Making the case for sustainable investments in plant breeding and seed systems in Africa

Rufaro Madakadze AGRA presented at

UKZN and Demand Led Plant Breeding

22 October 2021

Outline

- The need for improved seed systems in Africa
- The impact of investments in
  - Plant breeding education
  - Strengthening NARS research
  - Strengthening local seed producers
  - Developing seed and other inputs distribution networks
  - Last mile delivery of seed of improved varieties to reach farmer
- Final thoughts on how this can be sustained

AGRA

- **African-led alliance for a food-secure and prosperous future for all Africans**
  - Innovation-driven productivity and access to markets improve livelihoods of smallholders
  - Putting farmers at the centre of the continent's growing economy
  - Transforming agriculture from a solitary struggle to a thriving business

AGRA's headline goals for 2021

1. Double the incomes of 9 million farm households
2. Doubling the incomes of another 21 million through partnerships
3. Supporting a pathway to attain and sustain an agricultural transformation through sustainable agricultural productivity growth and access to markets and finance

Agriculture transformation

Starts with the SEED. Fueled by good FERTILIZER. Sustained by structured MARKETS

- Research and Development is the lifeblood of the seed industry
- Skilled researchers generate and disseminate technologies for farmers
- Technologies get to the intended users through last mile delivery
  - - agro dealers, extension agents and community-based advisors

Seed systems cycle

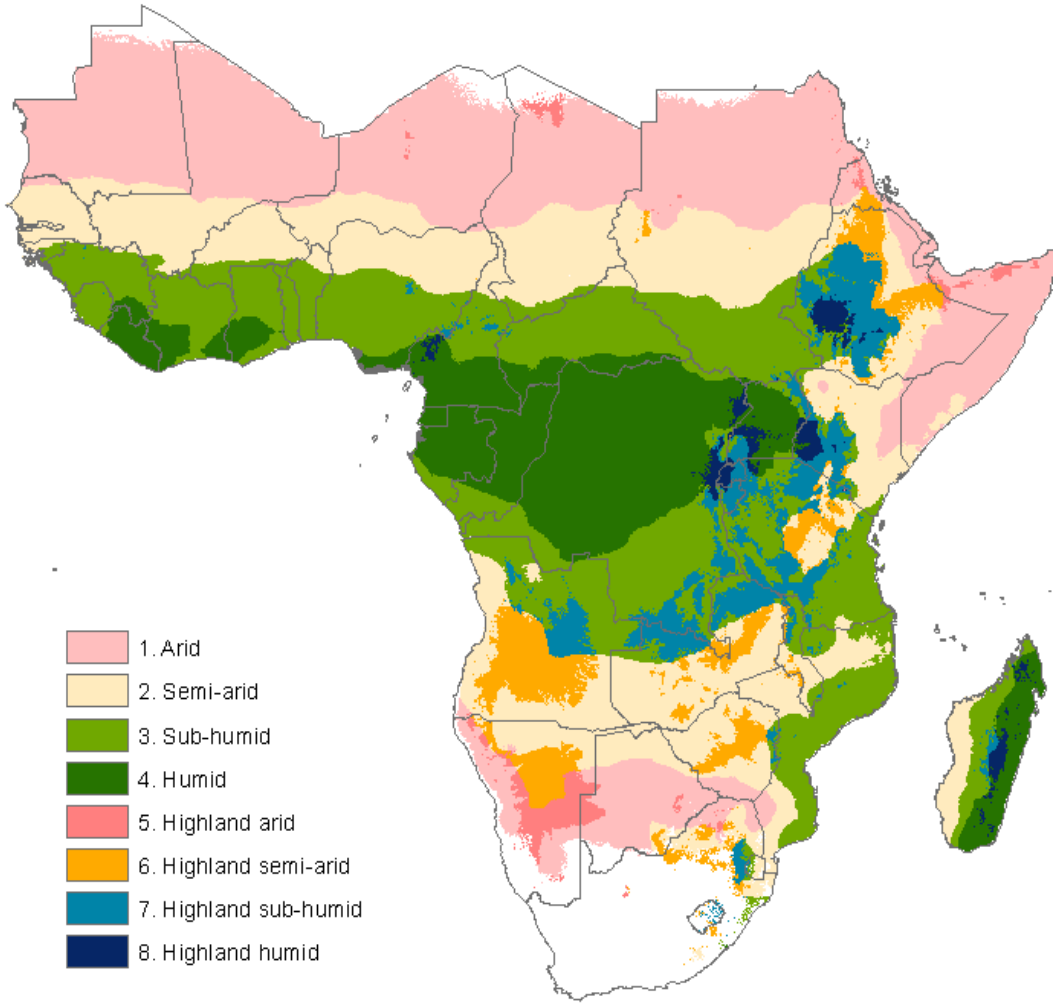
Tasai 2018

Breeding is the Backbone of the Complex Seed Supply in Africa

- **Diverse agro-ecologies**
  - **Broadly and specifically adapted varieties (niche)**
  - Breeders need to understand the market demands of the products they develop

- **Diverse food base – wide range of staple crops**
- **Mainly rain-fed systems**
- **Segmented political landscape**
- **Under-investment in agriculture**

- **This diversity and uncertain conditions represent a major implication for increasing crop yields across a broad area of the continent**



Credit: Harvest Choice

Capacity Building

- PASS studies showed 500 plant breeders across Africa in 2006.
- There were little to no dedicated plant breeding programs in African universities.
- The NARS needed better-trained staff, with broader and enhanced skills,
  - to ensure that a steady stream of improved varieties with farmer-preferred traits were
  - developed, released, multiplied and made accessible to smallholder farmers.

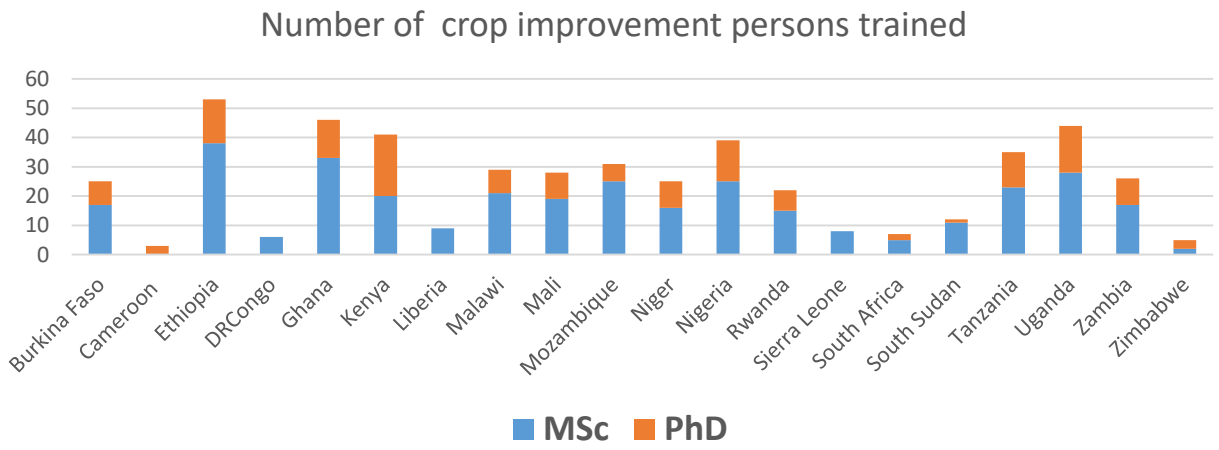
Objectives

- Provide funding for the training scientists, research technicians and seed enterprise personnel addressing smallholder farmer problems on priority African staple crops
- AGRA funded 13 MSc and 2 PhD Plant breeding post grad education programs in 14 institutions in Sub Saharan Africa
  - Funding included full scholarships and infrastructure to ensure quality
- One key element of AGRA's programs was the ongoing support of graduates after completion to variety release.
- It was a CRUCIAL element to ensure the IMPACT of the programs reached the farmers.

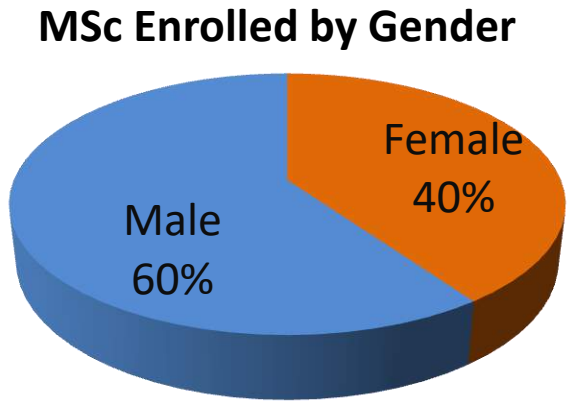


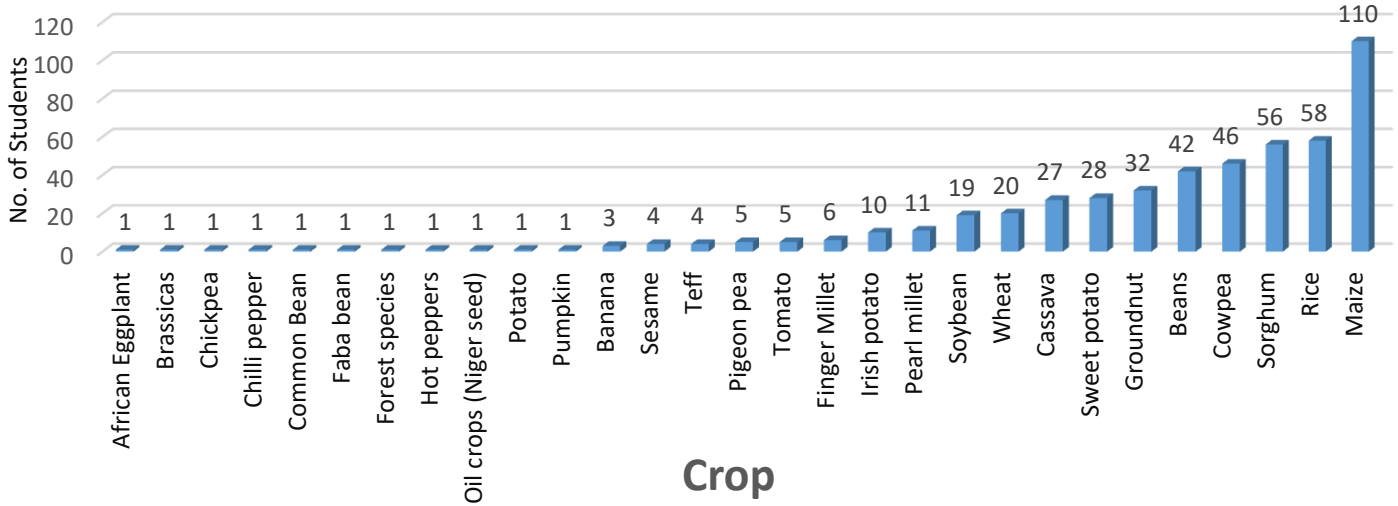


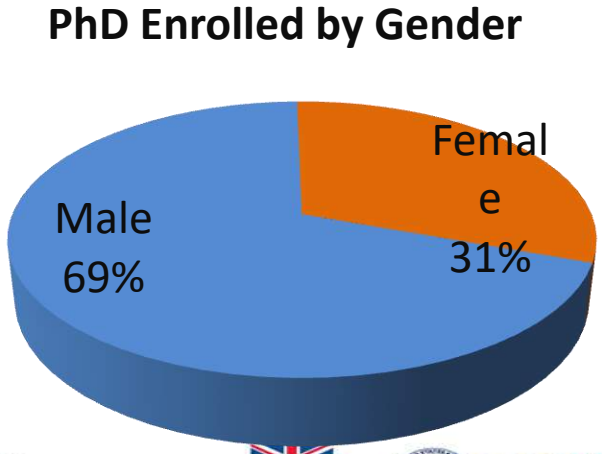

Post graduate scientists trained



AGRA has funded the training total of 503 plant breeders since 2007







Other seed systems personnel trained

Research technician training

- Plant breeding technician training conducted in East and Southern Africa at NaCRRI (Uganda) and for West Africa at IITA and ICRISAT
- Trains research technicians on the theory and practical of plant breeding including ethics
- 152 trained from 18 countries

Mid –Career Plant breeder Training

- UC Davis African Plant Breeding Academy
- Course developed by personnel who teach private sector plant breeders in the US, Europe and Asia
- Teaches public sector breeders on product development and modern plant breeding methodologies

Seed Company Personnel Training

- Conducted by Seed Enterprise Management Institute University of Nairobi – expanded to other countries Senegal, South Sudan and Rwanda
- Personnel trained on all aspects of seed – production, processing storage, quality assurance, business, marketing, legislation
- >1000 people trained

Impact of Plant Breeder Training

- Post graduate student training programs in plant breeding established
- >300 varieties released by AGRA funded scientists 70 % are commercialized
  - cowpea, cassava, finger millet, maize, sorghum sweet potato, beans, pigeon peas, groundnut, rice and bananas
  - released by ex students from Burkina Faso, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Uganda and Zambia
- Trained plant breeders constitute >40-50 percent of all active plant breeders in NARS of Rwanda, Malawi, Mozambique, Burkina Faso, Mali, and Niger
- Managing over 60 percent of the national plant breeding research in their respective countries
- Trained scientists training hundreds of other plant breeders and technicians in their countries (90 % supervising students and or engaged in teaching others)

Investments

- Need to explore new models of funding that includes governments, regional blocs and private sector
- Focus on orphan crops that do not have major investments by donors and ensure diversity of African food stuffs are maintained for resilience and relevancy to the continent
- Leveraging NARs and CGIAR centers for postgraduate student training and research supervision

Investments in Plant breeding activities in NARS

The program

Objective : To develop and release improved crop varieties with a focus on the major staples in Africa using participatory breeding approaches to facilitate adoption and utilization of these improved varieties

Funded over 100 breeding programs in NARS scattered all over 18 countries

Funding included

- Operational costs of running a breeding program up to early generation seed production
- Infrastructural support: vehicles, irrigation systems, cold storage facilities, computers

Results and Impact

685 climate smart & resilient varieties released, 60% commercialized from 18 countries

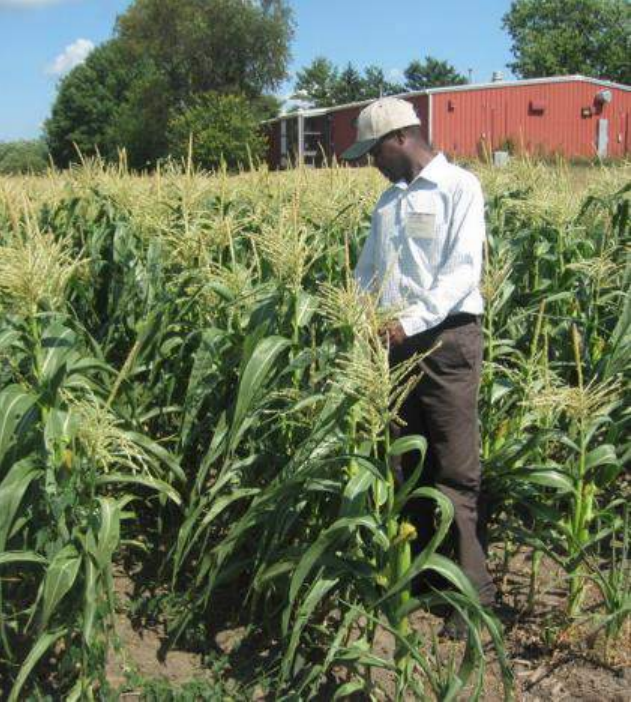
- Among traits developed
  - Disease and insect resistance
  - Drought tolerance
  - Early maturity
  - Stress tolerance
  - Nutrient efficiency
- Have replaced old varieties and contributed to observed yield increases 1.5t/ha to over 3
- Germplasm sharing

Key lessons

- Formalized public-private-partnership (PPP), between the public breeders and the private seed producers is critical
- Varieties developed by Breeders in partnership with seed companies more quickly commercialized and produced by farmers.
- Critical to ensure a healthy flow of newly-released crop varieties from national research institutes to private seed companies
- Facilitates the building of capacity of the private seed companies ---- easier transition of the production of foundation seed by the private sector.

Investments in local seed companies

- Mandate was to support seed production and dissemination initiatives.
- Entailed identification and funding promising enterprises,
- Mentoring and linking them to public breeding institutions for acquisition of varieties.
- Seed entrepreneurs supported fall into two categories, local private and public companies



Seed enterprise funding

- 110 Seed SME established from 11 SMES in 2006
- Home grown seed Cos producing 70% of seed grown in their countries
- No more imports in most countries
- Volume of Seed produced = 604,707 MT from 2,000 MT in 2006 and has benefited 24 M SHF
- Attracted more Seed Cos who have invested >$300M
- EGS production models, ET, NG, UG self-sufficiency in certain crops, many others at 60-70%
- E-tags

Investments

Build capacity for enterprises to access finance at friendly interest rates to invest in modern facilities – irrigation, mechanization, storage and processing

Critical to increase competition with multinationals and give farmers better choices

Investments in Input Distribution Networks

The goal was to improve the functioning of input markets by increasing access to farm inputs for smallholder farmers through the development of agro-dealer networks.

- 40,000 agro-dealers established
- Close to 1,000 VBAs serving as agro-dealers
- 1,080 Hub agro-dealers in place
- Distance travelled reduced from 30 km to average 10km

- AGRA's private sector-led Agrodealer development approach is a
    - quick,
    - cost-effective way

to enable farmers to gain last-mile access to the appropriate inputs required to increase their crop productivity.

Models that work to strengthen inputs distribution systems sustainably

- Start up Grants & Credit Guarantee schemes:
  - Provide incentives and mechanisms to support new ADs in rural areas;
  - Tap into VBA networks for last-mile delivery
  - Boost investment & operating capital in rural areas
- Work with the private sector in expanding AD networks for efficiency & sustainability: Involve Hub ADs & Input supply Cos in
  - BDS & Technical training
  - Provision of supplier credit
  - Market development & demand creation
  - Building business linkages
- Innovative ICT Tools and Platforms increase business transparency and improve record keeping
  - Enable real time data capture & management
  - Improve business trust & facilitate access to credit
  - Improve stocking & supply chain management
  - Provision of market information

Last mile delivery

- Public Extension not working well with 1:3000—10000 extension worker to farmer ratio
- AGRAs extension strategy – private sector led working with community-based advisors (CBAs/VBAs)
  - Village-based Advisors (VBAs) are “self-employed” agents, including women and youth who
    - **rapidly create demand for yield-enhancing inputs** whilst
    - **teaching farmers good agricultural practices using mother and baby demos and**
    - **Aggregating produce and linking farmers to markets**
  - Seed and fertilizer companies supply inputs to VBAs for demonstration and sale to farmers at the Village level – markets inputs at farmer level
- CBAs are trained by mainly public sector extension agents and private sector companies

Investments

- Advocate government and private sector to fund extension services
- Basically, privatize the last mile extension and input delivery

AGRA Growing Africa's Agriculture

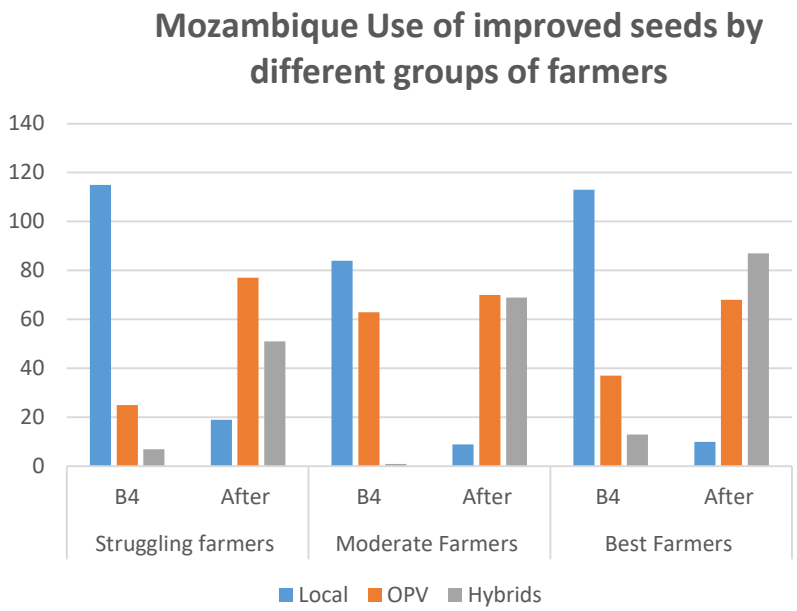
BILL & MELINDA GATES foundation

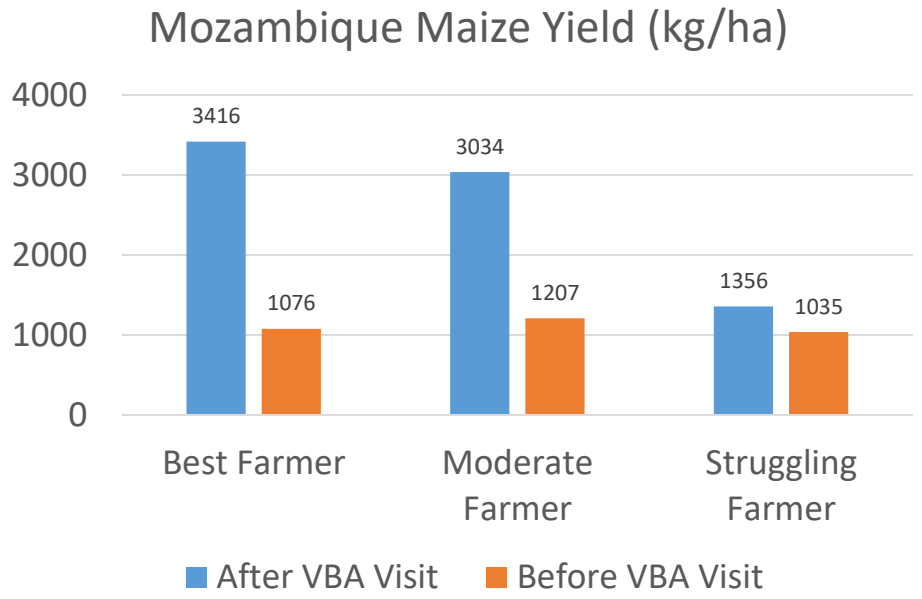
The ROCKEFELLER FOUNDATION

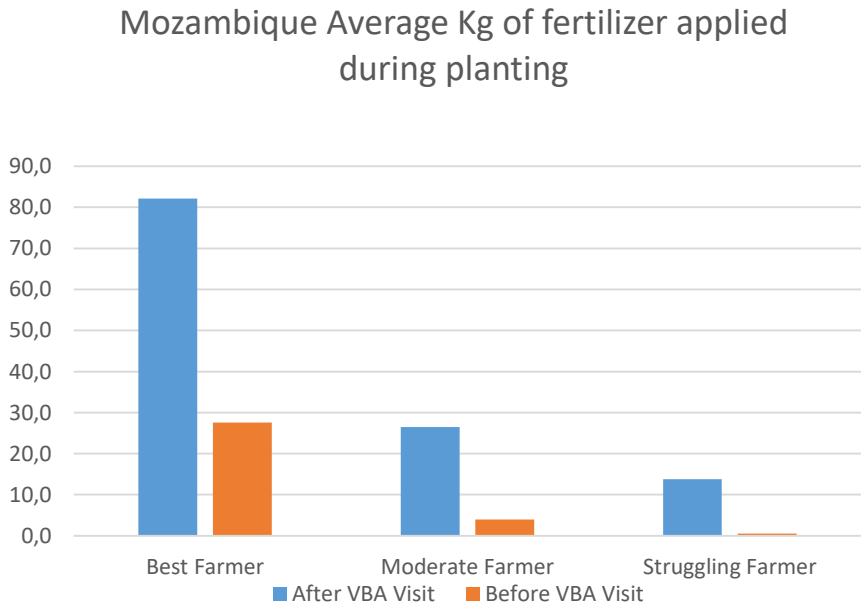
UKaid from the British people

USAID FROM THE AMERICAN PEOPLE

Early adoption results







TAKE HOME

- Invest in GREAT institutions: AGRA has made a huge impact on breeding and seed systems capacity and knowledge production BUT there is need for more investors
- Both research and enterprise development are critical in seed systems and require investments to grow and meet the demands of the continent
- There is need for continuous, reliable, stable funding for both CB and R&D
  - Can be accessed through advocating governments to increase funding
  - Privatize specific components that can be privatized
- Leverage partnerships with the private sector to increase funding for R&D
- Facilitate access to finance at good interest rates to ensure local private sector grows and can compete with regional and multinationals
- *Not to forget policy and legislation*

Thank you very much
Ndinotenda
Ngiabonga kakhulu