



C3P FOOD SECURITY BRIEF NO. 7

METHODOLOGY USED IN C3P FOOD SECURITY STUDIES IN EAST AND CENTRAL AFRICA

Edgar Twine and Steffen Abele

There is a large body of literature on the various methods used in food security assessments. The methodology used in these studies follows the work of Abele *et al.* (in press).

Surveys were conducted in six countries of east and central Africa namely Uganda, Kenya, Tanzania, Burundi, Rwanda and DR Congo between July 2006 and July 2007. Study areas in each country were selected basing on the incidence of CMD and/or BXW. Districts/provinces surveyed in the different countries were as depicted in Table 1.

Table 1: Countries and districts surveyed

Country	Sample size	Districts/provinces surveyed ¹
Uganda	1,076	Mbale; Kamuli; Kayunga; Mpigi; Masaka; Rakai; Bushenyi; Mbarara; Kabarole; Kyenjojo, Tororo, Iganga, Pallisa, Kumi, Soroti, Mukono, Luwero, Masindi, Apac, Lira, Nebbi, Arua
Kenya	262	Bay; Teso; Kuria; Siaya; Rachuonyo; Homa Bay, Busia
Tanzania	320	Bukoba; Muleba; Ngara; Geita; Sengerema; Ukerewe; Tarime; Mwanza; Bunda; Musoma
Burundi	331	Cankuzo; Makamba; Muramvya; Muyinga; Kayanza; Bururi; Kirundo; Cibitoke; Rutana; Karuzi; Ngozi; Gitega; and Mwaro
Rwanda	402	Western; Eastern; North; South; Kigali city
DRC	480	Kivu; North Kivu; Katanga; Maniema

¹Including districts included as databases in previous surveys used in the food security assessment in Uganda

SAMPLING AND SAMPLE SIZE

In all countries, the study employed probability sampling procedures, specifically the systematic random sampling method. The minimum sample size per country was guided by the following formula:

$$n = \frac{N}{(1 + N(e)^2)}$$

where n = sample size of survey area, N = population size of survey area, and e = desired level of precision. We assumed a 95% confidence level and maximum degree of variability of 50% (0.5). Our desired level of precision was 10%. Thus, the resulting sample size for Uganda, Kenya, Tanzania, Burundi, Rwanda and DR Congo was 1076, 262, 320, 331, 402 and 480, respectively, hence an overall sample size of 2,871 respondents.

DATA AND DATA ANALYSIS

Primary cross-sectional data were collected through interviews using a structured questionnaire¹ (see appendix). The survey obtained quantitative and qualitative data on several variables relevant to computation of different food security indicators. These included types of foods and food groups produced and consumed and their quantities, household incomes and expenditures, respondent's perception of their food security status, months of the year in which households are food insecure, and food insecurity coping mechanisms. Since the studies also sought to investigate the relationship between the crop diseases, i.e. CMD and BXW and household food security, data were also collected on households' experience with the diseases and the effect that they have had on households' food security status. Other data collected included households' GPS coordinates, socioeconomic and demographic variables such as household size and composition by age and sex, education level of household head, land holding, labour availability, availability of and accessibility to seed/planting materials, and constraints to crop production, all of which are thought to influence household food security.

Data analytical framework used aims at measuring household food security, investigating the factors that influence it and modeling the likely impact of losses due to CMD/BXW on food security. Due to the complex and multi-dimensional nature of the concept of food security, these studies used a combination of indicators, which are broadly categorized into quantitative and qualitative indicators. These include calorie availability from own-production, calorie intake from own-production, and household dietary diversity as quantitative indicators, and households' perception of their food security status as a qualitative indicator. Calorie availability and consumption were obtained by converting quantities of foods produced and consumed in different seasons of the year into their kilocalorie equivalencies using food composition tables for use in Africa by Wu Leung (1968). Average per capita daily calorie availability and intake were then compared with the FAO/WHO recommended intake of 2,100 kcal per day. In addition, incidence of food insecurity was obtained by computing the proportion of households, in each district/province that had calorie intake less than 2,100 kcal per person per day. Percentage contribution of bananas and cassava to calorie intake was also calculated by dividing the calories consumed of either crop by total calorie intake. Whereas calorie intake simply shows the intake of a single nutrient, household dietary

¹ Questionnaire used in Burundi, Rwanda and DR Congo was translated to French. Attached questionnaire is for Kenya survey.

diversity – the number of individual foods or food groups consumed by a household over a given period – reflects the quality of a household’s diet. A list of twelve food groups including cereals, roots and tubers, vegetables, fruits, meat, eggs, fishes, pulses, milk, oils and fats, sugar and miscellaneous (coffee, tea etc) was drawn. Respondents were then asked to indicate what food groups members of their households had consumed in the previous 24 hours but only if the previous 24 hours had been a normal day. Households’ dietary diversity score variable was calculated by adding up the number of food groups consumed. The value of this variable ranges from 0 – 12. The fourth indicator – household’s perception of their food security status – was based on the food sufficiency question, which required respondents to indicate whether (i) they had enough of the foods they wanted to eat or (ii) they had enough but not always the kind of food they wanted to eat or (iii) they sometimes did not have enough food to eat or (iv) they always did not have enough food to eat.

A four-stage analytical procedure was envisaged with the first two stages implemented in SPSS, the third and fourth to be implemented in STATA and GAMS, respectively. The first stage involves computation of descriptive statistics for socioeconomic and demographic variables as well as the four indicators of food security being used in the study. The second and third stages involve generating inferential statistics from correlation and regression analysis, respectively. The fourth stage involves solving linear and/or non-linear algebraic models that would show the likely impact on household food security of losses due to CMD and BXW given households’ resource constraints.

References

- Steffen, A., E. Twine, I. Ndyetabula and J. Legg. (In press). “Household Food Security in Tanzania: An Econometric Analysis of Calorie Intake in the Lake Victoria Basin”. *Eastern Africa Journal of Rural Development* 21(2): 57-68
- Wu Leung, W.T. 1968. *Food Composition Tables for Use in Africa*. FAO, Rome, Italy and US Department of Health, Education and Welfare, Bethesda, MD, USA

APPENDIX 1: SURVEY QUESTIONNAIRE

CROP CRISIS CONTROL PROJECT (C3P): A REGIONAL RESPONSE TO CMD AND BXW IN EASTERN AND CENTRAL AFRICA

HOUSEHOLD FOOD SECURITY SURVEY 2007

International Institute of Tropical Agriculture
Catholic Relief Services

Section 1: Identification of household and study area

1.1 (a) Province----- (b) District----- (c) Division-----

(d) Location----- (e) Sub-location ----- (f) Village -----

1.2 GPS coordinates of residence: (a) Latitude ----- (b) Longitude-----

(c) Elevation (m.a.s.l.): -----

1.3 Name of interviewer -----

1.4 Date of interview (day/month/year) ----- (IDATE)

Section 2: Household characteristics

A “household” includes all members of a common decision making unit (usually within one residence) that are sharing income and other resources. Include workers or servants as members of the household only if resident at least six months in the household.

Variable	Codes/measure
A.2.1 Name of Household head	
A.2.2 Sex of Household head	<i>1=Female, 2=Male</i>
A.2.3 Education level of household head	<i>Number of years in school excluding those in repeated classes</i>
A.2.4 Age of Household head	<i>Years</i>
A.2.5 Name of respondent	
A.2.6 Sex of the respondent	<i>1=Female, 2=Male</i>
A.2.7 Relationship to household head	<i>1=head; 2=spouse, 3=father, 4=mother, 5=son, 6=daughter, 7=other (specify)</i>
A.2.8 Household size	

A 2.9 Household composition by age and sex

Age category (years)	Males	Females
<1		
1 – 6		
7 – 13		
14 – 19		
20 – 59		
>59		

B. Land holding

Conversion: 1 ha = 10,000m² = 2.471 acres

B.1.1 Total land owned (acres)	
B.1.2 Total land rented in, sharecropped in, or borrowed (acres)	
B.1.3 Total land rented out, sharecropped out, or lent out (acres)	
B.1.4 Total land under cultivation (acres)	

Section 3: Crop production, consumption and marketed surplus

A. Output of crop enterprises and cropping systems

Crop grown	Cropping system*	Total acreage under crop	Average quantity per season (long rains) (kg/other units)	Average quantity per season (short rains) (kg/other units)
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* **Cropping system:** 1=Pure stand (monocropping), 2=Two crop intercropping, 3=More than two crop mixed cropping, 4=other (specify)

B. Home consumption and marketed surplus: For all crops grown (Section 3A),

B.1 What proportion of output is consumed and marketed after the long rains (period of relatively sufficient food availability)?

Crop	Share marketed (%)	Share consumed at home (%)	Share given to others for consumption (%)	Share used to plant next season (%)

B.2 What proportion of output is consumed and marketed after the short rains (period of relatively insufficient food availability)?

Crop	Share marketed (%)	Share consumed at home (%)	Share given to others for consumption (%)	Share used to plant next season (%)

C. Seed security: For all crops grown (Section 3A),

C.1 Where do you usually get your seed/planting material from?

Crop	Sources of seed/planting material*	Percentage of seed/planting material obtained from source
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Crop 1:

Crop 2:

Crop 3:

Crop 4:

Crop 5:

Crop 6:

Crop 7:

Crop 8:

Crop 9:

**1 = Own production; 2 = Neighbors as gift; 3 = Purchase from market; 4 = Purchase from neighbors; 5 = NGO's (free-of-charge); 6 = Government (free-of-charge); 7 = Purchase from Government; 8 = Purchase from NGOs; 99 = others*

C.2. Where did you get the seed/planting material for the last season from?

Crop	Sources of seed/planting material*	Percentage of seed/planting material obtained from source
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Crop 1:

Crop 2:

Crop 3:

Crop 4:

Crop 5:

Crop 6:

Crop 7:

Crop 8:

Crop 9:

*1 = Own production; 2 = Neighbors as gift; 3 = Purchase from market; 4 = Purchase from neighbors; 5 = NGO's (free-of-charge); 6 = Government (free-of-charge); 7= Purchase from Government; 8 = Purchase from NGOs; 99 = others

Section 4: Household labor availability

- 4.1 How many household members work on farm full time? -----
- 4.2 How many household members work on farm part-time? -----
- 4.3 How many household members work off farm full-time? -----
- 4.4 Does the household hire any labor services paid for in cash or kind? -----(1 = yes, 0 = no)
- 4.5 Does the household hire any animal services? ----- (1 = yes, 0 = no)
- 4.6 Does the household hire tractor services? ----- (1 = yes, 0 = no)

Section 5: CMD, CBSD, BXW, other diseases and production constraints/risks

- 5.1.1 Have you experienced a disease called Cassava Mosaic Disease? (*Describe the symptoms to respondent*) ----- (1 = yes; 0 = no)
- 5.1.2 Have you experienced a disease called Cassava Brown Streak Disease? (*Describe the symptoms to respondent*) ----- (1 = yes; 0 = no)
- 5.1.3 Have you experienced a disease called Banana Bacterial Wilt? (*Describe the symptoms to respondent*) ----- (1 = yes; 0 = no)

If yes to any or all of the above questions, ask 5.2 - 5.7

5.2 Year first experienced disease, effect of disease on crop production and food security, source(s) of information about disease.

Disease	Year 1 st experienced	Loss in crop production before intervention (%)	Reduction in food consumption due to disease* (%)	Source(s) of information**
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CMD

CBSD

BXW

*0 = no reduction at all (0%); 1 = minimal (0-20%); 2 = moderate (21-50%); 3 = high (51-70%); 4 = very high (71-100%)

**1 = extension worker; 2 = researchers; 3 = fellow farmers; 4 = radio; 5 = Television; 6 = newspapers; 7 = NGO/CBO; 99 = other

5.3 For each of the diseases above, what solutions have you put in place?

Disease	Solutions
CMD	

CBSD

BXW

5.4 Have you shifted from consumption of cassava to other crop(s) as a result of the disease? --
----- (1 = yes, 0 = no). If yes,

5.5 What crop(s) do you eat in place of cassava? -----

5.6 Have you shifted from consumption of banana to other crop(s) as a result of the disease? ---
----- (1 = yes, 0 = no). If yes,

5.7 What crop(s) do you eat in place of banana? -----

5.8 For each of the crops (Cassava and Banana), list 5 other important production constraints/risks

Crop	Constraint/risk	Rank*
Cassava		

Banana

**1-5 where 1 = most important.....5 = least important*

Section 6: Household income and expenditure

6.1 List the 3 major sources of income for the household over the last 5 years

Income source	
Primary source	
Secondary source	
Tertiary source	

** 1 = Production and sale of crops; 2 = Sale of own-produced planting/seed material; 3 = Production and sale of livestock & livestock products; 4 = Service providers (operating boda boda, bar, hotel, photography etc); 5 = Beer brewing; 6 = Brick making/masonry/stone quarrying; 7 = Carpentry/lumbering; 8 = Crafts and arts; 9 = Shop selling mainly industrial products; 10 = Trading in agricultural commodities (crop and livestock) other than own-produced; 11 = Agricultural input trading; 12 = Salary employment by local or central government; 13 = Salary employment by NGOs or CBOs; 14 = Salary employment by private companies; 15 = Casual laborer (labor export); 16 = Pension earners; 17 = Remittance income (from relatives, friends, rental income, donations, gifts); 18 = Mining; 19 = Sale of firewood; 20 = Sale of Charcoal; 21 = Fishing; 22 = Fish mongering; 99 = Others (specify)*

6.2 How much do you earn per month from each of the sources above?

Income source	Average earnings per month (KSh)
Primary source	
Secondary source	
Tertiary source	

6.3 What other income-generating opportunities exist for your household but have not yet been exploited and why?

Unexploited income-generating opportunities*	Reason(s)
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** use codes for 6.1 above*

6.4 Household consumption expenditures

Purchased Products		Frequency purchased	Period 1=daily 2=weekly 3=monthly 4=Yearly	Average quantity purchased (kg/unit)	Price per unit (kg/unit)	Purchased products/contribution made		Frequency purchased	Period 1=daily 2=weekly 3=monthly 4=Yearly	Average quantity purchased (kg/unit)	Price per unit (kg/unit)
Staples											
Maize grain	1					Salt	26				
Maize flour	2					Cooking oil/ghee	27				
Millet	3					Coffee	28				
Sorghum	4					Tea	29				
Wheat flour	5					Beer	30				
Rice	6					Soda	31				
Cassava (Fresh)	7					Local brew	32				
Cassava (Processed)	8					Tobacco/Cigarettes	33				
Sweet Potato	9					Others	34				
Irish Potato	10										
Matooke	11					Non Food items					
Other staples (any)	12					School fees	35				
Non Staples						Text books, pens etc	36				
Pork	13					Medical care	37				
Chicken	14					Transport	38				
Beef	15					Clothing	39				
Mutton	16					Cooking/lighting fuel	40				
Goat	17					Rent	41				
Fish	18					Others	42				
Dairy products	19					Contributions					
Beans	20					Saving schemes	43				
G. nuts	21					Remittances to relatives	44				
Cow peas	22					Church/Mosque	45				
Vegetable (any)	23					Credit repayments	46				
Fruits (any)	24					Mutual support groups	47				
Non Fresh Food items											
Sugar	25										

Section 7: Household food security status

7.1. What is the major source of food for the household? (*Tick only one*)

Source

- Own production
- Market purchase
- Inter-household transfers
- Relatives
- Exchange of labor for food
- Lending land in exchange for food

7.2 What are your major food security crops grown and why?

Major food security crop **Reason(s)**

7.3 Household dietary diversity: *Use the previous 24 hours as the reference period. First determine whether the previous 24-hour period was “usual” or “normal” for the household. If it was a feast or funeral or if over half of the household members were absent, skip this question. Include only food groups consumed by household members in the home or prepared in the home for consumption by household members outside the home.*

What types of foods did you or anyone else in your household eat yesterday during the day and at night?

Food group

Coding category*

- Cereals (e.g. foods made from millet, maize, sorghum, rice, wheat)
- Roots and tubers (e.g. potatoes, yams, cassava)
- Vegetables
- Fruits (including bananas)
- Meat (e.g. beef, goat, poultry, wild game)
- Eggs
- Fish
- Pulses, legumes, nuts (e.g. beans, peas, ground nuts)
- Milk and milk products
- Oil/fats
- Sugar/honey
- Miscellaneous (e.g. coffee, tea)

*1 = if anyone in the household ate the food in question; 0 = otherwise

7.4 Which of the following statements best describes the food eaten in your household? (*Tick only one*)

- (i) Enough of the kinds of food we want to eat -----
- (ii) Enough but not always the kind of food we want to eat -----
- (iii) Sometimes not enough to eat -----
- (iv) Often not enough to eat -----

7.5 If (ii)-(iv) above,

