Updating the Atlas of Common Bean (*Phaseolus vulgaris*) Production in Africa: a tool for targeting and evaluating legume research and development

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Objectives for PABRA

1. Produce a tool for targeting bean technologies in Africa, considering:
   • Major Bean Producing Areas
   • Socio-economic variables (poverty, gender, markets)
   • Specific environmental stresses including those associated with climate change

2. Make the tool widely available to research, development and farmer organisations

   Update the 1998 Atlas of Common Bean Production in Africa
Expansion to West Africa

Bean Atlas
Data Collection

Workshop
- Orange: No Workshop
- Gray: Non-PABRA country
- Green: Workshop

Countries:
- Senegal
- Guinea
- Guinea-Bissau
- Mali
- Burkina Faso
- Togo
- Cameroon
- Republic of the Congo
- Democratic Republic of the Congo
- Angola
- Zambia
- Zimbabwe
- South Africa
- Botswana
- Lesotho
- Swaziland
- Mauritius
- Madagascar
- Mozambique
- Tanzania
- Malawi
- Uganda
- Kenya
- Rwanda
- Burundi
- Sudan
- Ethiopia

Non-PABRA countries include:
- Cameroon
- Angola
- Republic of the Congo
- Democratic Republic of the Congo
- Lesotho
- Swaziland
- Mauritius
- Madagascar
- Mozambique
- Tanzania
- Malawi
- Uganda
- Kenya
- Rwanda
- Burundi
- Sudan
- Ethiopia
Delphi method

Guinee

DRC Sud

Zimbabwe
### Delphi method - results

#### (14) Marketing of beans
Instructions: Show the relative production of beans which are marketed for the types of markets where beans are sold for each major bean producing area

<table>
<thead>
<tr>
<th>Marketing of beans</th>
<th>Example Bean Production Area</th>
<th>AEZ III - North</th>
<th>AEZ III - North-West</th>
<th>AEZ II - Serenje</th>
<th>AEZ II - Chibombo</th>
<th>AEZ III - Copperbelt</th>
<th>AEZ II - Lundazi</th>
<th>AEZ II - Chipata</th>
<th>AEZ II - Chongwe</th>
<th>AEZ I</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of production marketed</td>
<td>40</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>% sold at local markets</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>20</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>% sold to traders and marketed nationally</td>
<td>5</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>80</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>% sold to traders and exported</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

#### (15) Market centres
Instructions: Identify the most important market centres for each major bean producing area

<table>
<thead>
<tr>
<th>Market centres</th>
<th>Example Bean Production Area</th>
<th>AEZ III - North</th>
<th>AEZ III - North-West</th>
<th>AEZ II - Serenje</th>
<th>AEZ II - Chibombo</th>
<th>AEZ III - Copperbelt</th>
<th>AEZ II - Lundazi</th>
<th>AEZ II - Chipata</th>
<th>AEZ II - Chongwe</th>
<th>AEZ I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Important market</td>
<td></td>
<td>Lusaka</td>
<td>C/belt</td>
<td>Lusaka</td>
<td>Lusaka</td>
<td>C/belt</td>
<td>Lundazi</td>
<td>Lusaka</td>
<td>Chipata</td>
<td>Choma</td>
</tr>
<tr>
<td>Second most important market</td>
<td></td>
<td>Kasama</td>
<td>DRC</td>
<td>Kabwe</td>
<td>Kabwe</td>
<td>Lusaka</td>
<td>Chipata</td>
<td>Chipata</td>
<td>Chongwe</td>
<td>Choma</td>
</tr>
<tr>
<td>Third most Important market</td>
<td></td>
<td>Luwingu</td>
<td>Solwezi</td>
<td>Serenje</td>
<td>Mumbwa</td>
<td>DRC</td>
<td>Malawi</td>
<td>Malawi</td>
<td>Kafue</td>
<td>Kaoma</td>
</tr>
<tr>
<td>Fourth most important market</td>
<td></td>
<td>Mporokoso</td>
<td>kasesma</td>
<td>Mkushi</td>
<td>Chibombo</td>
<td>Kabwe</td>
<td>katete</td>
<td>Katete</td>
<td>kabwe</td>
<td>Mongu</td>
</tr>
</tbody>
</table>
Comparison with previous version

• More precise
  - 182 Major Bean Producing areas (MBPAs)
  - Better definition of boundaries
• More accurate?
  - Up-to-date
  - More participatory
• Relatively cost efficient
• Includes better resolution spatial data (e.g. SRTM elevation, WorldClim climate data, AfSIS soils data) and more model results for bean suitability in a changing climate
Bean Atlas themes

1. Bean Production
2. Bean Seed Systems
3. Gender, Utilisation and Nutrition
4. Bean Markets and Marketing
5. Bean Seed types and varieties
6. Abiotic constraints
7. Biotic constraints
8. Bean research and development
Bean Production Areas

Harvested area ↑

Yield ↗ in W and E Africa

Yield ↘ in S Africa
### African Bean Environments

#### AFBE7: Sub-humid areas at mid-altitude and low latitude

<table>
<thead>
<tr>
<th>ID</th>
<th>ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>627,241</td>
<td>13.7</td>
</tr>
<tr>
<td>2</td>
<td>759,630</td>
<td>16.6</td>
</tr>
<tr>
<td>3</td>
<td>163,642</td>
<td>3.6</td>
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<tr>
<td>5</td>
<td>87,111</td>
<td>1.9</td>
</tr>
<tr>
<td>6</td>
<td>127,281</td>
<td>2.8</td>
</tr>
<tr>
<td>7</td>
<td>1,226,690</td>
<td>26.9</td>
</tr>
<tr>
<td>8</td>
<td>491,957</td>
<td>10.8</td>
</tr>
<tr>
<td>9</td>
<td>326,560</td>
<td>7.2</td>
</tr>
<tr>
<td>10</td>
<td>300</td>
<td>0.0</td>
</tr>
<tr>
<td>11</td>
<td>97,240</td>
<td>2.1</td>
</tr>
<tr>
<td>13</td>
<td>164,147</td>
<td>3.6</td>
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<tr>
<td>14</td>
<td>17,850</td>
<td>0.4</td>
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<tr>
<td>15</td>
<td>133,390</td>
<td>2.9</td>
</tr>
<tr>
<td>16</td>
<td>126,266</td>
<td>2.8</td>
</tr>
<tr>
<td>17</td>
<td>188,755</td>
<td>4.1</td>
</tr>
<tr>
<td>18</td>
<td>6,055</td>
<td>0.1</td>
</tr>
<tr>
<td>19</td>
<td>20,055</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Bean Markets and Trade Flows

Bean Producing Areas in Africa

% of production marketed (smallholder)

MK_PCS_Marketed

- No Data
- 0 - 20%
- 20 - 40%
- 40 - 60%
- 60 - 80%
- 80 - 100%
Bean Markets and Trade Flows

Major Bean Corridors

Bean trade flows
- Medium
- Medium/High
- Low
- Low/Medium

IMPORTANCE

[Map showing bean trade flows across different regions]
Bean Varieties

Older varieties are still common - such as K 132 in Uganda and Lyamungu 85 in Tanzania

Newer varieties have penetrated in other areas - such as Nasir in Ethiopia and to a lesser extent RWR 2245 in Rwanda
Constraints to Production

Bean Producing Areas in Africa

Yield Gap contribution estimate

Bruchids (Acanthoscelides spp. and Zabrotes spp.)

- **B. l. Bruchids**
  - No Data
  - 0 - 25 kg/ha
  - 25 - 50
  - 50 - 100
  - 100 - 200
  - 200 - 1000 kg/ha
Future Constraints to Production

Bean Producing Areas in Africa

Current Suitability Model Downscale
- Not Suitable
- Marginally Suitable
- Suitable
- Very Suitable
Conclusions

• Dissemination should be targeted, bean atlas is a good tool and source of information to do this

• Bean Atlas needs to be updated to remain useful

• Data are provided by experts – less accurate than surveys but more timely, and cheaper, and more accurate than using a single expert opinion

• Expansion to west Africa follows evolution of PABRA

• Consistent with changes in PABRA focus (e.g. marketing)

• Includes results from spatial models for those issues where some foresight is required (e.g. climate change)

• Bean Atlas currently under review
Acknowledgements

• All PABRA stakeholders especially DFATD and SDC
• Bean Farmers, Researchers, Traders, NGOs and Extension officials from:

Burkina Faso, Burundi, Cameroon, Republic of Congo, DRC, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Rwanda, Senegal, South Africa, Sudan, Swaziland, Togo, Uganda, Tanzania, Zimbabwe and Zambia
Thanks for your attention

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