Farm-level pathways to improved nutritional status

Gero Carletto, Benjamin Davis, Marie Ruel, Alberto Zezza

3rd AIEAA Conference, Alghero
27 June 2014
Outline

• Background and motivation
• Conceptual framework
• Data
  – National surveys vs impact evaluations???
• Results
• Methods
• Challenges for data, policy and research
Background and motivation

• Synthesis of 8 papers under revision for special issue of the *Journal of Development Studies*

• Policies, international initiatives to improve nutritional status via promotion of agriculture, despite lack of robust empirical evidence on direct linkages between agriculture and nutrition

• Objective: Inform the debate by assembling new evidence based on good, recent data, from different settings
Conceptual framework: Linking agriculture to nutrition

• Channels (Ruel and Alderman, *The Lancet*, 2013)
  – Food prices
  – Income from agriculture
  – Consumption of home production
  – Women’s social status and empowerment
  – Women’s time allocation
  – Women’s health
  – Value chains
  – Biofortification

• Market failures: Non-separable hh model

• Mental accounting

• Intra-household allocation
The data challenge

• Complex inter-related factors, complex data requirements
  – Detailed ag information
  – Reliable nutritional outcome indicators
  – Rich set of controls
  – Identification of causal pathways (?)

• National level data vs. case study, RCT’s trade-offs (external validity)
What agriculture?

• Production diversity: Number of crops, ag activities, food groups produced
• Ag production, revenues or income
• Intensity of participation in bio-fortification program
• Yields
• Farm size
• Own consumption/sales ratio
• Cow ownership
• Livestock ownership, by species
What outcomes?

• Dietary Diversity (HH and individual for 6-23)
• Anthropometrics (wasting, stunting, underweight)
• Vitamin A density
• Micronutrient adequacy
• Consumption of individual food groups (ancillary to DD)
• Milk intake for children under 2
• Consumption expenditure of specific livestock products
<table>
<thead>
<tr>
<th>SCALE</th>
<th>HH &amp; Child?</th>
<th>FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 district (Zambia)</td>
<td>hh AND Child (DD, anthro)</td>
<td>Dietary diversity: up for 6-23; stunting down for 24-59</td>
</tr>
<tr>
<td>36 village organizations in 4 districts (Mozambique)</td>
<td>HH</td>
<td>Positive; stronger on Vitamin A density, weaker on others, but higher with participation intensity</td>
</tr>
<tr>
<td>National (Nigeria)</td>
<td>HH</td>
<td>Positive for ag revenues. Positive but biased for crop diversity</td>
</tr>
<tr>
<td>National (Nepal)</td>
<td>Child (anthro)</td>
<td>Positive association between ag and nutrition for all children. Small, positive association for commercialization, only for younger children</td>
</tr>
</tbody>
</table>
Mozambique, bio-fortification and vitamin A intake density

Vitamin A density at endline
Reference children, by participation intensity (agriculture)

None Vines only Vines + Ext.

368 reference children.

De Brauw et al., forthcoming
## Results/2

<table>
<thead>
<tr>
<th>SCALE</th>
<th>HH &amp; Child?</th>
<th>FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>93 woredas (Ethiopia)</td>
<td>Child (both anthro and dd)</td>
<td>Positive, quite large effects on both intake and nutrition</td>
</tr>
<tr>
<td>Impact evaluation baseline (Nepal)</td>
<td>Child and maternal</td>
<td>Positive but small, with nuances</td>
</tr>
<tr>
<td>Uganda, national</td>
<td>HH (consumption) and child (anthro)</td>
<td>Positive (with nuances) on consumption, little on nutrition</td>
</tr>
</tbody>
</table>
# Cow ownership and milk consumption, Ethiopia

## Table 3: Association between child height and ownership of cows by age groups

<table>
<thead>
<tr>
<th>Age range (months)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 - 24</td>
<td>-0.055*</td>
<td>-0.018</td>
<td>-0.058*</td>
<td>-0.133***</td>
<td>-0.041</td>
<td>-0.099***</td>
</tr>
<tr>
<td>24 - 60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 - 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 - 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Outcome variable: Child is stunted**

<table>
<thead>
<tr>
<th>Household owns cow</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.055*</td>
<td>-0.018</td>
<td>-0.058*</td>
<td>-0.133***</td>
<td>-0.041</td>
<td>-0.099***</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.020)</td>
<td>(0.034)</td>
<td>(0.036)</td>
<td>(0.047)</td>
<td>(0.028)</td>
</tr>
</tbody>
</table>

| Observations      | 1,590 | 3,092 | 1,124 | 642  | 586  | 1,108 |

Hoddinott et al., forthcoming
Methods

• OLS, logits on a X-Section, no causal claims (sometimes with ‘robustness’, placebo)
• OLS, IV (often exploiting geo-referencing): Causality
• Experimental design with IV; non-separable hh model
Findings and Challenges

- Generally positive impacts
- Information on intensity and magnitude of impacts
- Randomize agriculture?
- “If ag important for nutrition, DHS should include more ag…”
- If market imperfections are the premise, policy is not only ag programming, but also removing those imperfections
- Panel, Geo-referencing for causal inference
- Despite the new, better data much can still not be assessed: What qualifies as a ‘contribution to knowledge’?