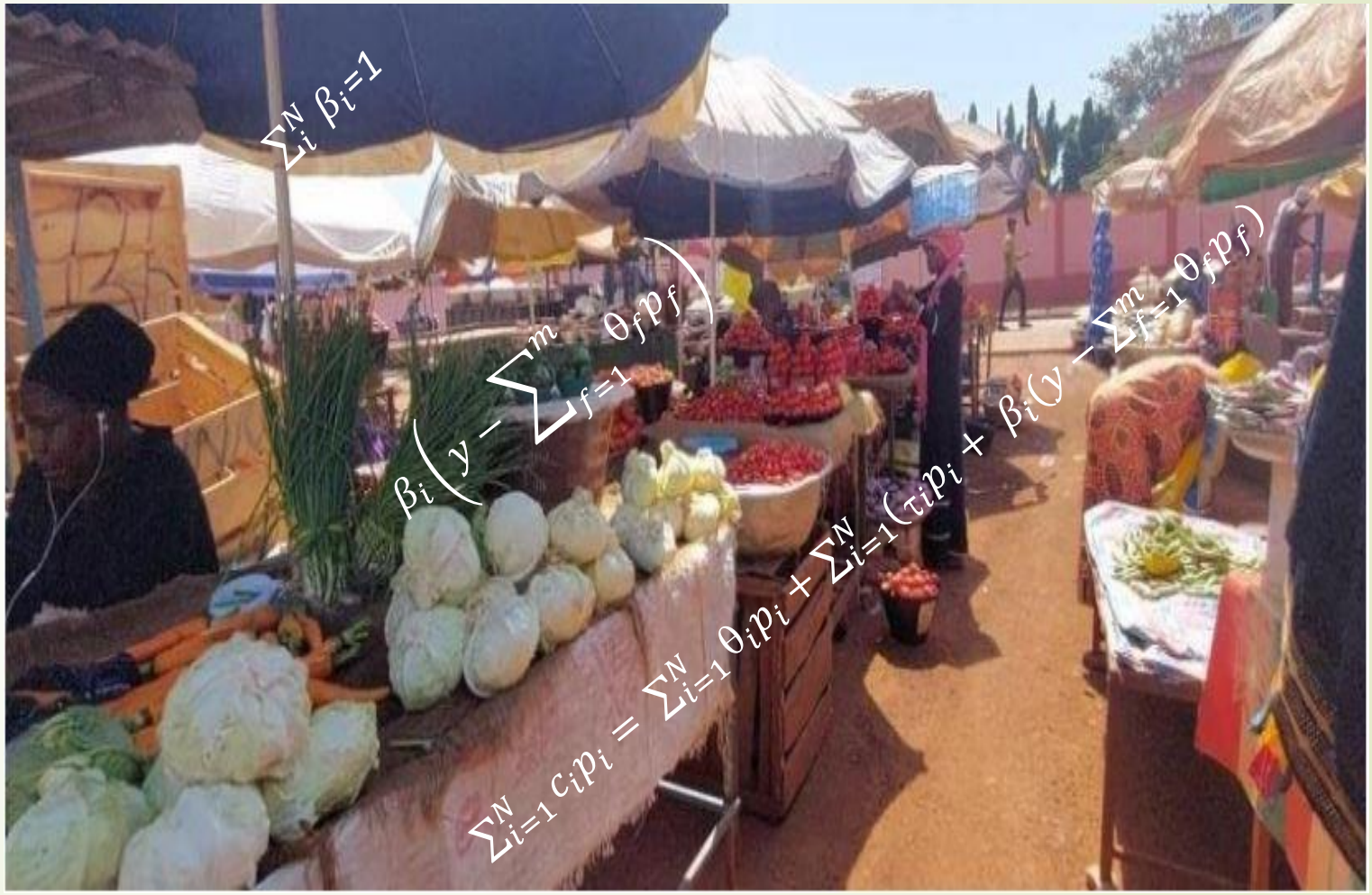
A conceptual model of expenditure, and non-separability in consumption and production for smallholder farmers in Northern Ghana

By David Ahiamadia
Doctoral Candidate:
Massey University

Supervisors

Dr. Ramilan Thiagarajah

Assoc. Professor Peter Tozer

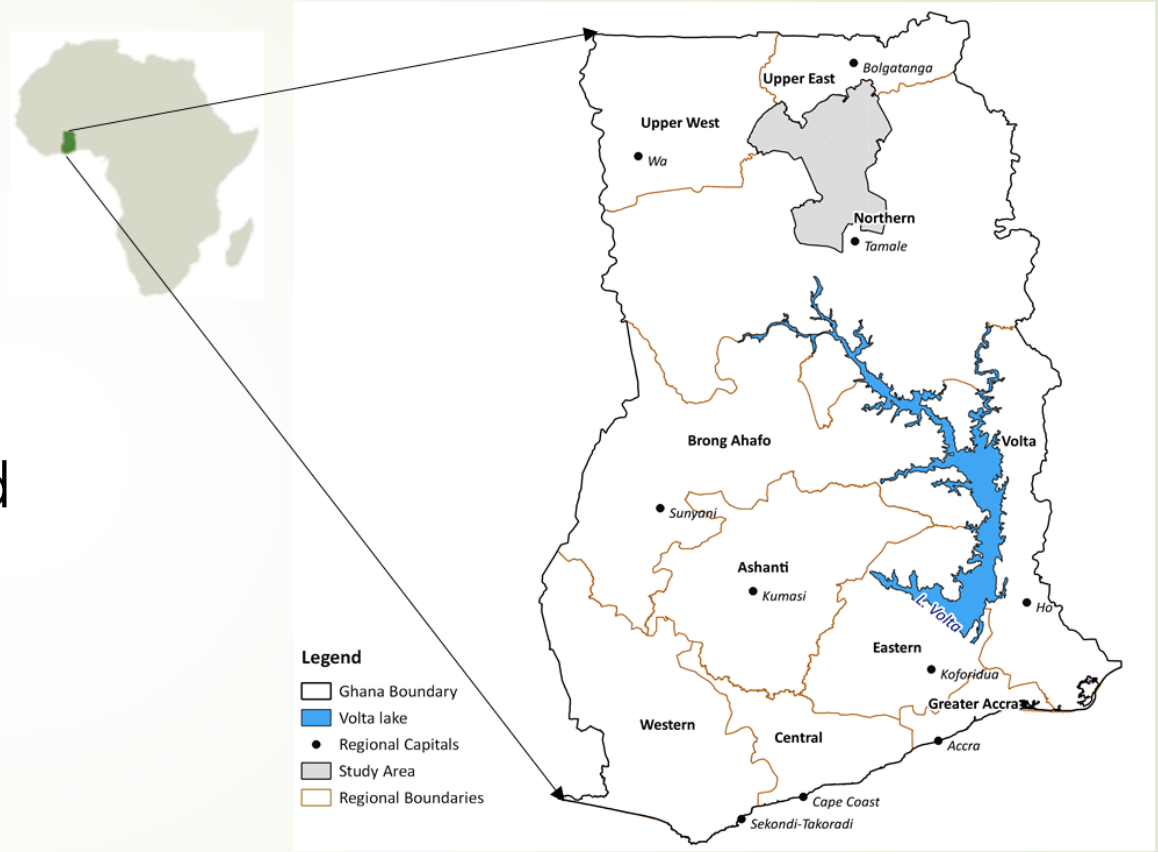


Presentation outline

- Overview
- Overview of own food production and expenditure of farm households
- A conceptual framework: Linear expenditure system
- Implications of the study

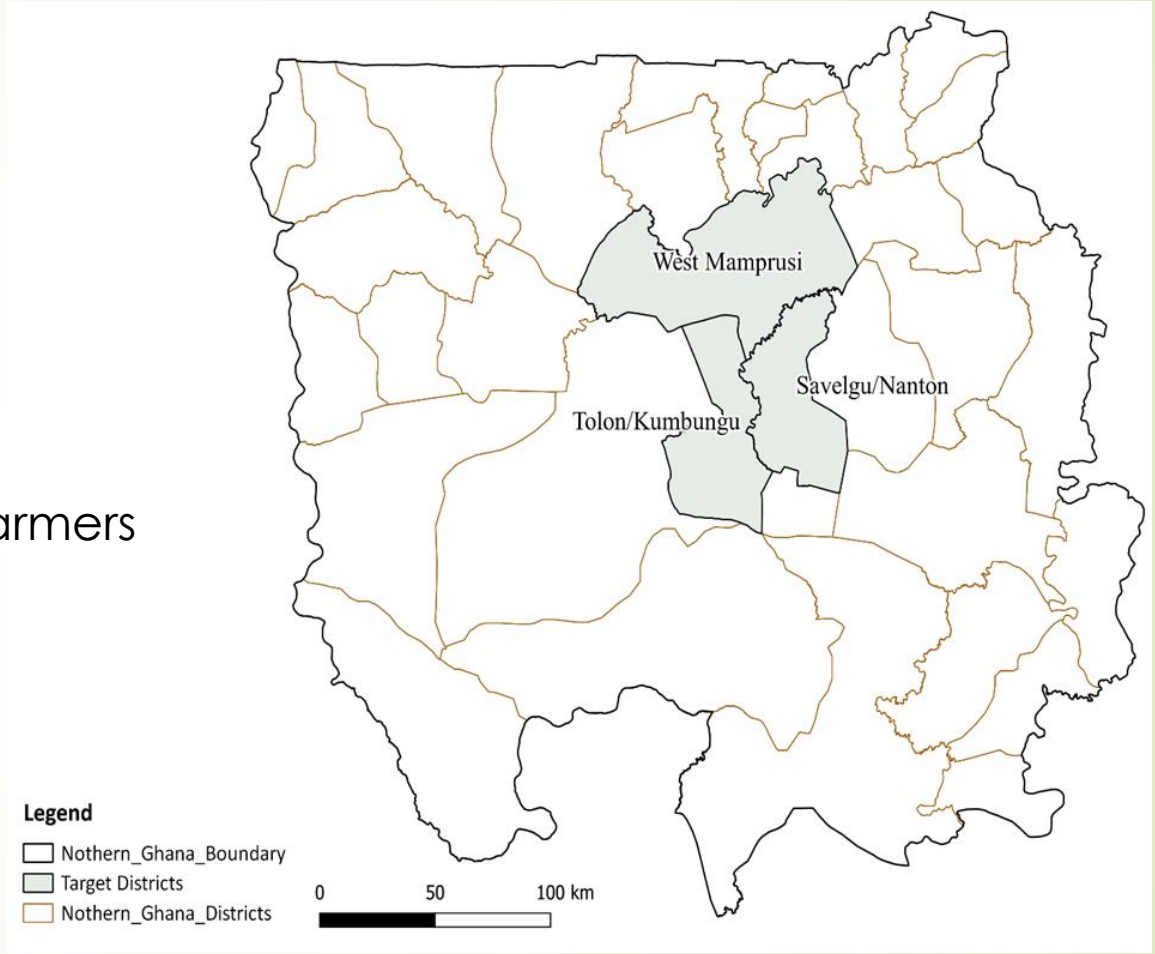
Overview

- Majority are smallholder farmers
- They are resource poor and heterogeneous



Brief description of Northern Ghana?

- One-third of Ghana's land size
- Leading producer of cereals and grains
- 80% of the population are smallholder farmers
- Unimodal rainfall
- Most climate vulnerable region



Farm systems in Northern Ghana

- Weakly integrated crop livestock systems
- Farm households made up of approximately three generations
- Household settlements are nucleated often located in the middle of farmlands
- Constrained with low inputs, poor soil fertility, seed quality, inadequate labour, and poor yield
- Own production is often totally consumed, or partly consumed and the rest sold to the market

Crops and livestock produced

- Maize
- Rice
- Sorghum
- Groundnut
- Chicken
- Cattle
- Goat

Overview of own food production and expenditure of farm households

- Own food production and consumption expenditure
- Purchased food expenditure
- Non-food expenditure

Research objectives

- Develop a conceptual linear expenditure model
- Examine the demand patterns across group of commodities consumed by small holder farm households
- Analyse the relationship between income and expenditure of food and non food commodity groups

Research questions

- What is the relationship between income and consumption of own food produced, purchased food, and non-food groups?
- Can smallholder farmers spend beyond subsistence?
- What is the effect of adequate consumption on the expenditure of other food and non-food groups?

A conceptual framework: Linear expenditure system

- Maximize the Stone-Geary Utility function :
- $u(X_1 - C_1)^{\beta_1} \ (X_2 - C_2)^{\beta_2}$ ⟶ *eqn 1*

  subject to: $Y = P_1X_1 + P_2X_2 \ldots P_NX_N$ ⟶ *eqn 2*

Using the Lagrangian F.O.C approach, a solution for the linear expenditure system in equation 3 is generated as:

$$X_iP_i = C_iP_i + \beta_i\left(Y - \sum_{j=1}^{N} C_jP_j\right) \longrightarrow \text{eqn 3}$$

- C_iP_i =subsistent expenditure on good *i, where i =1 to N*
- X_iP_i =Total expenditure on good *i*
- β_i = Marginal budget share for good *i*
- C_jP_j =Subsistent expenditure on other groups of commodities, where *j =1 to N*
- *Y* =Total income

Conceptual model developed

- Linear expenditure model:
- $c_i p_i = \theta_i p_i + \tau_i p_i + \beta_i \left(y - \sum_{j=1}^{J} \theta_j p_j \right)$ ⟶ *eqn 4*

  where: i =own food group, j = purchased food group, and non-food group
- $c_i p_i$=total expenditure on own food
- $\theta_i p_i$=subsistent expenditure on own food
- $\tau_i p_i$ = additional expenditure on own food to reach adequate consumption
- β_i = Marginal budget share on own food
- $\theta_j p_j$= subsistent expenditure on purchased food and non-food products

  y = total household income

Data

- Africa Rising Survey
- 615 Households
- 8 variables were analysed

Implications of the study

- Understand the consumption behaviour of farm households
- Implications for food security
- Predict demand patterns of farm households for policy implementation

Acknowledgements

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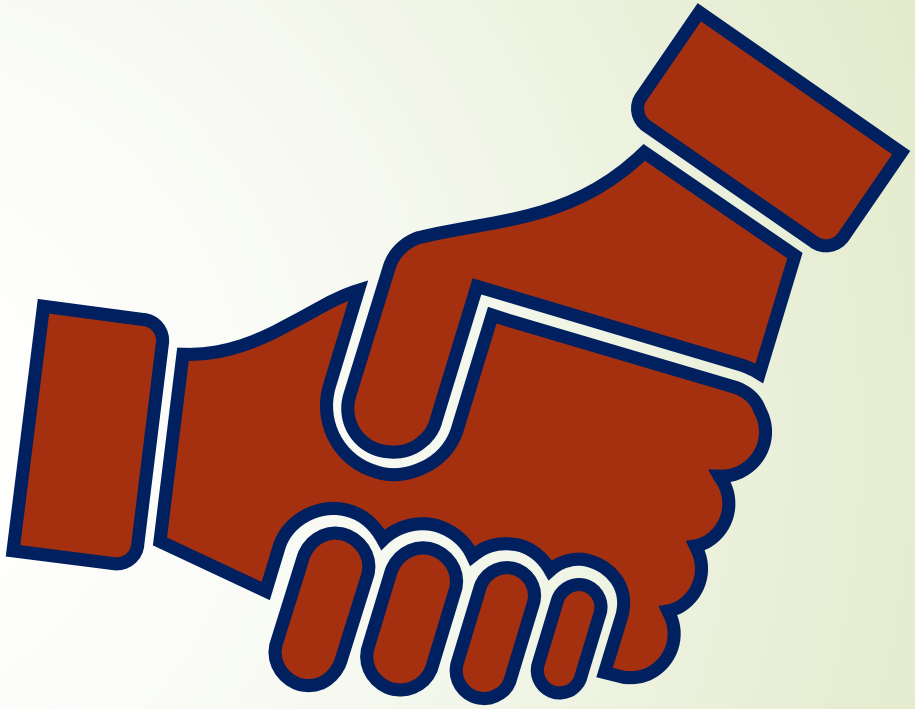
Thank you!



Email:
D.Ahiamadia@massey.ac.nz