Thoughts on Priority Research Topics to Support Agri-Food Systems Transformation in Africa

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Priority research issues always determined by key policy challenges

-- Some are known

-- Others are unseen
A FEW MAJOR TRENDS AFFECTING AGRI-FOOD SYSTEMS IN SUB-SAHARAN AFRICA

1. Major growth in per capita incomes
2. Impressive agricultural growth rates
3. Rise of commercialized African investor farmers
4. Rapid investment in agricultural value chains by African entrepreneurs
5. Diversification of the labor force into off-farm activities
6. Greater vibrancy of agricultural factors markets
7. Improved market access conditions for African farmers
### IMPRESSIVE AGRICULTURAL GROWTH

Annual inflation-adjusted agricultural growth rates, 2000-2016:

- Sub-Saharan Africa: +4.62%
- East Asia: +3.07%
- South Asia: +2.96%
- Latin America: +2.49%
- World: +2.75%
### Agricultural Value Added Annual Growth Rates 2000-2016 (constant local currency units)

<table>
<thead>
<tr>
<th>Country</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>6.2</td>
</tr>
<tr>
<td>Nigeria</td>
<td>5.91</td>
</tr>
<tr>
<td>Rwanda</td>
<td>5.47</td>
</tr>
<tr>
<td>Moz’bique</td>
<td>4.72</td>
</tr>
<tr>
<td>Mali</td>
<td>4.55</td>
</tr>
<tr>
<td>Tanzania</td>
<td>3.5</td>
</tr>
<tr>
<td>Kenya</td>
<td>3.07</td>
</tr>
<tr>
<td>Malawi</td>
<td>1.89</td>
</tr>
<tr>
<td>Zambia</td>
<td>-0.92</td>
</tr>
</tbody>
</table>

Source: World Development Indicators, 2017
RELATIONSHIP BETWEEN AGRICULTURAL GROWTH AND POVERTY REDUCTION

Pace of rural transformation and rural poverty reduction in East and Southern Africa, 1990s-2010s

7 UNMISTAKABLE SIGNS OF AGRI-FOOD SYSTEM TRANSFORMATION IN SSA

1. Major growth in per capita incomes
2. Impressive agricultural growth rates
3. Rise of commercialized African investor farmers
Annual growth rates in numbers of farms by size category, Zambia, 2001-2015
<table>
<thead>
<tr>
<th>Year</th>
<th>0-5 ha</th>
<th>5-10 ha</th>
<th>10-20 ha</th>
<th>20-100 ha</th>
<th>Over 100 ha</th>
<th>All farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1,032,743</td>
<td>69,063</td>
<td>12,468</td>
<td>2,141</td>
<td>81</td>
<td>1,116,496</td>
</tr>
<tr>
<td>2008</td>
<td>1,473,238</td>
<td>77,250</td>
<td>13,650</td>
<td>2,346</td>
<td>69</td>
<td>1,669,861</td>
</tr>
<tr>
<td>2012</td>
<td>1,295,293</td>
<td>75,357</td>
<td>18,037</td>
<td>2,595</td>
<td>32</td>
<td>1,417,992</td>
</tr>
<tr>
<td>2015</td>
<td>1,320,354</td>
<td>128,169</td>
<td>27,765</td>
<td>6,791</td>
<td>32</td>
<td>1,512,378</td>
</tr>
</tbody>
</table>

**Annual % change**
- 1.99%
- 6.11%
- 8.76%
- 15.51%
- -4.36%
- 2.53%

**Number of farms in Zambia by landholding size category**

<table>
<thead>
<tr>
<th>Year</th>
<th>0-5 ha</th>
<th>5-10 ha</th>
<th>10-20 ha</th>
<th>20-100 ha</th>
<th>Over 100 ha</th>
<th>All farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>941,801</td>
<td>124,892</td>
<td>36,920</td>
<td>12,470</td>
<td>414</td>
<td>1,116,496</td>
</tr>
<tr>
<td>2008</td>
<td>1,399,775</td>
<td>120,311</td>
<td>30,073</td>
<td>13,829</td>
<td>2,565</td>
<td>1,669,861</td>
</tr>
<tr>
<td>2012</td>
<td>1,212,482</td>
<td>120,450</td>
<td>45,017</td>
<td>12,650</td>
<td>683</td>
<td>1,417,992</td>
</tr>
<tr>
<td>2015</td>
<td>1,153,318</td>
<td>215,945</td>
<td>79,153</td>
<td>31,905</td>
<td>2,789</td>
<td>1,512,378</td>
</tr>
</tbody>
</table>

**Annual % change**
- 1.60%
- 5.21%
- 8.17%
- 11.13%
- 41.04%
- 2.53%

<table>
<thead>
<tr>
<th>Year</th>
<th>0-5 ha</th>
<th>5-10 ha</th>
<th>10-20 ha</th>
<th>20-100 ha</th>
<th>Over 100 ha</th>
<th>Total value of marketed crop produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>74.2</td>
<td>15.0</td>
<td>8.3</td>
<td>2.5</td>
<td>0.06</td>
<td>100.00</td>
</tr>
<tr>
<td>2008</td>
<td>62.9</td>
<td>21.9</td>
<td>11.7</td>
<td>3.4</td>
<td>0.05</td>
<td>100.00</td>
</tr>
<tr>
<td>2012</td>
<td>60.9</td>
<td>20.5</td>
<td>11.7</td>
<td>2.9</td>
<td></td>
<td>100.00</td>
</tr>
<tr>
<td>2015</td>
<td>52.9</td>
<td>22.6</td>
<td>19.6</td>
<td>4.8</td>
<td>0.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Annual % change

-2.04%  3.62%  9.78%  6.69%  -6.75%

7 UNMISTAKABLE SIGNS OF AGRI-FOOD SYSTEM TRANSFORMATION IN SSA

1. Major growth in per capita incomes

2. Impressive agricultural growth rates

3. Rise of commercialized African investor farmers

4. Rapid investment in agricultural value chains by African entrepreneurs
RAPID INVESTMENT IN AGRICULTURAL VALUE CHAINS BY AFRICAN ENTREPRENEURS

• 8-fold increase in the volumes and value of food marketed through rural-to-urban value chains since 2000 (Tschirley et al, 2017)

• Underlying drivers:
  – rapidly rising urban demand
  – high global food prices
  – agricultural sectoral reforms of 1990s
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RAPID DECLINE IN SHARE OF LABOR FORCE IN FARMING (IN FULL-TIME EQUIVALENTS)

Source: Yeboah and Jayne (2018)
Agriculture

Share in total employment (%)

Log of GDP per Capita (2010 US dollar)

Botswana  Ethiopia  Ghana  Kenya  Malawi  Mauritius
Nigeria  Senegal  South Africa  Tanzania  Zambia

- Botswana
- Ethiopia
- Ghana
- Kenya
- Malawi
- Mauritius
- Nigeria
- Senegal
- South Africa
- Tanzania
- Zambia
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### Mode of Acquisition of All Farm PLOTS in Tanzania

<table>
<thead>
<tr>
<th>Mode of Acquisition</th>
<th>Percent of Plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inherited</td>
<td>33.17%</td>
</tr>
<tr>
<td>Gifted</td>
<td>10.33%</td>
</tr>
<tr>
<td>Purchased</td>
<td>29.63%</td>
</tr>
<tr>
<td>Borrowed</td>
<td>11.09%</td>
</tr>
<tr>
<td>Rented</td>
<td>9.63%</td>
</tr>
<tr>
<td>Other (squatting / cleared land/ allocated)</td>
<td>6.16%</td>
</tr>
</tbody>
</table>

**Observations**: 4,291

**Percent of Total Farmland Area**

- Inherited/ gifted: 38.34%
- Purchased: 36.46%
- Borrowed: 6.90%
- Rented: 7.00%
- Other mode of acquisition: 11.30%

**Source**: LSMS/National Panel Survey 2014/15
NOMINAL VALUE OF TRACTOR IMPORTS TO SUB-SAHARAN AFRICA (EXCL. SOUTH AFRICA), 2001-2015

Source: Van der Westhuisen et al, 2018, based on Trade Map database
% OF FARM HOUSEHOLDS RENTING TRACTOR SERVICES IN TANZANIA, 2009 VS 2015

Source: Van der Westhuisen, 2018, based on LSMS/NPS surveys
MEAN LAND PRICES IN TANZANIA: +53.9% IN REAL TERMS IN 6 YEARS

OUTPUT AND FACTOR PRICE INDICES, RURAL MALAWI, 2004-2013

Sources: LSMS-ISA and IHS for land and wages; FEWSNET for urea and maize
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FARMER REPORTED NUMBERS OF TRADERS BUYING MAIZE IN THEIR VILLAGE, 2014

Source: Sitko and Jayne, 2014
1. Future ag growth needed from higher value per hectare and per laborer, not just area expansion
AFRICA’S AGRICULTURAL GROWTH STILL RELIES MAINLY ON CROPLAND EXPANSION, NOT ENOUGH ON PRODUCTIVITY GROWTH

SSA Total Food Imports from 7 to 40 billion USD (2001-2015) (intra SSA trade from 1 to 10 billion USD)

Total value food imports as % of African agricultural production value

Billions of nominal USD


Total Food Importsl_SSA
Total Food Imports_nonSSA
Total value food imports as % value of domestic agriculture production
YOUTH LIVELIHOODS OPTIONS
62% < 25 years

40% Non-farm

30% Struggling non-farm

60% Farming

50% Struggling farm

10% Successful non-farm

Pulled out of agriculture
- In jobs with high barriers to entry
- Post-secondary education
- Invested in skills

Pushed out of agriculture
- Relatively unskilled / limited education
- Limited access to land / finance
- Mainly informal sector / wage workers

Pushed into agriculture
- Few productive assets
- Poor access to land, finance, knowledge
- High concentration of poverty

Pulled into agriculture
- Good access to land, finance, etc.
- Favorable market access, infrastructure
- Diversified income sources
YOUTH LIVELIHOODS OPTIONS
62% < 25 years

40% Non-farm

30% Struggling non-farm

10% Successful non-farm

70% Successful non-farm

60% Farming

50% Struggling farm

10% Successful farming

30% Successful farming

Policies
• Inclusive economic growth
• Infrastructure
• R&D
• Education
  –  Post-secondary

Policies
• R&D / ext.
• Land access
• Finance
• Infrastructure and investments along value chain
  –  Irrigation
  –  Roads
  –  Electricity
A few priority research topics

1. Youth employment – how to manage the transition

2. Is agriculture still the main engine of economic transformation?
   • How can agricultural growth better contribute to poverty reduction?

3. How to improve market access conditions for smallholder farmers

4. How to effectively cope with food supply instability – managing the instability / role of state in staple food markets
A few priority research topics (continued)

5. How to raise output per hectare in sustainable ways – not just relying on area expansion

6. Sustainable intensification
   – how to achieve it in farmers’ fields?
   – ... in light of changing factor prices? (induced innovation hypothesis)

7. Does sustainability also apply to integrated food-energy-water-land systems?

8. How can smallholders’ raise crop response to fertilizer?

9. How can input subsidy programs be made effective?
THOUGHTS ON PRIORITY RESEARCH TOPICS TO SUPPORT AGRI-FOOD SYSTEMS TRANSFORMATION IN AFRICA
SUB SAHARAN AFRICA: ONLY REGION OF THE WORLD WHERE RURAL POPULATION CONTINUES TO RISE PAST 2050

Total Rural Population (millions)

Source: UN 2013
MAJOR CHALLENGES TO BE TACKLED

1. Future ag growth needed from higher value per hectare and per laborer, not just area expansion

2. Land/soil degradation – will make continued agricultural transformation more difficult unless addressed
   - Proximate causes: low adoption of “climate smart” and “sustainable” land management practices
   - Underlying culprits – ineffective national ag R&D and extension systems

3. The “employment challenge”: each year, roughly 17 million young Africans enter working age
62% < 25 years old

Age pyramid:
rural SSA, 2015

LOOMING EMPLOYMENT CHALLENGE IN SSA