Zambia’s Continued Strides Towards Increased Maize Productivity

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Outline

1 Maize in Zambia
   - Why maize matters in Zambia
   - A historical perspective on maize in Zambia

2 Evolution of maize productivity and production in Zambia
   - Maize productivity and production in Zambia, 1961 - present
   - Current maize production in Zambia

3 Where should we go from here?
   - Mega trends necessitating sustainable agricultural productivity growth in Zambia

4 Food for thought
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4. Food for thought
Why maize matters in Zambia

- Maize is the **staple**, grown by **89%** of smallholders on **54%** of all cultivated land.
- Unlike any other crop, maize is political and receives the most support in Zambia.

- Maize productivity growth is key to alleviate poverty, estimated at **77%** in rural Zambia.
- Agriculture employs **67%** of the labor force, provides livelihoods to **70%** of the population and ca. **10%** to GDP.

Source: RALS (2015); share of cultivated land
Maize is central in agricultural transformation

...through its effects on food and labor prices, agricultural productivity growth is the catalyst for broader processes of economic structural transformation in predominately agrarian societies  (Johnston and Mellor 1961)
A historical perspective on maize in Zambia (Zulu et al 2015)

First republic (1964 - 1972): one-party state
- productivity support policies through grain marketing boards
- credit access through the credit organization of Zambia; extension and nationalization

Second republic (1972 - 1991): multi-party systems
- pan-territorial pricing through the National Agricultural Marketing Board (NAMBOARD)
- cooperative supported agricultural productivity and output marketing
- fertilizer and seed subsidies provided, but later discontinued
- ZAMSEED, a parastatal seed company formed in 1981 but breeding dates back to 1962 at Mt. Makulu Research Station, now ZARI
A historical perspective on maize in Zambia


- structural adjustment programs brought austerity measures
- state involvement in grain marketing changed with the formation of the Food Reserve Agency (FRA) in 1995 to maintain strategic reserves

Fourth republic (2001 - 2011): multi-party systems, new deal administration

- resurgence of ag subsidies in 2002 under the Farmer Support Program (FSP) to increase access to fertilizer and maize seed for viable but vulnerable farmers
- scope of subsidies program broadened in 2009 and renamed Farmer Input Support Program (FISP)
- FRA mandate broaden beyond strategic grain reserves to full-scale market participation and floor price setting
A historical perspective on maize in Zambia

Fifth republic (2011 - to date): multi-party systems, increased govt expenditure

- continuation of FISP and FRA support at the expense of other programs
- FRA and FISP account for 2/3 of agricultural budget
- introduction of E-FISP to crowd in private sector participation and promote diversification
- Attempts to even broaden FRA mandate, unpredictable maize policies
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Maize productivity and production on upward trend in Zambia

Source: FAOStat 1961 - 2017
Maize productivity and production in the five republics

Source: FAOStat 1961 - 2017
A deeper dive into current maize production in Zambia
67% of all maize production uses improved seed varieties

Source: RALS (2015)
37% of all maize seed is purchased, but govt subsidies remain important

Source: RALS (2015)
About half of smallholders use fertilizer, but use rates remain low application rates below recommended thresholds.

**Figure 10: Fertilizer use and rate of use among smallholder farmers, 2003 to 2018**

**Figure 11: Fertilizer use by province of use among smallholder farmers, 2018**

Source: Chapoto et al (2018)
Maize productivity remains low

Source: Chapoto et al (2018)
Large yield gaps remain for rainfed maize

Source: http://www.yieldgap.org/gygamaps/app/index.html
57% of smallholders are net sellers, 39% net buyers

- ill-timed price support hurts net sellers and ill-targeted input support misses most of the smallholders

Source: RALS (2015)
BUT, 66.5% of smallholders cultivate < 2 ha

Source: RALS (2015)
Zambia is diverse, yet ag. research and extension under funded

Source: Kuteya et al., (2018)
Gains in maize productivity buoyed by vibrant seed industry

- Multinational and national large and small seed companies (MNSC, NLSC and NSSC) drive the seed industry in Zambia
- Seed companies, CIMMYT, IITA, ZARI develop germplasm
- Govt through SCCI and ZARI provide quality assurance

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4. Food for thought
1. Rapid population growth to top 2 billion by 2050 in SSA

- In fact, about 25% of the world population will be in SSA by 2050 and Zambian population is projected to reach 42 M
2. Rising food demand, but need not be met at the cost of forest

Production needs to double to meet food demand by 2050
Source: van Ittersum et al. (2016)

Area expansion drive most production in SSA (left) than in Asia (right)
Source: Jones and Franks (2015)
3. Low agricultural productivity, < 2t/ha, large yield gaps

Cereal yields among the lowest in SSA
Source: FAO (2017)

Large yield gaps in Maize in SSA
Source: http://www.yieldgap.org/
4.a Climate change to further depress yields by 2050

4.b Climate change to worsen water stress in Zambia

Baseline scenario, 1961 - 1990

Projected changes by 2050; Source: Hamududu and Ngoma (2019)
These mega trends define a sustainability challenge

Not only are agricultural systems in Zambia expected to double production by 2050 in order to meet the threefold increase in food demand and more diverse diets, they have to do so while sustainably managing natural resources, adapting to, and mitigating climate change.

The sustainability challenge underpins SDG 2: Zero Hunger by 2030

End hunger, achieve food security and improved nutrition and promote sustainable agriculture
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Despite enormous opportunities in the maize sector, questions remain:

1. How can use of improved seed varieties be increased sustainably?
2. How can private sector participation in the maize value chain be enhanced? Can smart-subsidies play a role?
3. How can Zambia enhance fertilizer use and responsiveness to fertilizer use?
4. How can Zambia achieve policy consistence and avoid stop-and-go maize politics?
5. How can Zambia increase uptake of stress tolerant maize seed varieties:
   - rainfall variability will likely get worse
   - incidences of pests and disease are on the rise
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Thank you

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