IMPROVING AGRICULTURAL INPUT AND OUTPUT MARKETS IN AFRICA: EVIDENCE AND WAY FORWARD

by
Antony Chapoto, PhD

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Lusaka Zambia
1. Agricultural Input market
   a. Review the performance of the recent wave of “smart” input subsidy programs
   b. Practical significance for policy and input market development
   c. Way Forward

2. Agricultural Output markets
   a. The food price dilemma
   b. Trade restrictions and effects on grain markets
      a. Country experiences: trade restrictions and effects on consumer and producer prices
   c. Way forward
# Competing models of roles of state and private sector in food markets

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
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</table>
| **Rely on markets**<br>state role limited to: | **Primary reliance on markets**<br>- but role for *rules-based state operations*<br>- e.g., buffer stock release to defend stated ceiling price<br>- Marketing board purchases at stated floor price announced in advance<br>- Transparent rules for initiating state imports | **Role for markets and discretionary state intervention**
|  - Public goods investment  
  - Regulatory framework  
  - Strengthening of institutions / defense of property rights  
  - Policies supportive of private sector entry and competition |  
|  
|  
|  
|  

- Based on premise that private sector cannot ensure adequate food supplies in response to production shortfalls
- Justification for unconstrained role for state interventions in markets to correct for market failures
INPUT SUBSIDY PROGRAMS (ISPs) IN SUB-SAHARAN AFRICA
ISP expenditures in SSA now account for over US$1.0 billion per year.
ISPs: From “bust” to “boom”? 

Early 2000s to Current

1. HIPC and the shift from conditionality to budget support
2. Malawi miracle -- “…simply by ignoring the experts”
3. Rise in global food prices since 2007
4. Shift in World Bank (WB) position -- now support “smart” subsidy programs

WB and other basket donors now financing most of the 7 countries with the biggest ISPs in SSA
Market-Smart Subsidies

1. ISP should be part of a wider strategy
2. Support market development / private sector investment
3. Promote competition
4. Pay attention to farmer demand
5. Insist on economic efficiency

Morris et al. 2007
6. Put farmers in the driver’s seat
7. Have an exit strategy
8. Pursue regional integration
9. Ensure sustainability
10. Promote pro-poor growth

Are our ISPs smart???  Morris et al. 2007
## Expenditures of Input Subsidy Programs

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual Program Cost (USD million)</th>
<th>% of Ag Budget</th>
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</thead>
<tbody>
<tr>
<td>Malawi</td>
<td>152 to 275</td>
<td>47 to 71%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>92 to 135</td>
<td>39 to 46%</td>
</tr>
<tr>
<td>Zambia</td>
<td>101 to 135</td>
<td>21 to 40%</td>
</tr>
<tr>
<td>Senegal</td>
<td>36 to 42</td>
<td>26 to 31%</td>
</tr>
<tr>
<td>Ghana</td>
<td>53 to 112</td>
<td>20 to 31%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>108 to 190??</td>
<td>?? (officially 26%)</td>
</tr>
<tr>
<td>Kenya</td>
<td>22 to 81</td>
<td>9 to 26%</td>
</tr>
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## Review of maize-fertilizer response rates on farmer-managed fields

<table>
<thead>
<tr>
<th>Study</th>
<th>country</th>
<th>Agronomic response rate (kgs maize per kg N)</th>
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<tbody>
<tr>
<td>Marenya and Barrett (2009)</td>
<td>Kenya</td>
<td>17.6</td>
</tr>
<tr>
<td>Liverpool-Tasie (2015)</td>
<td>Nigeria</td>
<td>8.0</td>
</tr>
<tr>
<td>Burke (2012)</td>
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<tr>
<td>Snapp et al (2013)</td>
<td>Malawi</td>
<td>7.1 to 11.0</td>
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<tr>
<td>Holden and Lunduka (2011)</td>
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<td>11.3</td>
</tr>
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<td>Pan and Christiaensen (2012)</td>
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1. characteristics of subsidy beneficiaries
2. the impacts of subsidy programs on national fertilizer use
3. the development of commercial input distribution systems
4. Sustainable agricultural intensification
## Characteristics of households acquiring subsidized fertilizer

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<td><strong>Political Economy factors</strong></td>
<td>Districts where ruling party won last presidential election get more</td>
<td>Constituencies where ruling party won last presidential election get more (and more so the larger the ruling party’s margin of victory)</td>
<td>Constituencies with more electoral support for challenger in the last presidential election get more</td>
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1. characteristics of subsidy beneficiaries
2. the impacts of subsidy programs on national fertilizer use
3. the development of commercial input distribution systems
4. Sustainable agricultural intensification
The impacts of subsidy programs on national fertilizer use

1. 1 MT of fertilizer distributed through subsidy program adds the following to farmers’ fields:
   
   • 515 kgs in Malawi,
   • 540 kgs in Zambia
   • 239 kgs in Kenya
## Diversion of fertilizer from FISP, Zambia

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<th>Planting year</th>
<th>Farmer claims</th>
<th>FSP/FISP distribution</th>
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<tbody>
<tr>
<td>2002</td>
<td>31,722</td>
<td>48,000</td>
</tr>
<tr>
<td>2003</td>
<td>33,372</td>
<td>60,000</td>
</tr>
<tr>
<td>2004</td>
<td>16,792 33%</td>
<td>50,000</td>
</tr>
<tr>
<td>2005</td>
<td>23,595</td>
<td>50,000</td>
</tr>
<tr>
<td>2006</td>
<td>58,404</td>
<td>84,000</td>
</tr>
<tr>
<td>2007</td>
<td>43,596</td>
<td>50,000</td>
</tr>
<tr>
<td>2008</td>
<td>55,114</td>
<td>80,000</td>
</tr>
<tr>
<td>2009</td>
<td>69,103</td>
<td>106,000</td>
</tr>
<tr>
<td>2010</td>
<td>116,116</td>
<td>179,000</td>
</tr>
<tr>
<td><strong>2002 - 10</strong></td>
<td><strong>447,814 63%</strong></td>
<td><strong>707,000</strong></td>
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Source: Mason, 2011
The impacts of subsidy programs on national fertilizer use

1. 1 MT of fertilizer distributed through subsidy program adds the following to farmers’ fields:
   • 515 kgs in Malawi,
   • 540 kgs in Zambia
   • 239 kgs in Kenya

2. Private sector crowded out
   - Failure to take into accounting for crowding out and diversion can seriously affect estimates of how ISPs affect total fertilizer use
Factors affecting N use efficiency

- Soil organic carbon
- Soil moisture – why N response on irrigated > rainfed fields
- Micronutrients
- pH (mainly basal)
- Management ability
- Timing of fertilizer application
- Timely and sufficient weed management
- Rotation of crops on a given plot
- Population growth ➔ cropping intensity ➔ soil degradation
- Fixation with N
- ISPs need to be part of a more holistic approach so that N can get sufficiently high crop response
Factors depressing Nitrogen Use Efficiency of inorganic fertilizer use

1. Low soil organic matter (SOM)
   - Significant decline in SOM over past 20 years in Malawi (Mpeketula and Snapp)
Fertilizer response rates in degraded areas

Maize yields as a function of plot soil carbon content

Source: Marenya & Barrett 2009
Factors depressing Nitrogen Use Efficiency of inorganic fertilizer use

1. Low soil organic matter
   - significant decline in SOM over past 20 years in Malawi (Mpeketula and Snapp)

2. Acidification
From Larson and Oldham, Mississippi State University Extension Service, 2008.

Source: Burke, 2012
Way Forward: Inputs

1. Raise public investment in agronomic research and extension programs to enable farmers to use fertilizer more efficiently

- ISPs are a powerful tool to quickly raise food production but they would be more effective if adequate resources were allocated to complementary public investments
2. Reconsider targeting guidelines to achieve more equitable development impacts
Way Forward: Inputs

3. Greater political will for ensuring that the subsidies go to the intended beneficiaries

- Currently 1/3 of state resources for ISPs are diverted (Malawi and Zambia), more in other cases (pre-2011 Nigeria)
Way Forward: Inputs

4. More balanced public expenditure patterns could more effectively promote national policy objectives

- Spending a large share of the ag budget on ISPs may not be the most effective way to promote the welfare of its citizens, but it is a highly demonstrable way to do so.

- Consider a more holistic approach to sustainable intensification
Elements of a holistic strategy

1. R&D (national ag research systems)
2. Extension programs / soil testing
3. Programs to help farmers restore soil quality
4. Conservation agricultural practices
5. Physical infrastructure
6. Reducing costs in input supply chains
7. More appropriate fertilizer use recommendations
OUTPUT MARKETS IN AFRICA
Food Price Dilemma

A never ending Government struggle!!!

Farmers lobby for higher FRA prices

Lower consumer prices, usually culminating into consumer subsidies
Private sector market participation

Unpredictable policies

Mistrust between Private sector and Government

Limited private sector investment and market participation
Example of so-called ‘market failure’

National food production shortfall anticipated

Who’s going to import? And how much?

State announces plan to import X tons

Supplies dwindle; prices skyrocket

“EVIDENCE THAT MARKETS FAIL!”

State incurs delays in contracting for imports

Private traders sit on sidelines

Indaba Agricultural Policy Research Institute
Maize Trade Restrictions

- Restrictions often imposed to strike a balance in this food price dilemma. Yet, questions remain:

1. Do trade restrictions for maize help to keep maize prices within reasonable bounds for consumers and producers?

2. Can trade restrictions support medium-term objectives of increased maize productivity, agricultural-led poverty reduction, and improved food security?
Maize Trade Restrictions

- Arguments by advocates of trade restrictions:
  - Under conditions of deficits:
    - government institutions are better positioned than private sector to meet demand:
      - Releasing government reserves on the market at subsidized rates
      - Importing and then releasing grain on to the market at subsidized rates
  - Under conditions of surplus:
    - Producer prices must be supported with government purchases: limits private sector’s involvement in the market
    - National food security must be ensured before exports are allowed
  - There is no trust in the private sector or open borders
Maize Trade Restrictions

Arguments by advocates of open borders:

Under deficit conditions:
- Private sector will respond to price incentives and import grain from regional or international markets.
- These imports will place a ceiling on domestic maize prices (i.e. import parity price) and will limit large spikes in prices.

Under surplus conditions:
- Private sector will respond by exporting to higher priced markets.
- These exports will place a floor price on maize (i.e. export parity price) without significant government expenditure buying maize.

Politically less attractive?
Do Trade Restrictions Promote More Stable Maize Prices?

- Chapoto & Jayne (2009), Minot (2013) finds that:
  - Maize price volatility is significantly higher in countries that actively intervene in their maize markets than it is in countries that make little or no effort to manage prices
- Minot (2013)
  - Prices in Malawi, Zambia, and Zimbabwe, which have large state-owned trading enterprises that buy and sell maize, experience food price movements that are more than 50 percent more volatile than in countries that do not have entities engaged in maize trade
Do Trade Restrictions Promote More Stable Maize Prices?

Source: Chapoto and Jayne 2009
Example Country Experiences

Remember that:

- When maize prices spike above import parity, consumers are being unnecessarily taxed by an inefficient market.
- When maize prices fall below export parity, producers are denied income opportunities from crop sales.
ZAMBIA
Deficit years

Source: Dorosh, Dradri and Haggblade (2007)
KENYA
Response to 2007/08 food price crisis

Source: Ministry of Agriculture Market Information Bureau for Nairobi wholesale prices; Kenya Bureau of Statistics for exchange rates; SAFEX and Tegemeo Institute for import parity prices.
TANZANIA
Welfare and production effects of trade restrictions

- Diao et. al. (2013) show that maize export bans can have a dramatic effect on the welfare of rural producers, with minimal gains for consumers:
  - lower producer prices by 7 to 26% in surplus regions, such as Mbeya, while simultaneously increasing the number of poor households in those regions.
  - Lowers the growth rate in maize production by about 2%.
  - Despite these negative effects on producers’ welfare, the bans only succeeded in marginally lowering the national food price index by about 1%.
Way Forward: Output markets

- We need to promote consultation and coordination between public and private sectors to reduce uncertainty in each others’ behavior.

- Government actions should be predictable.
  - Need for setting clearly defined and transparent rules for triggering government intervention with regard to changes:
    - in parastatal purchase and sale prices,
    - import and export decisions,
    - tariff changes
    - stock release triggers
Government actions should facilitate regional trade, not provide disincentives because regional trade has potential to:

- raise farm-gate prices in areas of surplus
- reduce consumer prices in areas of deficit
If governments intervenes too heavily, then markets will not develop

- We aught to have a system where private sector takes the lead in linking producers and consumers to the market not the other way around.

- Governments have a role but should be limited to enhancing private sector capacity rather than destroy it.
Thank You
4 questions

1. There is a role for ISPs in most SSA countries: True or False

2. Do you feel that ISPs in most SSA countries need:
   A: no changes to design:
   B: small tweaks:
   C: major reforms/improvements:
   D: should be discontinued:
3. What should be the primary rationale for input subsidy programs:

A: Increasing food supplies/food self-sufficiency
B: Poverty reduction
C: Dynamic economic growth
D: Others
4. Do you feel that ISPs in SSA should be:

A: Scaled up
B: Are at about the right level of expenditure
C: Should be downsized?