Innovative Methods and Metrics for Agriculture and Nutrition Actions

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

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Addis Ababa, Ethiopia (June 22, 2016)

Funded by:

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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

TYPOLOGY COMPONENTS

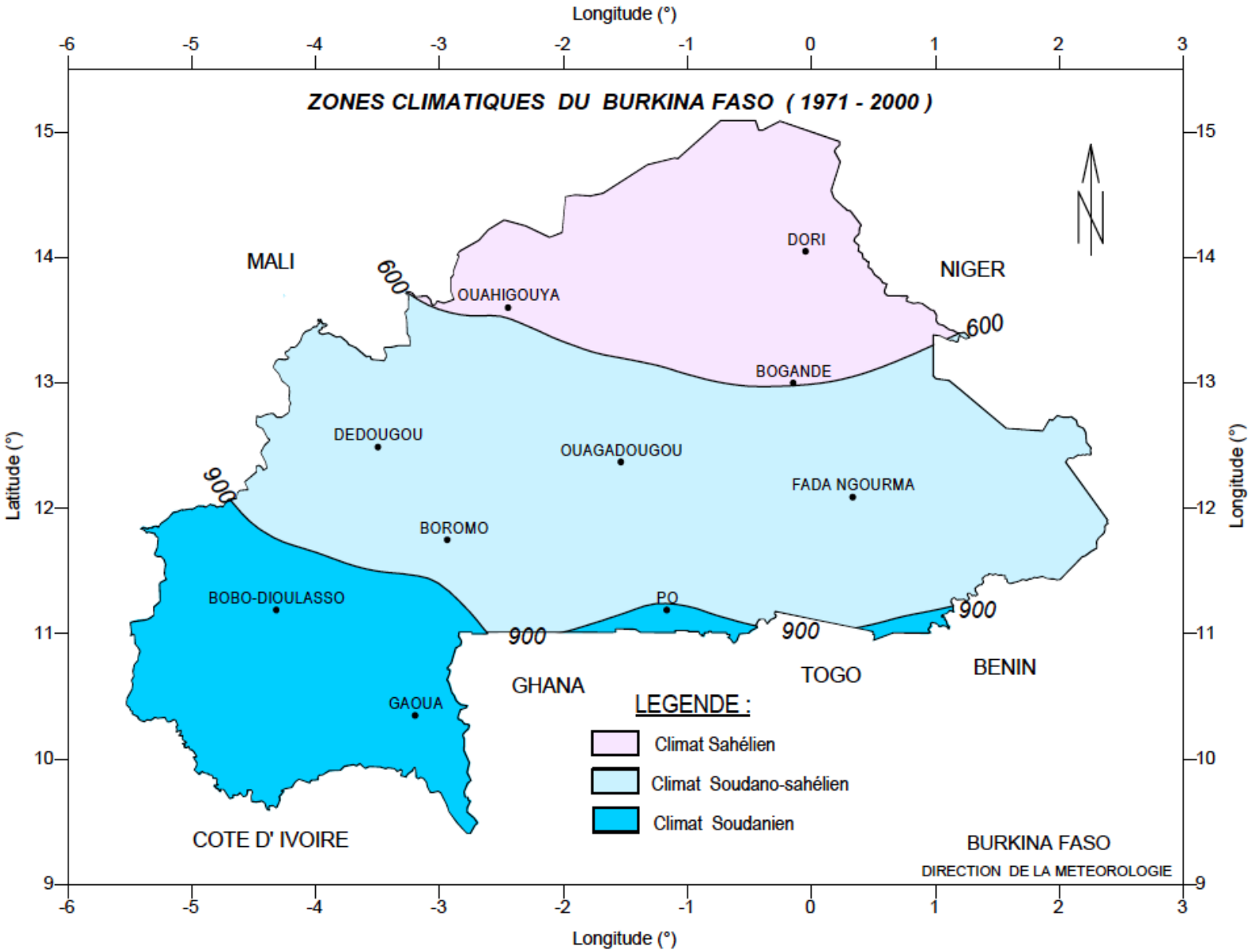
- Identified from evidence-based theory on household agricultural characteristics most influential on diet and nutritional status

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



Source: FAO (2010) Cartographie Des Zones Socio-Rurales 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-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

SURVEY DESIGN EXPERIMENT – OBJECTIVE 2

- 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

ANALYSIS

- 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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