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# THE CHARACTERISTICS AND DETERMINANTS OF FOOD CONSUMPTION OF POOR HOUSEHOLDS IN URBAN MALI

Volume I: Text

A thesis

Presented to the Faculty

of

The Fletcher School of Law and Diplomacy

by

MELANEE LYNN LOWDERMILK

In partial fulfillment of the requirements for the
Degree of Doctor of Philosophy

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# MELANEE LOWDERMILK

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Sahel Food Security Coordinator. Provide analytical assistance on Sahel food security issues and trends to A.I.D.'s Africa Bureau, USAID field Missions, Sahelian governments, and regional organizations (Club du Sahel/CILSS).

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Consultant. Conducted food needs assessments and training in African countries. Responsibilities included: (i) undertaking assessments of the food supply and utilization situation -- magnitude and commodity composition of the national food deficit/surplus; and (ii) training of USAID and host government personnel in the Food Needs Assessment Methodology and Template/Software. Assessments conducted in Guinea, Madagascar, Mauritania, Rwanda, Tanzania, and Zaire. Additional training conducted in Cote d'Ivoire, Kenya, and Rome, Italy (WFP).

**TUFTS UNIVERSITY/USAID** — **BAMAKO, MALI**

July 1986 - November 1988

Project Field Director, Food Price Policy and Consumption Research Project. Set up offices in the Ministere du Plan: hired and trained Malienne staff in field work, coding, data entry, and analysis using microcomputers. Analyzed data, wrote report, and presented findings to host government, donor, and A.I.D. officials. Utilizing expenditure data collected by the direction Nationale de la Statistique, the project collected and analyzed supplementary quantity data on principal food items to empirically determine the effects of food policies on consumption in urban areas.

| | | |
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| February 1986 - May 1986 | Research Assistant, The Special Office for African Affairs. Researched and wrote a paper on Aid Coordination and Long-term Agricultural Development Strategies using Ghana and Cote d'Ivoire as case studies. Specific issues addressed included Aid Coordination at the Sectoral Level, Food Aid, and Agricultural Research. | |
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| **Publications** | Beatrice Lorge Rogers and Melanee L. Lowdermilk. Food Prices and Food Consumption in Urban Mali. Final Report of the Tufts/DNSI/AID Food Price Project. Tufts University School of Nutrition, Medford, MA. October, 1988. | |
| | West Africa Bibliography: Chad, The Gambia, Mauritania, and Senegal, with an Overview of the Literature, WA2DB Working Papers/Reports. (West Africa Country Programs II, Division 2B, The World Bank, Washington, DC ), March, 1986. | |
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## ABSTRACT

Seventy-six percent of poor households are calorie deficient in urban Mali. This research identifies characteristics of the poor population and of their behavior (price and income responsiveness) to inform the design of interventions to increase their calorie consumption. The methods of analysis were a descriptive assessment of consumption, demographic, and employment characteristics of poor households, and an econometric analysis of the determinants of food consumption.

Consumption patterns of poor and wealthy households are strikingly similar. Caloric deficiency is concentrated in the lower 5 per capita expenditure deciles. As expenditure rises the proportion of calories from food groups remains stable, while calorie consumption levels rise dramatically. There is no inferior food. The multivariate analysis shows a higher responsiveness of the poor than the wealthy to changes in expenditure. Regression results indicate substitutability between rice and coarse grains for poor households: when millet/sorghum prices increase, rice substitutes for coarse grains. A symmetrical relationship was not observed for increases in rice prices. Home production of food has a positive impact on consumption. The analysis of demographic/employment characteristics shows: (i) Poor households have more children than wealthy households, (ii) Employment structure

across households is similar, (iii) Low levels of education are concentrated among the poor.

Long-term economic growth is a necessary, but insufficient condition for poverty reduction. Additional interventions are needed to ensure that the benefits of growth reach and enhance the consumption possibilities of the poor.

Based on this research, several interventions are available to increase calorie consumption by the poor. First, the high income responsiveness of the poor suggests that income generating activities would improve their access to food. Income transfers, although effective, would be prohibitively costly. The lack of an inferior food indicates that it will be difficult to efficiently target sub-groups within the population through price policy. Second, increasing home production of staple foods may augment consumption in certain cities. Third, there is a role for modern family planning practices. Fourth, increasing the access of the poor to education may provide the long-term basis for improved levels of income and hence food consumption.

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# INTRODUCTION

## 1. Scope of the Problem

This dissertation examines the relationship between poverty and food consumption in urban Mali. The analysis identifies the characteristics of poor households and estimates the determinants of their food consumption. The purpose of this research is to assist policymakers in designing interventions that can alleviate the worst conditions of poverty, most importantly, inadequate food consumption. An understanding of who the poor are, where they are located, what they eat, and how they respond to changes in income and prices is a critical input for this task. Moreover, information on household characteristic is essential to understanding the employment and income earning possibilities of the poor, and hence their access to food.

Mali is one of the poorest countries in Sub-Saharan Africa with a GNP per capita of $150 in 1985.[1] Poverty is pervasive, with inadequate access to food -- due principally to lack of purchasing power -- just one manifestation of the problems of underdevelopment. It is clear that a substantial portion of the urban population in Mali is poor by almost any definition. Low income households lack access to a basic set of

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[1]World Bank, World Development Report 1987 (Washington, D.C. World Bank, 1987), 232.

entitlements that include adequate food, shelter, employment, and education. It is clear from empirical research that the incidence and depth of caloric inadequacy is a striking feature of urban households: limited purchasing power restricts the ability of households to acquire or maintain an adequate diet.[2] Given the chronic nature of dietary inadequacy in urban Mali, this study will: (i) identify the characteristics of the urban poor of Mali; (ii) estimate the determinants of their food consumption; (iii) review food policy reform measures in Mali aimed at increasing equity and long-term growth (1981-1987); and (iv) examine policy options to augment the food consumption of the urban poor.

This doctoral research was undertaken in the context of cereal market reform in Mali. The initial research problem was one of determining the negative impact of price policy reform on the calorie consumption of the urban poor and how to address that impact. It was expected that reform would result in increased consumer prices, thus reducing the purchasing power of poor households. In practice, however, this issue was obscured in Mali. During the reform process good rains returned, improving the real incomes and calorie consumption of the poor. The prices of staple cereals fell over the year of this research (1985/86), and altered the circumstances of the study and the initial research problem. The focus on the food consumption possibilities of poor households, however, remains justified. Irrespective of the reform

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[2]Beatrice Lorge Rogers and Melanee L. Lowdermilk, Food Prices and Food Consumption in Urban Mali, Final Report of the Tufts/DNSI/AID Food Price Project (Medford, Mass.: Tufts University School of Nutrition, 1988)

process, calorie deficiency is a serious and chronic problem facing low-income households in urban Mali.

The focus on poor households is therefore motivated by seeking to understand and address a primary characteristic of poverty -- inadequate food consumption. Achieving minimum standards of food intake is now recognized as a desirable social objective in itself.[3] In addition, theories of human capital formation look at sufficient food intake and nutrition as contributing to the health, efficiency, and productivity of individuals over time.[4] If dietary inadequacy is severe and widespread, the consequence may be a long-term decline in the economy's potential for growth and human capital formation.

## 2. Conceptual Framework

This research first examines the food consumption and household characteristics associated with low levels of income. It then looks at how changes in income and food prices influence food expenditure and consumption at the household level. Other independent variables in the analysis include: household size, ratio of adult equivalent units to household members. education, region, season, and home production of

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[3]James E. Austin, Confronting Urban Malnutrition: The Design of Nutrition Programs, World Bank Staff Occasional Papers, no. 28 (Baltimore: Johns Hopkins University Press for the World Bank, 1980); and Shlomo Reutlinger and Marcelo Selowsky, Malnutrition and Poverty: Magnitude and Policy Options, World Bank Staff Occasional Papers, no. 23 (Baltimore: Johns Hopkins University Press for the World Bank, 1976).

[4]Alan Berg, Malnutrition: What Can Be Done? (Baltimore: Johns Hopkins University Press, 1987); and African Development Bank, United Nations Development Programme, and World Bank, The Social Dimensions of Adjustment in Africa: A Policy Agenda (Washington, D.C.: World Bank, 1990).

food. Figure 1 presents the conceptual framework for the analysis of the determinants of consumption. Nutritional status, although included in the diagram, is outside the scope of this research due to data limitations. A study of the nutritional status of household members would have been a logical add-on to this broader survey of food intak and expenditure at the household level. The dotted arrow in Figure 1 indicates that further research should be undertaken to assess the link between household food consumption and nutritional status of household members.

Previous analysis of the consumption data used in this dissertation shows that over half of the survey households suffer from inadequate calorie consumption.[5] In the urban context there is clearly a large group at nutritional risk. Given the chronic problem of dietary inadequacy, the issue of concern is to ascertain how the consumption of the poor in Mali responds to changes in key policy variables -- prices, income, education, and employment. With this information, interventions can then be designed to increase the food consumption of poor households.

## 3. Methodology

This research utilizes household expenditure data collected by the Malian government with financing from the World Bank (1985-1986), and standardized quantity data collected by the Tufts School of Nutrition (1986-1987) with financing from the U.S. Agency for International Development (USAID). The original household budget survey of 576

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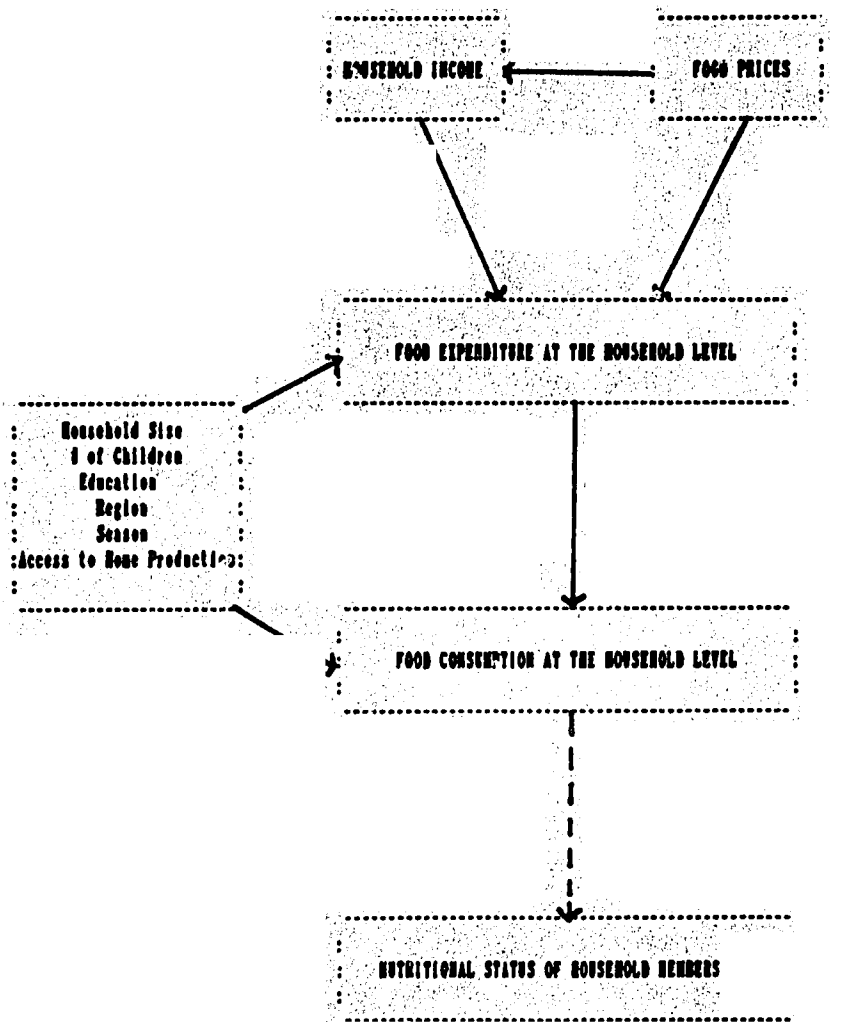
[5]Rogers and Lowdermilk, 20-21.

FIGURE 1:

CONCEPTUAL FRAMEWORK: DETERMINANTS OF CONSUMPTION



households was designed to construct weights for a consumer price index. It was conducted in the national capital city of Bamako and the seven regional capitals. Additional field work was undertaken to collect quantity data in order to standardize the local measures of food purchases.

The empirical work of this dissertation employed two methods of analysis: a descriptive assessment of the characteristics of low income households and an econometric analysis of the determinants of food consumption. To determine the responsiveness of the poor to changes in prices and incomes, elasticities of demand for key foods were estimated using Ordinary Least Squares (OLS) regression analysis. The elasticities of demand for a given food quantify how a percentage change in price or income affects the consumption of that food. The regression parameters were estimated using two specifications of the demand function: (i) double log, and (ii) double log quadratic with price-expenditure interaction terms. In the estimation of demand functions for disaggregated food commodities, a large proportion of non-consumers of the commodity being modelled results in biased estimates of the OLS coefficients. The Heckman two-stage procedure was used to correct for the bias introduced from instances of non-consumption.[6] (See Chapter 7, Section 2.2.1, for a complete discussion of the Heckman procedure)

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[6]James J. Heckman, "The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimation for Such Models," Annals of Economics and Social Measurement, 5 (Fall 1976).

## 4. Research Questions

Since the 1983/84-84/85 drought in Mali there has been an increasing interest of both the government and donors in nutrition surveillance and rehabilitation. Little quantified information, however, exists on food consumption in Mali. To date, studies of food consumption and nutrition have mainly focused on project-specific activities limited in time and geographic distribution. This dissertation, in contrast, uses data from a nation-wide survey of eight urban centers. In addition, the survey covers a period of one year a sufficient length of time to capture seasonal variations in food consumption The findings of this study will fill a gap in the current research: this is the first food consumption/expenditure survey of its kind to be conducted in Mali. Although data limitations exist, this dissertation aims to provide policy-makers with an understanding of the impact of changes in price, income, family size, employment, and education on the welfare of the urban poor in Mali

In examining the relationship between urban poverty and food consumption several questions need to be addressed. These questions include:

i) Who are the poor and what are their consumption and production characteristics, (by region, season and expenditure class)?

- -- household and per capita income levels
- -- expenditure patterns
- -- food consumption/expenditure patterns
- -- nature and magnitude of the 'consumption gap (calorie deficits per adult equivalent)
- -- occupation: sectors of activity and status within sectors.
- -- household structure: size, composition, female-headed households.
- -- education levels

-- assets: consumer durable goods, livestock, housing.

ii) Are there significant differences among the urban poor? Do household composition and socio-economic characteristics differ within the group defined as poor?

-- what are those differences, and how are they distributed among households?

iii) How are calorie deficits distributed between poor and wealthy households and across regions?

iv) What are poor urban households' apparent coping strategies to improve their economic situation?

-- multiple sources of income
-- number of children
-- structure of employment
-- high responsiveness to changes in prices and incomes.

v) How do changes in key variables affect the poor with respect to food consumption and caloric intake?

-- income
-- prices of principal foods: rice, millet/sorghum, peanut-butter, and beef
-- education
-- region
-- season
-- household characteristics

vi) What policy recommendations can be made to increase the calorie consumption of the poor?

## 5. Hypotheses to be Tested

These research questions generate three main sets of hypotheses addressed in this dissertation. The first set relates to the consumption characteristics of poor households (hypotheses (i) and (ii) examined in Chapter 5). The second set seeks to identify the characteristics -- family size and composition, employment, and education -- associated with low-income (hypotheses (iii) - (ix) discussed in Chapter 6). These hypotheses draw upon a number of

empirical studies[7] as well as observation in the field, and are formulated to determine if there are possible interventions to address the weak purchasing power of poor households, and hence their limited access to food. The third set relate to the price and income responsiveness of the food consumption of poor households, (hypotheses (x) and (xi) examined in Chapter 7). The theory and empirical findings that lie behind these hypotheses are reviewed in the Literature Review (Chapter 2).

The hypotheses to be tested are:

i) Rice is a luxury good consumed primarily by the wealthy; therefore policies that act to change the price of rice will have little effect on poor urban consumers.

ii) Millet and sorghum are inferior goods consumed primarily by the poor. Thus, these coarse grains would be good candidates for subsidies aimed at increasing the calorie intake of the poor.

iii) As per capita income declines dependency ratios increase.

iv) Poor households have a greater number of women working outside the home than wealthy households as adult family members attempt to lessen the squeeze of limited purchasing power.

v) A greater proportion of the poor than the wealthy engage in secondary sectors of activity, that is, work at more than one job or activity, as a coping strategy to improve their economic situation.

[7]Paul Glewwe and Oussama Kanaan, Targeting Assistance to the Poor Using Household Survey Data, Policy, Planning, and Research Working Paper, WPS 225 (Washington, D.C.: World Bank, Population and Human Resources Department, 1989); Michael Lipton, The Poor and the Poorest: Some Interim Findings, World Bank Discussion Papers, no. 25 (Washington, D.C.: World Bank, 1988); Pravin Visaria, Incidence of Poverty and the Characteristics of the Poor in Peninsular Malaysia, 1973, World Bank Staff Working Paper, no. 460 (Washington, D.C.: World Bank, 1981); and World Bank, World Development Report 1990 (New York: Oxford University Press, 1990).

vi) The urban poor are primarily involved in work in the informal sector, and thus have limited income earning possibilities.

vii) Unemployment is concentrated in the poorest groups in society.

viii) The poor are subject to greater variability in employment over the year than the non-poor.

ix) Education is positively associated with household income. Wealthy households have higher levels of education, giving them access to better jobs and income earning opportunities.

x) For staple foods the poor exhibit a higher responsiveness than the wealthy to changes in income and prices. If the poor are more responsive, then targeted interventions that reduce food prices or increase incomes would serve to increase the food consumption of the poor proportionately more than the rest of the population.

xi) Substitution exists between rice and coarse grains for poor households: an increase in rice prices will result in poor consumers substituting to coarse grains as a cheaper source of calories.

In 1985/86, policy-makers in Mali formulated hypotheses (i) and (ii) as a basis for predicting consumption patterns of urban households in Mali given increases in the price of rice brought about by policy reform. Analysis of the data, however, rejected these hypotheses, suggesting that increases in the price of rice would <u>adversely</u> affect the welfare of the urban poor. Specifically, the findings of the Tufts/DNSI/USAID project indicate that rice is not a luxury good, as both rich and poor allocate approximately half of their cereal budgets to rice.[8] Interestingly, coarse grains are likewise consumed by all expenditure classes, and together with rice form the staples of the Malian diet. The substitutability between rice and coarse grains was also not seen for the sample population as a whole: the present

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[8]Rogers and Lowdermilk.

analysis will show that substitutability does exist for low income households.

## 6. Organization of the Dissertation

This dissertation is organized as follows. Chapter 1 outlines the scope of the problem, research questions/hypotheses to be tested, and the methodology. A review of the literature is undertaken in Chapter 2. Chapter 3 presents a description of policy reform and political economy issues in Mali, thus providing the historical background to this study. A detailed review of the methodology -- survey design, implementation, data processing -- is presented in Chapter 4. Subsequent chapters focus on the determinants of food consumption of the poor. A descriptive assessment of the consumption and production characteristics of low income households is presented in Chapters 5 and 6 respectively. For comparative purposes, the characteristics of relatively wealthy households and the sample as a whole are also examined. Chapter 7 focuses on an econometric analysis of the determinants of food consumption of the poor. Chapter 8 then summarizes the findings of the descriptive and econometric analyses, and identifies policy options to augment the calorie consumption of the urban poor.

# CHAPTER 2

# REVIEW OF THE LITERATURE

## 1. Introduction

Until recently, there were few empirical studies examining the effects of food policies on the food consumption of the poor, particularly in Africa. A scarcity of data at the household level limited many studies to looking at consumption on an aggregate basis. These studies, while contributing information to assessing food production and import needs, provided little guidance to decision-makers interested in the equity effects of policy. In recent years, however, the focus of consumption analysis has shifted. Using the household as the unit of analysis, patterns and determinants of food consumption disaggregated by income class have revealed clear differences between the rich and the poor. Previous analysis of consumption data used in this dissertation showed that over half of the survey households -- those in the lowest 5 per capita expenditure deciles -- suffer from inadequate calorie consumption.[9] The link between poverty and hunger is clear; the mechanisms by which policies can augment incomes and increase the access of the poor to food are far less so, and form the basis for much of the food consumption research.

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[9]Ibid., 10.

In the literature, two principal themes appear to be driving the research agenda:

> the relationship between agricultural (supply-side) policies and the food consumption possibilities of different groups in the society, and
>
> food security, (adequate access to food, either through production or purchases. to maintain an 'active and healthy life').[10]

The first research agenda -- the impact of producer incentive policies on food consumption -- is a direct response to the major changes in the policy environment which are occurring in many developing countries. Policy reform has centered on the disengagement of the state from economic activities, thus allowing the market to determine prices and allocate resources. Policymakers need to have a detailed understanding of the distributional implications of price liberalization if they are to take the political risk of economic reform programs. From this perspective, it becomes particularly important to consider the impact of food policy reform on urban consumption patterns. It is in the major cities that the majority of the political risks are located. As a consequence, reform-minded politicians need to understand both the likely urban welfare implications of price liberalization and the most efficient mechanisms for minimizing the accompanying social costs.

As experience mounts in this area, it is clear that policy-makers in Africa will have a long-term requirement for this type of knowledge and support. Although there have been static improvements in the allocation of agricultural resources, the dynamic benefits of price

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[10]World Bank, Poverty and Hunger: Issues and Options for Food Security in Developing Countries (Washington, D.C.: World Bank, 1986) 1.

liberalization may take more time to appear than had been originally anticipated.

The second body of research -- that dealing with food security tries to identify the major economic factors which generate malnutrition in different societies. Much of the research in this area is an attempt to understand the seeming paradox of poverty and malnutrition coexisting with affluence and over-consumption. Why is it that, even in societies with large aggregate food surpluses and high per capita incomes, there are significant elements in the population who do not have enough to eat? And how can we explain in a society such as Mali the evidence of "adequate" levels of per capita food availability (by FAO/WHO standards) and the existence of widespread malnutrition? The food security literature, in moving beyond the somewhat simplistic slogan of food self-sufficiency, examines how the distribution of income and endowments influences access to food.

For simplicity of exposition, this review breaks the literature into four main issue areas:

(i) Food Consumption Analysis,
(ii) Structural Adjustment: Welfare Effects on the Poor,
(iii) Poverty Alleviation: Targeting the Poor, and
(iv) Food Security.

Section (i) introduces the analytical techniques used to interpret the Malian survey data. The consequences of price liberalization for urban consumers, particularly the poor, is examined in Section (ii). Section (iii) then reviews ways to identify and target the poor. while Section (iv) looks at the broad theme of food security

## 2. Food Consumption Analysis

Consumption analysis focuses on identifying the patterns and determinants of food consumption to understand better how changes in price policy affect different groups in society. Disaggregation by income class highlights the differences in consumption between the poor and the better-off groups in society. In Food Policy Analysis, Peter Timmer and co-authors advocate this disaggregated approach to food consumption analysis. He states that "the disaggregated consumption understanding is needed to trace the effects of various price and income policies on the food intake of the poor."[11]

Studies of food consumption utilize two complementary methods of analysis to understand food intake patterns of different groups in society. The first involves a descriptive view of the patterns of food consumption, identifying what the poor eat across seasons, regions, and income groups. Using econometric techniques, the second method focuses on the determinants of consumption, estimating how staple food intake changes as key policy variables -- prices and incomes -- change. The poor in developing countries spend large proportions of their incomes on food. Thus, even small changes in prices and incomes can have a dramatic effect on the dietary intake of vulnerable groups. For the poor, the high responsiveness of food intake to changes in prices and income has been confirmed in several consumption studies, some of which are cited in Section 2.6 below.

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[11]C. Peter Timmer, Walter P. Falcon, and Scott R. Pearson, Food Policy Analysis (Baltimore: Johns Hopkins University Press for the World Bank, 1983), 61.

Several general patterns emerge from analyses of food consumption in low-income developing countries. First and foremost, caloric inadequacy is concentrated among the poor. Secondly, food expenditures represent a large portion of the household budget, particularly for the poor. Thirdly, limited diversity of the diet characterizes the food consumption of those at the low end of the income distribution. Starchy staples (cereals and tubers) emerge as the dominant sources of both calories and protein. Lastly, as income rises dietary quality increases as wealthy households diversify their diets to include higher priced calories. A number of theories have been instrumental in laying the groundwork for consumption analysis and will be discussed below.

## 2.1 Engel's Law

In formalizing the link between income and food expenditure, Engel's law states that the share of expenditure allocated to food fal as income rises. Although the quality and the quantity of food purchases rise with income, a smaller proportion of total income is spent on food. This relationship is widely, if not universally, accepted in the literature. A recent review of the characteristics of the poor however, suggests that Engel's Law does not hold for the poorest 5-15% of the population in low-income countries.[12] For the extremely or 'ultra' poor, the proportion of income spent on food may remain stable or even increase as income rises. Thus, at very low levels of income non-linearity or even a reversal of the direction of change may characterize the Engel curve.

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[12]Lipton, The Poor and the Poorest, 13.

## 2.2 Bennett's Law

Consumer theory likewise predicts the relationship between income and calories derived from starchy staples such as cereals and tubers (cassava, potatoes, yams). Bennett's law states that as income rises the proportion of calories consumed from starchy staples -- the starchy staples ratio -- falls.[13] Empirical studies generally support this relationship showing that as incomes rise individuals diversify their diets to include higher priced calories. Again, there is evidence that the consumption behavior of very poor households may not conform to the predicted relationship. Michael Lipton notes that the ultra-poor "do not significantly diversify their foods as income rises. They tend to maintain the ratio of cereals and roots to both total calories and food outlays."[14] Increasing the quantity rather than the quality of the diet arises as the primary concern of very poor households, and continues until about 80 - 90% of caloric adequacy is reached.[15]

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[13]Timmer, Falcon, and Pearson, 56.

[14]Michael Lipton, Poverty, Undernutrition, and Hunger, World Bank Staff Working Papers, no. 597 (Washington, D.C.: World Bank, 1983), 40; and Lipton, The Poor and the Poorest, 13.

[15]Lipton, Poverty, Undernutrition, and Hunger, 36; Eileen Kennedy "Household Food Security: Kenya Case Study," Presentation at the International Nutrition Network Exchange Conference on Empowering Families to Achieve Household Food Security, Washington, D.C. at the U.S. Agency for International Development, 7 May 1991); and Professor Beatrice Rogers, Personal Communication, October 1989.

Bennett's law has important implications for policies aimed at augmenting the food intake of the poor. Identifying foods eaten primarily by the poor -- inferior goods whose consumption falls with rises in income -- creates a basis for self-targeted interventions. A subsidy on inferior foods is self-targeting since the benefits of the subsidy would reach the poor with little leakage to other groups. In many countries the consumption of starchy staples declines with income, suggesting that these foods may be efficient carriers of subsidies targeted towards the poor.[16] Note that the testing of Bennett's Law in the Malian context -- identifying inferior and luxury goods -- forms the bases for hypotheses (i) and (ii) presented in Chapter 1.

## 2.3 The Slutsky Equation: Substitution and Income Effects of Price Changes

Economic theory identifies two principal effects of changes in prices on consumption: substitution and income effects. When the price of a good rises, consumption of that good falls due to (i) a substitution towards other goods given the change in relative prices, and (ii) a reduction in purchasing power (holding nominal income constant). The Slutsky equation breaks down the overall effect of a price change on the consumption of a commodity into these two parts - substitution and income. The overall demand elasticity is decomposed into a substitution component (pure substitution elasticity) and an income component (income elasticity weighted by the budget share devoted to the commodity prior to the price change). Cross price elasticities

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[16]Timmer, Falcon, and Pearson, 43.

-- how a change in the price of one commodity affects the consumption of another commodity -- can also be allowed for in the equation. The Slutsky equation is presented below:[17]

$$e_{ij} = E_{ij} - N_i X_j$$

Where $e_{ij}$ = overall demand elasticity for commodity i when the price of commodity j changes.

$E_{ij}$ = the pure substitution elasticity for commodity i when the price of commodity j changes.

$N_i$ = the income elasticity for commodity i

$X_j$ = the budget share of commodity j in the consumer's total expenditures on all commodities.

As a matter of economic theory, the Slutsky equation holds only for individual utility functions. Although aggregate demand functions share certain properties with their individual counterparts (i.e. homogeneity and continuity), there is no aggregate version of Slutsky's equation.[18] A good which for one individual is inferior may be normal for a second. It is difficult to know, therefore, how to aggregate their preferences. In practice, the way around this problem is to estimate the Slutsky equation, assuming "representative" consumers of different income levels. The presumption is that, at similar levels of income, tastes

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[17]Ibid., 47.

[18] Hal R. Varian, Microeconomic Analysis, 2d ed. (New York: Norton and Company, 1984), 150-153.

and preferences are sufficiently similar to allow aggregation.[19] Most econometric studies which decompose the substitution and income effects of price changes look for these effects on consumer groups, disaggregated by per capita income levels.

Systematic variation in the components of the Slutsky equation by income class suggests that the food consumption of poor consumers is more responsive to changes in incomes and prices than that of wealthy consumers. The income effect is particularly strong since the poor spend a large proportion of their budgets on food, and the food purchases of the poor rise substantially with increases in income.[21] The substitution effect is likewise marked for low income consumers: the poor exhibit a high price sensitivity and more readily adjust their consumption patterns when food prices change than do wealthy groups. The Slutsky equation provides the theoretical bases for hypotheses (x) and (xi) presented in Chapter 1. These hypotheses are posited to test the responsiveness of the urban poor in Mali to changes in price and income

## 2.4 Estimation of Consumption Parameters: Price and Income Elasticities of Demand

The responsiveness of the poor to price and income changes has been investigated in a number of empirical studies. In The Effect of

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[19]Ibid., 152. More technically, the assumption is that for individuals of income class i, the marginal propensity to consume good j is constant.

Food Price and Income Changes on the Acquisition of Food by Low-Income Households, Harold Alderman reviews the findings of fifteen food consumption studies. Although different econometric techniques and types of data were used, some general patterns emerge across studies:[22] First, for a number of staple foods, price responsiveness declines as income rises. Second, estimates of income elasticities for both per capita food expenditures and per capita calorie intake are larger for the poor than the wealthy. Third, food expenditure elasticities are nearly two times larger than calorie intake elasticities suggesting that as income rises households diversify into higher quality foods.

Economic theory predicts that incomes and prices are the principal determinants of food consumption. Estimates of demand elasticities show a higher responsiveness of the poor than the well-off to changes in these variables. These empirical findings provide guidelines for designing price and income interventions to augment the caloric intake of the poor.[23] For example, if the poor are highly sensitive to price changes, price subsidies on staple foods would serve to increase consumption levels. Similarly, the high income elasticities of the poor suggest that increases in income -- transfers in-cash or in-kind -- would raise food consumption levels both in terms of quantity and perceived quality.

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[22]Harold Alderman, The Effect of Food Price and Income Changes on the Acquisition of Food by Low-Income Households (Washington, D.C.: International Food Policy Research Institute, 1986).

[23]Ibid., 2.

In the estimation of determinants of consumption, several problems emerge that are frequently cited in the literature.[24] First, the data necessary to estimate consumption parameters disaggregated by income class have been, until recently, quite scarce. Time series data captures variation in parameters over time, but typically does not break the sample population by socio-economic group. Thus, the principal source of data for food consumption studies has been cross-sectional providing information on a sample of households at one period of time. This information is both costly and time consuming to collect

Second, insufficient variation in prices from cross-sectional data may not allow the etimation of own and cross-price elasticities. Timmer and Alderman note, however, that panel cross-sectional data collected across regions and over time may resolve this problem by capturing significant spatial and temporal variation in prices.[25]

Third, certain commodities are not consumed by all households, introducing a disproportionate number of zero values for the dependent variable. The inclusion of zero consumers in the Ordinary Least Squares (OLS) regression biases the estimation of the coefficients downwards. Truncation of the sample to include only consumers does not eliminate the bias in the OLS coefficients. A standard method correcting for the

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[24]Timmer, Falcon, and Pearson; Alderman; C. Peter Timmer and Harold Alderman, "Estimating Consumption Parameters for Food Policy Analysis," Journal of Agricultural Economics 61 (December 1979); Rajiv Chaudhri and C. Peter Timmer, The Impact of Changing Affluence on Diet and Demand Patterns, World Bank Staff Working Papers, no. 785 (Washington, D.C.: World Bank, 1986); and David E. Sahn, "The Effect of Price and Income Changes on Food-Energy Intake in Sri Lanka," Economic Development and Cultural Change 36 (January 1988).

[25]Timmer and Alderman. 982.

bias introduced by zero consumers is a two-step technique developed by Heckman.[26] The first step uses probit analysis to estimate the probability of a household consuming a given food. The ratio of the unit normal density to the cumulative normal density function -- the inverse of the Mills ratio -- is then included as a regressor in the final OLS regression run on the truncated sample. This procedure yields unbiased estimates of the elasticities of demand of the good being modelled.

cross-sectional data to estimate the determinants of demand. Household expenditure surveys typically collect data on expenditures and quantities purchased. Unit values are calculated by dividing expenditure by quantity, and serve as proxies for market prices. Deaton notes that unit prices can be used to estimate demand parameters, but cautions that they reflect quality differences. Deaton further states that unit values are "contaminated by errors of measurement in expenditures and in quantities and are likely to be spuriously negatively correlated with measured quantities."[27]

### 2.5 Functional Specifications of the Demand Function

There are several econometric techniques for estimating complete systems of demand. These techniques use restrictions derived from demand theory to reduce the large number of parameters to be

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[26]Heckman, 475-492.

[27]Angus Deaton, "Quality, Quantity, and Spatial Variation of Price," American Economic Review 78 (June 1988): 418-419.

estimated.[28] The symmetry, adding-up, and homogeneity restricitons are imposed in both the Linear Expenditure System and the Almost Ideal Demand System (AIDS) to estimate the demand for food commodities.[29] These restrictions, however, have not stood up well to empirical testing. Statistical testing of adding-up has led to its rejection, since additivity does not allow for new commodities to enter the budget, and thus asumes that consumption bundles are the same for both low and high income cnsumers; the restrictions of symmetry and homogeneity have also not been borne out when tested empirically.[30] The rejection of these restrictions in practice, however, has given rise to the development of alternative functional forms to estimate the demand for disaggregated food commodities by expenditure group.

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[28]Alderman, 44-47. The author defines the three principal restrictions as follows:

The symmetry restriction states that price effects must be symmetrical across commodities (i.e. the cross-price elasticities of demand between any two goods x and y must be of the same magnitude and direction).

The imposition of the adding-up restriction implies that the summation of expenditures on all commodities, assuming no savings, is equal to the consumer's budget constraint.

The restriction of homogeneity of degree zero is often termed the "absense of money illusion" and states that demand will be unaffected if prices and incomes increase by the same proportion.

[29]See for example Angus Deaton and John Muellbauer, "An Almost Ideal Demand System," American Economic Review 70 (June 1980): 312-326. See also Robert Pollak and Terence Wales, "Estimation of Complete Demand Sustems from Household Budget Data: The Linear and Quadratic Expenditure Systems," American Economic Review 68 (June 1978): 348-359.

[30]Alderman, 47.

This dissertation uses two principal econometric models that allow for the estimation of expenditure-group specific elasticities of demand. These models are: (i) double log specification of the consumption function estimated separately for low-income households, high-income households, and for the sample population as a whole; and (ii) double log quadratic specification of the consumption function with price-income interaction terms. Using OLS regression techniques, elasticities of demand are estimated as single equations, commodity by commodity. In contrast to complete systems of demand, the single equation approach does not impose restrictions on the consumption parameters. Further advantages of these functional forms include ease of estimation (double log specification) and the use of price and income variation over the entire range of the sample (double log quadratic with price-expenditure interaction terms). These models are presented and reviewed in Section 3.1 of Chapter 7.

## 2.6 Food Consumption Studies

In recent years several studies have been conducted in developing countries linking food policies to consumption parameters disaggregated by income class. The findings of some of these studies are briefly discussed and summarized below.

In Food Consumption Parameters for Brazil and their Application to Food Policy, Cheryl Williamson Gray estimates the determinants of consumption for a nation-wide sample of households.[31] To assess food

[31]Cheryl Williamson Gray, Food Consumption Parameters for Brazil and their Application to Food Policy (Washington, D.C.: International Food Policy Research Institute, 1982).

intake patterns of the population Gray classified consumers by both per capita income and calorie consumption levels. Insufficient caloric intake is the principal nutritional problem in Brazil, particularly in urban areas. A breakdown between urban and rural households shows large differences in the composition of diets. Elasticity estimates from this study indicate that there is a strong and positive relationship between income and calorie consumption. In addition, malnourished groups show a high price responsiveness, adjusting their food consumption patterns when relative prices change. Gray relates the income and price elasticities estimated in this study to the extent to which price subsidies on wheat bread, milk, and rice increase calorie consumption of the malnourished. The results show that subsidizing wheat bread may contribute to calorie deficiency as households shift from higher calorie sources to bread. In contrast, subsidizing milk augments the caloric intake of the poor, yet is expensive, because wealthy households benefit disproportionately, since they consume more in quantity terms. Subsidizing low quality rice is the preferable policy option to benefit the poor since it is an inferior good not typically consumed by wealthy housholds.

Marito Garcia and Per Pinstrup-Andersen evaluate the effects of a food price subsidy scheme in a study of household consumption/nutrition in three rural provinces of the Philippines.[32] The subsidy program targeted two commodities contributing approximately two thirds of the

[32]Marito Garcia and Per Pinstrup-Andersen, The Pilot Food Price Subsidy Scheme in the Philippines: its Impact on Income, Food Consumption, and Nutritional Status (Washington, D.C.: International Food Policy Research Institute, 1987).

calorie consumption of the rural poor -- rice and vegetable oil. Sample villages were divided into two groups, those who received the subsidies and those who did not. In this way, half of the sample served as a control population. The criterion for village selection was high incidence of poverty and malnutrition. Comparative and multivariate analysis was used to estimate the determinants of household food consumption. The results of this study indicate that the subsidy scheme had a beneficial effect on increasing both food expenditures and the calories consumed of sample households. Anthropometric data collected on a sub-sample of households showed that the average weight of children below the age of five likewise increased. Estimates of elasticities show a significant relationship between income and calorie consumption. These findings suggest that a ten percent rise in real income is associated with a three percent increase in calorie consumption. The consumption effect is stronger by a factor of 1.5 for changes in income resulting from the price subsidies than for income from other sources.

Other studies also examine patterns of food consumption across income and/or occupational groups. In the Determinants of Food Consumption in the Dominican Republic, Beatrice Rogers and Anne Swindale investigate the effects of changes in prices and incomes on food intake.[33] This nation-wide study coverered 1440 households in both rural and urban areas. Income is a primary determinant of calorie and protein adequacy in the Dominican Republic: 37% of households in quartile 1 are calorie deficient compared to 8.4% in quartile 4. The

[33]Beatrice Lorge Rogers and Anne J. Swindale, Determinants of Food Consumption in the Dominican Republic (Medford, Mass.: Tufts University School of Nutrition, 1988).

descriptive findings of the study confirm the Engelian relationship of food expenditure to household income. The starchy staples ratio also declines with rises in income as Dominican consumers diversify their diets to include greater quantities of meat, milk, and vegetable oil. Estimates of price elasticities for all commodities except oil and low-quality rice fall as income increases across quartiles. In sum, the empirical findings of the Dominican Republic study strongly support theories of low-income consumer behavior.

In La substitution des cereales locales par les cereales importees: Ouagadougou, Thomas Reardon et al. examine urban food consumption patterns in Burkina Faso.[34] Rice is the preferred cereal in Ouagadougou, dominating both food consumption and expenditure. All income groups consume rice, while wheat is primarily consumed by the wealthy. Estimates of own-price elasticities of demand were not significantly different from zero for rice. The authors attribute this to the form in which rice is consumed by urban dwellers, particularly the poor. Employment/transportation constraints result in urban workers purchasing prepared rice and sauce for the mid-day meal. Cross-price elasticities show that there is limited substitution between rice and coarse grains in the face of price changes; rather, substitution takes place within the group of coarse grains. The policy implications of these findings are discussed in view of the change in consumption from

[34]Thomas A. Reardon, Taladidia Thiombiano, and Christopher L. Delgado, "La substitution des cereales locales par les cereales importees: la consommation alimentaire des menages a Ouagadougou, Burkina Faso," Paper presented at the Colloque CEDRES/IFPRI sur la Consommation Alimentaire au Burkina Faso, Ouagadougou, Burkina Faso 6-7 June 1988.

traditional coarse grains (millet, sorghum, maize) to imported rice and wheat in urban areas.

Further examples of disaggregated consumption analysis include two studies conducted by the International Food Policy Research Institute (IFPRI) in Sri Lanka. In The Effect of Price and Income Changes on Food-Energy Intake in Sri Lanka, the author estimates price and income elasticities of demand disaggregated by income group and sector (urban, rural, and estates). The findings of this research confirm the greater responsiveness of the poor than the wealthy to changes in price and income. Furthermore, although the poor substitute towards cheaper calorie sources when food prices rise, this effect was not seen for the basic staple, rice: "the reluctance of households to substitute for rice, even when faced with rising prices, coupled with its large budget share (23%), shows rice to be the most important consumption good."[35] In The Food Stamp Scheme in Sri Lanka: Costs, Benefits, and Options for Modification the author examines the effects of a targeted food stamp scheme on the calorie intake of poor households in Sri Lanka.[36] The effect of food stamps (income transfer) on caloric consumption was estimated for the sample disaggregated by per capita expenditure quintile. The results show that the impact on calorie consumption of additional income received through food stamps is greatest for the lowest quintile and declines significantly as expenditures increased.

[35]Sahn, 337.

[36]Neville Edirisinghe, The Food Stamp Scheme in Sri Lanka: Costs, Benefits, and Options for Modification (Washington, D.C.: International Food Policy Research Institute, 1987), 65-70.

Leakages to relatively wealthy households, however, result in a reduction in the cost-effectiveness of the food stamp scheme.

## 3. Structural Adjustment: Welfare Effects on the Poor

Following the recession in the early 1980's, many African countries have undertaken structural adjustment programs to "reduce internal and external deficits, increase efficiency in the economy, and reduce government expenditure."[37] To improve economic performance, policy reform measures have typically focused on giving the market a greater role in allocating resources. Structural adjustment measures generally include exchange rate devaluation, increasing agricultural producer prices to reflect world price levels and encourage production, reducing subsidies to both consumers and producers, liberalizing trade policy, reducing government payroll expenditures, and restructuring or selling off government-owned enterprises to the private sector.[38] Depending on the country-specific situation, these measures have been undertaken, alone or in combination, with the aim of promoting long-term productivity and economic growth.

### 3.1 Welfare Effects on the Poor

Macro-economic reform efforts have generated a growing concern about the effects of adjustment on the welfare of the poor. In The Alleviation of Poverty under Structural Adjustment, Lionel Demery and

[37]World Bank, Targeted Programs for the Poor during Structural Adjustment: A Summary of a Symposium on Poverty and Adjustment, April 1988, (Washington, D.C.: World Bank, 1988), 4.

[38]Ibid., 5.

Tony Addison note that under structural adjustment certain poverty groups may experience a reduction in real income and consumption.[39] First, real exchange rate devaluations (by definition) reduce real wages across the economy. The poor are particularly vulnerable to real wage declines since labor is typically their only productive asset. Second stabilization efforts that frequently accompany structural adjustment programs have a short run negative impact on output and employment Often it is the poor whose jobs are most vulnerable at a time of macroeconomic restraint. Third, the poor are particularly vulnerable to changes in food prices given low levels of income and high proportions of income spent on food. Even if there are market opportunities created by reform programs, the poor often cannot respond due to low levels of human capital and limited access to assets (land, labor, capital).

One of the principal social costs of adjustment may well be a deterioration in the food consumption levels and nutritional status of certain groups in society. In "Macroeconomic Adjustment and Human Nutrition," Per Pinstrup-Andersen notes that in some countries food consumption of the poor has fallen during periods of structural adjustment: "it appears that such reductions are inversely correlated with income level and that the highest income groups have suffered little or no such reductions."[40] Food intake of the lowest income groups has thus deteriorated, while the disparity in intake between income groups has widened. John Mellor looks at the role of food

[39]Lionel Demery and Tony Addison, The Alleviation of Poverty under Structural Adjustment (Washington, D.C.: World Bank, 1987), 1-44

[40]Per Pinstrup-Andersen, "Macroeconomic Adjustment and Human Nutrition," Food Policy 13 (February 1988): 38.

policies in adjustment programmes and their welfare effects. In "Food Policy, Food Aid, and Structural Adjustment Programmes" he points out that reductions in subsidies or other reforms that raise food prices may threaten the short-term welfare of the poor.[41] Both authors cite the need for further empirical work to assess the equity effects of structural adjustment policies. In "Food Prices and the Poor in Developing Countries," Per Pinstrup-Anderson also addresses the short and long-term effects of raising food prices on poor consumers. He notes that the short-run welfare effects of higher food prices can be severe: "policies that attempt to strengthen incentives to expand food production through higher food prices may result in reduced real incomes and severe hardships for the poor, at least in the short-run."[42] Economic growth and increased employment are the expected long-run benefits of liberalization; however, in the short-run the loss of purchasing power may result in a deterioration of nutritional status of the poor.

### 3.2 Measures to Mitigate the Adverse Effects of Adjustment on the Poor

In the short-run, the income earning opportunities and food consumption of the poor are vulnerable to the adverse effects of structural adjustment. Several authors highlight measures to mitigate the negative effects of adjustment on the poor. Pinstrup-Anderson

[41]John W. Mellor, "Food Policy, Food Aid, and Structural Adjustment Programmes: the Context of Agricultural Development," Food Policy 13 (February 1988): 13.

[42]Per Pinstrup-Andersen, "Food Prices and the Poor in Developing Countries," in Gittinger, Leslie, and Hoisington, 302.

outlines several policy options to offset the negative welfare effects on consumption including: general subsidies, targeted food subsidies, cash payments, food transfers, and food for work programs.[43] Paul Streeten identifies groups most vulnerable to price increases and outlines ways to protect their welfare in the short-run: gradual price increases, selective subsidies on food staples, and income subsidies.[44]

Approaches to increasing the productive capacity of the poor are also discussed as a way to assist vulnerable groups under adjustment These include: "increasing their access to productive assets, raising their return on assets, improving their employment opportunities ensuring their access to education and health services, and supplementing their resources with transfers."[45] In the 1988 World Bank report Targeted Programs for the Poor During Structural Adjustment, a number of measures to compensate the 'losers' -- vulnerable groups whose living standards fall as a result of adjustment -- are outlined. The study breaks down "vulnerable groups" into three categories: the "newly poor", the "borderline poor" and the "chronic poor". Different programs may be necessary to address each group (assuming that they can be identified with any precision). For example, the newly poor may consist in part of ex-civil servants. For this category, retraining may be an appropriate policy intervention. On the other hand, interventions to

[43]Ibid., 291.

[44]Paul Streeten, "Transitional Measures and Political Support for Food Price Policy Reform," in Gittinger, Leslie, and Hoisington, 279-280.

[45]Demery and Addison, 3.

improve the welfare of the "chronic poor" need to address the long term fundamentals of education, health and family planning. Of particular interest are country case studies (eg., Bolivia's Emergency Social Fund, Ghana's Program of Action to Mitigate the Social Costs of Adjustment Bangladesh's Grameen Bank, Chile's Infant and Child Nutrition Project) The main lessons derived from these country programs and echoed in The Social Dimensions of Adjustment in Africa: A Policy Agenda are:[46] (i) the need to secure political support, (ii) that short-term compensatory programs, often donor-supported, can help alleviate the impact of structural adjustment on the poor, (iii) that in the medium term employment-oriented programs are essential to help the poor increase incomes, and (iv) better information about the poor groups is needed for efficient targeting.

### 3.3 Sectoral Adjustment in Mali: Cereal Market Reform

Although Mali had not undertaken a specific structural adjustment programme at the time of this doctoral research, it had implemented a series of policies aimed at restructuring certain sectors of the economy.[47] Since 1981, food policy reform in Mali has focused on cereal market and price liberalization. The primary objective is to stimulate food production by allowing market forces to determine prices rather than government decree. Prior to 1981, the government of Mali had attempted to keep producer prices artificially low in an effort to

[46]African Development Bank, UNDP, and World Bank, 4-8, 24.

[47]Mali subsequently entered into a comprehensive structural adjustment program with the World Bank in 1990.

support the purchasing power of urban dwellers through cheap cereals. In "Food Security Policy Reform in Mali and the Sahel," Josue Dione reviews the liberalization of the cereals market in Mali and its effects on food producers and consumers.[48] Emmy Simmons likewise addresses the effectiveness of reform measures in "Policy and Structural Reform of Grain Markets in Mali."[49] See Chapter 3 for a full discussion of food policy reform in Mali (1981 - 1987)

One of the major thrusts of reforms in Mali has been a liberalization of both rice and coarse grain prices. Policy-makers, however, face a dilemma arising from the different role that prices play for producers and consumers. To farmers, higher prices provide incentives encouraging agricultural production, while to poor consumers higher prices restrict food purchases and intake.[50] Whether the poor are net buyers or sellers of food will determine the extent to which changes in food prices reduce or increase real incomes. Cereals form the base of the Malian diet, and dominate the consumption picture across regions. Urban households in Mali largely depend upon the market for rice, millet, and sorghum. Recent studies in southern Mali show that a significant proportion of small farmers are <u>also</u> net purchasers of

[48]Josue Dione, "Food Security Policy Reform in Mali and the Sahel Paper Presented at International Economics Association IXth World Congress, Athens, Greece, 28 August-1 September 1989.

[49]Emmy B. Simmons, "Policy and Structural Reform of Grain Markets in Mali," Paper Presented at Overseas Development Institute Conference on the Design and Impact of Adjustment Programmes on Agriculture and Agricultural Institutions, London, 10-11 September 1987.

[50]Timmer, Falcon, and Pearson, 10-11.

cereals.[51] Thus in Mali, the reduction in purchasing power associated with cereal price increases may well be experienced by the rural and the urban poor.

## 4. Poverty Alleviation: Targeting the Poor

An important theme in the literature is the need to identify and target the poor to transfer resources more efficiently.[52] 'Targeting' refers to interventions reaching intended beneficiaries but not other groups in society; the cost-effectiveness of these interventions is enhanced if leakages to other groups are minimized.[53] The issue of targeting is related to the social costs of adjustment; interventions designed to mitigate the adverse effects of price reform on consumption will be more cost-effective if they are targeted towards the poorest segments of society

Targeting attempts to restrict coverage of interventions to those who will benefit most. Minimizing leakages is essential to reducing the budgetary cost of providing a given benefit. Self-targeted interventions improve cost-effectiveness since they exclude other groups

[51]John Staatz, "The Structure of Cereals Demand: Mali, Presentation at the International Food Policy Research Institute Seminar on Food Security Policy and the Competitiveness of Agriculture in the Sahel, Washington, D.C., 17 October 1988.

[52]Timmer, Falcon, and Pearson, 66-68; Per Pinstrup-Andersen, "Macroeconomic Adjustment and Human Nutrition." 44-45: Shlomo Reutlinger, "Food Security and Poverty in Developing Countries," in Gittinger, Leslie, and Hoisington, 208; World Bank, Targeted Programs for the Poor, 10-24; and Glewwe and Kanaan, Targeting Assistance to the Poor.

[53]Timmer, Falcon, and Pearson, 66.

by providing benefits of interest only to the intended beneficiaries.[54] Subsidizing foods consumed primarily by the poor is often cited in the literature as an example of a self-targeted intervention; the benefits accrue to the poor since the commodity in question has little appeal to wealthier consumers.

Budgetary costs as well as political feasibility determine the scale and type of interventions used by governments to raise the welfare of poor groups. An up-to-date summary of these interventions is contained in the World Development Report 1990.[55] The report focuses on five main classes of interventions. First, general food price subsidy schemes are assessed as being highly effective in reaching the poor and relatively easy to administer. However, general food price subsidies are costly and subject to high leakages to the wealthy, unless the subsidies are limited to commodities consumed principally by the poor Second, the report discusses food ration schemes, often administered through fair price shops, as an alternative to general food subsidies. Although ration schemes tend to be quite costly administratively, experience in countries such as Egypt and Sri Lanka suggests that they are relatively effective instruments to increase food consumption among the poor.[56] Third, food stamps are similar to ration schemes except that they are denominated in currency rather than in commodity

[54]World Bank, World Development Report 1990, 4.

[55]Ibid., 90-102. The description of interventions and their country-specific applications are drawn from this document.

[56]See for example Harold Alderman and Joachim von Braun, The Effects of the Egyptian Food Ration and Subsidy System on Income Distribution and Consumption (Washington, D.C.: International Food Policy Research Institute, 1984); and Edirisinghe.

quantities. Experience in developing countries indicates that food stamps can be an efficient means to reach the poor provided that the real value of these stamps is not eroded by inflation. Fourth, the report briefly reviews supplementary feeding programs as an instrument to address the problem of under-nutrition in specific age and sex-based groups such as pregnant and lactating women, children under 5 years of age, and schoolchildren. The report notes that it is difficult to assess the outcomes of supplementary feeding programs. They frequently suffer from distribution abuses, and from intra-household leakages (e.g., children fed at school may receive less to eat at home). In addition, supplementary feeding programs that are not coordinated with other interventions to improve health and sanitation may do little to improve the recipients' nutritional status. A fifth approach is provided by Food for Work or Public Works Programs. Experience in India and Bangladesh indicates that there are two main benefits from these programs; they are self-targeting, provided that the wage is marginally below market, and they can create productive assets for the community. They can also help to offset seasonal variations in employment, thereby smoothing annual income and consumption of poor households.

In evaluating these different interventions, it is important for policy-makers to determine their relative costs. The report Poverty and Hunger breaks down these costs into three main categories.[57] First, there are the economic costs associated with any price distortion. For example, reducing consumer prices at the expense of farmers has a negative impact on agricultural output (and investment) to the extent

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[57]World Bank, Poverty and Hunger, 8-9.

that farmers are responsive to changes in price. Second, there are the administrative costs of delivering the program to the target group. Finally, there are the direct budgetary costs to the government. While these may be regarded as a pure transfer item, the relative budgetary costs of the different programs may be the decisive variable for policy makers. Clearly, there is no single policy intervention that can be ranked as superior on cost or efficiency grounds in all circumstances Ranking of interventions will also depend, in part, on political considerations such as the proportion of households who are excluded from the program. For example, political support will be greater for a given intervention if its benefits are broadly rather than narrowly distributed in society. There is a growing weight of empirical evidence, however, that the move away from general towards targeted subsidies has both economic and budgetary advantages. The key then is to identify the target groups.

Identifying intended beneficiaries -- in this case the poor requires a standard measure of welfare by which one can distinguish between socio-economic groups. Per capita income is most commonly used as a measure of welfare.[58] A minimum level of income is identified, and households falling below this 'poverty line' are defined as poor relative to the rest of the population. Although income is often used as a primary indicator of economic status/welfare, it may not be a sufficient basis for targeting interventions. The poor are

[58]World Bank, World Development Report 1990, 26; and Paul Glewwe and Jacques van der Gaag, Confronting Poverty in Developing Countries: Definitions, Information, and Policies, Living Standards Measurement Study, Working Paper No. 48 (Washington, D.C.: World Bank, 1988), 3-4.

characterized by low income and other factors that influence economic status. If the factors correlated with poverty can be identified through sample surveys, it may be possible to target by indicators at less cost than obtaining data on household incomes.[59] An exploration of factors such as household size and composition, housing, employment, access to productive resources, possession of assets, and education may provide a basis for defining who are the poor and targeting interventions to assist that group. For example, if poverty in urban areas is concentrated in certain neighborhoods, indicators such as housing or place of residence may identify the poor at much less cost than per capita expenditure. In many developing countries the informal sector provides employment and income to large portions of the urban population; if the poor are concentrated in informal sector activities then interventions to augment incomes targeted towards that sector may efficiently reach the poor.

The characteristics of the poor have been examined in a number of studies on poverty.[60] These studies provide the empirical bases for hypotheses (iii) - (ix) presented in Chapter 1 on household and employment characteristics of the poor. In The Poor and the Poorest, Michael Lipton notes that household size is positively associated with decreases in per capita income, and identifies large household size as a characteristic of the poor; the greater number of children and younger age distribution of low-income households is also confirmed by this

[59]World Bank, World Development Report 1990, 92.

[60]Glewwe and Kannan; Lipton, The Poor and the Poorest; Visaria; and World Bank, World Development Report 1990.

study of household characteristics.[61] The poverty studies cited above confirm Lipton's findings, and identify several other characteristics associated with low levels of income. First, the poor in developing countries appear to be concentrated in informal sector activities, particularly in urban areas. Although the informal sector represents an important source of employment for the poor, income earning opportunities from such activities are often limited by discriminatory regulations and governmental bias towards more large-scale, 'formal' activities. Second, unemployment is a key factor contributing to poverty; the evidence also suggests that the poor are more at risk of fluctuations in unemployment than the wealthy. Third, education is a key variable explaining differences in per capita income. Low levels of educational attainment are concentrated among the poor, contributing to low-productivity and limited income earning opportunities. In summary, the examination of household characteristics undertaken in poverty studies contributes to an understanding of who the poor are and what are their means of livelihood. Furthermore, in terms of poverty alleviation, significant differences in characteristics between socio-economic groups can often be used as a basis for targeting interventions to low-income households.

A number of different measures or indicators of welfare are cited in the literature. Although ranking households on the basis of per capita income predominates, other measures of welfare such as per capita

food expenditure and calorie consumption are possible indicators.[62] For purposes of analysis this dissertation adopted the per capita income measure of welfare.[63] Food expenditure and calorie consumption, however, were also explored as indicators of welfare.

As noted above, studies of poverty typically use per capita income as a standard measure of welfare. Accurate measurement of income is a difficult if not impossible task in many developing countries. There are three principal reasons why this is so. First, households may be reticent in giving out information that may be used for tax purposes by the government. Secondly, in some countries the variable nature of employment of the poor may make it difficult for respondents to recall lump-sum payments for services rendered. Thirdly, in societies largely dependent on subsistence agriculture, barter rather than money exchange for labor/services may characterize the economy. It is extremely difficult to quantify and translate these transactions into 'income' with any degree of accuracy. Given that reliable measures of income are difficult to obtain, per capita expenditure is often considered a proxy for income. Christiaan Grootaert discusses the income versus expenditure debate as it relates to welfare and states that "the consensus seems to be that expenditures are easier to measure and tend to be more accurately reported. They are also less subject to

[62]Paul Glewwe, The Distribution of Welfare in Cote d'Ivoire in 1985, Living Standards Measurement Study, Working Paper No. 29, (Washington, D.C.: World Bank, 1988); Alderman; Ravi Kanbur, Measurement and Alleviation of Poverty, International Monetary Fund Staff Papers, no. 34 (Washington, D.C.: International Monetary Fund 1987).

[63]Note that total per capita expenditure including the value of home-produced consumption was used as a proxy for income.

fluctuations than income, and in the context of the permanent income and life-cycle models they can be considered a proxy for income."[64] In addition he notes that data on household characteristics is necessary to provide a more comprehensive measure of the level of living/welfare.

Since the early 1980's The World Bank has undertaken a series of Living Standards Measurement Studies (LSMS) using household expenditure data to measure welfare. In The Distribution of Welfare in Cote d'Ivoire in 1985 Paul Glewwe uses a per capita expenditure ranking to assess the characteristics of different groups in society.[65] The analysis divides the sample into per capita 'consumption' groups (consumption defined as per capita expenditure plus the value of home produced food) and looks at household characteristics by quintile: expenditure, employment, household composition, asset ownership, and education. Glewwe then uses per capita consumption to construct poverty lines dividing the poor from the non-poor. Drawing two poverty lines -- at 10% and 30% of the per capita 'consumption' distribution he presents a profile of the characteristics associated with poverty for both rural and urban Cote d'Ivoire.

Further analysis of the Ivoirian LSMS data resulted in a recent study focusing on poverty reduction through targeting. In Targeting Assistance to the Poor Using Household Survey Data, Paul Glewwe and Oussama Kanaan seek to identify household characteristics associated

[64]Christiaan Grootaert, "The Conceptual Basis of Measures of Household Welfare and Their Implied Survey Data Requirements," The Review of Income and Wealth, series 29, no. 1 (March 1983): 10.

[65]Glewwe.

with low levels of welfare.[66] Multivariate OLS regression analysis was used to predict the effects of a set of explanatory variables on welfare (defined as per capita household expenditure). Of the explanatory variables used in the analysis region, educational attainment of household head, ethnicity housing characteristics, and access to potable water education of household head, per capita floor area of the housing unit, and ownership of a car or refrigerator are strongly associated with higher levels of welfare. Conversely, bicycle ownership and the household head belonging to the Voltaic ethnic group are associated with low levels of welfare. Using econometric techniques, the authors assess the effectiveness of income transfer schemes targeted on these characteristics in reducing the poverty of targeted groups.

In Identifying the Poor: Is "Headship" a Useful Concept?, Sandra Rosenhouse discusses household head classification and its relevance to targeting poor households.[67] Rosenhouse uses two different definitions of headship 'reported head' and 'working head' -- to examine the relationship between female-headed households and poverty. The findings of this study show that the working head classification is a more accurate indicator of poverty than reported head. Furthermore, the author concludes that if the aim of policy is poverty alleviation, then it may be more appropriate to identify poor households irrespective of sex of household head; among the poor specific groups can then be examined and targeted. In The Poor and the Poorest, Michael Lipton

[66]Glewwe and Kanaan.

[67]Sandra Rosenhouse, Identifying the Poor: Is "Headship" a Useful Concept?, Living Standards Measurement Study, Working Paper No. 58 (Washington, D.C.: World Bank, 1989).

examines the characteristics of the poor as they relate to the following four areas: (i) Poverty, Undernutrition, Hunger, (ii) Employment (iii) Asset Ownership, and (iv) Household Characteristics and Structure Lipton advocates a calorie-linked measure of poverty and uses a food adequacy standard to identify the poor:[88]

> People who spend 80 percent or more on food, yet fulfill less than 80 percent of the average calorie requirements for their age, sex and activity groups, are probably both hungry and undernourished ...; we call them ultra-poor. People spending 70 percent or more of income on food, and meeting
>
> 80-100 percent of requirements, are unlikely to be undernourished, but are sometimes hungry; we call them poor.

He stresses the need to distinguish not only between the poor and the wealthy in society, but also within the group defined as poor. For Lipton, the criteria for targeting vulnerable groups are calorie deficiency and food expenditure shares.

## 5. Food Security

The problem of inadequate food intake is complex and cannot be addressed solely by economic growth or increased food availability Even with adequate overall food supplies, certain socio-economic groups suffer caloric deficiency. The food security literature acknowledges the importance of availability, yet goes further to examine how the distribution of income and endowments -- purchasing power -- influences access to food.

In developing (and developed) countries inadequate food intake is a primary characteristic of poor households. Hunger arises due to an inequitable distribution of income and endowments: "People are hungry because they lack the resources to produce enough food for themselves or lack the purchasing power to acquire it in the market."[69] In a series of World Bank reports Shlomo Reutlinger discusses the problem of hunger in the context of food security. He defines food security as "access by all people at all times to enough food for an active, healthy life. Its essential elements are the availability of food and the ability to acquire it."[70] Defined in this way, food insecurity arises from an inability to acquire sufficient food through domestic production, imports, or market purchases, and can be either chronic or transitory Weak purchasing power, as opposed to shortages in the supply of food, emerges as the principal source of food insecurity. The concept of food security articulated by Reutlinger has been central in weaving together the threads of the food security literature: availability, access, and actual consumption/nutritional status.

## 5.1 Chronic and Transitory Food Insecurity

Several authors make the distinction between chronic and transitory food insecurity.[71] Dietary inadequacy over a prolonged period of time is evidence of the inability to gain access to enough food. Lack of resources constrains the ability of households to augment food intake: the term chronic food insecurity defines a situation of structural calorie and protein deficiency. In contrast, the temporary erosion of purchasing power brought upon by variability in prices, incomes, and/or agricultural production is termed transitory food insecurity. The most extreme example of transitory food insecurity is that of famine where large numbers of people experience a sharp and catastrophic decline in food consumption levels. Discussions of the history and causes of famine stress the complex interaction of factors that lead to situations of severe undernutrition, starvation, and death.[72] Central to the debate, however, is the recognition that a reduction in food availability is not the principal cause of famine. Famines can occur in situations of adequate overall food supply. Rather, a sudden collapse in purchasing power of certain groups results in an inability to gain access to sufficient food to sustain life.

[71] Ibid.; Reutlinger, "Food Security and Poverty in Developing Countries;" World Bank, The Challenge of Hunger in Africa (Washington, D.C.: World Bank, 1988); Carl Eicher, Food Security Battles in Sub-Saharan Africa (East Lansing, Mich.: Michigan State University, 1988); and Michael Weber, Informing Food Security Decisions in Africa: Empirical Analysis and Policy Dialogue (East Lansing, Mich.: Michigan State University, 1988)

[72] Nevin S. Scrimshaw, "The Phenomenon of Famine," Annual Review of Nutrition 7 (January 1987): 2.

Of course, the distinction between transitory and chronic food insecurity can break down in societies which are experiencing a long term degradation in their resource base. A number of Sub-Saharan African countries fall clearly into this category. Poor policies combined with increasing population pressures and political instability have lowered the productivity of many marginal areas, transforming groups from the status of transitory to chronic food-insecure.

## 5.2 Who are the Food Insecure?

The global distribution of calorie deficient diets shows a concentration in low-income countries, particularly in Asia and Sub-Saharan Africa. In 1988 the World Bank estimated that approximately 25% of Africa's population suffered from inadequate food intake; the same figure for Mali is 35% of the total population.[73] Global estimates of caloric deficiency are decidedly 'rough', yet do provide some indication of the magnitude of the problem of food insecurity.

Effective efforts to alleviate food insecurity will require an understanding of who the food insecure are and where they are located within countries. Reutlinger identifies three principal groups facing chronic food insecurity in low-income countries: the urban poor, the rural landless, and the small-scale farmers.[74] In Africa, the food insecure are concentrated in rural areas where a majority of the

[73]World Bank, Challenge of Hunger in Africa (Washington, D.C.: World Bank, 1988), 1.

[74]World Bank, Poverty and Hunger, 29.

population lives and works.[75] The growing problem of urban poverty and malnutrition in many countries, however, accentuates the need for simultaneous efforts to strengthen the purchasing power of both rural and urban populations.

### 5.3 Appropriate Unit of Analysis

Global estimates of the magnitude of food insecure populations are based upon highly aggregated data of per capita calorie intake. Measurement error aside, these estimates obscure the question of caloric adequacy at the level of the household or the individual. Regional, seasonal, and rural-urban differences are likewise ignored in the aggregate analysis.

There is a need to look beyond aggregate measures of food security to identify the food insecure within countries. Clearly, disaggregation is necessary if food insecure groups are to be identified and interventions designed to reduce chronic food insecurity. Often data limitations due to cost and time considerations will dictate the level of analysis. It should be noted, however, that each level of aggregation tends to blur differences across groups as calorie surpluses and deficits are combined into average values. For example, even if caloric adequacy is achieved at the household level (a standard unit of analysis), individuals may still experience food insecurity within the family.[76] Intra-household food distribution may be skewed due to gender or age biases in traditional family arrangements.

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[75]World Bank, Challenge of Hunger in Africa, 2.

[76]See for example Austin, Berg, and Reutlinger and Selowsky.

## 5.4 Reducing Chronic Food Insecurity: Policy Implications

In the long-run food security can be achieved only by economic growth and an equitable distribution of its benefits. This process may require interventions to ensure food security for vulnerable groups in the short-run. Specific interventions cited in the literature to reduce chronic food insecurity are income transfers, food price subsidies, and food supply policies.[77] Other approaches which have been attempted by government and donors include public works programs (particularly in India), small-scale income generating projects, land reform (outside Africa) and population resettlement programs (Indonesia, Ethiopia).[78]

These interventions seek to increase the real incomes of those at risk of food insecurity, thus providing the basis for increased food consumption. However, almost all suffer from budgetary constraints and are difficult for governments to sustain over the long term in the absence of major donor and multilateral support.

## 5.5 Entitlements

In "Poverty and Entitlements" Amartya Sen likewise examines the relationship between hunger and poverty. The notion of 'exchange entitlement' developed by Sen rests upon an individual's ownership of resources and the ability to exchange those resources for commodities.

[77]Reutlinger, "Food Security and Poverty in Developing Countries," 208-211.

[78] In Ethiopia the resettlement policies may have been more directed at political than at welfare objectives.

Hunger/starvation arises as an inability of the poor to "establish entitlement to enough food."[70] To increase the entitlement of the poor to sufficient food requires a strengthening of their command over resources. Prices and incomes play a central role in determining 'entitlements' and nutritional outcomes; consumption analysis focuses on these key variables in assessing means to augment the food intake of vulnerable groups.

## 6. Conclusions

A number of perhaps depressingly familiar themes have emerged from this literature review. Hunger and poverty are inextricably linked as the Philippines, Brazil, Burkina Faso, and Dominican Republic studies indicate. There are short term measures which can be taken to improve the calorie consumption and nutritional status of poor households. However in the longer term, there appears to be no alternative to a policy framework which increases the income earning opportunities and productivity of the poorest members of society.

The theoretical and empirical literature on food consumption and expenditure provides an understanding of what variables affect consumption, and how changes in those variables make certain groups of consumers vulnerable to inadequate food intake. Laws of consumer behavior put forward by Engel, Bennett, and Slutsky have been tested in a number of empirical studies. These studies suggest that Engel's and

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[70]Amartya Sen, "Poverty and Entitlements," in Gittinger, Leslie, and Hoisington, 302. In an earlier work Amartya Sen discusses the relationship between poverty and famine, making the clear distinction between overall food availability and food entitlements: Amartya Sen, Poverty and Famines (Oxford: Oxford University Press, 1981).

Bennett's laws may not hold for the poorest households. The analytical techniques used in consumption analysis provide a means to measure how changes in key variables -- prices and income -- affect the consumption of the poor. This information is essential to the design of interventions to augment the calorie consumption of low-income households.

The literature on structural adjustment highlights that the poor are particularly vulnerable in the short-term to changes in the policy environment. On the one hand, their low incomes and highly concentrated expenditure patterns make them vulnerable to increases in food prices. And on the other, their low levels of human capital can make poor households relatively inflexible in responding to shifts in the pattern of labor demand. An absence of tradeable or liquid assets compounds the problem. Although economic growth and increased employment are the expected outputs of reform, interventions targeted to the poor are needed in the short-term to address the adverse welfare effects of adjustment.

Targeted interventions are central to the policy-oriented literature on poverty alleviation. In order to transfer resources more efficiently, targeting attempts to limit interventions to those who will benefit most. Identifying the target group -- in this case the poor -- requires a standard measure of welfare that allows one to distinguish between poor and non-poor groups. Studies of poverty use per capita expenditure (income) as a standard welfare measure. Household characteristics, however, may be correlated with poverty and could be used as cost-effective indicators to target interventions to the poor.

The challenge for policy-makers is to find interventions which transfer resources to the poor in a way that is efficient (i.e. few leakages to non-target group) and administratively cost-effective.

The food security literature examines the relationship between income/endowments and food consumption. It is clear from the literature that there are no easy solutions to the problem of inadequate food intake. It is not a simple question of economic growth, since inequitable distribution, particularly in the short-run, can adversely affect the consumption possibilities of the poor. Nor can it be addressed through food supply policies alone, since increasing food availability does not deal with problems of distribution and access. Targeted interventions are also inadequate since they can rarely be sustained (and frequently suffer from high leakages). The ambitious goal of the food security literature is to develop a framework that interprets these policy issues to understand how they affect the social objective of universal food security.

# CHAPTER 3

# HISTORICAL BACKGROUND -- FOOD POLICY REFORM IN MALI

## 1. Introduction

The purpose of this chapter is to provide the background to this research through a description of policy reform in Mali from 1981 to 1987. The impact of the reform process on different consumer groups will also be examined. The phase of food policy reform under way in Mali during this period focused on the liberalization of cereals marketing and pricing. Coarse grains and rice form the mainstay of the Malian diet; cereals likewise dominate the food production picture. The improvement of cereals production and marketing in this low-income Sahelian country has thus emerged as an issue of central concern to policy-makers.

This chapter is organized as follows. Section 1 provides an historical background of Mali in the post-independence period. Section 2 reviews cereals pricing and marketing reform since 1981. The effects of reform measures on consumers are examined in Section 3. Section 4 summarizes the Malian experience and outlines the case for further empirical work to assess the distributional effects of reform.

## 1.1 Background

Situated in West Africa, the Republic of Mali is among the poorest countries in the world. In 1985 the total population was estimated at 7.5 million with a GNP per capita of $150. Mali is poor by almost any standard, as the following socio-economic indicators attest: life expectancy is 46 years of age; 83% of the adult population is illiterate; 23% of children are enrolled in primary school; and the infant mortality rate is one of the highest in the world at 174 per 1000 live births.[80]

Approximately 80% of the population derived a livelihood from agriculture in 1985 when the sector represented 50% of GDP. Agriculture thus plays a dominant role in the economy, with agricultural performance influencing the standard of living for the majority of the population. Cereals form the base of the Malian diet, both rural and urban, and represent the bulk of food crop production. The agricultural sector is characterized by the production of staple food crops (millet, sorghum, maize, and rice) and the production of cotton, groundnuts, and livestock for export. Table 3.1 (in text) presents production figures for cereal and export crops, 1981/82 - 1986/87. In Mali, cereals production is extremely variable and highly correlated with rainfall conditions.[81]

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[80]World Bank, World Development Report 1987; World Bank, World Development Report 1988 (New York: Oxford University Press for the World Bank, 1988); and John W. Sewell and Stuart K. Tucker, Growth, Exports, and Jobs in a Changing World Economy: Agenda 1988 (New Brunswick, N.J.: Transaction Books, 1988), 246. Socio-economic indicators are for the period of analysis of this doctoral research: 1985.

[81]John M. Staatz, Josue Dione, and N. Nango Dembele, "Cereals Market Liberalization in Mali," World Development 17 (May 1989): 704.

TABLE 3.1

AGRICULTURAL PRODUCTION IN MALI, (METRIC TONS): 1981/82 - 1986/87

| | 1981/82 | 1982/83 | 1983/84 | 1984/85 | 1985/86 | 1986/87 |
|---|---|---|---|---|---|---|
| RICE PADDY | 175000 | 129000 | 120000 | 112000 | 231000 | 249000 |
| MILLET/SORGHUM | 871000 | 793000 | 670000 | 510000 | 1200000 | 1301000 |
| MAIZE | 70000 | 95000 | 75000 | 94000 | 238000 | 230000 |
| TOTAL CEREALS | 1116000 | 1017000 | 874000 | 716000 | 1669000 | 1780000 |
| GROUNDNUTS | 97800 | 48300 | 26300 | 37600 | 67000 | 88000 |
| COTTON | 97700 | 128000 | 140700 | 144200 | 176000 | 187500 |

DATA SOURCES:

CEREALS: USAID/MALI, 1988.

NON-CEREALS: IMF, Mali: Production Statistics, 1988.

For example, cereals production more than doubled with the onset of adequate rainfall in 1985 after two years of drought: production levels rose from a low of 716,000 MT in the 1984/85 agricultural season to 1,669,000 MT in 1985/86. Of the cereals, millet and sorghum predominate, representing approximately three quarters of total production, followed by rice and maize. Although rice does not figure prominently in terms of production, it is a preferred cereal in urban areas. Urban demand for rice in Mali has increasingly been met by imports, both commercial and concessional.

The drought conditions of the past two decades generated an increasing concern on the part of policy-makers to assure the bases for improved agricultural productivity and for sustained output growth. Prior to independence Mali was a cereals exporter. This situation had been reversed by the mid-1960's, however, as agricultural growth stagnated and shortfalls in production were met by cereal imports. Climatic variation contributed to poor agricultural performance in the post-independence period. However, the stagnation of agricultural growth was also attributable, in part, to the policy choices of the Malian government.[82] An historical review of cereals policy in Mali is therefore necessary to provide an understanding of the forces leading to the reform of cereals marketing and pricing in 1981.

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[82]Simmons, 3.

## 1.2 Cereals Policy in the Post-Independence Period (1960-1981)

Mali received independence from France in 1960, and the new government pursued an extensive nationalization scheme with the aim of laying the foundations of an African socialist state. The Modiba Keita regime (1960-68) was characterized by the establishment of numerous state run companies with control over domestic and foreign trade. In 1964 the Office Malien des Produits Agricoles (OPAM) was set up as the state cereals marketing board. OPAM was accorded monopoly power in cereals marketing with a principal aim being to assure a cheap and stable supply of grain to urban consumers.

Since the early years of independence the Malian government attempted to regulate the cereals market by setting official consumer and producer prices. The implicit objectives of cereals policy were threefold: "(i) to increase rural incomes; (ii) to provide cheap cereals to urban areas: and (iii) to finance national development through the extraction of surplus from the agricultural sector."[83] Implicit objectives aside, in practice the aim of keeping consumer prices low predominated. Official producer prices were set below those prevailing before independence, and farmers were forced to sell a proportion of their production to OPAM at artificially low prices.[84] Private cereals trade was prohibited as the state attempted to consolidate OPAM's control of the cereals market. Compulsory cereal

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[83]Staatz, Dione, and Dembele, 704.

[84]J. Dirck Stryker, Ignatius Peprah, and Donald Brean, Incentive System and Economic Policy Reform in Mali (Somerville, Mass.: Associates for International Resources and Development, Inc., 1986), 3.

procurement was only one aspect of state intervention: roadblocks were set up throughout the country to restrict private cereals trade, and an economic 'police force' was authorized to enforce OPAM's monopoly rights.

In 1968 a military coup brought General Moussa Traore to power. The new regime, in a departure from the socialist orientation of its predecessor, abolished the monopoly of OPAM in 1969 and raised official producer prices to stimulate cereal production. In 1969 private sector traders were provided credit to finance grain deliveries to OPAM. However, the state's monopoly of grain marketing was restored later that year as it became clear that private traders had little incentive to sell to OPAM at what were still below market prices.[85] Following the restoration of OPAM's monopoly, the Malian government established several state-run rural development organizations (ODR's) to promote cereals production and to serve as suppliers to OPAM.

Cereals pricing and marketing policies in subsequent years were influenced by both climatic and political economy considerations. The drought of 1972/74 highlighted the extreme variability of food crop production in Mali; shortfalls in production were met by an influx of food aid and commercial cereal imports. Similar to other Sahelian countries, Mali espoused a policy of food self-sufficiency as a means to address the uncertainties of climate and the increasing reliance on food imports. Official producer prices were raised to provide incentives to cereals production. Political pressures simultaneously dictated that

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[85]Charles P. Humphreys, "Cereals Policy Reform in Mali: Draft," (Washington, D.C.: World Bank, 1986), Photocopied, 2.

official consumer prices be kept low for the benefit of urban consumers. The increase in producer prices without a proportionate increase in consumer prices, however, resulted in a massive increase in OPAM's budget deficit to CFAF 20 billion ($80 million) in 1976/77.[86] The deficit financing of cereals pricing policies continued into the late 1970's with a worsening of OPAM's financial position as a result.

It should be noted that although consumer subsidies were in principle available to all urban consumers the primary recipients of subsidized OPAM grain were urban-based civil servants and the military. The government's policy of compulsory sales to OPAM at low official prices did not assure adequate grain supplies for all consumers; indeed OPAM was able to purchase only 20-40% of marketed domestic production.[87] As demand exceeded supply at official prices, OPAM had to ration its grain supplies to selected consumers. Government workers and the army -- two important political constituencies -- emerged as the privileged clientele of the state marketing system. In effect, the state used cheap cereals as wage goods since low cereal prices enabled government salaries likewise to be kept low.

The cereals policy of the Malian government in the post-independence period resulted in an official market system serving a limited clientele with excess demand spilling over into a parallel market. Parallel market prices were well above official prices. OPAM had a monopoly of cereals marketing in theory only. In practice, private traders operating in the parallel market handled two thirds or

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[86]Ibid., 7; and Stryker, Peprah, and Brean, 5.

[87]Humphreys, 5; and Stryker, Peprah, and Brean, 5.

more of marketed domestic production. The majority of consumers, those excluded from OPAM concessionary sales, were obliged to purchase cereals on the parallel market at higher prices.[88] The risk premium associated with illegal trade on the part of merchants was passed on to consumers in the form of higher prices for staple grains.

OPAM's chronic deficit situation led to increasing pressure for reform of cereals marketing and pricing. The growing fiscal deficits of the state marketing board -- evidence of OPAM's operating inefficiencies and an official consumer price that was too low relative to the official producer price -- combined with poor agricultural performance and an increasing reliance on cereal imports contributed to the adoption by the Malian government of a comprehensive reform program for the cereals sub-sector in 1981.

## 2. Cereals Pricing and Marketing Reform

### 2.1 Reform Objectives and Measures Implemented

The reform of the cereals market in Mali has been supported by the Cereals Market Restructuring Project (PRMC). Established in 1981, the PRMC represented a multi-donor/Government of Mali agreement to use food aid resources to promote cereal policy reform. The nine donor members of the PRMC[89] agreed to provide multi-year commitments of food aid in

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[88]Note that consumers excluded from concessionary sales included rural households who were net purchasers of cereals as well as urban households.

[89]Donor members of the PRMC include: Belgium, Canada, the European Community, France, West Germany, Great Britain, the Netherlands, the U.S., and the World Food Program. (Austria joined at a later date.) The first phase of the PRMC was for a five year period, 1981 - 1986, while the second phase of the project ran from 1986 - 1990.

support of the liberalization of cereals marketing and pricing. Food aid and the local currency generated by food aid sales were seen as necessary to cushion the redistributive effects of reform: food aid was intended to "provide the financial and commodity safety nets perceived to be necessary to persuade potential losers from the reform process to go along".[90]

In an economic sense, the term liberalization implies a shift away from state intervention in the economy towards allowing market forces to allocate resources and determine prices. As it was initially used by the PRMC, however, the French term liberalisation denoted the legalization and promotion of private sector participation in the cereals market. Government control of prices was not to be fully relinquished, but rather, official prices were to be adjusted incrementally. Official prices were still to act as the reference price for the market. The objectives of the PRMC centered on a restructuring of the cereals market: liberalization of cereals marketing and pricing was to be a gradual rather than an abrupt process. The three specific objectives of the reform program were the:

i) Liberalization of the cereals market to include private traders.

ii) Promotion of cereals production by increasing producer prices and hence incentives.

iii) Reduction of the costs of the official marketing system: aligning official producer and consumer prices to reduce the level of subsidies.

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[90]Simmons, 7.

Under the PRMC reform program the intent was not to eliminate OPAM, but rather to promote the participation of the private sector in cereals marketing. Indeed, a reduction of the costs of the official marketing system involved improving the operating efficiency of OPAM. The PRMC thus acknowledged OPAM's regulatory role in the market while limiting its functions to that of "stabilizing market prices [through offsetting buffer stock arrangements], increasing producer incentives, and distributing emergency food aid."[91]

The government of Mali and the donors in the PRMC initially agreed to implement a series of policy reform measures over a period of 5 years. The PRMC provided commodity and financial resources in support of the three reform objectives outlined above. Table 3.2 (in text) presents cereals market reform measures by objective and year of implementation.

Reform measures enacted during the first phase of the PRMC, (1981-1986) highlight the gradual nature of the transition towards the liberalization of cereals marketing and pricing. The coarse grain market was liberalized in 1981, while paddy and rice market liberalization followed, albeit much more slowly, in 1986. Official producer and consumer prices were adjusted upwards on an annual basis. OPAM's financial situation initially improved due to the implementation of a cost-reduction and financial management programme: truck fleet reductions, staff cutbacks, and improved accounting controls. However, the premises of the reform program were called into question as cereal production conditions changed in the mid-1980's. The good harvests and

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[91]Staatz, Dione, and Dembele, 705-706.

TABLE: 3.3

MALI: CEREALS POLICY REFORM MEASURES: 1981/82 - 1986/87

| YEAR | OBJECTIVES | | |
|---|---|---|---|
| | LIBERALIZATION OF THE CEREALS MARKET | IMPROVE CEREAL PRODUCTION BY INCREASING PRODUCER PRICES | REDUCE COSTS OF THE OFFICIAL MARKETING SYSTEM |
| 1981/82 | Liberalization of Coarse Grain Market: Millet, Sorghum, and Maize.<br><br>Removal of Import Constraints | | OPAM Cost-Reduction/Financial Management Programme put into Effect<br>-- Truck Fleet Reduction<br>-- Staff Cutbacks<br>-- Accounting Control System |
| 1982/83 | Initiation of Retail Market Information System | Increase in Official Producer Prices:<br>i) Coarse Grains: from 42.5 to 45 FCFA/kilo.<br>ii) Paddy: from 50 to 55 FCFA/kilo. | Increase in Official Consumer Prices:<br>i) Coarse Grains: from 55 to 62.5 FCFA/kilo.<br>ii) Rice: from 105 to 115 FCFA/kilo. |
| 1983/84 | Initiation of Negotiations on Paddy Market Liberalization | Increase in Official Producer Prices:<br>i) Coarse Grains: from 45 to 50 FCFA/kilo.<br>ii) Paddy: from 55 to 61 FCFA/kilo. | |
| 1984/85 | Liberalization of Paddy Marketing in Operation Riz Ksipli, (Rice Producing ODR)<br><br>Initiation of Dialogue between the PRMC and Government of Mali on Office du Niger Reforms, (Principal Rice Producing ODR) | Increase in Official Producer Prices:<br>Paddy: from 60 to 65 FCFA/kilo. | Increase in Official Consumer Prices:<br>Rice: from 115 to 125 FCFA/kilo. |
| 1985/86 | Liberalization of Paddy Marketing in Office du Niger<br><br>ODR Rice Milling Services Offered to Private Sector | Increase in Official Producer Prices:<br>i) Coarse Grains: from 50 to 55 FCFA/kilo.<br>ii) Paddy: from 65 to 70 FCFA/kilo.<br><br>Implementation of OPAM Price Support Activity | Increase in Official Consumer Prices:<br>i) Coarse Grains: from 57.5 to 65 FCFA/kilo.<br>ii) Rice: from 125 to 135 FCFA/kilo. |
| 1986/87 | Elimination of OPAM's Monopsony Relationship with Rice Producing ODR's<br><br>Liberalization of the Rice Market<br><br>Seasonal Credit Provided to Private Sector Cereals Traders | Official Paddy Price Maintained at 70 FCFA/kilo in Office du Niger Only<br><br>Management Reforms in Rice Producing ODRs Implemented<br><br>Malian Government Abandons Official Producer Prices for Coarse Grains: Millet, Sorghum, and Maize | Malian Government Abandons Official Consumer Prices for Coarse Grains: Millet, Sorghum, and Maize<br><br>Malian Government Limits OPAM Role to:<br>i) Management of Security Stock<br>ii) Management/Distribution of Food Aid.<br>iii) Assuring Food Supplies to Chronically Deficit Regions.<br>iv) Development/Maintenance of Market Information Service |

SOURCES:

1981/82 - 1986/87: Emmy Simmons, Policy and Structural Reform of Grain Markets in Mali, (Overseas Development Institute, London: September 1987), 12 - 14.

1986/87: John D. Sloatz, James Dione, and M. Mango Doubola, Cereals Market Liberalization in Mali," in World Development, Vol. 17, No. 9, 709.

falling prices of 1985/86 and 1986/87, after successive years of drought, required a re-assessment of reform measures aimed at increasing producer and consumer prices and of OPAM's role in the cereals market.

## 2.2 Cereals Production and Prices: 1985/86 and 1986/87

The period of analysis of this doctoral research -- May 1985 to May 1986 -- spans a year that was unique. The survey data were collected in 3 rounds over the course of the year.[82] The first round of the survey was a season characterized by adequate rainfall. However. stocks were low following two years of drought, and many Malians depended on food aid cereals for their daily meals. The outlook for cereals production in 1985/86 was initially pessimistic in spite of apparently good rains, and coarse grain and rice prices remained high until the harvest of October/November. The good rainfall conditions resulted in relatively high production levels, and open market cereals prices, both producer and consumer, began to fall.[83] In November of 1985 OPAM stepped in to support official producer prices by purchasing coarse grains and paddy/rice. OPAM procurement of cereals did serve to stabilize the decline in official producer prices; however, the

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[82]The DNSI household expenditure survey was conducted in three rounds:

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|---|---|
| Round 1: | May - August 1985 |
| Round 2: | September - December 1985 |
| Round 3: | January - May 1986 |

[83]Total cereals production (millet/sorghum, maize, and paddy) was estimated at 1,669,000 MT in 1985/86 compared to 716,000 MT in the previous year. U.S. Agency for Economic Development, Consolidating Cereals Market Reform in mali: an Analysis of Current and Potential Roles for Public and Private Sector Institutions in the Grain Market, by Jennifer Bremer and Lyn Ellsworth (Bamako, Mali: U.S. Agency for International Development, 1986).

depletion of OPAM finances (both seasonal credit from the banking system and credit supplied by PRMC counterpart funds) in February 1986 and OPAM's subsequent withdrawal from the market resulted in prices falling dramatically. Cereal prices continued to fall over the third and final round of survey data collection when under normal conditions prices should have risen.

Contrary to expectations, coarse grain prices also fell throughout the following rainy season as farmers continued to move cereal supplies on to the now liberalized markets. In 1986 rains were again plentiful and cereals production in 1986/87 reached record levels. Due to financial constraints and large carry-over stocks from the previous year OPAM was unable to intervene in the market to support official producer prices. Open market prices in 1986/87 were again lower than official consumer prices, and OPAM's financial situation worsened as it was unable to sell its stocks at official prices. Two consecutive years of good harvests confirmed that producer price support interventions were not a viable option in Mali; as a result, the state redefined the role of OPAM in 1987, in effect restricting its activities, and officially abandoned the administered price system for coarse grains.[94]

### 2.3 Rationale for the TUFTS/DNSI/USAID Study of Food Prices and Consumption in Urban Mali

It is important to note that at the outset of the PRMC reform program little empirical information existed as to how consumers would respond to the reform process. Indeed, the present research on food

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[94]Staatz, Diane, and Dembele, 709.

consumption in urban Mali was prompted by the PRMC reform program. The 1985 policy reform agenda highlighted the issue of consumer prices, particularly for rice, the only commodity market still controlled by OPAM. The PRMC considered the raising of official consumer prices a critical step towards reducing OPAM's fiscal deficit. It was clear that a policy of maintaining official consumer prices below open market levels had resulted in considerable subsidies borne by the state marketing board.

When contemplating the effects of rice price liberalization in July of 1985, questions were posed by the PRMC as to how urban consumers would respond to an increase in prices. It was expected that rice price increases would result in consumers, particularly the poor, shifting from rice towards the relatively cheaper coarse grains (millet and sorghum). In the absence of any information on urban food consumption in Mali, the TUFTS/DNSI/USAID study of food prices and consumption was undertaken in 1986.

The PRMC proposal to raise official consumer prices to market level prices was presented to the Malian government in July of 1985. The International Monetary Fund (IMF) supported the proposed consumer price increase for coarse grains (from 62.5 to 95 CFA/kilo) and rice (from 125 to 165 CFA/kilo) and included it as part of the Stand-By Agreement being negotiated at that time.

The proposal for the price increase, however, was considered politically dangerous by the Malian government. There was a perceived risk, on the part of the government, that the magnitude of the price rise would trigger consumer unrest as the purchasing power of key

political constituencies declined. Indeed, the "indicated increases in food prices without compensatory increases in salaries in the government of Mali view, risked political crisis."[95] This crisis was averted, however, as the PRMC agreed to cover the government's payments to the rice producing ODR's, thus freeing the state to commit itself to a salary increase in 1986; in return, the PRMC was assured a role in the restructuring of all cereal-producing ODR's later that year.[96] As a result, the proposed consumer price increases were incorporated into the Stand-By Agreement that was signed and put into effect in November of 1985. At the time of implementation, however, little was known as to the consumer response. The negotiation and subsequent enactment of this price policy measure thus provided the impetus for research assessing the effects of price changes on the food consumption of urban households.

## 2.4 Outcomes of the Reform Process

To date, the accomplishments of the cereal market reform process in Mali have been mixed. The PRMC has been characterized by effective dialogue and cooperation between the Government and a multi-donor group in support of cereals market reform. During the early years of the reform programme, food aid proved an effective resource, both in financial and commodity terms. The benefits of using food aid resources in support of reform were sharply diminished, however, when the cereal

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[95]U.S. Agency for International Development, Evaluation of the Title II, Section 206 Project in Mali (Bamako, Mali: U.S. Agency for International Development, 1986), 6.

[96]Ibid., 6.

production situation shifted to that of surplus in the mid-1980's. Increasing the cereal supply through concessional imports at that time would have put downward pressure on already low prices; as a result, the donor members of the second phase of the PRMC have sought to use financial as well as commodity resources to support cereals market reform in Mali.[87]

The reform process in Mali focused on improving agricultural productivity and growth through market and price liberalization. The pace of change for market liberalization (i.e. legalization and promotion of private sector involvement) has been slower than expected. Although full liberalization of the cereals market, both coarse grains and paddy/rice, was accomplished by 1986, private traders in Mali still face barriers to participation in the market. Financial and transport constraints create barriers to entry to the private sector in the cereals market.

In terms of price policy, PRMC policy-makers initially assumed that price liberalization would entail increases in official consumer and producer prices, and this would result in stimulating production while reducing the costs of the official marketing system. Short-run costs to consumers would include a decline in purchasing power as prices rose. In the Mali case, however, climate emerges as the principal determinant of production and prices.[88] The good cereal production levels of 1985/86 and 1986/87 underscored the inability of OPAM to intervene in the market to support producer prices. Adequate rainfall

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[87]Staatz, Dione, and Dembele, 709.

[88]Ibid., 711.

and subsequent good harvests resulted in open market prices, producer and consumer, falling well below official levels. Unable to support prices due to lack of resources, the Malian government gave up the system of official coarse grain prices in 1987. Allowing market forces to determine prices, however, is only part of the answer to problems of low agricultural productivity and growth. In Mali agricultural producers face a host of binding constraints, in addition to climate, that limit their capacity to respond to improved price incentives: lack of inputs, poor extension services, limited access to improved technologies (equipment and seed varieties), and lack of marketing infrastructure.

### 3. The Effects of Cereals Market Reform on Consumers

The effects of reform are complex and differ across socio-economic groups. From the consumer perspective, some general comments can be made on the distributional consequences of reform. The principal losers from the reform process were those privileged consumers -- government workers and the army -- who no longer had access to OPAM sales at subsidized prices. The bulk of consumers, however, appear to have benefited from the reform process. First, consumers benefited from cereals market reform due to the large quantities of food aid provided by the PRMC and sold through OPAM on the open market. The influx of food aid cereals in the early 1980's resulted in a decline in market prices, thus augmenting the purchasing power of households.[88] Second, cereals market liberalization and the subsequent legalization of the

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[88]Ibid., 714; and Humphreys, 27.

parallel market should have resulted in a fall in consumer prices as the risk premium of private traders was eliminated.[100]

Despite the benefits of reform for the majority of consumers, many urban households in Mali lack the resources to purchase adequate supplies of staple cereals to meet minimum caloric requirements. Limited purchasing power restricts the ability of low-income households to maintain an adequate diet. The purchasing power of urban consumers as a group was augmented by the decline in staple cereal prices during the 1985/86 agricultural campaign, the year of the survey on which this doctoral research is based. Indeed, the IMF-mandated increase in official consumer prices in November 1985 had little effect, as the increased cereal supply resulted in market prices below official prices. The improvement in rainfall conditions and cereal production in 1985/86 is mirrored by an improvement in calorie intake of urban households across seasons. Data from the DNSI/TUFTS/USAID survey, however, show that although there was improvement in average food intake during the year, per capita calorie consumption of poor households was still far below recommended levels.

## 4. Conclusions

In summary, the principal objectives of food policy reform in Mali were to promote market liberalization, increase domestic grain production, and reduce the operating deficits of the state marketing board (OPAM). At the outset policymakers assumed that market liberalization would involve an increase in both consumer and producer

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[100]Staatz, Dione, and Dembele, 714.

prices. In the early years of the reform program official prices were adjusted upwards gradually. Producers were expected to respond to improved price incentives by increasing production levels, while in the short-run consumers were expected to bear the costs of declining purchasing power as prices rose. In the face of rising rice prices, consumers were expected to substitute towards millet and sorghum as cheaper sources of calories. Substitution between rice and coarse grains was expected to be more pronounced for the poor than for relatively wealthy consumers. Long-run benefits would include a decline in consumer prices as agricultural output increased. Changing market conditions in the mid-1980's -- principally the shift from a chronic cereal deficit situation to that of surplus -- resulted in market prices falling below official prices. The administered price system for coarse grains was officially abandoned by the state in 1987 as it became clear that price support actions were financially unviable.

Policy-makers entered the PRMC reform program subject to a high degree of uncertainty as to the outcomes of the reform process. In 1981 little or no empirical information was available on cereals consumption in Mali. One response by policy-makers to this dearth of information was to invest in better data as an input into the continuing reform process. As a result, the TUFTS/DNSI/USAID study of urban households was commissioned in 1986 to assess the effects of price changes on food consumption. The findings of that study showed that within the observed range of prices, there was no substitution between rice and coarse grains for the sample as a whole. This dissertation carries the

analysis further and explores in more detail the characteristics and consumption patterns of the urban poor in Mali.

Cereal market reform in Mali provided the impetus for this doctoral research. The initial research problem was one of determining the adverse effect of price policy reform on the food consumption of the poor in urban Mali and how to mitigate that effect. It was expected that reform would result in increased consumer prices, thus reducing the purchasing power of poor households. In 1985/86 the fortuitous return of the rains and good harvests, however, resulted in cereal prices falling over the course of the year. Although these circumstances altered the initial research problem, the focus on the characteristics and consumption of the poor remains relevant in urban Mali. With or without the reform process, caloric deficiency is a serious and chronic problem facing low-income urban households. Interventions to improve the calorie consumption of the poor require an understanding of how changes in incomes and prices effect their food consumption.[101] Furthermore, information on household and employment characteristics is needed in order to design interventions to augment the income of the poor, and thus improve their access to food.

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[101]Information on the price responsiveness of the poor is particularly relevant given increases in staple cereal prices since 1985/86. Informal interviews in Bamako (June 1988) suggested that households were substituting towards millet/sorghum as a cheaper source of calories since rice prices had risen substantially.

# CHAPTER 4

# METHODOLOGY

## 1. Source of Data

The expenditure data used in this dissertation are taken from the Enquete sur les Depenses des Menages Urbains conducted by the Direction Nationale de la Statistique et de l'Informatique, May 1985-June 1986. Financed by the World Bank, the principal objective of the DNSI survey was to collect detailed household expenditure data in order to construct a consumer price index. Although the original survey recorded all household expenditures, both food and non-food, the quantities of most food items were noted in traditional measures. In order to use the household expenditure data for food consumption analysis, a complementary data set of standardized food quantities was collected by the Tufts University School of Nutrition (1986-1987). The latter data collection effort and subsequent analysis were financed by USAID with the aim of ascertaining the effects of price policy changes on the food consumption of urban households. This dissertation goes further to analyze the food consumption patterns and determinants of consumption of low-income households in urban Mali.

## 2. Survey Design

The DNSI survey of a nationally representative sample of urban households was conducted in Bamako and the 7 regional capitals of Kayes, Koulikoro, Sikasso, Segou, Mopti, Gao, and Tombouctou. Data on expenditures were collected in three rounds from 576 survey households, 240 in Bamako and 48 in each of the regional capital cities. Interviews were conducted in the same households in each round. The sampling frame was based on the sections de numeration of the 1976 Population Census adjusted for population growth; housing compounds and households within compounds were selected with probabilities proportional to size. The household was chosen as the unit of analysis and was defined as those individuals who ate from a common pot (marmite commune) on a regular basis.[102]

The supplementary data on standardized food quantities were collected in the food markets specific to each city and in three rounds to correspond with the DNSI expenditure data. Sixty different traditional food measures were recorded in the DNSI survey, ranging from tas (pile) to poignee (handful). These measures themselves often had several prices for a given food such as 100 CFA, 200 CFA, 300 CFA per tas. In order to transform traditional measures into their kilo or litre equivalents, observations on the weight in grams of each different

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[102]The following DNSI documents provide a detailed review of the survey methodology: Mali, Direction Nationale de la Statistique et de l'Informatique, Enquete sur les Depenses des Menages Urbains: Methodologie - Resultats Preliminaires (mai 1985 - juin 1986) (Bamako, Mali: Ministere du Plan, 1987); and Mali, Direction Nationale de la Statistique et de l'Informatique, Enquete sur les Depenses des Menages Urbains: Resultats Definitifs (Bamako, Mali: Ministere du Plan, 1989).

measure for each food were collected. A unit price for each food purchase in each season was then calculated by dividing expenditure by the estimated average quantity value.

### 3. Survey Instrument and Implementation

The survey questionnaire was divided into three principal components: introductory (presentation), weekly (hebdomadaire), and retrospective (retrospectif). In order to capture changes in household size/composition over the year, the introductory questionnaire was conducted at the beginning of each round of data collection and at the end of the final round. This component of the survey questionnaire collected demographic and socio-economic data on the household including information on education, marital status, sectors and status of employment, housing, home production/gifts, and ownership of consumer durables and livestock. Detailed household expenditures, including item, place of purchase, quantities, and amount spent, were recorded in the weekly and retrospective questionnaires. The weekly questionnaire was conducted in three rounds, and recorded all regular household expenditures within one week using a 48 hour recall period; this week was considered representative of regular household expenditures for a given season.[103] The retrospective questionnaire recorded all non-regular or large purchases and for a given household was conducted up to 15 times during the survey period. Expenditures from the retrospective

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[103]This component of the survey questionnaire was conducted 4 times over a one week period in each round of data collection.

questionnaire were thus added over the year to arrive at total expenditure on non-regular household purchases.

The data form for the supplementary information on food quantities recorded the various traditional measures and corresponding standardized weights for each food item. By city and season the enumerators collected 10 observations on each food measure, weighing the traditional measure and noting its kilo equivalent weight. Examples of the DNSI questionnaire and the TUFTS/USAID data forms are presented in Appendix 1.

### 4. Data Processing and Analysis

TUFTS/USAID Project staff coded and cleaned the DNSI and the supplementary quantity data in Mali. The SPSS Data-Entry Package was used to enter the data onto PC computers: cross-checks and rules were written into the program to minimize errors of data entry. The aggregation of the expenditure and food consumption data to the household and per capita level was accomplished using SPSSX on the mainframe computer at Tufts University. Descriptive analysis of the data for this dissertation used both the mainframe and PC versions of SPSS, while the econometric analysis was performed using the Stata statistical package.[104]

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[104]It should be noted that during the course of the survey some of the sample households were replaced. Data from these replacement households are included in the analysis. For comparisons between and across regions three groups were used in the descriptive analysis: (i) country-wide; (ii) five Southern cities (Bamako, Koulikoro, Sikasso, Segou, Mopti), and Kayes Tombouctou, and Gao; and (iii) city-by-city. The econometric analysis was conducted on the group of five Southern cities, as well as the sample population as a whole.

## 5. Variables

Combining the DNSI and TUFTS/USAID data sets allowed for the calculation of standard food quantities and unit prices. In this way, household expenditure could be linked to food consumption levels. The key variables used in the analysis of food consumption and its determinants in urban Mali are presented below:

### 5.1 Per Capita Expenditure

In this study per capita expenditure, including the value of home production, is used as a proxy for income. As noted in the literature review, expenditure is typically used as a measure of economic status since it is more accurately reported and less variable over time than income.[105] The expenditure variable is average total monthly expenditure plus the estimated value of home production/gifts divided by the number of household members.

### 5.2 Home Production

In the DNSI survey, households were asked about the importance of home production and gifts of the following food commodities: rice, millet, maize, meat, fish, milk, peanuts, potatoes, cassava, and yams. The question was phrased in relative terms and the household was asked whether consumption from home production/gifts was less than, equal to, or greater than household purchases of these commodities. In order to use this information, we assigned values of .5 to less than, 1 to equal

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[105]Grootaert, 10.

to, and 1.5 to greater than purchases. This value was multiplied by purchased quantities to impute a quantity to food consumed from non-market sources; we assumed that the unit price of purchased food was also applicable to home-produced/gift food. The imputed value of home production/gifts was then added to purchased expenditures and quantities to arrive at total per capita expenditure and total quantity consumed of a particular food. Total consumption of calories and of protein variables were then calculated from the total quantity consumed of each food. It should be noted that the majority of sample households in urban Mali depend on the market for food acquisition, purchasing 96% of the value of total consumption, so that the error involved in the estimation of consumption from home production/gifts is not great for most families.

## 5.3 Food Quantities

Purchased food quantities per capita were calculated using the standardized quantity data collected in the field. First, purchased food quantities were converted from traditional to standard measures and were summed for each household. This total figure was divided by the number of household members to arrive at per capita purchased quantities at the household level; dividing through by the number of days in the reference period (usually one month) yielded a per capita daily quantity figure for each food item purchased by the household in each season.

## 5.4 Food Prices

The food price per kilo variables were calculated using the expenditure and quantities recorded at the household level. First, the traditional measures noted in the DNSI questionnaire were standardized using the quantity data collected in the field. Total expenditure on each food commodity was then divided by quantity to compute the household and cluster (city) level unit price weighted by the quantity purchased. Due to the method of computing prices in this study, errors in measurement of quantity and price are inversely related: under-estimation of quantity results in over-estimation of price and vice versa. Thus, to correct for the bias associated with measurement error of the quantity and price variables the cluster weighted average price was used for each food in each season.[106]

## 5.5 Calorie and Protein Consumption Per Adult Equivalent

The food consumption variables were calculated based on the quantity data noted in the DNSI questionnaire converted to their standardized kilo or litre equivalents, and include the value of home production and gifts. The following reference texts were used to calculate calorie and protein consumption.

Food and Agriculture Organization/U.S. Department of Health, Education, and Welfare, (FAO/USDHEW), Food Composition Table for Use in Africa, (Rome, Italy: FAO, 1968).

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[106]Angus Deaton, "Quality, Quantity, and Spatial Variation of Price," The American Economic Review 78 (June 1988): 419. Note: For purposes of analysis, each of the eight survey cities in Mali is defined as a cluster. Cluster prices are thus city level weighted average prices for each food in each season.

U.S. Department of Agriculture, (USDA), Nutritive Value of American Foods in Common Units, Agricultural Handbook No. 456, (Washington, DC: USDA, 1975a).

U.S. Department of Agriculture, (USDA), Composition of Food: Raw, Processed, Prepared, Agricultural Handbook No. 8, (Washington, DC: USDA, 1975b).

In this dissertation average calorie and protein consumption levels were adjusted to reflect the age and sex composition of the sample population. An adult male of moderate activity served as the reference case, with recommended intake levels of 2,300 calories and 52.3 grams of protein per day according to FAO/WHO.[107] Table 4.1 in Annex 1 presents adult caloric equivalent units by age and sex. Assigning the adult male a value of one, energy and protein requirements of 14 age-sex groupings were used to calculate the number of adult equivalents per household. Calorie and protein consumption per adult equivalent was determined by dividing total household consumption by the number of adult equivalents in each survey household. Daily consumption was then computed by dividing this value by the number of days in the reference period.

## 5.6 Demographic and Socio-Economic Variables

Although primarily concerned with household expenditures, the DNSI survey also collected detailed information on the demographic and socio-economic characteristics of urban households in Mali. This information was used to construct variables on household size and composition, as well as on employment, education, and asset ownership. Chapter 6 of

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[107]FAO/WHO. Energy and Protein Requirements: Report of a Joint FAO/WHO/UNU Consultation, Technical Report Series, no. 724 (Geneva: World Health Organization, 1985), 133-137.

this dissertation analyzes this data and presents a profile of poor households in urban Mali.

## 6. Data Limitations

Due to the use of expenditure data collected for purposes other than food consumption analysis, measurement error arises as the principal limitation of the data used in this dissertation. As discussed earlier, the original DNSI household survey recorded food expenditures, yet frequently noted traditional instead of kilo or litre food measures. In the absence of standardized measures, supplementary food quantity data was collected a year after the original expenditure data. Although it was impossible to control for differences in measures across years, seasonal adjustment was attempted by collecting quantity data in three rounds to correspond with the original expenditure data. The food quantity, calorie/protein, and the imputed price variables are thus subject to considerable measurement error, and are less reliable than the expenditure data to which they are linked. Furthermore, one cannot distinguish quality differences of a given food due to the general commodity codes assigned in the DNSI questionnaire. As a result, shifts in quality versus quantity of the same food are masked and cannot be assessed in the multi-variate analysis. Millet and Sorghum were also often noted under the same general code in the DNSI questionnaire; thus, for the purposes of analysis, purchased quantities of these coarse grains were added together and a weighted average unit price was imputed.

# CHAPTER 5

# CONSUMPTION CHARACTERISTICS OF THE POOR

## 1. Introduction

This chapter presents a descriptive analysis of the food consumption characteristics of poor urban households in Mali. The data presented here highlight the major characteristics of the sample population that distinguish the poor from the non-poor. The emphasis of this chapter, however, is on identifying differences in consumption patterns among the group defined as poor. The reason for examining consumption characteristics is to improve the design of interventions to augment the food consumption of poor households. In particular, the identification of differences in consumption patterns between expenditure groups may provide a basis for targeting interventions to the poor. Ordinary Least Squares regression analysis -- focusing on the most important calorie and protein sources in the diet -- will then be used in Chapter 7 to ascertain the determinants of consumption of the urban poor.

The organization of this chapter is as follows. Section 1 examines the consumption characteristics of the entire sample stratified by total per capita expenditure (income) Section 2 then identifies the poor and examines caloric adequacy within this group. Subsequent sections examine the principal variations in consumption within the

group defined as poor. Section 3 focuses on the expenditure and food consumption patterns of the poor. The major findings of the descriptive analysis are then summarized and presented in Section 4. The primary focus throughout is on the food consumption of the poor in urban Mali. In this chapter, the examination of consumption characteristics provides an understanding of who the poor are, where they are located, and what they eat. Information of this nature can increase the efficiency of poverty alleviation interventions by reducing leakages to non-poor groups, improve the relative distribution of benefits in favor of the poorest groups (ultra-poor), and identify options for interventions that have a low administrative cost.

This chapter builds on the Tufts/USAID/DNSI study of food prices and consumption in Mali in several ways.[108] The descriptive analysis in that report focused on food expenditure and consumption patterns of the sample as a whole. This chapter takes a number of further steps. First, the focus is on identifying the poor and presenting an analysis of the consumption characteristics of that group. Second, consumption has been adjusted to reflect differences in the age and sex composition of the sample: consumption is estimated on the basis of adult equivalent units rather than in per capita terms, and includes both calories and protein. Differences in caloric adequacy as a percentage of recommended intake and the consumption 'gap' are then assessed: (i) between the poor and the non-poor and (ii) within the group defined as poor. Third, the percentage share of the household budget spent on various non-food commodities is calculated for poor households. Fourth,

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[108]Rogers and Lowdermilk.

poverty incidence and depth indicators are calculated for the group defined as poor by region. Lastly, in the description of consumption characteristics this chapter goes beyond the TUFTS/USAID/DNSI study to provide a detailed analysis of consumption patterns in the group defined as poor.

### 1.1 Sample Stratification by Income (Expenditure)

The technique used to stratify the sample is based on total expenditure data. Although theoretically it would be preferable to use income data, thereby reflecting differences in savings across the sample, problems with income measurement in developing countries have generated the use of an alternative yardstick for measuring welfare based on total expenditure data.[109] There are two main reasons for the choice of expenditure data as an income proxy to stratify the sample. First, the use of expenditure data is consistent with economic theory. In welfare economics, welfare is considered a function of the consumption of goods and services: as the consumption of goods/services increases so too does household welfare.[110] Ranking households by total expenditure levels therefore provides a reasonable approximation of their relative welfare. Second, the vast majority of empirical studies on poverty use total expenditure data as a measure of household welfare.

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[109]See Literature Review, Section 3.

[110]Glewwe and van der Gaag, 3-4.

In addition to total expenditure, other indicators which have been used in the literature to measure welfare include food expenditure and calorie consumption.[111] Appendix 2 contains the main findings of sample stratification using these two indicators. These indicators, however, suffer from a number of drawbacks. Ranking sample households on the basis of food expenditure rather than total expenditure provides little, if any, new information since these two variables are highly correlated. Furthermore, the food expenditure ranking implies that poor and wealthy households have the same food share (share of the total budget allocated to food) which is inconsistent with the empirical evidence.[112] Stratifying the sample on the basis of calorie intake levels provides a measure of welfare that distinguishes calorie deficient households from those who are not. The principal drawback, however, relates to statistically estimating the determinants of consumption for sub-groups of the population. Dividing the sample into calorie adequate and calorie inadequate households and defining the latter group as poor truncates the sample on the basis of the dependent variable. Truncation introduces bias since the error term in the 'poor' sub-sample is not distributed normally.[113] Stratifying on the basis of calorie consumption also ranks households according to a single determinant of

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[111]See Glewwe; Alderman; and Kanbur for a review of different welfare indicators.

[112]Glewwe, 5, 75-77.

[113]Alderman, 63-65.

welfare, thereby capturing less information than a total expenditure measure.[114]

### 1.2 Per Capita Expenditure Deciles

Per capita expenditure deciles were calculated based upon annual expenditure levels across all households, including the estimated value of food from home production and gifts. Using this breakdown, households were assigned deciles relative to expenditure boundaries where decile one contains the poorest 10% and decile 10 contains the wealthiest 10% of the survey population. For the entire sample, household per capita expenditure ranges from a low of 2,204 CFA/month ($6) in decile 1 to a high of 26,374 CFA/month ($74) in decile 10.[115]

Across cities the percentage of households in each expenditure decile varies quite markedly, reflecting significant regional differences in income/wealth. Those cities with more than 50% of households in the lower 5 deciles are Kayes (84%), Sikasso (68%), Tombouctou (68%), Mopti (58%), and Gao (60%). Cities with a concentration of households in the upper 5 deciles are Bamako (57%), Koulikoro (73%), and Segou (57%). Across regions, Kayes and Tombouctou are the poorest cities with a clustering of households in the lower 3 expenditure deciles at 58% and 43% respectively. The preponderance of low-income households in these two regions is far from surprising. Kayes and Tombouctou are the most isolated regions in Mali, located in

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[114]It should be noted that calorie consumption may be an appropriate (albeit partial) welfare indicator if one considers food to be the most important consumption good.

[115]Exchange Rate (1985): 358 CFA/$

the extreme west and north of the country respectively. Limited agricultural potential coupled with a weak transportation infrastructure contribute to the relative poverty of these two regions. In terms of poverty alleviation, the greater concentration of low-income households in the North and West of the country suggests targeting of interventions by geographic region. Regional differences in expenditure/consumption and their implications for policy will be explored in Section 3.6 below.

Tables 5.1 and 5.2 (in text) present summary sample characteristics stratified by expenditure decile. Chapter 5 tables not shown in the text are presented in Appendix 3.

### 1.3 Food Share of Total Expenditure

Food represents the largest share of total expenditure for urban households in Mali. The percentage of the household budget allocated to food is substantial across all cities, ranging from 64% in decile 1 to 44 % in decile 10. For the sample population as a whole, the share of total household expenditure allocated to food decreases as income rises, consistent with Engel's law.

### 1.4 Calorie Consumption as a Percentage of Recommended Intake Levels

Assessing the magnitude of the consumption 'gap' -- calorie and protein deficits -- requires a standard measure of intake against which one can measure actual energy consumption. The FAO/WHO food intake recommendations provide information on requirements based upon age, sex, and activity levels. Socio-economic conditions in low-income countries, however, are often different from those in the reference Western case:

TABLE 5.1

SAMPLE CHARACTERISTICS: HOUSEHOLDS STRATIFIED BY PER CAPITA EXPENDITURE DECILES

| DECILES: PER CAPITA EXPENDITURE | PER CAPITA MONTHLY EXPENDITURE (CPA) | FOOD SHARE OF TOTAL EXPENDITURE | PER CAPITA MONTHLY FOOD EXPENDITURE (CPA) | RICE SHARE OF FOOD EXPENDITURE | OTHER CEREALS SHARE OF FOOD EXPENDITURE | DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT | DAILY CALORIC INTAKE AS A % OF RECOMMENDED LEVELS * | FOOD EXPENDITURE (CPA) PER 100 CALORIES |
|---|---|---|---|---|---|---|---|---|
| 1 | 2204 | 0.64 | 1321 | 0.23 | 0.18 | 1023 | 0.44 | 4.3 |
| 2 | 3724 | 0.64 | 2283 | 0.22 | 0.15 | 1300 | 0.61 | 5.4 |
| 3 | 4626 | 0.62 | 2842 | 0.21 | 0.16 | 1577 | 0.63 | 6.2 |
| 4 | 5524 | 0.6 | 3421 | 0.23 | 0.16 | 2043 | 0.89 | 5.6 |
| 5 | 6221 | 0.50 | 3027 | 0.24 | 0.14 | 2235 | 0.97 | 5.6 |
| 6 | 8443 | 0.59 | 4963 | 0.22 | 0.15 | 2500 | 1.11 | 6.3 |
| 7 | 10114 | 0.57 | 5587 | 0.22 | 0.16 | 2890 | 1.26 | 6.4 |
| 8 | 12227 | 0.57 | 6547 | 0.22 | 0.17 | 3513 | 1.53 | 6.2 |
| 9 | 15922 | 0.51 | 7762 | 0.18 | 0.14 | 3864 | 1.50 | 7.1 |
| 10 | 26374 | 0.44 | 10890 | 0.18 | 0.16 | 5112 | 2.22 | 7.0 |
| AVERAGE | 8195 | 0.56 | 4743 | 0.22 | 0.16 | 2540 | 1.13 | 6.04 |
| N = | 517 | | | | | | | |

* : Number of Households

* : UNO/FAO Recommended Caloric Intake Level = 2,300 Calories per Adult Equivalent

TABLE 5.2

SAMPLE CHARACTERISTICS: PERCENTAGE OF HOUSEHOLDS IN PER CAPITA EXPENDITURE DECILES BY REGION

| DECILES: PER CAPITA EXPENDITURE | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.1 | 2.1 | 10.2 | 7.1 | 0.1 | 12.0 | 14.8 | 4.0 |
| 2 | 5.5 | 0.0 | 14.3 | 8.9 | 0.1 | 26.0 | 16.7 | 6.0 |
| 3 | 11.4 | 4.2 | 14.3 | 5.4 | 5.5 | 20.0 | 11.1 | 18.0 |
| 4 | 11.4 | 10.4 | 16.3 | 14.3 | 10.4 | 10.0 | 13.0 | 16.0 |
| 5 | 11.4 | 10.4 | 10.2 | 10.7 | 10.4 | 8.0 | 7.4 | 16.0 |
| 6 | 11.3 | 14.6 | 6.1 | 23.2 | 14.5 | 8.0 | 14.8 | 12.0 |
| 7 | 13.3 | 16.7 | 10.2 | 8.9 | 9.1 | 4.0 | 11.1 | 10.0 |
| 8 | 11.0 | 14.6 | 14.3 | 5.4 | 10.9 | 2.0 | 7.4 | 6.0 |
| 9 | 11.1 | 14.6 | 2.0 | 5.4 | 7.3 | 8.0 | 1.9 | 4.0 |
| 10 | 8.6 | 12.5 | 2.0 | 10.7 | 1.0 | 2.0 | 1.9 | 6.0 |
| ALL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| N = | 155 | 48 | 49 | 56 | 55 | 50 | 54 | 50 |

N : Number of Households

climate or chronic illness caused by infection/parasites may modify calorie requirements.[116] Thus, these recommendations serve as a guide rather than as a definitive statement on requirements.

The results of the TUFTS/DNSI/USAID project calculated consumption on a per capita basis. Although per capita estimation of caloric intake provides a preliminary look at adequacy for the population as a whole, this method is somewhat misleading since it does not take into consideration the differing caloric needs of household members. Across all cities in Mali, poor households have a greater number of children than wealthy households. Accordingly, per capita estimates of calorie consumption levels are lower, and per capita calorie deficits higher than those estimated by the adult equivalency method. The per capita method results in over-estimating average calorie deficits for those households in the lower 5 deciles by 38%.

To adjust for the age and sex composition of survey households, this study calculated energy requirements based upon adult equivalency units (AEU). The value of one was given to an adult male of moderate activity weighing 66 kilos (145 pounds): recommended intake of 2,300 calories and 52.3 grams of protein per day. Household members were assigned weights according to fourteen age-sex groupings using the adult equivalent as the measure of unity.[117]

Using WHO/FAO food intake recommendations as a standard, caloric intake as a percentage of recommended levels was calculated for each household. Disaggregation by expenditure deciles highlights the

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[116]Lipton, The Poor and the Poorest, 10-11.

[117]FAO/WHO, 133-137.

significance of per capita income as a determinant of caloric adequacy. Calorie consumption is positively associated with income and rises dramatically across deciles with no levelling off at the higher end of the income distribution. The data reveal that calorie deficient households are concentrated in the lower 5 deciles of the sample distribution; on average, households in deciles 6 - 10 achieve caloric adequacy.

After adjusting for the age and sex composition of household members, the average size of the calorie deficit for those in the lower 5 deciles is 525 calories per adult equivalent per day across all cities.[118] Households in the upper five deciles show a calorie surplus of 1,048 calories per adult equivalent per day. These average figures, however, mask large variations by expenditure decile, region, and season. For example, within the low income group there are large deviations from the mean: average calorie deficits for the sample as a whole range from 1,277 calories per day in decile 1 to 65 calories per day in decile 5. In Mali, widespread calorie deficits are a salient feature of urban consumption. The depth of calorie deficiency in the lowest deciles suggests the importance of targeting interventions to the poorest groups in society. Tables 5.3 - 5.4 (in text) present calorie deficits by region and season.

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[118]Note that the average calorie deficit for the lower 5 deciles is 725 calories per day when using the per capita method of estimation.

TABLE 5.3

AVERAGE CALORIE CONSUMPTION AND DEFICITS, BY REGION AND EXPENDITURE GROUP: ROUNDS 1, 2, AND 3

| DECILES: PER CAPITA EXPENDITURE | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT: | | | | | | | | |
| Average: | 2507 | 2206 | 2261 | 2144 | 2075 | 1384 | 2185 | 2041 |
| Deciles 1 - 5: | 1751 | 1720 | 1965 | 2178 | 2130 | 1173 | 1644 | 2014 |
| Deciles 6 - 10: | 3066 | 2755 | 2555 | 2776 | 4012 | 2416 | 2266 | 2069 |
| DAILY CALORIE DEFICIT/ SURPLUS PER ADULT EQUIVALENT: | | | | | | | | |
| Average: | 207 | 508 | -39 | 844 | 875 | -916 | -115 | 541 |
| Deciles 1 - 5: | -840 | -571 | -265 | -121 | -170 | -1126 | -856 | -286 |
| Deciles 6 - 10: | 766 | 1455 | 555 | 1476 | 1712 | 216 | 966 | 1669 |
| N = | 265 | 49 | 49 | 96 | 55 | 56 | 54 | 59 |

DEFICIT = (-)
SURPLUS = (+)

NOTE: WHO/FAO Recommended Calorie Intake Level = 2,300 Calories/Adult Equivalent/Day

CALORIE CONSUMPTION BY SEASON: DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT — TABLE 5.4

| DECILES: PER CAPITA EXPENDITURE | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| HOUSEHOLDS IN DECILES 1 - 5: | | | | | | | | |
| Round 1 | 1390 | 1651 | 1436 | 2057 | 1402 | 1100 | 1400 | 2534 |
| Round 2 | 1513 | 1926 | 2134 | 1603 | 1921 | 1144 | 1672 | 1304 |
| Round 3 | 1928 | 1712 | 2080 | 2105 | 2010 | 1342 | 1412 | 1982 |
| HOUSEHOLDS IN DECILES 6 - 10: | | | | | | | | |
| Round 1 | 2580 | 3050 | 2047 | 3746 | 4297 | 2004 | 4140 | 5030 |
| Round 2 | 3104 | 3287 | 3100 | 3378 | 3224 | 2027 | 3200 | 4203 |
| Round 3 | 3303 | 4254 | 2850 | 4233 | 4400 | 2253 | 3343 | 3050 |

CALORIE DEFICIT/SURPLUS BY SEASON: DAILY CALORIE DEFICIT/SURPLUS PER ADULT EQUIVALENT

| DECILES: PER CAPITA EXPENDITURE | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| HOUSEHOLDS IN DECILES 1 - 5: | | | | | | | | |
| Round 1 | -910 | -640 | -864 | -243 | -808 | -1200 | -1[illegible]1 | 234 |
| Round 2 | -787 | -374 | -166 | -887 | -379 | -1156 | -1223 | -906 |
| Round 3 | -372 | -580 | -214 | -115 | -280 | -958 | -980 | -1210 |
| HOUSEHOLDS IN DECILES 6 - 10: | | | | | | | | |
| Round 1 | 250 | 1550 | 847 | 1446 | 2597 | -200 | 1840 | 2720 |
| Round 2 | 684 | 987 | 880 | 1079 | 924 | 307 | 900 | 1983 |
| Round 3 | 1803 | 1954 | 850 | 2953 | 2169 | -47 | 1943 | 1350 |
| N = # OF HOUSEHOLDS | N = 256 | 48 | 49 | 53 | 55 | 50 | 54 | 50 |

NOTE: (i) Weaknesses in the calculation of total calorie consumption are attributable to measurement error of the food quantity variable. See Chapter 4 (Methodology) for a discussion of data limitations.

(ii) Average calorie consumption levels for the entire sample improved over the period of the survey. Poor households in all cities except Gao showed a consistent increase in calorie consumption over the year. Gao stands out as an odd case, with calories consumed falling dramatically for both poor and wealthy households. This effect can be seen on a smaller scale for wealthy household in Tombouctou. Both Northern cities received substantial amounts of food aid during the drought; the decline in consumption levels may be attributable to the fall in food aid supplies as economic conditions improved over the year.

(iii) Round 1 (May - August 1985), Round 2 (September - December 1985), and Round 3 (January - May 1986).

### 1.5 Cereal Shares of Food Expenditure

Across deciles cereals dominate the food budget. Cereals represent the principal share of food expenditures in all deciles ranging from 41% in decile 1 to 33% in decile 10. For the sample as a whole, a breakdown of cereals shows that on average rice represents the largest share of food expenditure at 22% followed by coarse grains at 16%. Throughout the expenditure distribution, the data show the importance of rice in the household food budget.

### 1.6 Efficiency of Food Expenditure

Food expenditure per 100 calories was calculated to assess the efficiency of expenditure on food across deciles. Households in the lower deciles are more efficient and spend less per 100 calories than those at the higher end of the income distribution. As income increases across deciles, food expenditure per 100 calories rises from 4.3 CFA/100 calories in decile 1 to 7 CFA/100 calories in decile 10, suggesting purchases of higher quality foods. Data on dietary composition presented below, however, show little diversification into higher priced calorie sources as income rises. These two findings indicate that households may be shifting among different qualities of the same food rather than into different foods as income increases across deciles. The implications for policy would be that lower qualities of certain foods may act as inferior goods that self-target the poor as discussed in Section 1.8 below. For example, lower grades of rice or coarse grains may act as inferior goods in urban Mali. It is not possible, however, to examine the quality issue with this data set; as noted in

Chapter 4, different qualities of the same food were grouped under general codes in the DNSI expenditure questionnaire.

### 1.7 Dietary Quality: Starchy Staples Ratio

In food consumption analysis, the proportion of calories derived from starchy staples (cereals and root crops) is often used as a measure of dietary quality. According to Bennett's law, the starchy staples ratio falls with rising income as consumers diversify into higher priced calories.[119] In urban Mali, however, this relationship is not pronounced. The starchy staples ratio for all cities falls only slightly as income rises, even though total caloric intake increases. This suggests that even relatively 'wealthy' urban households are at the lower end of the income scale or, less likely, that Bennett's law does not hold in Mali. Both poor and wealthy households appear to be concerned primarily with increasing the quantity rather than the quality of food consumed as income rises. Again, shifts among qualities of the same food with increases in income are masked due to data limitations, and therefore cannot be examined with the Mali data.

### 1.8 Inferior Goods

It is important from a policy perspective to identify those foods which are inferior, commodities whose consumption falls as income rises.[120] Foods consumed primarily by the poor are the best candidates for subsidies aimed at increasing the calorie intake of that group. In

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[119]Timmer, Falcon, and Pearson, 56.

[120]Rogers and Lowdermilk, 10-11.

Mali, urban households consume rice and coarse grains in stable proportions, with increasing quantity the principal effect of rising income. Since higher income households consume greater quantities, any subsidy on prices of staple foods would serve to transfer a larger amount of income to the wealthy than to the poor. In many developing countries, coarse grains and tubers are inferior goods and serve as efficient carriers of subsidies, increasing the calorie intake of the target group without a great deal of leakage to the wealthy. This is not apparent in the Mali case, where coarse grains are consumed by wealthy and poor alike. Clearly, the lack of inferior goods in Mali limits the potential of commodity specific interventions to be targeted towards the poor.

Although it cannot be confirmed with this data set, the efficiency of expenditure and dietary composition data suggest that households may shift among different qualities of the same food. If lower qualities of a given food act as inferior goods in urban Mali, subsidization of those lower quality products would augment the calorie consumption of poor households. Further research is required to investigate the quality issue in urban Mali.

## 2. Drawing the Poverty Line: Defining the Poor in Urban Mali

In this study the poverty line was drawn at the fifth decile of the expenditure distribution. This was done for three main reasons. First, the majority of calorie deficient households are concentrated in the lower 5 expenditure deciles. Second, from an econometric standpoint, a 50% cut-off of the expenditure distribution allows

sufficient variation to estimate expenditure-group specific price elasticities. Third, this definition of the poor minimizes the number of 'mis-classified' households defined as:

(i) Case 1: Households in the wealthy deciles that are calorie inadequate.

(ii) Case 2: Households in the poor deciles that are calorie adequate.

Table 5.5 (in text) shows the results of drawing the poverty line at different deciles of the expenditure distribution. As one can see, the distribution is a U shape where the lowest point is when the poverty line is drawn at decile 5. The group defined as poor -- the lower 5 deciles of the sample population -- contains a substantial proportion of calorie deficient households (77%), while minimizing the number of calorie adequate 'poor' and calorically inadequate 'wealthy'. Throughout this study information on food consumption patterns and other socio-economic characteristics is presented using a breakdown between poor households (expenditure deciles 1 - 5) and wealthy households (expenditure deciles 6 - 10).

There is clearly a certain arbitrariness in where to draw the poverty line. Glewwe and van der Gaag note that "one cannot eliminate the subjective element when drawing the line, so that any poverty line involves value judgments of some kind".[121] Drawing a line based on total expenditure establishes a relative measure of poverty: those households falling below the line are considered poor relative to the rest of the population. Commonly used poverty lines in the literature are the

[121]Glewwe and van der Gaag, 5.

TABLE 5.5

DRAWING THE POVERTY LINE BY EXPENDITURE DECILE: NUMBER OF CASE 1 AND 2 HOUSEHOLDS

| PER CAPITA EXPENDITURE DECILE CUT-OFFS | CASE 1 HOUSEHOLDS | CASE 2 HOUSEHOLDS | TOTAL NUMBER OF CASE 1 AND 2 (MISCLASSIFIED) HOUSEHOLDS |
|---|---|---|---|
| 1 | 262 | 4 | 266 |
| 2 | 216 | 9 | 225 |
| 3 | 157 | 15 | 172 |
| 4 | 108 | 32 | 140 |
| 5 | 65 | 65 | 130 |
| 6 | 40 | 113 | 153 |
| 7 | 21 | 162 | 183 |
| 8 | 13 | 215 | 228 |
| 9 | 5 | 252 | 257 |
| 10 | 0 | 284 | 284 |

CASE 1 = 'WEALTHY' CALORIE DEFICIENT HOUSEHOLDS
CASE 2 = 'POOR' CALORIE ADEQUATE HOUSEHOLDS

bottom 10% and 30% of the sample population. Nevertheless, the decision to draw the line at 50% in this research, although slightly higher than the literature 'standard', seems justified given the prevalence and depth of calorie deficiency in the bottom 5 deciles.

## 2.1 Caloric Adequacy

Although on average caloric deficiency characterizes the poor, the depth of calorie deficiency varies for households in the lower 5 expenditure deciles. To assess the depth of the consumption gap, households were assigned to groups based on consumption as a percentage of recommended intake levels. Caloric adequacy groups were defined as households meeting: (i) less than 80% of recommended caloric intake, (ii) between 80% and 100% of recommended caloric intake, and (iii) 100% or more of recommended caloric intake. Table 5.6 (in text) presents caloric adequacy for poor and wealthy households. A regional breakdown of caloric adequacy groups is shown in Tables 5.7 - 5.11.

An assessment of caloric adequacy as a percentage of recommended intake shows that for the urban poor only 24% of households meet 100% or more of calorie requirements. Those households falling below the recommended intake level -- 2,300 calories per adult equivalent -- are concentrated in the less than 80% category. Clearly, a substantial proportion of the population is at serious risk of nutritional deficiency. Households meeting less than 80% of calorie requirements represent 58% of the poor population, while households between 80% and 100% represent 18% of the poor population.

TABLE 5.6

POOR HOUSEHOLDS: CALORIC CONSUMPTION AS A % OF RECOMMENDED INTAKE LEVELS, (ADULT EQUIVALENCY)

| | PER CAPITA MONTHLY EXPENDITURE (CFA) | FOOD SHARE OF TOTAL EXPENDITURE | PER CAPITA MONTHLY FOOD EXPENDITURE (CFA) | RICE SHARE OF FOOD EXPENDITURE | CEREALS SHARE OF FOOD EXPENDITURE | DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT | FOOD EXPENDITURE (CFA) PER 100 CALORIES | % OF HOUSEHOLDS IN CALORIC ADEQUACY GROUP |
|---|---|---|---|---|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 4845 | 0.6 | 2802 | 0.10 | 0.14 | 1233 | 7.00 | 0.38 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 6023 | 0.64 | 3820 | 0.21 | 0.15 | 2043 | 5.86 | 0.18 |
| HOUSEHOLDS WITH > 100% OF CALORIC ADEQUACY | 6120 | 0.68 | 3740 | 0.26 | 0.10 | 2822 | 4.27 | 0.24 |

WEALTHY HOUSEHOLDS: CALORIC CONSUMPTION AS A % OF RECOMMENDED INTAKE LEVELS, (ADULT EQUIVALENCY)

| | PER CAPITA MONTHLY EXPENDITURE (CFA) | FOOD SHARE OF TOTAL EXPENDITURE | PER CAPITA MONTHLY FOOD EXPENDITURE (CFA) | RICE SHARE OF FOOD EXPENDITURE | CEREALS SHARE OF FOOD EXPENDITURE | DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT | FOOD EXPENDITURE (CFA) PER 100 CALORIES | % OF HOUSEHOLDS IN CALORIC ADEQUACY GROUP |
|---|---|---|---|---|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 10707 | 0.47 | 4907 | 0.12 | 0.11 | 1568 | 11.46 | 0.10 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 12500 | 0.49 | 5860 | 0.17 | 0.15 | 2090 | 8.86 | 0.13 |
| HOUSEHOLDS WITH > 100% OF CALORIC ADEQUACY | 13020 | 0.50 | 7043 | 0.22 | 0.16 | 3327 | 8.18 | 0.76 |

Disaggregation of the poor by adequacy group reveals the robustness of income as a determinant of caloric adequacy. Per capita monthly expenditure increases steadily across adequacy groups. Poor households fulfilling less than 80% of calorie requirements allocate a large proportion of their total expenditures to food at 60%. Those who are calorie deficient among the poor spend more per 100 calories than those who reach caloric adequacy. This may be attributable to the concentration of Kayes, Tombouctou, and Gao households in the group experiencing less than 80% of caloric adequacy. Cereal prices reflect the high costs of transportation and marketing in these three cities, and are higher on average than in Southern Mali.[122] For those among the poor who achieve caloric adequacy, average calorie intake exceeds the minimum recommended level by only 27%.

Disaggregation by caloric adequacy highlights marked differences between poor and wealthy households. The findings of this study show that the majority of low-income households are calorie deficient. Poor households represent 77% of all calorie deficit households, and 86% of all households that suffer from less than 80% of caloric adequacy. In contrast, the majority of relatively wealthy households experience caloric adequacy. Among wealthy households there is a small group that appears to be calorie deficient despite much higher levels of income and food expenditure than calorically adequate poor households. The reason for this may be that wealthy households experiencing calorie deficiency are making expenditure choices that result in low consumption despite

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[122]See Section 3.6 below for a discussion of regional price differences.

relatively high income levels. In support of this explanation, it should be noted that calorie deficient wealthy households spend significantly more per capita on food than calorie adequate poor households. Furthermore, calorie deficient wealthy households appear to spend more per 100 calories (i.e. are less efficient) than the calorie adequate poor.

As discussed above, the data show that calorie deficiency represents a serious problem for an extremely large proportion of the urban population. From a policy perspective, the prevalence and depth of caloric inadequacy faced by poor households suggests that interventions to raise their calorie consumption will be extremely costly in budgetary terms. This issue will be examined in Chapters 7 & 8 where analysis is presented on income transfers as a means to increase the food intake of poor households. Using the income elasticities generated from the econometric analysis, the minimum cost of the income transfer required to increase the daily calorie consumption of poor urban households to the 2,300 level recommended by FAO/WHO is calculated.

### 3. Expenditure and Consumption Patterns of the Poor

This section examines the consumption characteristics of low-income households in order to determine if there are significant differences within the group defined as poor that will serve as a basis for developing interventions to increase the calorie consumption of specific groups.

### 3.1 Food as a Share of Total Expenditure

For the poor, the percentage of the household budget allocated to food is 62%. As income rises there is a stabilization of the food share of total expenditure at 64% in deciles 1 and 2, followed by a decline to 59% in decile 5.

Average per capita expenditure on food rises from 1,321 CFA in decile 1 to 3,927 CFA in decile 5. There is an interesting relationship between income growth and per capita food expenditure changes through the deciles. At first, almost all the extra income is allocated to increased expenditure on food, (i.e. as we move from decile one to decile two). On a percentage basis, per capita food expenditure increases at the same rate as income. However, as one moves from deciles two to five, increases in income surpass increases in food expenditure thus following the behavior predicted by Engel's law. This finding supports Lipton's hypothesis that the poorest segments of the population -- the ultra-poor -- increase their expenditures on food as income rises.

Table 5.12 (in text) presents the shares of total expenditure by product groups for the poor. A regional breakdown of product group shares is presented in Tables 5.13 - 5.22.

### 3.2 Non-Food Expenditures

After food, clothing and housing represent the major shares of expenditure for poor households across cities at 11% and 12% respectively. Expenditure on transportation follows at 4% of total expenditure. Health expenditures are quite small representing only 1%

TABLE 5.12

POOR HOUSEHOLDS:

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS, BY DECILE: ROUNDS 1, 2, AND 3

ALL CITIES:

| | AVERAGE (Deciles 1-5) | DECILE 1 | DECILE 2 | DECILE 3 | DECILE 4 | DECILE 5 | AVERAGE (Deciles 6-10) |
|---|---|---|---|---|---|---|---|
| FOOD | 62 | 64 | 64 | 61 | 60 | 59 | 56 |
| CLOTHING | 11 | 11 | 11 | 11 | 11 | 12 | 11 |
| HOUSING | 12 | 10 | 11 | 12 | 12 | 12 | 12 |
| HEALTH | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| TRANSPORT | 4 | 3 | 3 | 4 | 4 | 5 | 7 |
| OTHER | 11 | 12 | 11 | 10 | 12 | 11 | 13 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

of total expenditure. There is little variation in non-food expenditures across deciles except for transportation which rises from a low of 2% in decile 2 to a high of 5% in decile 5. These shares represent very low absolute expenditure levels on basic needs items such as health and housing, and may have adverse implications for the productivity and income earning possibilities of the poor. For example, malaria is endemic in Mali, and observation suggests that it results both in absenteeism and low levels of worker productivity. Given extremely limited resources, poor households are often unable to purchase malaria medication, and thus suffer the debilitating effects of this illness on a recurring basis.

### 3.3 Percentage of Food Expenditure Allocated to Food Groups

Cereals represent the principal expenditure out of the food budget. For the poor, the percentage of food expenditure allocated to cereals is 38%. Other major categories of food expenditure are meat (13%), sugar (8%), fruits/vegetables (8%), oil (5%), and peanuts (5%). Rice plays a major role in both the budgets and diets of poor households, representing nearly 60% of cereal expenditures. The remaining 40% of cereal expenditure is devoted primarily to millet/sorghum, with wheat and maize following as less preferred cereals.[123] Regional variation of food expenditure shares can be seen only for a few commodities. Clearly, policy interventions to augment the calorie consumption of low-income households must take into account the

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[123]As noted in Chapter 4, millet and sorghum are treated as one food due to the grouping of these two coarse grains under one general code in the DNSI questionnaire.

dominant role of cereals, particularly rice, in both the food budget and the diet.

Food and cereal group shares of expenditure by region and expenditure decile are presented in Tables 5.23 - 5.28. The description of food expenditure/consumption patterns draws upon the findings of the TUFTS/DNSI/USAID research project.[124]

Disaggregation of poor households in Table 5.23 (in text) shows little variation in food expenditure shares across deciles. Among the poor, the rice share of food expenditure remains fairly stable at 23%. Coarse grains, however, show a slight decline from 18% of food expenditure in decile 1 to 14% in decile 5. Interestingly, the relatively large sugar expenditure share remains stable at 8% across deciles; even the poorest households allocate a substantial portion of their food budgets to sugar purchases.

Among the poor, the percentage of cereal expenditure allocated to individual cereals shows the dominant role of rice: rice shares increase from 53% in decile one to 64% in decile 5. Millet and sorghum shares of cereal expenditure increase slightly across deciles while that of maize falls. Table 5.24 (in text) presents a breakdown of cereal expenditure shares among poor households.

### 3.4 Home Production and Gifts

The majority of sample households depend on the market for food acquisition, purchasing 96% of the value of total consumption. Poor households rely on non-market sources for 6% of total consumption

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[124]Rogers and Lowdermilk, 5-12.

TABLE 5.23

POOR HOUSEHOLDS:

PERCENTAGE OF FOOD EXPENDITURE ALLOCATED TO FOOD GROUPS, BY DECILE: ROUNDS 1, 2, AND 3

ALL CITIES:

| | AVERAGE | DECILE 1 | DECILE 2 | DECILE 3 | DECILE 4 | DECILE 5 |
|---|---|---|---|---|---|---|
| RICE | 23 | 23 | 22 | 21 | 23 | 24 |
| OTHER CEREALS | 16 | 18 | 16 | 16 | 16 | 14 |
| MEAT | 13 | 13 | 11 | 16 | 13 | 14 |
| MILK | 2 | 1 | 3 | 2 | 3 | 2 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 5 | 5 | 6 | 5 | 4 | 5 |
| LEGUMES | 0 | 0 | 0 | 0 | 0 | 0 |
| PEANUTS | 5 | 4 | 5 | 5 | 6 | 5 |
| TUBERS | 1 | 0 | 1 | 1 | 1 | 1 |
| SUGAR | 6 | 7 | 8 | 8 | 8 | 8 |
| FRUIT/VEGETABLES | 8 | 7 | 8 | 8 | 8 | 8 |
| OTHER | 19 | 22 | 20 | 19 | 18 | 19 |

Poor = Expenditure Deciles 1, 2, 3, 4, & 5

TABLE 9.24

POOR HOUSEHOLDS:

PERCENTAGE OF CEREAL EXPENDITURE ALLOCATED TO INDIVIDUAL CEREALS, BY DECILE: ROUNDS 1, 2, AND 3

ALL CITIES:

| | AVERAGE | DECILE 1 | DECILE 2 | DECILE 3 | DECILE 4 | DECILE 5 |
|---|---|---|---|---|---|---|
| RICE | 57 | 53 | 57 | 57 | 56 | 64 |
| WHEAT | 11 | 7 | 11 | 13 | 13 | 9 |
| MILLET/SORGHUM | 18 | 17 | 17 | 18 | 19 | 22 |
| MAIZE | 2 | 5 | 1 | 2 | 0 | 0 |
| OTHER | 12 | 18 | 14 | 10 | 12 | 5 |

Poor = Expenditure Deciles 1, 2, 3, 4, & 5

compared to 2% for wealthy households. Households in all cities augment their food consumption through home production/gifts of a number of commodities: cereals, meat, milk, peanuts, and tubers. In Gao, Tombouctou, and Kayes, home production/gifts of cereals represent a relatively important source of food for poor households; 51% of poor households in these cities noted home production of cereals compared to 27% of wealthy households. The econometric analysis confirms a positive relationship between home production and calorie consumption in all cities, suggesting that public sector provision of garden plots may augment the food consumption of poor households. (See Chapter 7 for further discussion of home production/gifts and its affect on food purchases and calorie consumption.)

Tables 5.29 - 5.34 show the percentage of households with home production/gifts by commodity, expenditure group, and region.

### 3.5 Food Consumption Patterns of the Poor

Similarities rather than differences mark the consumption patterns of poor urban households in Mali. Cereals form the base of the diet, contributing the majority of both calories and protein. The contribution of food groups to calorie and protein consumption by region are presented in Tables 5.35 - 5.56.

The econometric analysis presented in Chapter 7 concentrates on the most important calorie/protein sources in the diets of the poor as identified below -- rice, millet/sorghum, peanut-butter, and meat -- and estimates how changes in prices, income, and other socio-economic variables influence their consumption.

### 3.5.1 Principal Sources of Calories

Cereals are the dominant source of calories in the diet of the poor, contributing 77% on average to daily caloric intake. The dominance of cereals in the diet is seen in all survey cities, across expenditure deciles and seasons. For the urban poor, rice is clearly the preferred calorie source accounting for 42% of daily intake; coarse grains follow at 35%, of which millet/sorghum are the most important. Other sources of calories are: peanuts/peanut-butter (8%), sugar (6%), and oil (5%). The contribution of tubers to caloric intake is negligible across all regions and expenditure deciles. Tables 5.35 and 5.36 (in text) show the contribution of the major food groups to caloric consumption for the sample as a whole.

The overwhelming dominance of cereals implies limited diversity in the diet for poor households and this is confirmed by observation. Meal patterns in urban Mali consist primarily of a cereal base served with a sauce made of peanut-butter, meat, vegetables, or leaves. Rice and sauce is served at the mid-day meal, while a millet/sorghum dough (toh) and sauce is served in the evening Breakfast usually consists of a millet/sorghum porridge, bouillie. Qualitative interviews with households suggest that thinning of the sauce is common in poor households. If the household cannot afford to purchase meat, vegetables or leaves, the sauce is prepared with only bouillon -- traditional soumbala or cube maggi -- to add flavor to the rice or millet/sorghum base. Poor households may also reduce the number of meals per day from three to two as a way to economize on food.

TABLE 5.31

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 1010 | 40 | 720 | 42 | 1317 | 40 |
| OTHER CEREALS | 868 | 35 | 610 | 35 | 1140 | 34 |
| MEAT/POULTRY | 54 | 2 | 35 | 2 | 75 | 2 |
| MILK | 24 | 1 | 15 | 1 | 54 | 2 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 125 | 5 | 84 | 5 | 168 | 5 |
| LEGUMES | 6 | 0 | 4 | 0 | 0 | 0 |
| PEANUTS, PEANUT-BUTTER | 212 | 8 | 141 | 8 | 285 | 9 |
| TUBERS, PLANTAIN | 14 | 1 | 9 | 1 | 20 | 1 |
| SUGAR | 185 | 7 | 113 | 6 | 282 | 8 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2500 | 100 | 1742 | 100 | 3322 | 100 |
| N = | 617 | | 321 | | 296 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.30

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT
ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| FOOD GROUP | DECILE 1 CALORIES | DECILE 1 % | DECILE 2 CALORIES | DECILE 2 % | DECILE 3 CALORIES | DECILE 3 % | DECILE 4 CALORIES | DECILE 4 % | DECILE 5 CALORIES | DECILE 5 % |
|---|---|---|---|---|---|---|---|---|---|---|
| RICE | 312 | 38 | 515 | 38 | 699 | 41 | 745 | 42 | 898 | 42 |
| OTHER CEREALS | 343 | 42 | 494 | 37 | 606 | 36 | 582 | 32 | 756 | 35 |
| MEAT/POULTRY | 14 | 2 | 29 | 2 | 31 | 2 | 40 | 2 | 47 | 2 |
| MILK | 6 | 1 | 14 | 1 | 16 | 1 | 22 | 1 | 16 | 1 |
| EGGS | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 |
| OIL | 39 | 5 | 71 | 5 | 76 | 4 | 89 | 5 | 85 | 4 |
| LEGUMES | 2 | 0 | 8 | 0 | 4 | 0 | 3 | 0 | 6 | 0 |
| PEANUTS, PEANUT-BUTTER | 59 | 7 | 114 | 8 | 160 | 9 | 171 | 10 | 175 | 8 |
| TUBERS, PLANTAIN | 3 | 0 | 0 | 0 | 10 | 1 | 7 | 0 | 14 | 1 |
| SUGAR | 43 | 5 | 92 | 7 | 109 | 6 | 127 | 7 | 150 | 7 |
| TOTAL DAILY CALORIE CONSUMPTION PER AEU | 820 | 100 | 1340 | 100 | 1699 | 100 | 1767 | 100 | 2159 | 100 |

NOTE: Weaknesses in the calculation of total calorie consumption are attributable to measurement error of the food quantity variable. See Chapter 4 (Methodology) for a discussion of data limitations.

### 3.5.2 Principal Sources of Protein

The principal source of protein in the diet is likewise cereals. For the poor, rice and coarse grains contribute 73% to daily protein intake. Cereals are followed by peanuts/peanut-butter (15%) and meat (10%) as major protein sources in the diet. Again, the predominance of cereals holds true for all low-income households and in all seasons. This compares with an average contribution of 68% for cereals, 15% for peanuts/peanut-butter, and 12% for meat in the top 5 per capita expenditure deciles.

### 3.5.3 Rice as the Preferred Cereal

The Mali findings show that poor urban households consume rice across all regions. Rather than being a luxury good, rice forms the base of the urban diet, followed by less preferred cereals. The preferred role of rice in the diets of the poor is also confirmed by the econometric analysis in Chapter 7. The regression results show that an incremental increase in income results in a greater increase in the consumption of rice than of millet/sorghum.

As discussed in the TUFTS/DNSI/USAID study, the preference for rice may be attributable to time/labor, cost, and taste factors.[125] Rice does not need to be ground or pounded, thus taking substantially less time to prepare than millet/sorghum. The cooking time and fuel costs for rice are likewise lower than for millet/sorghum; interviews with households indicate that a kilo of rice takes approximately 25 minutes

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[125]Ibid., 25.

to cook as compared to 1 hour for millet/sorghum. Although rice is more expensive per kilo than other cereals, households appear to make purchase decisions on the basis of the cooked quantity of staple cereals. For example, respondents noted that to feed the same number of people requires 5 parts of millet/sorghum compared to 4 parts of rice. Finally, informal interviews with Malians suggest that rice is the cereal of choice for taste reasons. This is not to say that millet/sorghum acts as an inferior good. Urban households consume about equal proportions of rice and coarse grains across income groups. Millet/sorghum appears to play a complementary role in the diet, and is considered 'less harsh on the stomach' than rice. Malian children are also weaned on a millet/sorghum gruel since it is said to be easier to digest than rice.

## 3.6 Regional Differences

### 3.6.1 Poverty Incidence and Depth Indicators[128]

Poverty incidence and depth indicators were estimated to highlight the regional distribution of the poor in the survey population. The incidence of poverty, measured by the percentage share of poor individuals in the sample population, ranges from 31% in Segou to 92% in Kayes. The two Northern cities of Tombouctou and Gao show a high incidence of poverty at 69% and 67% respectively. The depth of poverty, measured by the percentage 'expenditure gap' of the average poor

[128]Poverty incidence and depth indicators are those cited by Visaria, 41-54: Lipton, The Poor and the Poorest, 58; and Glewwe and Kanaan, 13.

household from the poverty line,[127] shows that the gap is most pronounced in Kayes (39%) and Tombouctou (37%). Sikasso (34%), Segou (33%), and Bamako (28%) follow as cities where the depth of poverty is most visible. The regional breakdown of the sample shows a concentration of poverty in the West and the North of the country. Using either the incidence or depth indicators, poverty is most pronounced in Kayes and Tombouctou. Tables 5.57 and 5.58 (in text) present incidence and depth of poverty indicators by region.

### 3.6.2 Food Expenditure Shares by Region

Five Southern Cities. Poor households in the five Southern cities -- Bamako, Koulikoro, Sikasso, Segou, and Mopti -- allocate the largest proportion of their food budgets to rice (24%) and to other cereals (16%). Other foods of importance are: meat (12%), fruits/vegetables (9%), sugar (8%), peanuts (5%) and oil (4%).

Cereals form a principal part of the food budget for poor households. The proportion of food expenditure allocated to rice falls slightly at higher levels of income. This relationship, however, does not imply a fall in the quantity of rice purchased as income rises, but

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[127]Depth of poverty defined as:

$$\frac{\text{Per Capita Expenditure Level}_i - \text{Poverty Line Level of Expenditure}}{\text{Poverty Line Level of Expenditure}}$$

Where: i = household i
Poverty Line = 5th expenditure decile income level

TABLE 8.07

INCIDENCE OF POVERTY: URBAN MALI

PERCENTAGE OF HOUSEHOLD MEMBERS BELOW THE POVERTY LINE:
50% CUT-OFF OF THE EXPENDITURE (INCOME) DISTRIBUTION

| REGION | 50 PERCENT CUT-OFF |
|---|---|
| BAMAKO | 46 |
| KOULIKORO | 86 |
| SIKASSO | 86 |
| SEGOU | 81 |
| MOPTI | 84 |
| KAYES | 92 |
| TOMBOUCTOU | 89 |
| GAO | 87 |

TABLE 5.58

DEPTH OF POVERTY: URBAN MALI

AVERAGE EXPENDITURE GAP OF POOR HOUSEHOLDS AS A PERCENTAGE OF THE POVERTY LINE EXPENDITURE LEVEL

| REGION | AVERAGE EXPENDITURE GAP (%) |
|---|---|
| BAMAKO | 28 |
| KOULIKORO | 19 |
| SIKASSO | 34 |
| SEGOU | 33 |
| MOPTI | 9 |
| KAYES | 39 |
| TOMBOUCTOU | 37 |
| GAO | 25 |

rather an increase in other food expenditures relative to rice. Clearly, rice is not a luxury good, as poor households allocate a substantial proportion of the food budget to this staple grain, and this proportion falls as income rises.

Recent studies by the International Food Policy Research Institute (IFPRI) in Burkina Faso have also found that rice is a staple of the urban diet. In addition, poor households in Burkina Faso purchase rice in prepared form due to employment/transportation constraints resulting in higher rice expenditure levels than wealthy households.[126] This relationship was not confirmed in the Mali case, however, where both poor and wealthy households prefer to eat at home and rarely purchase prepared riz avec sauce.

Kayes, Tombouctou, and Gao: The expenditure patterns of poor households in Kayes and the two Northern cities also reflect the predominance of cereals in the food budget. Regional variation is most noticeable for meat and peanuts. Poor households in Kayes, Tombouctou, and Gao spend almost twice as much of their food budgets on meat than in other cities. Kayes exhibits the highest share of expenditure on peanuts of any city, with the poor allocating 9% of their food budgets to this important ingredient of the sauce.

### 3.6.3 Cereal Prices

In Mali, there are significant price differences in cereals across regions. The costs of transporting and marketing foods are high in the three remote cities of Kayes, Tombouctou, and Gao. Tombouctou and Gao,

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[126]Reardon, Thiombiano, and Delgado, 8.2.

located in the far north of the country, are chronically food deficit. The region of Kayes is a marginal production zone with few passable roads and only a single railroad line linking it with the South of Mali. Higher prices for staple cereals reduce the purchasing power of poor households in these three cities, and may contribute to low consumption levels. Policies that lower marketing costs through increasing competition or improving transport infrastructure may therefore be a necessary (if insufficient) condition to alleviate poverty in Kayes, Tombouctou, and Gao. Table 5.59 breaks down cereal prices by region and round of data collection.[129]

### 3.6.4 Targeting Interventions by Region

The Mali data show that poor households are concentrated in cities that are both remote and resource poor. Among poor households, calorie deficiency is most severe in Kayes, Tombouctou, and Gao. Environmental degradation, particularly desertification of the North of the country, exacerbates the problem of inadequate food production and consumption in these regions.

The concentration of severe calorie deficiency in poor household in Kayes, Tombouctou, and Gao justifies targeting interventions to the remote cities. In the short-term, food-for-work activities concentrating on improving urban infrastructure (roads, water supply, clinics, schools) would increase the calorie consumption of poor households, while providing socially beneficial outputs. In addition,

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[129]Note that prices are unit values calculated by dividing household cereal expenditures by estimated quantities purchased.

given the greater reliance of the poor than the wealthy on home production/gifts in these cities, the promotion of home gardens may marginally increase the consumption of poor households. As noted above, policies to reduce marketing costs through increased competition or improved transport infrastructure would also serve to alleviate poverty in the remote cities of Kayes, Tombouctou, and Gao. It should be noted, however, that there are few opportunities for sustainable and long-term economic growth in these depressed regions. In the long-term, there appears to be no alternative to poverty alleviation policies that emphasize education and training to encourage migration to other regions with greater potential.[130] As noted in Chapter 6, out-migration of male household heads in search of employment already appears to be the case in Tombouctou. Although out-migration from remote regions may represent a long-term solution, government and donor investment in interventions to address the severe and chronic problem of calorie deficiency -- food-for-work, home gardens, and reduced marketing costs/improved infrastructure -- will also be required.[131]

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[130]World Bank, World Development Report 1990, 72-73.

[131]In times of drought or localized food shortfalls, emergency food aid distributions in remote regions will also be necessary to sustain populations that in 'good' years live at the margin of subsistence. As noted in Chapter 3, OPAM has a role to play in this area given its responsibilities for food aid management and distribution. Furthermore PVOs (Private Voluntary Organizations) in Mali have been active in providing food aid to at risk populations during periods of drought/food shortfalls, and should be encouraged to do so in the future.

## 4. Empirical Findings and Policy Implications

The preceding sections examined the major consumption characteristics of poor urban households in Mali. This descriptive analysis was undertaken in order to understand and identify differences between the poor and non-poor, and within the group defined as poor, that could be used as the basis for developing interventions to target specific groups. The main conclusions arising from this analysis are as follows:

Food expenditure and consumption patterns are strikingly similar across expenditure groups in urban Mali. The most notable difference is that the poor consume approximately 50% less in caloric terms than their wealthy counterparts.

In urban Mali, the magnitude of the calorie deficiency problem is immense. The finding that over 50% of the sample population is calorie deficient suggests that interventions (e.g. income transfers) to increase the calorie consumption of poor households would have a highly negative impact on the government budget. This issue will be explored more fully in Chapters 7 and 8.

The majority of poor households consume less than 80% of recommended caloric intake, and are thus at nutritional risk. The most severe problems of caloric inadequacy are concentrated in the bottom deciles.

There is a strong preference for rice among poor as well as wealthier urban households in Mali. Rice is the cereal of choice for the poor as for all urban Malians. Millet/sorghum follow rice as the principal staples in the diet.

In urban Mali there is no self-targeting inferior food. There is no commodity in the Malian diet eaten primarily by the poor. As income rises, consumption of virtually all foods rises as households attempt to increase quantity over quality. Thus, price subsidies of staple foods would be an inefficient means of reaching the poor given leakage of the benefits to wealthy households. However, the increase in the price of calories as income rises suggests quality differences that should be investigated further. In the Mali case, lower qualities of the same food may act as inferior foods, although this cannot be confirmed with this data set

The poor augment their consumption from non-market sources -- home production and gifts -- more than wealthy households. The positive effect of home production/gifts is more pronounced in Kayes, Tombouctou, and Gao than in the Southern cities. The econometric analysis also shows a positive relationship between home production/gifts and

consumption. This suggests that the promotion of home production of staple foods, particularly in the North and West of the country, may increase the calorie consumption of the poor. (See Chapter 7 for a discussion of home production/gifts and its affects on purchases of staple foods and total calorie consumption.)

Regional differences in total expenditure (income) in urban Mali are pronounced. A high proportion of Kayes and Tombouctou households are concentrated in the lower 5 expenditure deciles. Prices for staple cereals are also higher in Kayes, Tombouctou, and Gao than in Southern Mali, contributing to the problem of severe calorie deficiency among poor households in those cities. This suggests that geographic targeting of interventions to those regions would improve the consumption possibilities of poor households. Policy options to alleviate poverty in Kayes, Tombouctou, and Gao include: (i) food-for-work activities, (ii) promotion of home gardens, (iii) reducing marketing costs/improving infrastructure, and (iv) investment in training and education to encourage out-migration to other regions with greater potential

In summary, the policy implications of these findings are threefold. First, the data suggest that it will be costly to implement interventions to increase the calorie consumption of poor households

given the large size of the target group (i.e. 50% of the urban population). Second, caloric deficiency is most pronounced among the poor in remote cities, and requires interventions targeted by region to address that problem. Lastly, the examination of consumption characteristics reveals marked similarities rather than differences in consumption patterns across expenditure groups. Although there may be differences in food quality between poor and wealthy households, the lack of an inferior good suggests that it will be difficult to target the poor on the basis of consumption characteristics. This raises the question whether there are observable differences between poor and wealthy households which could be used as a hook for a government intervention designed to increase the calorie consumption of the poor in urban Mali The focus of the next chapter turns to examine how important household characteristics -- composition, employment education, and assets -- vary across the sample population when stratified by expenditure (income).

## CHAPTER 6

## HOUSEHOLD AND EMPLOYMENT CHARACTERISTICS OF THE POOR

### 1. Introduction

The previous chapter looked at how food consumption varied across expenditure groups. The data showed a strong positive relationship between expenditure and calorie consumption levels. Households in the lower 5 per capita expenditure deciles of the sample -- the poor experienced a greater incidence and depth of caloric inadequacy than wealthy households.

To understand the effects of price and income changes on the poor requires knowledge about their economic circumstances [132] The aim of this chapter is to identify and construct a profile of household and employment characteristics of the poor in urban Mali. This profile can help in the design of policy interventions to alleviate poverty and improve the access of the poor to food Specifically, certain characteristics may indicate a greater incidence of poverty, and therefore could be used to design and target interventions to poor households. Insofar as the data reveal little evidence of an inferior good information on how household characteristics differ across expenditure groups will aid policy-makers interested in efficiently targeting the poor

[132]World Bank, World Development Report 1990, 24

This chapter is organized in three main parts. The first looks at household structure across expenditure groups: Sections 2.1 - 2.2 examine the size and age/sex composition of urban households. A review of household head characteristics is presented in Sections 2.3 - 2.4 The second part of the chapter then turns to examine the employment and income characteristics of the poor. Sections 3.1 - 3.7 assess the sectors of activity of household members, the participation of women in the labor force, status of employment (informal versus formal sector), and unemployment. Information on employment characteristics is essential to understanding factors influencing the income earning possibilities of the poor. An examination of educational attainment of household members by expenditure group is presented in Section 4. The fourth part of this chapter reviews the asset ownership of the poor. An examination of ownership patterns of consumer durables, livestock, and housing and amenities is presented in Sections 5.1 - 5.3. The focus throughout this chapter is on the characteristics of households that differentiate the poor from the non-poor, and that therefore might provide the basis for efficient poverty-alleviation interventions.

## 2. Household Structure

### 2.1 Household Size

Household size shows significant variation by region and expenditure group Across regions, household average size ranges from a low of 8 (Mopti) to a high of 14 (Kayes). The relationship of family size to income shows that in Mali the poor have larger families on average than the wealthy. This is explained at least in part by the

definition of poor households as those with low levels of per capita income. For the entire sample the difference in family size across expenditure groups is statistically significant at the .01 level, with poor households averaging 11 members compared to 9 members for wealthy households. As discussed in the Literature Review, this is consistent with the findings of Lipton and others who show that large family size is an important characteristic of poverty, and that family size declines with increases in per capita income.

### 2.2 Household Age and Sex Composition

In terms of household structure, the age distribution of household members is more informative than household size in distinguishing between the poor and the non-poor. In Mali, households with low per capita incomes are younger on average than high income households. The younger age distribution of poor households is often attributed to two factors:[133] (i) an individual's earnings usually grow with age, over the life-cycle, and (ii) due to inadequate purchasing power low-income households suffer from poor nutrition and health, and members are thus at greater risk of dying young. In addition, coping strategies of low-income households suggest that the poor have more children for a number of reasons. Children may be perceived as additional labor, contributing to family income. Poor households may also view children as a means of insurance in old age. The results in Mali show that poor households have 46% of their members below the age of 15 as compared to 39% for wealthy households. The number of children

[133]Chaudhri and Timmer, 41-42.

per household significantly differs at the .01 level across expenditure groups, ranging from 5.3 for the poor compared to 3.9 children for the wealthy. The number of children per poor household -- household members less than 15 years old -- ranges from a low of 4.2 (Mopti) to a high of 6.9 (Koulikoro). Again, the finding that poor households have more children than the wealthy is consistent with Lipton who identifies a concentration of children among poor households. The greater number of children in poor families suggests that family planning interventions -provision of contraceptives and their promotion through family planning education programs -- may be a way to alleviate poverty in the longer term.

The sex composition of households is uniform across expenditure groups in urban Mali. The breakdown of household members by sex shows that of the sample population 49% are male and 51% are female. Therefore in Mali, at least in urban areas, there is a lack of evidence of sex bias. (i.e. males and females have equivalent survival rates)

Observation suggests that the extended family is the basic social unit in urban Mali. The data show that large family size characterizes both expenditure groups, with the poor having a younger age distribution than the wealthy. There is no significant relationship between household income and sex composition.

## 2.3 Sex of Household Head

Mali is a strongly patriarchal society, with the <u>chef du menage</u> (head of household) usually being male Of the entire sample, only 11% of households are headed by women. Qualitative interviews suggest that

a woman will serve as household head only if her husband is dead or incapacitated, or if there is no adult male in the family who can take on this role. Differences across expenditure groups with respect to the sex of household head were statistically insignificant. The poor have a slightly higher percentage of female headed households than the wealthy at 12% and 10% respectively. For poor households, Tombouctou stands out as the only region with a relatively large number of female headed households (35%). A possible explanation may be the migration of poor male household heads from Tombouctou to less economically depressed regions in search of employment.

Female headed households have been identified in the development literature as being concentrated among the poor; women earn less on average than men in the labor market, and have additional time constraints imposed by home and childcare responsibilities.[134] Sex of household head is thus a possible indicator of poverty. Sharp differences in income (expenditure) by sex of household head, however, are not apparent in urban Mali. Across all cities, the average per capita income level of female headed households is 8,749 CFA/month compared to 9,239 CFA/month for male headed households. The difference in per capita income between male and female households was not statistically significant. As noted above, the number of households headed by women is also quite small in the urban context. These findings suggest limited scope for targeting the poor based upon sex of household head. Table 6.1 (in text) presents the sex of household head

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[134]Rosenhouse, 1-3

SEX OF HOUSEHOLD HEAD, (%), BY REGION AND EXPENDITURE GROUP:

| | | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | GAO | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|---|
| POOR HOUSEHOLDS: | | | | | | | | | |
| | Male: | 88.2 | 100.0 | 97.0 | 75.0 | 93.0 | 92.9 | 84.9 | 96.7 |
| | Female: | 11.8 | 0.0 | 3.0 | 25.0 | 6.3 | 7.1 | 35.1 | 3.3 |
| WEALTHY HOUSEHOLDS: | | | | | | | | | |
| | Male: | 91.0 | 85.7 | 93.8 | 93.8 | 78.3 | 100.0 | 88.2 | 100.0 |
| | Female: | 0.0 | 14.3 | 6.3 | 6.3 | 21.7 | 0.0 | 11.0 | 0.0 |
| | N = | 255.0 | 48.0 | 49.0 | 56.0 | 55.0 | 56.0 | 54.0 | 50.0 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

by region and income group  Tables not shown in the text are pr
in Appendix 4.

## 2.4 Marital Status of Household Head

Polygamy, the practice of having more than one wife is common in Mali although less evident in urban areas than in rural. According to Islamic law, a man is permitted to have as many as four wives if he is able to provide for them equally. A breakdown of marital status in urban Mali shows that 57% of household heads have one wife/spouse. A greater proportion of poor household heads have more than one wife than wealthy households: 37% of the poor and 34% of the wealthy. Differences in marital status between expenditure groups were statistically significant at the 05 level, and may be attributable to the poor having stronger linkages with rural areas and traditional customs than the wealthy. The poor also have a greater proportion of household heads who are widowed than the wealthy across all regions.

## 2.5 Policy Implications of Demographic Information

The demographic information presented above yields two policy relevant findings. First, the large number of children in poor households is an important and statistically significant indicator of poverty in urban Mali. Although number of children could be used as a criterion for targeting interventions to poor households, in practice there would be substantial leakages to non-poor households. For example, the non-poor could easily falsify the number of children per household in order to qualify for intervention benefits such as income

or food transfers. Furthermore, targeting by number of children would set into place an incentive structure that would encourage households to have more children, and ultimately contribute to a deterioration in household economic status. As noted above, given the concentration of children in poor households, family-planning may be part of a long-term solution to alleviate poverty. Second, female headed households in urban Mali are small in number and are not overly represented among the poor. This suggests that targeting interventions to female headed households would not be an effective means of reaching the poor.

### 3. Employment and Income

The purpose of this section is to describe the employment characteristics of poor households which distinguish them from the non-poor population. As discussed in Chapter 5, household expenditure (income) is a major determinant of nutritional adequacy. Income earning possibilities in the urban context are largely determined by the structure of employment and the ownership of assets. For the urban poor in developing countries, labor constitutes the single most important asset contributing to household income/wealth. Differences in income between the poor and the wealthy may be explained by a number of factors: (i) types of jobs: sectors of activity, (ii) number and sex of household members working, (iii) status of employment (informal versus formal sector) and (iv) education levels of household members. In assessing these factors the following hypotheses will be tested:

1) As per capita income declines dependency ratios increase.[135]

2) Poor households have a greater number of women working outside the home than wealthy households as adult family members attempt to lessen the squeeze of limited purchasing power.

3) A greater proportion of the poor engage in secondary sectors of activity as a coping strategy to improve their economic situation.

4) The urban poor are primarily involved in work in the informal sector, resulting in limited income earning possibilities.

5) Unemployment is concentrated in the poorest groups in society.

6) The poor are subject to greater variability in employment over the year than the non-poor.

7) Education is positively associated with household income; wealthy households have higher levels of education, giving them access to better jobs and income earning opportunities.

The data from this study will serve to confirm or reject the above hypotheses. Identifying the employment characteristics of urban households provides an understanding of the factors influencing household income This understanding is essential to targeted efforts to improve the income earning possibilities of the poor

### 3 1 General Employment Characteristics

In urban Mali disparities in per capita income levels are quite marked across expenditure groups and regions Disaggregation of the sample by per capita expenditure quartiles shows that households in

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[135]Dependency ratio defined as the number of household members between the ages of 0 and 14 and 60 or older divided by the number of household members between the ages of 15 and 59, irrespective of employment status.

quartile 1 have average annual per capita expenditure of 42,900 CFA ($120) compared to that of 223,800 CFA ($625) for households in quartile 4. A further breakdown shows that annual per capita expenditure per employed adult significantly differs at the .05 level and ranges from a low of 207,350 CFA ($579) in quartile 1 to a high of 783,300 CFA ($2,188) in quartile 4.[136]

The data show that working adult household members appear to earn, on average, nearly four times more in the wealthiest than in the poorest households.[137] There are several questions as to why this difference is so pronounced. Is one socio-economic group clustered in a certain type of job or activity? Are more people working in wealthier households, thus contributing to higher levels of income? Does the quality of jobs (measured in terms of monetary compensation) increase by expenditure group? Tables 6.2 - 6.3 (in text) present general employment and household information by quartile and expenditure group. As expected, the dependency ratio falls as income rises showing that in poor households a larger proportion of members are children who are unlikely to be engaged in income earning activities, confirming Hypothesis (1) above. For the survey population, the number of

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[136]Exchange rate (1985): 358 CFA/$

[137]As discussed earlier, per capita expenditure including the value of home production/gifts is used throughout this study as a proxy for income. Although the wealthy may receive transfer income in addition to wages, the assumption is made that in urban Mali the bulk of expenditure represents earned income. Unfortunately, this survey did not collect data on wages or sources of income; therefore, no job specific levels of income can be calculated. Information on sectors of activity contributing to household income and employment status,however, was recorded for the household head and for all family members.

TABLE: 6.2

HOUSEHOLD EMPLOYMENT CHARACTERISTICS, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FAMILY SIZE | 10.4 | 11.6 | 9.2 |
| NUMBER OF CHILDREN | 4.6 | 5.3 | 3.9 |
| NUMBER OF UNEMPLOYED ADULTS PER HOUSEHOLD | 3.3 | 3.7 | 2.8 |
| NUMBER OF EMPLOYED ADULTS PER HOUSEHOLD | 2.5 | 2.5 | 2.5 |
| NUMBER OF EMPLOYED ADULTS/ NUMBER OF FAMILY MEMBERS, (%) | 0.24 | 0.21 | 0.27 |
| AVERAGE ANNUAL PER CAPITA INCOME | | | |
| CFA | 110340 | 63498 | 161172 |
| $ | 398 | 177 | 450 |
| AVERAGE ANNUAL HOUSEHOLD INCOME | | | |
| CFA | 1147636 | 729882 | 1482782 |
| $ | 3205 | 2039 | 4142 |
| AVERAGE ANNUAL INCOME PER EMPLOYED ADULT | | | |
| CFA | 459014 | 291953 | 593113 |
| $ | 1282 | 816 | 1657 |
| DEPENDENCY RATIO | 0.96 | 1.10 | 0.80 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

HOUSEHOLD EMPLOYMENT CHARACTERISTICS, BY QUARTILE:

TABLE: 6.3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | | QUARTILE 2 | QUARTILE 3 | QUARTILE 4 |
|---|---|---|---|---|---|
| FAMILY SIZE | 10.4 | 11.6 | 11.5 | 10.1 | 8.4 |
| NUMBER OF CHILDREN | 4.0 | 5.5 | 5.1 | 4.5 | 1.3 |
| NUMBER OF UNEMPLOYED ADULTS PER HOUSEHOLD | 3.3 | 3.7 | 1.8 | 3.2 | 2.7 |
| NUMBER OF EMPLOYED ADULTS PER HOUSEHOLD | 2.5 | 2.4 | 2.6 | 2.4 | 2.4 |
| NUMBER OF EMPLOYED ADULTS/ NUMBER OF FAMILY MEMBERS, (%) | 0.24 | 0.21 | 0.23 | 0.24 | 0.29 |
| AVERAGE ANNUAL PER CAPITA INCOME | | | | | |
| CFA | 110340 | 42900 | 77032 | 120240 | 223860 |
| $ | 308 | 120 | 217 | 336 | 625 |
| AVERAGE ANNUAL HOUSEHOLD INCOME | | | | | |
| CFA | 1147536 | 497640 | 885061 | 1214424 | |
| $ | 3205 | 1390 | 2500 | 3392 | |
| AVERAGE ANNUAL INCOME PER EMPLOYED ADULT | | | | | |
| CFA | 459014 | 207350 | 344257 | 506010 | 783300 |
| $ | 1282 | 579 | 962 | 1413 | 2188 |
| DEPENDENCY RATIO | 0.96 | 1.10 | 1.00 | 0.90 | 0.70 |

## 3.2 Sector of Activity Contributing the Most to Household Income

Business/commerce represents the sector of activity contributing the most to household income. For the sample as a whole, 28% of households cite business as the principal income earning sector, with little or no differences between poor and wealthy households. Business is followed by the public sector as the second sector of activity contributing the most to household income, (20% of survey households)

### 3.2 1 Variation by Expenditure (Income)

Variation by expenditure group shows that the public sector represents the principal source of income for a larger percentage of wealthy than poor households: 25% of wealthy households versus 16% of poor households. Handicrafts and agriculture follow in decreasing order of importance as sectors contributing the most to household income. Differences between poor and wealthy households are slight for the latter two sectors; most noticeably, a larger percentage of poor

households earn income from agriculture (13%) than wealthy households (10%). This is consistent with the finding that poor households augment their consumption from home-production/gifts more than wealthy households. Although it cannot be investigated with this data set, poor urban families may produce staple foods for home consumption as well as for sale on the market to generate cash.

These findings indicate that differences in sectors of activity contributing to household income are not extreme across expenditure groups. The most noticeable differences are (i) a greater proportion of wealthy than poor households earn income from public sector activities, and (ii) a greater proportion of poor than wealthy households earn income from agricultural activities. Differences in income earned by employed adult household members, thus appears to be primarily driven by the quality of jobs rather than the type of jobs (sectors of activity) The monetary compensation levels for jobs held by wealthy household members appear to be much greater than those held by poor household members. In several studies of poverty in developing countries, education is positively correlated with income and represents a key factor contributing to job quality and compensation levels.[138] This relationship will be explored for urban Mali in Section 4 below. Tables 6.4 - 6.8 present general household characteristics pertaining to income and education by region

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[138]Glewwe, 19; Lipton, The Poor and the Poorest, 20; and Visaria 27

3.2 2 Variation by Region

Data for the five Southern cities -- Bamako, Koulikoro, Sikasso Segou, and Mopti -- show a pattern consistent with the sample as a whole. Regional differences are noticeable primarily in the two most Northern cities and Kayes. Similar to the group of five cities, households in Gao cite business as the key income earning sector (30% of households); however, in order of importance business is followed by handicrafts and agriculture, with only 8% of households identifying the public sector as the key source of household income. In contrast, the public sector in both Tombouctou and Kayes is the principal source of income; a larger proportion of wealthy than poor households in both cities cite jobs in the public sector as the principal contributors to household income. As noted earlier, Tombouctou and Kayes are ranked as the poorest cities according to poverty incidence and depth indicators. Efforts to augment incomes of the poor through interventions targeted to public sector activities in these two cities would prove inefficient given leakages to wealthy households. Since a program of public sector employment expansion is also infeasible for budgetary reasons, more thought will need to be given to constraints on private sector employment and output growth. It is unlikely however, that the characteristics of public sector jobs such as job security or relatively high wages can be replicated in the private sector Attempts to do so (e.g. worker rights legislation), are likely to backfire by resulting in a reduction in private sector employment expansion.

### 3.3 Sector of Activity of Household Head

Data for the sample population as a whole show that business/commerce also forms the principal sector of activity for household heads: 42% of all household heads engage in some form of business activity. Participation of household heads by sector shows that agriculture is the next most important activity (15%) followed by the public sector (14%). Military, handicrafts, health/medical, and religious professions follow in decreasing order of importance. A pattern emerges of a slightly higher proportion of wealthy than poor households citing household head participation in all sectors except agriculture and religious professions. Similar to the primary income earning sector findings, the poor show 19% of household heads engaged in agricultural activities as compared to 11% of wealthy households. Again, this is consistent with the finding that home production/gifts are more important for poor than wealthy households. Table 6.9 (in text) presents head of household characteristics for all cities. A detailed breakdown by region is shown in Tables 6.10 6.13

### 3.4 Primary and Secondary Sectors of Activity: All Adult Household Members[130]

The breakdown of the sample population by primary sectors of activity shows a concentration of household members above the age of 15 in business and commerce (19%). Students attending secondary and higher educational institutions account for 24.7% of household members. Women involved in household activities, menageres (housewives), represent 23%

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[130]Inclusive of household head.

TABLE 6.0

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Household Heads in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MARITAL STATUS:** | | | |
| 1 Wife/Spouse | 56.7 | 52.9 | 70.9 |
| 2 Wives | 25.0 | 26.5 | 13.3 |
| 3 Wives | 8.9 | 10.3 | 7.4 |
| 4 Wives | 1.8 | 0.6 | 3.0 |
| Divorced | 0.6 | 0.3 | 1.0 |
| Widowed | 5.0 | 7.2 | 2.7 |
| Single | 2.0 | 2.2 | 1.7 |
| **SEX:** | | | |
| Male | 89.1 | 87.9 | 90.5 |
| Female | 10.9 | 12.1 | 9.5 |
| **SECTOR OF ACTIVITY:** | | | |
| Public Sector | 13.5 | 10.5 | 16.8 |
| Business/Commerce | 41.5 | 37.2 | 46.2 |
| Agriculture | 15.4 | 19.3 | 11.1 |
| Handicrafts | 4.0 | 3.7 | 4.3 |
| Health/Medical | 1.9 | 1.7 | 2.2 |
| Military | 4.2 | 4.1 | 4.3 |
| Religious Professions | 2.6 | 3.7 | 1.4 |
| Other | 16.8 | 18.8 | 13.7 |
| **STATUS OF EMPLOYMENT:** | | | |
| Employed: Formal | 37.2 | 32.4 | 42.3 |
| Employed: Informal | 49.9 | 51.7 | 46.0 |
| Unemployed | 12.9 | 15.9 | 9.7 |
| **LEVEL OF EDUCATION:** | | | |
| None | 80.9 | 86.9 | 54.5 |
| Elementary | 14.1 | 14.5 | 22.8 |
| Secondary | 8.0 | 7.8 | 10.4 |
| Technical Secondary | 10.0 | 5.7 | 14.7 |
| Superior, (College) | 3.8 | 2.4 | 5.4 |
| Religious | 1.6 | 2.0 | 1.1 |
| Other | 0.5 | 0.7 | 0.3 |
| N = # OF HOUSEHOLDS | N = 617 | N = 321 | N = 296 |

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

of all household members. Other principal sectors of activity for household members are: agriculture (6%), military professions (5%), and the public sector (4%). Handicrafts, health/medical, religious professions, and household services combined account for only 9% of family members. In urban Mali, secondary sector jobs were limited with only 18% of household members citing an additional sector of activity Tables 6.14 - 6.15 (in text) present sectors of activity for all cities A breakdown by region is shown in Tables 6.16 6.33

3 4 1 Variation by Expenditure (Income)

Differences in sectors of activity are relatively small across expenditure groups. The data show a slightly greater proportion of wealthy household members in all sectors except agriculture and women involved in household activities (housewives). Stronger ties to the rural areas, (i.e. recent migration from rural areas or household location in urban periphery), may account for the fact that a larger proportion of poor household members engage in agricultural activities. The issue of female participation in the work-force is explored below

3 4 2 Variation by Region

Sectors of activity of household members show some variation by region. Business/commerce is not as pronounced in Kayes, Tombouctou, and Gao, as in the five Southern cities. The proportion of household members engaged in agricultural activities is also higher in Kayes, Tombouctou, and Gao than in the South of the country. Participation in the public sector is quite low for Tombouctou and Gao at 3% and 2% of

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.3 | 2.8 | 6.8 |
| BUSINESS/COMMERCE | 18.9 | 17.6 | 20.4 |
| AGRICULTURE | 6.8 | 7.1 | 4.3 |
| HANDICRAFTS | | 1.9 | 2.2 |
| HEALTH/MEDICAL | 1.6 | 1.1 | 1.1 |
| MILITARY | 4.6 | 4.6 | 4.6 |
| SECONDARY EDUCATION (Student) | 10.8 | 10.8 | 11.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 6.1 | 4.9 | 7.4 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 3.8 | 3.6 | 3.7 |
| RELIGIOUS EDUCATION (Student) | 4.2 | | 4.1 |
| RELIGIOUS PROFESSIONS | 1.6 | 1.6 | 1.7 |
| HOUSEHOLD SERVICES | 3.4 | 2.9 | 4.0 |
| HOUSEWIFE | 23.2 | 25.4 | 20.8 |
| OTHER | 9.5 | 11.7 | 7.9 |
| N = | 4087 | 2143 | 1944 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.16

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMOUCTOU, AND GAO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.1 | 4.7 | 3.5 |
| BUSINESS/COMMERCE | 2.6 | 2.9 | 2.3 |
| AGRICULTURE | 1.7 | 2.1 | 1.2 |
| HANDICRAFTS | 3.4 | 3.4 | 3.5 |
| HEALTH/MEDICAL | 0.2 | 0.4 | 0.1 |
| MILITARY | 0.1 | 0.3 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.1 | 0.1 | 0.1 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 2.1 | 2.2 | 2.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.1 | 0.1 | 0.1 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.8 | 0.8 | 0.8 |
| HOUSEWIFE | 3.2 | 2.3 | 4.2 |
| NO SECONDARY SECTOR OF ACTIVITY | 81.6 | 80.7 | 82.2 |
| N = | 4087.0 | 2143.0 | 1944.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

household members respectively, while in Kayes public sector activities account for 5% of household members employment.

3 4.3 Women Working Outside of the Home

The data show that in urban Mali the majority of women (females above the age of 15) do not work outside the home. On average, only 25% of all women are employed in income earning activities outside the home The findings of this study indicate that wealthy households have a greater number of women working than poor households. Wealthy household have 28% of women members working compared with 21% for poor households. Table 6.34 (in text) presents female employment by income group and region These findings refute Hypothesis (2) that posits that poor households have a greater number of women working outside the home as a means to augment income and lessen the squeeze of limited purchasing power. It appears that wealthy urban households in Mali have more women participating in income earning activities than poor households. A factor that may contribute to fewer poor women employed outside the home is the younger age distribution of poor households. On average poor households have more children than wealthy households. These findings indicate that poor women's participation in the labor force may be constrained by child-bearing and care-taking activities. As a result, policies aimed at expanding the employment opportunities of poor urban women must also deal with the time and labor constraints of child-care that they face.

TABLE 6.34

PERCENTAGE OF ADULT WOMEN WORKING OUTSIDE THE HOME, BY EXPENDITURE GROUP:

| Percentage of Women in each Category | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | GAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| **POOR HOUSEHOLDS:** | | | | | | | | |
| Working: | 22.9 | 18.4 | 22.2 | 26.5 | 31.6 | 11.3 | 35.1 | 10.2 |
| Not Working: | 77.1 | 82.4 | 77.8 | 74.5 | 68.3 | 88.7 | 64.9 | 89.8 |
| **WEALTHY HOUSEHOLDS:** | | | | | | | | |
| Working: | 28.8 | 17.0 | 39.6 | 38.9 | 28.3 | 4.8 | 38.6 | 12.7 |
| Not Working: | 71.2 | 83.0 | 60.4 | 61.1 | 81.7 | 95.2 | 63.2 | 87.3 |

### 3.4.4 Household Members with More than One Job

In studies of employment in developing countries, multiple sources of income are often noted as a survival or coping strategy of poor households.[140] These studies suggest that poor households engage in a number of activities/jobs as a means to diversify risk and to improve their economic situation. Multiple sources of income are evident when: (i) households have more than one income earner, or (ii) individual household members have more than one job. In terms of multiple sources of income, there is no significant difference between poor and wealthy households at either the household or individual level in urban Mali As discussed earlier, irrespective of expenditure class, there are on average 2.5 employed adults (income earners) per household. Moreover, at the individual level, members of poor and wealthy households are equally likely to have more than one job: only 18% of household members cite secondary sectors of activity. Although urban households clearly have more than one income earner per family, the data show that there is no significant difference in the percentage of household members engaging in more than one job across expenditure groups, thus contradicting Hypothesis (3).

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[140]Visaria, 36, 83-85; 1
Christopher Delgado, Coping with Food Insecurity at the Household Level in Drought-Affected Areas of Burkina Faso (Washington, D.C.: International Food Policy Research Institute, 1988), 17; Beatrice Lorge Rogers, "Distributional Impacts: Food Security Policy and the Competitiveness of Agriculture in the Sahel," Presentation at the U.S. Agency for International Development Beyond Mindelo Seminar, Washington, D.C. at the International Food Policy Research Institute, 15-17 October 1988): and Rosenhouse, 40-44.

### 3.5 Status of Employment: Informal versus Formal Sector

The status of employment of household members may contribute to differences in income across socio-economic groups. In many developing countries large numbers of the urban poor are self-employed. Studies of employment and labor markets often make the distinction between formal and informal sectors of activity. A commonly used definition of occupational status identifies those individuals involved in 'white or blue-collar' activities as formal sector workers and those who are independent or self-employed as informal sector workers.[141] For the purposes of this study, a breakdown of employment status was made using the above definition; adult household members were identified as being involved in the formal sector, in the informal sector, or as being unemployed.[142] Hypothesis (4) put forward at the beginning of this section was that the urban poor in Mali are primarily involved in work in the informal sector; as a result of their self-employed/independent status the poor are exposed to limited income earning possibilities and greater risk. The data from this study show, however, that there is little variation across expenditure groups in terms of informal sector participation. On average 27% of adult household members were employed in the informal sector, with no statistically significant difference between poor and wealthy households. The data from urban Mali clearly do not support the hypothesis that the poor are concentrated in informal

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[141]Ruben M. Suarez-Berenguela, Informal Sector, Labor M
Returns
Working

[142]Note that in the DNSI questionnaire, 'independent/self-employed was used to designate informal sector participation in urban Mali.

sector activities. This finding suggests that subsidies or transfers to informal sector workers would not target the poor since benefits would accrue to both poor and wealthy households.

A detailed breakdown of employment of adult household members by occupational status -- employer, high-level/management (cadre superieur), mid-level management (cadre moyen), laborer/worker, independent, and unemployed -- shows that there is some clustering of wealthy household members in the employer, high-level, and mid-level categories, with the major disparity between the poor and wealthy being that of unemployment. For all cities, there was a significant difference in unemployment across expenditure groups with 59% of poor adult family members unemployed compared to 52% for the wealthy. This finding supports Hypothesis (5) that unemployment is concentrated among the poorest groups in urban Mali.[143] A further breakdown by expenditure quartile reveals these two patterns more clearly: (i) as income increases a greater percentage of households members are employed in jobs of higher status and income earning potential (i.e. the categories of employer, high-level and mid-level/management ), and (ii) as

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[143]There are two possible explanations for the concentration of unemployment among the poor: (i) there are no jobs on the market, or (ii) whatever jobs are available are extremely low paying, and pay below people's reservation wage. The empirical evidence presented here suggests that income per job is very low for those poor household members who have jobs. At the margin, the other jobs available to the poor (if any exist) are presumably even lower paid. Furthermore, unemployment in wealthy households, although less pronounced than in poor households, suggests the presence of a segmented labor market. The implication for policy is that poverty alleviation interventions focusing on job creation for the poor must consider the reservation wage and the elasticity of labor supply by expenditure group. Further investigation is required of the determinants of labor supply in urban Mali.

unemployment falls, income increases. Differences in occupational status across regions are minor. Tables 6.35 - 6.37 (in text) present the status of employment of household members by expenditure group and by quartile. A breakdown by region is shown in Tables 6.38 - 6.46

### 3.6 Seasonal Variation in Unemployment

A breakdown of unemployment by expenditure group, quartile and season confirms that unemployment is concentrated in the lowest expenditure groups in all seasons: as income rises the percentage of unemployed household members falls. The data support Hypothesis (6) that the poor face greater variability in employment than the non-poor although this effect is quite small. Variation across seasons indicates that all groups show a decline in unemployment from round 1 to round 3. The poor -- particularly those in quartile 1 -- experience somewhat greater variation across seasons than the wealthy. This finding suggests that employment or food-for-work programs may need to consider targeting by season to offset fluctuations in the income and consumption of the poor. Tables 6.47 - 6.48 present unemployment by round of data collection.

### 3.7 Policy Implications of Household Employment Characteristics

There are 5 main policy relevant findings generated from this examination of household employment characteristics. First, the concentration of poor households in agricultural activities may confirm the importance of home production as a means to augment the calorie consumption of the poor. Second, it is unlikely that public sector

TABLE 6.35

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 17.4 | 14.0 | 21.2 |
| EMPLOYED IN INFORMAL SECTOR | 26.6 | 27.0 | 26.2 |
| UNEMPLOYED | 56.0 | 59.0 | 52.6 |
| N = | 1087 | 2143 | 1944 |

N = # OF HOUSEHOLD MEMBER

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

[illegible]

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11.4 10.0

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TABLE 0.37

EMPLOYMENT CHARACTERISTICS:

STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS (%), BY EXPENDITURE QUARTILES

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | QUARTILE 1 | QUARTILE 2 | QUARTILE 3 | QUARTILE 4 |
|---|---|---|---|---|---|
| EMPLOYER | 0.6 | 0.2 | 0.2 | 0.6 | 1.0 |
| 'CADRE SUPERIEUR | 0.8 | 0.1 | 0.5 | 0.5 | 2.2 |
| 'CADRE MOYEN' | 4.0 | 2.0 | 4.0 | 4.7 | 0.0 |
| LABORER/WORKER | 11.4 | 2.7 | 9.0 | 14.3 | 11.0 |
| INDEPENDENT | | 27.0 | 27.1 | 26.4 | 26.1 |
| UNEMPLOYED | 56.0 | | 57.6 | 53.2 | 51.0 |

employment can help to remedy poor household's lack of income, either on a regional or national basis. Public sector employment schemes first and foremost face severe fiscal constraints. Also, poor households for the most part lack the educational qualifications for the relatively well-paid jobs of the public sector (See Section 4 below). The promotion of public sector employment would also result in high leakage to the wealthy for whom public sector jobs represent the most important source of income for 25% of households. Third, the greater participation of wealthy women in the work-force suggests that policy interventions to promote employment opportunities for poor women may augment incomes. Such interventions, however, must take into account child-care constraints on poor women's time and energy. Fourth, targeting interventions to informal sector workers would not be an effective means of reaching the poor, since both poor and wealthy households are equally engaged in informal sector activities. Lastly since there are substantial unemployed resources in poor households, food-for-work activities might address the problem of inadequate food consumption and contribute to the improvement of urban infrastructure Food-for-work programs to target the poor should be designed in such a way that the wage 'in-kind' only attracts the poor unemployed (i.e. is below the reservation wage of the wealthy).

4. Education: Chef du menage and Household Members

In urban Mali education shows a strong positive relationship with per capita expenditure levels.[144] The distribution of educational attainment across regions reveals that: (i) a greater proportion of the poor than the wealthy have no education whatsoever, and (ii) the wealthy show a greater proportion of members completing all categories of formal education, (primary, secondary, technical secondary, and 'superieur'), than poor households. A breakdown of educational attainment by household head shows that 75% of chefs des menages in quartile 1 had no education compared with 46% in quartile 4. Due to aggregation this effect is less dramatic between poor and wealthy as defined here: 67% of poor household heads cite no education compared with 55% of wealthy households. Across quartiles and expenditure groups a pattern emerges of educational attainment rising sharply with income. This is apparent for all categories except religious schooling which shows a concentration among the poor.

The importance of education in explaining differences in expenditure levels and hence income is evident for all adult household members and children between the ages of 5 and 15 years old. The data therefore support Hypothesis (7) that education is positively associated with household income in urban Mali: wealthy households have higher levels of education, giving them access to better jobs and income earning opportunities

[144]Note that the relationship between education of household head and food expenditures/consumption will be examined in the econometric analysis of Chapter 7.

Tables 6.49 - 6.50 (in text) present educational attainment of household head by quartile and expenditure group. A regional breakdown of educational levels of household members -- adults and children -- is shown in Tables 6.51 - 6.70.

Evidence of low levels of educational attainment among the poor highlights the importance of education in Mali. From a policy perspective, education plays a key role in improving income earning possibilities. Although the returns to education become manifest in the long-run, interventions aimed at increasing access of the poor to education may provide a foundation for improved levels of income and hence access to food.

The data reveal that levels of educational attainment of the household head significantly differ across expenditure groups. It should be noted that although the poor in urban Mali show a concentration of household heads with no education at 67%, it would be difficult to use this characteristic to target interventions to poor households. The fact the 55% of wealthy households also cite no education for the household head indicates that there would be substantial leakages to non-poor groups.

## 5. Asset Ownership

### 5.1 Consumer Durable Goods

Ownership patterns of consumer durables reveal that few sample households possess televisions, refrigerators, modern stoves or cars in urban Mali. These items are clearly 'luxury goods' with a greater proportion of wealthy households citing ownership than poor households

TABLE 8.40

EDUCATION LEVEL OF HOUSEHOLD HEAD, BY QUARTILE

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Household Heads by Education Level | AVERAGE | QUARTILE 1 | QUARTILE 2 | QUARTILE 3 | QUARTILE 4 |
|---|---|---|---|---|---|
| NO EDUCATION | 60.9 | 75.2 | 61.1 | 59.8 | 46.[illegible] |
| ELEMENTARY | 14.1 | 13.2 | 15.4 | 13.[illegible] | 14.5 |
| SECONDARY | 9.8 | 4.1 | 10.3 | 9.5 | 11.8 |
| TECHNICAL SECONDARY | 10.0 | 4.1 | 8.9 | 14.8 | 14.5 |
| SUPERIOR/COLLEGE | 3.8 | 0.8 | 3.4 | 1.5 | 10.1 |
| RELIGIOUS | 1.6 | 1.7 | 2.3 | 0.8 | 1.6 |
| OTHER | | 0.9 | 0.8 | 0.5 | 0.1 |

TABLE 6.50

EDUCATION LEVEL OF HOUSEHOLD HEAD, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Household Heads by Education Level | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 60.9 | 66.9 | 54.5 |
| ELEMENTARY | 14.1 | 14.5 | 13.4 |
| SECONDARY | 9.0 | 7.8 | 10.1 |
| TECHNICAL SECONDARY | 10.0 | 5.7 | 14.7 |
| SUPERIOR/COLLEGE | 3.5 | 2.4 | 5.4 |
| RELIGIOUS | 1.6 | 2.0 | 1.1 |
| OTHER | 0.6 | 0.7 | 0.3 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Mobylettes also show an ownership pattern concentrated in the wealthy expenditure group. In contrast, ownership of radios is quite common in urban areas with 75% of households possessing one or more: 68% of poor households and 84% of wealthy households. Similar to the Cote d'Ivoire study on household indicators, bicycles in urban Mali represent a consumer durable that the poor are more likely to own than the wealthy.[145] This cheaper mode of transport requiring no fuel other than 'manpower' is more frequently used by the poor than by the wealthy. Tables 6.71 - 6.72 (in text) show consumer durables, livestock, and housing/amenities for the sample as a whole. Tables 6.73 - 6.80 present this information disaggregated by region.

## 5.2 Livestock

Although the sample was urban, households cited some ownership of livestock particularly sheep. Goats, donkeys and cattle were also noted, but were less frequently owned than sheep. Possession of horses and camels was extremely rare across all regions. For the sample as a whole ownership of livestock is quite limited. The general pattern emerges of wealthy households having more small-stock than poor households; ownership of larger animals shows little variation by expenditure group. Regional variation is most marked for Kayes where a large proportion of households, both rich and poor, own sheep, goats, cattle, and donkeys. In sum, livestock ownership in Mali may be a form of asset holding or 'saving', particularly in rural areas However given the limited numbers of urban households citing ownership no

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[145]Glewwe and Kanaan, 39

TABLE 8.71

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH CONSUMER DURABLES, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| PRODUCTS: | Number of Items. | AVERAGE | | |
|---|---|---|---|---|
| TELEVISIONS: | | | | |
| | 0 | 80.8 | 95.8 | 85.1 |
| | 1.0 | 9.1 | 4.4 | 14.2 |
| | >1 | 8.3 | 0.0 | 0.7 |
| RADIOS: | | | | |
| | 0 | 24.5 | 32.4 | 15.9 |
| | 1.0 | 52.7 | 49.2 | 56.4 |
| | >1 | 22.8 | 18.4 | 27.7 |
| REFRIGERATORS: | | | | |
| | 0 | 87.0 | 95.3 | 79.7 |
| | 1.0 | 9.9 | 4.0 | 16.2 |
| | >1 | 2.3 | 0.7 | 4.1 |
| STOVES, (Modern): | | | | |
| | 0 | 98.9 | 99.7 | 98.0 |
| | 1.0 | 1.0 | 0.3 | 1.7 |
| | >1 | 0.1 | 0.0 | 0.3 |
| CARS: | | | | |
| | 0 | 85.9 | 92.8 | 78.4 |
| | 1.0 | 11.2 | 6.2 | 16.0 |
| | >1 | 2.9 | 1.0 | 5.6 |
| MOTORCYCLES/MOBYLETTES: | | | | |
| | 0.0 | 63.9 | 74.8 | 52.0 |
| | 1.0 | 28.8 | 22.1 | 36.2 |
| | >1 | 8.3 | 3.1 | 9.8 |
| BICYCLES: | | | | |
| | 0 | 80.9 | 78.8 | 83.1 |
| | 1.0 | 17.5 | 19.0 | 15.9 |
| | >1 | 1.6 | 2.2 | 1.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.71 (Continued)

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH LIVESTOCK, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| LIVESTOCK: | Number of Animals. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| SHEEP: | | | | |
| | 0 | 67.1 | 71.0 | 62.0 |
| | 1.0 | 10.8 | 10.6 | 11.1 |
| | >1 | 22.1 | 18.4 | 26.1 |
| GOATS: | | | | |
| | 0 | 90.5 | 90.7 | 88.2 |
| | 1.0 | 3.6 | 4.4 | 2.7 |
| | >1 | 6.0 | 4.9 | 7.1 |
| CATTLE: | | | | |
| | 0 | 91.6 | 93.1 | 88.9 |
| | 1.0 | 2.0 | 2.2 | 1.7 |
| | >1 | 6.5 | 4.7 | 8.4 |
| DONKEYS: | | | | |
| | 0 | 87.7 | 87.8 | 87.5 |
| | 1.0 | 9.2 | 5.4 | 10.1 |
| | >1 | 3.1 | 3.7 | 2.4 |
| HORSES: | | | | |
| | 0 | 99.7 | 99.7 | 99.7 |
| | 1.0 | 0.3 | 0.3 | 0.3 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CAMELS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE: 6.72

HOUSING AND AMENITIES, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **HOUSING:** | | | |
| Thatch | 1.8 | 2.8 | 0.7 |
| Mud-brick | 46.5 | 51.7 | 40.9 |
| Cement/Mud-brick | 30.1 | 25.2 | 35.5 |
| Cement | 17.2 | 16.2 | 18.2 |
| Modern Apartment | 2.8 | 1.9 | 3.7 |
| Other | 1.6 | 2.2 | 1.0 |
| **ELECTRICITY:** | | | |
| Yes | 25.9 | 19.0 | 33.4 |
| No | 74.1 | 81.0 | 66.6 |
| **WATER:** | | | |
| Cistern | 1.8 | 2.6 | 0.7 |
| Porter | 8.6 | 11.5 | 5.4 |
| Well in the Concession | 37.0 | 34.9 | 39.2 |
| Tap/Faucet: Free | 15.7 | 13.1 | 18.6 |
| Tap/Faucet: Pay | 25.9 | 26.8 | 25.0 |
| Surface Water | 10.2 | 10.0 | 10.5 |
| Other | 0.8 | 0.9 | 0.6 |
| **COOKING FUEL:** | | | |
| Wood | 36.6 | 50.5 | 21.6 |
| Charcoal | 62.9 | 46.0 | 78.1 |
| Gas | 0.3 | 0.3 | 0.3 |
| Other | 0.2 | 0.3 | 0.0 |
| **HO** | | | |
| Owner | 66.1 | 67.3 | 64.9 |
| Renter | 27.4 | 23.7 | 31.4 |
| Free Occupancy | 6.5 | 9.0 | 3.7 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 817 | N = 321 | N = 296 |

N = # OF HOUSEHOLDS
Poor = Expenditure Deciles 1 -5
Wealthy = Expenditure Deciles 6 - 10

attempt was made to estimate the monetary value of livestock. From a cultural perspective, sheep play an important role in religious festivals in Mali. Traditionally, sheep are slaughtered and eaten during the celebration of Tabaski and other religious events. In urban areas the price of sheep rises dramatically prior to Tabaski, up to five times the average market price, in response to demand pressures.

## 5.3 Housing and Amenities

### 5.3.1 Housing Status and Type

Housing status tells us little about what distinguishes the poor from the non-poor. On average two thirds of households in the sample own their own homes; a slightly greater proportion of the poor are owner occupants than the wealthy. Nearly one third of households rent their dwelling with 'Free Occupancy' and 'Other' representing 7% of households. Housing type does show some, albeit small, clustering by income group On average 75% of households live in homes built either of mud-brick or some combination of cement and mud-brick. A greater

apartment dwellings than do the poor. In contrast, the poor show more families living in mud-brick and thatch homes than the wealthy Patterns of housing status and type are fairly consistent across regions except in Gao. In this Northern city a large share of the wealthy are owner occupants as opposed to renters; in addition mud-brick is the dwelling of choice with 95% of wealthy households living in mud-brick homes compared to 77% of poor households.

### 5.3.2 Electricity

The majority of households do not have electricity in urban Mali; on average only 26% of households have electricity in their homes. A breakdown by expenditure group shows that the wealthy depend on electrical lighting more than their poor counterparts: 19% of poor households and 33% of wealthy households. Kayes, one of the poorest cities in Mali (measured by levels of per capita expenditure as well as poverty incidence and depth indicators) is an interesting case. On average, fifty percent of households in Kayes have electricity, with 63% of wealthy homes depending on electrical lighting This is due to the construction of a dam near Kayes, and subsequent hydraulic power generation. Thus, the availability of electricity is not a good discriminator of poor and wealthy households.

### 5.3.3 Water

Several studies associate low levels of income with lack of adequate water.[146] In urban Mali, the two main sources of water in the home for all sample households are (i) a well in the concession (housing compound), and (ii) a tap/faucet (payment required). Other sources in declining order of importance are tap/faucet (free), surface water (water from natural sources), and water porters (vendors). There is marked variation, however, across regions and income groups making it difficult to ascertain patterns or tendencies. Clearly, sources of water are region specific in Mali. As a result, families may have

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[146]World Bank, World Development Report 1991 24-25; Austin 14; and Berg 37

little discretionary power over the supply or source of water, so that water source is not an indicator of economic status.

### 5.3.4 Cooking Fuel

The two principal types of cooking fuel used in the home -- wood and charcoal -- show variation both by expenditure group and by region. For the entire sample, the wealthy show a strong preference for charcoal while the poor show about equal usage of both forms of fuel. In the North of the country there are two distinct patterns across expenditure groups: households in Gao are nearly solely dependent on charcoal while in Tombouctou the majority of households use wood fuel. As in Tombouctou, wood fuel is the primary cooking fuel of households in Kayes. Gas is rarely used and shows no differentiation by expenditure group across all regions. Thus, type of cooking fuel used is not a household characteristic that distinguishes the poor from the non-poor.

## 5.4 Policy Implications of Asset Ownership and Housing/Amenities

On the whole, asset ownership is a weak predictor of poverty in urban Mali. Of the assets examined (consumer durables and livestock), only bicycles are more likely to be owned by the poor than the wealthy. Housing status and amenities provide little information on what distinguishes the poor from the non-poor. Similarities across expenditure groups suggest limited scope for interventions targeted on the basis of these household characteristics.

## 6. Empirical Findings and Policy Implications

The previous sections constructed a profile of the characteristics of urban households in Mali. Disaggregation by expenditure group and region provided a means to distinguish between the poor and the non-poor. The main empirical findings to be drawn from the data are as follows:

Poor households have a younger age distribution than wealthy households, (i.e. more children per household).

Households headed by women are few in number and do not appear to be overly represented among the poor. Differences in per capita income by sex of household head are also not great. Thus, targeting on the basis of the sex of household head appears limited in the Malian context.
The dependency ratio falls as income rises, suggesting that for the poor a larger proportion of members are children who are unlikely to be engaged in income earning activities.

Wealthy households have more women working outside the home than poor households. Given the greater number of children in poor households, policies aimed at increasing employment opportunities for poor women must also take into account the childcare responsibilities that they face.

In urban Mali, disparities in income levels are not attributable to differences in the number of income earners per household. Rather, those individuals in wealthy households who are employed appear to earn four times more than their poor counterparts.

Poor households do not have a greater proportion of members engaged in secondary sectors of activity as a coping strategy to improve their economic situation. On average, only 18% of household members, poor or wealthy, engage in secondary sectors of activity.

Differences in the types of jobs (sectors of activity) or the status of jobs (informal versus formal sector) are not extreme across expenditure groups. Job quality, measured by monetary compensation levels, thus appears to be the main determinant of income differences.

Education shows a strong positive relationship with per capita income.

Household and employment characteristics of the poor are similar in many respects to those of the wealthy. There are important differences, however, that can inform the design of policy interventions to reduce poverty.

In the short-term, interventions that might contribute to improving the access of the poor to food include food-for-work activities and expanding employment opportunities for poor women. First, given unemployed resources in poor households, food-for-work activities may augment the calorie consumption of the poor in the short-run. Food-for-work would contribute to increased food intake of poor households, while improving urban infrastructure. A key consideration in implementing this type of intervention would be setting the 'in-kind' wage at a level that does not attract the participation of non-poor groups. Seasonal targeting of food-for-work activities should also be addressed. As noted in Chapter 5, an area requiring further investigation is the relationship between consumption of different qualities of food and income. If inferior qualities of food are identified in urban Mali, they could be used as payment for food-for-work activities. Since the poor would be the primary consumers of these lower quality products, this type of payment in-kind would effectively screen out wealthier groups in society. Second, the greater number of working women in wealthy households suggests that improving employment opportunities for poor women may contribute to increased household income and access to food. The younger age distribution in poor households, however, indicates that childcare responsibilities may be a principal constraint to poor women's participation in the workforce. Therefore, policies to expand the employment opportunities of poor urban women must consider and address the time and labor constraints of childcare.

The empirical findings also suggest several longer-term solutions to the problem of inadequate income and access to food. First, the finding that the poor have more children than the wealthy suggests that there are economic gains from reducing the number of children per household. The policy implication is that in urban Mali there is a role for modern family planning practices. Policy interventions in this area must focus not only on increasing the access of the poor to contraceptives, but on family planning education programs to promote their use. Second, the finding that poor and wealthy households have the same number of income earners -- 2.5 -- highlights that the wealthy enjoy much higher monetary compensation levels per employed adult than the poor. Job quality rather than sectors of activity or status of employment appears to be the main determinant of income. Evidence from developing countries shows that education has a role to play in enhancing job quality and improving incomes. In urban Mali the data show the importance of education in explaining differences in expenditure and income levels. Low levels of education are concentrated among the poor. From a policy perspective, educational attainment appears to be a key indicator of household economic status. Educational attainment is strongly related to higher levels of per capita income. Improving the access of the poor to education may thus provide the basis for improved levels of income and hence food consumption.

# CHAPTER 7

# DETERMINANTS OF FOOD CONSUMPTION OF THE URBAN POOR

## 1 Introduction

The purpose of this chapter is to estimate how changes in incomes and prices affect the food consumption of poor households compared with relatively wealthy households and the sample population as a whole. This chapter builds upon the descriptive analysis of Chapter 5 to use econometric techniques in examining how the poor change their consumption patterns when incomes or prices change. Using household expenditure and food consumption data two hypotheses will be tested for urban households in Mali:

i) For staple foods the poor exhibit a higher responsiveness than the wealthy to changes in income and prices.

ii) Substitution exists between rice and coarse grains for poor households: an increase in rice prices will result in poor consumers substituting to coarse grains as a cheaper source of calories.

The implications of hypothesis (i) are twofold. First, higher income responsiveness suggests that the poor would increase their intake of basic staples proportionately more in response to a rise in income than the rest of the population. Second, with greater price responsiveness a rise in staple food prices would result in the poor decreasing their staple food intake proportionately more than the rest of the sample

population, whereas a fall in staple food prices would result in proportionately greater consumption

Information of this nature is important for policy-makers to be able to predict the consumption consequences of price and income changes. If hypothesis (i) proves true for the Mali case there may be a role for targeted employment/income generation activities and price subsidies to poor urban households. The substitution effect between rice and coarse grains posited by hypothesis (ii) suggests that as rice prices rise poor households shift their limited resources to purchasing the cheaper staple in order to maintain total calorie intake, while wealthier households are not financially constrained to do so. This would suggest that the substitution effect declines with increases in income since the budget of wealthy households is unlikely to become a binding constraint in the event of price increases of staple foods.

As discussed earlier, within the context of cereal market reform in Mali the PRMC posed the question of how consumers would respond to increases in rice prices in urban Mali. The expectation in 1985 was that increases in the price of rice would result in consumers shifting towards relatively cheaper coarse grains. Analysis of the Mali expenditure/consumption data, however, showed that for the sample as a whole there was no substitution between rice and coarse grains within the observed range of prices.[147] Hypothesis (ii) above goes further to test substitutability for poor households. In urban Mali rice is a principal source of calories for rich and poor alike. If the substitution effect is low or non-existent for low-income households,

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[147]Rogers and Lowdermilk, 17-19.

policies that raise the price of rice would have a negative welfare effect on the poor

Ordinary Least Squares (OLS) regression techniques were used to estimate the determinants of demand of the poor. The Heckman Two-Step procedure is the method used in this dissertation to correct for the bias of zero consumers.[148] This chapter has five sections in addition to this introduction Section 2 presents a review of consumer theory relating preference maximization to the derivation of the demand curve Section 3 focuses on econometric models of the demand function that allow for the estimation of expenditure-group specific elasticities The model specifications used in this dissertation to estimate income and price elasticities of demand are presented in Section 4 Sections 4.1 and 4.2 discuss the results of the regression analysis Section 5 compares the elasticity estimates generated from the two models. Lastly, Section 6 discusses the size of the income transfer necessary to raise the consumption of the poor to recommended intake levels.

## 2 Consumer Theory

The theory of the consumer rests upon the notion of preference ordering: the consumer chooses from a set of affordable consumption bundles the bundle he or she prefers. Consumer preferences serve to classify consumption bundles as 'preferred' or 'at least as good as while commodity prices and consumer income jointly determine the

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[148] Heckman

affordable consumption set.[149] Assumptions that underlie the ordering of consumer preferences are presented below.[150]

Assumption 1: Completeness

For any two consumption bundles x y in X either $x \geq y$ or $y \geq x$ or both.

Completeness states that for any two consumption bundles the consumer expresses either preferance or indifferance.

Assumption 2: Reflexivity

For all x in X, $x \geq x$.

Reflexivity states that any consumption bundle is preferred or indifferent to itself.

Assumption 3: Transitivity

For any three consumption bundles x, y, and z in X, if $x \geq y \geq z$, then $x \geq z$.

Transitivity states that there is a consistent ordering of preferences such that if x is preferred or indifferent to y, and y is preferred or indifferent to z, then x is preferred or indifferent to z.

Assumption 4: Continuity

The graph of those bundles indifferent to x is continuous. Continuity states that given a consumption bundle of two goods, a

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[149]Hugh Gravelle and Ray Rees, Microeconomics (London: Longman Group Limited, 1981), 55.

[150]This section draws upon; Varian, 111-118; Angus Deaton, The Measurement of Welfare: Theory and Practical Guidelines, Living Standards Measurement Study, Working Paper No. 7 (Washington, D.C.: World Bank, 1980), 1-12; Louis Philips, Applied Consumption Analysis (New York: American Elsevier Publishing Co., Inc., 1974), 16-31; and Gravelle and Reeves, 56-59.

Note: Given two bundles x and y within the set of possible consumption bundles X, the notation $x \geq y$ means that the consumer prefers x to y or is indifferent between x and y.

reduction in the quantity of good x' can be compensated for by an increase in the quantity of good x'' such that the consumer is left indifferent between the two consumption bundles.

Assumption 5: Non-Satiation

Non-satiation simply implies that more is preferred to less. For any two consumption bundles x, y in X, x will be preferred (>) to y if x includes at least more of one good and the same quantities of all other goods.

Assumption 6: Strict Convexity

For any consumption bundle x in X, the set of bundles preferred or indifferent to x is strictly convex, (i.e. consumption bundles preferred or indifferent to x lie to the right of or on the same indifference curve boundary).

If the above assumptions hold, consumer preferences can be represented by a continuous utility function (U). The problem confronting the rational consumer is one of preference or utility maximization given a set of affordable consumption bundles. The budget constraint determines the set of feasible or affordable consumption bundles, and is defined as: $\Sigma_i p_i * x_i \leq Y$, where $p_i$ is the price of good i, $x_i$ is the quantity of good i, and Y is the consumer's money income. The maximization of utility subject to the consumer's budget constraint is represented by:

$$\text{Max } U(x_1, x_2, \ldots, x_n)$$

$$\text{s.t.} \quad \Sigma_i p_i * x_i \leq Y \qquad \text{where } (i = 1 \ldots n)$$

Consumer equilibrium occurs when the marginal rate of substitution between two goods (the ratio of relative marginal utilities) is equal to the relative prices of those goods:

$$MRS_{yx} = MU_x/MU_y = p_x/p_y$$

The demanded consumption bundle emerges as the value of the $x_i$ that maximizes consumer utility; the function relating quantities demanded to prices and incomes is termed the demand function.[151] The consumer demand function can be represented by:

$$D_i = f(P_i, Y, P_j, T), \qquad \text{where:}$$

$D_i$ = Demand for good i
$P_i$ = Price of good i
$Y$ = Income
$P_j$ = Price of other goods
$T$ = Tastes

As noted above, the determinants of demand are the price of the good in question, consumer income, the price and availability of related goods, and consumer tastes. The demand curve, as the graphical counterpart of the demand function, represents the quantities of a good that an individual will want to buy as own price varies keeping other prices and income constant. Aggregate or market demand is simply a horizontal aggregation of individual consumer demand curves.

There are several neo-classical assumptions regarding the properties of utility functions and the derivation of the demand curve.[152] The first is that of a perfectly competitive market where

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[151]Varian, 116.

[152]It is clear that the assumption of perfect competition and access to information does not hold in the case of Mali. Monopolistic competition in the retail food market on the part of private traders may have led to price fixing, while the government controlled the price of some commodities such as rice, beef, and sugar during the survey period. Furthermore, the assumption of weak separability places implausible restrictions on substitution between different commodity groups. For example, when food prices rise poor households may reduce consumption of non-food commodities in order to maintain total calorie intake.

buyers and sellers have equal access to information. This assumption implies that prices are parametric and competitively determined. The second assumption is related to the issue of savings. In demand analysis, savings (income minus consumption) are typically considered to be deferred consumption, and therefore do not enter into the utility function. Borrowing or negative-savings is likewise considered to be zero. Weak separability is the third assumption and denotes the partition of the utility function into sub-functions related to groups of commodities. Each sub-utility function represents an ordering of consumer preferences on a specific commodity group. Weak separability states that the preference ranking on consumption bundles in a specific commodity group are not affected by the quantities consumed outside that group.[153] In food consumption analysis weak separability would imply the partition of commodities into food and non-food groups. The ordering of preferences associated with food consumption and hence the demand for food is assumed to be unaffected by the quantities consumed of non-food items. In practice, however, this assumption is implausible; Deaton and Muellbauer note that "weak separability places severe restrictions on the degree of substitutability between goods in different groups."[154] If one assumes weak separability, the demand for food would be a function solely of food prices and expenditures rather than total expenditure or other prices.

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[153]Deaton, The Measurement of Welfare, 24.

[154]Angus Deaton and John Muellbauer, Economics and Consumer Behavior (Cambridge: Cambridge University Press, 1980), 128.

In estimating commodity specific demand functions, one is interested in how the determinants of demand influence quantities demanded. Elasticities of demand measure the effect of price or income changes on the demand for a commodity (i.e. the percentage change in the quantity demanded of a good due to a percentage change in income, its own price, or the prices of related goods). The income, own-price, and cross-price elasticities of demand are defined as:

$$e_y = Y/q_i * dq_i/dY$$

$$e_i = p_i/q_i * dq_i/dp_i$$

$$e_{ij} = p_j/q_i * dq_i/dp_j$$

Where:

e - Elasticity
Y - Income
$p_i$ - Price of commodity i
$q_i$ - Quantity of commodity i
$p_j$ - Price of commodity j

Demand elasticities provide an indication of the responsiveness of quantities demanded to changes in key variables.[155] Income elasticities highlight the extent to which commodities are luxury, normal, or inferior goods: luxury good ($e_y > 1$), normal good ($0 < e_y < 1$), and inferior good ($e_y < 0$). It should be noted that commodities often shift categories as incomes rise. For example, wheat may be considered a luxury good for poor households (a given increase in income results in a more than proportional increase in quantity demanded), but a normal good for wealthy households (a given increase in income results in a less than proportional increase in quantity demanded). Own-price

[155]See the Literature Review (Chapter 2: Section 4) for a discussion of Engel's Law and the Slutsky Equation.

elasticities indicate how the quantity demanded of a good changes when its own price changes holding income, other prices, and tastes constant. Cross-price elasticities identify commodities as substitutes or complements. Goods i and j are defined as substitutes if an increase in the price of good i results in an increase in the quantity consumed of good j, holding income constant. The two goods are complements if an increase in the price of good i results in a decrease in the quantity consumed of good j, holding income constant. This information is particularly relevant to decision-makers interested in the effects of policy on the food consumption of households. Modeling the food acquisition behavior of poor households -- estimating income and price elasticities of demand -- is the focus of the rest of this chapter.

## 3. Models of the Consumption Function

The aim of this section is to review econometric models of household food acquisition behavior that allow for the estimation of expenditure-group specific elasticities of demand. Methods developed to deal with the bias introduced by non-consumption of food commodities will also be examined.

### 3.1 Econometric Models

Recent attempts to estimate expenditure-group specific elasticities of demand from cross-section data include Gray (1982), Alderman and von Braun (1984), Sahn (1988), Rogers and Swindale (1988),

and Swindale (1989).[156] From these studies two principal econometric models emerge:

(i) Double log specification of the consumption function estimated separately for low-income households, high-income households, and for the sample population as a whole.

(ii) Double log quadratic specification of the consumption function with price-income interaction terms.

The above specifications of the consumption function are estimated as single equations on a commodity by commodity basis using OLS regression techniques.

The first model, the double-log specification, is estimated separately for each expenditure or income group. This model is considered one of the simplest specifications of the consumption function and is of the general form:[157]

$$\text{Log } C_i = \alpha + B_1 \log X + B_2 \log p_i + \Sigma_i B_3 \log p_i + B_4 D + U_i$$

Where:

$C_i$ = Per capita consumption of good i
$X$ = Per capita expenditure (income proxy)
$p_i$ = Price of good i
$p_j$ = Price of related goods j
$D$ = Vector of qualitative and demographic variables hypothesized to influence the dependent variable.
$U_i$ = Error term

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[156]Gray; Alderman and Braun; Sahn; Beatrice Rogers and Anne Swindale, Determinants of Food Consumption in the Dominican Republic (Medford, MA: Tufts University School of Nutrition, 1988); and Anne Jennifer Swindale, "Econometric Models of Food Demand in the Dominican Republic," Ph.D. diss., The Fletcher School of Law and Diplomacy, Tufts University, 1989.

[157]See for example Gray, Alderman and von Braun, Rogers and Swindale, and Rogers and Lowdermilk.

The principal advantage of the double-log specification is its ease of estimation and interpretation:[158] given the log form, the coefficients of the price and income terms can be interpreted directly as elasticities. Implicit in the model is the assumption that elasticities are constant for each expenditure group. Limitations, however, arise when using this functional form to estimate consumption parameters. Since regressions must be run for sub-groups of the population in order to estimate expenditure-group specific elasticities, there is a loss of degrees of freedom in the estimation procedure that limits the variation necessary to achieve statistically significant results.

Insufficient variation proved to be the case in the previous analysis of the Mali data. The income and price elasticities of demand for the poorest 25% of the population were statistically insignificant when using the double log specification of the consumption function.[159] Thus, this dissertation employs a broader definition of poverty that includes households in the lower 5 deciles of the expenditure (income) distribution.

An alternative specification allowing for the estimation of expenditure-group specific elasticities is that of the double-log quadratic with price-income interaction terms. The general estimating model is of the form:[160]

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[158]Gray, 23.

[159]Rogers and Lowdermilk, 13.

[160]See Sahn and Swindale for model specifications of this form.

$$LNQ_i = \alpha + B_1 LPCEXP + B_2 (LPCEXP)^2 + B_3 LNP_i + \Sigma_j B_4 LNP_j + B_5 (LNP_i * LPCEXP) + \Sigma_j B_6 (LNP_j * LPCEXP) + B_7 Z + U_i$$

Where:

| | | |
|---|---|---|
| $LNQ_i$ | = | The log of per capita consumption of good i |
| LPCEXP | = | The log of per capita expenditures. |
| $(LPCEXP)^2$ | = | The log of per capita expenditures squared. |
| $LNP_i$ | = | The log of the price of good i. |
| $LNP_j$ | = | The log of the price of good j. |
| $LNP_i$ * LPCEXP<br>$LNP_j$ * LPCEXP | = | Price-Expenditure Interaction Terms: the log of Price * log of Per-Capita Expenditures. |
| Z | = | Vector of qualitative and demographic variables |
| $U_i$ | = | Error Term |

As for the previous model, this specification of the consumption function uses total per capita expenditure as an income proxy. The inclusion of an expenditure squared term allows the expenditure elasticity of demand to vary across the range of expenditure included in the regression. As expenditure rises, the quadratic term permits a commodity to move from being a luxury good (expenditure elasticity $e_y > 1$) to a necessity ($0 < e_y < 1$) to an inferior good ($e_y < 0$).[181] The model also includes interaction terms as independent variables in the regression. Price-expenditure interaction terms allow the price elasticities of demand to vary across expenditure groups, and capture

[181]Gray, 24.

the combined effect of price and expenditure on the dependent variable. The vector of demographic and qualitative variables is included to adjust for determinants of food consumption not attributable to price or income. As for the simple double-log specification, this model uses household size and composition variables, as well as dummy variables for season and/or region.

The double-log specification of the consumption function with price-expenditure interaction terms allows parameters to be estimated for sub-groups of the sample population. A principal advantage of the model is that the regression analysis utilizes the variation in incomes and prices over the entire range of observations in the sample. To calculate expenditure-group specific elasticities, one uses the mean level of expenditure and prices for each expenditure group. The formulae for calculating elasticities of demand by expenditure group are presented below.[162]

<u>Expenditure Elasticity</u>:

$$e_y = B_1 + 2(B_2)(LPCEXP) + B_5(LNP_i) + \Sigma_j B_6(LNP_j)$$

<u>Own Price Elasticity</u>:

$$e_i = B_3 + B_5(LPCEXP)$$

<u>Cross Price Elasticity</u>:

$$e_j = B_4 + B_6(LPCEXP)$$

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[162]Discussion with Professor Dirck Stryker (November 1990), and Swindale.

## 3.2 Econometric Issues

### 3.2.1 Non-Consumption

In estimating demand functions for disaggregated food commodities, econometric problems emerge when a large proportion of zero values are observed for the dependent variable. Non-consumption of a food commodity during the survey period results in biased estimates of the OLS coefficients. Ordinary Least Squares produces unbiased and efficient coefficient estimates if the following assumptions on the error term ($U_i$) hold:

i) $E(U_i) = 0$
ii) Variance $(U_i) = \sigma^2$ for all i
iii) Covariance $(U_i, U_j) = 0$ for $i \neq j$
iv) $U_i \sim N(0, \sigma^2)$.

The inclusion of zero consumers in the OLS regression biases the coefficients due to a violation of assumption (iv) above, (i.e. the error term is not distributed normally). Estimating the consumption function on the truncated sample (non-zero consumers) does not eliminate the bias and results in a violation of assumption (i): $E(U_i) \neq 0$.

Models with limited dependent variables were first applied in the work of James Tobin in 1958.[163] In investigating the relationship between durable goods expenditure and total disposable income using OLS regression techniques, he noted the bias introduced when a large proportion of households reported no expenditure on durable goods during

[163]James Tobin, "Estimation of Relationships for Limited Dependent Variables," Econometrica 26 (January 1958): 24-36.

the survey period. To illustrate the bias introduced by non-expenditure, Tobin puts forward the following regression model:[164]

$$Y_i = BX_i + U_i \quad (i = 1 \ldots n) \qquad (1)$$

where: $Y$ = household expenditure on durable goods.
$X$ = household income
$U_i$ = Error Term

and the standard OLS assumptions on the error term hold. Assume the observed value of expenditure is $Y^*_i$ such that:

$$Y^*_i = Y_i \qquad \text{if } Y_i > 0$$

$$Y^*_i = 0 \qquad \text{if } Y_i \leq 0$$

Observed expenditure $Y^*_i$ is positive when $B X_i + U_i > 0$, and is equal to zero when $BX_i + U_i \leq 0$. The estimating model can then be represented by:

$$Y^*_i = BX_i + U^*_i \qquad (2)$$

Truncation of the $Y^*_i$ occurs at zero while that of the error term $U^*_i$ is at $-(BX_i)$, implying that the means of the $Y^*_i$ and $U^*_i$ are different from those of the underlying $Y_i$ and $U_i$.[165] Since the $E(U^*_i) \neq 0$, a standard assumption of the OLS regression model is violated and the estimated coefficients are biased. The method proposed by Tobin to

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[164]Jan Kmenta, Elements of Econometrics, Second Edition (New York: Macmillan Publishing Company, 1984), 560-562.

[165]Ibid., 561.

correct for this bias is that of maximum likelihood estimation using the entire sample of observations in two stages.

An alternative method to correct for the bias of zero consumers was developed by James Heckman in 1976.[166] Similar to the tobit method formulated by Tobin, the two-step procedure proposed by Heckman makes a probabilistic statement about positive observations of the $Y^*_i$. The Heckman method is computationally less burdensome than maximum likelihood estimation techniques, however, and goes further to decompose the consumption decision into two parts: (i) the decision to consume or not to consume, and (ii) the decision about how much to consume.[167] Another advantage to Heckman's technique is that the model in each stage can be different. In estimating the determinants of consumption of poor urban households in Mali, this dissertation uses the Heckman two-step procedure to correct for the bias of non-consumption.

Heckman identifies the bias associated with OLS estimation of limited dependent variable models as that of a missing variable problem. He proposes a "computationally simple estimator applicable to such models ... that amounts to estimating the omitted variable and using least squares including the estimated omitted variable as a regressor."[168] Heckman applies this estimator to a model of female labor supply and wages, where wages of working women are the limited dependent

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[166]Heckman, 475-493.

[167]Pamela S. Haines, David K. Guilkey, and Barry M. Popkin, "Modeling Food Consumption Decisions as a Two-Step Process," American Journal of Agricultural Economics 70 (August 1988): 543-552.

[168]Heckman, 475.

variable: positive observations of the $Y^*_i$ are only noted for those women already in the labor force, whereas the wages of those women whose reservation wage is greater than the market wage (and thus opt not to work) are noted as being zero.[169]

The missing variable bias attributed to OLS estimation can be seen when taking the expectation of equation 2 above.[170] Assuming observations of $Y^*_i > 0$, one can rewrite equation 2 as:[171].

$$E(Y^*_i) = X_iB + E(U_i \geq -X_iB) \qquad (3)$$

where $X_i$ is a vector of independent variables and B is a vector of unknown parameter coefficients. OLS regressions run on the positive observations of $Y^*_i$ (the truncated sample) leave out the $E(U_i \geq -X_iB)$, thus giving rise to missing variable bias. To correct for this bias, Heckman uses probit analysis to estimate the missing variable -- conditional mean of the $U_i$ -- for the entire sample (zero and non-zero observations). The estimated mean of the $U_i$ is then used as an independent variable in an OLS regression run on the truncated sample.

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[169]Kmenta, 461.

[170]Expectation defined as weighted average of a random variable where the weights are the probability of observing a specific value of x:

$$E(x) = \Sigma_x x \text{ Probability } (x)$$
$$= \int f(x)dx$$

where f represents the probability density function of x.

[171]Heckman, 477.

The estimator used by Heckman, the inverse of the Mills ratio, predicts the probability of positive consumption and is represented by:[172]

$$\frac{f(\phi_i)}{1 - F(\phi_i)}$$

Where $\phi_i = \dfrac{-X_iB_i}{(\sigma)^{1/2}}$

and:

$\sigma$ = the standard deviation of the error term

$f(\phi_i)$ = the unit normal density function

$F(\phi_i)$ = the cumulative normal density function

The two-step procedure developed by Heckman to correct for the bias of zero consumers first uses the probit model to determine the probability of positive consumption of the good in question. The probit results provide an estimate of $\phi_i$ and of the Mills ratio. The inverse of the Mills ratio is then included as an independent variable in an OLS regression run on the truncated sample. Given the adjustment for zero consumers, the estimated coefficients from the second step regression are representative of the population as a whole.

As discussed above, the Heckman procedure was originally applied to an analysis of labor markets. The inverse of the Mills ratio was included as a regressor in the second-stage OLS regression to correct for the bias of non-entry into the labor force. In labor economics the estimated coefficient of the Mills ratio relates directly to a theory of

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[172]Ibid., 479.

reservation wages and self-selection into the labor force. A negative and significant coefficient is termed 'negative selection' and refers to the case where the reservation wage is positively correlated with the duration of unemployment: those who are currently unemployed are predicted to have a higher reservation wage than those who are currently employed.[173] Positive selection, a positive and significant coefficient of the Mills ratio, refers to the opposite case where those who are unemployed have a lower reservation wage than their employed counterparts.

There is some debate in the food consumption literature on the interpretation of the estimated coefficient of the Mills Ratio. Although the coefficient of the Mills ratio should be the standard deviation of the error term in the underlying demand function, the vast majority of authors do not discuss the sign or significance of the coefficient. For example, Alderman and von Braun note that inclusion of the inverse of the Mills ratio simply corrects for the non-consumption bias, and that "one is not particularly interested in the coefficient."[174] Others suggest that the coefficient of the estimated 'missing variable' reflects the bias introduced by non-consumers.

An application of labor market theory to food consumption analysis would identify an unobserved reservation price for a given commodity

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[173]John T. Addison and Pedro Portugal, "Job Displacement, Relative Wage Changes, and Duration of Unemployment," Journal of Labor Economics 7 (July 1989): 292.

[174]Alderman and von Braun, 71.

that influences the consumption decision.[175] Positive selection, a positive Mills ratio coefficient, would occur when an individual's reservation price was lower than the market price, and thus the individual would choose not to consume the commodity in question. The alternative case of negative selection -- a negative and significant Mills ratio coefficient -- would predict that an individual's reservation price was higher than the market price. It is extremely unlikely those who choose not to consume do so because they have a higher reservation price than those who consume. Thus, the case of negative selection in food consumption analysis is difficult if not impossible to interpret. A discussion of the sign and significance of the estimated coefficients from the econometric analysis is presented in Section 4.1.7 below.

### 3.2.2 Heteroskedasticity: Pooling of Data

Heteroskedasticity arises when the variance of the error term is not constant. In the presence of heteroskedasticity OLS parameter estimates remain unbiased, but are not efficient or minimum variance estimates. In national cross-section data, heteroskedasticity may occur if the variances of the error terms associated with some regions are different from those of other regions. To determine whether the data can be pooled a regression was run on the entire sample and the unrestricted error sum of squares ($ESS_{ur}$) was calculated. A second regression was run on each region or grouping of regions and a

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[175]Reservation price defined as the price an individual is willing to pay for commodity x.

restricted error sum of squares ($ESS_r$) was calculated. To test whether the assumption of identical variances is correct, one posits the null hypothesis that the variances are constant and uses the following F statistic to determine if the null hypothesis can be rejected.[176]

$$\frac{(ESS_{ur} - ESS_r)/k}{ESS_{ur}/(N+M-2k)} \qquad F \sim (k, N + M - 2k)$$

Where:

k = Number or restrictions, (intercept plus parameters to be estimated)

N = Number of cases in unrestricted regression.

M = Number of cases in restricted regression.

If the F statistic is greater than the critical value of the F distribution at the 5% level, one can reject the null hypothesis implying that the data cannot be pooled. For the purposes of this dissertation, the above F test was performed to ascertain whether the data from the 8 urban centers in Mali could be pooled. The null hypothesis of constant variances was rejected for the pooling of data from all cities. This was not the case, however, for pooling data from the 5 Southern cities of Bamako, Koulikoro, Sikasso, Segou and Mopti. Thus, the regression analysis presented in Sections 4 and 5 below uses data for the 5 city group alone.

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[176]Robert S. Pindyck and Daniel L. Rubinfeld, Econometric Models and Economic Forecasts, 2d ed. (New York: McGraw-Hill Book Company, 1981), 124.

### 3.2.3 Multi-collinearity

Multi-collinearity arises when independent variables are highly correlated with each other. The presence of multi-collinearity implies that OLS parameter estimates are inefficient, and is typically characterized by large standard error and variance terms. Testing for the presence of multi-collinearity was done for the model specifications used in this dissertation. The correlation matrix for all pairs of independent variables did not indicate that multi-collinearity was a problem for the specifications of the demand function presented in Section 4.

## 3.3 Data Issues: Time Series versus Cross Section Data

Either time series or cross-section data can be used to estimate the determinants of demand. It should be noted that the interpretation of parameter estimates differs depending on the type of data used. Elasticities of demand generated from time series are typically considered to be short-run estimates. Limitations on the use of time series data for food consumption purposes, however, include: (i) the costliness of data collection over extended periods, and (ii) the aggregation of data into commodity groups, which obscures commodity-specific responses to changes in key variables. Cross section data, in contrast, provide a wealth of detailed information on households. Price elasticity coefficients estimated from models using cross-section data are commonly interpreted to represent long-term adjustment parameters,

with price variation attributable to temporal, spatial, and quality differences.[177]

The data used in this dissertation are cross sectional, providing a detailed picture of household consumption patterns. As noted earlier, however, the same households were sampled three times over a period of one year. Prices were changing rapidly during the survey period 1985/86. Indeed, contrary to expectations, cereal prices fell dramatically and continuously due to the abundant harvest of 1985 after two consecutive years of drought. As a result, the price elasticity estimates generated from the Mali data may well be considered short term rather than habitual responses to changes in prices.

## 4. Model Specification

This dissertation uses the two specifications of the consumption function presented in Section 3.1 above: (i) double log specification of the consumption function estimated separately for low-income households, high-income households, and the sample population as a whole, and (ii) double log quadratic specification of the consumption function with price-expenditure interaction terms (DLQ). Dummy variables are included to account for season, home production of staple foods, and education of the household head. The commodities selected for analysis are rice, millet/sorghum, peanut-butter, and beef. As discussed in Chapter 5, cereals form the base of the Malian diet providing the bulk of both calories and protein. Peanut-butter and beef are used in the sauces for the rice and toh (millet/sorghum) base. In estimating expenditure-

[177]Timmer, Falcon, and Pearson, 54.

group specific elasticities, the Heckman two-step procedure is used to correct for the bias of zero consumers of staple foods.

### 4.1 Double Log Specification of the Consumption Function

The first model specification used is of the general form:

$$LNCONS_i = \alpha + B_1 LNPCX + B_2 LNHHSIZE + B_3 LNHHCOMP + B_4 LNP_i + \Sigma_i B_5 LNP_j + B_6 SEASON + B_7 HOMEPROD + B_8 EDUCCM + B_9 MILLS RATIO + U_i$$

Where:

| | |
|---|---|
| $LNCONS_i$ | = Log of Per Capita Purchased Quantities of Good i; |
| LNPCX | = Log of Per Capita Expenditure |
| LNHHSIZE | = Log of Number of Household Members |
| LNHHCOMP | = Log of Ratio of Adult Equivalent Units to the Number of Household Members. |
| $LNP_i$ | = Log of the Price of good i |
| $LNP_j$ | = Log of the Price of good j |
| SEASON | = Dummy Variable for Season |
| HOMEPROD | = Dummy Variable for Home Production of Staple Foods, 0=none, 1=yes. |
| EDUCCM | = Dummy Variable for Education of Household Head (Chef de Menage), 0=none, 1=yes. |
| MILLSRATIO | = Inverse of the Mills Ratio |
| $U_i$ | = Error Term |

Overall, the double log specification of the consumption function yields estimates that are reasonable and agree with the findings of the descriptive analysis presented in Chapter 5. Expenditure elasticities

are positive and statistically significant for all commodities, confirming a strong and positive relationship between expenditure and per capita consumption of staple foods. The calorie regression results support the finding of a positive relationship between consumption and expenditure. Furthermore, the double log specification yields plausible price elasticities of demand.

### 4.1.1. Results: Five Southern Cities

Tables 7.1-7.4 (in text) present the regression results of the double log specification for rice, millet/sorghum, peanut-butter, and beef for the 5 Southern cities of Bamako, Koulikoro, Sikasso, Segou, and Mopti. Table 7.5 (in text) shows the number and percentage of zero consumers by commodity. Appendix 5 presents the regression results for all cities combined.

### 4.1.2 Expenditure Elasticities of Demand

In general, the estimated expenditure elasticities of demand for staple food commodities were plausible, showing the expected signs and relative magnitudes. Expenditure elasticities proved positive and significant for all expenditure groups. As expected, the elasticities of staple foods declined with increases in total expenditure, indicating the greater responsiveness of the poor to changes in income. The lack of an inferior good in Mali is evident from the econometric as well as the descriptive results: none of the expenditure elasticities is negative and significant indicating that there is no good whose absolute consumption declines with increases in income.

TABLE: 7.1

FIVE SOUTHERN CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Rice (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.9046 ** | 0.2418 * | 0.5926 ** |
| | (.1823) (4.963) | (.1413) (1.711) | (.1077) (5.501) |
| OWN PRICE | -1.0407 | -0.4242 | -0.6325 * |
| | (.8331) (-1.256) | (.4587) (-.925) | (.4108) (-1.661) |
| CROSS PRICE: Millet/Sorghum | 0.5254 * | 0.1665 | 0.2755 |
| | (.3227) (1.628) | (.2450) (.677) | (.1970) (1.468) |
| HOME PRODUCTION: Rice | -0.4096 | -0.1343 | -0.2301 |
| | (.2776) (-1.476) | (.1882) (-.677) | (.1630) (-1.412) |
| HOME PRODUCTION: Millet/ Sorghum | -0.0740 | 0.0307 | -0.0419 |
| | (.0790) (-.936) | (.0697) (.440) | (.0522) (-.802) |
| FAMILY SIZE | 0.1082 | -0.4485 ** | -0.1840 |
| | (.2275) (.476) | (.1801) (-2.489) | (.1420) (-1.295) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.5911 ** | -0.0118 | -0.2205 |
| | (.2755) (-2.145) | (.1628) (-.072) | (.1438) (-1.534) |
| SEASON 2 | 0.0808 | 0.0490 | 0.0697 |
| | (.0825) (.979) | (.0626) (.783) | (.0499) (1.396) |
| SEASON 3 | 0.0699 | 0.1573 * | 0.1180 * |
| | (.1246) (.561) | (.0885) (1.779) | (.0724) (1.631) |
| EDUCATION OF HOUSEHOLD HEAD | -0.1154 | -0.0838 | -0.1044 |
| | (.1191) (-.968) | (.0886) (-.946) | (.0718) (-1.454) |
| MILLS RATIO | -0.4192 | 0.3676 | 0.0197 |
| | (.4390) (-.955) | (.3413) (1.136) | (.2706) (.073) |
| Adjusted R | 0.1710 | 0.1921 | 0.3235 |
| F Statistic | 10.02 ** | 14.98 ** | 50.09 ** |
| Number of Households | 482 | 648 | 1130 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy: Expenditure Deciles 6 - 10

TABLE: 7.2

FIVE SOUTHERN CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Millet/Sorghum (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.4372 ** | 0.3073 ** | 0.3693 ** |
| | (.1632) (2.679) | (.1354) (2.269) | (.0892) (4.143) |
| OWN PRICE | -0.4157 | 0.1062 | -0.1419 |
| | (.5586) (-.744) | (.4241) (.250) | (.3323) (-.427) |
| CROSS PRICE: Rice | 1.1469 | -1.1616 * | -0.3918 |
| | (1.037) (1.106) | (.6839) (-1.698) | (.5536) (-.708) |
| HOME PRODUCTION: Rice | -0.0475 | -0.0514 | -0.0479 |
| | (.2119) (-.224) | (.1568) (-.328) | (.1251) (-.383) |
| HOME PRODUCTION: Millet/ Sorghum | 0.0267 | 0.1085 | 0.0631 |
| | (.1120) (.238) | (.1094) (.992) | (.0757) (.834) |
| FAMILY SIZE | -0.5248 ** | -0.3216 * | -0.3922 ** |
| | (.2075) (-2.529) | (.1726) (-1.863) | (.1279) (-3.066) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1646 | -0.2579 | -0.2226 |
| | (.3817) (-.431) | (.2324) (-1.110) | (.1963) (-1.134) |
| SEASON 2 | -0.1255 | 0.0662 | -0.0080 |
| | (.1070) (-1.173) | (.0852) (.776) | (.0651) (-.123) |
| SEASON 3 | 0.0895 | 0.3571 ** | 0.2547 ** |
| | (.1623) (.551) | (.1118) (3.193) | (.0907) (2.807) |
| EDUCATION OF HOUSEHOLD HEAD | -0.0029 | -0.1357 ** | -0.0885 |
| | (.1035) (-.028) | (.0700) (-1.938) | (.0579) (-1.529) |
| MILLS RATIO | 0.6745 * | 0.3197 | 0.4534 ** |
| | (.3835) (1.759) | (.3087) (1.043) | (.2319) (1.955) |
| Adjusted R | 0.1360 | 0.1708 | 0.2564 |
| F Statistic | 6.43 ** | 11.36 ** | 30.24 ** |
| Number of Households | 380 | 554 | 934 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy: Expenditure Deciles 6 - 10

TABLE: 7.3

FIVE SOUTHERN CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Peanut-Butter (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.4951 ** | 0.3249 ** | 0.4572 ** |
| | (.1371) (3.610) | (.1108) (2.934) | (.0701) (6.524) |
| OWN PRICE | -1.7452 ** | -1.7386 ** | -1.7031 ** |
| | (.3184) (-5.481) | (.2328) (-7.468) | (.1848) (-9.214) |
| CROSS PRICE: Beef | 2.2412 ** | 1.0016 | 1.2444 ** |
| | (.8581) (2.612) | (.6635) (1.510) | (.4984) (2.537) |
| HOME PRODUCTION: Peanuts | -0.2099 | 0.1932 | 0.0217 |
| | (.1637) (-1.282) | (.1492) (1.295) | (.1096) (.198) |
| HOME PRODUCTION: Meat | -0.0752 | 0.2269 | 0.0507 |
| | (.2942) (-.256) | (.3897) (.582) | (.2321) (.218) |
| FAMILY SIZE | 0.1483 | -0.3161 ** | -0.1889 * |
| | (.1860) (.797) | (.1521) (-2.078) | (.1090) (-1.733) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.6995 ** | -0.1635 | -0.4109 |
| | (.3427) (-2.580) | (.2474) (-.885) | (.1989) (-2.068) |
| SEASON 2 | -0.1270 | -0.0551 | -0.0886 |
| | (.1095) (-1.160) | (.1074) (-.513) | (.0761) (-1.164) |
| SEASON 3 | -0.4743 ** | -0.3715 ** | -0.4022 ** |
| | (.1828) (-2.595) | (.1551) (-2.395) | (.1156) (-3.478) |
| EDUCATION OF HOUSEHOLD HEAD | -0.3507 ** | -0.1219 | -0.1762 ** |
| | (.1008) (-3.477) | (.0782) (-1.559) | (.0606) (-2.908) |
| MILLS RATIO | -0.6166 | 0.0297 | -0.1064 |
| | (.4180) (-1.475) | (.3175) (.094) | (.2322) (-.458) |
| Adjusted R | 0.2215 | 0.2685 | 0.3279 |
| F Statistic | 11.71 ** | 20.22 ** | 44.96 ** |
| Number of Households | 415 | 577 | 992 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy: Expenditure Deciles 6 - 10

TABLE: 7.4

FIVE SOUTHERN CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Beef (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.5186 ** | 0.3287 ** | 0.4038 ** |
| | (.1472) (3.524) | (.1420) (2.314) | (.0863) (4.679) |
| OWN PRICE | -0.9507 * | -1.3210 ** | -1.1765 ** |
| | (.5836) (-1.629) | (.5341) (-2.473) | (.3847) (-3.664) |
| CROSS PRICE: Peanut-Butter | -0.9351 | -2.2861 ** | -1.6341 ** |
| | (.6471) (-1.445) | (.5607) (-4.006) | (.4102) (-3.984) |
| HOME PRODUCTION: Peanuts | 0.1929 | -0.6191 ** | -0.2987 * |
| | (.2538) (.766) | (.2138) (-2.854) | (.1598) (-1.889) |
| HOME PRODUCTION: Beef | -0.8494 * | -0.7164 * | -0.6383 ** |
| | (.3493) (-1.659) | (.4231) (-1.693) | (.2602) (-2.453) |
| FAMILY SIZE | -0.6017 ** | -0.6336 ** | -0.5490 ** |
| | (.1643) (-3.662) | (.1393) (-4.546) | (.1016) (-5.798) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1534 | 0.1447 | 0.0676 |
| | (.4306) (-.356) | (.2652) (.546) | (.2235) (.303) |
| SEASON 2 | -0.4277 | -0.7308 ** | -0.5605 ** |
| | (.3524) (-1.214) | (.2990) (-2.444) | (.2211) (-2.534) |
| SEASON 3 | -0.8485 | -1.5257 ** | -1.1887 ** |
| | (.5296) (-1.598) | (.4515) (-3.379) | (.3343) (-3.556) |
| EDUCATION OF HOUSEHOLD HEAD | 0.2510 | 0.3128 ** | 0.2687 ** |
| | (.1562) (1.607) | (.1089) (2.872) | (.0880) (3.053) |
| MILLS RATIO | 1.1473 ** | 1.3722 ** | 1.1780 ** |
| | (.4844) (2.369) | (.3957) (3.468) | (.2958) (3.983) |
| Adjusted R | 0.1202 | 0.1941 | 0.2654 |
| F Statistic | 5.64 ** | 12.08 ** | 28.05 ** |
| Number of Households | 345 | 507 | 852 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy: Expenditure Deciles 6 - 10

TABLE: 7.5

FIVE SOUTHERN CITIES

NUMBER AND PERCENTAGE OF ZERO CONSUMERS BY COMMODITY AND EXPENDITURE GROUP

| COMMODITY | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| RICE: | | | |
| Number of Zero Consumers | 65 | 46 | 111 |
| Zero Consumers/Sample Population, (%) | 0.12 | 0.07 | 0.09 |
| MILLET/SORGHUM: | | | |
| Number of Zero Consumers | 167 | 140 | 307 |
| Zero Consumers/Sample Population, (%) | 0.31 | 0.20 | 0.25 |
| PEANUT-BUTTER: | | | |
| Number of Zero Consumers | 132 | 117 | 249 |
| Zero Consumers/Sample Population, (%) | 0.24 | 0.17 | 0.20 |
| BEEF: | | | |
| Number of Zero Consumers | 202 | 187 | 389 |
| Zero Consumers/Sample Population, (%) | 0.37 | 0.27 | 0.31 |

Poor: Expenditure Deciles 1 - 5
Healthy: Expenditure Deciles 6 - 10

Rice and Millet/Sorghum: Rice expenditure elasticities differed significantly at the .05 level between poor and wealthy households.[171] For poor households the expenditure elasticity was quite high at .905 suggesting that a 10% increase in income, holding prices and demographic/qualitative variables constant, would result in a 9% increase in per capita purchases of rice. Expenditure elasticities for wealthy households and for the sample as a whole were substantially lower at .242 and .593 respectively. The expenditure elasticity estimates for rice, a primary dietary staple contributing 40% to daily calorie intake, shows a greater income responsiveness on the part of the poor than that of the wealthy population. Millet/sorghum shows a similar pattern to that of rice with expenditure elasticities declining, albeit slightly, from .437 for the poor to .307 for the wealthy. The millet/sorghum results indicate that a 10% increase in income would result in a 4% increase in consumption for the poor compared with a 3% increase for the wealthy. Although the millet/sorghum elasticities decline as income rises, the difference in elasticities between expenditure groups was not statistically significant at the .05 level.

For poor households, the rice expenditure elasticity (.905) is higher and significantly different from the millet/sorghum expenditure elasticity (.437). This suggests that a given increase in income, holding prices constant, results in proportionately higher consumption of rice than that of coarse grains. Informal interviews suggest that rice, given its ease of preparation and fuel/time saving qualities, is

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[171]Note that statistical test (T Statistic) for the difference between poor and wealthy households is presented in Annex 5.

increasingly becoming the cereal of choice for urban households. The cereal expenditure elasticities support this finding for poor households indicating that an incremental increase in income results in greater consumption of rice than of the coarse grains.

Peanut-Butter and Beef: Expenditure elasticities were positive and highly significant for both peanut-butter and beef for all expenditure groups. Similar to the case of cereals, expenditure elasticities for peanut-butter decline in magnitude with increases in income. For poor households the peanut-butter expenditure elasticity was relatively high at .495 compared to .325 for wealthy households; the difference across expenditure groups, however, did not prove significant. Expenditure elasticities for beef also decline across expenditure groups. Beef expenditure elasticities were .519 for the poor and .329 for the wealthy, yet again the difference across expenditure groups was not statistically significant.

### 4.1.3 Own-Price Elasticities of Demand

Theory suggests that own-price elasticities of staple foods should be negative and significantly different from zero. A number of empirical studies have also shown that own-price elasticities of staple foods decline in absolute value as income rises.[179] For a given rise in price, this would imply a proportionately larger reduction in per capita consumption for the poor than for the wealthy.

The own-price elasticity of demand for rice in urban Mali was estimated at -.683 and was significant for the entire sample, indicating

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[179]Alderman. 25-26; and Timmer, Falcon, and Pearson, 47-48.

that a 10% increase in price would result in a 7% decline in per capita rice consumption. It is surprising to note, however, that own-price elasticities for rice although negative were not significantly different from zero for the poor or the wealthy sub-groups of the population. Across expenditure groups, the own-price elasticity of millet/sorghum was also not significantly different from zero.[180] This implies that per capita consumption is unresponsive to changes in own prices holding income and other prices constant. Therefore, an increase in the price of millet/sorghum will reduce real consumer income, but will not affect demanded quantities. Only peanut-butter and beef showed negative and significant own-price elasticities for all expenditure groups. For the entire sample, peanut butter was highly price elastic at -1.7 showing little difference in elasticities between the poor and wealthy sub-groups of the population. Interestingly, own-price elasticities for beef showed a greater responsiveness on the part of the wealthy than the poor to changes in price: -.951 in poor households and -1.32 in wealthy households. This may be attributable to the fact that beef is not a basic staple, and wealthy households have more consumption choices available to them than the poor. Although the sign and magnitude of the coefficients suggest that a given increase in beef prices reduces purchases of wealthy households proportionately more than poor

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[180]In urban Mali the lack of own-price responsiveness for staple cereals is surprising and may be attributable to the problem of limited price variability due to the use of cluster average prices. Also, as the price of a given cereal increases, poor households may reduce their expenditure on non-cereal items rather than adjust the quantities consumed of that cereal.

households, the difference across expenditure groups was not statistically significant.

### 4.1.4 Cross-Price Elasticities of Demand

Cross-price elasticities of demand were also estimated in order to ascertain the trade-off or substitution effects across commodities. Only those prices assumed to have an effect on per capita consumption of the good in question were included in the estimation of the demand function. Thus, the cereal regressions included rice and millet/sorghum prices, while the non-cereal regressions included peanut-butter and beef prices.

Rice and Millet/Sorghum: In urban Mali rice and millet/sorghum act as substitutes only for low-income urban consumers. The significant and positive price coefficient for coarse grains in the rice regression indicates that a 10% increase in millet/sorghum price would result in a 5% increase in rice consumption. Substitution between rice and the coarse grains is thus evident for low-income urban consumers: when millet/sorghum prices rise the poor shift their consumption towards the relatively cheaper staple cereal. This effect was not symmetrical across the two commodities, however, as the cross-price term for rice in the millet-sorghum regression was not significantly different from zero.

For wealthy consumers, rice and millet/sorghum show a complementary relationship indicated by the high and negative cross-price elasticity term in the millet/sorghum regression. The difference between poor and wealthy households proved significant at the .05 level. This finding supports the observation that rice and millet/sorghum play

different roles in the Malian diet: rice is eaten primarily at the mid-day meal while millet/sorghum forms the staple of the evening meal. Empirical evidence from other low-income countries also suggests that substitutability between cereals is low or non-existent for the wealthier segments of the population.[181] The Mali results suggest that for the wealthy an increase in the price of rice reduces purchases of millet/sorghum, while not affecting purchased quantities of rice.

Peanut-Butter and Beef: For poor households, the cross-price elasticity term in the peanut-butter regression is positive and highly significant indicating that peanut-butter and beef are substitutes. The substitution effect is not significant for wealthy households although the coefficient remains positive. The wealthy do not substitute towards peanut-butter, perhaps since they are better able to purchase beef regardless of price. In Mali peanut-butter and meat are used as ingredients in preparing sauces for rice and millet/sorghum. The regression results show that as beef prices rise low-income consumers utilize peanut-butter as a substitute in preparing sauces. The substitution effect for the poor, however, is again not symmetrical across commodities.

The results of the beef regression show that beef and peanut-butter are complements for the wealthy and the sample as a whole. Beef, the typically more expensive calorie/protein source, is often added to the traditional peanut-butter sauce (tiga dege) by those who can afford it. This may explain, in part, the complementary relationship between

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[181]See for example Reardon, Thiombiano, and Delgado; and Sahn, 325.

the two goods for wealthy households. The cross-price elasticity is also negative for poor households, but did not prove to be statistically significant. An increase in the price of peanut-butter results not only in a decline in per capita purchases of peanut-butter for the wealthy, but in purchases of beef as well. For the case of peanut-butter and beef, substitutability in the face of beef price increases appears to be characteristic of the poor alone. Across expenditure groups, the cross-price elasticities for the beef and peanut-butter regressions significantly differ at the .05 level.

### 4.1.5 Other Variables Influencing Per Capita Food Purchases

The regression model included several qualitative and demographic variables to account for influences on demand other than price and income. Season, home production, and educational status dummy variables were included in the above specification of the consumption function. Dummy variables take on the value of one if a qualitative characteristic is present and zero if it is not. Significant coefficient estimates for dummy variables indicate a shift in the intercept of the estimated regression line.

Seasonality and Home Production: Seasonal dummy variables were included as regressors to eliminate seasonal influences on consumption behavior. To reflect the effect of home produced food or gifts on the dependent variable, home production dummy variables were also included in the regression equation. For both poor and wealthy households, the significant and negative coefficient for beef indicates that home production or gifts have a negative effect on purchased beef quantities:

consumers choose to reduce their purchases when beef is produced for home consumption. Other than beef, home production/gifts surprisingly had no significant effect on purchased quantities for the urban poor. One would expect a reduction in the purchases of the poor as they seek to augment their food consumption through home production/gifts of staple foods. The descriptive data show that the urban poor rely on non-market sources for 6% of total consumption compared to 2% for wealthy households.

Education of the Household Head: An educational status dummy was included as a regressor to capture the effect of education of the household head on per capita food purchases. The dummy variable is defined as one if the household head had any education and zero otherwise. For the sample as a whole, education of the household head appears to be negatively associated with purchased quantities of peanut-butter while the opposite relationship is observed for beef. Education is also negatively associated with purchases of millet/sorghum for wealthy households. Insofar as education and expenditure are correlated, the finding that education is positively associated with higher priced calorie purchases supports the descriptive analysis in chapters 5 and 6. Education and per capita expenditure show a strong positive relationship, and as expenditure rises so too does the share of the food budget allocated to beef purchases. However, it is unclear why education, holding expenditure constant, would lead to greater beef purchases. For the poor, the educational status dummy appears significant only for peanut-butter purchases (-.35).

Household Size and Composition: In urban Mali the effect of household size and composition on per capita purchases is pronounced for all foods. For the poor, the regression results show that household size is significant and negatively associated with per capita purchases of millet/sorghum and beef. The ratio of adult equivalent units to household members was included as a regressor to adjust for the effects of household composition on purchased quantities of staple foods. The presence of more adult household members is indicated as this ratio approaches one. A significant positive coefficient shows that the presence of more adults (and adult males) increases per capita purchases. A negative coefficient is counter-intuitive, since one would expect an increase in the proportion of adults to result in increased energy requirements and hence food purchases. The regression of per capita purchases on household composition for poor households, however, yields negative and significant results for rice and peanut-butter. It is unclear why this is the case for these two staple foods in urban Mali.

Interestingly, for wealthy households, household size rather than composition appears to affect per capita purchases of all staple foods negatively. As the number of household members increases per capita purchases of staple foods falls suggesting the presence of economies of scale in food consumption for the wealthy. There is a minimum efficient scale of meal preparation related to fixed costs of fuel and preparation time. For a small household this minimum efficient scale may result in higher per capita food purchases than is the case for larger households. This relationship is likely to be particularly pronounced in the case of

wealthy households since small wealthy households may be able to afford meal preparation at less than efficient scale. This implies that as family size increases for the wealthy there is a strong negative association with per capita food purchases.

### 4.1.6 Inverse of the Mills Ratio

The estimated coefficient for the inverse of the Mills ratio proved not to be significantly different from zero for rice or peanut-butter. The Mills ratio coefficient for millet/sorghum and beef, however, was positive and significant at the .05 level. This suggests the case of positive selection where the reservation price of non-consumers is lower than for consumers of the good in question. It should be noted that the latter two commodities have a larger proportion of zero consumers than either rice or peanut-butter. The percentage of zero consumers by commodity is as follows: rice (9%), millet/sorghum (25%), peanut-butter (20%), and beef (31%).[182]

### 4.1.7 Determinants of Calorie Consumption

OLS regression techniques were also used to estimate the determinants of calorie consumption of the urban poor using the double

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[182]In order to assess the stability of the results, commodity specific regressions were run without the Heckman two-step procedure. For rice, a commodity with very few zero consumers, the sign, magnitude, and significance of the regression coefficients were almost identical between the probit and non-probit specifications. Differences in the magnitude and significance of estimated coefficients emerged for those commodities with 20% or more of households citing non-consumption: millet/sorghum, peanut-butter, and beef. This effect was most pronounced for beef, the commodity with the highest proportion of zero consumers (31%).

log specification. The log of total per capita calorie consumption was regressed on the set of independent variables used in the commodity specific equations with the following modifications: (i) the calorie regressions include prices of the 4 staple foods, and (ii) the home production dummy variable was defined as one if the household produced any food commodities and zero otherwise.[183] Table 7.6 (in text) presents the regression results of the calorie consumption estimations by expenditure group.

Expenditure Elasticities: As expected, total calorie consumption is significantly and positively associated with per capita expenditure The calorie regression shows an expenditure elasticity for poor households of 1.125 declining to .418 for wealthy households with the difference between the estimates statistically significant at the .05 level. This finding is consistent with the hypothesis that the poor exhibit a higher responsiveness to changes in income than the wealthy. Furthermore, the relationship is quite strong, indicating rather severe calorie deficiency in urban Mali.

Price Elasticities: Rice, millet/sorghum, peanut-butter, and beef contribute on average 86% to total per capita calorie consumption. For the sample as a whole, price elasticities of calorie consumption are negative and significant for all commodities except rice. The regression results show that increases in the price of staple food commodities (with the exception of rice) generate a significant negative effect on calorie consumption, probably reflecting a negative income

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[183]Home produced foods include: rice, millet, maize, meat, fish, milk, peanuts, potatoes, cassava, and yams (igname).

TABLE: 7.6

FIVE SOUTHERN CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Total Per Capita Daily Calorie Consumption | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 1.1248 ** | 0.4182 ** | 0.7752 ** |
| | (.0491) (22.865) | (.0422) (9.910) | (.0230) (32.797) |
| RICE PRICE | 0.3062 | -0.6526 * | -0.1378 |
| | (.6295) (.486) | (.3644) (-1.791) | (.3247) (-.424) |
| MILLET/SORGHUM PRICE | -0.2676 | -0.0177 | -0.3076 ** |
| | (.2525) (-1.060) | (.1951) (-.091) | (.1591) (-1.934) |
| PEANUT-BUTTER PRICE | -0.0228 | -0.3836 ** | -0.2261 ** |
| | (.1840) (-.124) | (.1317) (-2.914) | (.1109) (-2.039) |
| BEEF PRICE | -0.3320 * | -0.4468 ** | -0.3489 ** |
| | (.1887) (-1.760) | (.1683) (-2.643) | (.1291) (-2.703) |
| HOME PRODUCTION | -0.2722 ** | 0.1576 ** | 0.2041 ** |
| | (.0496) (5.485) | (.0439) (3.589) | (.0342) (5.964) |
| FAMILY SIZE | -0.0370 | -0.1125 ** | -0.0354 |
| | (.0376) (-.986) | (.0275) (-4.084) | (.0229) (-1.542) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1492 | -0.2356 ** | -0.1819 * |
| | (.1637) (-.856) | (.1181) (-1.995) | (.1011) (-1.799) |
| SEASON 2 | -0.0508 | -0.0061 | -0.0028 |
| | (.0750) (-.677) | (.0561) (-.109) | (.04589) (-.060) |
| SEASON3 | -0.0200 | -0.0592 | -0.0507 |
| | (.1429) (-.140) | (.0910) (-.651) | (.0801) (-.633) |
| EDUCATION OF HOUSEHOLD HEAD | -0.1015 * | -0.1256 ** | -0.1225 ** |
| | (.0598) (-1.697) | (.0400) (-3.136) | (.0251) (-3.494) |
| Adjusted R | 0.5250 | 0.2288 | 0.5170 |
| F Statistic | 55.87 ** | 10.69 ** | 121.87 ** |
| Number of Households | 547 | 694 | 1241 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy: Expenditure Deciles 6 - 10

effect. Because households do not substitute away from these basic commodities in the face of price increases (since there are no good substitutes available) they suffer a significant loss in real income resulting in a reduction in total per capita calorie consumption. This relationship does not hold for rice where it appears that some substitution does take place into cheaper calorie sources in the event of a rice price increase. Substitution into millet/sorghum, however, was not confirmed in the commodity specific regression presented in Section 4.1.4.

The regression results suggest that poor households substitute towards cheaper calorie sources in order to mitigate the negative income effects of price increases and maintain per capita calorie consumption. In contrast, it appears that wealthy households on the whole do not substitute, and as a result reduce total calorie consumption in the event of food price increases.

Other Variables Influencing Total Calorie Consumption: As expected, home production shows a positive and significant effect on calorie consumption for all expenditure groups, indicating that home production augments food intake levels. It should be noted, however, that in the urban context possibilities for producing staple foods for home consumption are limited. Although this is counter-intuitive, education of the household head has a negative association with total calorie consumption; this effect is apparent across expenditure groups and for the sample as a whole. Also contrary to expectations is the finding that family size and composition appear to have no significant effect on calorie consumption of the poor. This is surprising given the

higher number of children and hence lower calorie requirements of poor households.

### 4.2 Double Log Quadratic Specification of the Consumption Function with Price-Expenditure Interaction Terms (DLQ)

The second specification of the consumption function used in this dissertation is of the form:

$$LNCONS_i = \alpha + B_1 LNPCX + B_2 (LNPCX)^2 + B_3 LNHHSIZE + B_4 LNHHCOMP + B_5 LNP_i + B_6 (LNP_i * LNPCX) + \Sigma_j B_7 LNP_j + \Sigma_j B_8 (LNP_j * LNPCX) + B_9 SEASON + B_{10} HOMEPROD + B_{11} EDUCCM + B_{12} MILLS\ RATIO + U_i$$

Where:

| | |
|---|---|
| $LNCONS_i$ | = Log of Per Capita Purchased Quantities of good i |
| LNPCX | = Log of Per Capita Expenditure |
| $(LNPCX)^2$ | = Log of Per Capita Expenditure Squared |
| LNHHSIZE | = Number of Household Members |
| LNHHCOMP | = Log of Ratio of Adult Equivalent Units to the Number of Household Members |
| $LNP_i$ | = Log of the Price of good i |
| $LNP_j$ | = Log of the Price of good j |
| $(LNP_i * LNPCX)$ | = Interaction Term: log of the price of good i multiplied by the log of per capita expenditure |
| $(LNP_j * LNPCX)$ | Interaction Term: log of the price of good j multiplied by the log of per capita expenditure |
| SEASON | = Dummy Variable for Season |
| HOMEPROD | = Dummy Variable for Home Production of Staple Foods |

EDUCCM = Dummy Variable for Education of Chef de Menage

MILLSRATIO = Inverse of the Mills Ratio

$U_i$ = Error Term

As for the simple double log specification, elasticities of demand by expenditure group were estimated for rice, millet/sorghum, peanut-butter, beef, and total calorie consumption. The DLQ specification of the consumption function yields reasonable elasticity estimates, particularly for the expenditure elasticities. Insignificant results for price elasticities, however, were evident in the calorie regression.

### 4.2.1. Results: Five Southern Cities

The estimated expenditure and price elasticities for the five Southern cities using the DLQ specification are presented in Tables 7.12 7.14 (in text). Appendix 6 (A) presents the regression results for the five city group, while the estimated elasticities of demand for all cities combined are shown in Appendix 6 (B)

### 4.2.2 Expenditure Elasticities of Demand

As expected, estimated expenditure elasticities were positive and significant for both poor and wealthy households, and for the sample as a whole. The pattern of declining expenditure elasticities as expenditure rises was evident for all commodities.

Rice and Millet/Sorghum: Across expenditure groups, positive and significant expenditure elasticities were evident for both rice and millet/sorghum. For the poor, the expenditure elasticity for rice at

ELASTICITIES: FIVE SOUTHERN CITIES: TABLE: 7.12

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| RICE | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.718 ** | 0.513 ** | 0.820 ** |
| Standard Error: | 0.110 | 0.046 | 0.068 |
| T Statistic: | 6.527 | 11.804 | 9.118 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -1.082 * | -0.105 | -0.537 |
| Standard Error: | 0.631 | 0.431 | 0.448 |
| T Statistic: | -1.715 | -0.244 | -1.199 |
| T Significance: | 0.065 | 0.810 | 0.230 |
| CROSS-PRICE ELASTICITY: (Millet-Sorghum) | 0.786 ** | -0.030 | 0.331 |
| Standard Error: | 0.228 | 0.221 | 0.331 |
| T Statistic: | 3.447 | -0.136 | 1.000 |
| T Significance: | 0.000 | 0.880 | 0.317 |

| MILLET-SORGHUM | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.418 ** | 0.345 ** | 0.377 ** |
| Standard Error: | 0.098 | 0.067 | 0.074 |
| T Statistic: | 4.265 | 5.149 | 5.095 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -0.097 | -0.024 | -0.030 |
| Standard Error: | 0.356 | 0.339 | 0.316 |
| T Statistic: | -0.272 | -0.071 | -0.095 |
| T Significance: | 0.787 | 0.944 | 0.928 |
| CROSS-PRICE ELASTICITY: (Rice) | -0.076 | -0.247 | -0.436 |
| Standard Error: | 0.786 | 0.592 | 0.610 |
| T Statistic: | -0.096 | -0.417 | -0.715 |
| T Significance: | 0.390 | 0.874 | 0.472 |

*: significant at .10 Poor: Deciles 1 - 5

**: significant at .05 Wealthy: Deciles 6 - 10

ELASTICITIES: FIVE SOUTHERN CITIES: TABLE: 7.13

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| PEANUT-BUTTER | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.519 ** | 0.409 ** | 0.458 ** |
| Standard Error: | 0.099 | 0.052 | 0.083 |
| T Statistic: | 5.242 | 7.865 | 7.270 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -1.365 ** | -1.382 ** | -1.054 ** |
| Standard Error: | 0.212 | 0.199 | 0.185 |
| T Statistic: | -6.439 | -9.457 | -8.941 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| CROSS-PRICE ELASTICITY: (Beef) | 1.183 ** | 1.088 ** | 1.130 ** |
| Standard Error: | 0.511 | 0.465 | 0.461 |
| T Statistic: | 2.315 | 2.340 | 2.451 |
| T Significance: | 0.020 | 0.019 | 0.014 |

| BEEF | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.449 ** | 0.396 ** | 0.419 ** |
| Standard Error: | 0.095 | 0.092 | 0.086 |
| T Statistic: | 4.726 | 4.304 | 4.872 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -1.228 ** | -1.058 ** | -1.133 ** |
| Standard Error: | 0.432 | 0.453 | 0.399 |
| T Statistic: | -2.843 | -2.336 | -2.840 |
| T Significance: | 0.005 | 0.019 | 0.005 |
| CROSS-PRICE ELASTICITY: (Peanut-Butter) | -1.381 ** | -1.482 ** | -1.526 ** |
| Standard Error: | 0.488 | 0.371 | 0.408 |
| T Statistic: | -3.240 | -3.995 | -3.740 |
| T Significance: | 0.000 | 0.000 | 0.000 |

*: significant at .10
**: significant at .05

Poor: Deciles 1 - 5
Wealthy: Deciles 6 - 10

ELASTICITIES: FIVE SOUTHERN CITIES

TABLE: 7.14

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| DEPENDENT VARIABLE = TOTAL PER CAPITA DAILY CALORIE CONSUMPTION (Purchased + Home Grown) | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE: | 0.938 ** | 0.555 ** | 0.724 ** |
| Standard Error: | 0.025 | 0.025 | 0.020 |
| T Statistic: | 37.520 | 22.200 | 36.200 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| RICE PRICE: | -0.166 | -0.489 | -0.391 |
| Standard Error: | 0.032 | 0.233 | 0.335 |
| T Statistic: | -0.618 | -1.468 | -1.167 |
| T Significance: | 0.535 | 0.142 | 0.242 |
| MILLET-SORGHUM PRICE: | -0.230 | -0.083 | -0.148 |
| Standard Error: | 0.172 | 0.175 | 0.152 |
| T Statistic: | -1.337 | -0.474 | -0.974 |
| T Significance: | 0.180 | 0.638 | 0.332 |
| PEANUT-BUTTER PRICE: | -0.080 | -0.382 | -0.249 |
| Standard Error: | 0.380 | 0.425 | 0.485 |
| T Statistic: | -0.211 | -0.899 | -0.515 |
| T Significance: | 0.834 | 0.368 | 0.535 |
| BEEF PRICE: | -0.487 | -0.380 | -0.433 |
| Standard Error: | 0.288 | 0.318 | 0.304 |
| T Statistic: | -1.703 | -1.223 | -1.424 |
| T Significance: | 0.089 * | 0.222 | 0.156 |

*: significant at .10
**: significant at .05

Poor: Deciles 1 - 5
Wealthy: Deciles 6 - 10

.718 is higher than that of the wealthy (.543) and of the sample as a whole (.620). The results indicate that a 10% increase in income of the poor would result in a 7% increase in per capita purchases of rice compared to a 5% increase for the wealthy. Expenditure elasticities for millet/sorghum also show a higher responsiveness on the part of the poor to changes in expenditure than the wealthy. Although expenditure elasticities decline in magnitude as expenditure rises for both cereals, the difference between expenditure groups was not statistically significant. Expenditure elasticities of poor households, however, significantly differ between rice (.718) and millet/sorghum (.418) This finding suggests that a given increase in income for the poor would result in proportionately greater increases in consumption of rice than of coarse grains.

Peanut-Butter and Beef: Expenditure elasticities for peanut-butter and beef were also positive, significant, and declined with increases in expenditure. Similar to the case of cereals, the difference between expenditure groups was not statistically significant. For the poor, the results show that an increase in income, holding prices constant, would have the same effect on per capita purchases of the two goods: a 10% increase in income would result in a 5% increase in per capita purchased quantities of both peanut-butter and beef.

### 4.2.3 Own-Price Elasticities of Demand

As expected, estimated own-price elasticities of demand were negative for all commodities. For the sample as a whole, own-price elasticities for rice and millet/sorghum, although negative, were not

significantly differenct from zero. When broken by expenditure group, rice showed a negative and significant own-price elasticity only for th poor (-1.082). This indicates that for poor households a 10% increase in the price of rice would result in an 11% decline in per capita rice purchases. The decline in rice own-price elasticities as expenditure rises confirms the hypothesis that the poor are more responsive to changes in price than are the wealthy. This was not evident for millet/sorghum, however, where per capita purchases were insensitive to changes in own-price for all expenditure groups. In contrast, own-price elasticities for peanut-butter and beef were negative and highly significant for all expenditure groups. For the sample as a whole, elasticities were quite large for both peanut-butter (-1.654) and beef (-1.133), showing no significant variation across expenditure groups. This implies that a 10% increase in own-price, holding income and other prices constant, would result in a 17% and 11% decline in per capita purchases of peanut-butter and beef respectively.

### 4.2.4 Cross-Price Elasticities of Demand

In the rice regression, a positive and significant cross-price elasticity was again evident for poor households (.786). The results show that rice and coarse grains are substitutes only for the poor: a 10% increase in the price of millet/sorghum results in an 8% increase in per capita rice purchases. Substitution, however, was evident only in one direction, with changes in the price of rice having no significant effect on per capita purchases of millet/sorghum.

Although cross-price elasticities for beef and peanut-butter were highly significant, they were not symmetrical across commodities. The results show that increases in the price of beef would result in all expenditure groups shifting into peanut-butter, (i.e. the two goods are substitutes). Increases in the price of peanut-butter, however, would result in a relatively large decline in beef purchases for all expenditure groups suggesting a relationship of complements.

### 4.2.5 Determinants of Calorie Consumption

The determinants of calorie consumption were also estimated using the DLQ specification of the consumption function. Estimated expenditure elasticities were positive and highly significant for all expenditure groups. The expenditure elasticity of the poor was quite high at .938, and as expected declined with increases in expenditure: the difference between expenditure groups was statistically significant at the .05 level. This finding supports the hypothesis that the poor are more responsive to changes in income than the wealthy. The price elasticity estimates with regard to total calorie consumption, however, were implausible. Although negative, virtually all of the price elasticity estimates were insignificant, indicating that changes in the prices of staple foods have no effect on total calorie consumption. Note that the lack of statistical significance of the price elasticity estimates may be partly due to limited price variation.

5. Comparison of Double Log and DLQ Elasticity Estimates

The double log and DLQ models generate similar estimates for expenditure elasticities, both in terms of relative magnitude and in variation across expenditure groups. Both models show expenditure elasticities for all commodities that are positive, significant, and decline in magnitude as expenditure rises. Furthermore, both models show that poor households have a significantly higher expenditure elasticity for rice than for millet/sorghum. This finding is consistent with the preferred role of rice in the diets of the urban poor in Mali. The only significant difference between the two models relates to the variation of rice expenditure elasticities across expenditure groups: the estimated expenditure elasticity from the double log model shows a significant difference between poor and wealthy households while this was not observed for the DLQ model.

Own-price elasticity estimates from the double log and DLQ models were also quite similar. Virtually all of the own-price elasticity estimates from both models show the expected negative sign. Both models confirm that millet/sorghum is insensitive to changes in own-price. There was also no significant difference between the double log and DLQ model estimates of own-price elasticities for peanut-butter and beef. For the two models, however, estimates for rice own-price elasticities were not consistent. The DLQ model estimated a significant own-price elasticity of rice for poor households, while this was not evident for the double log model. The magnitude and sign of the own-price elasticities from the two models, however, were almost identical.

The results of both the double log and the DLQ models show that poor households substitute towards rice when millet/sorghum prices rise. Both models also confirm that the substitution effect is not symmetrical. (i.e. an increase in the price of rice has no significant effect on millet/sorghum purchases). The estimated cross-price elasticities of beef and peanut-butter from the DLQ model log specification, however, appear to contradict the results of the double log model. The DLQ model shows that for all expenditure groups peanut-butter and beef act either as substitutes (when beef prices rise) or complements (when peanut-butter prices rise). In contrast, the double log model shows a different pattern across expenditure groups. The results show that when the price of beef increases, only low income consumers substitute towards the relatively cheaper good (peanut-butter). Conversely, when peanut-butter prices rise, only the wealthy regard the two commodities as complements and reduce their consumption of both peanut-butter and beef.

With respect to calorie expenditure elasticities, the double log and the DLQ models present almost identical results. Both models confirm that a given increase in income results in proportionately higher calorie consumption for the poor than the wealthy. In urban Mali, the relatively high expenditure elasticities of the poor compared to the wealthy indicates the presence of severe calorie deficiency. Differences between the two models' estimates of price elasticities, however, are evident. The DLQ estimates show that changes in prices have no effect on total calorie consumption. In contrast, the double log

estimates indicate that the poor are more likely to substitute than either the wealthy or the sample as a whole.

### 6. Size of Income Transfer Necessary to Raise Consumption of the Poor to Recommended Intake Levels

As discussed above, both models confirm that a given increase in income results in proportionately higher calorie consumption for the poor than the wealthy. This finding suggests that targeting income transfers or income generation activities to the poor would be an effective means of raising calorie consumption levels. Using calorie consumption expenditure elasticities, it is possible to calculate the increase in income necessary to bring average calorie consumption of poor households up to a minimum recommended intake level of 2,300 calories per person per day. The cost of an income transfer program to raise the consumption of the poor to minimum recommended levels is shown in Table 7.21 (in text).[184] Table 7.22 (in text) presents the DLQ

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[184]Income transfer (T) by decile calculated as follows:

$(Y_1 / e_y) * (2{,}300/C) = Y_2$

$Y_2 - Y_1 = T$

Where:

| | | |
|---|---|---|
| $Y_1$ | = | Per Capita Monthly Expenditure (Income) |
| $Y_2$ | = | Per Capita Monthly Expenditure (Income) + Transfer to Raise Consumption to 2,300 Calories Per Person Per Day |
| $e_y$ | = | Expenditure Elasticity of Calorie Consumption. |
| 2,300 | = | Recommended Daily Calorie Consumption Level. |
| C | = | Actual Per Capita Daily Calorie Consumption Level. |
| T | = | Income Transfer per Month. |

TABLE 7.21

INCOME TRANSFER NECESSARY TO RAISE CONSUMPTION OF THE POOR TO RECOMMENDED INTAKE LEVELS:
2,300 CALORIES PER PERSON PER DAY

FIVE SOUTHERN CITIES: Model = Double Log Quadratic with Price-Expenditure Interaction Terms.

| | DECILE 1 | DECILE 2 | DECILE 3 | DECILE 4 | DECILE 5 |
|---|---|---|---|---|---|
| PER CAPITA INCOME TRANSFER TO RAISE CALORIE CONSUMPTION TO MINIMUM RECOMMENDED LEVEL: | | | | | |
| CFA Per Month: | 1216.50 | 1783.30 | 2611.03 | 1608.36 | 3194.09 |
| $ Per Month: | 3.38 | 5.01 | 7.30 | 4.10 | 8.75 |
| PER CAPITA INCOME TRANSFER TO RAISE CALORIE CONSUMPTION TO MINIMUM RECOMMENDED LEVEL: | | | | | |
| CFA Per Year: | 14520.01 | 21520.32 | 31339.40 | 17940.51 | 37600.03 |
| $ Per Year: | 40.56 | 60.11 | 87.54 | 50.12 | 105.05 |
| TOTAL ANNUAL INCOME TRANSFER TO THE POOR IN FIVE SOUTHERN CITIES:* | | | | | |
| CFA Per Year: | 472182576 | 1054280070 | 2565852055 | 1099070701 | 2369716020 |
| $ Per Year: | 1318840 | 2944858 | 7167464 | 4147709 | 9335040 |

*: In calculating the total annual income transfer, 1985 population estimates were weighted by the proportion of households in each deciles by city.

Exchange rate (1985): 358 CFA/$

POPULATION: 1985

| | |
|---|---|
| Bamako | 646002 |
| Koulikoro | 35594 |
| Sikasso | 59699 |
| Segou | 41928 |
| Mopti | 50316 |

Urban Population Growth Rate: 4.5%

ELASTICITIES: FIVE SOUTHERN CITIES

TABLE: 7.22

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| DEPENDENT VARIABLE = TOTAL PER CAPITA DAILY CALORIE CONSUMPTION (Purchased + Home Produced) | DECILE 1 | DECILE 2 | DECILE 3 | DECILE 4 | DECILE 5 |
|---|---|---|---|---|---|
| EXPENDITURE: | 1.246 ** | 0.976 ** | 0.915 ** | 0.839 ** | 0.778 ** |
| Standard Error: | 0.044 | 0.027 | 0.024 | 0.021 | 0.020 |
| T Statistic: | 28.318 | 36.146 | 36.125 | 39.952 | 38.800 |
| T Significance: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RICE PRICE: | -0.055 | -0.237 | -0.287 | -0.326 | -0.359 |
| Standard Error: | 0.463 | 0.465 | 0.411 | 0.370 | 0.352 |
| T Statistic: | -0.128 | -0.510 | -0.698 | -0.867 | -1.020 |
| T Significance: | 0.897 | 0.610 | 0.484 | 0.741 | 0.317 |
| MILLET-SORGHUM PRICE: | -0.348 | -0.249 | -0.216 | -0.191 | -0.169 |
| Standard Error: | 0.285 | 0.183 | 0.165 | 0.156 | 0.152 |
| T Statistic: | -1.313 | -1.361 | -1.309 | -1.224 | -1.112 |
| T Significance: | 0.190 | 0.174 | 0.190 | 0.222 | 0.263 |
| PEANUT-BUTTER PRICE: | 0.185 | -0.040 | -0.108 | -0.160 | -0.266 |
| Standard Error: | 0.343 | 0.374 | 0.110 | 0.109 | 0.389 |
| T Statistic: | 0.481 | -0.107 | -0.931 | -1.466 | -0.516 |
| T Significance: | 0.631 | 0.912 | 0.352 | 0.144 | 0.603 |
| BEEF PRICE: | -0.566 ** | -0.500 * | -0.478 ** | -0.461 ** | -0.447 |
| Standard Error: | 0.266 | 0.282 | 0.134 | 0.120 | 0.299 |
| T Statistic: | -2.177 | -1.773 | -3.567 | -3.859 | -1.495 |
| T Significance: | 0.000 | 0.077 | 0.000 | 0.000 | 0.134 |

*: significant at .10
**: significant at .05

expenditure elasticities of calorie consumption on which the income transfer estimates are based by decile.

For poor households -- those in the lower 5 expenditure deciles -- the cost of raising calorie consumption to recommended levels is extremely costly at $5.73 per person per month. On an annual basis this would represent an income transfer of $25,574,825 or 2.3% of GDP to the poor population of the 5 Southern cities of Mali: Bamako, Koulikoro, Sikasso, Segou, and Mopti.[185] Restricting transfers to the lowest 3 expenditure deciles where the depth of caloric inadequacy is most pronounced would still require a substantial transfer of $5.23 per person per month (or a total annual transfer of $11,431,267 representing 1% of GDP). Given limited financial resources of the government and the donor community, an income transfer program of this size would be prohibitively expensive in the Malian context. Income transfers thus do not appear to be a feasible a means to increase the consumption of the poor in urban Mali. Given the cost and size of the target group in urban Mali, a more feasible approach to improving the consumption possibilities of the poor would be to focus on employment and income generation activities.

It should be noted that narrowing the potential target group would lower the budgetary costs of an income transfer program. The calorie regression for households in decile 1 shows an expenditure elasticity of 1.246 declining to .976 in decile 2: the difference between estimates was significantly different at the .01 level. This suggests that income transfers or employment/income generating activities would have a

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[185]Percentage of GDP estimated for year of doctoral research: 1985.

## 7. Conclusions

The regression results from both models generally support the hypothesis that for staple foods poor households exhibit a higher responsiveness to changes in income. The relative magnitudes of the estimated coefficients show a higher responsiveness to changes in income on the part of the poor than that of the wealthy. For both models, the difference between expenditure groups proved statistically significant at the .05 level for total calorie consumption. The policy implication of greater income responsiveness in the latter case is that targeted employment or income generation activities would provide a means to improve the calorie consumption levels of poor households as a group. Given the size of the target group -- 50% of the urban population these types of interventions appear to be more feasible than targeted income transfers. Income transfers would be more feasible if the target group were narrowed. The higher income responsiveness of households in decile 1 indicates that income transfers targeted to this group would

significantly augment calorie consumption. In this case the size of the transfer is substantially reduced, yet a large proportion of the calorie deficient population is excluded.

A decline in the absolute value of own-price elasticities of demand for staple foods as income rises was not seen in the Mali case. It should be noted that difficulties in estimating own and cross-price parameters with limited variation in prices have been well documented in the literature.[186] As outlined in Chapter 4 (Methodology), the method of imputing food prices from the Mali survey data dictates that more confidence be placed in the expenditure (income) parameters than the price parameters.

The hypothesis of substitutability between rice and coarse grains for poor households was also tested using both models. For poor households substitution was evident only in one direction: an increase in the price of millet sorghum resulted in an increase in rice purchases, while an increase in the price of rice had no significant effect on millet/sorghum purchases. This result has important policy implications. The lack of substitution for the latter case suggests that policies that increase the price of rice in Mali may have a negative real income effect on poor households, and consequently adverse effects on caloric adequacy.

[186] Timmer and Alderman, 982; and Alderman and von Braun, 75.

# CHAPTER 8

## CONCLUSIONS AND POLICY OPTIONS

In urban Mali, caloric deficiency is a primary attribute of poor households. The purpose of this research was to identify characteristics of the poor population and of their behavior (price and income responsiveness) which could improve the design of interventions to increase their calorie consumption. The descriptive analyses presented in Chapters 5 and 6 highlighted the main consumption and household characteristics that distinguish the poor from the non-poor. Using econometric techniques, Chapter 7 then estimated the determinants of food consumption of poor households. The empirical findings and policy options generated from this research are presented in Sections 1 - 3 below.

It should be noted that this dissertation research was conducted in 1985/86 during a period of cereal market reform in Mali. The original research problem was to determine the adverse impact of price policy reform on the consumption of the poor and how to mitigate that impact. This issue, however, was obscured in Mali since the good rainfall conditions and harvest after two years of drought resulted in cereal prices falling during the period of the survey. The focus of this dissertation on the food consumption of the urban poor, however, remains justified. Despite improvements in consumption in 1985/86,

caloric deficiency is a serious and chronic problem in urban Mali. Interventions to augment the calorie consumption of the poor require information on food consumption patterns, determinants of consumption, and a range of household characteristics.

### 1. Income (Expenditure) and Calorie Consumption

It is clear from this research that there is a strong and positive relationship between total per capita expenditure (income) and calorie consumption. The descriptive analysis of food consumption patterns shows that as total expenditure increases so too does calorie intake. The multivariate analysis confirms this relationship, and indicates a higher responsiveness of the poor than the wealthy to changes in expenditure. Both the double log and DLQ models generate positive and significant expenditure elasticities that decline in magnitude with increases in per capita expenditure. The hypothesis of higher responsiveness on the part of the poor to changes in expenditure was upheld for total calorie consumption by both models. These empirical findings suggest that increases in per capita income will be critical to improving the food consumption of the urban poor. Given the pervasive reach of poverty in Mali, a strategy focusing on long-term economic growth and productivity will be the most sustainable means of reaching the poor. Economic growth, rather than a redistribution of poverty, is necessary to improve the purchasing power of poor households on a sustainable basis. However, measures need to be taken in both the short and long-term to ensure that the benefits of growth reach and enhance the consumption possibilities of the poor.

A key issue, therefore, is whether the Malian economy can grow in the medium term at a rate consistent with significant reductions in the incidence and depth of poverty. During the period 1980 - 1988, GDP (Gross Domestic Product) per capita in Mali grew at 3.2% per annum.[187] When accounting for the effect of population growth of 2.7% per annum, this implies a per capita growth of income of .5% in real terms. However, the early 1980's were a period of drought combined with global recession, including a significant deterioration of Mali's terms of trade as a result of the oil shock. Therefore, if one considers only the period 1985 - 1990, per capita growth in GDP in real terms was equivalent to 3.3% on an annual basis. Future growth may remain at this level, as the longer term benefits of the adjustment effort made by the Malian economy begin to yield dynamic efficiency gains.

Using the calorie expenditure (income) elasticities generated from the econometric analysis in Chapter 7, it is possible to estimate the growth in real income needed to bring the consumption of poor urban households up to the minimum recommended level of 2,300 calories per person per day.[188] As shown in Table 8.1 below, the following annual growth rates in real per capita income would be required to achieve caloric adequacy for poor urban households over the period 1988 - 1998:

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[187]GDP and population estimates are those of the World Bank, World Development Report 1990, 178 -180, 228.

[188]Calculation of Growth Rates Based on Expenditure Elasticities of Calorie Consumption for Deciles 1 - 5 Generated from DLQ Econometric Model.

Table 8.1:

Annual Growth Rate in Real Per Capita Income Necessary to Raise Calorie Consumption to Minimum Recommended Level: 2,300 Calories Per Person Per Day, (1988 - 1998):

| Per Capita Expenditure Decile: | Annual Growth Rate in Real Per Capita Income,(%): |
|---|---|
| 1 | 4.5 |
| 2 | 3.9 |
| 3 | 4.3 |
| 4 | 2.2 |
| 5 | 3.1 |

When compared to per capita real growth achieved on an annual basis between 1985 - 1990, a growth-oriented strategy appears essential and may be a feasible approach to addressing the problem of caloric adequacy in poor households. If growth can be sustained over 10 years at slightly higher rates (e.g. 4% per capita) than were achieved in the latter half of the 1980's, households in expenditure deciles 4 through 5 would reach caloric adequacy, thus significantly reducing the size of the potential target group. The key assumption that underlies this analysis is that the benefits of growth would be evenly distributed throughout the population. If growth is not distributed equally and results in an increase in inequality, then the 10 year growth rates corresponding to caloric adequacy for poor households would be significantly higher. Skewing the benefits towards the poor through a labor intensive growth strategy would correspondingly accelerate the rate at which poor households reach caloric adequacy.

Although long-term economic growth is an important part of an overall package to alleviate poverty and improve the purchasing power of

poor households, it remains critical that the government and donor community undertake short and long-term measures to address the problem of caloric inadequacy of poor households. Even with economic growth, short-term interventions to augment calorie consumption will remain relevant for households in the lowest expenditure deciles in urban Mali. Furthermore, longer-term interventions that enhance the ability of poor households to benefit from growth are essential if the growth 'dividend' is to be distributed more equally throughout the economy.

In designing interventions to alleviate poverty it is also essential to consider the issue of intra-household distribution: 'who gets what' within the household. In the literature on poverty and nutrition, it is well known that pregnant and lactating women and children below the age of five are particularly vulnerable to inadequate food and nutrient intake. Interventions to raise the calorie consumption of the poor may reach poor households, but fail to reach vulnerable individuals within those households. Clearly, the effectiveness of the policy interventions presented below is conditioned by the distribution of income and food within households. Although it is impossible to examine intra-household distribution with this data set, this issue should be the subject of future research.

## 2. Policy Options: Short-term Interventions to Address Inadequate Food Consumption

### 2.1 Price Subsidies

Comparisons between the poor and wealthy point to a lack of notable differences in food consumption patterns. Contrary to expectations there is very little diversification into higher priced

calories as expenditure rises. Quantities consumed and hence caloric intake appears to be the strongest difference across expenditure groups, with the wealthy consuming twice as much in caloric terms as their poor counterparts. Intra-poor comparisons also show few differences in food consumption patterns. The lack of differences in food consumption patterns across expenditure groups indicates that it will be difficult to target sub-groups within the population efficiently through price policy.

In urban Mali there is no food that can be identified as inferior, (i.e. a good whose absolute consumption declines with increases in expenditure). Although the regression results show that price subsidies of staple foods would serve to improve daily caloric intake of urban households, the lack of an inferior good implies that this type of intervention would not efficiently target the poor. For example, subsidized imports of rice (one feasible policy option, if costly in fiscal terms) although increasing caloric adequacy in poor urban households, would disproportionately benefit wealthier households since they consume more rice in quantity terms than the poor.

As noted in Chapter 5, however, the efficiency of expenditure and dietary composition data suggest that households may shift among different qualities of the same food as income rises. If lower qualities of a given food act as inferior goods, subsidization of those lower quality products would increase the calorie consumption of poor households. Given data limitations, the quality issue cannot be explored with this data set. Further research is required to investigate the relationship between consumption of lower quality foods

and per capita expenditure (income) in urban Mali to determine whether inferior qualities of foods can be identified.

## 2.2 Income Transfers

The finding that calorie intake of the poor exhibits a higher responsiveness to increases in expenditure than that of the wealthy suggests that targeted income transfers may provide a means of augmenting the calorie consumption levels of poor households. Given the widespread problem of poverty in urban Mali this type of intervention, although effective, would be extremely costly. As shown in Chapter 7, the estimated cost of the income transfer required to raise calorie consumption of the poor to minimum recommended levels would be prohibitively expensive at $5.73 per person per month. On a national scale this would represent a total transfer of $25,574,825 per year to poor households in the 5 Southern cities Mali or 2.3% of GDP.[180] Given limited financial resources, neither the government of Mali nor donors would be prepared or able to take on an income transfer program of this size. Even targeting the lower 3 expenditure deciles where calorie deficiency is concentrated would represent a massive income transfer of $5.23 per person per month. Although somewhat less expensive than targeting all poor households, this would translate into an income transfer estimated at $11,431,267 per year or 1% of GDP. Limiting the target group to the poorest 10% of the population reduces the size of the income transfer considerably to $1,318,946 on an annual basis. Although narrowing the target group to households in decile 1 reduces

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[180]Percentage of 1985 GDP.

the cost of an income transfer program, it also excludes a substantial portion of the population suffering from caloric deficiency.

It is clear from the above that income transfers in the Malian context do not appear to be a feasible means of increasing the food consumption of poor households. Given the cost and magnitude of the problem -- 50% of the population suffers from inadequate calorie consumption -- a more feasible approach to increasing the access of the poor to food would be to concentrate interventions on income and employment generation in urban areas. This issue is discussed in Section 3 below in the context of expanding the income earning possibilities of the poor.

It should be noted, that a growing economy is a pre-condition for a feasible program of income transfers to poor urban households. First, from a political perspective it is easier to redistribute resources when the 'economic pie' is growing. Second, during periods of growth there are more financial resources available for transfer programs. Third, given the effects of growth in per capita income on consumption, there would be a smaller target group of poor households suffering from inadequate calorie consumption.

### 2.3 Home Production

The positive and significant contribution of home production/gifts to daily calorie intake suggests that there may be scope for increasing production of staple foods for home consumption. Although access to land and water resources is limited in the urban context, state or community provision of garden plots for small scale production of staple

foods may provide poor households with the means to increase calorie intake at the margin. The data show that the poor in Kayes, Tombouctou, and Gao increase their cereal consumption from home production/gifts more than the poor in southern Mali. Given lower land values in these remote cities, the promotion of home production would be more feasible than in wealthier cities such as Bamako or Koulikoro where land sells at a premium. However, water availability may pose a constraint to the promotion of home gardens, particularly in the North of the country.

It should also be remembered that food from non-market sources in this analysis includes both home production and gifts. As discussed in Chapter 4, it was impossible to disaggregate these two component parts of food from non-market sources in the DNSI questionnaire. Therefore, one cannot attribute the positive contribution of home production/gifts to calorie consumption solely to home production of staple foods. Given this caveat, prior to any large scale promotion of home garden schemes, a pilot home garden project in Kayes, Tombouctou, or Gao could be set-up to test the hypothesis that home production contributes to household level food consumption.

## 2.4 Geographic Targeting

In Mali, the concentration of severe calorie deficiency in poor households in Kayes, Tombouctou, and Gao justifies targeting interventions to these remote and resource poor cities. Interventions to alleviate poverty in these cities, however, are inevitably constrained by two factors. First, the remote location and limited accessibility of these cities suggests that there will be high

administrative costs associated with interventions to reduce poverty. Second, there are few opportunities for sustainable economic growth in these regions, suggesting that out-migration may be the most viable option for alleviating poverty in the long-term.

In the short-term, food-for-work programs would augment the calorie consumption of the poor in Kayes, Tombouctou, and Gao. The greater reliance of poor households on home production/gifts in these cities also suggests that the promotion of home gardens may increase the food consumption of the poor. Given higher food prices faced by households in these regions, policies that reduce marketing costs through increased competition or improvement in infrastructure would increase household purchasing power and hence access to food. Limited prospects for economic growth in Kayes, Tombouctou, and Gao, however, suggest that a different approach is required to reach the poor in the longer-term. In these cities a critical policy intervention is investment in education and training to allow migration to other regions with greater economic potential. Although out-migration may contribute to poverty alleviation in the long-term, government and donor investment is required to address the severe and chronic problem of calorie deficiency. Clearly, interventions such as food-for-work activities, home gardens, and the reduction of marketing costs/improvement of transport infrastructure have a role to play in improving the consumption possibilities of the poor in the short-term.

## 2.5 Food Transfers

The findings of this study do not rule out the use of food transfers or food-for-work programs to increase the food availability of poor households. As noted in the literature review, supplementary feeding programs that distribute subsidized or free food have been effective in reaching the under-nourished in developing countries. In urban Mali, food distribution through clinics or primary schools to vulnerable household members -- pregnant women, lactating mothers, and children -- could be used as means to augment food consumption. Food-for-work activities in urban Mali would also increase the food consumption of poor households, while improving urban infrastructure such as roads, water supply, clinics, and schools. To effectively target the poor, food-for-work programs should be designed so that the wage 'in-kind' attracts only the poor unemployed. For example, if lower qualities of staple foods could be identified as inferior goods, these inferior qualities could be used as payment for work, effectively targeting the poor. In addition, greater seasonal variation in employment for the poor than the wealthy suggests that food-for-work activities should be targeted by season to offset fluctuations in income and consumption.

Although effective in addressing an immediate need, these types of interventions represent a short-term solution to a chronic problem of inadequate food intake. Longer term solutions are clearly needed to provide a sustainable basis for improved consumption levels.

## 3. Policy Options: Long-term Interventions to Address Inadequate Food Consumption

### 3.1 Expansion of Income Earning Opportunities

Both the descriptive and econometric analyses show that the food consumption of the urban poor in Mali is highly responsive to changes in income. Therefore, a long-term solution to the problem of inadequate food intake must address the need to expand the income earning opportunities of the poor. In part, this solution depends on an overall policy framework for sustainable economic growth. However, specific measures are needed to ensure that the benefits of growth reach the poor.

The data show that unemployment is concentrated among poor households in urban Mali. For the poor, labor represents the most important asset contributing to household income and wealth. One way to enhance the income earning opportunities of the poor would be to improve their access to education as discussed below. Another way to improve the human capital of the poor would be to provide job training in skills relevant to the urban sector. Training in service professions such as electricity, plumbing, carpentry, and construction may be appropriate. Finally, credit for small-scale activities such as street-vending, crafts, gardening, should also be made available to poor urban households. Credit schemes targeted towards the poor have proved highly successful in generating income in some countries and could be applied in Mali. For example, the Grameen Bank in Bangladesh provides credit at market rates to the poor to finance small-scale activities ranging from basket weaving to vegetable sales. The bank was started in the mid-1980's with the aim of providing the poor with the means to improve

their economic situation. Loans are made to individuals with no collateral requirements. Community members serve as guarantors of the loan and effectively ensure repayment. In urban Mali, the Grameen Bank could serve as a model for credit schemes targeted towards the poor.

### 3.2 Family Planning

The data highlight the younger age distribution of poor households in urban Mali. The greater number of children in poor households may be attributable to a perception of children as additional household labor and/or insurance to parents in old age. In the short run, however, the high dependency ratio of poor households contributes to their low levels of welfare, suggesting a potential economic payoff to greater use of modern family planning practices. The greater number of children in poor households indicates that there may be a role for family planning interventions as part of a coordinated program to address urban poverty. To be effective, such interventions need to consider ways to improve the access of the poor to contraceptives as well as promote their use through family planning education programs.

### 3.3 Education

Sustained improvements in per capita income levels will depend, in part, on the development of human resources through education. The data show a strong and positive relationship between educational attainment and per capita expenditure. In urban Mali low levels of education are concentrated among the poor with educational attainment rising sharply with expenditure. This finding supports the hypothesis that wealthy

households have higher levels of education, and thus have access to better jobs and income earning opportunities. Given the strong and positive relationship between educational attainment and per capita expenditure levels, government and donor efforts to promote educational opportunities for poor households should be strengthened in Mali. particular, investments in education at the primary level -- emphasizing improved quality as well as access -- would provide an effective means of benefitting the poor.

## 4. Future Research

The analysis of this dissertation has inevitably been constrained by the quality of the data used. At the outset it appeared that using expenditure data collected for a different purpose would be a cost-effective means of gathering/analyzing data for food consumption analysis. Measurement error, however, arose from linking food quantity data, collected a year after the expenditure survey, to the original data set. Therefore, the author would recommend that resources be devoted to conducting a comprehensive food consumption survey that collects food expenditures as well as measured food quantities and prices. The data in this type of survey should be sufficiently disaggregated to examine the relationship between consumption of different qualities of a given food and per capita expenditure (income), as well as to quantify and separate the contribution of home production and gifts to household food consumption. The reliability and hence usefulness of the data for food consumption analysis would be enhanced considerably.

Future research efforts might also include an examination of the link between household food availability, individual consumption, and individual nutritional status. In addition, information on intra-household decision-making and food allocation would provide an understanding of non-price factors that influence food consumption. Cross-country comparisons of food consumption patterns and determinants would also highlight the effects of price and income policies on consumption, and contribute to the design of interventions to augment the caloric intake of vulnerable groups. Finally, it should be noted that food sector interventions are necessary, but not sufficient to improve the welfare of the urban poor in Mali. Within a growing economy characterized by more efficient resource allocation, efforts to augment food intake levels of the poor should be complemented by interventions aimed at addressing other basic needs of the population such as health, housing, sanitation, and education.

# THE CHARACTERISTICS AND DETERMINANTS OF FOOD CONSUMPTION OF POOR HOUSEHOLDS IN URBAN MALI

Volume II: Appendices

A thesis

Presented to the Faculty

of

The Fletcher School of Law and Diplomacy

by

MELANEE LYNN LOWDERMILK

In partial fulfillment of the requirements for the
Degree of Doctor of Philosophy

AUGUST/1991

243a

# APPENDIX 1

1) DNSI SURVEY QUESTIONNAIRE AND TUFTS/DNSI/USAID DATA COLLECTION FORM

2) ADULT CALORIE EQUIVALENT UNITS

MINISTERE D'ETAT CHARGE DU PLAN

DIRECTION NATIONALE
DE LA STATISTIQUE
ET DE L'INFORMATIQUE

REPUBLIQUE DU MALI
Un Peuple - Un But - Une Foi

# ENQUETE SUR LES DEPENSES DES MENAGES URBAINS 1985-86

## Questionnaire Présentation

N° BE 274
N° CONCESSION 298

CODIFICATION

VB 8 (1)
Quar 012 (2)
N° M 421 (4)
Pass 101 (7)
Typ 1 (8)

Observations du Contrôleur

R.A.S

Nom : Diakité Date 21/8/85 Signature

Observations du Superviseur

Nom : Fagy Diallo Date 01/10/85 Signature

Réservé à la Direction de l'Enquête

Ville Bamako

Quartier FALADIE

Chef de Ménage Tiéoulen Samaké

Saison 1 N° Cahier dans la Saison

Région Naissance du Chef de Ménage Koulikoro

Nationalité du Chef de Ménage malienne

Questionnaire Rempli le 21/8/85

Le secret des renseignements individuels fournis dans ce questionnaire sera scrupuleusement respecté. En aucun cas les réponses ne peuvent être utilisées à des Fins de contrôle fiscal ou de répression économique

# P Présentation du Ménage

CODIFICATION

| Nbr | Sex | Naiss | Stm | Nat | Rég | ICM | IME | SA | SP | NBP | NBA | NBE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 1 | 2 0 | 1 | 1 | 2 | 1 | 1 | 3 | 5 | 0 3 | 0 3 | 0 0 |
| 10 | 11 | 12 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 23 | 25 |

NBR = Nombre de Rétrospectifs auquel le ménage doit répondre au total dans cette saison : 4, 5 ou 6

SEX = Sex du chef de ménage
Homme 1 Femme 2
Non renseigné 3

NAISS = Année de Naissance du chef de ménage
— 1900 et + Noter les 2 derniers chiffres
— Avant 1900 Noter 99
— Inconnu ou renseigné 98

STM = Statut Matrimonial du C M
Celibataire 8
Marié 1 femme 1
Polygami 2 femmes 2
Marie 3 femmes 3
Polygami 4 femmes 4
Poligami 5 femmes 5
Divorcé 6
Veuf 7
Non renseigné 9

NAT = Nationalité du C M
Malien 1
Autres Africains 2
Autres étrangers 3
Non renseigné 4

REG. = Région de Naissance du chef de ménage
Kayes 1
Koulikoro 2
Sikasso 3
Ségou 4
Mopti 5
Tombouctou 6
Gao 7
Bamako-District 8
Etranger 9

ICM = Instruction du CM
Sans Instruction ou 1er Cycle Fond. 1
Second Cycle Fond. 2
Secondaire ou Technique 3
Supérieur 4
Autres et non renseigné 5

IME = Instruction du ménage
Même Code que ICM mais Instruction de la personne la plus instruite du ménage

SA = Secteur d'activité du plus important revenu rguler du ménage
Admini-public et parapublic1
Etreprises non commerciales 2
Agriculture Elevage Pêche 3
Artisanat 4
Professions libérales 5
Commerce 6
Autres 7

SP = Statut dans la profession de la personne qui apporte le plus important revenu régulier
Employeur 1
Cadre Supérieur 2
Employé ou Ouvrier 4
Cadre Moyen 3
Indépendant 5
Sans objet ou Autres 6

NBP = Nombre total de personnes du ménage

NBA = Nombre d'Adultes du ménage (15 ans et + )

NBE = Nombre d'Enfants du ménage (— de 15 ans)

# P Logement - Inventaire de l'Equipement et du Bétail
## Autoconsommation

| Type Log | Elect | Eau | Combust | Statut d'occ | CODIFICATION |
|---|---|---|---|---|---|
| 4 | 2 | 2 | 9 | 1 | |
| 27 | 28 | 29 | 30 | 31 | |

**Type de logement**

- Case toit chaume [ ] 5
- Maison banco [X] 4
- Maison en semi dur [ ] 3
- Maison en dur [ ] 2
- Maison moderne (ou appartement) [ ] 1
- Autres [ ] 6

**Electricité**

- Oui [ ] 1
- Non [X] 2

**Eau**

- Eau Courante [ ] 1
- Puits dans Concession [ ] 2
- Fontaine gratuite [ ] 3
- Fontaine payante [X] 4
- Porteur d'eau [ ] 5
- Citerne [ ] 6
- Autres [ ] 7

**Combustible**

- Gaz utilisé [ ] 1
- Gaz acheté [ ] 2
- Charbon acheté [X] 3
- Charbon utilisé [ ] 4
- Bois acheté [X] 5
- Bois utilisé [ ] 6
- Autres et non renseigné [ ] 7

**Statut d'occupation**

- Propriétaire [X] 1
- Locataire [ ] 2
- Occupant gratuit [ ] 3
- Autres ou non renseigné [ ] 4

| Code Produit | Nombre | Equipement total possédés | CODIFICATION |
|---|---|---|---|
| | | Téléviseur | 0 0 (33) |
| 0 | 1 | Poste radio et Combinés | 0 1 (34) |
| 0 | 0 | Machine à laver | 0 0 (35) |
| | 0 | Réfrigérateurs et Congélateurs | 0 0 (36) |
| | 0 | Cuisinières modernes | 0 0 (40) |
| | 0 | Automobiles | 0 0 (41) |
| | 0 | Motocyclettes | 0 0 (42) |
| | 0 | Bicyclettes | 0 0 (43) |
| | 0 | Chameaux | 0 0 (45) |
| | 0 | Chevaux | 0 0 (50) |
| | 0 | Anes | 0 0 (51) |
| | 0 | Bovins | 0 0 (52) |
| | 0 | Moutons | 0 0 (53) |
| | 0 | Chèvres | 0 0 (54) |

| | | CODIFICATION |
|---|---|---|
| Riz | 1 | 1 (60) |
| Mil | 2 | 2 (61) |
| Maïs | 2 | 2 (62) |
| Viande | 1 | 1 (63) |
| Poisson | 1 | 1 (64) |
| Lait | 1 | 1 (65) |
| Arachide | 1 | 1 (66) |
| Pomme de terre | 1 | 1 (67) |
| Manioc | 1 | 1 (68) |
| Igname | 1 | 1 |

**Autoconsommation**

- Pas d'Autoconsommation 1
- Autoconsommation inférieure aux achats 2
- Autoconsommation équivalente aux achats 3
- Autoconsommation supérieure aux achats 4

## P Caractéristiques des Membres du Menage

| N° Pers. | NOM et PRÉNOMS | Lien avec C M | Sexe | Année Naiss. | Statut Matri | Niveau Instr. | Secteur d'Activité N° 1 | Statut dans S A | Secteur d'Activité N° 2 | Statut dans SA | N° Obs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Tiéoulen Samaké | CM | M | 1920 | MR | ST | Cultivateur | SO | | – | |
| 2 | Sénédja Bakayoko | Epse | F | 1935 | MR | ST | ménagère | SO | | – | |
| 3 | Tenebon Samaké | fils x Epse | M | 1955 | MR | E1 | Tailleur | T | | – | |

MINISTERE D'ETAT CHARGE DU PLAN

DIRECTION NATIONALE
DE LA STATISTIQUE
ET DE L'INFORMATIQUE

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Un Peuple - Un But - Une Foi

# ENQUETE SUR LES DEPENSES DES MENAGES URBAINS 1985 - 86

## Questionnaire Hebdomadaire

N° S.E. 276
N° CONCESSION 298

**Observations du Contrôleur**

R.A.S

Nom : Diakité Date 11 11 12 85 Signature

**Observations du Superviseur**

Nom : Date Signature

**Réservé à la Direction de l'Enquête**

Ville Bamako
Quartier Faladie
Chef de Ménage Mamadou Samaké

Saison 2 N° Cahier dans la Saison 1

Dépenses effectuées :

| à partir de (début) | jusqu'à (fin) |
|---|---|
| 21 11 11 (jour mois) | 21 11 11 (jour mois) |
| 08 (heure) | 08 (heure) |

Le secret des renseignements individuels fournis dans ce questionnaire sera scrupuleusement respecté. En aucun cas les réponses ne peuvent être utilisées à des fins de contrôle fiscal ou de répression économique

**CODIFICATION**

Vil 2 (1)
Quar 012 (2)
N° M 1127 (4)
Pass (7)
Typ 2 (9)
Début 2311 (10–13)
Fin 2111 (14–17)
Nb opér. (18–20)

# H Dépenses Courantes

Toutes les dépenses inscrites sur cette page ont été faites dans la période ci-contre

| Jour | Mois | | Heures |
|---|---|---|---|
| 21 | 11 | à partir de | 01 Heures |
| 21 | 11 | jusqu'à | 11 Heures |

CODIFICATION
V O M P TE
18 02 12 17 24 4
1 2 4 7 9

| N° Pvs | Produit ou service objet de la dépense | NB | Unité | Montant | F X M | N OBS | Lieu d'Achat | Mois (10 11) | Produit (12–17) | Montant (18–24) | TL (25) | N° opé (23–28) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21 | Cube maggi | 1 | cube | 20F | F | | M Faladié | 11 | 196100 | 0000020 | 3 | |
| | Tomate concentrée | 1 | boîtier | 15F | F | | M Faladié | 11 | 195000 | 0000015 | 3 | |
| | oignon grillé | 1 | tas | 25F | F | | M Faladié | 11 | 196000 | 0000025 | 3 | |
| | Eitié | 1 | poule | 10F | F | | M Faladié | 11 | 196500 | 0000010 | 3 | |
| | farine de moulin | 4 | pane | 20F | F | | M Faladié | 11 | 840000 | 0000020 | 3 | |
| | potasse | 1 | tas | 10F | F | | M Faladié | 11 | 196700 | 0000010 | 3 | |
| | Boîte | 1 | mix | 25F | F | | M Faladié | 11 | 143000 | 0000025 | 3 | |
| | Poisson | 3 | tas | 150F | F | | M Faladié | 11 | 372400 | 0000150 | 3 | |
| | Pathon | 21 | plum | 5F | F | | M Faladié | 11 | 161140 | 0000005 | 3 | |
| | riz | 1 | Kg | 175F | F | | M Faladié | 11 | 111110 | 0000175 | 3 | |
| | Igname | 1 | tas | 250F | F | | M Faladié | 11 | 167220 | 0000250 | 3 | |
| 1 | eau | 1 | fût | 75F | F | | Fontaine Faladié | 11 | 311400 | 0000075 | 9 | |
| | Boîte | 21 | mix | 25F | F | | M Faladié | 11 | 143000 | 0000025 | 3 | |
| 3 | Pâté | 1 | mix | 100F | F | | O Faladié | 11 | 172000 | 0000100 | 5 | |
| | Pathon | 21 | tas | 100F | F | | O Faladié | 11 | 372400 | 0000100 | 5 | |

# Dépenses Courantes

Toutes les dépenses mentionnées sur cette page ont été faites dans la période ci-contre

| | |
|---|---|
| 17 / 11 | à partir de |
| 19 / 11 | jusqu'à |
| Jour / Mois | |

19 Heures

18 Heures

CODIFICATION

V O M P TE

18 012 1217 24 4

1 2 4 7 9

| N° Plan | Produit ou service objet de la dépense | NB | Unité | Montant | FX-RA | NOBS | Lieu d'Achat | Mois (10 11) | Produit (12 … 17) | Montant (18 … 24) | TL (25) | N° opé (26 … 28) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | fraise de moulin | 7 | paire | 40F | F | | Moulin Falaise | 11 | 840000 | 0000040 | 9 | |
| | Igname | 1 | tas | 200F | F | | M Faladie | 11 | 116700 | 0000950 | 3 | |
| | Tomate fraiche | 11 | tas | 100F | F | | M Faladie | 11 | 116326 | 0000100 | 3 | |
| | Bube maggi | 3 | cube | 60F | F | | M Faladie | 11 | 119610 | 0000060 | 3 | |
| | Bitom | 6 | fruit | 15F | F | | M Faladie | 11 | 116114 | 0000015 | 3 | |
| | foie | 5 | tas | 300F | F | | M Faladie | 11 | 324000 | 0000300 | 3 | |
| | riz | 11 | kg | 350F | F | | M Faladie | 11 | 111110 | 0000350 | 3 | |
| | Bola | 1 | noix | 40F | F | | M Faladie | 11 | 143000 | 0000040 | 3 | |
| | Fiefie | 2 | feuille | 10F | F | | M Faladie | 11 | 119650 | 0000015 | 3 | |
| | patasse | 1 | tas | 10F | F | | M Faladie | 11 | 119670 | 0000010 | 3 | |
| | Sauvala | 2 | feuille | 40F | F | | M Faladie | 11 | 119600 | 0000040 | 3 | |
| | Tomate Concentré | 3 | cuillère | 45F | F | | M Faladie | 11 | 119500 | 0000045 | 3 | |
| 1 | Bolo | 4 | noix | 50F | F | | M Faladie | 11 | 143000 | 0000050 | 3 | |
| | eau | 3 | fût | 225F | F | | Fontaine Faladie | 11 | 311400 | 0000225 | 9 | |
| 3 | Bbalon | 3 | tas | 70F | F | | M Faladie | 11 | 324000 | 0000070 | 3 | |
| | Saumon | 1 | lamme | 10F | F | | B Faladie | 11 | 81200 | 0000010 | 5 | |

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ET DE L'INFORMATIQUE

REPUBLIQUE DU MALI
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# ENQUETE SUR LES DEPENSES DES MENAGES URBAINS 1985-86

## Questionnaire Rétrospectif

N° SE .....274.....
N° CONCESSION 298.....

**Observations du Contrôleur**

R-A-S

Nom : Diakité Date 01 1 10 17 1 8 5 1 Signature

**Observations du Superviseur**

Nom : F. Sissoko Date 01 8 10 17 1 8 5 Signature

**Réservé à la Direction de l'Enquête**

Ville Bamako

Quartier Faladié

Chef de Ménage Tiéoulen Samaké

Saison 1 N° Cahier dans la Saison 1

Dépenses effectuées :

à partir de (début) 2 1 8 1 0 1 5 1 (jour mois) 0 1 8 (heure)

jusqu'à (fin) 0 1 5 1 0 1 6 1 (jour mois) 0 1 8 (heure)

V12

Le secret des renseignements individuels fournis dans ce questionnaire sera scrupuleusement respecté. En aucun cas les réponses ne peuvent être utilisées à des fins de contrôle fiscal ou de répression économique

**CODIFICATION**

Vil 1 8 (1)
Quar 0 1 8 (2)
N° M 1 1 2 7 (4)
Pass 1 1 1 (7)
Typ 3 (9)
Début 2 1 8 1 0 1 5 1 (10–13)
Fin 2 1 4 1 0 1 6 1 (14–17)
Nb opér. 0 1 0 1 3 (18–20)

**R Dépenses non Courantes**

Toutes les dépenses inscrites sur cette page ont été faites dans la période ci-contre

18 01 51 à partir de 01 81 Heures
21 51 01 61 jusqu'à 01 81 Heures
Jour Mois

CODIFICATION
V O M P TE
18 02 12 17 11 5
1 2 4 7 9

| N° Pvs | Produit ou service objet de la dépense | NB | Unité | Montant | F X M | N O B S | Lieu d'Achat | Mois (10) | Produit (12–17) | Montant (18–24) | TL (25) | N° opé (26–29) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | tissu | 6 | mètre | 2250F | P | | E.M. Damoko | 06 | 012000 | 0002250 | 3 | 001 |
| | frais de couture | 1 | fois | 1250F | F | | D | 06 | 213000 | 0001250 | 9 | 002 |
| 3 | Cadeau | 1 | fois | 1000F | F | | D | 06 | 960000 | 0001000 | 9 | 003 |
| 4 | NEANT | | | | | | | | | | | |

TUTTS/DMSI/USAID: LES DONNEES SUPPLEMENTAIRES

VILLE: TOMBOUCTOU Code: _____

PASSAGE: 3 Code: _____ NOM DE ENQUETRICE: _____

_____

PRODUIT: RIZ Code: _____

| MESURE | No. 1 | | No. 2 | | No. 3 | | No. 4 | | No. 5 | | No. 6 | | No. 7 | | No. 8 | | No. 9 | | No. 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix | Pesee | Prix |
| PANY (35 - 65 CFA) | | | | | | | | | | | | | | | | | | | | |
| PANY (66 - 90 CFA) | | | | | | | | | | | | | | | | | | | | |
| PANY (91 - 115 CFA) | | | | | | | | | | | | | | | | | | | | |
| TAS (75 - 125 CFA) | | | | | | | | | | | | | | | | | | | | |
| KILO | | | | | | | | | | | | | | | | | | | | |
| SAC (2250-2750 CFA) | | | | | | | | | | | | | | | | | | | | |
| SAC (4750-5250 CFA) | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

TABLE: 4.1

ADULT CALORIC EQUIVALENT UNITS

| AGE (Years) | SEX | ADULT MALE CALORIC EQUIVALENT |
|---|---|---|
| 1 - 3 | Male | 0.57 |
| | Female | 0.57 |
| 3 - 5 | Male | 0.66 |
| | Female | 0.66 |
| 5 - 7 | Male | 0.79 |
| | Female | 0.74 |
| 7 - 10 | Male | 0.89 |
| | Female | 0.77 |
| 10 - 18 | Male | 1.13 |
| | Female | 0.91 |
| 18 - 30 | Male | 1.04 |
| | Female | 0.72 |
| 30 - 60 | Male | 1.00 |
| | Female | 0.77 |
| Over the Age of 60 | Male | 0.85 |
| | Female | 0.66 |

SOURCE:

FAO/WHO. Energy and Protein Requirements: Report of a Joint FAO/WHO/UNU Consultation, Technical Report Series 724 (Geneva: World Health Organization, 1985), 133-137.

# APPENDIX 2

## STRATIFICATION OF SAMPLE HOUSEHOLDS BY:

(A) PER CAPITA FOOD EXPENDITURE

(B) CALORIE CONSUMPTION PER ADULT EQUIVALENT

Two alternative measures of household welfare were used to stratify sample households: food expenditure and calorie consumption. First, households were stratified on the basis of per capita food expenditure levels where decile 1 represents the lowest 10% and decile 10 represents the highest 10% of the food expenditure distribution. Second, households were stratified on the basis of daily calorie consumption per adult equivalent, where decile 1 represents the lowest 10% and decile 10 represents the highest 10% of the calorie consumption distribution. Annex tables 1 and 2 present sample characteristics for households stratified by these two measures. The results were similar to those for the total expenditure ranking with the following exceptions.

Stratification of the sample on the basis of either food expenditure or calorie consumption results in the share of food in total expenditure remaining stable across deciles.

For the food expenditure ranking, stable food shares occur due to classifications of households of different total expenditure (income) in the same food expenditure decile. For example, assume two households A and B with total monthly incomes of 15,000 and 30,000 respectively. Each households spends 10,000 CFA/month on food, so the share of food in total expenditure is 66% for household A and 33% for household B. The food expenditure ranking would assign the households to the same decile, resulting in an average food share of 50%. Across deciles, averaging the food shares of households with similar food expenditure levels and different total expenditure levels would result in a stabilization of the food share.

For the calorie consumption ranking a similar argument applies. Stabilization of the food share across calorie consumption deciles may be attributable to low-income calorie deficient households and relatively high-income calorie deficient households being assigned to the same calorie consumption decile. For example, assume two households A and B with daily calorie consumption levels of 1,600 calories per adult equivalent. Household A spends 60% while household B spends 40% of its total income on food. These households would be assigned to the same calorie consumption decile, with an average food share of 50%. Again, averaging of food shares of households from different total expenditure levels yet similar calorie consumption levels would yield stable food shares across the sample distribution.

Ranking sample households on the basis of calorie consumption levels shows that low consumption households are less efficient in terms of food expenditure than their better-off counterparts. Although somewhat counter-intuitive, food expenditure/100 calories falls across deciles from 8 CFA in decile 1 to 6 CFA in decile 10. This is due to a concentration of Kayes, Tombouctou and Gao households in the lower deciles. As explained in Section 3.6.3 of Chapter 5, households in these three cities face higher cereal prices than those in the five Southern cities.

ANNEX 2: TABLE 1 (A)

SAMPLE CHARACTERISTICS: HOUSEHOLDS STRATIFIED BY PER CAPITA FOOD EXPENDITURE

| DECILES: PER CAPITA FOOD EXPENDITURE | PER CAPITA MONTHLY EXPENDITURE (CFA) | FOOD SHARE OF TOTAL EXPENDITURE | PER CAPITA MONTHLY FOOD EXPENDITURE (CFA) | RICE SHARE OF FOOD EXPENDITURE | OTHER CEREALS SHARE OF FOOD EXPENDITURE | DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT | CALORIC INTAKE AS A % OF RECOMMENDED LEVEL * | FOOD EXPENDITURE (CFA) PER 100 CALORIES |
|---|---|---|---|---|---|---|---|---|
| 1 | 2008 | 0.53 | 1070 | 0.19 | 0.3 | 1217 | 0.61 | 3.0 |
| 2 | 4274 | 0.57 | 2185 | 0.22 | 0.10 | 1258 | 0.55 | 5.1 |
| 3 | 6061 | 0.50 | 2776 | 0.21 | 0.15 | 1772 | 0.77 | 5.2 |
| 4 | 6721 | 0.57 | 3204 | 0.23 | 0.15 | 1882 | 0.82 | 5.0 |
| 5 | 7707 | 0.50 | 3903 | 0.23 | 0.14 | 2142 | 0.93 | 5.0 |
| 6 | 8501 | 0.59 | 4393 | 0.22 | 0.15 | 2362 | 1.03 | 6.2 |
| 7 | 9695 | 0.59 | 5114 | 0.23 | 0.10 | 2707 | 1.20 | 6.3 |
| 8 | 11405 | 0.56 | 6030 | 0.22 | 0.14 | 2975 | 1.20 | 6.0 |
| 9 | 13931 | 0.53 | 7472 | 0.21 | 0.15 | 3704 | 1.61 | 6.7 |
| 10 | 22870 | 0.55 | 11064 | 0.19 | 0.15 | 5316 | 2.31 | 6.0 |
| AVERAGE | 9195 | 0.59 | 4743 | 0.22 | 0.16 | 2540 | 1.13 | 6.04 |

N = 617

N : Number of Households
* : WHO/FAO Recommended Calorie Intake Level = 2,300 Calories per Adult Equivalent

ANNEX 2: TABLE 1 (B)

SAMPLE CHARACTERISTICS: PERCENTAGE OF HOUSEHOLDS IN PER CAPITA FOOD EXPENDITURE DECILES BY REGION

| DECILES: PER CAPITA FOOD EXPENDITURE | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| 1 | 4.3 | 4.2 | 12.2 | 5.4 | 9.1 | 17.0 | 13.0 | 6.0 |
| 2 | 11.0 | 8.3 | 12.2 | 10.7 | 3.0 | 21.0 | 13.0 | 4.0 |
| 3 | 0.0 | 4.2 | 10.3 | 8.9 | 7.3 | 13.7 | 7.4 | 6.0 |
| 4 | 10.6 | 12.5 | 10.3 | 14.3 | 7.3 | 17.0 | 5.8 | 16.0 |
| 5 | 7.1 | 16.7 | 16.3 | 17.0 | 14.5 | 11.0 | 7.4 | 12.0 |
| 6 | 0.4 | 4.2 | 12.2 | 10.7 | 10.0 | 5.0 | 9.3 | 14.0 |
| 7 | 12.2 | 16.8 | 8.2 | 14.3 | 21.8 | 5.0 | 9.3 | 10.0 |
| 8 | 14.9 | 8.3 | 8.2 | 5.4 | 7.3 | 2.0 | 11.1 | 12.0 |
| 9 | 12.5 | 8.3 | 4.1 | 1.8 | 9.1 | 2.0 | 16.7 | 14.0 |
| 10 | 8.0 | 16.6 | 8.0 | 10.7 | 8.1 | 2.0 | 7.4 | 12.0 |
| ALL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| N = | 255 | 48 | 49 | 56 | 76 | 60 | 54 | 50 |

N : Number of Households

ANNEX 2: TABLE 2 (A)

SAMPLE CHARACTERISTICS: HOUSEHOLDS STRATIFIED BY CALORIE CONSUMPTION PER ADULT EQUIVALENT

| DECILES: CALORIE CONSUMPTION PER ADU | PC MONTHLY EXPENDITURE (CFA) | FOOD SHARE OF TOTAL EXPENDITURE | PER CAPITA MONTHLY FOOD EXPENDITURE (CFA) | RICE SHARE OF FOOD EXPENDITURE | OTHER CEREALS SHARE OF FOOD EXPENDITURE | DAILY CALORIE CONSUMPTION PER ADULT EQUIVALENT | CALORIC INTAKE AS A % OF RECOMMENDED LEVEL * | FOOD EXPENDITURE (CFA) PER 100 CALORIES |
|---|---|---|---|---|---|---|---|---|
| 1 | 4414 | 0.66 | 2160 | 0.16 | 0.14 | 870 | 0.38 | 0.2 |
| 2 | 5204 | 0.6 | 2910 | 0.18 | 0.13 | 1293 | 0.56 | 7.5 |
| 3 | 7010 | 0.50 | 3750 | 0.19 | 0.14 | 1563 | 0.66 | 8.0 |
| 4 | 8225 | 0.50 | 4010 | 0.22 | 0.16 | 1866 | 0.81 | 7.2 |
| 5 | 9112 | 0.57 | 4365 | 0.24 | 0.15 | 2100 | 0.95 | 8.7 |
| 6 | 8656 | 0.58 | 4512 | 0.24 | 0.17 | 2526 | 1.10 | 8.0 |
| 7 | 8816 | 0.59 | 5250 | 0.21 | 0.17 | 2920 | 1.27 | 8.0 |
| 8 | 20968 | 0.50 | 6055 | 0.20 | 0.15 | 3400 | 1.48 | 8.0 |
| 9 | 12721 | 0.6 | 6830 | 0.24 | 0.10 | 4210 | 1.84 | 8.6 |
| 10 | 23329 | 0.56 | 11036 | 0.23 | 0.17 | 6621 | 2.88 | 8.0 |
| AVERAGE | 9195 | 0.53 | 4743 | 0.22 | 0.16 | 2540 | 1.13 | 0.04 |

N = 617

N : Number of Households
* : WHO/FAO Recommended Caloric Intake Level = 2,300 Calories per Adult Equivalent

NOTE: Weaknesses in the calculation of total calorie consumption are attributable to measurement error of the food quantity variable. See Chapter 4 (Methodology) for a discussion of data limitations.

ANNEX 2: TABLE 2 (B)

SAMPLE CHARACTERISTICS: PERCENTAGE OF HOUSEHOLDS IN CALORIE CONSUMPTION PER ADULT EQUIVALENT DECILES

| DECILES: CALORIE CONSUMPTION PER AEU | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| 1 | 10.0 | 4.2 | 10.4 | 4.2 | 10.4 | 41.7 | 10.4 | 16.7 |
| 2 | 10.0 | 2.1 | 6.3 | 7.1 | 10.4 | 27.1 | 10.4 | 6.3 |
| 3 | 6.7 | 10.4 | 10.4 | 1.1 | 2.1 | 10.4 | 10.4 | 2.1 |
| 4 | 12.4 | 6.3 | 12.5 | 6.3 | 10.4 | 6.3 | 14.6 | 10.4 |
| 5 | 10.0 | 10.4 | 12.5 | 12.5 | 10.7 | 6.3 | 6.3 | 14.6 |
| 6 | 10.4 | 10.7 | 16.7 | 22.9 | 6.3 | 2.1 | 12.5 | 6.3 |
| 7 | 13.3 | 12.5 | 10.4 | 10.8 | 6.3 | 6.3 | 6.3 | 14.6 |
| 8 | 10.4 | 6.3 | 4.2 | 6.3 | 10.8 | 0.0 | 6.3 | 6.3 |
| 9 | 10.4 | 12.5 | 6.3 | 10.4 | 6.3 | 2.1 | 6.3 | 10.4 |
| 10 | 3.7 | 16.7 | 2.1 | 12.5 | 12.5 | 0.0 | 2.1 | 10.4 |
| ALL | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| N = | 261 | 48 | 48 | 50 | 52 | 50 | 54 | 50 |

N : Number of Households

# APPENDIX 3

## TABLES: CONSUMPTION CHARACTERISTICS OF THE POOR

TABLE 5.7

CALORIC INTAKE AS A % OF RECOMMENDED LEVELS, BY EXPENDITURE GROUP: ADULT EQUIVALENCY

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 35.5 | 58.8 | 10.8 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 15.7 | 18.2 | 12.9 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 48.9 | 23.0 | 76.3 |
| N= | 575 | 296 | 279 |

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 30.1 | 54.3 | 9.8 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 16.0 | 18.3 | 14.0 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 53.9 | 27.4 | 76.2 |
| N= | 432 | 197 | 235 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

ROUNDS 1, 2, AND 3

TABLE 5.8

CALORIC INTAKE AS A % OF RECOMMENDED LEVELS, BY EXPENDITURE GROUP: ADULT EQUIVALENCY

CITY: BAMAKO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 32.9 | 57.7 | 14.0 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 17.1 | 20.2 | 14.7 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 50.0 | 22.1 | 71.3 |
| N= | 618 | 184 | 124 |

CITY: KOULIKORO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 18.8 | 53.8 | 5.7 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 14.8 | 30.8 | 8.6 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 66.7 | 15.4 | 85.7 |
| N= | 48 | 13 | 35 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

ROUNDS 1, 2, AND 3

TABLE 5.9

CALORIC INTAKE AS A % OF RECOMMENDED LEVELS, BY EXPENDITURE GROUP: ADULT EQUIVALENCY

CITY: SIKASSO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 41.7 | 56.3 | 12.5 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 12.5 | 12.5 | 12.5 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 45.8 | 31.3 | 75.0 |
| N= | 48 | 32 | 16 |

CITY: SEGOU

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 14.6 | 36.8 | 0.0 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 12.5 | 15.8 | 10.3 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 72.9 | 47.4 | 89.7 |
| N= | 48 | 19 | 29 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

ROUNDS 1, 2, AND 3

TABLE 5.10

CALORIC INTAKE AS A % OF RECOMMENDED LEVELS, BY INCOME GROUP: ADULT EQUIVALENCY

CITY: MOPTI

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 31.3 | 51.7 | 6.0 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 18.8 | 13.8 | 26.3 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 50.0 | 34.5 | 73.7 |
| N= | 48 | 29 | 19 |

CITY: KATES

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 83.0 | 89.7 | 50.0 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 8.5 | 7.7 | 12.5 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 8.5 | 2.6 | 37.5 |
| N= | 47 | 39 | 8 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

ROUNDS 1, 2, AND 3

TABLE 5.11

CALORIC INTAKE AS A % OF RECOMMENDED LEVELS, BY EXPENDITURE GROUP: ADULT EQUIVALENCY

CITY: TOMBOUCTOU

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 45.8 | 62.5 | 12.5 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 12.5 | 15.6 | 6.3 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 41.7 | 21.9 | 81.3 |
| N= | 48 | 32 | 16 |

CITY: GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| HOUSEHOLDS WITH < 80% OF CALORIC ADEQUACY | 27.1 | 42.9 | 5.0 |
| HOUSEHOLDS WITH > 80% AND < 100% OF CALORIC ADEQUACY | 22.9 | 35.7 | 5.0 |
| HOUSEHOLDS WITH > 100 OF CALORIC ADEQUACY | 50.0 | 21.4 | 90.0 |
| N= | 42 | 28 | 20 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

ROUNDS 1, 2, AND 3

TABLE 5.13

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 58 | 62 | 55 |
| CLOTHING | 12 | 11 | 12 |
| HOUSING | 12 | 12 | 12 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 5 | 4 | 7 |
| OTHER | 12 | 10 | 13 |
| N = | 617 | 308 | 308 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 5.14

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 55 | 59 | 52 |
| CLOTHING | 12 | 12 | 13 |
| HOUSING | 12 | 11 | 13 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 7 | 5 | 8 |
| OTHER | 13 | 12 | 13 |
| N = | 463 | 212 | 251 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.15

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: KATZS

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 59 | 59 | 58 |
| CLOTHING | 10 | 10 | 10 |
| HOUSING | 16 | 15 | 13 |
| HEALTH | 0 | 0 | 1 |
| TRANSPORT | 3 | 2 | 8 |
| OTHER | 13 | 14 | 10 |
| N = | 50 | 42 | 8 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.10

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: KOULIKORO

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 47 | 48 | 46 |
| CLOTHING | 17 | 21 | 16 |
| HOUSING | 16 | 12 | 16 |
| HEALTH | 2 | 2 | 2 |
| TRANSPORT | 5 | 5 | 5 |
| OTHER | 14 | 12 | 15 |
| N = | 46 | 13 | 35 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.17

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: SIKASSO

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 57 | 61 | 50 |
| CLOTHING | 16 | 15 | 17 |
| HOUSING | 10 | 8 | 13 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 5 | 4 | 7 |
| OTHER | 11 | 11 | 12 |
| N = | 49 | 33 | 16 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.10

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: SEGOU

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 53 | 53 | 53 |
| CLOTHING | 10 | 10 | 10 |
| HOUSING | 13 | 14 | 12 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 4 | 2 | 1 |
| OTHER | 19 | 20 | 18 |
| N = | 56 | 24 | 32 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.19

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: MOPTI

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 66 | 68 | 62 |
| CLOTHING | 10 | 9 | 12 |
| HOUSING | 10 | 10 | 11 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 2 | 2 | 2 |
| OTHER | 11 | 10 | 11 |
| N = | 55 | 32 | 23 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.20

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: TOMBOUCTOU

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 71 | 72 | 68 |
| CLOTHING | 8 | 8 | 1 |
| HOUSING | 9 | 8 | 18 |
| HEALTH | 1 | 1 | 0 |
| TRANSPORT | 1 | 1 | 1 |
| OTHER | 10 | 9 | 11 |
| N = | 54 | 37 | 17 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.21

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: GAO

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 75 | 74 | 76 |
| CLOTHING | 9 | 8 | 10 |
| HOUSING | 10 | 11 | 8 |
| HEALTH | 0 | 0 | 0 |
| TRANSPORT | 1 | 1 | 1 |
| OTHER | 5 | 6 | 5 |
| N = | 50 | 30 | 20 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.12

PERCENTAGE OF TOTAL EXPENDITURE ALLOCATED TO PRODUCT GROUPS: ROUNDS 1, 2, AND 3

CITY: BAMAKO

| PRODUCT GROUP | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| FOOD | 54 | 51 | 52 |
| CLOTHING | 11 | 11 | 12 |
| HOUSING | 12 | 12 | 12 |
| HEALTH | 1 | 1 | 1 |
| TRANSPORT | 9 | 9 | 11 |
| OTHER | 12 | 13 | 11 |
| N = | 255 | 110 | 145 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.25

PERCENTAGE OF FOOD EXPENDITURE ALLOCATED TO FOOD GROUPS, BY INCOME GROUP: ROUNDS 1, 2, AND 3

| | | ALL CITIES | 6 SOUTHERN CITIES |
|---|---|---|---|
| RICE: | | | |
| | Poor | 22.0 | 23.9 |
| | Wealthy | 20.7 | 20.7 |
| OTHER CEREALS: | | | |
| | Poor | 15.7 | 16.3 |
| | Wealthy | 15.5 | 15.3 |
| MEAT: | | | |
| | Poor | 13.4 | 11.6 |
| | Wealthy | 15.3 | 14.3 |
| MILK: | | | |
| | Poor | 2.3 | 2.2 |
| | Wealthy | 3.0 | 3.7 |
| EGGS: | | | |
| | Poor | 0.0 | 0.0 |
| | Wealthy | 0.1 | 0.1 |
| OIL: | | | |
| | Poor | 4.9 | 4.4 |
| | Wealthy | 4.7 | 4.6 |
| LEGUMES: | | | |
| | Poor | 0.3 | 0.2 |
| | Wealthy | 0.2 | 0.2 |
| PEANUTS: | | | |
| | Poor | 4.8 | 5.1 |
| | Wealthy | 4.2 | 4.6 |
| TUBERS: | | | |
| | Poor | 0.8 | 1.0 |
| | Wealthy | 1.3 | 1.3 |
| SUGAR: | | | |
| | Poor | 7.9 | 8.1 |
| | Wealthy | 8.6 | 8.1 |
| FRUIT/VEGETABLES: | | | |
| | Poor | 7.5 | 8.8 |
| | Wealthy | 8.6 | 9.2 |
| OTHER: | | | |
| | Poor | 19.7 | 18.3 |
| | Wealthy | 17.2 | 16.0 |

Poor = Expenditure Deciles 1 - 5 Wealthy = Expenditure Deciles 6 - 10

TABLE 5.26

PERCENTAGE OF CEREAL EXPENDITURE ALLOCATED TO INDIVIDUAL CEREALS, BY INCOME GROUP: ROUNDS 1, 2, AND 3

| | | ALL CITIES | 5 SOUTHERN CITIES |
|---|---|---|---|
| RICE: | | | |
| | Poor | 58.0 | 57.7 |
| | Wealthy | 56.9 | 57.0 |
| WHEAT: | | | |
| | Poor | 11.0 | 9.8 |
| | Wealthy | 16.6 | 16.5 |
| MILLET/SORGHUM: | | | |
| | Poor | 18.9 | 22.1 |
| | Wealthy | 21.5 | 22.0 |
| MAIZE: | | | |
| | Poor | 1.4 | 0.7 |
| | Wealthy | 0.2 | 0.1 |
| OTHER: | | | |
| | Poor | 10.7 | 9.7 |
| | Wealthy | 4.8 | 4.4 |
| | N = | 817 | 403 |

N = # of Households

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.27

PERCENTAGE OF FOOD EXPENDITURE ALLOCATED TO FOOD GROUPS, BY REGION AND INCOME GROUP: ROUNDS 1, 2, AND 3

| | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| RICE: | | | | | | | | |
| Poor | 24.1 | 24.6 | 22.0 | 21.2 | 20.4 | 18.5 | 24.0 | 19.4 |
| Wealthy | 18.8 | 21.7 | 21.0 | 21.5 | 24.4 | 11.3 | 24.2 | 21.6 |
| OTHER CEREALS: | | | | | | | | |
| Poor | 15.4 | 13.3 | 20.0 | 15.6 | 14.3 | 16.0 | 16.7 | 14.4 |
| Wealthy | 14.9 | 15.3 | 16.2 | 16.0 | 10.8 | 13.5 | 17.0 | 16.5 |
| MEAT: | | | | | | | | |
| Poor | 12.9 | 10.0 | 9.0 | 12.2 | 9.1 | 17.3 | 16.1 | 17.5 |
| Wealthy | 10.1 | 10.1 | 13.4 | 13.5 | 11.0 | 18.3 | 26.1 | 21.7 |
| MILK: | | | | | | | | |
| Poor | 2.5 | 2.0 | 1.1 | 1.1 | 2.0 | 3.2 | 1.1 | 3.2 |
| Wealthy | 4.1 | 2.7 | 3.3 | 2.7 | 3.0 | 4.0 | 3.0 | 2.6 |
| EGGS: | | | | | | | | |
| Poor | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Wealthy | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| OIL: | | | | | | | | |
| Poor | 4.1 | 7.2 | 3.4 | 3.0 | 5.5 | 7.7 | 7.7 | 1.0 |
| Wealthy | 4.2 | 7.1 | 5.0 | 3.7 | 4.0 | 8.0 | 7.1 | 2.3 |
| LEGUMES: | | | | | | | | |
| Poor | 0.2 | 0.0 | 0.0 | 0.1 | 0.2 | 1.0 | 0.1 | 0.1 |
| Wealthy | 0.1 | 0.4 | 0.0 | 0.3 | 0.0 | 0.7 | 0.0 | 0.2 |
| PEANUTS: | | | | | | | | |
| Poor | 0.3 | 3.0 | 3.0 | 0.4 | 1.0 | 0.2 | 0.1 | 3.5 |
| Wealthy | 4.9 | 3.4 | 2.0 | 7.4 | 1.7 | 10.0 | 0.1 | 1.1 |
| TUBERS: | | | | | | | | |
| Poor | 1.0 | 0.5 | 1.0 | 1.1 | 0.0 | 1.0 | 0.1 | 0.4 |
| Wealthy | 1.4 | 1.0 | 2.3 | 1.0 | 0.3 | 1.3 | 0.0 | 1.0 |
| SUGAR: | | | | | | | | |
| Poor | 7.7 | 10.1 | 7.5 | 8.1 | 9.4 | 9.0 | 5.1 | 8.0 |
| Wealthy | 8.5 | 12.0 | 7.8 | 8.4 | 10.0 | 8.1 | 5.3 | 8.0 |
| FRUIT/VEGETABLES: | | | | | | | | |
| Poor | 8.7 | 5.0 | 12.2 | 8.2 | 8.8 | 8.0 | 2.0 | 4.0 |
| Wealthy | 10.1 | 8.3 | 11.0 | 8.8 | 7.0 | 8.2 | 3.0 | 6.2 |
| OTHER: | | | | | | | | |
| Poor | 17.0 | 22.6 | 17.3 | 17.0 | 22.0 | 17.0 | 23.5 | 20.3 |
| Wealthy | 16.0 | 16.0 | 16.0 | 13.3 | 19.2 | 19.0 | 18.3 | 16.7 |

Poor = Expenditure Deciles 1 - 5 Wealthy = Expenditure Deciles 6 - 10

TABLE 5.20

PERCENTAGE OF CEREAL EXPENDITURE ALLOCATED TO INDIVIDUAL CEREALS, BY REGION AND INCOME GROUP: ROUNDS 1, 2, AND 3

| | BAMAKO | KOULIKORO | SIKASSO | SEGOU | MOPTI | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|---|---|---|---|
| RICE: | | | | | | | | |
| Poor | 59.3 | 65.3 | 54.0 | 50.9 | 51.4 | 62.5 | 56.9 | 55.0 |
| Wealthy | 54.8 | 61.4 | 58.2 | 57.1 | 62.4 | 47.1 | 58.2 | 58.7 |
| WHEAT: | | | | | | | | |
| Poor | 12.6 | 7.1 | 8.2 | 3.6 | 7.2 | 11.5 | 9.6 | 20.2 |
| Wealthy | 20.7 | 8.5 | 14.7 | 12.4 | 7.5 | 24.6 | 15.3 | 15.5 |
| MILLET/SORGHUM: | | | | | | | | |
| Poor | 19.3 | 24.2 | 28.7 | 28.4 | 19.7 | 9.7 | 15.4 | 14.2 |
| Wealthy | 19.7 | 27.0 | 19.5 | 25.0 | 24.3 | 13.0 | 17.5 | 21.0 |
| MAIS: | | | | | | | | |
| Poor | 1.3 | 0.0 | 0.0 | 0.3 | 0.2 | 4.1 | 3.0 | 0.4 |
| Wealthy | 0.1 | 0.0 | 0.0 | 0.1 | 0.3 | 5.3 | 0.2 | 0.0 |
| OTHER: | | | | | | | | |
| Poor | 7.5 | 3.4 | 9.1 | 10.8 | 14.4 | 13.2 | 15.1 | 10.2 |
| Wealthy | 4.7 | 2.1 | 7.0 | 4.5 | 5.5 | 9.1 | 7.0 | 3.9 |
| N = | 258 | 48 | 48 | 58 | 55 | 86 | 54 | 58 |

N = # of Households

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.20

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **RICE** | | | |
| No Home Consumption | 85.6 | 82.2 | 88.1 |
| Home Consumption < Purchases | 12.3 | 15.0 | 9.8 |
| Home Consumption = Purchases | 1.3 | 1.6 | 1.4 |
| Home Consumption > Purchases | 0.8 | 1.2 | 0.1 |
| **MILLET** | | | |
| No Home Consumption | 78.0 | 76.0 | 80.1 |
| Home Consumption < Purchases | 15.4 | 16.8 | 13.0 |
| Home Consumption = Purchases | 5.3 | 5.3 | 5.4 |
| Home Consumption > Purchases | 1.3 | 1.9 | 0.7 |
| **MAIZE** | | | |
| No Home Consumption | 85.4 | 82.6 | 88.5 |
| Home Consumption < Purchases | 11.5 | 13.7 | 9.1 |
| Home Consumption = Purchases | 2.4 | 3.1 | 1.7 |
| Home Consumption > Purchases | 0.6 | 0.6 | 0.7 |
| **MEAT** | | | |
| No Home Consumption | 98.1 | 97.8 | 98.6 |
| Home Consumption < Purchases | 1.6 | 1.8 | 1.4 |
| Home Consumption = Purchases | 0.2 | 0.1 | 0.0 |
| Home Consumption > Purchases | 0.3 | 0.0 | 0.0 |
| **FISH** | | | |
| No Home Consumption | 95.0 | 94.7 | 96.6 |
| Home Consumption < Purchases | 1.1 | 1.2 | 1.0 |
| Home Consumption = Purchases | 1.0 | 0.9 | 1.0 |
| Home Consumption > Purchases | 2.3 | 3.1 | 1.4 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.20, (Continued)

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MILK** | | | |
| No Home Consumption | 96.4 | 96.3 | 96.0 |
| Home Consumption < Purchases | 2.8 | 2.2 | 3.4 |
| Home Consumption = Purchases | 0.5 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.3 | 0.0 | 0.0 |
| **PEANUTS** | | | |
| No Home Consumption | 92.0 | 92.5 | 93.2 |
| Home Consumption < Purchases | 6.2 | 6.5 | 5.7 |
| Home Consumption = Purchases | 0.8 | 0.8 | 0.1 |
| Home Consumption > Purchases | 0.2 | 0.3 | 0.0 |
| **POTATOES** | | | |
| No Home Consumption | 98.4 | 99.7 | 96.0 |
| Home Consumption < Purchases | 1.1 | 0.0 | 2.4 |
| Home Consumption = Purchases | 0.5 | 0.3 | 0.7 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MANIOC** | | | |
| No Home Consumption | 99.7 | 99.4 | 99.0 |
| Home Consumption < Purchases | 0.5 | 0.3 | 0.7 |
| Home Consumption = Purchases | 0.5 | 0.3 | 0.7 |
| Home Consumption > Purchases | 0.3 | 0.0 | 0.7 |
| **ICHAME** | | | |
| No Home Consumption | 99.7 | 99.7 | 99.7 |
| Home Consumption < Purchases | 0.2 | 0.0 | 0.3 |
| Home Consumption = Purchases | 0.2 | 0.3 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.30

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **RICE** | | | |
| No Home Consumption | 89.0 | 86.8 | 90.8 |
| Home Consumption < Purchases | 8.2 | 9.0 | 7.6 |
| Home Consumption = Purchases | 1.7 | 2.4 | 1.2 |
| Home Consumption > Purchases | 1.1 | 1.8 | 0.4 |
| **MILLET** | | | |
| No Home Consumption | 74.5 | 70.8 | 77.7 |
| Home Consumption < Purchases | 17.0 | 21.2 | 15.1 |
| Home Consumption = Purchases | 6.0 | 5.7 | 6.4 |
| Home Consumption > Purchases | 1.5 | 2.4 | 0.8 |
| **MAIZE** | | | |
| No Home Consumption | 82.7 | 77.8 | 86.8 |
| Home Consumption < Purchases | 13.4 | 17.0 | 10.4 |
| Home Consumption = Purchases | 3.0 | 4.2 | 2.0 |
| Home Consumption > Purchases | 0.9 | 0.8 | 0.8 |
| **WHEAT** | | | |
| No Home Consumption | 98.1 | 97.6 | 98.4 |
| Home Consumption < Purchases | 1.5 | 1.4 | 1.6 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.4 | 0.9 | 0.0 |
| **FISH** | | | |
| No Home Consumption | 95.2 | 94.3 | 96.0 |
| Home Consumption < Purchases | 1.3 | 1.4 | 1.2 |
| Home Consumption = Purchases | 1.3 | 1.4 | 1.2 |
| Home Consumption > Purchases | 2.2 | 2.8 | 1.6 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.30 (Continued)

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MILK** | | | |
| No Home Consumption | 96.5 | 96.7 | 96.4 |
| Home Consumption < Purchases | 2.8 | 1.4 | 3.6 |
| Home Consumption = Purchases | 0.4 | 0.9 | 0.0 |
| Home Consumption > Purchases | 0.4 | 0.9 | 0.0 |
| **PEANUTS** | | | |
| No Home Consumption | 94.0 | 96.3 | 92.8 |
| Home Consumption < Purchases | 5.0 | 3.3 | 6.4 |
| Home Consumption = Purchases | 0.8 | 0.0 | 0.8 |
| Home Consumption > Purchases | 0.2 | 0.5 | 0.0 |
| **POTATOES** | | | |
| No Home Consumption | 98.3 | 99.8 | 97.1 |
| Home Consumption < Purchases | 1.1 | 0.0 | 2.0 |
| Home Consumption = Purchases | 0.0 | 0.1 | 0.1 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.1 |
| **MANIOC** | | | |
| No Home Consumption | 98.3 | 99.1 | 97.6 |
| Home Consumption < Purchases | 0.8 | 0.1 | 0.8 |
| Home Consumption = Purchases | 0.8 | 0.1 | 0.8 |
| Home Consumption > Purchases | 0.4 | 0.1 | 0.8 |
| **IGNAME** | | | |
| No Home Consumption | 99.0 | 99.5 | 99.6 |
| Home Consumption < Purchases | 0.1 | 0.0 | 0.4 |
| Home Consumption = Purchases | 0.1 | 0.5 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

Rounds 1, 2, and 3

TABLE 5.31

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: KATES

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **RICE** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MILLET** | | | |
| No Home Consumption | 66.0 | 64.3 | 75.0 |
| Home Consumption < Purchases | 22.0 | 21.4 | 25.0 |
| Home Consumption = Purchases | 10.0 | 11.9 | 0.0 |
| Home Consumption > Purchases | 2.0 | 2.4 | 0.0 |
| **MAIZE** | | | |
| No Home Consumption | 94.0 | 92.9 | 100.0 |
| Home Consumption < Purchases | 4.0 | 4.7 | 0.0 |
| Home Consumption = Purchases | 2.0 | 2.4 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MEAT** | | | |
| No Home Consumption | 96.0 | 95.2 | 100.0 |
| Home Consumption < Purchases | 4.0 | 4.8 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **FISH** | | | |
| No Home Consumption | 94.0 | 92.9 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 7.1 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.31 (Continued)

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: KATES

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MILK** | | | |
| No Home Consumption | 90.0 | 90.5 | 87.5 |
| Home Consumption < Purchases | 8.0 | 7.1 | 12.5 |
| Home Consumption = Purchases | 2.0 | 2.4 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **PEANUTS** | | | |
| No Home Consumption | 88.0 | 66.5 | 75.0 |
| Home Consumption < Purchases | 30.0 | 33.5 | 12.5 |
| Home Consumption = Purchases | 2.0 | 0.0 | 12.5 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **POTATOES** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MANIOC** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **IGNAME** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.32

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: TOMBOUCTOU

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **RICE** | | | |
| No Home Consumption | 83.3 | 75.7 | 100.0 |
| Home Consumption < Purchases | 16.7 | 24.3 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MILLET** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MAIZE** | | | |
| No Home Consumption | 90.7 | 89.2 | 94.1 |
| Home Consumption < Purchases | 9.3 | 10.8 | 5.9 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MEAT** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **FISH** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.32 (Continued)

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: TOMBOUCTOU

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MILK** | | | |
| No Home Consumption | 98.1 | 97.3 | 100.0 |
| Home Consumption < Purchases | 1.9 | 2.7 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **PEANUTS** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **POTATOES** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MANIOC** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **IGNAME** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.33

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **RICE** | | | |
| No Home Consumption | 42.0 | 33.3 | 55.0 |
| Home Consumption < Purchases | 58.0 | 66.7 | 45.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MILLET** | | | |
| No Home Consumption | 98.0 | 100.0 | 95.0 |
| Home Consumption < Purchases | 2.0 | 0.0 | 5.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MAIZE** | | | |
| No Home Consumption | 98.0 | 93.1 | 100.0 |
| Home Consumption < Purchases | 1.0 | 0.1 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.1 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.1 | 0.0 |
| **MEAT** | | | |
| No Home Consumption | 98.0 | 96.7 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 2.0 | 3.3 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **FISH** | | | |
| No Home Consumption | 96.0 | 93.1 | 100.0 |
| Home Consumption < Purchases | 2.0 | 3.1 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.1 | 0.0 |
| Home Consumption > Purchases | 2.0 | 3.3 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.33 (Continued)

PERCENTAGE OF HOUSEHOLDS CONSUMING FROM HOME PRODUCTION/GIFTS, BY EXPENDITURE GROUP:

CITY: GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MILK** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **PEANUTS** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **POTATOES** | | | |
| No Home Consumption | 96.0 | 100.0 | 90.0 |
| Home Consumption < Purchases | 4.0 | 0.0 | 10.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **MANIOC** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |
| **IGNAME** | | | |
| No Home Consumption | 100.0 | 100.0 | 100.0 |
| Home Consumption < Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption = Purchases | 0.0 | 0.0 | 0.0 |
| Home Consumption > Purchases | 0.0 | 0.0 | 0.0 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

Rounds 1, 2, and 3

TABLE 5.34

PERCENTAGE OF HOUSEHOLD WITH NO CONSUMPTION FROM HOME PRODUCTION OR GIFTS, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| PRODUCTS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| RICE | 85.0 | 82.2 | 89.2 |
| MILLET | 78.0 | 76.1 | 80.1 |
| MAIZE | 85.4 | 82.3 | 88.5 |
| MEAT | 98.1 | 97.5 | 98.6 |
| FISH | 95.6 | 94.7 | 96.6 |
| MILK | 96.4 | 95.3 | 96.6 |
| PEANUTS | 92.0 | 92.5 | 92.2 |
| POTATOES | 98.4 | 99.7 | 96.9 |
| MANIOC | 98.7 | 99.4 | 98.0 |
| IGNAME | 99.7 | 99.7 | 99.7 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.37

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| | AVERAGE | | POOR HOUSEHOLDS | | WEALTHY HOUSEHOLDS | |
|---|---|---|---|---|---|---|
| FOOD GROUP | CALORIES | % | CALORIES | % | CALORIES | % |
| RICE | 1022 | 39 | 740 | 40 | 1262 | 38 |
| OTHER CEREALS | 942 | 36 | 711 | 38 | 1138 | 34 |
| MEAT/POULTRY | 45 | 2 | 26 | 1 | 62 | 2 |
| MILK | 28 | 1 | 14 | 1 | 58 | 2 |
| EGGS | 6 | 0 | 0 | 0 | 0 | 0 |
| OIL | 130 | 5 | 83 | 4 | 169 | 5 |
| LEGUMES | 8 | 0 | 2 | 0 | 9 | 0 |
| PEANUTS, PEANUT-BUTTER | 251 | 9 | 167 | 9 | 323 | 10 |
| TUBERS, PLANTAIN | 17 | 1 | 12 | 1 | 21 | 1 |
| SUGAR | 200 | 8 | 116 | 6 | 272 | 8 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2651 | 100 | 1871 | 100 | 3314 | 100 |
| N = | 463 | | 211 | | 252 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.38

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT
ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| FOOD GROUP | DECILE 1 | | DECILE 2 | | DECILE 3 | | DECILE 4 | | DECILE 5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CALORIES | % | CALORIES | % | CALORIES | % | CALORIES | % | CALORIES | % |
| RICE | 320 | 35 | 521 | 37 | 695 | 36 | 756 | 41 | 899 | 40 |
| OTHER CEREALS | 465 | 45 | 574 | 40 | 721 | 40 | 637 | 34 | 830 | 37 |
| MEAT/POULTRY | 12 | 1 | 11 | 1 | 21 | 1 | 28 | 1 | 34 | 2 |
| MILK | 6 | 1 | 11 | 1 | 14 | 1 | 25 | 1 | 12 | 1 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - |
| OIL | 42 | 5 | 64 | 5 | 69 | 4 | 86 | 5 | 78 | 4 |
| LEGUMES | 1 | 0 | 5 | 0 | 1 | 0 | 2 | 0 | 3 | 0 |
| PEANUTS, PEANUT-BUTTER | 74 | 8 | 120 | 8 | 176 | 10 | 192 | 10 | 185 | 8 |
| TUBERS, PLANTAIN | 4 | 0 | 6 | 0 | 12 | 1 | 8 | 0 | 17 | 1 |
| SUGAR | 44 | 5 | 80 | 6 | 112 | 6 | 122 | 7 | 148 | 7 |
| TOTAL DAILY CALORIE CONSUMPTION PER AEU | 908 | 100 | 1417 | 100 | 1814 | 100 | 1855 | 100 | 2225 | 100 |

NOTE: Weaknesses in the calculation of total calorie consumption are attributable to measurement error of the food quantity variable. See Chapter 4 (Methodology) for a discussion of data limitations.

TABLE 5.39

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: KATES

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 476 | 34 | 417 | 36 | 768 | 32 |
| OTHER CEREALS | 358 | 16 | 300 | 26 | 648 | 27 |
| MEAT/POULTRY | 37 | 3 | 31 | 3 | 67 | 3 |
| MILK | 20 | 1 | 16 | 1 | 40 | 2 |
| EGGS | - | 0 | 0 | 0 | 0 | 0 |
| OIL | 137 | 10 | 112 | 10 | 265 | 11 |
| LEGUMES | 18 | 1 | 16 | 1 | 28 | 1 |
| PEANUTS, PEANUT-BUTTER | 221 | 16 | 181 | 15 | 416 | 17 |
| TUBERS, PLANTAIN | 8 | 1 | 7 | 1 | 10 | 0 |
| SUGAR | 107 | 8 | 91 | 8 | 171 | 7 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 1380 | 100 | 1172 | 100 | 2415 | 100 |
| N = | 50 | | 42 | | 8 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.40

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: KOULIKORO

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 1225 | 38 | 755 | 44 | 1399 | 37 |
| OTHER CEREALS | 1144 | 36 | 594 | 34 | 1348 | 36 |
| MEAT/POULTRY | 45 | 1 | 26 | 2 | 53 | 1 |
| MILK | 23 | 1 | 9 | 1 | 29 | 1 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 200 | 6 | 106 | 6 | 217 | 6 |
| LEGUMES | 15 | 0 | 1 | 0 | 20 | 1 |
| PEANUTS, PEANUT-BUTTER | 202 | 6 | 103 | 6 | 240 | 6 |
| TUBERS, PLANTAIN | 5 | 0 | 2 | 0 | 6 | 0 |
| SUGAR | 286 | 9 | 132 | 8 | 343 | 9 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 3205 | 100 | 1728 | 100 | 3755 | 100 |
| N = | 48 | | 12 | | 36 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.41

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: SIKASSO

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 728 | 33 | 540 | 28 | 1104 | 33 |
| OTHER CEREALS | 1107 | 50 | 1094 | 57 | 1133 | 40 |
| MEAT/POULTRY | 36 | 2 | 22 | 1 | 64 | 2 |
| MILK | 26 | 1 | 10 | 1 | 63 | 2 |
| EGGS | 0 | 0 | 0 | 0 | 5 | 0 |
| OIL | 60 | 3 | 44 | 2 | 91 | 3 |
| LEGUMES | 1 | 0 | 1 | 0 | 1 | 0 |
| PEANUTS, PEANUT-BUTTER | 112 | 6 | 80 | 5 | 158 | 6 |
| YUMS, PLANTAIN | 37 | 2 | 31 | 2 | 50 | 2 |
| SUGAR | 125 | 6 | 94 | 5 | 190 | 7 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2224 | 100 | 1932 | 100 | 2854 | 100 |
| N = | 49 | | 33 | | 10 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.42

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: SEGOU

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 1025 | 34 | 634 | 32 | 1295 | 35 |
| OTHER CEREALS | 1190 | 40 | 890 | 44 | 1408 | 38 |
| MEAT/POULTRY | 45 | 2 | 27 | 1 | 58 | 2 |
| MILK | 20 | 1 | 5 | 0 | 32 | 1 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 118 | 4 | 93 | 5 | 130 | 4 |
| LEGUMES | 10 | 0 | 1 | 0 | 18 | 0 |
| PEANUTS, PEANUT-BUTTER | 379 | 13 | 234 | 12 | 484 | 13 |
| TUBERS, PLANTAIN | 42 | 1 | 28 | 1 | 52 | 1 |
| SUGAR | 159 | 5 | 95 | 5 | 205 | 6 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2994 | 100 | 2007 | 100 | 3688 | 100 |
| N = | 56 | | 24 | | 22 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.43

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: HOPTI

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 1320 | 46 | 1064 | 49 | 1727 | 43 |
| OTHER CEREALS | 1028 | 36 | 711 | 33 | | 38 |
| MEAT/POULTRY | 37 | 1 | 25 | 1 | 57 | 1 |
| MILK | 47 | 2 | 27 | 1 | 77 | 2 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 147 | 5 | 123 | 6 | 182 | 5 |
| LEGUMES | 0 | 0 | 0 | 0 | 0 | 0 |
| PEANUTS, PEANUT-BUTTER | 61 | 2 | 63 | 3 | 58 | 1 |
| TUBERS, PLANTAIN | 7 | 0 | 7 | 0 | 8 | 0 |
| SUGAR | 225 | 8 | 153 | 7 | 335 | 8 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2878 | 100 | 2173 | 100 | 3972 | 100 |
| N = | 55 | | 32 | | 23 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.44

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: TOWNOUCTOU

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 1140 | 54 | 882 | 56 | 1656 | 51 |
| OTHER CEREALS | 601 | 28 | 413 | 26 | 988 | 31 |
| MEAT/POULTRY | 111 | 5 | 81 | 5 | 178 | 6 |
| MILK | 16 | 1 | 8 | 1 | 31 | 1 |
| EGGS | 0 | 0 | 0 | 0 | | 0 |
| OIL | 132 | 6 | 103 | 7 | 192 | 6 |
| LEGUMES | 1 | 0 | 1 | 0 | 0 | 0 |
| PEANUTS, PEANUT-BUTTER | 2 | 0 | 1 | 0 | 3 | 0 |
| TUBERS, PLANTAIN | 3 | 0 | 1 | 0 | 7 | 0 |
| SUGAR | 114 | 5 | 83 | 5 | 177 | 5 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2120 | 100 | 1573 | 100 | 3232 | 100 |
| N = | 54 | | 37 | | 17 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

TABLE 5.46

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: GAO

| | AVERAGE | | POOR HOUSEHOLDS | | WEALTHY HOUSEHOLDS | |
|---|---|---|---|---|---|---|
| FOOD GROUP | CALORIES | % | CALORIES | % | CALORIES | % |
| RICE | 1302 | 48 | 880 | 47 | 1914 | 48 |
| OTHER CEREALS | 975 | 36 | 628 | 34 | 1479 | 37 |
| MEAT/POULTRY | 92 | 3 | 51 | 3 | 148 | 4 |
| MILK | 32 | 1 | 38 | 2 | 34 | 1 |
| EGGS | 0 | 0 | 1 | 0 | 0 | 0 |
| OIL | 58 | 2 | 34 | 2 | 92 | 2 |
| LEGUMES | 3 | 0 | 1 | 0 | 7 | 0 |
| PEANUTS, PEANUT-BUTTER | 60 | 2 | 75 | 4 | 55 | 1 |
| TUBERS, PLANTAIN | 4 | 0 | 2 | 0 | 10 | 0 |
| SUGAR | 200 | 7 | 164 | 9 | 251 | 6 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2737 | 100 | 1865 | 100 | 3889 | 100 |
| N = | 50 | | 30 | | 20 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 3.49

CALORIES AND PERCENTAGE OF CALORIES OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: BAMAKO

| FOOD GROUP | AVERAGE CALORIES | AVERAGE % | POOR HOUSEHOLDS CALORIES | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS CALORIES | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 980 | 39 | 730 | 41 | 1172 | 38 |
| OTHER CEREALS | 799 | 32 | 573 | 32 | 973 | 32 |
| MEAT/POULTRY | 49 | 2 | 37 | 2 | 66 | 2 |
| MILK | 45 | 2 | 15 | 1 | 68 | 2 |
| EGGS | 0 | 0 | 0 | 0 | 0 | 0 |
| OIL | 117 | 5 | 70 | 4 | 148 | 5 |
| LEGUMES | 0 | 0 | 0 | 0 | 0 | 0 |
| PEANUTS, PEANUT-BUTTER | 304 | 12 | 218 | 12 | 369 | 12 |
| TUBERS, PLANTAIN | 12 | 0 | 6 | 0 | 17 | 1 |
| SUGAR | 201 | 8 | 113 | 6 | 266 | 8 |
| TOTAL CALORIES PER DAY PER ADULT EQUIVALENT | 2513 | 100 | 1767 | 100 | 3085 | 100 |
| N = | 255 | | 109 | | 146 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 9.47

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 24.9 | 34.0 | 18.6 | 36.1 | 31.4 | 32.7 |
| OTHER CEREALS | 26.2 | 35.9 | 13.8 | 30.5 | 34.3 | 35.7 |
| MEAT/POULTRY | 8.1 | 11.1 | 5.2 | 10.1 | 11.2 | 11.7 |
| MILK | 2.2 | 3.0 | 1.0 | 1.9 | 3.4 | 3.5 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.5 | 0.7 | 0.3 | 0.6 | 0.7 | 0.7 |
| PEANUTS, PEANUT-BUTTER | 11.0 | 15.1 | 7.5 | 14.6 | 14.8 | 15.4 |
| TUBERS, PLANTAIN | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 | 0.3 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 73.0 | 100.0 | 51.5 | 100.0 | 96.1 | 100.0 |
| N = | 617.0 | | 321.0 | | 296.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.48

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 24.5 | 32.1 | 18.5 | 33.8 | 28.6 | 31.2 |
| OTHER CEREALS | 28.6 | 37.4 | 21.0 | 38.8 | 34.4 | 38.2 |
| MEAT/POULTRY | 7.2 | 9.4 | 4.2 | 7.7 | 9.1 | 10.2 |
| MILK | 2.3 | 3.0 | 0.8 | 1.6 | 3.6 | 3.8 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.5 | 0.7 | 0.2 | 0.4 | 0.7 | 0.7 |
| PEANUTS, PEANUT-BUTTER | 13.1 | 17.1 | 9.9 | 18.3 | 16.7 | 17.6 |
| TUBERS, PLANTAIN | 0.2 | 0.3 | 0.2 | 0.4 | 0.3 | 0.3 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 76.4 | 100.0 | 54.7 | 100.0 | 95.0 | 100.0 |
| N = | 463.0 | | 211.0 | | 252.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.49

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: KATES

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 15.0 | 32.1 | 13.4 | 33.4 | 22.8 | 28.5 |
| OTHER CEREALS | 10.6 | 23.1 | 9.1 | 22.7 | 19.7 | 24.6 |
| MEAT/POULTRY | 7.0 | 15.0 | 5.9 | 14.7 | 12.5 | 15.6 |
| MILK | 1.4 | 3.0 | 1.2 | 3.0 | 2.7 | 3.4 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 1.4 | 3.0 | 1.2 | 3.0 | 2.2 | 2.7 |
| PEANUTS, PEANUT-BUTTER | 11.0 | 23.6 | 9.2 | 22.9 | 20.0 | 25.0 |
| TUBERS, PLANTAIN | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 46.7 | 100.0 | 40.1 | 100.0 | 80.1 | 100.0 |
| N = | 50.0 | | 42.4 | | 8.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

TABLE 5.50

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: KOULIKORO

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 28.4 | 33.8 | 17.6 | 37.8 | 32.5 | 33.2 |
| OTHER CEREALS | 36.8 | 43.8 | 19.5 | 41.9 | 43.2 | 44.1 |
| MEAT/POULTRY | 5.5 | 6.5 | 3.3 | 7.1 | 6.3 | 6.4 |
| MILK | 1.5 | 1.8 | 0.6 | 1.3 | 1.0 | 1.0 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 1.1 | 1.3 | 0.0 | 0.0 | 1.5 | 1.5 |
| PEANUTS, PEANUT-BUTTER | 10.0 | 12.0 | 5.5 | 11.8 | 12.5 | 12.8 |
| TUBERS, PLANTAIN | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 84.0 | 100.0 | 46.5 | 100.0 | 98.0 | 100.0 |
| N = | 48.0 | | 13.0 | | 35.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.51

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: SIKASSO

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 16.4 | 25.3 | 12.6 | [illegible] | 24.2 | 29.5 |
| OTHER CEREALS | 33.7 | 52.1 | 33.7 | 60.0 | 33.8 | 41.2 |
| MEAT/POULTRY | 6.5 | 10.0 | 4.1 | 7.3 | 11.3 | 13.8 |
| MILK | 1.7 | 2.6 | 0.6 | 1.1 | 3.3 | 4.0 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PEANUTS, PEANUT-BUTTER | 5.9 | 9.1 | 4.8 | 8.5 | 8.3 | 10.1 |
| TUBERS, PLANTAIN | 0.5 | 0.8 | 0.4 | 0.7 | 0.7 | 0.9 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 64.7 | 100.0 | 56.2 | 100.0 | 82.1 | 100.0 |
| N = | 40.0 | | 31.0 | | 18.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.52

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: SEGOU

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 23.2 | 26.4 | 15.0 | 25.5 | 28.9 | 26.0 |
| OTHER CEREALS | 35.8 | 40.7 | 24.8 | 45.6 | 42.0 | 38.7 |
| MEAT/POULTRY | 6.6 | 7.5 | 3.3 | 5.6 | 8.8 | 8.1 |
| MILK | 1.2 | 1.4 | 0.2 | 0.5 | 2.0 | 1.8 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.8 | 0.9 | 0.1 | 0.2 | 1.4 | 1.3 |
| PEANUTS, PEANUT-BUTTER | 19.8 | 22.5 | 13.0 | 22.1 | 24.6 | 22.8 |
| TUBERS, PLANTAIN | 0.5 | 0.6 | 0.3 | 0.5 | 0.7 | 0.6 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 87.9 | 100.0 | 58.8 | 100.0 | 108.6 | 100.0 |
| N = | 56.0 | | 24.0 | | 32.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.53

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: HOPTI

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 37.2 | 46.3 | 30.6 | 49.5 | 47.3 | 43.2 |
| OTHER CEREALS | 30.8 | 38.3 | 21.9 | 35.4 | 44.9 | 41.0 |
| MEAT/POULTRY | 6.1 | 7.6 | 4.1 | 6.6 | 9.5 | 8.7 |
| MILK | 3.0 | 3.7 | 1.7 | 2.8 | 4.9 | 4.5 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PEANUTS, PEANUT-BUTTER | 3.2 | 4.0 | 3.4 | 5.5 | 2.9 | 2.6 |
| TUBERS, PLANTAIN | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 80.4 | 100.0 | 61.8 | 100.0 | 109.6 | 100.0 |
| N = | 55.0 | | 32.9 | | 23.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

TABLE 5.54

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: TOMBOUCTOU

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 26.9 | 46.3 | 20.4 | 48.9 | 37.0 | 43.2 |
| OTHER CEREALS | 18.7 | 33.5 | 13.0 | 31.2 | 30.5 | 35.6 |
| MEAT/POULTRY | 9.9 | 17.7 | 7.5 | 18.0 | 15.4 | 18.0 |
| MILK | 1.2 | 2.1 | 0.6 | 1.4 | 2.6 | 3.0 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 | 0.0 |
| PEANUTS, PEANUT-BUTTER | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 |
| TUBERS, PLANTAIN | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 56.9 | 100.0 | 41.7 | 100.0 | 85.7 | 100.0 |
| N = | 54.0 | | 37.0 | | 17.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.55

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: GAO

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 35.7 | 42.0 | 24.8 | 42.9 | 51.4 | 41.4 |
| OTHER CEREALS | 28.0 | 32.9 | 18.5 | 31.9 | 41.0 | 33.0 |
| MEAT/POULTRY | 15.5 | 18.2 | 0.7 | 1.0 | 24.9 | 20.1 |
| MILK | 2.3 | 2.7 | 2.1 | 3.6 | 2.5 | 2.0 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.2 | 0.2 | 0.1 | 0.2 | 0.5 | 0.4 |
| PEANUTS, PEANUT-BUTTER | 3.1 | 3.6 | 3.6 | 6.2 | 2.5 | 2.0 |
| TUBERS, PLANTAIN | 0.2 | 0.2 | 0.1 | 0.2 | 0.4 | 0.3 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 85.0 | 100.0 | 58.0 | 100.0 | 124.1 | 100.0 |
| N = | 50.0 | | 20.0 | | 20.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 8.50

PROTEIN (GRAMS), AND PERCENTAGE OF PROTEIN OF MAJOR FOOD GROUPS PER DAY PER ADULT EQUIVALENT: ROUNDS 1, 2, AND 3

CITY: BAMAKO

| FOOD GROUP | AVERAGE PROTEIN (Grams) | AVERAGE % | POOR HOUSEHOLDS PROTEIN (Grams) | POOR HOUSEHOLDS % | WEALTHY HOUSEHOLDS PROTEIN (Grams) | WEALTHY HOUSEHOLDS % |
|---|---|---|---|---|---|---|
| RICE | 23.1 | 31.1 | 17.8 | 33.7 | 27.1 | 29.8 |
| OTHER CEREALS | 24.0 | 32.3 | 17.4 | 33.0 | 28.1 | 33.0 |
| MEAT/POULTRY | 8.0 | 10.8 | 4.8 | 8.7 | 10.7 | 11.8 |
| MILK | 2.7 | 3.6 | 0.9 | 1.7 | 4.1 | 4.5 |
| EGGS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OIL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LEGUMES | 0.5 | 0.7 | 0.4 | 0.8 | 0.5 | 0.6 |
| PEANUTS, PEANUT-BUTTER | 15.8 | 21.3 | 11.6 | 22.0 | 19.1 | 21.0 |
| TUBERS, PLANTAIN | 0.2 | 0.3 | 0.1 | 0.2 | 0.3 | 0.3 |
| SUGAR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL PROTEIN (GRAMS), PER DAY PER ADULT EQUIVALENT | 74.3 | 100.0 | 52.8 | 100.0 | 90.9 | 100.0 |
| N = | 255.0 | | 109.0 | | 146.0 | |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 5.59

CEREAL PRICES BY REGION AND ROUND: CFA/KILO

| CEREAL | FIVE SOUTHERN CITIES | KAYES | TOMBOUCTOU | GAO |
|---|---|---|---|---|
| RICE: | | | | |
| Average | 152 | 145.0 | 152.0 | 172.0 |
| Round 1 | 152 | 142.0 | 146.0 | 199.0 |
| Round 2 | 152 | 151.0 | 156.0 | 149.0 |
| Round 3 | 151 | 141.0 | 155.0 | 170.0 |
| MILLET: | | | | |
| Average | 94 | 121.0 | 139.0 | 138.0 |
| Round 1 | 107 | 112.0 | 161.0 | 174.0 |
| Round 2 | 84 | 122.0 | 140.0 | 138.0 |
| Round 3 | 80 | 129.0 | 115.0 | 104.0 |
| SORGHUM: | | | | |
| Average | 86 | 117.0 | 140.0 | 74.0 |
| Round 1 | 105 | 106.0 | 112.0 | 82.0 |
| Round 2 | 82 | 127.0 | 200.0 | 69.0 |
| Round 3 | 76 | 117.0 | 107.0 | 81.0 |
| MAIZE: | | | | |
| Average | 79 | 89.0 | 85.0 | 81.0 |
| Round 1 | 90 | 82.0 | 81.0 | 106.0 |
| Round 2 | 85 | 82.0 | 85.0 | 52.0 |
| Round 3 | 82 | 103.0 | 90.0 | 85.0 |

# APPENDIX 4

## TABLES: HOUSEHOLD AND EMPLOYMENT CHARACTERISTICS OF THE POOR

TABLE 6.4

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **SECTOR OF ACTIVITY CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Public Sector | 20.1 | 16.6 | 26.0 |
| Business/Commerce | 28.1 | 27.1 | 29.1 |
| Agriculture | 11.5 | 13.1 | 9.8 |
| Handicrafts | 12.8 | 11.8 | 13.9 |
| Other | 27.5 | 32.4 | 22.2 |
| **OCCUPATIONAL STATUS OF HOUSEHOLD MEMBER CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Employed: Formal | 38.2 | 33.3 | 43.6 |
| Employed: Informal | 51.1 | 52.3 | 49.7 |
| Unemployed | 10.8 | 14.4 | 6.8 |
| **HIGHEST LEVEL OF EDUCATION IN HOUSEHOLD** | | | |
| Elementary | 47.5 | 53.0 | 41.6 |
| Secondary | 27.4 | 28.0 | 26.7 |
| Technical Secondary | 18.0 | 16.3 | 20.9 |
| Superior, (College) | 7.1 | 3.7 | 10.8 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 617 | N = 321 | N = 296 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.6

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **SECTOR OF ACTIVITY CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Public Sector | 20.8 | 15.1 | 25.0 |
| Business/Commerce | 20.8 | 30.7 | 20.1 |
| Agriculture | 11.2 | 12.7 | 10.0 |
| Handicrafts | 12.7 | 10.8 | 14.3 |
| Other | 25.3 | 30.7 | 20.7 |
| **OCCUPATIONAL STATUS OF HOUSEHOLD MEMBER CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Employed: Formal | 39.7 | 34.9 | 43.8 |
| Employed: Informal | 50.5 | 51.4 | 49.8 |
| Unemployed | 9.8 | 13.7 | 6.4 |
| **HIGHEST LEVEL OF EDUCATION IN HOUSEHOLD** | | | |
| Elementary | 46.4 | 54.2 | 39.8 |
| Secondary | 27.8 | 27.8 | 27.6 |
| Technical Secondary | 17.1 | 12.3 | 21.1 |
| Superior, (College) | 8.9 | 5.7 | 11.6 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 463 | N = 212 | N = 251 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.8

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: KATES

| Percentage of Households In each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **SECTOR OF ACTIVITY CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Public Sector | 28.0 | 28.2 | 37.5 |
| Business/Commerce | 26.0 | 26.2 | 25.0 |
| Agriculture | 12.0 | 14.3 | 0.0 |
| Handicrafts | 12.0 | 14.3 | 0.0 |
| Other | 22.0 | 16.0 | 37.5 |
| **OCCUPATIONAL STATUS OF HOUSEHOLD MEMBERS CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Employed: Formal | 38.0 | 38.1 | 37.5 |
| Employed: Informal | 50.0 | 52.4 | 37.5 |
| Unemployed | 12.0 | 9.5 | 25.0 |
| **HIGHEST LEVEL OF EDUCATION IN HOUSEHOLD** | | | |
| Elementary | 32.0 | 33.3 | 25.0 |
| Secondary | 36.0 | 35.7 | 37.5 |
| Technical Secondary | 30.0 | 31.0 | 25.0 |
| Superior, (College) | 2.0 | 0.0 | 12.5 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 50 | N = 42 | N = 8 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

TABLE 6.7

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: TOMBOUCTOU

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| SECTOR OF ACTIVITY CONTRIBUTING THE MOST TO HOUSEHOLD INCOME: | | | |
| Public Sector | 16.6 | 10.8 | 28.4 |
| Business/Commerce | 13.6 | 13.5 | 11.8 |
| Agriculture | 14.8 | 13.5 | 17.6 |
| Handicrafts | 11.2 | 16.2 | 0.0 |
| Other | 44.5 | 46.0 | 41.2 |
| OCCUPATIONAL STATUS OF HOUSEHOLD MEMBER CONTRIBUTING THE MOST TO HOUSEHOLD INCOME: | | | |
| Employed: Formal | 33.2 | 24.3 | 52.9 |
| Employed: Informal | 50.1 | 56.6 | 35.3 |
| Unemployed | 16.7 | 19.0 | 11.8 |
| HIGHEST LEVEL OF EDUCATION IN HOUSEHOLD | | | |
| Elementary | 66.7 | 70.3 | 58.8 |
| Secondary | 22.2 | 24.3 | 17.6 |
| Technical Secondary | 9.2 | 5.4 | 17.6 |
| Superior, (College) | 1.6 | 0.0 | 5.9 |
| Other | 0.0 | 0.0 | 0.1 |
| N = # OF HOUSEHOLDS | | N = 37 | N = 17 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.8

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **SECTOR OF ACTIVITY CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Public Sector | 8.0 | 10.0 | 5.0 |
| Business/Commerce | 30.0 | 20.0 | 45.0 |
| Agriculture | 10.0 | 13.3 | 5.0 |
| Handicrafts | 16.0 | 10.0 | 25.0 |
| Other | 36.0 | 46.7 | 20.0 |
| **OCCUPATIONAL STATUS OF HOUSEHOLD MEMBER CONTRIBUTING THE MOST TO HOUSEHOLD INCOME:** | | | |
| Employed: Formal | 30.0 | 26.7 | 35.0 |
| Employed: Informal | 58.0 | 53.3 | 65.0 |
| Unemployed | 12.0 | 20.0 | 0.0 |
| **HIGHEST LEVEL OF EDUCATION IN HOUSEHOLD** | | | |
| Elementary | 52.0 | 50.0 | 55.0 |
| Secondary | 22.0 | 23.3 | 20.0 |
| Technical Secondary | 24.0 | 26.7 | 20.0 |
| Superior, (College) | 2.0 | 0.0 | 5.0 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 50 | N = 30 | N = 20 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.10

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| Percentage of Household Heads in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MARITAL STATUS:** | | | |
| 1 Wife/Spouse | 55.1 | 52.9 | 57.0 |
| 2 Wives | 26.9 | 29.2 | 25.0 |
| 3 Wives | 8.0 | 7.5 | 8.4 |
| 4 Wives | 2.4 | 0.9 | 3.6 |
| Divorced | 0.9 | 0.5 | 1.2 |
| Widowed | 4.5 | 6.6 | 2.8 |
| Single | 2.2 | 2.4 | 2.0 |
| **SEX** | | | |
| Male | 89.6 | 89.6 | 89.6 |
| Female | 10.4 | 10.4 | 10.4 |
| **SECTOR OF ACTIVITY:** | | | |
| Public Sector | 15.0 | 10.7 | 18.7 |
| Business/Commerce | 45.6 | 44.2 | 46.8 |
| Agriculture | 13.9 | 16.8 | 11.5 |
| Handicrafts | 3.3 | 3.6 | 3.0 |
| Health/Medical | 1.6 | 1.5 | 1.7 |
| Military | 3.9 | 4.1 | 3.8 |
| Religious Professions | 2.1 | 4.1 | 0.4 |
| Other | 14.5 | 15.8 | 14.1 |
| **STATUS OF EMPLOYMENT:** | | | |
| Employed: Formal | 40.0 | 36.5 | 43.0 |
| Employed: Informal | 48.9 | 51.3 | 46.8 |
| Unemployed | 11.1 | 12.2 | 10.2 |
| **LEVEL OF EDUCATION:** | | | |
| None | 59.0 | 86.0 | 54.5 |
| Elementary | 12.7 | 13.7 | 11.9 |
| Secondary | 9.9 | 8.1 | 11.5 |
| Technical Secondary | 10.2 | 5.1 | 14.5 |
| Superior, (College) | 4.6 | 3.0 | 6.4 |
| Religious | 1.0 | 3.0 | 0.0 |
| Other | 0.7 | 1.1 | 0.3 |
| N = # OF HOUSEHOLDS | N = 463 | N = 212 | N = 251 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 0.11

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: KAYES

| Percentage of Household Heads in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MARITAL STATUS:** | | | |
| 1 Wife/Spouse | 40.0 | 33.3 | 75.0 |
| 2 Wives | 20.0 | 23.8 | 0.0 |
| 3 Wives | 24.0 | 28.2 | 12.5 |
| 4 Wives | 0.0 | 0.0 | 0.0 |
| Divorced | 0.0 | 0.0 | 0.0 |
| Widowed | 14.0 | 14.3 | 12.5 |
| Single | 2.0 | 2.4 | 0.0 |
| **SEX** | | | |
| Male | 94.0 | 92.9 | 100.0 |
| Female | 6.0 | 7.1 | 0.0 |
| **SECTOR OF ACTIVITY:** | | | |
| Public Sector | 14.0 | 16.4 | 12.5 |
| Business/Commerce | 29.7 | 28.2 | 37.5 |
| Agriculture | 10.8 | 12.8 | 0.0 |
| Handicrafts | 4.3 | 5.1 | 0.0 |
| Health/Medical | 4.2 | 2.6 | 12.5 |
| Military | 6.3 | 5.1 | 12.5 |
| Religious Professions | 0.0 | 0.0 | 0.0 |
| Other | 29.0 | 30.8 | 25.0 |
| **STATUS OF EMPLOYMENT:** | | | |
| Employed: Formal | 27.5 | 25.6 | 37.5 |
| Employed: Informal | 48.0 | 48.7 | 50.0 |
| Unemployed | 23.6 | 25.7 | 12.5 |
| **LEVEL OF EDUCATION:** | | | |
| None | 55.6 | 59.0 | 37.5 |
| Elementary | 23.4 | 13.1 | 35.0 |
| Secondary | 6.5 | 7.7 | 0.0 |
| Technical Secondary | 14.6 | 10.2 | 27.5 |
| Superior, (College) | 0.0 | 0.0 | 0.0 |
| Religious | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| N = # OF HOUSEHOLDS | N = 50 | N = 42 | N = 8 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 0.12

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: TOMPOUCTOU

| Percentage of Household Heads in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MARITAL STATUS:** | | | |
| 1 Wife/Spouse | 77.7 | 73.0 | 88.2 |
| 2 Wives | 11.1 | 10.8 | 11.8 |
| 3 Wives | 3.7 | 5.4 | 0.0 |
| 4 Wives | 3.7 | 5.4 | 0.0 |
| Divorced | 0.0 | 0.0 | 0.0 |
| Widowed | 3.7 | 5.4 | 0.0 |
| Single | 0.0 | 0.0 | 0.0 |
| **SEX.** | | | |
| Male | 72.1 | 64.9 | 88.2 |
| Female | 27.9 | 35.1 | 11.8 |
| **SECTOR OF ACTIVITY:** | | | |
| Public Sector | 0.3 | 0.3 | 0.3 |
| Business/Commerce | 18.6 | 15.9 | 18.8 |
| Agriculture | 21.3 | 18.1 | 6.3 |
| Handicrafts | 8.0 | 3.1 | 18.8 |
| Health/Medical | 8.2 | 0.3 | 12.5 |
| Military | 0.0 | 0.0 | 0.0 |
| Religious Professions | 8.2 | 8.3 | 12.5 |
| Other | 31.4 | 34.3 | 24.8 |
| **STATUS OF EMPLOYMENT:** | | | |
| Employed: Formal | 34.9 | 28.1 | 50.0 |
| Employed: Informal | 39.8 | 40.8 | 37.5 |
| Unemployed | 25.5 | 31.3 | 12.5 |
| **LEVEL OF EDUCATION:** | | | |
| None | 71.2 | 78.1 | 56.3 |
| Elementary | 14.6 | 15.6 | 12.5 |
| Secondary | 4.1 | 3.1 | 0.3 |
| Technical Secondary | 8.0 | 3.1 | 18.8 |
| Superior, (College) | 0.0 | 0.0 | 0.0 |
| Religious | 1.9 | 0.0 | 8.1 |
| Other | 0.1 | 0.1 | 0.0 |
| N = # OF HOUSEHOLDS | N = 54 | N = 37 | N = 17 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.13

HEAD OF HOUSEHOLD CHARACTERISTICS, BY EXPENDITURE GROUP:

CITY: GAO

| Percentage of Household Heads in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **MARITAL STATUS:** | | | |
| 1 Wife/Spouse | 62.1 | 50.1 | 80.0 |
| 2 Wives | 26.0 | 30.0 | 20.0 |
| 3 Wives | 8.0 | 13.3 | 0.0 |
| 4 Wives | 0.0 | 0.0 | 0.0 |
| Divorced | 0.0 | 0.0 | 0.0 |
| Widowed | 2.0 | 3.3 | 0.0 |
| Single | 2.0 | 3.3 | 0.0 |
| **SEX** | | | |
| Male | 98.0 | 96.7 | 100.0 |
| Female | 2.0 | 3.3 | 0.0 |
| **SECTOR OF ACTIVITY:** | | | |
| Public Sector | 6.3 | 7.1 | 5.0 |
| Business/Commerce | 41.0 | 25.0 | 55.0 |
| Agriculture | 27.4 | 35.7 | 15.0 |
| Handicrafts | 6.2 | 3.6 | 10.0 |
| Health/Medical | 4.2 | 3.6 | 5.0 |
| Military | 0.0 | 0.0 | 0.0 |
| Religious Professions | 2.2 | 3.6 | 0.0 |
| Other | 12.8 | 21.4 | 0.0 |
| **STATUS OF EMPLOYMENT:** | | | |
| Employed: Formal | 22.7 | 17.9 | 30.0 |
| Employed: Informal | 70.8 | 71.4 | 70.0 |
| Unemployed | 6.4 | 10.7 | 0.0 |
| **LEVEL OF EDUCATION:** | | | |
| None | 86.8 | 71.4 | 90.0 |
| Elementary | 16.3 | 7.1 | 10.0 |
| Secondary | 8.4 | 10.7 | 5.0 |
| Technical Secondary | 6.3 | 7.1 | 5.0 |
| Superior, (College) | 2.2 | 3.6 | 0.0 |
| Religious | 0.0 | 0.0 | 0.0 |
| Other | 0.1 | 0.1 | 0.0 |
| N = # OF HOUSEHOLDS | N = 50 | N = 30 | N = 20 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.16

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.5 | 2.9 | 5.8 |
| BUSINESS/COMMERCE | 20.9 | 19.8 | 21.8 |
| AGRICULTURE | 5.1 | 6.1 | 4.3 |
| HANDICRAFTS | 2.0 | 2.0 | 2.1 |
| HEALTH/MEDICAL | 1.7 | 1.1 | 2.1 |
| MILITARY | 4.6 | 4.7 | 4.4 |
| SECONDARY EDUCATION (Student) | 10.1 | 10.8 | 10.4 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 6.6 | 5.2 | 7.6 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 3.8 | 4.0 | 3.6 |
| RELIGIOUS EDUCATION (Student) | 4.6 | 5.2 | 4.1 |
| RELIGIOUS PROFESSIONS | 1.4 | 1.2 | 1.5 |
| HOUSEHOLD SERVICES | 3.4 | 3.3 | 3.6 |
| HOUSEWIFE | 21.4 | 22.7 | 20.3 |
| OTHER | 9.4 | 11.0 | 8.4 |
| N = | 3003 | 1315 | 1688 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.1

MPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN
ECONDARY SECTORS OF ACTIVITY. BY EXPENDITURE GROUP.

ITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.3 | 5.3 | 3.4 |
| BUSINESS/COMMERCE | 2.8 | 3.3 | 2.3 |
| AGRICULTURE | 1.7 | 2.7 | 1.0 |
| HANDICRAFTS | 3.9 | 4.0 | 3.8 |
| HEALTH/MEDICAL | 0.2 | 0.4 | 0.1 |
| MILITARY | 0.1 | 0.2 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.1 | 0.2 | 0.1 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 2.5 | 2.8 | 2.3 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.1 | 0.1 | 0.1 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.1 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.8 | 0.9 | 0.7 |
| HOUSEWIFE | 4.2 | 3.3 | 4.8 |
| NO SECONDARY SECTOR OF ACTIVITY | 79.3 | 76.2 | 81.3 |
| N = | 3003.0 | 1316.0 | 888.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.18

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: BAMAKO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.7 | 3.3 | 5.7 |
| BUSINESS/COMMERCE | 20.8 | 20.6 | 21.0 |
| AGRICULTURE | 3.6 | 4.3 | 2.0 |
| HANDICRAFTS | 2.0 | 2.3 | 1.7 |
| HEALTH/MEDICAL | 1.1 | 0.3 | 2.3 |
| MILITARY | 4.1 | 4.6 | 4.8 |
| SECONDARY EDUCATION (Student) | 10.1 | 9.8 | 10.4 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 7.4 | 6.5 | 8.1 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 4.5 | 2.3 | 5.6 |
| RELIGIOUS EDUCATION (Student) | 4.8 | 5.7 | 4.1 |
| RELIGIOUS PROFESSIONS | 1.8 | 1.6 | 2.1 |
| HOUSEHOLD SERVICES | 2.7 | 2.6 | 2.6 |
| HOUSEWIFE | 20.4 | 22.1 | 19.2 |
| OTHER | 10.8 | 12.0 | 9.8 |
| N = | 1737 | 737 | 1000 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.10

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: BAMAKO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 2.5 | 2.7 | 2.4 |
| BUSINESS/COMMERCE | 1.0 | 2.3 | 1.1 |
| AGRICULTURE | 0.6 | 1.1 | 0.2 |
| HANDICRAFTS | 3.7 | 4.2 | 3.3 |
| HEALTH/MEDICAL | 0.1 | 0.3 | 0.0 |
| MILITARY | 0.1 | 0.1 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.2 | 0.3 | 0.1 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 2.4 | 3.0 | 2.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.1 | 0.0 | 0.1 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.6 | 0.5 | 0.6 |
| HOUSEWIFE | 3.4 | 3.5 | 3.3 |
| NO SECONDARY SECTOR OF ACTIVITY | 84.7 | 82.0 | 86.0 |
| N = | 1737.0 | 737.0 | 1000.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.20

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SUMMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: KOULIKORO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 6.3 | 4.8 | 7.1 |
| BUSINESS/COMMERCE | 15.4 | 18.1 | 14.1 |
| AGRICULTURE | 4.7 | 1.2 | 6.5 |
| HANDICRAFTS | 4.3 | 3.6 | 4.7 |
| HEALTH/MEDICAL | 0.8 | 2.4 | 0.0 |
| MILITARY | 4.3 | 2.4 | 5.3 |
| SECONDARY EDUCATION (Student) | 13.4 | 13.3 | 13.1 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 5.5 | 1.2 | 7.6 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 2.0 | 0.6 | 2.9 |
| RELIGIOUS EDUCATION (Student) | 4.3 | 0.0 | 3.5 |
| RELIGIOUS PROFESSIONS | 0.8 | 0.6 | 1.2 |
| HOUSEHOLD SERVICES | 0.1 | 1.2 | 0.0 |
| HOUSEWIFE | 24.0 | 25.3 | 24.7 |
| OTHER | 12.5 | 20.5 | 8.3 |
| N = | 253 | 83 | 170 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.21

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: KOULIKORO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.7 | 3.6 | 5.3 |
| BUSINESS/COMMERCE | 2.4 | 1.2 | 2.8 |
| AGRICULTURE | 3.6 | 9.6 | 0.0 |
| HANDICRAFTS | 4.7 | 1.2 | 6.5 |
| HEALTH/MEDICAL | 0.4 | 0.0 | 0.6 |
| MILITARY | 0.0 | 0.0 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 3.2 | 2.4 | 3.5 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.0 | 0.0 | 0.0 |
| HOUSEWIFE | 2.0 | 0.0 | 1.2 |
| NO SECONDARY SECTOR OF ACTIVITY | 78.2 | 76.0 | 79.4 |
| N = | 253.0 | 83.0 | 170.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.22

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: SIKASSO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 2.3 | 0.9 | 4.2 |
| BUSINESS/COMMERCE | 26.8 | 18.8 | 37.1 |
| AGRICULTURE | 9.4 | 9 | 9.0 |
| HANDICRAFTS | 0.8 | 0.9 | 0.6 |
| HEALTH/MEDICAL | 1.8 | 1.4 | 2.4 |
| MILITARY | 4.2 | 5.0 | 3.0 |
| SECONDARY EDUCATION (Student) | 10.4 | 14.1 | 4.8 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 3.4 | 2.1 | 4.8 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 2.3 | 3.7 | 0.6 |
| RELIGIOUS EDUCATION (Student) | 3.1 | 1.7 | 2.4 |
| RELIGIOUS PROFESSIONS | 0.3 | 0.5 | 0.0 |
| HOUSEHOLD SERVICES | 3.1 | 2.8 | 3.6 |
| HOUSEWIFE | 23.4 | 24.8 | 21.6 |
| OTHER | 8.7 | 10.0 | 5.9 |
| N = | 385 | 218 | 167 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.28

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: SIKASSO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 8.6 | 10.8 | 6.0 |
| BUSINESS/COMMERCE | 4.9 | 6.9 | 2.4 |
| AGRICULTURE | 4.2 | 5.0 | 3.0 |
| HANDICRAFTS | 2.9 | 4.1 | 1.2 |
| HEALTH/MEDICAL | 0.3 | 0.5 | 0.0 |
| MILITARY | 0.0 | 0.0 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 3.4 | 4.1 | 2.4 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | .0 |
| HOUSEHOLD SERVICES | 0.3 | 1.5 | 1.0 |
| HOUSEWIFE | 9.0 | .2 | 18.3 |
| NO SECONDARY SECTOR OF ACTIVITY | 66.4 | 55.1 | 66.2 |
| N = | 385.0 | 218.0 | 167.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.24

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: SEGOU

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | HEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 6.6 | 2.3 | 8.2 |
| BUSINESS/COMMERCE | 22.0 | 19.8 | 12.8 |
| AGRICULTURE | 5.0 | 8.1 | 3.9 |
| HANDICRAFTS | 0.9 | 1.2 | 0.0 |
| HEALTH/MEDICAL | 1.3 | 0.0 | 1.7 |
| MILITARY | 3.8 | 3.5 | 1.0 |
| SECONDARY EDUCATION (Student) | 13.2 | 14.0 | 12.9 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 6.0 | 3.5 | 7.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 1.9 | 3.5 | 1.3 |
| RELIGIOUS EDUCATION (Student) | 6.3 | 3.5 | 7.3 |
| RELIGIOUS PROFESSIONS | 0.9 | 1.2 | 0.9 |
| HOUSEHOLD SERVICES | 7.5 | 5.8 | 8.2 |
| HOUSEWIFE | 17.3 | 22.1 | 15.5 |
| OTHER | 6.7 | 11.5 | 4.7 |
| N = | 316 | 86 | 232 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.26

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: SEGOU

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.1 | 4.7 | 3.8 |
| BUSINESS/COMMERCE | 3.8 | 0.0 | 5.2 |
| AGRICULTURE | 2.2 | 3.5 | 2.0 |
| HANDICRAFTS | 6.6 | 7.0 | 6.5 |
| HEALTH/MEDICAL | 0.2 | 1.2 | 0.0 |
| MILITARY | 0.6 | 2.3 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.2 | 0.0 | 0.4 |
| TECHNICAL SECONDARY EDUCATION. (Student) | 3.1 | 3.5 | 2.0 |
| SUPERIOR/COLLEGE EDUCATION. (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.2 | 0.0 | 0.4 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 2.2 | 2.3 | 2.2 |
| HOUSEWIFE | 6.0 | 9.3 | 7.1 |
| NO SECONDARY SECTOR OF ACTIVITY | 68.0 | 72.2 | 67.2 |
| N = | 212.0 | 86.0 | 232.0 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5

Wealthy = Expenditure Deciles 6 - 11

TABLE 6.26

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: MOPTI

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | HEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 2.9 | 3.1 | 2.5 |
| BUSINESS/COMMERCE | 19.0 | 20.4 | 16.8 |
| AGRICULTURE | 8.7 | 10.5 | 5.9 |
| HANDICRAFTS | 2.9 | 1.0 | 5.9 |
| HEALTH/MEDICAL | 1.6 | 1.0 | 2.1 |
| MILITARY | 4.2 | 4.7 | 3.4 |
| SECONDARY EDUCATION (Student) | 8.4 | 8.4 | 8.4 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 6.1 | 5.2 | 7.6 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 3.5 | 5.2 | 0.8 |
| RELIGIOUS EDUCATION (Student) | 3.9 | 5.2 | 1.7 |
| RELIGIOUS PROFESSIONS | 1.3 | 1.6 | 0.8 |
| HOUSEHOLD SERVICES | 6.1 | 1.3 | 5.9 |
| HOUSEWIFE | 27.4 | 24.6 | 31.9 |
| OTHER | 4.0 | 2.8 | 5.9 |
| N = | 310 | 191 | 119 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.27

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: MOPTI

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 4.8 | 5.2 | 4.2 |
| BUSINESS/COMMERCE | 6.1 | 6.3 | 5.9 |
| AGRICULTURE | 3.2 | 4.7 | 0.8 |
| HANDICRAFTS | 2.9 | 3.1 | 2.5 |
| HEALTH/MEDICAL | 0.3 | [illegible] | 0.0 |
| MILITARY | 0.0 | 0.0 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 1.0 | 2.6 | 0.8 |
| HOUSEWIFE | 1.0 | 2.6 | 0.8 |
| NO SECONDARY SECTOR OF ACTIVITY | 78.9 | 75.0 | 85.0 |
| N = | 310.0 | 191.0 | 119.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.28

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: KAYES

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 5.3 | 4.3 | 15.0 |
| BUSINESS/COMMERCE | 15.4 | 15.0 | 10.0 |
| AGRICULTURE | 5.9 | 6.5 | 0.0 |
| HANDICRAFTS | 1.8 | 1.9 | 0.0 |
| HEALTH/MEDICAL | 1.5 | 1.4 | 2.5 |
| MILITARY | 3.3 | 3.4 | 2.5 |
| SECONDARY EDUCATION (Student) | 12.7 | 12.5 | 15.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 4.4 | 4.8 | 0.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 2.9 | 3.1 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 3.1 | 3.1 | 2.5 |
| RELIGIOUS PROFESSIONS | 1.3 | 1.2 | 2.5 |
| HOUSEHOLD SERVICES | 0.7 | 0.7 | 0.0 |
| HOUSEWIFE | 31.4 | 31.1 | 35.0 |
| OTHER | 10.3 | 10.1 | 15.0 |
| N = | 455 | 415 | 40 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.20

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: KATES

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 2.8 | 2.7 | 5.0 |
| BUSINESS/COMMERCE | 2.0 | 1.4 | 7.5 |
| AGRICULTURE | 2.4 | 2.2 | 0.0 |
| HANDICRAFTS | 2.2 | 2.2 | 2.5 |
| HEALTH/MEDICAL | 0.2 | 1.2 | 0.0 |
| MILITARY | 0.4 | 0.5 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.2 | 0.2 | 0.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 1.3 | 1.4 | 0.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.4 | 0.5 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.9 | 0.0 | 0.0 |
| HOUSEWIFE | 0.4 | 1.5 | 0.0 |
| NO SECONDARY SECTOR OF ACTIVITY | 87.8 | 88.2 | 80.0 |
| N = | 455.0 | 415.0 | 40.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 8 - 10

TABLE 6.30

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: TOMBOUCTOU

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 2.7 | 1.2 | 5.1 |
| BUSINESS/COMMERCE | 10.7 | 14.7 | 4.0 |
| AGRICULTURE | 7.3 | 11.0 | 1.0 |
| HANDICRAFTS | 3.4 | 3.7 | 3.0 |
| HEALTH/MEDICAL | 1.1 | 0.0 | 2.0 |
| MILITARY | 7.6 | 8.0 | 7.1 |
| SECONDARY EDUCATION (Student) | 14.1 | 11.7 | 18.2 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 6.5 | 4.9 | 9.1 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 3.4 | 2.5 | 5.1 |
| RELIGIOUS EDUCATION (Student) | 2.3 | 0.0 | 5.1 |
| RELIGIOUS PROFESSIONS | 4.2 | 4.3 | 4.0 |
| HOUSEHOLD SERVICES | 9.8 | 6.7 | 14.1 |
| HOUSEWIFE | 19.5 | 20.9 | 17.2 |
| OTHER | 7.7 | 9.2 | 5.0 |
| N = | 262 | 163 | 99 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5

TABLE 6.31

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: TOMBOUCTOU

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 3.4 | 4.3 | 2.0 |
| BUSINESS/COMMERCE | 5.0 | 6.7 | 2.0 |
| AGRICULTURE | 0.8 | 1.2 | 0.0 |
| HANDICRAFTS | 5.0 | 6.1 | 3.0 |
| HEALTH/MEDICAL | 0.4 | 0.6 | 0.0 |
| MILITARY | 0.4 | 0.6 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.4 | 0.0 | 1.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 1.5 | 1.8 | 1.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 3.4 | 3.7 | 3.0 |
| HOUSEWIFE | 0.8 | 1.2 | 0.0 |
| NO SECONDARY SECTOR OF ACTIVITY | 78.8 | 73.8 | 88.0 |
| N = | 262.0 | 163.6 | 99.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 1(

TABLE 6.32

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN PRIMARY SECTORS OF ACTIVITY, BY EXPENDITURE GROUP.

CITY: GAO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 1.9 | 1.2 | 3.4 |
| BUSINESS/COMMERCE | 12.5 | 10.0 | 17.9 |
| AGRICULTURE | 10.0 | 12.0 | 8.5 |
| HANDICRAFTS | 1.9 | 0.0 | 4.3 |
| HEALTH/MEDICAL | 0.8 | 0.4 | 1.7 |
| MILITARY | 2.7 | 1.6 | 5.1 |
| SECONDARY EDUCATION (Student) | 7.9 | 6.0 | 12.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 2.5 | 1.6 | 4.3 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 3.3 | 2.8 | 4.3 |
| RELIGIOUS EDUCATION (Student) | 3.0 | 3.2 | 2.6 |
| RELIGIOUS PROFESSIONS | 1.4 | 0.8 | 2.6 |
| HOUSEHOLD SERVICES | 1.9 | 1.6 | 2.6 |
| HOUSEWIFE | 34.3 | 38.0 | 26.5 |
| OTHER | 15.0 | 20.0 | 4.2 |
| N = | 367 | 250 | 117 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.33

EMPLOYMENT CHARACTERISTICS OF SURVEY HOUSEHOLDS: % OF MEMBERS IN SECONDARY SECTORS OF ACTIVITY. BY EXPENDITURE GROUP.

CITY: GAO

| SECTORS OF ACTIVITY | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| PUBLIC SECTOR | 3.0 | 2.0 | 5.1 |
| BUSINESS/COMMERCE | 0.3 | 0.3 | 0.0 |
| AGRICULTURE | 1.0 | 1.2 | 3.4 |
| HANDICRAFTS | 0.5 | 0.4 | 0.0 |
| HEALTH/MEDICAL | 0.0 | 0.0 | 0.0 |
| MILITARY | 0.0 | 0.0 | 0.0 |
| SECONDARY EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| TECHNICAL SECONDARY EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| SUPERIOR/COLLEGE EDUCATION, (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS EDUCATION (Student) | 0.0 | 0.0 | 0.0 |
| RELIGIOUS PROFESSIONS | 0.0 | 0.0 | 0.0 |
| HOUSEHOLD SERVICES | 0.0 | 0.0 | 0.0 |
| HOUSEWIFE | 0.3 | 0.4 | 0.0 |
| NO SECONDARY SECTOR OF ACTIVITY | 93.5 | 95.2 | 89.7 |
| N = | 587.0 | 250.0 | 117.0 |

N = # OF HOUSEHOLD MEMBERS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.30

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP

PRIMARY SECTOR OF ACTIVITY

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 18.6 | 15.6 | 20.0 |
| EMPLOYED IN INFORMAL SECTOR | 26.8 | 27.1 | 26.6 |
| UNEMPLOYED | 54.6 | 57.[illegible] | 52.5 |
| N = | 3003 | 1315 | 1681 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.30

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: BAMAKO

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 18.0 | 16.1 | 19.4 |
| EMPLOYED IN INFORMAL SECTOR | 26.0 | 25.9 | 26.1 |
| UNEMPLOYED | 56.0 | 58.0 | 54.5 |
| N = | 1737 | 737 | 1000 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.40

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: KOULIKORO

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 14.6 | 13.3 | 15.3 |
| EMPLOYED IN INFORMAL SECTOR | 23.3 | 20.5 | 24.7 |
| UNEMPLOYED | 62.1 | 66.2 | 60.0 |
| N = | 253 | 83 | 170 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 -.10

TABLE 6.41

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: SIKASSO

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 21.0 | 13.3 | 31.3 |
| EMPLOYED IN INFORMAL SECTOR | 27.8 | 27.1 | 28.7 |
| UNEMPLOYED | 51.2 | 59.6 | 40.0 |
| N = | 385 | 218 | 167 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.42

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: SEGOU

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 23.0 | 17.4 | 25.0 |
| EMPLOYED IN INFORMAL SECTOR | 26.7 | 23.3 | 28.0 |
| UNEMPLOYED | 50.3 | 59.3 | 47.0 |
| N = | 318 | 80 | 232 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.43

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: MOPTI

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 17.7 | 16.6 | 19.3 |
| EMPLOYED IN INFORMAL SECTOR | 31.6 | 34.0 | 27.7 |
| UNEMPLOYED | 50.7 | 49.2 | 53.0 |
| N = | 310 | 191 | 119 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.44

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: KATES

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 10.5 | 9.6 | 20.0 |
| EMPLOYED IN INFORMAL SECTOR | 24.8 | 26.0 | 12.5 |
| UNEMPLOYED | 64.7 | 64.4 | 67.5 |
| N = | 455 | 415 | 40 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.45

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: TORRONCTON

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 22.6 | 20.0 | 25.3 |
| EMPLOYED IN INFORMAL SECTOR | 28.4 | 31.9 | 26.3 |
| UNEMPLOYED | 48.1 | 47.2 | 48.4 |
| N = | 262 | 183 | 99 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.46

EMPLOYMENT CHARACTERISTICS:
STATUS OF EMPLOYMENT OF ADULT HOUSEHOLD MEMBERS, (%), BY EXPENDITURE GROUP:

PRIMARY SECTOR OF ACTIVITY

CITY: GAO

| STATUS | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| EMPLOYED IN FORMAL SECTOR | 12.5 | 8.4 | 21.4 |
| EMPLOYED IN INFORMAL SECTOR | 24.3 | 22.8 | 27.4 |
| UNEMPLOYED | 63.2 | 68.8 | 51.2 |
| N = | 367 | 250 | 117 |

N = # OF HOUSEHOLD MEMBERS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

EMPLOYMENT CHARACTERISTICS:

PERCENTAGE OF UNEMPLOYED ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE QUARTILE — TABLE 6.47

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | QUARTILE 1 | QUARTILE 2 | QUARTILE 3 | QUARTILE 4 |
|---|---|---|---|---|---|
| ROUND 1 | 58.7 | 59.4 | 62.5 | 58.6 | 53.0 |
| ROUND 2 | 57.0 | 59.2 | 59.7 | 54.7 | 52.0 |
| ROUND 3 | 56.2 | 62.7 | 57.8 | 56.1 | 51.1 |

TABLE 6.48

EMPLOYMENT CHARACTERISTICS:

PERCENTAGE OF UNEMPLOYED ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| ROUND 1 | 58.7 | 60.7 | 56.1 |
| ROUND 2 | 57.0 | 59.4 | 53.9 |
| ROUND 3 | 56.2 | 59.3 | 53.5 |

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.51

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 52.0 | 58.4 | 44.9 |
| ELEMENTARY | 18.0 | 16.8 | 19.2 |
| SECONDARY | 17.8 | 15.1 | 20.7 |
| TECHNICAL SECONDARY | 8.1 | 5.8 | 10.6 |
| SUPERIOR/COLLEGE | 2.0 | 1.3 | 2.7 |
| RELIGIOUS | 2.1 | 2.4 | 1.8 |
| OTHER | 0.2 | 0.2 | 0.1 |
| N = | 4087 | 2143 | 1944 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.52

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 5 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, MOPTI, KAYES, TOMBOUCTOU, AND GAO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 35.4 | 40.2 | 29.4 |
| ELEMENTARY | 46.4 | 41.6 | 52.6 |
| SECONDARY | 9.5 | 8.5 | 10.0 |
| RELIGIOUS | 8.7 | 8.7 | 7.8 |
| N = | 2075 | 1158 | 917 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 0.53

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 50.0 | 54.3 | 45.2 |
| ELEMENTARY | 17.3 | 15.3 | 19.0 |
| SECONDARY | 18.3 | 15.7 | 20.4 |
| TECHNICAL SECONDARY | 0.0 | 0.0 | 10.4 |
| SUPERIOR/COLLEGE | 2.6 | 2.0 | 3.0 |
| RELIGIOUS | 2.7 | 3.5 | 2.0 |
| OTHER | 0.2 | 0.3 | 0.0 |
| N = | 3003 | 1316 | 1688 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.34

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 6 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 31.3 | 34.5 | 28.2 |
| ELEMENTARY | 48.1 | 42.5 | 53.4 |
| SECONDARY | 10.3 | 10.6 | 10.1 |
| RELIGIOUS | 10.3 | 12.4 | 8.3 |
| N = | 1690 | 783 | 817 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.66

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: BAMAKO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 46.4 | 54.0 | 40.8 |
| ELEMENTARY | 16.1 | 18.4 | 19.3 |
| SECONDARY | 19.9 | 16.7 | 22.9 |
| TECHNICAL SECONDARY | 10.4 | 8.7 | 11.0 |
| SUPERIOR/COLLEGE | 3.4 | 2.0 | 4.5 |
| RELIGIOUS | 1.8 | 3.1 | 0.9 |
| OTHER | 0.0 | 0.1 | 0.0 |
| N = | 1737 | 737 | 1000 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.56

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 5 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITY: BARAKO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 30.5 | 35.9 | 25.4 |
| ELEMENTARY | 54.3 | 45.3 | 62.7 |
| SECONDARY | 9.7 | 10.4 | 9.2 |
| RELIGIOUS | 5.5 | 8.4 | 2.7 |
| N = | 862 | 417 | 445 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.57

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: KOULIKORO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 43.1 | 45.8 | 41.8 |
| ELEMENTARY | 21.3 | 16.9 | 23.5 |
| SECONDARY | 22.9 | 21.7 | 23.5 |
| TECHNICAL SECONDARY | 5.5 | 2.4 | 7.1 |
| SUPERIOR/COLLEGE | 1.6 | 2.4 | 1.2 |
| RELIGIOUS | 3.6 | 6.0 | 2.4 |
| OTHER | 1.0 | 4.8 | 0.5 |
| N = | 252.0 | 83.0 | 170.0 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.50

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 5 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITY: KOULIKORO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 17.3 | 15.2 | 10.7 |
| ELEMENTARY | 64.0 | 57.0 | 68.4 |
| SECONDARY | 10.8 | 15.1 | 6.8 |
| RELIGIOUS | 7.9 | 12.1 | 6.1 |
| N = | 139 | 166 | 73 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 0.50

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: SIKASSO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 46.5 | 50.0 | 41.9 |
| ELEMENTARY | 22.3 | 17.9 | 28.1 |
| SECONDARY | 18.7 | 20.2 | 16.8 |
| TECHNICAL SECONDARY | 7.0 | 4.1 | 10.8 |
| SUPERIOR/COLLEGE | 1.0 | 2.3 | 0.0 |
| RELIGIOUS | 3.9 | 5.5 | 1.0 |
| OTHER | 0.0 | 0.0 | 0.0 |
| N = | 305 | 218 | 107 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.00

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 6 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITY: SIKASSO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 30.1 | 31.3 | 28.3 |
| ELEMENTARY | 41.1 | 39.3 | 43.4 |
| SECONDARY | 6.3 | 5.8 | 7.1 |
| RELIGIOUS | 22.5 | 23.5 | 21.2 |
| N = | 253 | 140 | 113 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.61

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: SEGOU

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 58.8 | 64.0 | 56.0 |
| ELEMENTARY | 12.3 | 16.1 | 11.2 |
| SECONDARY | 15.7 | 16.1 | 16.9 |
| TECHNICAL SECONDARY | 6.9 | 3.6 | 8.3 |
| SUPERIOR/COLLEGE | 0.9 | 1.1 | 0.9 |
| RELIGIOUS | 5.3 | 1.2 | 6.9 |
| OTHER | 0.1 | 0.0 | 0.0 |
| N = | 318 | 66 | 232 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 8.02

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 6 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITY: SZEGED

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 32.4 | 32.8 | 32.3 |
| ELEMENTARY | 41.0 | 47.5 | 37.8 |
| SECONDARY | 10.0 | 6.0 | 13.4 |
| RELIGIOUS | 16.0 | 14.0 | 16.5 |
| N = | 188 | 81 | 127 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.03

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: MOPTI

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 71.3 | 73.8 | 67.2 |
| ELEMENTARY | 9.4 | 6.3 | 13.4 |
| SECONDARY | 8.4 | 8.4 | 8.4 |
| TECHNICAL SECONDARY | 7.4 | 6.8 | 8.4 |
| SUPERIOR/COLLEGE | 1.3 | 1.6 | 0.8 |
| RELIGIOUS | 2.6 | 3.1 | 1.7 |
| OTHER | 0.0 | 0.0 | 0.1 |
| N = | 310 | 191 | 119 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.04

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 5 AND 15 YEARS OLD, BY EXPENDITURE GROUP

CITY: MOPTI

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 47.1 | 46.9 | 49.6 |
| ELEMENTARY | 19.7 | 22.4 | 15.3 |
| SECONDARY | 19.8 | 19.4 | 20.4 |
| RELIGIOUS | 13.4 | 12.2 | 15.3 |
| N = | 157 | 90 | 59 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.05

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: KATES

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 53.4 | 54.9 | 37.5 |
| ELEMENTARY | 20.7 | 20.7 | 20.0 |
| SECONDARY | 18.5 | 18.3 | 20.0 |
| TECHNICAL SECONDARY | 6.0 | 5.5 | 17.5 |
| SUPERIOR/COLLEGE | 0.4 | 0.2 | 2.5 |
| RELIGIOUS | 0.4 | 0.2 | 2.5 |
| OTHER | 0.0 | 0.2 | 0.0 |
| N = | 455.0 | 415.0 | 40.0 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.08

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 6 AND 16 YEARS OLD, BY EXPENDITURE GROUP

CITY: KATES

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 44.8 | 46.7 | 23.5 |
| ELEMENTARY | 44.2 | 41.8 | 70.6 |
| SECONDARY | 3.5 | 3.3 | 5.9 |
| RELIGIOUS | 7.5 | 8.2 | 0.0 |
| N = | 201 | 184 | 17 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.67

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: TOMBOUCTOU

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 62.2 | 74.2 | 42.4 |
| ELEMENTARY | 15.6 | 14.7 | 17.2 |
| SECONDARY | 13.7 | 8.0 | 23.2 |
| TECHNICAL SECONDARY | 7.3 | 1.8 | 16.2 |
| SUPERIOR/COLLEGE | 0.0 | 0.0 | 0.0 |
| RELIGIOUS | 1.1 | 1.2 | 1.0 |
| OTHER | 0.1 | 0.1 | 0.0 |
| N = | 202 | 133 | 99 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.08

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 5 AND 16 YEARS OLD BY EXPENDITURE GROUP

CITY: TOMBOUCTOU

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 42.5 | 51.7 | 51.3 |
| ELEMENTARY | 51.6 | 45.6 | 33.3 |
| SECONDARY | 5.9 | 2.7 | 15.4 |
| RELIGIOUS | 0.0 | 0.0 | 0.0 |
| N = | 153 | 114 | 39 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.09

EDUCATION LEVEL OF ADULT HOUSEHOLD MEMBERS, BY EXPENDITURE GROUP:

CITY: GAO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 59.7 | 66.4 | 45.3 |
| ELEMENTARY | 19.9 | 17.6 | 24.6 |
| SECONDARY | 15.3 | 11.6 | 23.1 |
| TECHNICAL SECONDARY | 4.4 | 3.2 | 6.8 |
| SUPERIOR/COLLEGE | 0.2 | 0.4 | 0.0 |
| RELIGIOUS | 0.5 | 0.8 | 0.0 |
| OTHER | 0.0 | 0.0 | 0.0 |
| N = | 367 | 250 | 111 |

N = # OF HOUSEHOLD MEMBERS, (ADULT)

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

table 6.70

EDUCATION LEVEL OF HOUSEHOLD MEMBERS BETWEEN THE AGES OF 6 AND 16 YEARS OLD, BY EXPENDITURE GROUP

CITY: GAO

| EDUCATION LEVEL | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| NO EDUCATION | 55.4 | 67.5 | 34.0 |
| ELEMENTARY | 33.9 | 27.3 | 45.5 |
| SECONDARY | 8.9 | 5.2 | 18.2 |
| RELIGIOUS | 0.8 | 0.0 | 2.3 |
| N = | 121 | 77 | 44 |

N = # OF HOUSEHOLD MEMBERS, (CHILDREN)

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Quartiles 6 - 10

TABLE 6.73

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH CONSUMER DURABLES, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| PRODUCTS: | Number of Items. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| TELEVISIONS: | | | | |
| | 0 | 87.7 | 93.4 | 82.0 |
| | 1.0 | 11.8 | 6.6 | 16.3 |
| | >1 | 0.4 | 0.0 | 0.6 |
| RADIOS: | | | | |
| | 0 | 21.6 | 31.1 | 13.5 |
| | 1.0 | 53.8 | 50.0 | 57.0 |
| | >1 | 24.6 | 18.9 | 29.5 |
| REFRIGERATORS: | | | | |
| | 0 | 86.4 | 95.3 | 78.0 |
| | 1.0 | 11.0 | 4.2 | 16.7 |
| | >1 | 2.6 | 0.5 | 4.4 |
| STOVES, (Modern): | | | | |
| | 0 | 98.5 | 99.5 | 97.6 |
| | 1.0 | 1.3 | 0.3 | 2.0 |
| | >1 | 0.2 | 0.0 | 0.4 |
| CARS: | | | | |
| | 0 | 84.0 | 91.5 | 77.7 |
| | 1.0 | 12.3 | 7.1 | 16.7 |
| | >1 | 3.7 | 1.4 | 5.6 |
| MOTORCYCLES/MOBYLETTES: | | | | |
| | 0.0 | 59.0 | 71.2 | 48.0 |
| | 1.0 | 33.0 | 25.0 | 39.8 |
| | >1 | 8.0 | 3.8 | 11.6 |
| BICYCLES: | | | | |
| | 0 | 76.4 | 71.2 | 80.9 |
| | 1.0 | 21.6 | 25.0 | 17.9 |
| | >1 | 2.0 | 2.9 | 1.2 |
| | | N = 463 | N = 213 | N = 251 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 8.73 (Continued)

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH LIVESTOCK, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| LIVESTOCK: | Number of Animals. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| SHEEP: | | | | |
| | 0 | 70.0 | 74.1 | 66.5 |
| | 1.0 | 10.4 | 9.4 | 11.2 |
| | >1 | 19.6 | 16.5 | 22.3 |
| GOATS: | | | | |
| | 0 | 95.3 | 95.8 | 94.8 |
| | 1.0 | 1.5 | 1.0 | 1.2 |
| | >1 | 3.2 | 2.3 | 4.0 |
| CATTLE: | | | | |
| | 0 | 92.0 | 94.3 | 90.0 |
| | 1.0 | 1.5 | 1.0 | 1.2 |
| | >1 | 6.5 | 3.8 | 8.8 |
| DONKEYS: | | | | |
| | 0 | 89.8 | 90.1 | 89.6 |
| | 1.0 | 7.8 | 6.6 | 8.1 |
| | >1 | 2.4 | 3.3 | 1.8 |
| HORSES: | | | | |
| | 0 | 99.8 | 100.0 | 99.8 |
| | 1.0 | 0.2 | 0.0 | 0.4 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CAMELS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 403 | N = 212 | N = 251 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Healthy = Expenditure Deciles 6 - 10

TABLE 6.74

HOUSING AND AMENITIES, BY EXPENDITURE GROUP

CITIES: BAMAKO, KOULIKORO, SIKASSO, SEGOU, AND MOPTI

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **HOUSING:** | | | |
| Thatch | 0.8 | 0.8 | 0.8 |
| Mud-brick | 43.5 | 50.5 | 37.5 |
| Cement/Mud-brick | 35.5 | 34.0 | 38.7 |
| Cement | 16.2 | 11.3 | 20.3 |
| Modern Apartment | 3.5 | 2.4 | 4.4 |
| Other | 0.6 | 0.9 | 0.3 |
| **ELECTRICITY:** | | | |
| Yes | 23.1 | 13.7 | 31.1 |
| No | 76.9 | 86.3 | 68.9 |
| **WATER:** | | | |
| Cistern | 1.7 | 2.8 | 0.8 |
| Porter | 6.5 | 9.4 | 4.0 |
| Well in the Concession | 45.8 | 47.2 | 44.8 |
| Fountain/Free | 16.8 | 16.0 | 17.5 |
| Fountain/Pay | 26.1 | 17.9 | 21.9 |
| Surface Water | 8.0 | 5.2 | 10.4 |
| Other | 1.1 | 1.5 | 0.8 |
| **COOKING FUEL:** | | | |
| Wood | 29.2 | 41.5 | 18.7 |
| Charcoal | 70.2 | 57.6 | 80.9 |
| Gas | 0.4 | 0.5 | 0.4 |
| Other | 0.2 | 0.4 | 0.0 |
| **HOUSING STATUS:** | | | |
| Owner | 63.9 | 65.6 | 62.5 |
| Renter | 31.5 | 27.6 | 34.7 |
| Free Occupancy | 4.5 | 6.8 | 2.8 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 463 | N = 212 | N = 251 |

N = # OF HOUSEHOLDS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.75

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH CONSUMER DURABLES, BY EXPENDITURE GROU

CITY: KATES

| PRODUCTS: | Number of Items. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| TELEVISIONS: | | | | |
| | 0 | 98.0 | 100.0 | 87.5 |
| | 1.0 | 2.0 | 0.0 | 12.5 |
| | >1 | 0.0 | 0.0 | 0.0 |
| RADIOS: | | | | |
| | 0 | 4.0 | 4.8 | 0.0 |
| | 1.0 | 64.0 | 61.9 | 75.0 |
| | >1 | 32.0 | 33.3 | 25.0 |
| REFRIGERATORS: | | | | |
| | 0 | 88.0 | 88.1 | 87.5 |
| | 1.0 | 10.0 | 9.5 | 12.5 |
| | >1 | 2.0 | 2.4 | 0.0 |
| STOVES, (Modern): | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | |
| | >1 | 0.0 | 0.0 | 0.0 |
| CARS: | | | | |
| | 0 | 92.0 | 92.9 | 87.5 |
| | 1.0 | 8.0 | 7.1 | 12.5 |
| | >1 | 0.0 | 0.0 | 0.0 |
| MOTORCYCLES/MOPEDS/ETC: | | | | |
| | 0.0 | 56.0 | 61.9 | 25.0 |
| | 1.0 | 42.0 | 35.7 | 75.0 |
| | >1 | 2.0 | 2.4 | 0.0 |
| BICYCLES: | | | | |
| | 0 | 82.0 | 83.3 | 75.0 |
| | 1.0 | 16.0 | 14.3 | 25.0 |
| | >1 | 2.0 | 2.4 | 0.0 |
| | | N = 50 | N = 42 | N = 8 |

N = # OF HOUSEHOLDS

Poor Expenditure Deciles 1 - 5
Wealthy Expenditure Deciles 6 - 10

TABLE 6.75 (Continued)

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH LIVESTOCK, BY EXPENDITURE GROUP

CITY: KATES

| LIVESTOCK: | Number of Animals. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| SHEEP: | | | | |
| | 0 | 44.0 | 50.0 | 12.5 |
| | 1.0 | 16.0 | 14.3 | 25.0 |
| | >1 | 40.0 | 35.7 | 62.5 |
| GOATS: | | | | |
| | 0 | 82.0 | 88.1 | 50.0 |
| | 1.0 | 12.0 | 7.1 | 37.5 |
| | >1 | 6.0 | 4.8 | 12.5 |
| CATTLE: | | | | |
| | 0 | 86.0 | 88.1 | 75.0 |
| | 1.0 | 12.0 | 11.9 | 12.5 |
| | >1 | 2.0 | 0.0 | 12.5 |
| DONKEYS: | | | | |
| | 0 | 80.0 | 83.3 | 62.5 |
| | 1.0 | 18.0 | 16.7 | 25.0 |
| | >1 | 2.0 | 0.0 | 12.5 |
| HORSES: | | | | |
| | 0 | 98.0 | 97.6 | 100.0 |
| | 1.0 | 2.0 | 2.4 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CAMELS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 50 | N = 42 | N = 8 |

N = # OF HOUSEHOLDS

Poor Expenditure Deciles 1 - 5
Wealthy Expenditure Deciles 6 - 10

TABLE 6.70

HOUSING AND AMENITIES, BY EXPENDITURE GROUP

CITY: KATES

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **HOUSING:** | | | |
| Thatch | 0.0 | 0.0 | 0.0 |
| Mud-brick | 22.0 | 26.2 | 0.0 |
| Cement/Mud-brick | 18.0 | 7.1 | 75.0 |
| Cement | 60.0 | 66.7 | 25.0 |
| Modern Apartment | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **ELECTRICITY:** | | | |
| Yes | 50.0 | 47.6 | 62.5 |
| No | 50.0 | 52.4 | 37.5 |
| **WATER:** | | | |
| Cistern | 2.0 | 2.4 | 0.0 |
| Porter | 36.0 | 33.3 | 50.0 |
| Well in the Concession | 6.0 | 4.8 | 12.5 |
| Fountain/Free | 0.0 | 0.0 | 0.0 |
| Fountain/Pay | 18.0 | 19.0 | 12.5 |
| Surface Water | 38.0 | 40.5 | 25.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **COOKING FUEL:** | | | |
| Wood | 88.0 | 92.9 | 62.5 |
| Charcoal | 12.0 | 7.1 | 37.5 |
| Gas | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **HOUSING STATUS:** | | | |
| Owner | 90.0 | 89.5 | 87.5 |
| Renter | 8.0 | 7.1 | 12.5 |
| Free Occupancy | 2.0 | 2.4 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 50 | N = 42 | N = 8 |

N = # OF HOUSEHOLDS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.77

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH CONSUMER DURABLES, BY EXPENDITURE GROU

CITY: TOMBOUCTOU

| PRODUCTS: | Number of Items. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| TELEVISIONS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| RADIOS: | | | | |
| | 0 | 46.4 | 51.4 | 35.3 |
| | 1.0 | 42.5 | 40.5 | 47.1 |
| | >1 | 11.0 | 8.1 | 17.6 |
| REFRIGERATORS: | | | | |
| | 0 | 94.5 | 100.0 | 82.4 |
| | 1.0 | 5.5 | 0.0 | 17.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| STOVES, (Modern): | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CARS: | | | | |
| | 0 | 98.2 | 100.0 | 94.1 |
| | 1.0 | 1.8 | 0.0 | 5.9 |
| | >1 | 0.0 | 0.0 | 0.0 |
| MOTORCYCLES/MOBYLETTES: | | | | |
| | 0.0 | 94.5 | 100.0 | 82.4 |
| | 1.0 | 5.5 | 0.0 | 17.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| BICYCLES: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 54 | N = 37 | N = 17 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.77 (Continued)

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH LIVESTOCK, BY EXPENDITURE GROUP

CITY: TOMBOUCTOU

| LIVESTOCK: | Number of Animals. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| SHEEP: | | | | |
| | 0 | 70.3 | 64.9 | 82.4 |
| | 1.0 | 13.0 | 16.2 | 5.9 |
| | >1 | 16.7 | 18.9 | 11.7 |
| GOATS: | | | | |
| | 0 | 77.7 | 70.3 | 94.1 |
| | 1.0 | 13.0 | 19.9 | 0.0 |
| | >1 | 9.3 | 10.8 | 5.9 |
| CATTLE: | | | | |
| | 0 | 96.3 | 94.1 | 100.0 |
| | 1.0 | 1.9 | 2.7 | 0.0 |
| | >1 | 1.9 | 2.7 | 0.0 |
| DONKEYS: | | | | |
| | 0 | 76.1 | 70.3 | 82.4 |
| | 1.0 | 13.0 | 16.2 | 5.9 |
| | >1 | 12.9 | 13.5 | 11.7 |
| HORSES: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CAMELS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 54 | N = 37 | N = 17 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.70

HOUSING AND AMENITIES, BY EXPENDITURE GROUP

CITY: TOMBOUCTOU

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **HOUSING:** | | | |
| Thatch | 1.9 | 2.7 | 0.0 |
| Mud-brick | 61.2 | 67.6 | 47.1 |
| Cement/Mud-brick | 22.1 | 16.2 | 35.3 |
| Cement | 1.3 | 0.0 | 5.9 |
| Modern Apartment | 0.0 | 0.0 | 0.0 |
| Other | 12.0 | 13.5 | 11.7 |
| **ELECTRICITY:** | | | |
| Yes | 25.6 | 16.2 | 47.1 |
| No | 74.2 | 83.8 | 52.9 |
| **WATER:** | | | |
| Cistern | 3.7 | 5.4 | 0.0 |
| Porter | 9.2 | 8.1 | 11.8 |
| Well in the Concession | 5.6 | 5.4 | 5.9 |
| Fountain/Free | 3.7 | 2.7 | 5.9 |
| Fountain/Pay | 74.2 | 78.4 | 64.7 |
| Surface Water | 3.7 | 0.0 | 11.8 |
| Other | 0.0 | 0.0 | 0.0 |
| **COOKING FUEL:** | | | |
| Wood | 81.6 | 89.2 | 64.7 |
| Charcoal | 18.4 | 10.8 | 35.3 |
| Gas | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **HOUSING STATUS:** | | | |
| Owner | 75.8 | 70.3 | 88.2 |
| Renter | 16.7 | 18.9 | 11.1 |
| Free Occupancy | 7.5 | 10.8 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| | N = 54 | N = 37 | N = 17 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5

Wealthy = Expenditure Deciles 6 - 10

TABLE 6.70

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH CONSUMER DURABLES, BY EXPENDITURE GROUP

CITY: GAO

| PRODUCTS: | Number of Items. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| TELEVISIONS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| RADIOS: | | | | |
| | 0 | 48.0 | 56.7 | 35.0 |
| | 1.0 | 42.0 | 36.7 | 50.0 |
| | >1 | 10.0 | 0.0 | 15.0 |
| REFRIGERATORS: | | | | |
| | 0 | 94.0 | 100.0 | 85.0 |
| | 1.0 | 4.0 | 0.0 | 10.0 |
| | >1 | 2.0 | 0.0 | 5.0 |
| STOVES, (Modern): | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CARS: | | | | |
| | 0 | 84.0 | 93.3 | 70.0 |
| | 1.0 | 14.0 | 6.7 | 25.0 |
| | >1 | 2.0 | 0.0 | 5.0 |
| MOTORCYCLES/MOPTLETTES: | | | | |
| | 0.0 | 84.0 | 86.7 | 80.0 |
| | 1.0 | 14.0 | 10.0 | 20.0 |
| | >1 | 2.0 | 3.3 | 0.0 |
| BICYCLES: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 50 | N = 30 | N = 20 |

N = # OF HOUSEHOLDS

Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

TABLE 6.76 (Continued)

HOUSEHOLD POSSESSIONS: % OF HOUSEHOLDS WITH LIVESTOCK, BY EXPENDITURE GROUP

CITY: GAO

| LIVESTOCK: | Number of Animals. | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|---|
| SHEEP: | | | | |
| | 0 | 80.0 | 86.7 | 20.0 |
| | 1.0 | 8.0 | 6.7 | 10.0 |
| | >1 | 32.0 | 6.0 | 70.0 |
| GOATS: | | | | |
| | 0 | 88.0 | 83.3 | 45.0 |
| | 1.0 | 4.0 | 0.0 | 10.0 |
| | >1 | 28.0 | 16.7 | 45.0 |
| CATTLE: | | | | |
| | 0 | 88.0 | 90.0 | 85.0 |
| | 1.0 | 0.0 | 6.7 | 5.0 |
| | >1 | 0.0 | 3.3 | 10.0 |
| DONKEYS: | | | | |
| | 0 | 90.0 | 100.0 | 75.0 |
| | 1.0 | 10.0 | 0.0 | 25.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| HORSES: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| CAMELS: | | | | |
| | 0 | 100.0 | 100.0 | 100.0 |
| | 1.0 | 0.0 | 0.0 | 0.0 |
| | >1 | 0.0 | 0.0 | 0.0 |
| | | N = 50 | N = 30 | N = 20 |

N = # OF HOUSEHOLDS

Poor Expenditure Deciles 1 - 5
Wealthy Expenditure Deciles 6 - 10

TABLE 6.80

HOUSING AND AMENITIES, BY EXPENDITURE GROUP:

CITY: GAO

| Percentage of Households in each Category | AVERAGE | POOR HOUSEHOLDS | WEALTHY HOUSEHOLDS |
|---|---|---|---|
| **HOUSING:** | | | |
| Thatch | 12.0 | 20.0 | 0.0 |
| Mud-brick | 84.0 | 76.7 | 95.0 |
| Cement/Mud-brick | 2.0 | 0.0 | 5.0 |
| Cement | 0.0 | 0.0 | 0.0 |
| Modern Apartment | 2.0 | 3.3 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **ELECTRICITY:** | | | |
| Yes | 28.0 | 20.0 | 40.0 |
| No | 72.0 | 80.0 | 60.0 |
| **WATER:** | | | |
| Cistern | 0.0 | 0.0 | 0.0 |
| Porter | 0.0 | 0.0 | 0.0 |
| Well in the Concession | 20.6 | 26.7 | 10.0 |
| Fountain/Free | 34.0 | 23.3 | 50.0 |
| Fountain/Pay | 36.0 | 36.7 | 35.0 |
| Surface Water | 10.0 | 13.3 | 5.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **COOKING FUEL:** | | | |
| Wood | 0.0 | 6.7 | 5.0 |
| Charcoal | 94.0 | 93.3 | 95.0 |
| Gas | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 |
| **HOUSING STATUS:** | | | |
| Owner | 52.0 | 43.3 | 65.0 |
| Renter | 20.0 | 23.3 | 15.0 |
| Free Occupancy | 28.0 | 33.3 | 20.0 |
| Other | 0.1 | 0.1 | 0.0 |
| | N = 50 | N = 30 | N = 20 |

N = # OF HOUSEHOLDS
Poor = Expenditure Deciles 1 - 5
Wealthy = Expenditure Deciles 6 - 10

## APPENDIX 5

## REGRESSION RESULTS: ALL CITIES

### MODEL: DOUBLE LOG SPECIFICATION OF THE CONSUMPTION FUNCTION ESTIMATED SEPARATELY FOR POOR HOUSEHOLDS, WEALTHY HOUSEHOLDS, AND THE SAMPLE AS A WHOLE

NOTE Statistical Test for the Difference Between Poor and Wealthy Households:

Null Hypothesis: $H_o$ $B_1 - B_2 = 0$

Alternative Hypothesis: $H_1$: $B_1 - B_2 \neq 0$

T statistic where the null hypothesis $H_o$ posits that the difference between the estimates is zero

$$t = \frac{(B_1 - B_2)}{\sqrt{(s_1^2 + s_2^2) - 2*COV(B_1, B_2)}}$$

ALL CITIES:

NOTES: DOUBLE LOG SPECIFICATION OF THE CONSUMPTION FUNCTION ESTIMATED SEPARATELY FOR POOR HOUSEHOLDS, WEALTHY HOUSEHOLDS, AND THE SAMPLE POPULATION AS A WHOLE.

The double log specification was also used to estimate the elasticities of demand for all cities combined. Due to the presence of heteroskedasticity, the econometric analysis presented in chapter 7 focused on the 5 Southern cities. Section 2.2.2 outlines the statistical test for determining whether or not the data from all cities could be pooled. It should be noted that estimated coefficients remain unbiased in the presence of heteroskedasticity, but are not minimum variance estimates. With this in mind the results for the pooled sample -- Bamako, Koulikoro, Sikasso, Segou, Mopti, Gao, and Tombouctou -- are presented below:

TABLE: 7.7

ALL CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Rice (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | HEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.8309 ** | 0.2483 * | 0.6169 ** |
| | (.1482) (5.607) | (.1346) (1.845) | (.0927) (6.655) |
| OWN PRICE | 0.9763 | 0.1051 | 0.3416 |
| | (.6671) (1.464) | (.4098) (.256) | (.3520) (.971) |
| CROSS PRICE: Millet/Sorghum | -0.2584 | -0.0903 | -0.2404 * |
| | (.2107) (-1.226) | (.1837) (-.491) | (.1369) (-1.756) |
| HOME PRODUCTION: Rice | -0.2824 | -0.1430 | -0.2162 |
| | (.2160) (-1.308) | (.1753) (-.816) | (.1352) (-1.599) |
| HOME PRODUCTION: Millet/ Sorghum | -0.0828 | 0.0545 | -0.0453 |
| | (.0839) (-.986) | (.0834) (.653) | (.0586) (-.773) |
| FAMILY SIZE | 0.0033 | -0.4566 ** | -0.2073 * |
| | (.1789) (.018) | (.1762) (-2.591) | (.1228) (-1.688) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.4146 * | -0.0216 | -0.1882 |
| | (.2523) (-1.643) | (.1536) (-.141) | (.1368) (-1.376) |
| ROUND 2 | -0.0380 | 0.0529 | 0.0217 |
| | (.0726) (-.524) | (.05778) (.915) | (.0453) (.480) |
| ROUND 3 | -0.1619 * | 0.1077 | -0.0158 |
| | (.0927) (-1.745) | (.0758) (1.421) | (.0589) (-.269) |
| EDUCATION OF HOUSEHOLD HEAD | -0.1214 | -0.1028 | -0.1188 ** |
| | (.0938) (-1.294) | (.0762) (-1.349) | (.0586) (-2.016) |
| MILLS RATIO | -0.2002 | 0.3885 | 0.0542 |
| | (.5187) (-.028) | (.3081) (1.281) | (.2171) (.249) |
| Adjusted R | 0.1589 | 0.1910 | 0.3387 |
| F Statistic | 11.37 ** | 15.77 ** | 61.21 ** |
| Number of Households | 605 | 669 | 1294 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Healthy: Expenditure Deciles 6 - 10

TABLE: 7.8

ALL CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Millet/Sorghum (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.5372 ** | 0.3324 ** | 0.4164 ** |
| | (.1520) (3.534) | (.1346) (2.470) | (.0883) (4.713) |
| OWN PRICE | -1.4582 ** | -0.3786 | -0.8587 ** |
| | (.5973) (-2.438) | (.5227) (-.709) | (.3893) (-2.257) |
| CROSS PRICE: Rice | 2.3777 ** | -0.8217 | 0.4221 |
| | (.9350) (2.542) | (.5893) (-1.394) | (.4936) (.855) |
| HOME PRODUCTION: Rice | -0.0693 | -0.0461 | -0.0487 |
| | (.1992) (-.348) | (.1576) (-.293) | (.1228) (-.396) |
| HOME PRODUCTION: Millet/ Sorghum | -0.0857 | 0.0405 | -0.0857 |
| | (.1122) (-.764) | (.1126) (.359) | (.0784) (-.073) |
| FAMILY SIZE | -0.4274 ** | -0.2886 ** | -0.3661 ** |
| | (.1488) (-2.912) | (.1336) (-2.161) | (.0962) (-3.806) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.2954 | -0.2583 | -0.2439 |
| | (.3685) (-.802) | (.2381) (-1.085) | (.1988) (-1.227) |
| ROUND 2 | -0.2384 | 0.0172 | -0.0758 |
| | (.1060) (-2.248) | (.0873) (.197) | (.0664) (-1.142) |
| ROUND 3 | -0.1278 | 0.2752 * | 0.1167 |
| | (.1797) (-.711) | (.1478) (1.861) | (.1125) (1.037) |
| EDUCATION OF HOUSEHOLD HEAD | -0.0074 | -0.1451 ** | -0.0792 |
| | (.1005) (-.074) | (.0738) (-1.967) | (.0591) (-1.338) |
| MILLS RATIO | 0.5346 * | 0.3624 | 0.4667 ** |
| | (.3088) (1.732) | (.2602) (1.393) | (.1944) (2.401) |
| Adjusted R | 0.2458 | 0.1685 | 0.2965 |
| F Statistic | 13.77 ** | 11.00 ** | 40.04 ** |
| Number of Households | 432 | 588 | 1020 |

**: Significant at .05

*: Significant at .10

Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5

Wealthy: Expenditure Deciles 6 - 10

TABLE: 7.9

ALL CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Peanut-Butter (Purchased Quantities Per Person Per Day) | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 0.5131 ** | 0.2862 ** | 0.4184 ** |
| | (.1176) (4.362) | (.0983) (3.013) | (.0606) (6.902) |
| OWN PRICE | -0.8272 ** | -0.9280 ** | -0.7754 ** |
| | (.1576) (-5.249) | (.1712) (5.374) | (.1069) (-7.257) |
| CROSS PRICE: Beef | 2.4870 ** | 1.1550 * | 1.2318 ** |
| | (.8529) (2.891) | (.6631) (1.742) | (.4980) (2.483) |
| HOME PRODUCTION: Peanuts | -0.0407 | 0.1933 | 0.0286 |
| | (.12000) (-.339) | (.1338) (1.444) | (.0882) (.324) |
| HOME PRODUCTION: Meat | -0.1306 | 0.2205 | 0.0373 |
| | (.2413) (-.541) | (.3884) (.568) | (.2040) (.183) |
| FAMILY SIZE | 0.0407 | -0.3516 ** | -0.5176 ** |
| | (.1680) (.242) | (.1386) (-2.538) | (.1604) (-2.765) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -1.0158 ** | -0.0935 | -0.3802 ** |
| | (.3123) (-3.252) | (.2468) (-.379) | (.1913) (-1.987) |
| ROUND 2 | 0.0824 | 0.1396 | 0.1235 ** |
| | (.0769) (1.072) | (.0905) (1.542) | (.05234) (2.117) |
| ROUND 3 | 0.0811 | 0.0566 | 0.0765 |
| | (.0876) (.933) | (.1133) (.500) | (.0730) (1.047) |
| EDUCATION OF HOUSEHOLD HEAD | -0.2070 ** | -0.1421 ** | -0.1489 ** |
| | (.0839) (-2.466) | (.0708) (-2.006) | (.0535) (-2.781) |
| MILLS RATIO | -0.4777 | 0.0534 | 0.0434 |
| | (.3489) (-1.377) | (.2685) (.199) | (.1982) (.219) |
| Adjusted R | 0.2381 | 0.2538 | 0.3457 |
| F Statistic | 15.57 ** | 19.60 ** | 54.61 ** |
| Number of Households | 514 | 603 | 1117 |

**: Significant at .05
*: Significant at .10
Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5
Wealthy Expenditure Deciles 6 - 10

TABLE: 7.10

ALL CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Commodity = Beef (Purchased Quantities Per Person Per Day) | | | | | |
|---|---|---|---|---|---|---|
| | POOR | | WEALTHY | | ENTIRE SAMPLE | |
| PER CAPITA EXPENDITURE | 0.5273 ** | | 0.6770 ** | | 0.5370 ** | |
| | (.1831) | (2.880) | (.2710) | (2.502) | (.1448) | (3.716) |
| OWN PRICE | -1.0110 | | 0.5575 | | -0.1638 | |
| | (1.0872) | (-.930) | (1.4222) | (.392) | (.8307) | (-.197) |
| CROSS PRICE: Peanut-Butter | 0.2418 | | 0.0538 | | 0.2693 * | |
| | (.2106) | (1.148) | (.2597) | (.207) | (.1573) | (1.711) |
| HOME PRODUCTION: Peanuts | -0.0497 | | -0.8319 ** | | -0.3542 ** | |
| | (.1442) | (-.345) | (.1781) | (-4.670) | (.1129) | (-3.138) |
| HOME PRODUCTION: Beef | -0.2954 | | -0.2766 | | -0.3053 | |
| | (.2950) | (-1.001) | (.4076) | (-.679) | (.2407) | (-1.281) |
| FAMILY SIZE | -0.6011 ** | | -0.1742 | | -0.3745 * | |
| | (.2956) | (-2.033) | (.3795) | (-.459) | (.2230) | (-1.679) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | 0.0812 | | -0.1762 | | -0.0495 | |
| | (.4010) | (.203) | (.3756) | (-.469) | (.2588) | (-.191) |
| ROUND 2 | -0.2481 | | 0.3711 | | 0.1026 | |
| | (.3571) | (-.695) | (.4545) | (.816) | (.2679) | (.383) |
| ROUND 3 | -0.4159 | | 0.2777 | | 0.0181 | |
| | (.5320) | (-.782) | (.6431) | (.429) | (.3893) | (.046) |
| EDUCATION OF HOUSEHOLD HEAD | 0.2091 | | 0.0865 | | 0.1490 | |
| | (.1496) | (1.398) | (.1597) | (.542) | (.1044) | (1.427) |
| MILLS RATIO | 1.4484 | | -0.1082 | | 0.6287 | |
| | (.9415) | (1.539) | (1.1788) | (-.092) | (.7028) | (.895) |
| Adjusted R | 0.1469 | | 0.1596 | | 0.2329 | |
| F Statistic | 8.03 ** | | 10.22 ** | | 28.16 ** | |
| Number of Households | 450 | | 535 | | 985 | |

**: Significant at .05

*: Significant at .10

Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5

Wealthy Expenditure Deciles 6 - 10

TABLE: 7.11

ALL CITIES

REGRESSION RESULTS: Model = Double Log Specification of the Consumption Function

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Total Per Capita Daily Calorie Consumption | | |
|---|---|---|---|
| | POOR | WEALTHY | ENTIRE SAMPLE |
| PER CAPITA EXPENDITURE | 1.0050 ** | 0.4424 ** | 0.7749 ** |
| | (.0445) (24.586) | (.0422) (10.475) | (.0220) (35.292) |
| RICE PRICE | 0.6273 | -0.3578 | 0.0232 |
| | (.5354) (1.171) | (.3624) (-.987) | (.3663) (.070) |
| MILLET/SORGHUM PRICE | -0.4306 ** | -0.0270 | -0.3151 ** |
| | (.1800) (-2.393) | (.1772) (-.152) | (.1307) (-2.417) |
| PEANUT-BUTTER PRICE | -0.1065 | -0.2657 ** | -0.1772 ** |
| | (.0862) (-1.235) | (.0849) (-3.129) | (.0619) (-2.860) |
| BEEF PRICE | -0.1875 | -0.5705 ** | -0.3471 ** |
| | (.1685) (-1.113) | (.1626) (-3.563) | (.1189) (-2.919) |
| HOME PRODUCTION | 0.2780 ** | 0.1324 ** | 0.2051 ** |
| | (.0437) (6.382) | (.0430) (3.082) | (.0316) (6.498) |
| FAMILY SIZE | -0.0164 | -0.0904 ** | -0.0202 |
| | (.0339) (-.544) | (.0276) (-3.286) | (.0219) (-.923) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1373 | -0.3729 ** | -0.2069 ** |
| | (.1509) (-.910) | (.1176) (-3.171) | (.0972) (-2.746) |
| SEASON 2 | -0.0599 | 0.0209 | 0.0163 |
| | (.0505) (-1.185) | (.0486) (.431) | (.0356) (.459) |
| SEASON 3 | -0.1123 * | -0.0213 | -0.0421 |
| | (.0603) (-1.863) | (.0576) (-.370) | (.0422) (-1.000) |
| EDUCATION OF HOUSEHOLD HEAD | -0.0960 * | -0.1096 ** | -0.1084 ** |
| | (.0535) (-1.796) | (.0398) (-2.755) | (.0334) (-3.248) |
| Adjusted R | 0.5206 | 0.2256 | 0.5363 |
| F Statistic | 69.02 ** | 20.56 ** | 150.18 ** |
| Number of Households | 820 | 830 | 1650 |

**: Significant at .05

*: Significant at .10

Standard Errors and T Statistics in Parentheses

Poor: Expenditure Deciles 1 - 5

Wealthy: Expenditure Deciles 6 - 10

## APPENDIX 6 (A)

## REGRESSION RESULTS: FIVE SOUTHERN CITIES

## MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

REGRESSION RESULTS, (FIVE SOUTHERN CITIES) TABLE: 7.15

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Purchased Quantities Per Person Per Day | | | |
|---|---|---|---|---|
| | RICE | | MILLET/SORGHUM | |
| PER CAPITA EXPENDITURE | 1.1010 | | -1.7015 | |
| | (3.2134) | (.343) | (3.1170) | (-.548) |
| PER CAPITA EXPENDITURE SQUARED | -0.0310 ** | | -0.0311 | |
| | (.0437) | (-2.036) | (.0357) | (-.871) |
| RICE PRICE | -0.0351 * | | -4.1867 | |
| | (5.1165) | (-1.778) | (5.7114) | (-.735) |
| RICE PRICE-EXPENDITURE INTERACTION TERM | 0.0527 * | | 0.4188 | |
| | (.5503) | (1.731) | (.6128) | (.683) |
| MILLET/SORGHUM PRICE | 7.4862 ** | | -1.0917 | |
| | (1.935) | (3.868) | (2.5425) | (-.429) |
| MILLET/SORGHUM PRICE-EXPENDITURE INTERACTION TERM | -0.7365 ** | | 0.1192 | |
| | (.2145) | (-3.707) | (.2865) | (.421) |
| HOME PRODUCTION: RICE | -0.2057 | | -0.0187 | |
| | (.1444) | (-1.424) | (.1228) | (-.152) |
| HOME PRODUCTION: MILLET/SORGHUM | -0.0168 | | 0.0876 | |
| | (.0514) | (-.328) | (.0734) | (1.195) |
| FAMILY SIZE | -0.2180 ** | | -0.4398 ** | |
| | (.1053) | (-2.071) | (.1133) | (-3.882) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1815 | | -0.1758 | |
| | (.1432) | (-1.268) | (.1949) | (-.902) |
| SEASON 2 | 0.0687 | | 0.0034 | |
| | (.0534) | (1.286) | (.0677) | (.050) |
| SEASON 3 | 0.0906 | | 0.2761 ** | |
| | (.0733) | (1.235) | (.0925) | (2.983) |
| EDUCATION OF HOUSEHOLD HEAD | -0.0010 | | -0.0918 | |
| | (.05014) | (-1.500) | (.0571) | (-1.607) |
| MILKS RATIO | 0.0840 | | 0.5129 ** | |
| | (.2310) | (.365) | (.2127) | (2.599) |
| Adjusted R | 0.3382 | | 0.2805 | |
| F Statistic | 42.21 ** | | 24.48 ** | |
| Number of Households | 1130 | | 834 | |

NOTE: (i) **: Significance at .05; (ii) *: Significance at .10; (iii) Standard Errors and T Stats in ( )

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

REGRESSION RESULTS, (FIVE SOUTHERN CITIES) TABLE: 7.10

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Purchased Quantities Per Person Per Day | | | |
|---|---|---|---|---|
| | PEANUT-BUTTER | | BEEF | |
| PER CAPITA EXPENDITURE | 5.0375 * | | -0.7127 | |
| | (2.5037) | (1.905) | (2.8415) | (-.251) |
| PER CAPITA EXPENDITURE SQUARED | -0.0742 * | | -0.0236 | |
| | (.0447) | (-1.661) | (.0393) | (-.601) |
| PEANUT-BUTTER PRICE | 2.8822 * | | -2.3351 | |
| | (1.551) | (1.858) | (2.4016) | (-.997) |
| PEANUT-BUTTER PRICE-EXPENDITURE INTERACTION TERM | -0.5049 ** | | 0.0008 | |
| | (.1709) | (-2.955) | (.2430) | (.397) |
| BEEF PRICE | 1.9616 | | -2.6241 | |
| | (2.7676) | (.704) | (3.4101) | (-.769) |
| BEEF PRICE-EXPENDITURE INTERACTION TERM | -0.0826 | | 0.1060 | |
| | (.2999) | (-.369) | (.3922) | (.434) |
| HOME PRODUCTION: PEANUTS | 0.0276 | | -0.3073 * | |
| | (.1032) | (.255) | (.1641) | (-1.873) |
| HOME PRODUCTION: MEAT | 0.0001 | | -0.6334 ** | |
| | (.2301) | (.418) | (.2605) | (-2.431) |
| FAMILY SIZE | -0.2308 ** | | -0.5706 ** | |
| | (.0965) | (-2.390) | (.1001) | (-5.700) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.3587 * | | 0.0677 | |
| | (.1947) | (-1.842) | (.2241) | (.302) |
| SEASON 2 | -0.0935 | | -0.5222 ** | |
| | (.0750) | (-1.246) | (.2221) | (-2.351) |
| SEASON 3 | -0.4135 ** | | -1.1235 ** | |
| | (.1130) | (-3.639) | (.3304) | (-3.400) |
| EDUCATION OF HOUSEHOLD HEAD | -0.1702 ** | | 0.2473 ** | |
| | (.0582) | (-2.918) | (.0884) | (2.861) |
| MILLS RATIO | -0.0197 | | 1.1365 ** | |
| | (.2155) | (-.091) | (.2946) | (3.856) |
| Adjusted R | 0.3330 | | 0.2660 | |
| F Statistic | 36.34 ** | | 23.02 ** | |
| Number of Households | 992 | | 852 | |

NOTE: (i) **: Significance at .05; (ii) *: Significance at .10; (iii) Standard Errors and T Stats in ( )

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

TABLE 7.11: REGRESSION RESULTS, (FIVE SOUTHERN CITIES) TABLE: 7.17

| INDEPENDENT VARIABLES | DEPENDENT VARIABLE: Total Per Capita Daily Calorie Consumption: | |
|---|---|---|
| PER CAPITA EXPENDITURE | 5.7200 ** | |
| | (2.0652) | (2.770) |
| PER CAPITA EXPENDITURE SQUARED | -0.1000 ** | |
| | (.0161) | (-12.384) |
| RICE PRICE | 1.5672 | |
| | (3.266) | (.480) |
| RICE PRICE-EXPENDITURE INTERACTION TERM | -0.2170 | |
| | (.3523) | (-.616) |
| MILLET/SORGHUM PRICE | -1.4304 | |
| | (1.4721) | (-.972) |
| MILLET/SORGHUM PRICE-EXPENDITURE INTERACTION TERM | 0.1428 | |
| | (.1644) | (.868) |
| PEANUT-BUTTER PRICE | 2.4067 ** | |
| | (.9037) | (2.663) |
| PEANUT BUTTER PRICE-EXPENDITURE INTERACTION TERM | -0.2956 ** | |
| | (.0996) | (-2.969) |
| BEEF PRICE | -1.2891 | |
| | (1.3599) | (-.948) |
| BEEF PRICE EXPENDITURE-INTERACTION TERM | 0.0953 | |
| | (.1529) | (.623) |
| HOME PRODUCTION: | 6.2074 ** | |
| | (.0323) | (6.430) |
| FAMILY SIZE | -0.0857 ** | |
| | (.0219) | (-3.904) |
| RATIO: # OF ADULT EQUIVALENT UNITS/# OF HOUSEHOLD MEMBERS | -0.1669 * | |
| | (.0952) | (-1.754) |
| SEASON 2 | -0.0320 | |
| | (.0448) | (-.714) |
| SEASON 3 | -0.0491 | |
| | (.0765) | (-.642) |
| EDUCATION OF HOUSEHOLD HEAD | -0.1095 ** | |
| | (.0331) | (-3.315) |
| Adjusted R | 0.5735 | |
| F Statistic | 105.22 ** | |

NUMBER OF HOUSEHOLDS = 1241

NOTE: (i) **: Significance at .05; (ii) *: Significance at .10; (iii) Standard Errors and T Stats in ( )

## APPENDIX 6 (B)

## ESTIMATED ELASTICITIES: ALL CITIES

## MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

ALL CITIES:

NOTES: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS SPECIFICATION

The estimated elasticities for all cities combined using the double log quadratic with price-expenditure interaction terms specification are presented below. Note that the parameter estimates are unbiased, but are not efficient or minimum variance estimates due to heteroskedasticity. (See Chapter 7: Section 2.2.2).

ELASTICITIES: ALL CITIES

TABLE: 7.18

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| RICE | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.617 ** | 0.534 ** | 0.576 ** |
| Standard Error: | 0.108 | 0.045 | 0.071 |
| T Statistic: | 5.713 | 11.867 | 8.113 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | 0.520 | 0.732 * | 0.026 ** |
| Standard Error: | 0.505 | 0.388 | 0.136 |
| T Statistic: | 1.030 | 1.887 | 4.603 |
| T Significance: | 0.303 | 0.059 | 0.000 |
| CROSS-PRICE ELASTICITY: (Millet-Sorghum) | 0.106 | -0.475 ** | -0.184 |
| Standard Error: | 0.168 | 0.167 | 0.135 |
| T Statistic: | 0.631 | -2.844 | -1.363 |
| T Significance: | 0.529 | 0.005 | 0.174 |

| MILLET-SORGHUM | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.516 ** | 0.416 ** | 0.466 ** |
| Standard Error: | 0.098 | 0.070 | 0.077 |
| T Statistic: | 5.265 | 5.943 | 6.052 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -1.018 ** | -0.680 * | -0.884 ** |
| Standard Error: | 0.413 | 0.364 | 0.363 |
| T Statistic: | -2.634 | -1.868 | -2.435 |
| T Significance: | 0.009 | 0.061 | 0.015 |
| CROSS-PRICE ELASTICITY: (Rice) | 0.735 | 0.147 | 0.441 |
| Standard Error: | 0.716 | 0.519 | 0.541 |
| T Statistic: | 1.027 | 0.283 | 0.815 |
| T Significance: | 0.303 | 0.779 | 0.412 |

*: significant at .10
**: significant at .05

ELASTICITIES: ALL CITIES

TABLE: 7.10

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| PEANUT-BUTTER | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.432 ** | 0.378 ** | 0.406 ** |
| Standard Error: | 0.089 | 0.044 | 0.056 |
| T Statistic: | 4.854 | 8.591 | 7.250 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -0.624 ** | -0.805 ** | -0.764 ** |
| Standard Error: | 0.116 | 0.133 | 0.107 |
| T Statistic: | -5.378 | -6.085 | -7.140 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| CROSS-PRICE ELASTICITY: (Beef) | 0.911 * | 1.082 ** | 0.896 ** |
| Standard Error: | 0.520 | 0.481 | 0.477 |
| T Statistic: | 1.752 | 2.249 | 2.088 |
| T Significance: | 0.080 | 0.024 | 0.037 |

| BEEF | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE ELASTICITY: | 0.504 ** | 0.463 ** | 0.484 ** |
| Standard Error: | 0.141 | 0.132 | 0.132 |
| T Statistic: | 3.574 | 3.508 | 3.667 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| OWN-PRICE ELASTICITY: | -0.611 | -0.478 | -0.545 |
| Standard Error: | 0.751 | 0.909 | 0.808 |
| T Statistic: | -0.814 | -0.527 | -0.675 |
| T Significance: | 0.418 | 0.596 | 0.497 |
| CROSS-PRICE ELASTICITY: (Peanut-Butter) | 0.321 * | 0.097 | 0.209 |
| Standard Error: | 0.194 | 0.146 | 0.148 |
| T Statistic: | 1.655 | 0.664 | 1.412 |
| T Significance: | 0.097 | 0.509 | 0.159 |

*: significant at .10
**: significant at .05

ELASTICITIES: ALL CITIES

TABLE: 7.20

MODEL: DOUBLE LOG QUADRATIC WITH PRICE-EXPENDITURE INTERACTION TERMS

| DEPENDENT VARIABLE = TOTAL PER CAPITA CALORIE CONSUMPTION (Purchased + Home Produced) | POOR | WEALTHY | ENTIRE SAMPLE |
|---|---|---|---|
| EXPENDITURE: | 0.950 ** | 0.573 ** | 0.782 ** |
| Standard Error: | 0.026 | 0.028 | 0.022 |
| T Statistic: | 36.536 | 20.464 | 34.636 |
| T Significance: | 0.000 | 0.000 | 0.000 |
| RICE PRICE: | -0.106 | -0.119 | -0.112 |
| Standard Error: | 0.403 | 0.319 | 0.318 |
| T Statistic: | -0.263 | -0.373 | -0.352 |
| T Significance: | 0.795 | 0.711 | 0.726 |
| MILLET-SORGHUM PRICE: | -0.274 | -0.130 | -0.202 |
| Standard Error: | 0.153 | 0.150 | 0.125 |
| T Statistic: | -1.791 | -0.867 | -1.616 |
| T Significance: | 0.073 * | 0.384 | 0.105 |
| PEANUT-BUTTER PRICE: | -0.169 | -0.278 | -0.244 |
| Standard Error: | 0.300 | 0.337 | 0.319 |
| T Statistic: | -0.563 | -0.825 | -0.765 |
| T Significance: | 0.575 | 0.407 | 0.441 |
| BEEF PRICE: | -0.345 | -0.552 | -0.449 |
| Standard Error: | 0.289 | 0.302 | 0.286 |
| T Statistic: | -1.283 | -1.826 | -1.570 |
| T Significance: | 0.201 | 0.073 | 0.116 |

*: significant at .10
**: significant at .05

Poor: Deciles 1 - 5
Wealthy: Deciles 6 - 10

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