

Mali Agriculture-Nutrition Linkages Project

A. List of research instruments by type of activity and frequency of interviews

1. Quantitative survey –Sample of 750 households (See sampling notes).
 - a. Monthly interviews
 - i. Interview with household head
 1. Household Demographics
 - ii. Interview with mothers of every child in sample households between the ages of 0-4 years at beginning of survey
 1. Anthropometrics
 2. Illness
 - iii. Interview with household members responsible for determining daily food rations
 1. Weighing local measurement units
 - iv. Bi-Monthly price surveys at markets serving sample households
 1. Local market measurement units
 2. Prices
 - b. Weekly interviews
 - i. Interviews with all adult household members receiving income, making expenditures and transacting agricultural/animal products
 1. Income/expenditure
 2. Agricultural/animal transactions
 - ii. Interview with household members who operate store
 1. Income/expenditure data
 - iii. Interview with household members responsible for management of agricultural production activities
 1. Agricultural costs of production
 2. Agricultural harvest
 - c. One shot questionnaires conducted at beginning of survey
 - i. Cereal stocks – household member level
 - ii. Household assets – household head
 - iii. Household activities and responsibilities – household member
 - iv. Household field measurements – household members
 - d. Additional one shot questionnaires to be implemented
 - i. Adult weight/height measurements
 - ii. Health/nutrition opinion and practices surveys
 - iii. Mother's background/assets prior to marriage

2. Qualitative case study on subsample of households to study child feeding and care practices, mother's time allocation and food weighing
3. Community questionnaires to be implemented in villages and districts where sample households are located
 - a. Traditional village head
 - i. Village social services infrastructure
 - ii. Ministry and NGO health and nutrition activities
 - iii. Village demographics
 - b. Farmer village associations
 - i. Association finances, activities
 - c. Community health center staff
 - i. Health center finances, activities
 - d. Commune mayor and communal representatives
 - i. Commune finances and activities
 - e. Male and female focus groups
 - i. Discuss findings, actions

B. Overview of Sampling

The Agriculture-Nutrition Linkages Project, in collaboration with the Nutrition Monitoring Policy Unit (DSSAN) in the Ministry of Health, the Institute of the Sahel (INSAH), the Planning and Statistics Unit of the Ministry of Health (CPS/MS), the National Public Health Research Institute (INRSP), the National Statistical Office (DNSI) and the Rural Economic Institute (IER), financed by the USAID mission in Mali (USAID/Mali/SEG), is undertaking a household study to better understand how policies and interventions related to rural and agricultural development can improve child health and nutritional outcomes. This document outlines the sampling procedure undertaken for this study. Other information detailing the project can be located on the Food Security web site: http://www.aec.msu.edu/agecon/fs2/mali_nut/index.htm.

Findings from the initial analysis of existing data (phase I) from earlier Demographic and Health Surveys in Mali (1987 and 1995), a Budget-Consumption Study (1989) and a World Bank Socio-Economic Study (1994) were presented to the Ad Hoc Committee on Nutrition, a multi-disciplinary group comprised of representatives from various governmental ministries and donor organizations (see Tefft et al. 2000). (The report containing these findings is also accessible at the above website). From these findings, the group selected several themes of research to be conducted during the second phase of the project. The group identified three regions in Mali where the study would be conducted. Furthermore, to the extent that the study would benefit from information gathered by the up-coming Demographic and Health Survey (2001), the Agriculture-Nutrition Linkages project would select a sub-sample of households wherever possible.

The 6 Sub-Regions (Cercles)

The primary goal of the project is to examine possible synergies between agricultural development and improved child health; consequently, a primary criterion for selecting different regions was agricultural productivity within the zone. The three regions identified by the Committee were Sikasso, Segou and Mopti. Sikasso is both the largest coarse grain and cotton production zone in Mali. Segou is home to the Office du Niger, the major irrigated rice production scheme. Mopti engages in more traditional agricultural production of millet, but is also a major center of onion production and also has a wide range of non-farm activities that may serve as a useful comparison to agricultural production.

Within each of the three regions, two sub-regions (administrative units termed “cercles” in French) were chosen for study: Kolondieba and Koutiala in Sikasso; Macina and Niono in Segou; and, Bandiagara and Koro in Mopti. Kolondieba is more isolated than Koutiala, and in many ways Koutiala is an older, more advanced cotton-producing area. Niono is in the heart of the irrigated rice area, while many of the villages in the cercle of Macina lie on the perimeter of this zone. Bandiagara is located in the Dogon escarpment where land is a major constraint; Koro, part of the plateau towards Burkina Faso, has much more available land, but faces the environmental constraints of increasing desertification.

Villages within the 6 Sub-Regions (Cercles)

The Demographic and Health Survey 20001 randomly selected enumeration areas (section d'enumeration, or "SE") from each cercle (sub-region). Each SE contains one and usually more villages, and is designed to have similar levels of population and, consequently, each person will have an equal probability of being selected. These selection probabilities can then be adjusted later, if necessary.

The Agriculture-Nutrition Linkages Study then randomly selected five SEs from each cercle. In the case of the cercle Niono, there were only five SEs, so all were selected. For the remaining sub-regions, five out of seven SEs were selected in Kolondieba, five out of six in Koutiala, five out of seven in Macina, five out of eight in Bandiagara and five out of six in Koro.

Selecting a Household – the DHS 2001 Study

For each SE, a census was taken of all the households and a map was drawn. The households were selected randomly from the list. More precisely, concessions, usually starting with the village chief, were numbered in a consecutive pattern on the map. The census then identified the number of households within each concession. The definition of household employed by the DHS is a husband, his spouse(s) and all their unmarried children¹. Thus, within each concession there were generally multiple households. An interval was selected at random and a starting point on the list of households. For example, "3" may be chosen as the first household (perhaps residing in concession #1) and the interval "3.6" was also selected. Numbers were rounded off, and the next household interviewed would be #7. In general, 40 households were selected; however, in some instances either the interval was too large or the village too small to permit the selection of 40 households.

Selecting a Household – Agriculture-Nutrition Linkages Study

For each SE, a census was taken of all the households and a map was drawn. Only households with children under four were included for sampling. Four years of age is necessary for analytical purposes so that following one year of study all children in the sample are still under five years of age, corresponding to the World Health Organization's statement that genetic differences in height across healthy, well-nourished populations only account for one cm. of variation among five year-old children (WHO 1995). Twenty-five households were selected per enumeration unit (SE), where possible; in three cases, the DHS study selected less than 25 households (after removing duplicates in the same concession). In these villages, all the households were retained: 21 in Touni; 23 in Kendie; and, 23 in Diaweli. A complete list of the villages selected and the number of households sampled from the DHS is presented in table 1.

¹ The definition of a "household" employed by the Agriculture-Nutrition Linkages Study is different; this is discussed in the following section.

Where possible, the census of the villages conducted by the Agriculture-Nutrition Linkages survey team, using the random interval selected by the DHS team, continued to survey additional households. This was possible in either large villages or when the random interval selected was small. Consequently, in two villages where there were an insufficient number of concessions, the Agriculture-Nutrition sample retained all of the DHS concessions and was able to randomly select additional households to complete the selection of 25 households. In an additional two villages, the DHS team had not performed a census due to inundation; consequently, the Agriculture-Nutrition sample is randomly drawn from the list of households gathered during the census visit. Please see table 1 for more detail.

The definition of “household” employed by the Agriculture-Nutrition Linkages project is that of a work-eat group. More specifically, the study defines the household as all the members engaged in common production and consumption. Thus, the fruits of their labor are pooled to supply at least some of the food consumed by the household. According to this definition, there may be more than one “DHS household” in a work-eat group. In practice, the work-eat definition corresponds much more closely to that of a concession, although not in every case. If, using the DHS definition, two households from the same concession were selected for the study, then the Agriculture-Nutrition Linkages sample dropped one of the two households. Because the size of the household had not been conclusively determined, selection probabilities were not weighted by household size. However, during the course of the survey this information can be obtained and the results weighted accordingly, if necessary.

Sampling Procedure

Samples were selected randomly using SPSS version 10.0. First, the five villages were selected from each cercle. Then, 25 households in each village were selected randomly. Both routines used the “random seed” command to generate these samples. Examples of the syntax files are presented below.

Selecting the Villages in a Cercle (Kolondieba):

```
SET SEED = RANDOM .  
SELECT IF (CERCLE = 34) .  
SAMPLE 5 FROM 7 .  
EXECUTE .
```

Selecting the Households in a Village (Bogodougou, Missala):

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SET SEED = RANDOM .  
SELECT IF (GRAPPE = 141) .  
SAMPLE 25 FROM 34 .  
EXECUTE .
```

Table 1: Villages and Number of Households Selected from the DHS 2001

<u>Region</u>	<u>Cercle</u>	<u>Cluster #</u>	<u>Village</u>	<u># of HHs Ag-Nut.</u>	<u># of HHs DHS 2001</u>		
Sikasso	Kolondieba	141	Bogodougou, Missala	25	34		
		143	Zantoumana, Garako hameau de Farako	25	44		
		144*	Kadiana I et II	0/25	0/47		
		145*	Wobilen	0/25	0/52		
		147	Bafaga	25	39		
		142	<i>Falani, Katiola</i>	<i>Not Selected</i>			
		146	<i>Tountourala</i>	<i>Not Selected</i>			
	Koutiala	150	N'Golokouna	25	25		
		151	Nianabougou	25	25		
		152*	Nizanso	16/9	16/67		
		154	N'Gania, N'Tobogou	25	47		
		155	N'Golobabougou	25	39		
		153	<i>N'Tosso</i>	<i>Not Selected</i>			
		Segou	Macina	198*	Touara	20/5	20/27
				200	Massadougou, Segou-Coura	25	46
202	Nenena			25	30		
203	Ouadie			25	32		
204	Tienglola, Kien-Koury			25	35		
199	<i>Niarro</i>			<i>Not Selected</i>			
Niono	208		Kouyan-Ngolabala	25	34		
	209		Niessoumana ou N6	25	34		
	210		Bougouni ou N16	25	32		
	211		Godji, Daouna	25	33		
	212		Sing-Rangabe	25	35		
	Mopti		Bandiagara	238	Boro	25	43
241		Kendie		23	23		
242		Somoci		25	26		
243		Ouakarana		25	40		
244		Touni		21	21		
239		<i>Goundaka</i>		<i>Not Selected</i>			
240		<i>Bombori-Ouro, Dani-Ouro, Abdoul Kari</i>		<i>Not Selected</i>			
245		<i>Kound-Guina</i>		<i>Not Selected</i>			
Koro		271	Ene	25	36		
		272	Daga	25	32		
		273	Diessere	25	25		
		274	Diaweli, Oya	23	23		
		276	Domonosogou	25	46		
		275	<i>Wol Anakana</i>	<i>Not Selected</i>			

*An insufficient number of households were pre-selected by the DHS 2001; all households identified by the DHS are selected (identified by the first numbers in each of the two columns. The second number in the Ag-Nut column indicates the number of households needed to increase the sample in the village to 25 households; the second number in the DHS column indicates the number of additional households interviewed during the census.