Categorization of Rural Cropping Households in Zambia

A. Kuteya, Michael Weber, S. Kabwe, M. Beaver, A. Chapoto, B. Burke & N. Mason

Food Security Research Project, Lusaka
Presentation at Catholic Relief Services, Lusaka
17th March, 2011
Objectives

- To identify and understand characteristics of smallholder farmers in developing improved assistance programs & policies

- To help develop relevant categories of rural cropping households in Zambia
Presentation Outline

I. Logic and Overview Explanation of Basic Analysis
II. Income and Related Food Security Indicators
III. HH-Level Demographics and Population Location
IV. HH Assets - Land and Livestock Ownership
VIII. Summary and Conclusion
SS: Empirical Data on Smallholders in Zambia – Nation Wide Random Random Surveys
(PHS/SS 99/00, 02/03 & 07/08= 364 SEAs)
(CFS 06/07 and onwards = 640 SEAs)

I. Logic and Overview Explanation of Basic Analysis Results

- Three-Year Study Period
- Household Income - best indicator of HH welfare
- Constant 2009/2010 ZMK

\[ NI_t = GI_t - PC_t \]
Four Market Interaction Categories for Cropping Households

1. Grower and Seller of Maize
2. Grower and Buyer of Maize or Mealies
3. Does not Grow but Buyer of Maize or Mealies
4. Not in the market as buyers nor as sellers
Section II
Income and Related Food Security Indicators
<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Estimated Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 2007/08</td>
<td>@ 1,493,197 ≈ 1.5 million</td>
</tr>
<tr>
<td>SS 2003/04</td>
<td>@ 1,243,811 ≈ 1.2 million</td>
</tr>
<tr>
<td>SS 2000/01</td>
<td>@ 1,109,898 ≈ 1.1 million</td>
</tr>
</tbody>
</table>
National HH-level average income

- 2008 @ K 5,070,524
- 2004 @ K 5,144,841
- 2001 @ K 4,004,343

Net incomes ↑ roughly by 28%
HH Income by Terciles and Market Categories - 2008

Maize Mkt Categories - (% HH per category)
## HH Income Source Combinations by Study Year

<table>
<thead>
<tr>
<th>% of Households</th>
<th>2001</th>
<th>2004</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming Only</td>
<td>52.8</td>
<td>56.1</td>
<td>45.5</td>
</tr>
<tr>
<td>F &amp; FW</td>
<td>4.7</td>
<td>5.4</td>
<td>4.7</td>
</tr>
<tr>
<td>F &amp; N-FW</td>
<td>8.1</td>
<td>9.2</td>
<td>6.8</td>
</tr>
<tr>
<td>F &amp; Bus</td>
<td>25.6</td>
<td>21.6</td>
<td>33.6</td>
</tr>
<tr>
<td>F, B, FW</td>
<td>2.4</td>
<td>2.2</td>
<td>3.1</td>
</tr>
<tr>
<td>F &amp; B, N-FW</td>
<td>4.1</td>
<td>4.2</td>
<td>4.8</td>
</tr>
</tbody>
</table>

*F=farming; FW=farm wages; N-FW= non-farm wages; Bus or B = business*
Maize Production/Purchases

- Overall, 80% HHs produce maize
- 90% HHs in high income tercile
- 75% - low tercile
- Low income tercile are maize net buyers
- High income tercile are net sellers-K855,000/yr
Off-farm income

- Total income = farming and off-farm
- Off-farm income is very important
- Business make up 50% of off-farm income
% Distribution of HHs in Market Categories by Tercile - 2008

<table>
<thead>
<tr>
<th>Percent of Households</th>
<th>1- Grow/Sell</th>
<th>2- Grow/buy</th>
<th>3-Buy/Not Growing</th>
<th>4-Not in market</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Income Tercile</td>
<td>44</td>
<td>34</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Mid Income Tercile</td>
<td>25</td>
<td>41</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Low Income Tercile</td>
<td>13</td>
<td>42</td>
<td>14</td>
<td>31</td>
</tr>
</tbody>
</table>
Section III
HH-Level Demographics and Pop Location
- 6 members per HH (3 prime age adults)
- Female & elderly headed HHs - 25%
- Female and elderly headship more in low tercile
% of Single and Married Female Headed HHs

Marketing Year

2000/01  2003/04  2007/08

Headship %

% of Single Female Headed HHs

% of Married Female Headed HHs
Education for Most Educated Males and Females

- Low Tercile: # Years of Education Of Most Educated Male HH Member = 4
- Mid Tercile: 6
- High Tercile: 7
- National Average: 5
AEZ II and III contain vast majority of HHs

AEZ IIa & IIb has more HHs in high tercile

AEZ III, largest group is medium tercile

Poor HHs are in all parts of the country
Location of HHs by Income Terciles in Selected Provinces

Low Income Tercile  Mid Income Tercile  High Income Tercile
Section IV
Household-Level Assets, Including Land and Livestock Ownership
Mean Area Cultivated in Ha per HH

<table>
<thead>
<tr>
<th>Income Tercile</th>
<th>Land Size Planted (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.9</td>
</tr>
<tr>
<td>Mid</td>
<td>1.4</td>
</tr>
<tr>
<td>High</td>
<td>2.2</td>
</tr>
<tr>
<td>Total National Average</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Mean Area Cultivated in Ha per HH by Income Tercile

- **National Average**
  - SS 2007/2008: 1.5
  - SS 2003/2004: 1.5
  - SS 2000/2001: 1.5

- **High Income Tercile**
  - SS 2007/2008: 2.2
  - SS 2003/2004: 2.4
  - SS 2000/2001: 2

- **Mid Income Tercile**
  - SS 2007/2008: 1.4
  - SS 2003/2004: 1.5
  - SS 2000/2001: 1.5

- **Low Income Tercile**
  - SS 2007/2008: 0.9
  - SS 2003/2004: 0.9
  - SS 2000/2001: 1
ACCESS TO OTHER ASSETS

- Chickens most reared then goats, cattle & pigs
- 93% HHs own 14 chickens
- 23 to 29% of households own 6 - 7 goats
- 20 to 24% of HHs own 9-10 cattle
- 2 crops/HH
V. Summary and Conclusion
✓ Characteristics & Categories
✓ Heterogeneity
✓ High income households benefit the most from subsidies
✓ Benefits through market interactions are highly concentrated
✓ Land size cultivated - 1.5 Ha/HH
✓ Cattle ownership – 24%
80% Smallholders produce maize
6 members per HH
Existence of poor HHs in all parts of the country despite relative concentration
Eastern has 22% Poor HHs
Poor HHs retain 60% of 2700 calories
Thank You
Twalumba
Zikomo
Mathematically, the following expression of net household income holds:

\[ NI_t = GI_t - PC_t \]  \hspace{1cm} (1)\]

where

- \( NI_t, t = 1, \ldots, N \), is the net household income observed in SS year \( t \)
- \( GI_t, t = 1, \ldots, N \), is the gross household income observed in SS year \( t \)
- \( PC_t, t = 1, \ldots, N \), all associated costs of production in SS year \( t \).

Gross HH income for each study year can be expressed as:

\[ GI_t = \sum_{t=1}^{n} (gvharv_t + vegsales_t + totlivs_t + livprod_t + grossoffarm_t) \]  \hspace{1cm} (2)\]

where

- \( gvharv_t, t = 1, \ldots, N \), is simply gross value of harvest for crops observed
- \( vegsales_t, t = 1, \ldots, N \), equals total value of fruits/vegetable sales observed in year \( t \)
- \( totlivs_t, t = 1, \ldots, N \), represents total income for livestock observed in year \( t \)
- \( livprod_t, t = 1, \ldots, N \), is total income for livestock products observed in year \( t \)
- \( grossoffarm_t, t = 1, \ldots, N \), total off farm income observed in year \( t \)

Production Costs equation.

\[ PC_t = \sum_{t=1}^{n} (buscost_t + totfertcost_t) \]  \hspace{1cm} (3)\]