IMPLICATIONS OF INCREASING POPULATION DENSITIES ON FARM INTENSIFICATION AND POVERTY REDUCTION STRATEGIES IN KENYA

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Poverty and hunger

• Reducing poverty and hunger have been a critical policy concern in most of the sub-Saharan African countries for the past half-century.

• Yet, despite series of governments and development agencies interventions, poverty still remains pervasive.

• More than 40% of sub-Saharan Africa’s population is estimated to be below the poverty line.

• Majority of the hungry and poor are the rural households who are smallholder farmers.
Population below poverty line
--World--
IFPRI: 2013 GLOBAL HUNGER INDEX BY SEVERITY

Note: For the 2013 GHI, data on the proportion of undernourished are for 2008-2010. Data on severe malnutrition are for the last year in the period 2008-2010 for which data are available, and data on child malnutrition are for 2011. GHI scores were not calculated for countries for which data were not available, and for countries with very small populations. The 2013 GHI could not be calculated for former Soviet states, because national undernourishment estimates for 2006-2008 were not available for Uzbekistan and Kyrgyzstan, which became independent in 2011.
Hunger and poverty reduction strategy

• Based on the region’s land resource endowment, an agricultural-led growth strategy has been touted as the best way for rapid and sustained reductions in food insecurity and poverty

• Fischer and Shah (2010) report that sub-Saharan Africa has about 202/446 million hectares of uncultivated arable land in the world

• The region is also reported to possess an enormous yield gap in staple grains (Fischer et al., 2009; Deininger and Byerlee, 2011)

• Renewed interest in the “unutilized” land – “land grabs” – following food and fuel prices volatility and adverse climatic conditions
Household landholding vs. income

Source: Jayne et al., 2003
Is Africa a land abundant continent?
Land abundance hypothesis
-- what do we know?--

- Newspaper headlines and household level survey data show a different picture:
  - Newspaper headlines show rising land conflicts
  - Population densities in many areas of rural Africa are much higher than they were two decades ago:
    - High populations growth rates (2.5%/year) and low urbanization rates
    - Led to declining trends in farm size and fallow rates
      - More than half of smallholder farms are less than 1.5 hectares
  - Even in countries with low population densities, there are inequalities in land access:
    - Persistently concentrated rural settlements
      - 1% of SSA’s rural areas contain 16% of its rural people
      - 20% of SSA’s rural areas contain 76% of its rural people
Land abundance hypothesis
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Newspaper headlines show increased land conflicts
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- Causes of the wave of violence that engulfed Kenya after the presidential election in December 2007
  - Local analysts point to historical land inequalities the main cause
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![Rural population growth 1960-2010](source: World Development Indicators, World Bank)
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![Arable land per capita 1960-2010](image)

- All arable land is either fully allocated or already under cultivation
- Persistently concentrated rural settlements
- 1% of SSA's rural areas contain 16% of its rural people
- 20% of SSA's rural areas contain 76% of its rural people
- 29 hectares per person
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Hectares of arable land per person in agriculture (10 year average)

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<td>Ethiopia</td>
<td>0.501</td>
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<td>0.224</td>
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<td>0.264</td>
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<td>0.655</td>
<td>0.569</td>
<td>0.509</td>
<td>0.416</td>
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<tr>
<td>Zimbabwe</td>
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<td>0.550</td>
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<td>0.420</td>
<td>0.469</td>
<td>76.5%</td>
</tr>
<tr>
<td>Rwanda</td>
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<td>0.213</td>
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<td>0.186</td>
<td>0.174</td>
<td>82.1%</td>
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<tr>
<td>Mozambique</td>
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<td>0.314</td>
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<td>82.6%</td>
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<tr>
<td>Ghana</td>
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<td>0.508</td>
<td>0.492</td>
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<td>87.5%</td>
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<tr>
<td>Nigeria</td>
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<td>0.860</td>
<td>0.756</td>
<td>0.769</td>
<td>0.898</td>
<td>91.4%</td>
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</table>
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    - All arable land is either fully allocated
Figure 3: Population density in Kenya
Agro-climatic zones in Kenya
Case Study

Land access in Kenya: What can we learn from the medium-scale farmers’ growth?
Rising medium scale farmers in Africa

• Emergent farmers: cultivating 5 to 20 hectares of land

• Emergent farmers have little in common with large-scale commercial farmers

• Explosion in the number of indigenous medium-scale farmers:
  • +103% growth in number of medium-scale farms (2001-2011) compared to +32% growth of small-scale farms (Sitko and Jayne, 2013)
  • The medium-scale farmers’ overall production is also increasing

• Yet, the processes behind this group’s growth and its productivity compared to smallholder farmers is unclear
What is driving the growth of medium scale farmers?

• Premise #1: Growth in medium-scale farms driven by successful smallholders transitioning to larger scale of production through asset accumulation?
  • If so, indication of inclusive smallholder-led structural transformation

• Premise #2: Growth in medium-scale farms driven by land institutions, policies and public spending patterns that encourage land acquisitions by wealthy individuals
Data and methods

• **Data sources**
  - Survey with 200 medium scale farmers
  - Cultivating 5-50 hectares of land
  - Household survey data of 296 smallholders
  - Focus group discussions

• **Methods**
  - Bivariate descriptive analyses
  - Medium scale farmers sample is divided into two mutually exclusive analytical groups based on the primary source of capital
    - Farm-led strategy
    - Non-farm led (lateral entry) strategy
  - Econometric models
    - Pathways into medium scale farming and production differences
    - Comparing smallholders and medium scale farmers
Key results [I]

1. Majority (60%) of medium-scale farmers used non-farm entry strategy
   • Most of them are current/former public sector employees
   • Acquired land from savings from non-farm, largely urban jobs
   • Had high education attainment

2. Only a minority were primarily engaged in agriculture
   • But had sufficient initial endowment of land– average of 2 hectares

3. Owned over two times more land than they were using for crops:
   • High degree of land owned for speculative purposes
   • Inability of these farmers to make productive use of their land
Key results [II]

4. Acquired most of their land through purchases
   • Had more land outside the location in which they were born

5. Farm-led strategy group acquired most of their land before 1990s
   • Non-farm led strategy group acquired most of their land in 1990-2000

6. Productivity per hectare owned or cultivated is an increasing but nonlinear function of area cultivated
   • Threshold at about 40-50 hectare
Is African agriculture intensifying in response to rising population density?
So, what do diminishing landholding sizes mean for a feasible poverty reduction strategy in sub-Saharan Africa?

- In the middle of increased smallholder inaccessibility to land?
- Limited off-farm opportunities and migration?

The *Asian green revolution* was a small farm phenomenon (Johnston and Kilby, 1975; Mellor, 1976)

- Over 80 percent of farms in India, Bangladesh, Indonesia, China, Japan and Viet Nam are less than two hectares
- Is there a potential for similar forms of inclusive smallholder-led agricultural growth in SSA?
Boserup (1965): Land use intensity responds to population density

Potential forms of intensification:
- Value output/ha
- Modern inputs
  - Fertilizers
  - High yielding seeds and quick maturing crops
- Soil quality improvements
  - Terracing, mulching, etc.
- Irrigation
- Improved crop choices--shift to higher value crops
- Reduced fallow/continuous cultivation
Smallholder intensification

- Literature has not considered what lies beyond the smallholder intensification
  - Soil fertility is declining in densely populated areas due to nutrient mining with continued cultivation and reduced fallows (Dreschel et al., 2001)
  - Evidence show low crop response to inorganic fertilizer application due increased soil acidity as a result of inorganic fertilizer overuse (Marenya & Barrett, 2009)
  - Intensification not possible beyond some population density thresholds (Jayne & Muyanga, 2012; Muyanga & Jayne, 2013)
Case Study: Smallholder intensification in Kenya
Objectives

- Effects of increasing population density on smallholder agricultural production in Kenya
  
  - **Strategy:** estimate the impact of rising population densities on factor inputs, output supply, and household incomes
Effects of population density on smallholder-intensification – conceptual framework

- **Population density**
  - **INDIRECT EFFECTS**
    - Land prices
    - Non-market institutions
    - Landholding
    - Expected output prices
    - Input prices
    - Input demand
  - **DIRECT EFFECTS**
    - Information flow, institution development, transaction costs
    - Output supply
    - Income

- **Observed and Unobserved Variables**
  - **Observed**
  - **Unobserved**
Data sources

- Household Survey Panel Data:
  - Nationwide Egerton University (Tegemeo Institute) rural household survey panel dataset

- National Population Census Data:

- Gridded Population Data:
  - High-resolution gridded estimates of rural population distributions - GRUMP (Global Rural-Urban Mapping Project)
  - Population density: persons/km² of arable land
  - Land quality – agricultural potential
Results: Farm intensification thresholds

Figure 1: Fertilizer quantities applied per hectare cultivated

Figure 2: Total value of cash expenditures per ha cultivated

Figure 3: Area cultivated per household

Figure 4: Net crop income per hectare cultivated
Farm intensification thresholds

Figure 5: Net crop income per family labor (resident adults)

Figure 6: Non-farm income per household
Policy suggestions

• Sustainable intensification in densely populated areas
  • Public investment in agricultural research focusing on new land-saving farm technologies and practices appropriate for small farms

• Rural-rural migration
  • Incentives for people owning more land than they need to release what they don’t need to land-poor groups
  • Physical infrastructure investment in less populated areas e.g. roads and irrigation

• Rural-urban migration
  • Off-farm employment opportunities in urban center
  • Invest in education to equip students necessary skills
Conclusion

- While foreign “land grabs” have captured international attention, perhaps a more serious threat to land access for the millions of smallholder farmers in the region is the transfer of land to a relatively wealthy class of “medium-scale” farmers through land markets and the political process.
- Current land policies undermine the long-term potential of the inclusive smallholder agriculture-led growth.
  - Medium scale farmers buy into farming using economic, social and political capital conferred through non-farm employment.
- Rural poverty and food insecurity is likely to persist unless government institutes pro-smallholders’ land access policies.
- Spatial inequality in landholding (social injustices) lead to social and political tensions that can undermine social and political stability.
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