Urbanization and Smallholders in Africa:

From headwinds to tailwinds in African agricultural development

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Topics in Advanced Agriculture: Markets and Trade
July 31, 2014

Urbanization and Smallholders in Africa

African cities, markets and trade are booming

BBC NEWS
15 April 2013
World Bank: Africa’s economic growth to outpace average
Economic growth in sub-Saharan Africa should significantly outpace the global average over the next three years, according to the World Bank.

Bloomberg
Sub-Saharan Africa Economy to Grow
By David Malingha, Doya -- Apr 7, 2014
Economic growth in sub-Saharan Africa is forecast to accelerate to 5.2 percent this year...

The Globe and Mail
Fortyfold strategy
For rapid growth, Africa is the new China
Rory Carroll
Published Friday, Apr 18, 2014, 8:13 AM EDT

The Washington Post
Africa’s emergence poses choice for US ties
Associated Press, May 6th 2014
...So far, the U.S. is lagging in the worldwide race to reap economic benefits in Africa...
Urbanization and Smallholders in Africa

Today: What’s behind these headlines, and what do these trends imply for smallholder farmers?

**BBC News**
15 April 2013
World Bank: Africa’s economic growth to outpace average
Economic growth in sub-Saharan Africa should significantly outpace the global average over the next three years, according to the World Bank. Higher commodities, increasing investment and a general pick-up in the world economy should all boost the continent’s growth to more than 5%.

**The Globe and Mail**
10 May 2014
Portfolio Strategy
For rapid growth, Africa is the new China

**The Washington Post**
10 May 2014
Africa’s emergence poses choice for US ties
Associated Press, May 6
...So far, the U.S. is lagging in the worldwide race to reap economic benefits in Africa...

Urbanization and Smallholders in Africa
Trends | Implications | Data and Methods

Africa is catching up, but still has very far to go

Food supply and real income by region, 1990-2012

<table>
<thead>
<tr>
<th>Dietary energy (kCal/pers/day)</th>
<th>Real income per capita (GDP at 2011 PPP prices)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0</td>
</tr>
<tr>
<td>2500</td>
<td>10,000</td>
</tr>
<tr>
<td>3000</td>
<td>20,000</td>
</tr>
<tr>
<td>3500</td>
<td>30,000</td>
</tr>
<tr>
<td>High-Income Countries</td>
<td>40,000</td>
</tr>
<tr>
<td>World Average</td>
<td>50,000</td>
</tr>
<tr>
<td>South Asia</td>
<td></td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td></td>
</tr>
</tbody>
</table>

Higher income has enabled people to meet many goals, like taller children.

Figure 1. Child height and real income, 1985-99 and 2000-10
(Ezzati et al. estimates, N=1,486 from 137 countries)

...and at each income level, children are slightly taller now.


Income changes diet quality as well as quantity.

Share of calories from animal sources, total food supply and income, 1961-2009

Total calories available rise from under 2000 to over 3500 per person/day.

Animal-sourced foods rise from about 5% to about 40% of calories.

Income also buys sanitation and clean water, etc.

Access to sanitation, improved water and income, 1990-2010


Income growth involves structural change

- Most of the poorest people start life in rural areas
  - they rely on agriculture for economic opportunity
  - and move to off-farm work as soon as they can

Amai Nickson and family at Chakuma Village, Zimbabwe
25 years after I taught in the classroom at right (with Tadius Shumba)
Urbanization and off-farm work can eventually employ all the children of farmers

For the world as a whole, rural population has almost peaked and will soon begin to decline


...but Africa still faces over 30 years of rural population growth

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Africa’s year-to-year rural population increase has been fast but is now slowing

Rural population increase in Africa, South Asia and Worldwide, 1950-2050

From 1970 to 1995, Africa had over 2% per year rural population increase. Africa’s rural population growth is now slowing and will eventually stop. For the world as a whole, rural population growth will soon become negative, allowing more land per farm.


Adapting to higher rural population density involves difficult, surprising innovations

Traditional planting “Zai” pits

*Zai* pits

Digging *zai* pits concentrates moisture and nutrients, making it worthwhile to use more fertilizer and new seed varieties.

Burkina Faso, 1997

William A. Masters – Tufts University (http://sites.fufts.edu/willmasters)
Like population growth, child dependency was very high and is now falling

Child and elderly dependency rates by region (0-15 and 65+), 1950-2030

From 1970 to 1995, Africa had over 90 child dependents per 100 working-age adults

That dependency rate is still high but now falling (a "demographic gift")

Africa’s situation now is like South Asia’s in the 1960s


Africa is in the last stage of demographic transition from large to small families

Two families involved in USAID-Heifer International projects in Nakasongola and Luweero districts, Uganda (2011)
What do these trends imply for programs and projects in agriculture, food and nutrition?

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Urbanization-Smallholder Linkages: The CGIAR ISPC Foresight Study

- Five commissioned background papers
  - Asia: Tom Reardon
  - Africa: Thom Jayne
  - Livestock: Cees de Haan
  - Geography: Agnes Andersson-Djurfeldt & Magnus Jirström
  - Cross-cutting: Peter Hazell
- Fifteen discussants in a 2-day workshop, Jan 25-26
  - Awudu Abdulai, Deborah Balk, Derek Byerlee, Cheryl Doss, Ken Giller, Margaret McMillan, Clare Narrod, Jerry Nelson, Kei Otsuka, Carl Pray, Agnes Quisumbing, Bharat Ramaswami, Anita Regmi, Steve Staal, Steve Wiggins
- Active participation of ISPC
  - Ken Cassman, Doug Gollin, Tim Kelley & Rashid Hassan
Implications of urbanization trends for smallholders

- Global agriculture is increasingly diverse, along two main axes:
  - **Commercialization: dynamic vs. hinterland zones**
    -- “Quiet revolution” from low transport cost to ports and cities, even as many farmers remain in hinterland areas,
    -- big differences for input use and role of agribusiness
  - **Resource ownership: family vs. investor-owned farms**
    -- “Farm size” is tailored to family enterprise for most crops, despite scale economies in processing & marketing
    -- family-size farms vary in area/worker and mechanization but demography drives trends in average area/worker

===> *Agricultural policies and programs should be tailored to diversity and change in farm size and commercialization, as well as climate change etc.*

Main implications for commercialization

- **In “dynamic” zones along transport routes**
  -- income growth relies on local input supply and product marketing, even as farm size remains tailored to family enterprise
  => Interventions should aim to equip competing input suppliers and product marketers with increasingly productive innovations
- **In “hinterland” zones facing high transport costs**
  -- income can grow but from a low base, with few inputs
  => Interventions should aim to accelerate growth with public and community innovations adapted to farmers’ needs

*Watch out for exceptions and transitions as dynamism spreads*
-- it is difficult to predict the path of commercialization
=> Interventions can and should drive income growth in both dynamic and hinterland areas through both commercialized and public innovations
Main implications for farm structure

- **Most crops need family-size farms, whether small or large**
  -- Farm size is tailored to family enterprise for most crops, because cost of supervising workers offsets scale economies in machinery and management
  => Average farm size = land area / number of farm families, even as families diversify and then migrate as fast as possible
  => Heterogeneity arises from land quality and family assets

- **Many investor-owned farms fail, but they sometimes succeed**
  -- Large enough scale economies in machinery and management usually only in on-farm processing (e.g. tea, sugar, oil palm)
  or packaging for transport (e.g. cut flowers, high-value veg.)
  or easy supervision (e.g. livestock exc. dairy, some crops)
  => Innovations can expand investor-owned farming (e.g. with GPS on variable-rate equipment) but is very difficult to do.

Main implications for farm size

- **In Asia, family-size farms are growing (from very small now!)**
  -- Slowdown in total population growth + continued urbanization leads to negative rural population growth, rising land/farmer
  => In dynamic zones, output per farmer can rise very fast; in hinterlands, farmers must mechanize or migrate

- **In Africa, family-size farms are getting smaller**
  -- Slow fall in total population growth + recent urbanization leads to slowing but still rapid rural population growth
  => In some regions, cropped area can still expand but most farmers experience falling land/farmer

  ====> Most Asian farmers seek labor-saving innovations, whereas most African farmers seek to increase labor/hectare
Data and methods behind our conclusions

Average farm sizes are starting to grow in Asia, but will continue to shrink in Africa

Table 1: Trends in rural population, 1970 to 2050, Asia and Africa

<table>
<thead>
<tr>
<th></th>
<th>Average annual rate of change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1970-2011</td>
</tr>
<tr>
<td>Asia</td>
<td>+0.85</td>
</tr>
<tr>
<td>Africa</td>
<td>+1.97</td>
</tr>
</tbody>
</table>

Source: Hazell 2013, from UN data.

How accurate is this forecast?

- UN population projections are imperfect, but their biases probably understate the Asia-Africa difference;
- Places and people vary around regional trends, but rural population growth drives change in average farm size;
- Settlement of new areas has been limited and difficult.

Changes in rural, urban and total populations, 1950-2050

**Data and methods behind our conclusions**

*Farmers diversify and migrate as fast as possible to nonfarm work, but opportunities are limited*

![Graph showing migration between major administrative regions, 2002](image)

**Fig. 2.** Urban in-migration rate by age and gender in Uganda. Source: Balk (2013), from Uganda census data.

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**Data and methods behind our conclusions**

*The total number of farmers and total land area is largely fixed, so expanding some farms implies that others will shrink*

<table>
<thead>
<tr>
<th>Country (year of survey)</th>
<th>Sample size</th>
<th>Mean farm size (ha)</th>
<th>Gini Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Overall</td>
<td>Land per household</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>First quartile</td>
</tr>
<tr>
<td>Kenya, 1997</td>
<td>1146</td>
<td>0.28</td>
<td>0.41</td>
</tr>
<tr>
<td>Kenya, 2010</td>
<td>1146</td>
<td>1.86</td>
<td>0.32</td>
</tr>
<tr>
<td>Ethiopia, 1996</td>
<td>2658</td>
<td>1.17</td>
<td>0.24</td>
</tr>
<tr>
<td>Rwanda, 1984</td>
<td>2018</td>
<td>1.20</td>
<td>0.28</td>
</tr>
<tr>
<td>Rwanda, 1990</td>
<td>1181</td>
<td>0.94</td>
<td>0.17</td>
</tr>
<tr>
<td>Rwanda, 2000</td>
<td>1584</td>
<td>1.71</td>
<td>0.16</td>
</tr>
<tr>
<td>Malawi, 1998</td>
<td>5657</td>
<td>0.99</td>
<td>0.22</td>
</tr>
<tr>
<td>Zambia, 2001</td>
<td>6618</td>
<td>2.76</td>
<td>0.56</td>
</tr>
<tr>
<td>Mozambique, 1996</td>
<td>3851</td>
<td>2.10</td>
<td>0.48</td>
</tr>
</tbody>
</table>

**Most farms got smaller… even as sometimes, the biggest get bigger**

Source: Jayne 2013, from various household surveys, and land distribution becomes more skewed.
Data and methods behind our conclusions

The number of farmers is fixed by demography & off-farm opportunity and available land area is fixed by nature & infrastructure

Typical distribution of farm sizes (e.g. lognormal)

Farm size distribution is like a balloon:
Expanding the biggest farms usually implies shrinking land available for the smallest

Stylized changes for Kenya 1997-2010 and Rwanda 1990-2000

Increasing number of the smallest farms
Expansion of relatively big farms

Source: Adapted from Giller (2013)

Data and methods behind our conclusions

Urbanization and income growth raises demand for starchy staples in the poorest countries, but not in the richest ones

Composition of one additional dollar of food expenditure across 144 countries, ranked by per-capita income

Source: Regmi (2013), from Muhammad et al. (2011)
Data and methods behind our conclusions

*Urbanization and income growth raises demand for meat even in the poorest countries*

Meat consumption and income in Ethiopia by urban/rural residence, 1996-2004

![Graph showing meat consumption and income in Ethiopia by urban/rural residence, 1996-2004](source: De Haan (2013))

Data and methods behind our conclusions

*Food productivity growth and food prices drive demand for non-food items and hence off-farm opportunities*

Effect of a 10% rise in food prices on non-food expenditure

![Graph showing effect of 10% rise in food prices on non-food expenditure](source: Regmi (2013))
Summary of key points

- **Economic development involves slow, widespread trends**
  - Gradual improvement in nutrition and health
  - Urbanization and investment in off-farm activity

- **Demographic trends have U-shaped worsening before improving**
  - Farm sizes will keep shrinking in Africa, but less quickly
  - Farm sizes have already or will soon start rising in Asia
  - Child dependency rates in Africa are falling, but remain high
  - Africa’s level has now declined to what was S. Asia’s peak

- **Successful projects and policies anticipate and respond to trends**
  - To reach the poorest, must target small farms and busy moms
  - In dynamic zones, must anticipate rapid commercialization
  - In isolated hinterlands, farmers will remain very isolated