Developing an innovative approach to measuring farmer livelihoods and testing critical nutrition linkages

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Addis Ababa, Ethiopia (June 22, 2016)
OBJECTIVES

1. Develop nutrition-sensitive typologies of smallholder farmer livelihoods, and determine the association of these typologies with nutrition outcomes

2. Assess the effect of agricultural survey design on:
   1. estimates of farmer livelihood characteristics;
   2. associations of these characteristics with nutrition outcomes
WHY LIVELIHOOD TYPOLOGIES?

• Smallholder farmers increasingly engaged in both market- and subsistence-oriented production, and earn off-farm or non-farm income

• Patterns of dynamic, inter-related agricultural characteristics can be lost in traditional multivariate analysis

• Relevant to understanding influence of agriculture on nutrition given inherent complexity of interventions and challenge of policy design amidst this complexity
• Identified from evidence-based theory on household agricultural characteristics most influential on diet and nutritional status

Four typology components:
1. Diversity of agricultural production
2. Access to land, labor and production inputs
3. Extent and distribution of household income from farm, off-farm, and non-farm activities
4. Sex-specific control of agricultural income and decisions

Sources: Kadiyala et al. (2014), Agriculture and nutrition in India: mapping evidence to pathways, ANYAS; World Bank (2007), From Agriculture to Nutrition: Pathways, Synergies, and Outcomes, Washington, DC
AGROECOLOGICAL ZONES OF BURKINA FASO

METHODS – OBJECTIVE 1

• Analysis of secondary data
  – 2016 Burkina Faso Integrated Household Survey (LSMS-ISA)
  – Burkina Faso 2014 Continuous Multisectoral Survey (EMC) (Enquête Multisectorielle Continue)

• Non-hierarchical cluster analysis to identify livelihood typologies
CLUSTER ANALYSIS

• Group data into classes such that cases within a cluster have high similarity, but are highly dissimilar with respect to cases in other clusters.

• Non-hierarchical partitioning (k-means) cluster analysis
  • Size of distance of similarity matrix may preclude hierarchical procedure
  • $F$-$\text{max}$ statistic used to identify optimum number of clusters

• Cluster validity interpreted in relation to a priori typology components, assessing mean and dispersion of indicator variables within and between clusters.
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• Non-hierarchical cluster analysis to identify livelihood typologies

• Multi-level models testing association of typologies and individual components with household-level dietary diversity, anthropometric status of <5 children
Methodological randomized controlled trial, using distinct data collection approaches, to assess bias in:

- classification of households into typologies
- estimates of associations of typologies and component characteristics with nutrition outcomes

Data on agricultural production, land, labor, inputs, earnings, control of management decisions collected differently in each of 3 trial arms

Dietary and anthropometric data collected systematically across all arms
**DESCRIPTION OF TRIAL**

- **Control arm:** *Disaggregated* (n = 600 HH)
  - Data collected from household member that manages each plot, by plot and season

- **Treatment arm 1:** *Plot manager aggregate* (n = 600 HH)
  - Aggregate production data by plot manager across all plots and seasons

- **Treatment arm 2:** *Household aggregate* (n = 600 HH)
  - Aggregate data for entire household from individual most knowledgeable about agricultural production
• Estimate average treatment effect of survey treatment on livelihood components and typology classifications

• Quantify the effect of survey design biases on coefficient estimates for associations of livelihood components and typologies with diet and anthropometric outcomes
  – In multiple regression models, interact livelihood variables with dummy variables for randomized treatment assignment
POLICY IMPLICATIONS

• Inform prioritization of nutrition-sensitive agricultural policies that account for interaction of household characteristics (avoid unintended consequences, and exploit synergies)

• Estimating bias in estimates can facilitate better survey designs, inform choice of instruments and policy priorities, and estimate confidence intervals for interpreting results in studies that use different survey designs

• E.g., Production diversification interventions require accurate estimates of potential dietary impacts, particularly considering diversity and evenness of production across land area
UPDATES AND OUTSTANDING CHALLENGES

• Implementation of cognitive and pilot testing of survey instruments

• Stakeholder engagement with GoBF

• Analysis of agricultural production diversity and orientation on seasonal buffering of dietary diversity

• Continuing analysis of 2014 Burkina Faso EMC; pending analysis of 2016 Burkina Faso LSMS-ISA 2016

• Exploring future intervention scenarios and partners

• Application of 24-hour dietary recalls in West Africa
THANK YOU

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