export and aggregation businesses**

- **Mean value of bean sales for women was worth US$ 65,992 per trader while the men had US$ 113,422, almost 2 times more than women/year**

- **Women sold closer home within the district - they mainly sourced grain close to their localities, men source and sell in distant regions/markets**

<table>
<thead>
<tr>
<th>Type of Trader</th>
<th>Women (%)</th>
<th>Men (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailer</td>
<td>56.4</td>
<td>31.6</td>
</tr>
<tr>
<td>Collector/aggregator/broker</td>
<td>13.5</td>
<td>21.1</td>
</tr>
<tr>
<td>Wholesaler</td>
<td>26.4</td>
<td>40.1</td>
</tr>
<tr>
<td>Producer-trader</td>
<td>3.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Exporter/others</td>
<td>0.6</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Yellow Bean Grain Market Pull

Part III: Lessons learned and implications for strengthening grain trade systems
Lessons on YB Grain Trade

• High demand, rapid growth in less than ten years and rising (taste, palatability, flatulence, cooking)

• Differentiated grain market; preference for single varieties within the yellow beans

• Market pull (by consumers and producers) for yellow varieties is strong, but traders faced inadequate supply to meet demands

• Grain market lays a foundation (pull) for more private (formal, informal) investors in seed supply and resilience, harnessed by the bean corridor

• These present opportunities for investment in both grain and seed supplies: But major constraints exist:
  1. Unreliable supply of grain;
  2. Inadequate seed and poor linkages to research
  3. Poor quality of beans;
  4. Unpredictable market levies, poor storage and limited credit availability
Implications: Strengthening investments in the corridor for growth

- The yellow bean corridor can translate the grain volumes to business and investment opportunities to upgrade seed supplies by enterprises for growth and gender inclusion
- But there is need to invest in:
  + Sufficient provision of variety information to potential users;
  + Increase the technical capacities of value chain actors to handle the beans seed;
  + Increase collaborations and linkages in the value chain and;
  + Provide sufficient policy support for within and cross border trade.

- Yellow bean corridor success is not just about grain movement… BUT
  + It is also about informal seed movement and;
  + Supporting informal seed availability, access and quality enhancement in Tanzanian corridors and beyond
S34D Consortium Partners
The informal seed sector spreading innovation in the yellow bean chain in Tanzania

Sustainability 2021, 13(16), 8897; https://doi.org/10.3390/su13168897
Channels through which farmers source seed

Modified from Almekinders + Louwaars 1999
## Seed Markets

<table>
<thead>
<tr>
<th>Informal/local seed markets</th>
<th>Agro-dealers/seed companies</th>
</tr>
</thead>
</table>

Many crops: cereals, legumes

Maize, vegetable seed
‘IMPROVED SEED’ = Seed quality + Performing varieties

* certified
* QDS
* farmers’

* modern
* improved

Variants of yellow beans in Tanzania
Sample/Methods:

- Sites in 12 regions in Tanzania (wholesalers, exporters, aggregators, and retailers)
- Survey of more than 340 traders
  - Large grain traders
  - Large seed traders
  - Seed retailers
- GIS mapping of seed and grain flows
- DNA and fingerprinting analysis

Partnerships:

- PABRA (Alliance of Bioversity International + CIAT),
- Tanzania Agricultural Research Institute (TARI)
- Supported by USAID through the Supporting Seed Systems for Development (S34D) activity
Findings: seed / seed business
# Seed and grain businesses

![Graph showing peak sales percentage responses over months from Jun-18 to Jun-19.]

## Type of Trader

<table>
<thead>
<tr>
<th>Type of Trader</th>
<th>Volume (MT)</th>
<th>Non-sowing period</th>
<th>Sowing period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% grain</td>
<td>% seed</td>
</tr>
<tr>
<td>Large Traders</td>
<td>2,117 (48.1)</td>
<td>84.1%</td>
<td>15.9%</td>
</tr>
<tr>
<td>(avg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retailers</td>
<td>295 (4.6)</td>
<td>80.5%</td>
<td>19.5%</td>
</tr>
<tr>
<td>(avg)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Informal seed management: trader practices

<table>
<thead>
<tr>
<th>Type of Practice</th>
<th>Retailers (N = 41)</th>
<th>Large Traders (N = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># yes</td>
<td>% yes</td>
</tr>
<tr>
<td>Get grain from specific regions - with similar adaptation</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Seek out specific varieties to buy (which can be planted)?</td>
<td>31</td>
<td>76</td>
</tr>
<tr>
<td>Buy from specific growers who are known for high quality seed?</td>
<td>11</td>
<td>27</td>
</tr>
<tr>
<td>Ask growers (ahead of time) to multiply select varieties</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Keep each variety pure—as single variety?</td>
<td>30</td>
<td>73</td>
</tr>
<tr>
<td>Keep freshly harvested stocks apart?</td>
<td>30</td>
<td>73</td>
</tr>
<tr>
<td>Grade stocks (which grain/which seed)?</td>
<td>19</td>
<td>46</td>
</tr>
<tr>
<td>Do germination tests?</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Have special storage conditions (to help with seed viability)?</td>
<td>16</td>
<td>39</td>
</tr>
<tr>
<td>Sort out ‘waste’ (pebbles, dirt, dust)?</td>
<td>27</td>
<td>66</td>
</tr>
<tr>
<td>Sort out ‘bad grains/seed’—that is broken, immature, or discolored?</td>
<td>27</td>
<td>66</td>
</tr>
<tr>
<td>Sell seed and grain separately, at different prices?</td>
<td>19</td>
<td>46</td>
</tr>
</tbody>
</table>

Clear practices to manage informal seed: larger traders used on average **6.7**.

Retailers used on average **5.5**.

Many traders sell seed and grain separately, at different prices.

Seed = **10-25% +**
Trader seed and grain flows

Seed flows - local

Grain flows - across country across borders
Yellow bean informal seed: sourcing and sale

Seed sourcing and seed sale generally within region
## Large trader sources of seed and grain (actors)

<table>
<thead>
<tr>
<th>Source</th>
<th>Grain</th>
<th>Seed</th>
<th>Grain + Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-production</td>
<td>32.6</td>
<td>34.8</td>
<td>28.3</td>
</tr>
<tr>
<td>Farmers directly</td>
<td>73.9</td>
<td>76.1</td>
<td>65.2</td>
</tr>
<tr>
<td>Collectors (who source from farmers)</td>
<td>71.7</td>
<td>56.5</td>
<td>52.2</td>
</tr>
<tr>
<td>Other traders, small and middle level</td>
<td>54.3</td>
<td>41.3</td>
<td>34.8</td>
</tr>
<tr>
<td>Wholesalers</td>
<td>4.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Seed Companies</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>QDS producers</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Research / NARS</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>2.2</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Findings: Varieties-
DNA methods and fingerprinting
Genetic identity of yellow bean traded in Tanzania: methodology

Step 1: Establish a panel or library of DNA fingerprints “The reference library”

- Develop a list of improved varieties of target crop currently in use in the target countries—released/official varieties and local landraces.
- Collect breeder seed of these varieties to develop the library
- Sample and ship leaf or DNA to collaborating lab (LGC outsourcing service)
- Analyze data to establish a panel or library of DNA fingerprints

Step 2: Develop fingerprints of trader samples

- Yellow grain samples (501) corresponding to trader survey data collected
- TARI nominated samples (breeder seed of released yellow bean varieties (reference) assembled
- Seed sent to Kawanda (Uganda) for seed germination and leaf sampling
- Leaf samples shipped to Intertek (Sweden) to run the reference library (markers) to establish fingerprints of trader samples and return data
- Data analyzed to majorly cluster trader samples around the reference (yellow released varieties and known landraces)
<table>
<thead>
<tr>
<th>Key</th>
<th>Reference varieties</th>
<th>% of trader samples</th>
<th>Group name</th>
<th>Type</th>
<th>Release date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>SELIAN13</td>
<td>44.9</td>
<td>Selian 13</td>
<td>Modern</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>NJANO GOLOLI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MASINDI YELLOW LONG TZ ; UNLABELED2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>Un-clustered</td>
<td>18.9</td>
<td>Unknown</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>Group 3</td>
<td>MASINDI YELLOW SHORT; NJANO GOLOLI</td>
<td>13.2</td>
<td>Masindi Yellow</td>
<td>Landrace from Uganda</td>
<td>--</td>
</tr>
<tr>
<td>Group 4</td>
<td>UYOLE16</td>
<td>11.4</td>
<td>Uyole 16</td>
<td>Modern</td>
<td>2016</td>
</tr>
<tr>
<td>Group 5</td>
<td>MOORE88002 TZ UNLABELED 1 RUSHULA</td>
<td>6.5</td>
<td>MOORE 88002</td>
<td>Modern</td>
<td>1999 released in Burundi, Uganda and DRC</td>
</tr>
<tr>
<td>Group 6</td>
<td>NJANO UYOLE</td>
<td>5.0</td>
<td>Njano Uyole</td>
<td>Modern</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td>UYOLE98;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UYOLE NJANO NDEFU; VWAWA MKT MBUZI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
So how did modern varieties enter the informal seed system?

- TARI **dynamic** release of modern varieties: 15 between 2011-2020 (yellow+ other types)
- TOSCI scaling up certified + QDS 2.2 MT (2013) to 300-500 MT/years after
- Many on-farm demonstrations
- Field days
- ....
Moving Forward
Immediate actions needed- to be evaluated

1. **Information (truly link informal traders to better formal sector information)**
   - Link *traders* to info on new varieties, specific sources of quality seed
   - Ensure *traders* represented on commodity and seed/grain platforms
   - Give *traders* tools to popularize and get feedback on varieties/seed quality (incl. PVS trials)

2. **Strategic injections of new varieties (active not passive strategy)**
   - Develop strategy to inject varieties into informal system
   - Use small packs as one entry point (multiple outlets for sale- rural shop)
   - ....

3. **Efforts to enhance seed quality (informal system)**
   - Leverage areas for building on certified seed (scale points with special producers)
   - Work with farmers and traders to keep varieties separate
   - Promote better storage- farmers and traders
   - ....
The current situation- and steps beyond

• Expand further lessons learned in Tanzania (use them!)
  – Other beans types
  – Other crops (...cowpea)

• Learn more about ‘seed flow processes’ (informal sector, formal sector and their interaction) + move learning to other parts of Africa --even beyond.

→ This is a win situation --------with no (?) $$ investment
Study drivers

- **Researchers (ABC)/PABRA, TARI**
  - Kessy Radegunda, Eliud Birachi, Nestory Shida, Clare Mukankusi, Edith Kadege, Agnes Ndunguru, Jean-Claude Rubyogo, Robin Buruchara, Bhramar Dey, Magdalena William, Denis Mcharo, Patrick Gallagher, Noel Templer, Sylvia Kalemera, Mercy Mutua, Louise Sperling

- **340 + Traders**
Grain Market: A Pull for Seed Businesses across Bean Corridors in Tanzania

FEED THE FUTURE SUPPORTING SEED SYSTEMS FOR DEVELOPMENT (S34D)

December 17, 2021
G2L Co. Ltd Products

- The company trades on cereals: (maize, rice), pulses: soybean and common beans.
- 25% of the business is common beans.
- Areas of operation Mbeya, Iringa, Njombe, Ruvuma regions.
- Current capacity: 6000 tons of Njano uyole (yellow) and Uyole 96 (red kidney).
Southern Highland of Tanzania.
- High potential for bean production.
- TARI Uyole.
- Seed production is supported by TARI Uyole and other development partners.
Partnerships

TARI Uyole/Alliance - CIAT

- EALY GENERATION SEED (EGS)
- CERTIFIED SEED
- VARIETIES DEVELOPMENT (PVS)
- CAPACITY BUILDING TO SHF 7185 (41% women) 485 (41% women)

G2L (OFF-TAKER)

SEED COMPANIES

SMALLHOLDER FARMERS

FINANCIAL SERVICES

FARM SAVED SEED

QDS PRODUCERS
Challenges

• Lack of coordinated multistakeholders' platform.
  ❖ Inadequate quantity of early generation seed (EGS).
  ❖ Client press their odder of different varieties during the harvest time. This year 2021 most client are looking for “Sugar beans”.

• Climate change.

• COVID 19 pandemic (market).

• The Uyole 96 (red kidney beans) discolor, they are not suitable for our international market.

• Women are trustful but they are shy/afraid to be engaged into contract farming.

• Inadequate equipment e.g., duster cleaner, drier and grading machine.
Way forward

• Better varieties of sugar and dark red kidney.
• At least 45% of common bean to be used to process *Instant Baby Food* (add Value.).
• Strengthen multistakeholders’ platform to support coordination of key actors.
• Continue Linking SHFs with financial institutions for easy financial access.
• Assist to register farmers groups.
Thank you

Asante saana
Grain Market: A Pull for Seed Businesses across Bean Corridors in Tanzania

Dr. Geoffrey Mkamilo - DG TARI
December 17, 2021
Economic importance of Beans in Tanzania

- Bean is one of 45 commodities supported by Tanzania Agriculture Research Institute (TARI).

- In 2019, the production of bean grains is 1.2 million tons per year valued at USD 1.048 B from various bean types.

- Research on common bean is supported by three centers in Tanzania:
  - Uyole – Southern Highland
  - Maruku – Lake and Western zone
  - Selian – Northern zone
Impactful Partnership

- Tanzania Agriculture Research Institute (TARI) collaborates with the Alliance of Bioversity International and CIAT through the Pan-African Bean Research Alliance (PABRA) since 1986:
  - Development of new beans varieties 49 (market demand, climate variability, food security, nutrition, and livelihood).
  - Testing bean corridor approach which is increasingly generating interest from the government investments in beans and increasingly upgrading bean value chain.
  - Seed companies producing bean seed has increased from 1 in 2015 to 13 in 2021.
  - Seed production (certified and Quality Declared classes) has increased from 542.7MT in 2015 to 1932.4MT in 2020.
  - Bean yield has increased from 0.77 MT/ha in 2012 to 1.3 MT/ha in 2019.
  - Capacity building to NARS (short term and long-term courses e.g., MSc and PhD) and other value chain actors.
Implications of the yellow bean study in agri-research in Tanzania

- Raised the profile of beans in the country from subsistence to cash crop and attracted different investments in the value chains e.g. private sector entrepreneurs, school feeding programs where several developments partners to improve nutrition of school children.

- Government investment in beans collaboration with IFAD e.g. under ‘Agriculture and fishery development program (AFDP)’.

- Commodity approach across other commodities to accelerates impact.

- Synchronize seed system and grain production/market and demand led breeding (DLB).
Way forward/appreciation

- TARI will catalyze the mainstreaming good lessons from the YB study to other commodities

- The PABRA model is an exemplary partnership between NARS and CGs that we would like to have it.

- As chairman of ASERECA, I request that the YB study should be extended to ASERECA countries since the YB is traded across various ASARECA countries.

- TARI is open to new ideas and ready to work with partners to continue to address all challenges that slowing down the agricultural sector growth

- We extend our sincere appreciation to all donors and development partners who have been key in supporting the transformation of agriculture in Tanzania for a couple of years.
Thank you

Asante sana
Dr. Jeff Ehlers
Programme Officer
Bill & Melinda Gates Foundation
Closing Remarks

Jean Claude Rubyogo
Alliance Global Bean Programme Leader & Director
Pan-Africa Bean Research Alliance (PABRA)