Agricultural Productivity in Zambia: Has there been any Progress?

Presented by Antony Chapoto
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What is ACF/FSRP?

• A collaboration between ACF and FSRP/MSU with other stakeholders in Agriculture – MACO, ZNFU, Millers, Traders etc.

• Main Objectives
  – Empirical research to inform agricultural policy
  – Capacity Building (Data collection, management and analytical capacity)
  – Outreach

• Thanks to funding from USAID and SIDA
Agricultural Productivity?

• A major indicator of crop productivity is cost of production, i.e., costs per hectare / bags produced per hectare,
  – reduces the cost per unit area

• Focus for this presentation:
  Yield = output/land harvested - A measure of land productivity

Africa’s agricultural productivity:
lowest in the world
Why invest in Agriculture?

- Agriculture is a powerful poverty fighter
  - No country has ever achieved mass poverty reduction without a prior substantial boost in broad based agricultural productivity (Timmer, 2005)
  - Latin American experience shows that it is possible to achieve agricultural productivity growth on large farms without having much impact on poverty rates.
  - Need to raise broad based productivity of smallholder farmers in order to fight poverty.

Agricultural growth and poverty reduction in China

![Graph showing agricultural production and rural poverty from 1980 to 1995](chart.png)
## LOW PRODUCTIVITY

Crop yields (Mt/ha) year, Zambia vs Global Averages

<table>
<thead>
<tr>
<th>Crop</th>
<th>2001/02</th>
<th>2003/04</th>
<th>2005/06</th>
<th>2007/08</th>
<th>2009/10</th>
<th>Global*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>1.0</td>
<td>1.7</td>
<td>1.5</td>
<td>1.3</td>
<td>2.1</td>
<td>4.47</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0.7</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>0.9</td>
<td>2.66</td>
</tr>
<tr>
<td>Rice</td>
<td>1.0</td>
<td>1.0</td>
<td>1.3</td>
<td>1.2</td>
<td>1.7</td>
<td>3.84</td>
</tr>
<tr>
<td>Millet</td>
<td>0.7</td>
<td>1.0</td>
<td>0.7</td>
<td>1.0</td>
<td>1.1</td>
<td>0.82</td>
</tr>
<tr>
<td>Sunflower</td>
<td>0.4</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.6</td>
<td>-</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>0.4</td>
<td>0.7</td>
<td>0.5</td>
<td>0.6</td>
<td>0.7</td>
<td>1.35</td>
</tr>
<tr>
<td>Soybean</td>
<td>0.7</td>
<td>0.6</td>
<td>0.7</td>
<td>0.7</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td>Cotton</td>
<td>0.8</td>
<td>1.1</td>
<td>0.9</td>
<td>0.8</td>
<td>1.0</td>
<td>-</td>
</tr>
</tbody>
</table>

*COMESA

## Zambia National Production per Agricultural household (Metric Tonnes)

<table>
<thead>
<tr>
<th>Crop</th>
<th>2001/02</th>
<th>2003/04</th>
<th>2005/06</th>
<th>2007/08</th>
<th>2009/10</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>0.58</td>
<td>1.07</td>
<td>0.98</td>
<td>0.93</td>
<td>1.66</td>
<td>Upward</td>
</tr>
<tr>
<td>Sorghum</td>
<td>0.03</td>
<td>0.03</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>Constant</td>
</tr>
<tr>
<td>Rice</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>Constant</td>
</tr>
<tr>
<td>Millet</td>
<td>0.05</td>
<td>0.04</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>Constant</td>
</tr>
<tr>
<td>Sunflower</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>Constant</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>0.05</td>
<td>0.06</td>
<td>0.05</td>
<td>0.07</td>
<td>0.11</td>
<td>Upward</td>
</tr>
<tr>
<td>Soybeans</td>
<td>0.00</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>Constant</td>
</tr>
<tr>
<td>Cotton</td>
<td>0.07</td>
<td>0.12</td>
<td>0.13</td>
<td>0.06</td>
<td>0.05</td>
<td>Up and down</td>
</tr>
<tr>
<td>Beans</td>
<td>0.04</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>Constant</td>
</tr>
<tr>
<td>Sweet Potatoes</td>
<td>0.08</td>
<td>0.07</td>
<td>0.08</td>
<td>0.09</td>
<td>0.17</td>
<td>upward</td>
</tr>
</tbody>
</table>
Productivity Challenge

• The challenge of improving farm productivity appears to have a straightforward solution:
  – use the power of crop science to generate improved farm technologies,
  – put these technologies into the hands of small farmers, and
  – provide them with the knowledge to get the most out of these technologies.

• The big question: why has this not happened in Sub Saharan Africa?
Smallholder Farm Maize Sector Performance and Trends

Data on Smallholder Farmers in Zambia

Nation Wide Random Surveys
CFS/PHS/SS 99/00 = 364 SEAs
CFS 2006/07 onward = 660 SEAs
Characteristics of Smallholder Maize Farming Sector

- The majority of Zambian smallholder farmers grow maize (>80%)
- Yields remain low, despite massive state interventions in input distribution.
- 33% of rural households are buyers of maize only (plus 3% net buyers)
- 21% of rural household are net sellers
  - Highly concentrated patterns of surplus generation - 2% of farm households account for 50% of marketed maize surplus

Maize Market Position of Smallholder Farmers in Zambia

Source: CSO/FSRP- National Supplemental Survey 2008
Maize Production: Metric Tonnes

Source: FAOSTATS, CFS Survey Data (2009 and 2010)

Maize production: Area cultivated and Average yields
Maize Yields (mt per hectare of area harvested), Fertilizer Users vs. Non-users

Maize Yield Quintile, and Percent of Smallholders Using/Not Using Fertilizer by Source in Zambia

Source: SS 2008
Why has productivity remained stagnant in Zambia?
Key Investments to Drive Productivity Growth in Agriculture

- Technology (research on crops/livestock, management practices, extension, processing improvements)
- Markets (property rights, standards, contract law, adjudication, market facilities, market price and supply information, marketing extension)
- Infrastructure (roads, irrigation, rural electrical power, ports, communications)

IFPRI review of rate of return studies

<table>
<thead>
<tr>
<th>Investments</th>
<th>Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsidies</td>
<td>Negative to 12%</td>
</tr>
<tr>
<td>- research &amp; extension</td>
<td>35% to 70%</td>
</tr>
<tr>
<td>- roads</td>
<td>20% to 30%</td>
</tr>
<tr>
<td>- education</td>
<td>15% to 25%</td>
</tr>
<tr>
<td>- communications</td>
<td>10% to 15%</td>
</tr>
<tr>
<td>- irrigation</td>
<td>10% to 15%</td>
</tr>
</tbody>
</table>

- If we believe these findings, they have major implications
Why Frequent Negative Returns for Subsidies Programs?

- Subsidized inputs crowd out the private sector deliveries & discourage investments in new private fertilizer sales networks.
- Misallocation and inefficiencies in usage does not encourage sustainable fertilizer use.
- Diversion and rent seeking raises incomes of some but does little to raise crop productivity.
- Late delivery of inputs does not improve productivity.

Proportion of MACO Budget Devoted to FRA and FSP (2001-2009), Zambia
Budgetary implications for Zambia

- Should Government spend greater share of its budget to
  - Agricultural productivity R&D
  - Extension
  - Rural infrastructure development
  - Irrigation
- Instead of subsidies on fertilizer and maize purchase program, which provide the least profitable forms of agricultural spending?

What is the way Forward?

- For both smallholders and commercial farmers growing maize and other crops, fundamental productivity growth is needed to lead to higher output, farm income and food security.
- Zambia needs to create opportunities to be competitive in capturing regional and international markets.
What is the Way Forward?

- The current approach of high output, high incomes and high prices for farmers is **NOT** sustainable over the longer-run as it is for the most part only possible with costly subsidies to both input and output markets?

What is the way Forward?

- Generation and transmission of managerial and technical information skills to farmers
  - Extension needed to increase farmer’s ability to manage input use
  - Extension to emphasize input efficiency instead of use levels e.g., precise timing of input application
  - Adequate research and extension linkages
What is the way Forward?

• Public/private investment in breeding research for replacement of old varieties
  – Need to capture genetic gains in productivity in order to manage drought stress and disease susceptibility

• Public/private investment in resource augmenting practices
  – Conservation farming may reduce risks and enhance intertemporal productivity

What is the way Forward?

• Scarce public funds always have an opportunity cost. If used for subsidies for private goods, who pays for needed public goods to complement private goods?
  – Increasing the amount of resources deployed in agriculture
  – Prioritize investment spending in drivers of productivity across sub-sectors, functions, economic uses, regions and administrative boundaries
What is the way Forward?

• Improving markets for rural farmers and consumers
  – Is FISP the answer to low agricultural productivity?
  – Maybe a flexible subsidy program may assist farmers.
  – Is FRA or quasi government institution the answer?
  – Can Zambia afford it?

• How can private sector play a role in a meaningful and sustainable way?

Thank You