Better Data for Better Agricultural Policies: the LSMS-ISA experience

GERO CARLETTO
Lead Economist
Development Research Group
The World Bank
LSMS-ISA: Working on 3 Fronts

- Collecting & disseminating multi-topic panel household survey data with a focus on agriculture in 8 African countries

- Improving methods in agricultural statistics based on rigorous experimentation

- Conducting and promoting policy research
Survey Features

- Implemented by National Statistical Offices
- Multi-topic, disaggregated/gender
- Nationally/regionally-representative samples
- Panel of households & individuals
- Field-based data entry (CAPI)
- Linked with ecosystem data
- Open access unit-record & geo-spatial data
## Survey Schedule

<table>
<thead>
<tr>
<th>Country</th>
<th>Baseline</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>2008/09</td>
<td>2010/11 (Jul 2014)</td>
</tr>
<tr>
<td>Uganda</td>
<td>2009/10</td>
<td>2010/11 2011/12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2013/14 (Dec 2014)</td>
</tr>
<tr>
<td>Malawi</td>
<td>2010</td>
<td>2013 (Jul 2014)</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2010/11</td>
<td>2012/13</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>2011/12</td>
<td>2013/14 (Dec 2014)</td>
</tr>
<tr>
<td>Niger</td>
<td>2011</td>
<td>2014</td>
</tr>
<tr>
<td>Mali</td>
<td>2014</td>
<td>2016</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>2014/15</td>
<td>2015/16</td>
</tr>
</tbody>
</table>
LSMS-ISA: Working on 3 Fronts

• Collecting & disseminating multi-topic household survey data with a focus on agriculture in 8 African countries

• Improving methods in agricultural statistics based on rigorous experimentation

• Conducting and promoting policy research
Methodological Research

• “Minding the (Data) Gap” research program
• Collaborative effort (FAO/GS, CGIAR, PSE, NSOs, …)
• Focus on improving productivity measurement
• Components
  – Land area measurement
  – Soil fertility
  – Continuous and root crop production
  – Seed variety identification
  – Agricultural labor
  – Livestock
  – Skills
Why focus on methodological research?
Exhibit # 1: Your Avg. Yield Series
EXHIBIT # 2: Maize Yield Estimates in Country X

Year: 2006/07
EXHIBIT # 3:
Your Avg. Cassava Yields in your Avg. Country
Measuring Farm Productivity

- Many different measures, similar issues!
- Partial measures of productivity: Labour, Land
- Focus here is on land productivity (yield) and how method used affects its measurement

\[
Yield = \frac{Output}{Land}
\]
Measuring Output

• Smallholders don’t keep records
• Recall widely used, but does not always work
• Continuous crops harvested in small quantities over several months (e.g. cassava, banana, ...)
• Measured in non-standard units of varying size
• Different units along the value chain; different states
• Prices/Unit values (own consumption)
The problem in pictures ...
Focus on denominator (Land) ...

What are the different methods?

• Satellite imagery
  • Lots of potential but …

• “Eye estimate”
  • Surprisingly widespread but …

• Traversing (compass and rope)
  • Gold standard but …

• Farmer’s self-reporting
  • Widely used but …

• GPS
  • Increasingly used but …
Does using GPS to measure plot area make a difference?

Systematic bias in reporting ...

... plus heaping!
# Comparing GPS and Farmers' SR Land Area Measures

<table>
<thead>
<tr>
<th>Farm Size (terciles)</th>
<th>Yields difference (GPS-SR)/GPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller</td>
<td>28%</td>
</tr>
<tr>
<td>Medium</td>
<td>7%</td>
</tr>
<tr>
<td>Larger</td>
<td>-30%</td>
</tr>
</tbody>
</table>

Source: 2005/06 UNHS
But, is UNHS a special case?

<table>
<thead>
<tr>
<th>FARM SIZE (terciles)</th>
<th>Pooled</th>
<th>Malawi</th>
<th>Uganda</th>
<th>Tanzania</th>
<th>Niger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller</td>
<td>19.4%</td>
<td>18.0%</td>
<td>17.4%</td>
<td>32.2%</td>
<td>19.1%</td>
</tr>
<tr>
<td>Medium</td>
<td>-4.3%</td>
<td>-5.7%</td>
<td>-4.1%</td>
<td>-0.1%</td>
<td>-3.3%</td>
</tr>
<tr>
<td>Larger</td>
<td>-19.1%</td>
<td>-13.9%</td>
<td>-34.0%</td>
<td>-28.5%</td>
<td>-89.6%</td>
</tr>
</tbody>
</table>

Yields differences: (GPS-SR)/GPS

LSMS-ISA: Working on 3 Fronts

- Collecting & disseminating multi-topic household survey data with a focus on agriculture in 8 African countries
- Improving methods in agricultural statistics based on rigorous experimentation
- Conducting and promoting policy research
Policy Research

• **Telling Facts from Myths in African Agriculture**
  – 15 F&M

• **Nutrition & Agriculture**
  – Partners: BMGF, IFPRI

• **Livelihood, Vulnerability & Resilience in Drylands**

• **Gender & Agriculture**
  – Partners: IFAD, Gender Innovation Lab, IFPRI, FAO, ONE
Gender & Agriculture

• LSMS traditional focus: individual disaggregated data on demographics, education, health & labor

• LSMS-ISA: Expanded individual disaggregation on
  – Intra-household control of resources
  – Agriculture (& livestock): Ownership (rights), management, control, labor, control, extension

• Opportunity to revisit the extent & drivers of gender gap in agricultural productivity in Africa
LEVELLING THE FIELD
IMPROVING OPPORTUNITIES FOR WOMEN FARMERS IN AFRICA

THE WORLD BANK
ONE
Why should we care about women farmers?

- Women farmers produce less per hectare than men
- Focus on women farmers could have big payoffs (FAO)
  - Women with equal access to inputs would increase their output by 20-30%
  - Aggregate increases could lift 100-150 million out of hunger
- This is inefficient! This is money on the table. Why aren’t we doing something?
Not gender & agriculture again...

This time it’s different!

1. New Data

   – Before: national data = little on gender
detailed data = 6 villages in Burkina Faso

   – Now: nationally representative LSMS-ISA data

     • 6 countries: Ethiopia, Malawi, Niger, Nigeria, Tanzania, Uganda

     • That’s 40% of SSA population

     • Detailed production, (gender) management data, and input data
This time, it’s different

2. New, consistently applied methods (in this area)
   – Decomposition analysis. Look at contribution of levels of factors of production, but also *returns* to these factors

<table>
<thead>
<tr>
<th>Kg of fertilizer (levels)</th>
<th>Yield from 1kg of fertilizer (returns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male farmer</td>
<td>after harvesting</td>
</tr>
<tr>
<td>Female farmer</td>
<td>after harvesting</td>
</tr>
</tbody>
</table>
What are the facts?
How much less do they produce?

DIFFERENCE AFTER ACCOUNTING FOR PLOT SIZE AND REGIONS

- ETHIOPIA: 24%***
- MALAWI: 25%***
- NIGER:
  - North: 46%***
  - South: 17%
- NIGERIA: 66%***
- TANZANIA: 23%***
- UGANDA: 33%***
What’s driving the gap?

- Example of Malawi
  - 80% of the gap comes from differences in the levels of factors of production
    - Household adult male labor input
    - High-value export crop cultivation
    - Access to agricultural implements
    - Inorganic fertilizer
  - And 20% of the gap comes from returns to those factors
    - Lower returns to adult male labor & inorganic fertilizer on female-managed plots
    - Domestic duties (children in particular) lower women’s agricultural productivity
How do we level the field?
From evidence to action

• Report has 10 key policy priorities
  – Within these, 18 concrete policy options
  – We looked for rigorous, tested interventions
    • There is still a significant knowledge gap about what works
    • But we have some promising (i.e. those with rigorous impact evaluation evidence), some emerging
<table>
<thead>
<tr>
<th>Key Driver</th>
<th>Policy Priority</th>
<th>State of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND</td>
<td>1. Strengthen women’s land rights.</td>
<td>PROMISING</td>
</tr>
<tr>
<td></td>
<td>2. Improve women’s access to hired labor.</td>
<td>EMERGING</td>
</tr>
<tr>
<td></td>
<td>3. Enhance women’s use of tools &amp; equipment that reduce the amount of labor they require on the farm.</td>
<td>EMERGING</td>
</tr>
<tr>
<td></td>
<td>4. Provide community-based child-care centers.</td>
<td>EMERGING</td>
</tr>
<tr>
<td>LABOR</td>
<td>5. Encourage women farmers to use more, &amp; higher-quality, fertilizer.</td>
<td>PROMISING</td>
</tr>
<tr>
<td>NON-LABOR INPUTS</td>
<td>6. Increase women’s use of improved seeds.</td>
<td>EMERGING</td>
</tr>
<tr>
<td>Key Driver</td>
<td>Policy Priority</td>
<td>State of Evidence</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>INFORMATION</td>
<td>7. Tailor extension services to women’s needs, and leverage social networks to spread agricultural knowledge.</td>
<td>PROMISING</td>
</tr>
<tr>
<td>ACCESS TO MARKETS</td>
<td>8. Promote women’s cultivation of high-value/cash crops.</td>
<td>EMERGING</td>
</tr>
<tr>
<td></td>
<td>9. Facilitate women’s access to &amp; effective participation in markets.</td>
<td>PROMISING</td>
</tr>
<tr>
<td>HUMAN CAPITAL</td>
<td>10. Raise education levels of adult female farmers.</td>
<td>PROMISING</td>
</tr>
</tbody>
</table>
Some final thoughts ...

• On methodology
  – “Quick wins”
    • Use of GPS for land area measurement
      – Sourcebook
    • Non-standard units
      – CAPI; conversion tables
    • Information on crop state
    • Protocols on data integration (satellite imagery, ...)
  – Tougher “nuts to crack”
    • Intercropping
    • Post-harvest losses
    • Continuous and root crops
    • Labor inputs
    • Prices

• Need more methodological validation!
Some final thoughts (cont’d) ...

• On policy research
  – “Quick wins”
    • Improve access and documentation
    • Tool for dissemination/increase usability
    • Marginal repurposing of existing/planned surveys
    • Enhanced integration and use of data sources
      – Multi-purpose
      – Survey-to-survey
  – Tougher “nuts to crack”
    • Individual-level data
      – Nutrition, Gender
    • Institutional coordination (for scaling up)
      – Global Strategy
    • Capacity Building