# Bridging Research and Development Practice
# by
# Khalid Bomba, CEO, Agricultural Transformation Agency, Ethiopia
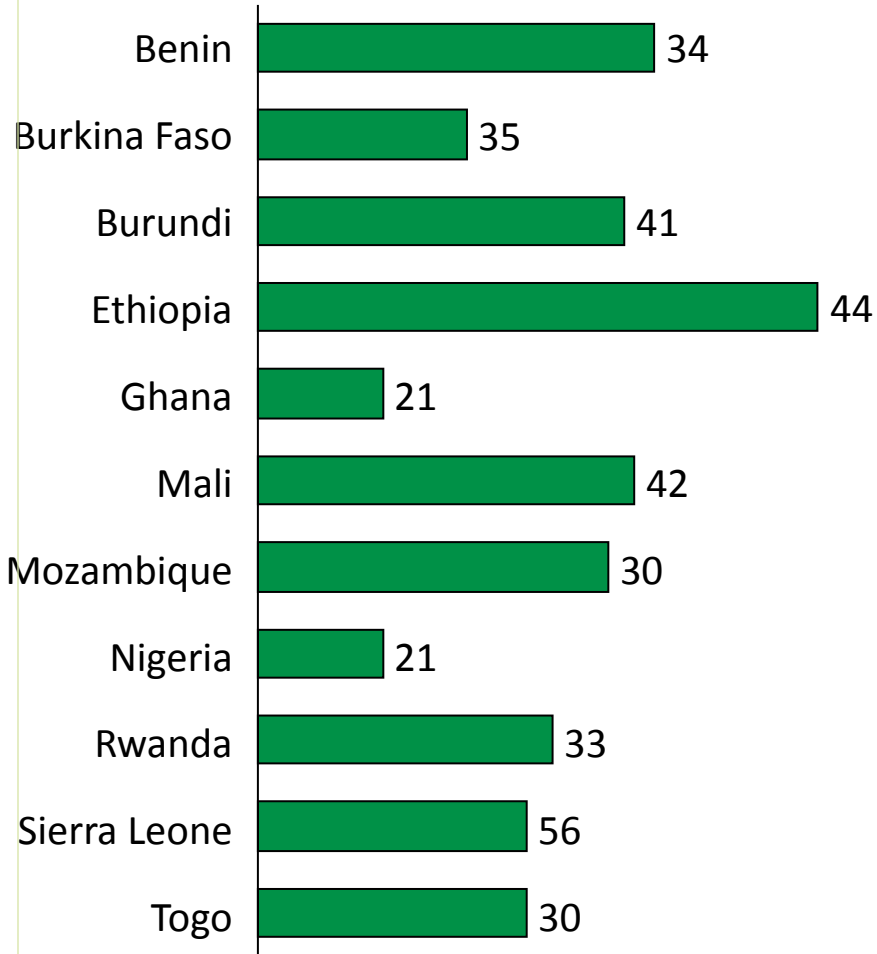
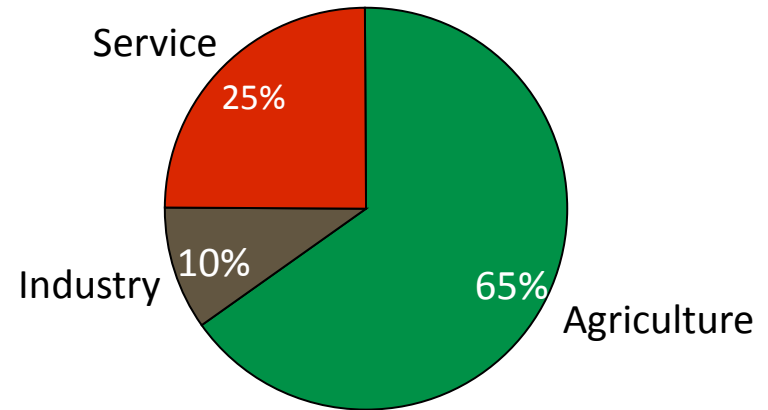Keynote Address given at Research to Feed Africa Policy Dialogue, Addis Ababa

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Agriculture is of vital importance for the economic growth of the continent, accounting for 32% of the regions gross domestic product and employees 65% of the labour force

## Share of agriculture as a percentage of GDP

| Country | Value |
|---|---|
| Benin | 34 |
| Burkina Faso | 35 |
| Burundi | 41 |
| Ethiopia | 44 |
| Ghana | 21 |
| Mali | 42 |
| Mozambique | 30 |
| Nigeria | 21 |
| Rwanda | 33 |
| Sierra Leone | 56 |
| Togo | 30 |

## Share of agriculture to employment

Service 25%
Industry 10%
Agriculture 65%

Source: World bank , 2014

# Looking to the future, the African agricultural sector faces significant challenges in supporting the expanding economy of the continent

**Population pressure**

**Increased population will result in less land per household**
- Population is expected to increase from 1.1 billion today to 2.4 billion in 2050
- Agriculture is dominated by smallholder farming, where the average land holding in Sub Saharan Africa is **no more than 2.4 hectares**
- Africa is experiencing the highest urban growth rate in the last two decades: the share of urban population is projected to increase from **36% to 60% by 2050.**[1]

**Disease and insect pest**

**Agriculture is challenged by new and recurring crop diseases such as**
- Maize lethal necrosis:
- Cassava mosaic and brown streak viruses and banana wilt
- Wheat rusts and
- Bacterial wilt of potato

**Climate change and natural resource degradation**

**Volatile and unpredictable weather patterns and natural resource depletion are expected to worsen without significant intervention**
- Periodic drought caused by irregular rainfall distribution reduces maize yields by an average of 15% each year.[2]
- Africa's desertification rate is twice that of world rate: deforestation has wiped out nearly 90% of Africa's forest

Source: [1]African Development Bank, 2014; [2]International Institute of Tropical Agriculture, 2009

**Gaps between yields at research centers and national average yields are very wide because of poor adoption. The example of Ethiopia is illustrated below.**

# National yields on average less than 1/3 the yield achieved by research and 1/6 of the maximum potential achieved globally

Productivity differences between farmers' plots and research (tonne / ha)

| Crop | National average | Yield achieved by research in Ethiopia | Maximum yield achieved globally |
|---|---|---|---|
| Wheat | 2.1 | 7.5 | 15 |
| Maize | 3 | 14 | 26 |
| Tef | 1.4 | 4.3 | N/A |
| Barley | 1.7 | 5 | 9 |
| Coffee | 0.7 | 2.6 | 6 |
| Cotton | 2 | 4 | 6 |

# Africa can harness advances in agriculture research to further increase yields close to that of developed countries and reduce the challenges posed by climate change and land degradation

## Modern bioscience

- Expedite variety generation through Marker assisted selection
- Vaccines for livestock diseases
- Produce clean planting material thru TC
- Safe utilization of GMO can make significant contributions to economic growth:
  - Bt cotton in India resulted in 24% increase in yield and 50% gain in profit
- Huge potential to alleviate biotic and abiotic constraints
- Africa has been laggard in utilizing Bt cotton to boost its textile industries
- Ethiopian government is making policy changes to create enabling environment for biotech research

## Integrated soil fertility management (ISFM)

- Appropriate ISFM technologies are pathway to increase soil fertility and soil health
- In most African countries, soil is increasingly depleted because of low fertilizer utilization and blanket recommendation
- Ethiopia is currently in the process of creating digital soil information system
- This will help in applying agro-ecology and soil specific recommendations

## Irrigation

- African agriculture is heavily dependent on rain-fed agriculture
- Increasing crop area under irrigation should be a priority to:
  - Have multiple crops in a year
  - Diversify production
- It should be a priority to know water resource including through ground water mapping

## Agriculture implements

- Making available appropriate mechanization technologies at affordable prices is of critical importance to:
- Reduce the high pre- and post harvest loss
- Increase efficiency during peak seasons
- Optimal application of research recommendation (eg. Raw planting)

- Roling (1990) argues that, historically, research has stopped too early in what should be a continuous and dynamic process of developing and diffusing new technology. Researchers have been physically and mentally isolated from farmers, with the tendency to hand down an unfinished, untested product to extension staff.

- "Extension contact staff - squeezed between the farmers they live among, who often ridicule the technologies they bring, and their superiors, who demand results in line with policy directives - have been caught in a crisis of morale."

**Advances in research cannot be translated into increased yields without enhanced adoption. Adoption of agricultural technologies by smallholder farmers in Africa is poor this can be attributed to several factors**

## Major challenges

**1**

**Quality and relevance of research**

- Relevance of technologies in addressing farmers challenges and understanding their constraints
- Limited monitoring and evaluation of R&D programs/projects
- Poor policy enforcement

**2**

**Poor linkage among stakeholders**

- Distinct division of labor between research and extension systems
- Unidirectional linear research-extension-farmers model
- This leaves out all the other relevant stakeholders

**3**

**Inadequate communication plan for uptake and scale up**

- Lack of a comprehensive plan of action to manage knowledge, ensuring communication and uptake promotion and effective scaling up
- Research programs and projects are not evaluated for effectiveness in communicating information and in facilitating knowledge sharing, uptake and utilization.

# The poor adoption cont'd

**4** **Inadequate for communication and uptake**
- Projects don't include communication, promotion of uptake and impact targets
- Limited time and budget allocated for comm. and uptake
- Limited training in communication and uptake promotion

**5** **Limited incentive to reward impact**
- Incentive and motivations are limited for researchers
- Evaluation is mostly based on academic qualifications and publications, not for delivery of outputs

**6** **Insufficient end-user involvement**
- End-users are not usually involved in tech. generation
- Technological packages being generated and promoted become irrelevant and inappropriate.

**7** **Ineffectiveness of extension system**
- Extension system must change their role from a prescribing to a facilitating one.
- Limited infrastructure of farmers training centers
- Capacity gap between researchers and development agents

**In order to address the identified bottlenecks, several interventions will be required. A few among them are**

**1** | **Accountable interaction between researchers policy makers and development practitioners**

- Encourage science- based policy formulation by establishing close linkage between the research system, extension and policy makers
- Promote joint problem assessment, technology generation, planning and field testing between researchers, development practitioners and farmers
- Create functional and organizational linkages between research and extension

**2** | **Ensure sufficient access to finance for farmers**

- Strengthen financial intermediaries in the rural areas
- Ensure sufficient liquidity and improved systems of delivery for lending to farmers
- Ensure distribution of agriculture input credits via voucher system during planting season

**3** | **Encourage private sector engagement and use of ICT**

- Enabling environment to attract private sector in input multiplication, distribution and extension service provision
- Use of IVR, SMS, videos and other tools