FARA
Forum for Agricultural Research in Africa
Situating the grain legume agenda in African agricultural research for development strategies

Yemi Akinbamijo PhD
Executive Director

Keynote presentation at the Joint Pan-African Grain Legume and World Cowpea Conference
Livingstone, Zambia
29th February 2016
Outline

1. Background:
   - Timing of this conference
   - About FARA
   - Africa’s development context and agenda

2. Why grain legumes matter in Africa

3. Situating grain legumes in CAADP and the Science Agenda for Agriculture in Africa

4. Concluding thoughts

5. 7th Africa Agriculture Science Week and FARA GA
Excellent timing of the conference

From agendas and strategies to results-focused implementation at country level
Conference Theme

*Sustainable* Grain Legume Systems for Food, Income, and Nutritional Security in a *rapidly Changing Climate*
Increasing frequency & severity of extreme weather conditions

African drought Monitor, Princeton University
Increasing frequency & severity of extreme weather conditions

NDVI (Normalized Difference Vegetation Index) measures extent to which plants absorb visible light and reflect infrared light. Drought-stressed vegetation have less NDVI.

Lejweleputswa is a district in northwest Free State, South Africa
Extreme weather conditions

• 49 million people in southern Africa could be affected by a drought that has been worsened by the most severe and longest El Nino weather pattern in 35 years (WFP, Feb 2016)

• 14 million people face hunger in the region

• Ethiopia is in the grip of its worst drought in recent history. More than 10 million people are in need of assistance according to the Government and WFP.

• ET Govt has spent USD 300m on relief food
About FARA

• Mandated to coordinate agriculture research and innovation in Africa
  - Mandate from Constituents of the Forum, the African Union Commission and NEPAD Agency

• As continental apex body, FARA performs its functions with and through the sub regional organisation and national institutions, and GFAR in line with subsidiarity principle.

• Secretariat located in Accra, Ghana.
FARA facilitates the effective deployment of STI Agriculture towards achievement of development outcomes
FARA’s core programmes (2016-2018)

- Knowledge Management for Decision Support
- Capacity Development for Implementation
- Innovation Systems and Partnerships
Africa’s development context and agenda
Africa’s Development Context

• The “Africa Rising” narrative
  
  - Rising incomes, rising inequality; millions left behind
  
  - Poverty is more widespread in Africa than elsewhere (43% of Africans in extreme poverty)
  
  - Number of poor people increased by 100m from 1990 to 2012 (World Bank, 2015)
Africa’s Development Context

- Youth unemployment

- Vulnerability to shocks (e.g. commodity prices, climatic changes, foreign investments)

- Food insecurity—highest prevalence of malnutrition in the world (one in 4 people)
This pertains despite an abundance of resources.

AGENDA 2063
“A strategy to optimise the use of African resources for the benefit of all Africans”
Africa’s Agenda 2063

Vision:
An integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the international arena.

Strategies towards realisation of this vision:
• Inclusive growth and sustainable development
• Integration
• People driven development involving women and youth
• Partnership
• Good governance and rule of law
Agenda 2063
Policy frameworks

The Future we want for Africa
AGENDA 2063
Unity, Prosperity & Peace

CAADP

Science, Technology and Innovation Strategy for Africa 2024

PIDA
Programme for Infrastructure Development in Africa
Situating grain legumes in the Africa’s development agenda’s

Rationale:

• Considered most effective means of scaling out technologies, practices, policies etc

• Assures relevance and ownership by countries and hence sustainability

• Anticipated to be a major means of mobilising the investments required for Ag. R&D
In which development agenda are we to situate grain legumes?
Why grain legumes matter in Africa
Why legumes matter?

• Important food sources and adaptable to diverse agro-ecologies including marginal areas

• Nutrition and health

• Important sources of income & feed:

• Natural resource management & sustainable farming systems
Food security & adaptability

• Often referred to as “poor people’s meat”—esp. important to those who cannot afford enough milk, meat or fish to meet their protein needs.

• Often grown in underutilized niches in farming systems such as intercrops, relay crops & end-of-season second crops – squeezing more food from less land.

• More crops grown means less risk. e.g. when drought ruins a cereal crop, later-flowering legumes often escape it, rescuing the farm family’s food supply.

• When grown in rotation with other crops, grain legumes break the weed & disease cycles of those crops and enrich the soil with N, reducing farmer’s vulnerability to crop failures.
Nutritional profile of pulses and grains (g/100g dry weight)

<table>
<thead>
<tr>
<th></th>
<th>Peas</th>
<th>Beans</th>
<th>Chickpeas</th>
<th>white rice</th>
<th>wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>23</td>
<td>23-26</td>
<td>26</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>60</td>
<td>67-71</td>
<td>60</td>
<td>90</td>
<td>83</td>
</tr>
<tr>
<td>Fibre</td>
<td>16</td>
<td>17-28</td>
<td>14</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Fat</td>
<td>1</td>
<td>1-2</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Nutrition and Health

• Rich in protein, oil, and micronutrients e.g. iron and zinc – which tend to be deficient in diets of the poor.

• Contain amino acids that are deficient in cereals, sharply raising protein quality when eaten together.

• Exceptional palatability: WFP uses peanut butter and chickpea pastes as base ingredients in emergency famine relief foods.

• Bioactive compounds that show some evidence of helping to combat cancer, diabetes and heart disease.
Nutrition ... contd

• However, legume proteins are generally deficient in sulphur amino acids (*cysteine* & *methionine*)

• Culinary cultures have evolved to mix cereals and legumes (e.g. maize and beans)—the beans compensate for the low lysine content of maize.

• Some nutrient deficiencies in legumes have been addressed by bio fortification. For example, HarvestPlus has enhanced Fe content in beans (DRC, Rwanda)
Important source of income and feed

- **Source of both food and income** (grain legumes attract prices comparable to or higher than cereals)

- The oil, fresh pods, peas and leaves attract good prices in urban and export markets.

- The haulm and press-cake are **valued as livestock feed**; their high protein content adds considerable nutritional value to cereal straw feeds.
NRM

- BNF (300kgN/ha for beans & 600kgN/ha for tree legumes)
- Stacking the cropping extends the period when land is protected by leafy cover thereby reducing soil erosion.
- Increases the capture, productive use and recycling of water and nutrients
- By enriching livestock diets, grain legumes foster crop-livestock mixed farming systems, which are more sustainable than crop-only or livestock-only systems.
Consumption of grain legumes in Africa

Trends over last 30 years show that per capita daily intake of pulses has increased markedly in Africa compared to other regions where it has been largely stable.
Protein supply from Pulses (1980-2014)
Situating grain legumes in CAADP and the Science Agenda for Agriculture in Africa (S3A)
• Framework for guiding concerted actions to make agriculture a major contributor to broad-based economic growth in Africa.

• CAADP process has been initiated in over 40 countries. In 2\textsuperscript{nd} decade of CAADP, focus is on implementation of country agriculture transformation plans.

• At Malabo AU summit, HoSGs reaffirmed commitment to CAADP through Malabo declaration on 3AGT
Malabo 3AGT resolutions relevant to situating grain legumes in country strategies

• CAADP implementing countries are to prioritise at least 5 agricultural commodities in the post Malabo strategy—*pulses should feature among the five this time round*

• Commitment to enhancing resilience of livelihoods and production systems to climate variability and other related risks. *Legumes are critical to realisation of this goal*
Outcomes:  Wealth creation & poverty reduction; Improved Food and Nutrition Security, Resilience; and Environmental sustainability

Transformation & Sustained Inclusive Growth of Agriculture

Level 2 results:

1. Increased agriculture production and productivity
2. Better functioning national agric. and food markets & increased intra/ inter–regional trade,
3. Expanded local agro-industry and value addition
4. Improved management and governance of natural resources for sustainable agricultural production

Level 3 results: Strengthening systemic capacities to deliver results
Grain legume interventions within the CAADP RF, for example

Level 2: Agric. transformation and sustained and inclusive growth

- Increased production and productivity of grain legumes
- Intra-regional trade
- Agro-industry and value chain development
- NRM and sustainable agriculture

Level 3: Strengthened systemic capacities to deliver results

- Strengthened capacity for evidence based planning and implementation of legume programmes e.g. N2Africa
- Objective and inclusive policy design and implementation process e.g. PACA actions, BNFB (CIP/FARA)
- Effective and accountable institutions
Legume-based agro-enterprise: the linkages

Legume Seed Farming

Edible oil processing plant

Emulsifiers
Shortenings
Margarine
Edible oils
Phytosterols

Soap stock: soaps and detergents

Oil press: Animal feed

Animal feed
Models for scaling agro-enterprises

- **FARA working with partners across the continent has formulated and tested models to improve profitability of agro-enterprises, namely**

  - Integrated agricultural research for development (Innovation Platforms-(IPs))
    - Through IPs, actors in the legume value chain participate in the development of innovations to address bottlenecks at every stage of the value chain.

  - UniBRAIN agribusiness incubation model
    - Harness research, university and private sector to incubate agribusinesses---*strengthening systemic capacities*
Policy is a game changer

Game changing power of policy depends on relevant innovations for increasing productivity + pre and post harvest handling and infrastructure
The S3A as an instrument for positioning legumes in national agriculture STI agendas

• Implementation of S3A obliges countries to review their agriculture STI policies and strategies

• It provides for assessments of national capacities to design & implement Ag. transformation programmes

• This is an opportunity for countries to assess their commodity programmes e.g. legumes, with a view to revamping them

• Climate change will compel countries to elevate the priority given to grain legumes.
The S3A as an instrument for positioning legumes in national agriculture STI agendas

- The S3A also calls for African **solidarity in science** through, for example,
  - Increased mobility of experts across national borders and institutions
  - Regional and sub regional collaborative arrangements that allow sharing of facilities and human resources, e.g. through centres of excellence
    - A centre of excellence for legume research is an institutional innovation worth considering
    - Other grain legumes may consider partnerships like the bean alliance (PABRA), if they do not yet exist.
Feeding Africa

A mega initiative of the African Development Bank to:

1. Eliminate extreme poverty,
2. End hunger and malnutrition,
3. Achieve food self-sufficiency and turning Africa into a net food exporter,
4. Set Africa in step with global commodity and agricultural value chains

Raising food productivity

Reorganizing markets and improving conditions for trade

Strategies

Value chains

- Cereal crops
- Roots and tubers
- Grain legumes

- Livestock and dairy
- Blue economy (fish)
- Climate smart agriculture
Key areas for attention by legume research

1. Productivity: Close legume yield gaps

Average grain yields (t ha\(^{-1}\)) of the targeted legumes based on FAO statistics

<table>
<thead>
<tr>
<th>Legume</th>
<th>Ghana</th>
<th>Nigeria</th>
<th>Ethiopia</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Yield Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickpea</td>
<td>1.4</td>
<td></td>
<td>1.4</td>
<td>0.6</td>
<td>0.8</td>
<td>5.5</td>
</tr>
<tr>
<td>Common bean</td>
<td>1.3</td>
<td></td>
<td>1.3</td>
<td>0.5</td>
<td>0.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Cowpea</td>
<td>0.8</td>
<td></td>
<td>0.8</td>
<td>1.2</td>
<td>0.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Groundnut</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
<td>0.7</td>
<td>0.9</td>
<td>3.5</td>
</tr>
<tr>
<td>Soybean</td>
<td>1.0</td>
<td>1.5</td>
<td>1.2</td>
<td>0.8</td>
<td></td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: N2Africa

Average yields range from 11% to 40% of potential yield
Key areas for attention by legume research

2. Nutrition

- **Enhance protein profile (amino acids)**
- **Reduce anti-nutritional and anti-metabolic factors**
- **Bio fortification: increase diversity of bio fortified legumes**
- **Enhance flavour and cookability**
Key areas for attention by legume research

3. Enhance adaptability of legumes to biotic and abiotic stresses (temperature, drought pest and diseases)

• Enhance role of legumes in climate smart agriculture

• Identify and disseminate Rhizobium strains with high BNF efficiency
4 Concluding thoughts
Concluding thoughts on future legume research in Africa

1. “Science for agriculture in Africa is too important to be outsourced...” (S3A, 2014)

- CGIAR and other ARIs are doing fantastic work on legumes. Priorities are however largely determined by their funders

- African institutions and funders must play their part to assure that Africa has the capacity to address its priorities. CAADP is the entry point.
Concluding thoughts on future legume research in Africa

2. Collective action, Partnerships and Solidarity in Science are key mechanisms for addressing the gaps

- Rhizobium inoculants from EMBRAPA through the Africa-Brazil Innovation Marketplace have helped double grain yields in Ghana

- We need Institutional innovations required to achieve these kinds of results and to spread them rapidly across the continent (private sector engagement, RECs, FARA/SROs).
Concluding thoughts on future legume research in Africa

3. Impact of legumes conditional on upscaling improved technologies, agro-enterprises, intra & intra-regional trade

- Align legume programmes to national and regional priorities / agendas. Site-integration CGIAR work is very welcome
- Seed systems are major bottle neck for going to scale
- Policy is potentially a game changer, esp. w.r.t. to trade
- Adopt Innovation Platforms and Incubation of agro-enterprises as models for development of needed capacities
Concluding thoughts on future legume research in Africa

4. Data and information systems on legumes

- It was a struggle to get data on legumes in preparing this paper

- Quality data required to demonstrate the strategic significance of legumes in agri-food systems. Data is emerging as a form of currency for R&D--a Malabo Commitment

- Also to plan interventions and track their outcomes & impacts
7th Africa Agriculture Science Week and FARA General Assembly
Apply Science, Impact Livelihoods
Kigali, Rwanda, 13-16 June 2016
Thank you

www.faraafrica.org

Save the Date

7th Africa Agriculture Science Week and FARA General Assembly

Apply Science, Impact Livelihoods

Kigali, Rwanda, 13-16 June 2016