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Determinants of Food Consumption
in the Dominican Republic

Volume I: Text

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EXECUTIVE SUMMARY

This study investigates the effects on food consumption of changes in various food prices and in household income in the Dominican Republic. Its purpose is to assist in predicting the likely effects of alternative food price policies, as well as the effects of economic policies which might alter income levels among various population groups.

There is currently a great deal of concern on the part of the government over the need to balance the objective of household food adequacy with objectives of economic efficiency and of national food security. Recent government policies of economic liberalization suggest a recognition that allowing the free operation of market forces may be the best way to encourage the regular, predictable availability of food. But at the same time, consumers, especially low-income consumers, are facing a loss of purchasing power due to the falling value of the peso on the international market, while prices for many foods and other items are rising. Given the existing serious problem of nutritional inadequacy, which can only be made worse by the current economic situation, the government has good reason to explore alternative programs and policies to protect the food consumption levels of the poor during this period of economic restructuring.

Data reported in this study were obtained from a nationally representative survey of household income, expenditure, and food consumption, conducted from January through November 1986.

Nutritional Adequacy

The results of the study indicate that a significant problem of dietary adequacy exists in the Dominican Republic. On average, 17% of households are at risk of inadequate caloric intake (below 75% of recommended levels), and 24% are at risk for deficient protein.

The major determinant of dietary inadequacy is household income (as measured by household total expenditures, including the value of food consumed from unpaid sources). In the lowest expenditure quartile, 37% of

households are at risk of deficient caloric intake, and in the lowest decile, 60% are at risk, compared with only 8.4% in the highest quartile.

Regional variation in the risk of caloric and protein deficiency is primarily due to regional variation in income level. The Frontier region has the highest proportion of households in the high-risk category for both calories and protein; it also has the lowest average expenditure level and the highest proportion of households in the lowest expenditure classes.

Urban areas have a slightly higher proportion of households at risk of deficient caloric intake than rural households, in spite of the slightly higher average income levels in the cities; but rural areas have a slightly higher proportion of protein deficient households.

The proportion of total household expenditure devoted to food rises from the bottom decile to the bottom quartile of expenditure, and this proportion does not begin to decline until the third quartile of expenditure. This suggests that, up to the median level of expenditure, households have not reached the level of affluence at which their food preferences are satisfied, so that they can devote a larger proportion of any increase in income to non-food goods. Below-median households do tend to increase the quantity, the diversity, and the quality of their diets by purchasing more expensive foods such as milk, oil, and chicken in addition to larger amounts of rice, beans, yuca, and plantain.

Households with access to home-produced food achieve higher levels of caloric and protein consumption than do comparable households without home consumption. At similar expenditure level, fewer households with access to home-produced food are at risk of dietary inadequacy. However, access to home production is by no means a guarantee of nutritional adequacy. The Frontier, with the highest proportion of households consuming home production, also has the highest proportion of households at risk because of their low income. Access to home production is largely confined to rural areas; within each region, access to home produced food is not related to expenditure level, but is evenly distributed among expenditure classes.

Consumption Patterns

Rice is the dominant food in the Dominican diet at all income levels and in almost every region, contributing 31% of calories and 25% of protein consumed on average in the country. Only in the Frontier is the caloric contribution of rice exceeded by that of starchy tubers and plantain and green banana; rice is the second most important food.

The composition of the diet is remarkably uniform throughout the country. The same foods appear as the top ten contributors to calorie and protein intake at all income levels and in all regions.

The relative importance of these foods varies because at higher income, more expensive foods become a more important part of the diet. Most regional differences in consumption patterns are explained by the variation in income level. Some differences in the Frontier are due to their greater dependence on home-produced food and to lower prices for the starchy tubers and plantains.

The relative contribution of rice is greatest in lower-income households. In the lowest expenditure quartile, rice contributes 37% of calories (32% of protein) compared with 25% of calories (19% of protein) in the highest quartile.

This diminishing proportion does not represent a diminishing quantity of rice consumed per capita. At higher income levels, households consume more rice per capita, but their consumption of other foods rises more. The foods which show the most marked increase in consumption with rising income are animal protein sources, especially chicken and beef, and milk; plantain, and vegetable oil are also consumed in greater amounts, and increase their relative contribution to the diet, at higher incomes.

There are very few foods in the Dominican diet which can be characterized as inferior, that is, whose consumption declines as income rises. The most important of these is corriente or common rice. Its consumption declines, and that of select rice increases, as income rises. This suggests that Dominican consumers are sensitive to quality differences

in rice, and that quality can be used as a mechanism to target a variety of rice to the low income population. Brown sugar is the other food whose consumption declines as income rises. Yuca and plantain are distinctly not inferior foods; they show a rising expenditure elasticity of demand as income rises.

Milk is the most important animal protein source in the lowest expenditure classes. Milk is not an inferior food; consumption is very responsive both to income and to price. Milk is also the only major food whose consumption per capita increases significantly when there are more children in the household.

Price Effects on Food Consumption

There are a few foods whose prices affect the overall caloric and protein adequacy of the household. The prices of both yuca and oil are directly related to caloric and protein consumption per adult equivalent. When the prices of these goods fall, the overall level of the diet (and not only consumption of these foods) increases significantly.

The price of chicken has the opposite effect: when the price of chicken falls, consumption of chicken rises, but the level of both caloric and protein consumption falls. This effect is highly significant in the lowest expenditure quartile, where protein and caloric consumption are most likely to be deficient. Apparently, when the price of chicken is low, consumers substitute chicken for some of the rice, beans, plantain, and sugar they would otherwise be eating. The increase in perceived quality from eating some chicken comes at the cost of a net reduction in the calories and protein consumed.

The study did not observe a significant effect of the price of rice on total caloric or protein consumption, possibly because there was insufficient observed variation in the price of common rice due to price controls, as well as because consumers may adjust their consumption to compensate for price changes in rice by substituting other foods such as pasta. As rice is the preferred dietary staple, this adjustment, which protects dietary adequacy, may result in a lower perceived quality of the

diet. The price elasticity of demand for common rice was calculated to be $-.419$. Consumption of all rice showed an elasticity with respect to common rice price of $-.335$.

Purchasing Patterns

About half of all food expenditure in the Dominican Republic takes place at colmados, small, local neighborhood stores which sell food in very small quantities at a time, and where credit is often extended to purchasers. More than 80% of all transactions (food purchases) take place at the colmado. Virtually every neighborhood is served by at least one colmado. Prices at the colmado for basic items such as rice, yuca, plantain, sugar, and vegetable oil are the same as or only very slightly higher or lower than prices at the public market.

This pattern has significant implications for the design of any food distribution program. The centralized distribution of food in relatively large quantities at infrequent intervals does not conform very well to Dominican purchasing patterns. The benefits of such a centralized distribution program would have to be quite substantial for people to invest their time. Furthermore, many consumers may not have the cash to buy large quantities at one time.

Use of Public Food Distribution Systems

Publicly distributed free and subsidized food accounted for less than 1% of calorie and protein consumption on average during the period of the survey (Jan. - Nov. 1986). The importance of these sources exceeded 1% only in the Frontier (the poorest region of the country) and in the capital, where they accounted for 1.5% and 4.4% of calories, respectively.

Free distribution of food showed significant degree of targeting toward the low-income population in the Frontier and the capital. The subsidized program (the Ventas Populares) was used to about the same degree by all expenditure classes. Current policies are focusing on expanding these public distribution systems as a means of protecting the food consumption levels of the poor.

Income Sources

Virtually all households rely on a variety of sources for their incomes. Few households depend exclusively on farming for their livelihood. Only 6.4% of households receive more than 90% of their income (including the value of home-consumed food) from farming. The highest proportion is in the Frontier, where 25.6% of households fall in this category. On average, households whose heads are farmers derive 40% of their income (calculated to include home consumption of food) from non-farm sources including wages, transfers, and income from a family business.

Households headed by agricultural laborers have the lowest average income level of all occupational categories. Households headed by formal-sector employees receiving regular salaries or wages have above-average income; farm households (those headed by farmers) have incomes close to the average for the Dominican Republic.

Policy Implications

The study suggests that there is a need for policies to protect the food consumption level of the poor. The current policy focus on rice, particularly on common rice, seems to be justified both by the dominance of rice in the diet and by the fact that common rice (not all rice) acts as an inferior food. The price of oil has been subject to government manipulation in the past. The price of oil is directly related to dietary adequacy; a policy which raises its price might have a negative effect on the calorie and protein consumption of the poor. In contrast, the price of chicken is inversely related to caloric and protein adequacy among the poor. Policies which reduce the price of chicken might have adverse effects on the dietary adequacy of low-income groups.

The dominance of the colmado in purchasing patterns, and the low level of use of existing public distribution systems, suggest that it might be useful to explore the possibility of using the very widespread network of these private-sector outlets in implementing any public food distribution policy.

The variety of income sources in individual Dominican households is striking. In particular, few households depend entirely on farming for their livelihood. This suggests that there is a wide range of income-related policies which would affect the incomes of farm households; farm-price related strategies are not the only ones which would reach them.

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1. Introduction

1.1 Purposes of the Study

The present study seeks to investigate the effects on food consumption of changes in various food prices and in household income in the Dominican Republic. Its purpose is to assist in predicting the likely effects of alternative food price policies, as well as the effects of economic policies which might alter income levels among various population groups.

The focus of the study is on providing information which can help predict how price and income policies, or changes in incomes and prices brought about by external forces, might affect the welfare and well-being of the Dominican population. For this reason, the study distinguishes among various income classes and among several geographic regions of the country, recognizing that the vulnerable population, where welfare is most affected by price and income changes, is not evenly distributed among these groups.

Disaggregation of the analysis according to income level is important because income is the most important determinant of food consumption. The importance of individual foods in the overall diet varies considerably according to a household's income level. The effects of a price change can, therefore, be quite different in different income classes. Changes in income level will certainly affect the demand for particular foods. And perhaps, most important, dietary inadequacy is very strongly related to income level, so that any price or income policy must take particular account of the potential effect on vulnerable, low-income groups.

Analysis by region is important because similar policies may have different effects in different regions of the country for a variety of reasons. There are significant differences in income level among regions: in particular, the Frontier region has a considerably lower level of income than the rest of the country; and urban incomes tend to be somewhat higher than rural incomes. Rural areas, though, have greater access to home-produced food and other goods, which may have an effect on the way in which food prices alter food consumption. The degree of the population's dependence on farming also naturally shows significant variation by region.

Although few households in any region depend entirely on farming, a policy which altered the prices of farm products would affect rural and urban areas in different ways.

1.2 Organization of the Report

The report first describes food consumption patterns in the Dominican Republic, documenting which foods are the most important contributors to the diet, and which foods account for the greatest proportion of expenditure. Variation in these patterns by income class and by region is documented, and the effects of access to land and home production of food are described.

In the following chapter, estimates are presented of the quantitative effect on food consumption of changes in household income and in the prices of particular foods. Patterns of substitution in consumption in response to price changes are described.

The report then documents the incidence of inadequate protein and calorie consumption and its variation among income groups and regions of the country. Dietary inadequacy is related to consumption patterns as well as to food prices and income sources. Foods whose prices affect dietary adequacy are identified.

The major sources of food are described, including the role of government distribution systems in the provisioning of households. Socioeconomic indicators are presented, including a description of the various sources of income and the relative importance of these sources among regions and income classes.

Finally, regional differences in prices are presented, and the relative cost of nutrients in different foods is discussed.

1.3 Policy Background

Food prices have been manipulated as a policy tool in the Dominican Republic as far back as 1939. Attempts to protect consumers by keeping

food prices low and by providing subsidized distribution outlets date back at least to the late 1960's, when the Price Stabilization Institute, INESPRES, was formed with the dual objectives of protecting consumers from high prices and providing price support to the agricultural sector.* INESPRES operated as a monopoly in rice marketing, purchasing all the milled rice directly from the mill and distributing it by quota at a fixed mark-up to retailers and wholesalers. Responsibility for rice commercialization was taken from INESPRES in 1986, but the policy of maintaining fixed prices was continued, implemented by the Agricultural Bank, until August 1987, when the government lifted price controls and permitted a free market in rice. Nonetheless, the government continues to obtain rice by means of domestic purchases and through its monopoly on imports.

This rice, which is kept as a buffer stock, is currently being offered for sale to retailers associations with the stipulation that it not be sold above a price specified by the government. This represents an attempt to counter the rising cost of living which has been a source of public discontent, occasionally erupting into protest, since the currency devaluation began in 1984.

Aside from rice, milk has also been a target of price control. INESPRES markets a reconstituted fluid milk made from non-fat dry milk and vegetable oil. The milk has been obtained through U.S. food aid in the past and is currently being purchased on the international market. This milk sets a price with which local dairy producers must compete in the marketing of fluid milk. Various government programs have also distributed milk free or at subsidized prices, through the food marketing system, and through other public distribution systems such as the Ventas Populares program of INESPRES.

Vegetable oil has also been a subject for consumer price manipulation. Until 1985, INESPRES imported vegetable oil from the U.S. using foreign exchange valued at the artificially high official exchange rate, and sold it on the open market at prices far exceeding their cost. The profit from

* Allen (1985) reviews the history of food price policy in the Dominican Republic, in particular with respect to the operation of INESPRES.

the oil operation was used to cross-subsidize the consumer price of rice. With the final devaluation in 1985, which unified the exchange rate at the free market level, this source of funds was no longer available to INESPRES; the loss of these funds was one reason for INESPRES's insolvency. Unrefined sugar has also been subject to price control from the 60's to the present time.

In addition to these major commodities, other commodities have from time to time been the target of government price manipulation. The prices of yuca (manioc) and plantain were controlled before 1985; when controls were lifted, prices doubled, indicating that the controls represented a substantial implicit consumer subsidy.

Chicken is periodically obtained by the government through low-cost imports as a way of meeting public demand when domestic supplies are scarce and prices rise. Minor products such as eggs, onions, and garlic, and some processed foods have also been handled by government channels as a means of guaranteeing consumer access.

INESPRE continues to operate several distribution systems intended to provide a basket of basic consumption items (including rice, beans, yuca and plantain, vegetable oil, milk, sugar, and a few other items) at "affordable" prices. The major distribution programs of INESPRES are the Ventas Populares, a program intended to be targeted to low income consumers; and the Mercado de Productores, which is a public farmers market at which some of the marketing costs are subsidized in an effort to provide the opportunity for direct sales from farmers to consumers, eliminating the marketing margins due to middlemen.

There is a great deal of concern on the part of the government over the need to balance the objective of household food adequacy with objectives of economic efficiency and of national food security. Attempts at government control of marketing channels, whether through INESPRES or other institutions, have resulted in market inefficiency and, at times, in shortages and the emergence of a parallel market in which high prices prevail. The objective of supporting farm prices has at times been undermined by problems of late and unreliable payment to farmers or

processors for their products. Provision of low cost imports also, of course, reduces the domestic market price to farmers. The government is recognizing that allowing the free operation of market forces may be the best way to encourage the regular, predictable availability of food.

At the same time, consumers, especially low-income consumers, are facing a loss of purchasing power due to the falling value of the peso on the international market, while prices for many foods and other items are rising. Given the existing serious problem of nutritional inadequacy, which can only be made worse by the current economic situation, the government has good reason to explore alternative programs and policies to protect the food consumption levels of the poor during this period of economic restructuring.

The present report should provide information on the determinants of food consumption and dietary adequacy which can shed some light on the probable effects of alternative interventions which the government might consider to deal with the present difficult situation. It is hoped that the results of this study will be useful and will provide some long-term benefits to the people of the Dominican Republic.

2. Method

2.1 Study Design

Data reported in this study were obtained from a ten-month, national household sample survey of household income, expenditure, and food consumption.

The study was conducted from January through November, 1986. One hundred and forty four households were interviewed each month for a total sample size of 1440. The actual number of households successfully interviewed was 1404, representing a 98% completion rate. Each household was visited 4 times over the course of 8 days, once every other day. The interviewers generally lived in the sample area for the duration of the interviews (with the exception of Santo Domingo and Santiago), staying in households not included in the sample. This gave the interviewers the opportunity to gain the confidence of the people they were interviewing and

to double check prices and weights in the stores actually used by the respondents. All of the interviewers were women, which contributed to the excellent rapport that developed between interviewer and respondent.

2.2 Sample Method

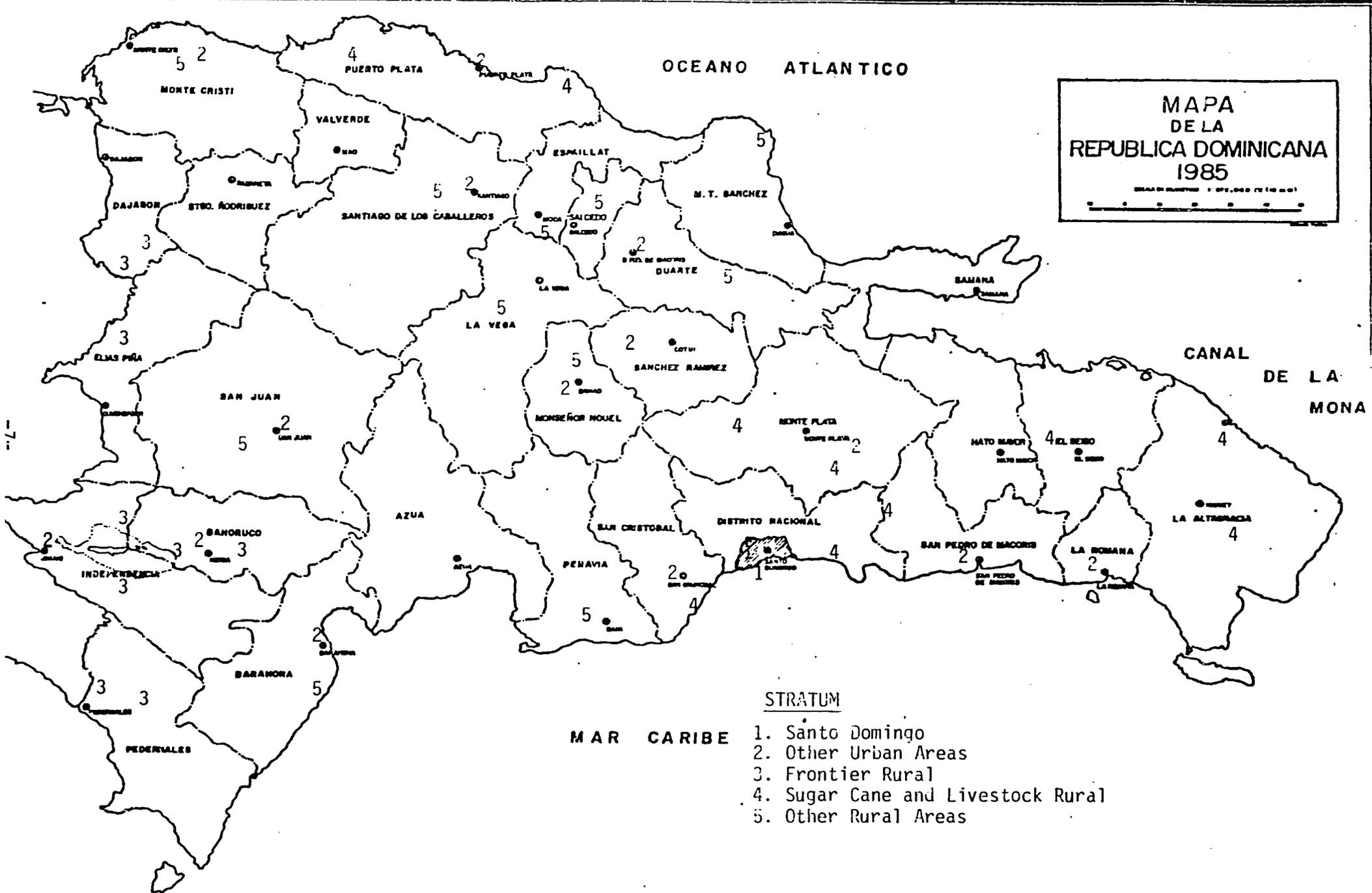
Stratified cluster sampling was used to obtain a sample of households representative of the Dominican Republic and of each stratum. The sample frame used was the household list from the 1981 National Census, updated just prior to drawing this sample. The country was divided into 5 strata:

1. Santo Domingo
2. Other Urban Areas
3. Rural Frontier Region
4. Rural Areas of Sugar Cane and Livestock Production
5. Other Rural Areas

Santo Domingo was self-representing, as it has unique characteristics being the capital city and by far the largest city in the country. Other Urban Areas (Stratum 2) is the most geographically varied of the strata, including urban areas from all over the country, from Santiago de los Caballeros (the second largest city, located in the agriculturally rich Cibao valley) to Jimaní (a small urban area on the dry, hot Haitian border). Stratum 3 (Frontier Region, Rural) runs along the Haitian border from Dajabon in the north to Pedernales in the south. In addition to Dajabon and Pedernales, the sample for this Stratum included the rural areas of Elias Piña, Bahoruco and Independencia. The Rural Areas of Sugar Cane and Livestock (Stratum 4) is another geographically varied stratum. The sample included the provinces of El Seibo, La Altagracia, La Romana, San Pedro de Macoris, Hato Mayor and Monte Plata in the east, Puerto Plata in the north, San Cristobal in the west, and the rural areas surrounding the capital. Stratum 5 (Other Rural Areas) is composed principally of the Cibao and San Juan valleys. The sample included the provinces of Monséñor Noüel, Sanchez Ramirez, Duarte, La Vega, Salcedo, Espaillat, Santiago de los Caballeros, Monte Cristi, M.T. Sanchez, San Juán, Barahona, and Perávia.

The sample selection process varied according to stratum. The first stage for the Santo Domingo sample (Stratum 1) consisted of the random selection of neighborhoods ("barrios" or "ensanches") within the city. The

FIGURE 2.1



MAPA
DE LA
REPUBLICA DOMINICANA
1985
ESCALA DE DISTANCIA 1:100,000 (1:100,000)

STRATUM

MAR CARIBE

1. Santo Domingo
2. Other Urban Areas
3. Frontier Rural
4. Sugar Cane and Livestock Rural
5. Other Rural Areas

LOCATION OF SAMPLED CLUSTERS

probability of selection of any given barrio was proportional to the number of households recorded during the 1981 census. Then the barrios were divided into sectors and three of these were randomly selected in each. Before the third stage of sampling the sectors were visited and the household lists updated. The selected sectors were then divided into groups of 24 houses (clusters). Three clusters were randomly selected, then 8 households from each cluster. Thus each selected city sector was represented by 24 households from three clusters. A total of 336 households were selected in Santo Domingo. (See Table 2.1.)

The first stage of the selection process for Other Urban Areas (Stratum 2) consisted of the random selection of cities proportional to the number of occupied households in each (from the 1981 Census). After this stage the process was the same as in Santo Domingo. A total of 384 households were selected in Other Urban Areas, from 14 different cities.

Provinces in the Dominican Republic are divided into municipalities, which contain both urban and rural areas. The first stage of the selection of the rural sample (Strata 3,4 and 5) consisted of the random sampling of municipalities within each stratum with probability proportional to the number of occupied households. The municipalities were divided into supervision areas (from the 1981 census) and these areas were then randomly sampled. Twenty four households were randomly selected from each chosen supervision area. A total of 216 households were selected in Stratum 3, 240 in Stratum 4, and 264 in Stratum 5.

Stratum 3 (Rural Frontier Region) was deliberately oversampled to allow for regional analysis. The Frontier region represents an area of particular interest to the Dominican Government as it is the poorest region in the country, but it is very sparsely populated, containing 3% of the population, and a national sample drawn in strict proportionality would have given a sample of only about 40 households, not enough to do separate analysis of the region. Thus the Frontier was sampled about 5 times more heavily than its population would otherwise warrant. Therefore when analysis is conducted on the country as a whole or broken down by factors other than region, the cases are weighted to adjust for the oversampling of underpopulated regions. The weights for each stratum may be found in

Table 2.1. (See Appendix 1, Table 2A for a detailed breakdown of sample survey by region.)

	TABLE 2.1				
	SANTO DOMINGO	OTHER URBAN	RURAL FRONTIER	CANE & LIVESTOCK	OTHER RURAL
POPULATION ^a	1,313,172	1,622,688	160,886	1,020,988	1,509,848
SAMPLE SIZE	336	384	216	240	264
WEIGHT	1.087	1.066	.183	1.103	1.485

^a VI Censo Nacional de Poblacion y Vivienda 1981. Oficina Nacional de Estadistica, Secretariado Tecnico de la Presidencia, Santo Domingo, 1982.

2.3 Data Gathered

The questionnaire was divided into 4 principal sections. Section A contained questions on household composition and demographic information. It also covered socio-economic information such as principal and secondary fuel, services available, water supply, and sanitation facilities. The availability and use of INESPRES programs (Programa Nacional de Afiliados, Venta Popular and the Section 416 milk product program) were also investigated in this section.

2.3.1 Household Composition

For the purposes of this survey, a person was considered a member of the household if he or she had been present for at least 6 out of the last 12 months, eating and sleeping in the house. Three categories of sex were used: 1) male 2) female, not pregnant nor lactating and 3) female, pregnant or lactating. Two categories for females were used because the nutritional requirements of pregnant and lactating women are greater than those of non-pregnant and non-lactating women. Age was recorded in years

for all members older than 5. Children younger than 5 years had their age recorded in months.

2.3.2 Demographic Information

The education level of the household members was recorded in years of schooling completed. For example, if a person had to repeat 1st grade 3 times and finally dropped out after passing on to but not completing second grade, their level of education was recorded as 1 year. Family members were asked for their principal and secondary activities, ranked in terms of time spent, not money earned. Finally, the migration status of each member was recorded, that is, whether they were currently living in the household. Family members who had permanently or semi-permanently migrated more than 6 months out of the household were not considered members. A count was made of all the household members who were present on the first day of interviews. This measure was later used to calculate the number of adult-equivalents in the household in order to calculate caloric and protein requirements.

2.3.3 Expenditure

Section C contained information about household cash expenditures. The expenditure items measured included:

1. Housing
2. Transport
3. Services (electricity, water, telephone)
4. Fuel
5. Personal Hygiene
6. Food
7. Domestic Employees
8. Entertainment, Tobacco, Alcohol
9. Gambling
10. School expenses (including uniforms)
11. Clothing (excluding school uniforms)
12. Linen
13. Durable goods
14. Payments (transfers) to family members or other private individuals.

Expenditure information was obtained for the most appropriate reference period and then converted to a monthly basis to determine the household's economic level. An estimate of the value of food consumed but not paid for

(from home production, own business, in-kind pay, gifts and free government sources) was obtained from the weekly consumption data and added to cash expenditures to obtain a proxy for the household's real income. Monthly cash expenditures on medicine were not included in household expenditures as they were felt to be too variable. Estimations of the value of free housing, clothing, and gifts other than food were also not included, because of the difficulty of imputing a monetary value.

The value of "free" food was obtained by imputing the weighted average price the household paid for that good in cases where the household bought it. Prices were weighted by the amount bought from different sources then averaged across all sources. In cases where the household did not buy the food at all, the weighted average cluster price was used, and where a cluster price was not available, the weighted average stratum price was used. If the good was not purchased at all in the entire stratum, no value was imputed. No major goods except premium rice in the Frontier region were missed in this way.

The household's monthly real expenditure (that is, including the imputed value of free food) was divided by the number of household members to obtain a per capita expenditure figure. This was used to determine expenditure quartiles and deciles, which were used to indicate economic status. Per capita expenditure was felt to be a better indicator of household economic status than total household expenditure. If total expenditure were to be used as the indicator variable for economic status, poorer households tend to fall in the higher income quartiles, as they have, on average, twice as many members as richer households (by the per capita measure) and therefore a higher total expenditure. Dividing by number of household members corrects for this and gives a better indication of the economic status of the household.

2.3.4 Income and Production

Section D covered information on different sources of income. Because income information has been generally found to be less reliable than expenditure information, the information gathered on the sources and amount of income was used to estimate only the relative importance of income sources, not the absolute economic level of the household.

Information on agricultural and livestock resources and production was gathered in this section. This information was used to separate farm from non-farm families. For the purposes of analysis, a household was considered a farm family if they cultivated more than .5 tareas of land in the last 12 months or owned large animals (cattle, sheep, goats, horses) or had more than 10 poultry which had produced eggs in the last 12 months. Two measures of land availability were taken. First, respondents were asked if the family had title to any land and how much. Then they were asked if they had cultivated any land in the last 12 months and how much. If they did cultivate land, the tenure of that land was investigated. Dominicans farm land to which they have title, land which belongs to the state but is farmed free, land they rent or borrow, and land they sharecrop. Use of agricultural inputs such as labor, agrochemicals, irrigation and machinery was noted for those households which cultivated land. For each of the crops harvested, information was gathered on the total production, uses of the production, cash income from crop sales and any loan repayment out of that income.

Livestock information gathered included the current stock and animal production information. This included the number of weeks of milk and egg production in the past 12 months. Sales of animal products was also investigated, with information gathered on the product, amount sold and income earned in the month previous to the interview. Changes in stock were measured by gathering information on livestock purchases and sales in previous 12 months.

Other agricultural information included the amount of large agricultural purchases or sales of land or machinery in the previous 12 months.

Another principal component of household income which was investigated in detail were all jobs of each household member. Jobs were defined to include both paid and unpaid (family) labour. Information was gathered on the duration of each job (number of weeks worked), whether it was full- or part-time work, where the work was (in the home or the household's lands, in the community or outside the community), the wage rate and pay period (daily, monthly, etc.) and the total amount earned in the previous 12 months.

Other sources of income investigated were income from a family business, from pensions and institutional payments, from private transfers (both a measure of total cash which was received over the previous 12 months and a yes/no question as to whether the household received any in-kind transfers such as food or clothing, rental income (money amount and in-kind (yes/no) payments), income from non-agricultural sales, and income from interest, dividends and/or inheritance; all for the previous 12 months.

2.3.5 Food Consumption

Section B contained food consumption information for 1 week. This information was gathered over a period of 8 days with visits by the interviewer every other day. On the day of the interview, the respondent was asked about the household's consumption from the day before the interview and from 2 days before the interview (yesterday and the day before yesterday). Thus the consumption data gathered is based on no more than 24 or 48 hour recall.

Not all foods consumed were measured by the interviewers. Those where quantities were estimated included all foods that contribute significantly to calories or protein. Food not measured included fruits other than plantains and bananas, vegetables other than the starchy roots, squash, and pigeon peas, and processed goods such as coffee, tea, chocolate, and most canned goods. Information on the frequency of purchase and consumption of these foods was gathered, as was the total amount spent on these goods, but the physical amount consumed was not estimated. Thus total calories and protein consumed is underestimated, but as the foods not measured are a small part of total caloric and protein consumption, this underestimation is probably minor. (See the beginning of Chapter 5 for further discussion.)

Section B included 5 subsections. First, the respondent was asked about all food that entered the household from any source other than home production or a family business. Information on the quantity, total cost, and source of each item was gathered. If an item entered the household several times in one day, each purchase or gift was noted separately. Then

the respondent was asked if she had attempted to obtain any item that was not available. If she had, the item(s) and the source where it was attempted to be obtained was noted, as was the amount of time spent looking for the food and what the respondent did when it was unavailable. Next the respondent was asked if the household had sold or given away any food. The food, an estimate of quantity, to whom it was sold, and amount received from the sale were noted. When the food was given away as a gift, the quantity was estimated. Most of the food flows estimated in this part of Section B were already cooked dishes given as gifts to neighbors and/or relatives. Next the respondent was asked to list all food prepared in household for consumption of household members. The interviewer started with the question, "What was the first thing consumed in your house yesterday (day before yesterday)?" Where dishes had been prepared, all ingredients were listed and the quantities of all ingredients other than fruits, vegetables and some processed foods were estimated. For each item consumed, the source was also noted. Finally, the fifth part of Section B covered the meals or snacks eaten out of the house. This included any food consumed outside the home except food prepared at home for consumption outside by family members. The interviewer recorded the meal, location and total cost (if any) of all food eaten outside the home by each family member.

The food quantity estimation techniques used by the interviewers were taught to them by a trained nutritionist. The preferred measure was the actual weight of the food when it was known by the respondent. When the respondent did not know the weight of the food, several different techniques to estimate the quantity were available to the interviewers. If the good was purchased and the price per pound and total amount spent were known, quantity was estimated by dividing total spent by price per pound. All the interviewers travelled with a bag of white beans which were used in combination with beakers of 100 and 1000 mls. to get volumetric estimation of unknown quantities. These were used to estimate quantities of both raw ingredients (rice, sugar, beans, etc.) and amounts of cooked dishes received as gifts or purchased by the household. When a household received, purchased or consumed a dish which was already cooked, a volumetric measure of the quantity was obtained. Through the use of common recipes, this quantity was then converted to the weight of raw ingredients

contained. Quantities of liquids (oil, milk, etc.) were estimated with water in the graduated beakers. For estimation of butter, margarine or lard, a water displacement technique was used. Two dimensional cardboard food models were used to estimate quantities of roots, tubers, bananas, fish, meat and cheese. These models were especially important for the estimation of consumption of home produced foods, as these were often starchy roots or bananas and plantains.

2.4 Estimated Calorie and Protein Consumption

Once the quantities consumed were estimated, caloric and protein content of the foods were calculated. These calculations were based on the following sources:

1. Tabla de Composicion de Alimentos Mas Comunes en la Republica Dominicana (Secretaria del Estado de Salud Publica y Asistencia Social, Division de Nutricion, Santo Domingo, 1984).
2. Valor Nutritivo de los Alimentos Mexicanos (Instituto Nacional de la Nutricion, Mexico, D.F., 1983).
3. Nutritive Value of American Foods in Common Units (USDA Agricultural Handbook #456, Washington, DC, 1975).
4. Composition of Food Raw, Processed, Prepared (USDA Agricultural Handbook #8, Washington, DC., 1975).

The measures of caloric and protein content of foods were corrected for edible portion^{*}, but not for household waste as the amount of waste was observed to be insignificant. An estimate of net calories and protein available to the household was obtained by subtracting from calories and protein prepared in the household and received from outside the amounts given away in the form of cooked dishes. The number of adult equivalents in the household was calculated using caloric and protein requirements of eleven age/sex categories and calculating the proportion of the requirements of an adult male of 45kg., of moderate activity.^{**} Both

* Edible portion information was obtained from the food composition tables. In the absence of such information, the edible portion was calculated by measuring a sample of the foods.

** The figures for calorie and protein requirements were obtained from Energy and Protein Requirements, Technical Report Series #724, World Health Organization, Geneva, 1985.

caloric and protein adult-equivalents were calculated; unless otherwise noted, calorie adult-equivalents are used in the analysis. The number of members present on first day of interviews was used for this calculation. No adjustment was made for guests who ate in the household or for members who did not. The measure of caloric and protein adequacy was based on the number of adult equivalents in the household not on the number of consumers of each dish. Data were collected on the number of persons consuming each dish prepared in the household (but not their age/sex breakdown). In every stratum and at all income levels, the number of consumers on average was slightly higher than the number of persons in the household. This suggests that our estimates of caloric and protein adequacy tend to overestimate availability, and to underestimate any problem which exists.

Daily caloric and protein availability was calculated by dividing total consumption by the number of days for which information was gathered (almost always 7).

The source of each item consumed was noted. Special interest was paid to food received through INESPRES programs. The principal programs were the Ventas Populares (purchased food) and the Section 416 milk products program (which distributed free powdered milk, butter and/or cheese to targeted households in the capital and the Frontier). When the source of a food was a government program, the amount of time spent in order to obtain the food was noted as well as the quantity and total cost (if any). All purchased sources and free sources were noted. "Free" food sources include gifts (both private and state), food received as in-kind pay, food obtained from a family business, and food produced and consumed by the household (home production).

2.5 Quality Control

Several techniques were used to insure the quality of the data. The interviewers received scheduled visits from two Dominican field supervisors. In addition to these visits, the Project Director made frequent, unannounced on-site visits of at least 2 days. During these visits the interviewers were observed during interviews. In addition, the questionnaires were carefully reviewed by the Project Director and the

interviewer together. There were several ways of cross-checking information within the questionnaire to assure internal consistency. For example, cross reference was made between food entering the household and food consumed. The interviewers rapidly learned to make sure that all food which entered the household was accounted for. If an item of food was bought and not consumed for some reason, this was noted in the questionnaire. There was the opportunity to return to some households to fill in missing information when a supplemental anthropometric study was conducted a few months later using the same sample and the same field workers (Johnson, 1987).

Once the data was entered on the computer, several other checks were made to clean up outliers and inconsistent information. Most of the data cleaning took place in-country, which allowed for reference to the questionnaires and consultation with the interviewers. Usually the time between data gathering and data entry was not great, so that when questions came up the interviewers could remember the case and explain or correct the inconsistencies or errors.

3. Food Consumption Patterns

3.1 Income

Food consumption patterns in the Dominican Republic vary markedly by income level. Tables 3.1-3.3 show the percentage contribution of each of eleven food groups to caloric and protein consumption and to the total cash value of food consumed, broken down by expenditure class.* Calorie and protein contributions of the major food groups are presented graphically in Figs. 3.1-3.2.

Compared with many Asian countries where rice contributes as much as 80% or more of calories, the picture one gets in the Dominican Republic is of a rather varied diet, containing significant amounts of animal products even at low income levels. Nevertheless, rice is the dominant contributor

* Consumption was measured excluding fruits, vegetables, and the category "other processed foods". Cash value of food consumed includes the imputed value of foods not purchased. Expenditure deciles and quartiles were computed based on monthly expenditure per capita, including the cash value of food not purchased (See Chapter 2).

FIGURE 3.1

PERCENT OF CALORIES FROM FOOD GROUPS By Expenditure Class

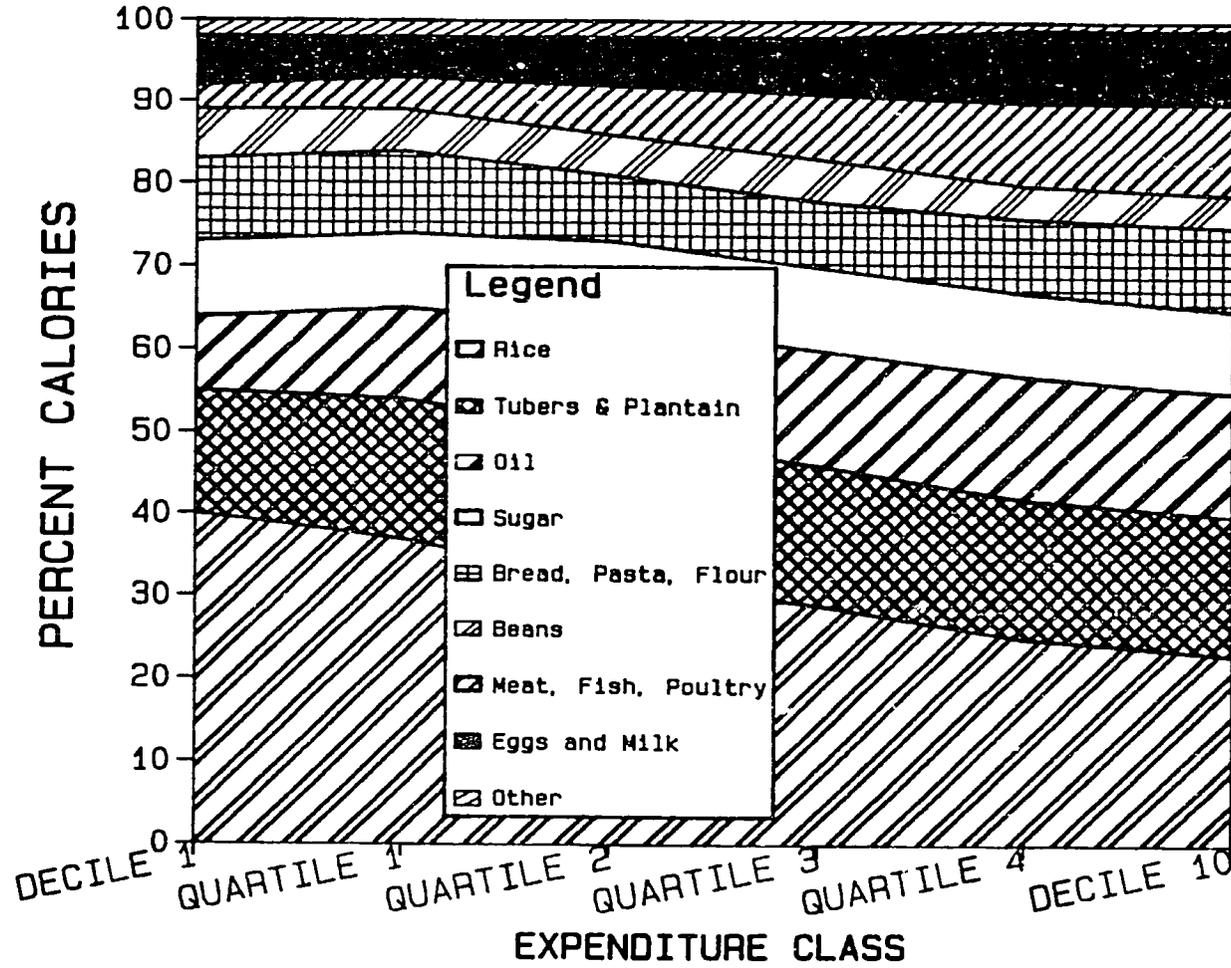


FIGURE 3.2

PERCENT OF PROTEIN FROM FOOD GROUPS By Expenditure Class

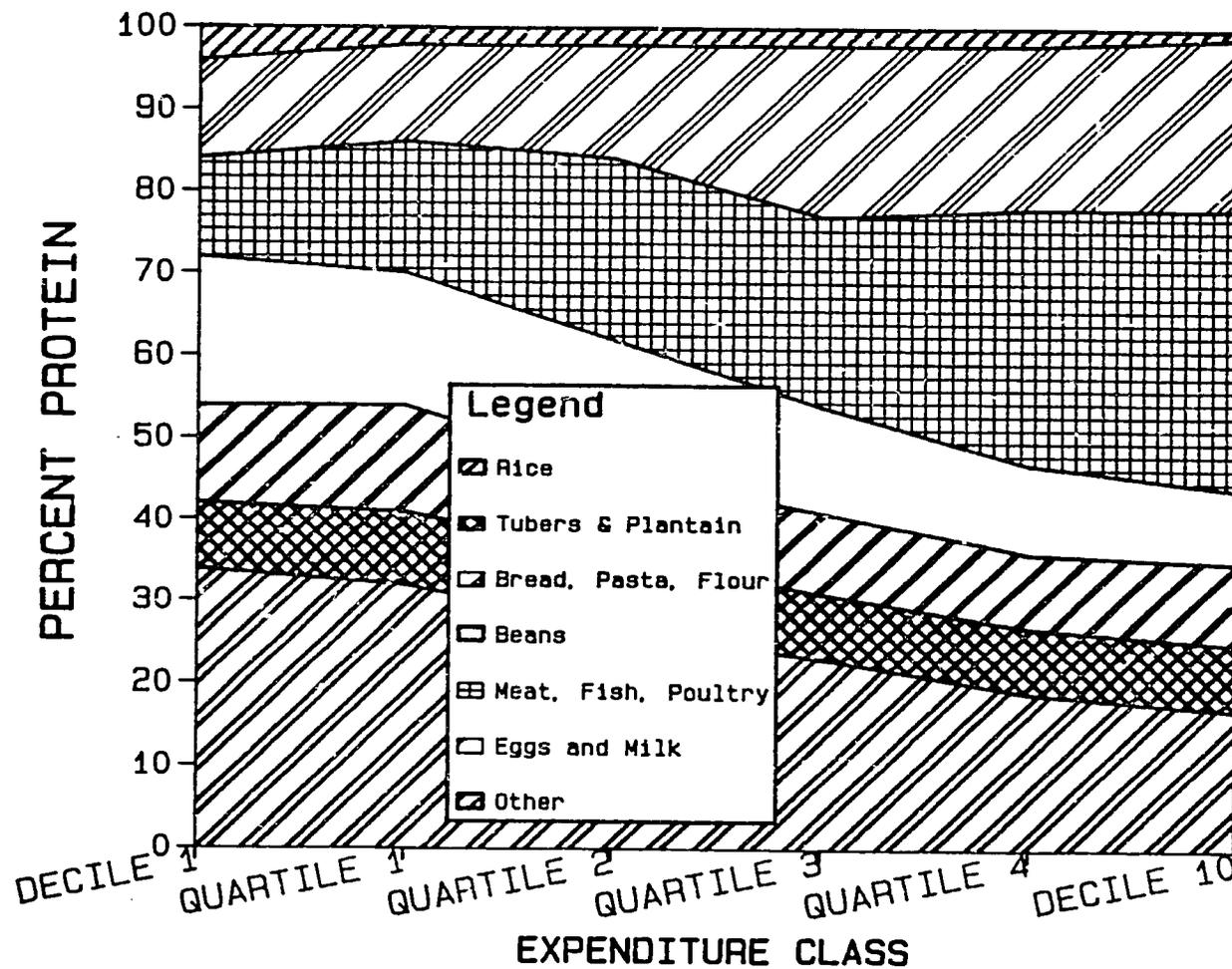


TABLE 3.1

PERCENT OF CALORIES CONSUMED FROM EACH FOOD GROUP
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	30.65	11.74	40.28	14.90	37.24	13.42	32.30	10.34	29.05	9.76	24.77	9.74	22.86	16.07	.0060
BEANS	4.76	3.68	6.09	5.12	5.13	4.03	5.19	3.67	4.55	3.10	4.07	2.90	3.66	2.93	.0001
OTHER GRAINS	.78	2.22	1.67	4.62	1.15	3.19	.90	2.25	.64	1.56	.52	1.81	.38	1.27	.0037
TUBERS, PLANTAINS	17.31	12.18	14.55	15.57	16.61	14.49	18.09	12.49	17.25	11.27	17.13	10.21	16.94	10.71	.5061
MEAT, FISH	7.30	5.17	3.19	4.02	4.17	3.81	6.44	4.60	8.01	4.26	10.22	5.88	11.38	6.33	.0000
MILK, MILK PRODUCTS	6.04	7.16	5.74	10.60	4.66	8.05	5.02	6.10	6.55	5.84	7.94	8.26	8.16	5.74	.0000
EGGS	.74	.83	.24	.37	.39	.50	.70	.83	.79	.78	1.09	1.17	1.32	1.29	.0000
BREAD, FLOUR, PASTA	8.96	7.51	10.05	10.00	10.31	9.09	8.41	6.52	8.42	6.72	8.65	7.05	9.57	8.78	.0031
OIL	13.36	6.28	9.10	6.61	11.04	6.06	12.87	5.77	13.99	5.40	15.22	6.86	15.31	6.33	.0000
SUGAR	9.52	6.88	8.57	6.61	8.79	6.16	9.65	7.04	10.19	6.92	9.57	6.91	9.62	8.16	.0848
OTHER FATS	.52	1.49	.46	2.25	.45	1.69	.37	1.30	.50	1.05	.77	1.65	.74	1.43	.0033
AVERAGE DAILY CALORIES PER CAPITA	2060	1102	1157	572	1420	587	1928	740	2303	983	2609	1479	2753	1875	.0000
N OF CASES	1345		110		301		314		311		311		122		

TABLE 3.2

PERCENT OF PROTEIN CONSUMED FROM EACH FOOD GROUP
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	25.14	11.52	34.13	14.02	32.24	12.66	27.10	10.32	23.28	9.19	18.76	9.64	16.62	11.06	.0000
BEANS	13.99	9.49	17.97	13.42	15.75	10.98	15.73	9.63	13.10	8.24	11.21	7.67	9.37	7.07	.0000
OTHER GRAINS	1.94	5.02	3.86	8.64	2.86	6.55	2.29	5.52	1.61	3.59	1.28	4.40	.98	3.62	.0007
TUBERS, PLANTAINS	8.49	7.51	8.19	10.57	8.73	9.03	8.79	7.46	8.25	6.62	8.18	6.73	8.18	6.80	.6469
MEAT, FISH	24.37	13.87	11.77	11.06	15.92	11.92	22.43	13.17	27.02	11.33	31.39	14.33	34.23	14.92	.0000
MILK, MILK PRODUCTS	12.94	12.84	11.42	15.86	10.20	12.94	11.08	12.98	14.14	10.90	16.30	13.37	16.80	13.38	.0000
EGGS	2.54	3.03	.90	1.36	1.49	1.93	2.56	3.24	2.70	2.69	3.44	3.85	4.03	4.22	.0000
BREAD, FLOUR, PASTA	10.53	9.10	11.71	12.00	12.77	11.97	9.97	7.64	9.84	7.48	9.37	7.36	9.73	8.48	.0000
OTHER FATS	.52	1.47	* .02		.01	.03	* .02		.01	.03	.02	.04	.02	.04	.0001
PERCENT FROM ANIMAL SOURCES	39.87	17.88	24.10	17.90	27.62	15.91	36.08	16.70	43.87	14.08	51.15	16.04	55.08	16.06	.0000
AVERAGE DAILY GMS. PROTEIN PER CAPITA	47.69	27.09	24.36	12.11	29.73	12.48	42.81	17.38	53.62	23.13	64.83	36.27	72.51	47.52	.0000
N OF CASES	1345		110		301		314		311		311		122		

TABLE 3.3
 PERCENT OF VALUE EATEN FROM EACH GROUP
 BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	12.98	8.51	23.22	12.51	19.66	10.73	14.04	7.30	10.82	5.55	8.24	5.59	7.43	6.07	.0000
BEANS	5.91	5.51	10.03	9.56	8.04	7.18	6.70	5.34	4.92	3.92	3.93	3.23	3.18	3.31	.0000
OTHER GRAINS	1.51	4.63	3.46	9.02	2.22	6.13	1.88	5.30	1.18	2.53	1.01	4.40	.90	4.12	.0043
TUBERS, PLANTAINS	12.46	9.47	11.43	12.68	13.11	11.99	13.35	9.83	12.02	7.70	11.47	8.06	10.99	7.21	.0435
MEAT, FISH	39.54	17.22	22.01	17.71	28.27	17.31	37.14	16.06	44.25	13.41	47.51	15.55	48.88	16.45	.0000
MILK, MILK PRODUCTS	8.73	9.95	9.97	15.07	7.95	11.41	7.29	9.18	8.95	7.38	10.59	10.55	11.03	10.05	.0002
EGGS	2.42	2.80	1.30	2.00	1.80	2.23	2.63	3.44	2.46	2.29	2.80	3.14	3.24	3.51	.0001
BREAD, FLOUR, PASTA	4.50	4.58	6.28	7.61	6.14	6.54	4.43	4.15	3.96	3.10	3.46	3.19	3.49	3.49	.0000
OIL	9.37	5.66	9.33	7.26	9.90	5.69	9.88	5.67	8.92	4.31	8.68	5.91	8.49	6.98	.0056
SUGAR	2.32	2.20	2.65	2.49	2.57	2.44	2.47	2.63	2.29	1.81	2.05	1.89	2.20	2.56	.0225
OTHER FATS	.20	.90	.28	1.55	.29	1.27	.14	.51	.19	.52	.20	1.05	.10	.24	.2354
AVERAGE DAILY VALUE EATEN (ED\$)	9.07	5.53	4.81	3.20	6.67	4.35	8.71	4.80	10.17	5.19	10.75	6.61	10.91	6.58	.0000
N OF CASES	1345		110		301		314		311		311		122		

of calories in every expenditure class, contributing 30% of calories on average to the diet. Its relative importance declines from 40% of calories in the lowest decile to 23% in the highest, but this reflects an increase in total calories consumed rather than a decline in quantity of rice consumed. The absolute quantity of rice consumed per capita, in fact, rises with income until it levels off in the top quartile and begins to decline only in the top decile. Table 3.4 shows the quantities of individual foods consumed per capita, broken down by expenditure class.

At the time of the survey, two major qualities of rice were sold: *corriente* (common) and *selecto* (premium). Table 3.4 shows that common rice has the characteristics of an inferior good in the top two income quartiles (that is, in both quantity and in percentage terms, consumption declines with rising income). This is not true of rice as a whole. Consumption of common rice increases with rising income in below-median households, indicating that, in these poorer households, quantity of the staple diet is still more of a concern than improving the quality of food consumed.

Table 3.4 shows that, aside from common rice, the only food whose absolute consumption clearly declines with rising income is green banana (which is consumed as a starch, like plantain). Yuca (cassava), an important staple of the poor, shows no significant change in absolute consumption with rising income, though its proportional contribution to the diet declines because consumption of other foods is rising. Raw (brown) sugar, considered an inferior food, shows significant decline in absolute consumption in Quartiles 3 and 4, though consumption rises from Decile 1 through Quartile 2. All the other foods that we studied show either steady or rising per capita consumption with rising per capita expenditure. This suggests that households up to and even above the median per capita expenditure level perceive a need to increase not only the quality but also the quantity of the food that they consume. It also suggests that any attempt to target a consumer subsidy by choosing foods with a consumption pattern skewed to the poor will have limited foods to choose from. The current policy of focusing on differentiating a low quality of rice appears to be one promising possibility.

TABLE 3.4

PER CAPITA DAILY CONSUMPTION OF SELECTED FOODS
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	lbs	SD	lbs	SD	lbs	SD	lbs	SD	lbs	SD	lbs	SD	lbs	SD	
COMMON RICE	.308	.237	.265	.158	.294	.161	.337	.187	.321	.270	.277	.292	.198	.258	.0072
SELECT RICE	.058	.139	.004	.029	.014	.059	.031	.096	.079	.149	.114	.198	.160	.250	.0000
ALL RICE	.370	.217	.271	.155	.309	.148	.368	.161	.405	.220	.403	.285	.390	.330	.0000
RED BEANS	.055	.052	.042	.044	.041	.038	.055	.049	.058	.050	.062	.060	.051	.055	.0000
OTHER BEANS	.010	.028	.002	.008	.005	.013	.012	.033	.011	.026	.010	.035	.014	.047	.0107
GREEN PIGEON PEA	.016	.050	.015	.036	.013	.034	.019	.063	.018	.048	.015	.055	.016	.064	.4625
DRIED PIGEON PEA	.003	.014	.003	.014	.004	.014	.004	.015	.002	.014	.002	.011	.002	.012	.3135
PLANTAIN (b)	.448	.613	.110	.193	.242	.373	.405	.459	.518	.660	.596	.751	.564	.611	.0000
YUCA	.210	.413	.165	.365	.212	.424	.241	.532	.197	.317	.187	.327	.163	.334	.3681
GREEN BANANA (c)	.132	.545	.183	.617	.135	.440	.164	.509	.185	.863	.066	.253	.038	.132	.0485
SWEET POTATO	.070	.324	.031	.107	.037	.161	.050	.133	.079	.306	.121	.543	.110	.421	.0081
POTATO	.044	.106	.008	.056	.009	.024	.017	.040	.045	.086	.102	.178	.164	.227	.0000
YAUTIA	.026	.143	.011	.079	.007	.051	.024	.102	.026	.070	.047	.262	.041	.250	.0098
SQUASH	.022	.114	.007	.029	.013	.064	.014	.062	.025	.074	.032	.193	.030	.146	.1013
NONE	.015	.109	*	.008	.003	.026	.005	.036	.029	.163	.023	.147	.039	.225	.0072
CHICKEN	.088	.097	.019	.030	.033	.044	.069	.071	.111	.097	.131	.125	.155	.137	.0000
BEEF	.050	.078	.010	.022	.018	.037	.037	.047	.053	.082	.086	.105	.095	.112	.0000
PORK	.014	.036	.003	.016	.003	.012	.007	.024	.018	.034	.028	.055	.026	.054	.0000
GOAT	.003	.019	.001	.012	.001	.014	.002	.015	.003	.016	.005	.025	.009	.037	.1089
FRESH FISH	.015	.074	.003	.017	.009	.034	.011	.039	.014	.063	.027	.130	.046	.196	.0202
DRIED FISH	.010	.023	.003	.008	.005	.010	.007	.016	.012	.025	.015	.034	.013	.028	.0000
SALAMI	.009	.017	.002	.006	.003	.006	.007	.013	.010	.017	.014	.024	.013	.024	.0000
SARDINES	.004	.017	.003	.006	.003	.008	.003	.008	.003	.009	.005	.032	.003	.012	.3895
EGGS (a)	.212	.266	.046	.070	.081	.105	.183	.216	.242	.249	.345	.373	.435	.445	.0000
LIQUID MILK (a)	.132	.184	.052	.090	.059	.094	.102	.159	.167	.206	.202	.216	.212	.209	.0000
POWDERED MILK	.007	.023	.004	.010	.005	.017	.007	.027	.006	.017	.007	.025	.004	.014	.5213
EVAPORATED MILK	.007	.025	.001	.009	.001	.007	.002	.012	.007	.029	.014	.037	.019	.043	.0000
CHEESE	.008	.024	.001	.007	.002	.009	.004	.017	.009	.025	.012	.024	.017	.032	.0000
BUTTER	.001	.006	*	.001	*	.002	*	.003	.001	.006	.003	.008	.004	.010	.0000
VEGETABLE OIL	.069	.048	.029	.030	.039	.026	.063	.041	.079	.041	.094	.061	.093	.054	.0000
MATURE COCONUT (d)	.024	.071	.032	.067	.030	.065	.029	.085	.028	.078	.012	.058	.009	.057	.0064
BREAD ROLLS	.654	.062	.021	.030	.031	.042	.046	.057	.064	.060	.069	.068	.074	.073	.0000
PASTA	.030	.034	.024	.023	.028	.027	.030	.034	.028	.030	.037	.043	.038	.050	.0037
REFINED SUGAR	.014	.038	*	.005	.001	.007	.004	.016	.015	.041	.033	.056	.052	.062	.0000
SEMI-REFINED SUGAR	.014	.044	.002	.009	.004	.025	.006	.020	.019	.053	.023	.059	.013	.038	.0000
RAW SUGAR	.082	.088	.054	.048	.065	.052	.092	.079	.098	.106	.076	.103	.064	.111	.0000
N OF CASES	1397		109		300		314		312		307		118		

(a) All figures are in pounds except Fresh Milk which is in litres and Eggs, which are by unit.

(b) A medium plantain weighs .563 lbs.

(c) A small green banana weighs .125 lbs.

(d) A medium mature coconut weighs 1.57 lbs.

Table 3.5 shows the relative contribution of individual foods to total caloric intake, broken down by expenditure class. A number of foods show increasing importance in lower income households, and then declining importance at higher income levels. These foods include common rice and yuca, where the importance begins to decline above Quartile 2. Raw sugar and green bananas do not decline in importance until Quartile 4; and plantain and red beans show consistent rising importance, except between the top quartile and the top decile of per capita income. Select rice, vegetable oil, and all the important animal protein sources (beef, chicken, fish, eggs, liquid milk) show a rising relative contribution to caloric intake throughout the observed income distribution.

It is not at all surprising to find the quality of the diet, as indicated by premium rice and a higher consumption of animal products, rising as income rises. What is noteworthy is that plantain and the starchy roots except for common rice and yuca (cassava) do not appear to be inferior, and even these are only inferior above Quartile 2. Even raw sugar, the cheapest source of calories and a food generally considered undesirable (compared to the preferred refined sugar), shows increasing absolute and relative importance up to the highest income quartile. In spite of the Dominican Republic's status as a "middle income" poor country, this is not a picture of an affluent consumption pattern. That is, the increase in consumption of most foods does not begin to level off until the highest income level.

At the same time, Table 3.2 shows that even at the very lowest income levels, a substantial proportion of protein comes from the higher-quality animal sources. In the bottom decile, over 24% of protein comes from animal products. In the top quartile, more than 50% of protein intake is from these sources. These figures indicate the importance which Dominican consumers place on the quality of their diets, even when the quantity of the diet (i.e. caloric content) is inadequate, as it is for 60% of the households in the bottom decile.

These figures suggest that protein intake could be increased in low-income households even without a change in income by substituting relatively lower-priced vegetable protein sources for the more expensive

TABLE 3.5

PERCENT OF CALORIES FROM SELECTED FOODS
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
COMMON RICE	25.45	15.52	38.15	14.99	34.45	14.85	28.76	13.24	21.72	14.41	16.82	14.40	12.80	13.79	.0000
SELECT RICE	4.53	9.92	.66	4.38	1.69	7.04	2.96	8.73	6.56	11.87	7.60	10.93	9.63	11.61	.0000
ALL RICE	30.65	11.74	40.28	14.90	37.24	13.42	32.30	10.34	29.05	9.76	24.77	9.76	22.86	10.07	.0000
RED BEANS	4.03	3.39	5.51	4.93	4.51	3.94	4.23	3.15	3.72	2.85	3.51	2.81	2.99	2.68	.0003
OTHER BEANS	.73	1.65	.57	1.22	.61	1.32	.95	2.15	.81	1.53	.55	1.46	.66	1.86	.0106
GREEN PIGEON PEA	.49	1.80	1.17	4.31	.69	2.75	.55	1.61	.46	1.16	.35	1.57	.26	.82	.1526
DRIED PIGEON PEA	.25	1.15	.42	1.64	.40	1.47	.31	1.42	.15	.86	.16	.75	.10	.52	.0188
PLANTAIN	7.91	8.32	3.10	5.00	5.88	8.59	8.39	9.23	8.22	8.10	8.68	6.81	8.10	6.67	.0001
YUCA	4.47	7.75	5.51	11.77	5.92	11.00	4.78	8.26	3.78	5.08	3.32	4.83	2.92	4.73	.0001
GREEN BANANA	1.89	5.46	3.61	8.44	2.63	6.52	2.47	6.58	1.97	5.60	.74	2.28	.52	1.84	.0001
SWEET POTATO	1.24	4.20	1.24	3.95	1.11	3.63	1.05	2.70	1.21	3.74	1.71	6.13	1.98	6.55	.1979
POTATO	.68	1.57	.19	.59	.20	.52	.29	.72	.69	1.39	1.48	2.49	2.35	3.20	.0000
YAUTIA	.52	2.43	.32	2.16	.20	1.39	.54	2.40	.55	1.42	.71	3.79	.52	2.81	.0770
SQUASH	.10	.47	.05	.19	.09	.42	.08	.42	.11	.26	.13	.67	.12	.33	.4492
NAMS	.20	1.37	.02	.22	.08	.65	.10	.64	.37	2.05	.28	1.73	.41	2.45	.0317
CHICKEN	3.24	3.50	1.29	1.96	1.81	2.36	2.93	3.40	3.76	3.22	4.13	4.23	4.73	4.53	.0000
BEEF	1.73	2.77	.78	2.81	.94	2.53	1.40	1.98	1.61	2.30	2.77	3.52	3.16	3.57	.0000
PORK	.45	1.29	.13	.72	.13	.58	.32	1.16	.65	1.58	.75	1.56	.66	1.56	.0000
EGG	.06	.39	.02	.23	.03	.31	.05	.35	.08	.47	.07	.43	.11	.46	.3720
FRESH FISH	.21	.76	.14	.67	.24	.83	.18	.60	.17	.60	.31	1.04	.46	1.33	.1200
DRIED FISH	.42	.92	.24	.52	.29	.55	.37	.80	.48	.93	.58	1.28	.63	.95	.0007
SALAMI	.62	1.44	.23	.82	.32	.70	.58	1.28	.67	1.41	.88	2.09	.84	2.81	.0000
SARDINES	.18	.47	.21	.46	.23	.49	.18	.46	.15	.33	.15	.52	.13	.57	.0931
EGGS	.73	.87	.24	.36	.38	.50	.69	.82	.78	.78	1.08	1.16	1.32	1.29	.0000
LIQUID MILK	4.13	6.46	3.71	9.69	2.94	6.59	3.44	5.61	4.57	5.23	5.72	8.10	5.70	5.32	.0000
POWDERED MILK	.94	2.89	1.26	4.75	1.11	3.70	.92	2.72	.81	2.32	.81	2.58	.45	1.56	.5349
EVAPORATED MILK	.18	.76	.07	.43	.05	.31	.08	.38	.19	.73	.39	1.27	.55	1.69	.0000
CHEESE	.53	1.78	.38	2.12	.26	1.39	.40	1.62	.58	1.37	.77	1.72	1.04	2.39	.0003
BUTTER	.22	.82	.09	.46	.11	.56	.11	.71	.23	.80	.46	1.15	.54	1.30	.0000
VEGETABLE OIL	13.18	6.30	8.92	6.60	10.85	6.11	12.67	5.80	13.77	5.45	15.11	6.84	15.22	6.31	.0000
MATURE COCONUT	1.35	3.57	2.80	5.67	2.28	4.73	1.48	3.55	1.35	3.62	.53	1.94	.41	1.85	.0000
BREAD ROLLS	3.67	4.44	2.60	3.90	3.24	5.32	3.26	4.17	3.97	3.85	3.86	3.93	4.16	4.32	.0616
PASTA	3.71	4.72	5.68	8.69	4.74	6.11	3.65	3.63	3.29	4.78	3.53	4.37	4.03	5.67	.0010
REFINED SUGAR	1.14	2.95	.22	1.39	.18	1.10	.49	1.83	1.29	3.26	2.55	4.10	3.86	4.44	.0000
SEMI-REFINED SUGAR	1.28	4.14	.41	2.22	.57	3.17	.69	2.03	1.66	4.08	1.98	5.27	1.62	6.11	.0000
RAW SUGAR	7.03	7.54	7.68	6.37	7.82	5.90	8.34	7.82	7.38	9.21	4.95	6.60	4.07	6.65	.0000
AVERAGE DAILY KCAL PER CAPITA	2060	1102	1157	572	1420	587	1928	740	2303	983	2609	1479	2753	1875	.0000
N OF CASES	1345		110		301		314		311		311		122		

animal protein. However, the absolute quantities of animal protein foods consumed are so small that such substitution would have minimal effect on dietary adequacy, and it would come at the cost of a reduction in the perceived quality of the diet.*

Equally important is the point that, when caloric intake is inadequate, the protein which is consumed may be used by the body as a calorie source rather than as protein. In reality, therefore, protein adequacy may be even lower than it appears based on protein consumption alone. Since a high proportion of low-income households are at risk of deficient caloric intake, this suggests that increasing the overall quantity of the diet should be the primary nutrition-related concern of policy.

Table 3.6 shows the relative contribution of individual foods to protein intake at different expenditure levels. Common rice is the dominant contributor of protein in all expenditure classes except the top decile, though its relative importance declines sharply with rising expenditure level. Rice (including both common and select) is the major source of protein throughout the expenditure distribution. Red beans decline in importance as expenditure rises, and chicken, beef, eggs, and liquid milk increase their contribution. The contribution of yuca, a poor source of protein, declines to practically nil as income rises. The dominant contributors of protein in the lowest expenditure class (Decile 1) are rice (33%) and beans (16%). Of the animal sources, liquid milk is clearly the most important (7%) followed by chicken, which contributes 4% of protein in the bottom decile, and 6% in the bottom quartile. Less-preferred animal foods such as salami and dried fish are much less important contributors of protein. This is undoubtedly due to the much

*The protein requirements used as the basis for assessing dietary adequacy in this study (FAO/WHO, 1985, p 120) are based on the assumption of a mixed diet in which 40% of the protein comes from rice, 35% comes from beans and other pulses, and 15% comes from animal sources. It is necessary to specify this assumption because the body's ability to use protein from animal sources is greater than its ability to use vegetable proteins. The overall level of efficiency of the protein utilization in the Dominican diet is at least as high as that assumed by the requirements. More than 15% of protein is from animal sources even in the lowest income class, and rice and beans are ordinarily consumed together, which enhances the net protein utilization of the protein from both foods.

TABLE 3.6

PERCENT OF PROTEIN FROM SELECTED FOODS
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUANTILE 1		QUANTILE 2		QUANTILE 3		QUANTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
COMMON RICE	21.36	14.17	32.73	14.12	30.10	13.81	24.38	12.47	17.93	12.67	13.25	12.60	10.02	13.35	.0000
SELECT RICE	3.40	7.62	.58	3.90	1.48	6.22	2.37	7.09	4.94	9.04	5.34	7.72	6.38	7.64	.0000
ALL RICE	25.14	11.52	34.13	14.02	32.24	12.66	27.10	10.32	23.28	9.19	18.76	9.64	16.62	11.06	.0000
RED BEANS	11.90	9.05	16.39	12.82	13.88	10.72	12.93	8.95	10.77	7.70	9.76	7.58	7.75	6.53	.0000
OTHER BEANS	2.07	1.65	1.58	3.60	1.87	4.33	2.79	5.87	2.29	4.50	1.45	3.87	1.62	4.60	
GREEN PIGEON PEA	1.23	3.82	2.45	7.10	1.63	4.93	1.43	3.96	1.19	2.85	.86	3.70	.67	2.35	.0849
DRIED PIGEON PEA	.66	3.01	1.27	5.01	1.13	4.13	.79	3.60	.38	2.02	.40	1.95	.26	1.41	.0062
PLANTAIN	3.28	3.99	1.38	2.24	2.75	4.60	3.63	4.59	3.34	3.65	3.25	2.78	2.88	2.61	.0547
YUCA	1.82	3.86	2.69	6.74	2.73	5.84	1.98	4.13	1.40	2.09	1.18	1.93	.96	1.74	.0000
GREEN BANANA	1.18	3.80	2.60	6.71	1.75	4.84	1.50	4.22	1.20	3.82	.40	1.28	.25	.88	.0001
SWEET POTATO	.68	2.63	.66	2.34	.61	2.33	.58	1.63	.63	2.24	.95	3.82	1.04	3.80	.2648
SQUASH	.23	1.08	.15	.62	.21	1.01	.18	1.08	.23	.54	.28	1.51	.24	.77	.7095
NAMB	.20	1.54	.02	.25	.09	.74	.09	.58	.37	2.20	.30	2.11	.47	3.15	.0555
POTATO	.63	1.34	.20	.55	.22	.52	.30	.72	.65	1.19	1.30	2.08	1.98	2.60	.0000
YAUTIA	.36	2.13	.29	2.15	.17	1.35	.39	2.08	.33	.85	.53	3.49	.38	2.57	.2433
CHICKEN	9.65	9.66	4.10	5.83	5.88	7.22	8.92	9.17	11.33	9.21	11.45	11.12	12.29	11.01	.0000
BBBF	4.61	6.54	1.89	4.91	2.61	5.60	3.99	5.27	4.38	5.56	6.98	7.91	7.59	8.13	.0000
PORK	1.11	3.04	.36	1.92	.35	1.54	.84	2.97	1.57	3.49	1.74	3.65	1.45	3.52	.0000
GOAT	.28	1.76	.17	1.82	.20	1.83	.26	1.55	.37	1.98	.34	1.84	.48	2.01	.6589
FRESH FISH	1.62	5.45	1.22	5.54	1.93	6.39	1.53	4.86	1.36	4.50	2.06	6.46	2.95	8.00	.3536
DRIED FISH	3.31	5.89	1.93	4.67	2.28	4.45	2.98	5.49	3.96	6.56	4.16	6.74	4.95	7.20	.0002
SALAMI	1.50	3.52	.64	2.13	.92	1.97	1.60	3.87	1.77	3.52	2.09	4.38	1.80	5.33	.0005
SARDINES	.81	2.32	1.01	2.26	1.09	2.35	.84	2.50	.65	1.47	.65	2.66	.61	3.35	.0590
EGGS	2.52	3.01	.89	1.35	1.47	1.91	2.53	3.21	2.67	2.69	3.42	3.81	4.02	4.18	.0000
LIQUID MILK	8.60	11.63	7.34	14.27	6.54	11.21	7.58	12.28	9.66	10.32	10.98	12.56	11.05	12.02	.0000
POWDERED MILK	1.93	5.51	2.48	7.66	2.35	6.74	1.94	5.36	1.64	4.52	1.61	5.02	.85	3.04	.3102
EVAPORATED MILK	.49	2.22	.19	1.14	.16	.84	.23	1.00	.49	1.68	1.03	3.99	1.51	5.76	.0000
CHEESE	1.64	4.87	1.00	4.71	.80	3.52	1.21	3.92	1.87	4.08	2.37	4.62	2.95	5.82	.0000
BUTTER	.00	.02	*	.02	*	.02	*	.02	*	.03	.01	.03	.01	.04	.0000
BREAD ROLLS	4.85	5.96	3.52	4.98	4.64	8.25	4.40	5.29	5.25	4.90	4.70	4.57	4.72	4.54	.3231
PASTA	3.93	5.25	6.39	10.66	5.46	7.52	3.95	4.13	3.38	4.74	3.38	4.20	3.59	5.12	.0000
WHEAT FLOUR	.78	3.53	.51	1.74	1.00	3.08	.66	2.86	.62	2.61	.54	2.41	.82	2.77	.1672
CORN FLOUR	.70	3.08	.89	2.93	1.28	5.00	.71	2.46	.39	1.25	.55	2.84	.67	3.69	.0035
MATURE COCONUT	.81	2.16	1.79	3.67	1.45	3.05	.87	2.10	.76	2.02	.30	1.15	.24	1.17	.0000
AVG. DAILY PROTEIN PER CAPITA	47.69	27.09	24.36	12.11	29.73	12.48	42.81	17.38	53.62	23.13	64.83	36.27	72.51	47.52	.0000
N OF CASES	1345		110		301		314		311		311		122		

* = Less than .01%

TABLE 3.7

PERCENT OF VALUE EATEN FROM SELECTED FOODS
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
COMMON RICE	11.13	9.28	22.52	12.25	18.44	10.96	12.59	8.02	8.21	6.56	5.85	6.51	4.55	6.66	.0000
SELECT RICE	1.67	3.93	.29	1.76	.86	3.80	1.29	3.90	2.45	4.57	2.31	3.47	2.81	3.50	.0000
ALL RICE	12.98	8.51	23.22	12.51	19.66	10.73	14.04	7.30	10.82	5.55	8.24	5.59	7.43	6.07	.0000
RED BEANS	5.19	5.24	9.37	9.23	7.25	6.97	5.74	4.84	4.17	3.58	3.49	3.19	2.74	3.20	.0000
OTHER BEANS	.71	1.78	.66	1.37	.79	1.77	.95	2.35	.73	1.68	.43	1.31	.43	1.43	.0041
GREEN PIGEON PEA	1.26	4.41	2.87	8.80	1.74	5.88	1.59	5.07	1.07	2.42	.87	4.14	.78	3.44	.0553
DRIED PIGEON PEA	.21	1.05	.53	2.21	.43	1.65	.25	1.18	.09	.47	.12	.60	.09	.55	.0004
PLANTAIN	5.47	5.72	2.94	4.76	4.89	6.79	6.11	6.44	5.54	4.96	5.18	4.38	4.65	4.52	.0512
YUCA	3.09	5.73	4.01	7.74	4.57	8.56	3.44	6.23	2.45	3.25	2.02	3.36	1.64	2.98	.0000
GREEN BANANA	.78	2.68	1.78	5.68	1.19	3.95	.95	2.70	.74	2.38	.25	.82	.20	.76	.0001
SWEET POTATO	.69	2.49	.71	2.42	.63	2.12	.72	1.95	.75	3.14	.73	2.77	.74	2.27	.9375
POTATO	.92	1.80	.48	1.22	.47	1.07	.53	1.29	.97	1.57	1.70	2.62	2.53	3.24	.0000
YAUTIA	.53	3.28	.65	5.00	.34	3.10	.69	4.44	.47	1.26	.57	3.80	.24	.75	.6153
SQUASH	.46	1.88	.30	1.12	.45	1.97	.34	1.24	.46	.93	.60	2.87	.52	1.85	.4376
NAHE	.24	1.94	.06	.60	.11	.82	.09	.52	.39	2.80	.43	2.72	.63	3.84	.0559
CHICKEN	8.08	7.05	4.27	5.80	5.84	6.70	7.86	6.88	9.41	6.67	8.76	7.38	9.23	7.30	.0000
BEEF	5.37	6.45	2.59	5.44	3.28	5.77	5.12	5.83	5.43	5.84	7.21	7.19	7.45	7.13	.0000
PORK	1.59	3.67	.53	2.40	.61	2.26	1.19	3.47	2.24	4.14	2.38	4.35	2.08	4.17	.0000
GOAT	.38	2.15	.25	2.51	.33	2.44	.32	1.68	.45	2.13	.48	2.40	.77	3.21	.7397
FRESH FISH	.77	2.71	.63	2.99	.87	2.97	.62	2.07	.64	2.18	1.13	3.59	1.47	3.38	.6711
DRIED FISH	1.73	2.99	1.42	2.89	1.59	2.80	1.65	2.68	1.98	3.41	1.81	3.11	1.98	3.03	.3722
SALAMI	1.40	2.59	.68	2.24	.96	2.09	1.38	2.27	1.56	2.87	1.61	2.96	1.22	3.28	.0079
SARDINES	.49	1.48	.75	1.70	.77	1.69	.46	1.09	.33	.77	.41	1.88	.27	1.46	.0010
EGGS	2.39	2.76	1.28	1.98	1.77	2.19	2.61	3.41	2.44	2.28	2.77	3.05	3.20	3.32	.0001
LIQUID MILK	5.06	8.05	5.83	12.99	4.46	9.07	4.44	8.00	5.43	6.12	6.14	9.10	6.19	7.97	.0247
POWDERED MILK	1.36	4.45	2.20	6.46	2.07	6.57	1.27	3.97	.93	2.70	1.03	3.53	.54	1.96	.0061
EVAPORATED MILK	.58	2.42	.33	1.86	.28	1.37	.34	1.34	.64	2.24	1.06	3.98	1.52	5.80	.0003
CHEESE	1.37	4.53	1.31	6.20	.86	4.17	1.03	3.47	1.55	3.91	1.74	3.59	2.15	4.38	.0104
BUTTER	.27	.98	.15	.54	.16	.84	.14	.81	.29	.93	.54	1.34	.59	1.40	.0000
VEGETABLE OIL	9.26	5.54	9.16	7.18	9.75	5.65	9.78	5.63	8.82	4.32	8.59	5.70	8.39	6.58	.0065
MATURE COCONUT	.43	1.37	1.15	2.60	.86	2.17	.46	1.16	.38	1.19	.13	.57	.10	.64	.0000
BREAD ROLLS	2.67	3.38	2.67	3.95	3.03	4.84	2.55	3.15	2.72	2.59	2.23	2.29	2.09	1.99	.0284
PASTA	1.27	2.40	2.93	6.38	2.19	4.22	1.28	1.54	.93	1.41	.84	1.29	.90	1.65	.0000
REFINED SUGAR	.34	.93	.06	.39	.06	.36	.17	.63	.45	1.17	.69	1.17	1.01	1.26	.0000
SEMI-REFINED SUGAR	.35	1.26	.14	.70	.26	1.60	.21	.62	.44	1.15	.46	1.44	.40	1.87	.0221
RAW SUGAR	1.68	3.56	2.38	2.46	2.20	2.07	2.12	3.62	1.69	5.83	.87	1.22	.77	1.39	.0000
AVERAGE DAILY VALUE EATEN	9.07	5.53	4.81	3.20	6.67	4.35	8.71	4.80	10.17	5.19	10.75	6.61	10.91	6.58	.0000
N OF CASES	1345		110		301		314		311		311		122		

lower protein density of salami, and to the small quantities consumed of both foods.

This description of protein sources should not paint a picture of luxurious consumption levels at low income. Table 3.4 indicates that the percentage contributions discussed above reflect very small absolute quantities consumed: .02 lbs., or a third of an ounce of chicken per person per day, and .05 liters (1.8 fl. oz.) of milk in the bottom decile.

The top 5 contributors of calories in the lowest quartile are (in order) common rice (34%) vegetable oil (11%), raw sugar (8%), yuca (cassava) (6%), and plantain (6%). In the top quartile, they are common rice (17%), vegetable oil (15%) plantain (9%), select rice (8%), and liquid milk (6%). Raw sugar is sixth (5%). (See Table 3.8.)

The top 5 contributors of protein in the bottom income quartile are (in order) common rice (30%), red beans (14%), liquid milk (6.5%), chicken (5.9%), and pasta (5.5%). In the highest quartile, they are common rice (13%), chicken (11%) liquid milk (11%), red beans (10%), and beef (7%). (See Table 3.9.)

The fact that four of the top five foods are the same in both groups indicates that the observed differences in consumption patterns are due to purchasing power and not to different habits or preferences. The same foods generally make up the diets of all income groups, but the relative importance of the higher quality foods increases with rising income.

3.2 Region

There are few notable differences in consumption patterns in the five regions represented by the survey, with the exception of the Frontier. Tables 3.10 and 3.11 show the percentage contribution of each food group to

* All per capita and per adult-equivalent figures are computed by dividing household consumption by a measure of household size adjusted for age/sex composition. No data on individual consumption was available. The simplifying assumption of equitable intra-household food distribution is implicit in the calculation.

TABLE 3.8

TOP 10 CONTRIBUTORS TO CALORIES
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 2		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10	
	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%
1.	Common Rice	25.45	Common Rice	38.15	Common Rice	34.45	Common Rice	28.76	Common Rice	21.72	Common Rice	16.82	Veg. Oil	15.22
2.	Veg. Oil	13.18	Veg. Oil	8.92	Veg. Oil	10.85	Veg. Oil	12.67	Veg. Oil	13.77	Veg. Oil	15.11	Common Rice	12.80
3.	Plantain	7.91	Raw Sugar	7.68	Raw Sugar	7.82	Plantain	9.39	Plantain	8.22	Plantain	8.68	Select Rice	9.63
4.	Raw Sugar	7.03	Pasta	5.68	Cassava	5.92	Raw Sugar	8.34	Raw Sugar	7.38	Select Rice	7.60	Plantain	8.10
5.	Select Rice	4.53	Cassava	5.51	Plantain	5.88	Cassava	4.78	Select Rice	6.56	Liquid Milk	5.72	Liquid Milk	5.70
6.	Cassava	4.47	Red Beans	5.51	Pasta	4.74	Red Beans	4.23	Liquid Milk	4.57	Raw Sugar	4.95	Chicken	4.76
7.	Liquid Milk	4.13	Liquid Milk	3.71	Red Beans	4.51	Pasta	3.65	Bread Rolls	3.97	Chicken	4.13	Bread Rolls	4.16
8.	Red Beans	4.03	Green Banana	3.61	Bread Rolls	3.24	Liquid Milk	3.44	Cassava	3.78	Bread Rolls	3.86	Raw Sugar	4.07
9.	Pasta	3.71	Plantain	3.10	Liquid Milk	2.94	Bread Rolls	3.26	Chicken	3.76	Pasta	3.53	Pasta	4.03
10.	Bread Rolls	3.67	Mature Coconut	2.80	Green Banana	2.63	Select Rice	2.96	Red Beans	3.72	Red Beans	3.51	Beef	3.16

TABLE 3.9

TOP 10 CONTRIBUTORS TO PROTEIN
BY PER CAPITA EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 2		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10	
	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%	FOOD	%
1.	Common Rice	21.36	Common Rice	32.73	Common Rice	30.10	Common Rice	24.38	Common Rice	17.93	Common Rice	13.25	Chicken	12.29
2.	Red Beans	11.90	Red Beans	16.39	Red Beans	13.88	Red Beans	12.93	Chicken	11.33	Chicken	11.45	Liquid Milk	11.05
3.	Chicken	9.65	Liquid Milk	7.34	Liquid Milk	6.54	Chicken	8.92	Red Beans	10.77	Liquid Milk	10.98	Common Rice	10.02
4.	Liquid Milk	8.60	Pasta	6.39	Chicken	5.88	Liquid Milk	7.58	Liquid Milk	9.66	Red Beans	9.76	Red Beans	7.75
5.	Bread Rolls	4.85	Chicken	4.10	Pasta	5.46	Bread Rolls	4.40	Bread Rolls	5.25	Beef	6.98	Beef	7.59
6.	Beef	4.61	Bread Rolls	3.52	Bread Rolls	4.64	Beef	3.99	Select Rice	4.94	Select Rice	5.34	Select Rice	6.38
7.	Pasta	3.93	Cassava	2.69	Plantain	2.75	Pasta	3.95	Beef	4.38	Bread Rolls	4.70	Dried Fish	4.95
8.	Select Rice	3.40	Green Banana	2.60	Cassava	2.73	Plantain	3.63	Dried Fish	3.96	Dried Fish	4.16	Bread Rolls	4.72
9.	Dried Fish	3.31	Powdered Milk	2.48	Beef	2.64	Dried Fish	2.98	Pasta	3.38	Pasta	3.38	Eggs	4.02
10.	Plantain	3.28	Green Pigeon Pea	2.45	Powdered Milk	2.35	Eggs	2.53	Plantain	3.34	Plantain	3.25	Pasta	3.59

TABLE 3.10

PERCENT OF CALORIES CONSUMED FROM EACH FOOD GROUP
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	30.65	11.74	29.52	10.20	29.80	11.51	28.31	13.35	32.48	12.58	31.46	12.27	.0016
BEANS	4.76	3.68	3.83	2.60	5.16	4.51	6.47	5.50	4.84	3.17	4.94	3.48	.0000
OTHER GRAINS	.78	2.22	.43	.92	.83	1.84	1.45	2.80	.67	2.84	1.03	2.72	.0000
TUBERS, PLANTAINS	17.31	12.18	14.80	7.81	14.98	9.89	31.36	19.80	20.15	14.06	18.45	13.42	.0000
MEAT, FISH, POULTRY	7.30	5.17	9.39	5.02	8.58	5.49	4.13	4.61	5.37	3.67	5.86	4.83	.0000
MILK, MILK PRODUCTS	6.04	7.16	5.91	6.53	7.02	7.63	3.47	4.87	5.85	8.43	5.57	6.28	.0000
EGGS	.74	.83	1.04	.99	.75	.86	.27	.39	.42	.51	.75	.92	.0000
BREAD, FLOUR, PASTA	8.96	7.51	11.43	7.13	8.35	6.08	7.10	6.35	9.00	9.26	7.59	7.42	.0000
OIL	13.36	6.28	14.14	5.19	13.98	6.84	9.55	4.80	13.17	6.57	12.58	6.27	.0000
SUGAR	9.52	6.88	8.56	5.99	9.90	6.58	7.76	8.14	7.92	6.75	11.28	7.41	.0000
OTHER FATS	.52	1.49	.90	1.64	.60	1.55	.08	.62	.08	.26	.44	1.75	.0000
AVERAGE DAILY CALS. PER CAPITA	2060	1102	1754	616	1995	910	1928	957	2319	1471	2227	1248	.0000
N OF CASES	1345		318		367		201		223		240		

TABLE 3.11

PERCENT OF PROTEIN CONSUMED FROM EACH FOOD GROUP
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	25.14	11.52	23.09	9.90	22.87	11.27	24.53	10.92	28.22	11.75	27.17	12.17	.0000
BEANS	13.99	9.49	10.82	7.13	14.07	10.46	19.59	14.25	15.34	8.94	15.16	9.30	.0000
OTHER GRAINS	1.94	5.02	1.02	2.19	2.00	4.29	4.37	8.02	1.66	5.40	2.61	6.44	.0000
TUBERS, PLANTAINS	8.49	7.51	6.77	4.10	6.94	5.75	16.56	13.56	9.89	8.10	9.75	9.00	.0000
MEAT, FISH	24.37	13.87	29.35	12.17	27.86	13.99	16.35	14.11	19.37	11.56	20.77	14.10	.0000
MILK, MILK PRODUCTS	12.94	12.84	12.12	11.40	14.32	12.89	8.63	12.05	13.19	13.67	12.55	13.33	.0000
EGGS	2.54	3.03	3.34	3.14	2.46	3.12	1.11	1.65	1.59	2.04	2.74	3.30	.0000
BREAD, FLOUR, PASTA	10.53	9.10	13.42	8.98	9.43	7.06	8.82	8.07	10.69	10.81	9.19	9.30	.0000
OTHER FATS	.52	1.47	.02	.04	.01	.03	*	.03	*	.01	.01	.03	.0000
PERCENT FROM ANIMAL SOURCES	39.87	17.88	44.83	15.34	44.64	17.46	26.10	17.18	34.16	17.09	36.07	18.23	.0000
AVERAGE DAILY GMS. PROTEIN PER CAPITA	47.69	27.09	43.48	17.78	49.86	24.32	39.89	23.22	50.01	34.16	48.40	30.66	.0000
N OF CASES	1345		318		367		201		223		240		

TABLE 3.12

PERCENT OF VALUE CONSUMED FROM EACH FOOD GROUP
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	12.98	8.51	10.57	6.10	11.22	7.41	15.80	9.32	15.39	9.04	14.89	9.86	.0000
BEANS	5.91	5.51	4.30	3.32	5.47	6.10	8.60	8.56	7.26	6.36	6.54	4.93	.0000
OTHER GRAINS	1.51	4.63	.91	1.76	1.42	3.04	2.80	6.25	.83	4.55	2.46	6.87	.0000
TUBERS. PLANTAINS	12.46	9.47	10.88	6.41	10.86	7.75	20.05	14.29	14.98	10.95	12.95	10.73	.0000
MEAT, FISH	39.54	17.22	44.80	14.40	42.91	16.36	28.49	20.96	35.38	16.37	35.57	18.31	.0000
MILK, MILK PRODUCTS	8.73	9.95	9.20	9.60	10.22	10.66	6.52	9.44	7.36	9.50	8.01	9.66	.0001
EGGS	2.42	2.80	2.86	2.71	2.30	2.94	1.57	2.42	1.53	1.86	2.85	3.13	.0000
BREAD, FLOUR, PASTA	4.50	4.58	5.90	5.45	4.10	3.71	4.30	4.42	3.98	4.25	4.07	4.56	.0000
OIL	9.37	5.66	8.18	4.05	8.97	5.84	9.52	4.85	11.25	6.97	9.49	5.44	.0000
SUGAR	2.32	2.20	2.01	1.58	2.32	1.99	2.30	3.20	1.97	1.96	2.85	2.75	.0001
OTHER FATS	.20	.90	.33	.79	.17	.70	N.A.	N.A.	.04	.15	.27	1.39	.0000
AVERAGE VALUE OF FOOD CONSUMED (RD\$/DAY)	9.07	5.64	9.52	5.19	10.06	5.98	7.28	5.57	8.36	5.23	8.61	5.46	.0000
N OF CASES	1345		318		367		201		223		240		

total calorie and protein consumption, broken down by region of the country. Figures 3.3 and 3.4 present these graphically. Tables 3.13 and 3.14 list, for comparison, the top ten individual foods in terms of their calorie and protein contribution.

Rice, oil, plantain, and sugar are the dominant contributors of calories in all regions. Rice and beans are the dominant contributors of protein; liquid milk and chicken are the most important animal sources. Almost the same foods appear in the top five and the top ten listing for all regions. Urban regions derive a higher proportion of their protein from animal sources (44% compared with 26% in the frontier and about 35% in the other rural areas). Bread is also consumed somewhat more and is a more important calorie source in urban than in rural areas. This is easily explained by the constraints on marketing bread, which probably make it less widely available in rural areas. Table 3.15, which shows absolute quantities consumed per capita by region, confirms this difference.

3.2.1 Frontier

The one region which does stand out as different from the others is the Frontier region, the mountainous area which borders Haiti. This region of the country is quite distinct from the rest of the Dominican Republic in many ways. It is poorer: 56% of its households fall in the lowest quartile of expenditure per capita (calculated for the country as a whole) and only 3.5% fall in the top quartile. Twenty-six percent fall in the bottom decile (See Chapter 7 Table 7.3 for a breakdown of all regions.) The frontier is much more dependent on farming for its income than even the other rural regions, and depends very much more on consumption of home-produced food (See Chapter 6). The region is also less well served by roads and by public services such as plumbing and electricity than the rest of the country. Only about 2.9% of the Dominican population lives in the Frontier area.

The consumption pattern in the Frontier reflects the lower income and greater isolation of the region. This is the only region where starchy tubers and plantains contribute more calories than rice to the diet. Even more striking, this group of foods, which is not protein-dense, contributes

FIGURE 3.3
 PERCENT OF CALORIES FROM EACH FOOD GROUP
 BY REGION

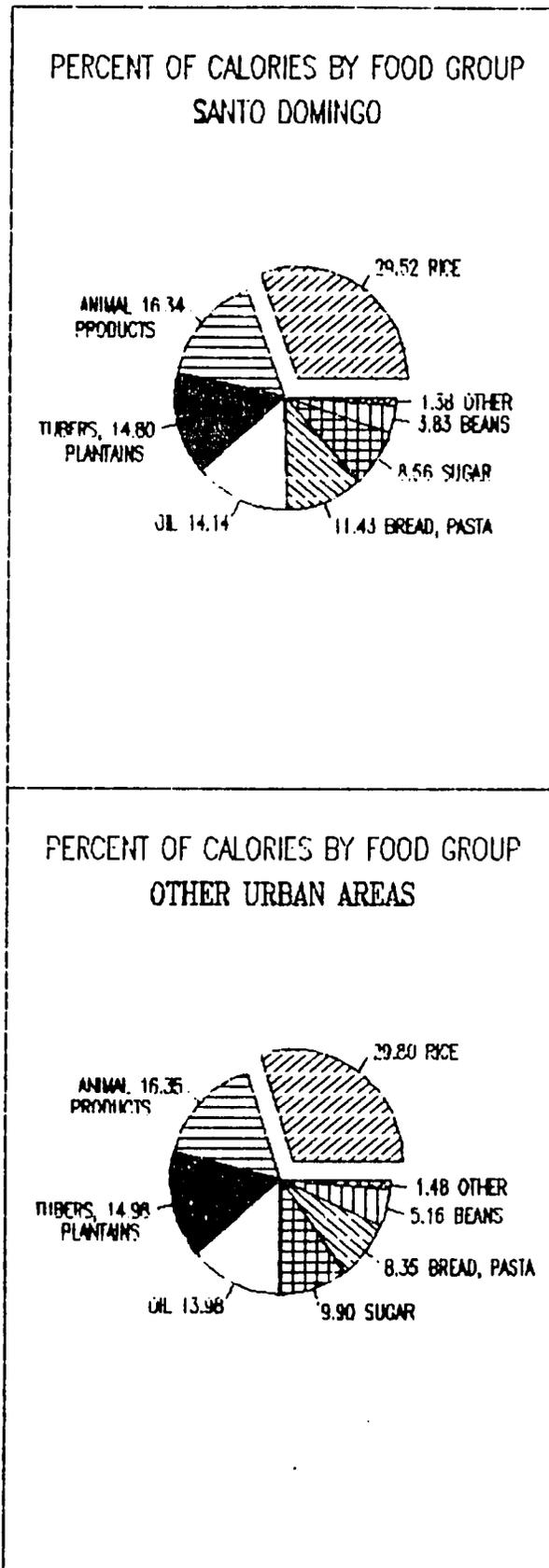


FIGURE 3.3 CONT.

PERCENT OF CALORIES FROM EACH FOOD GROUP BY REGION

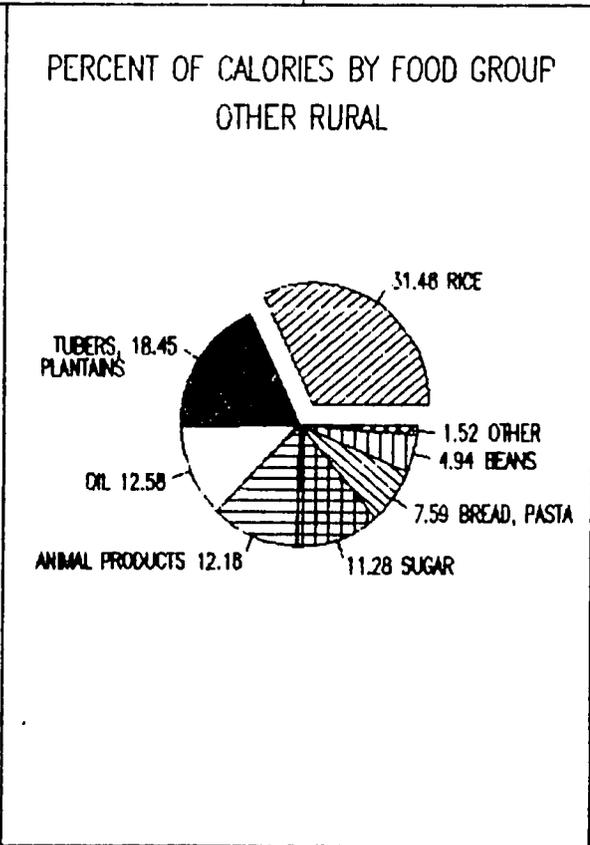
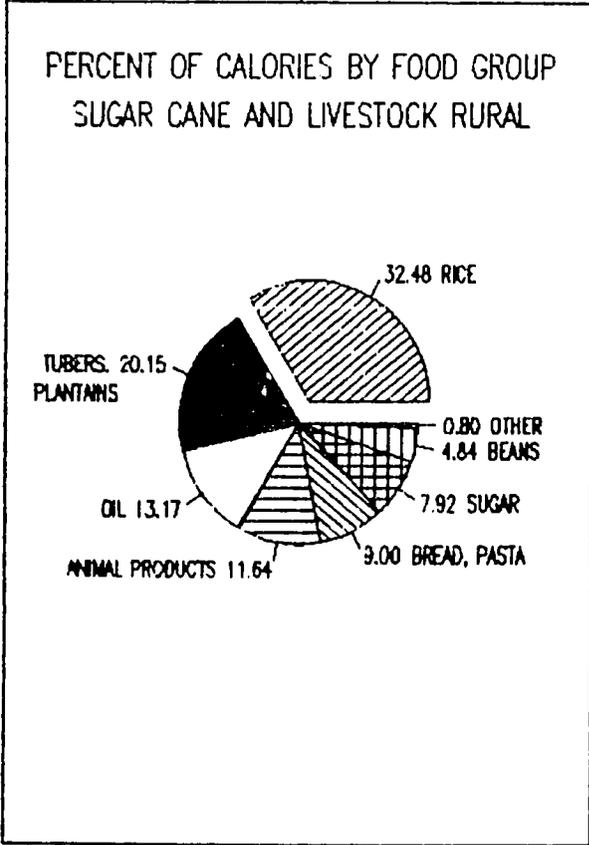
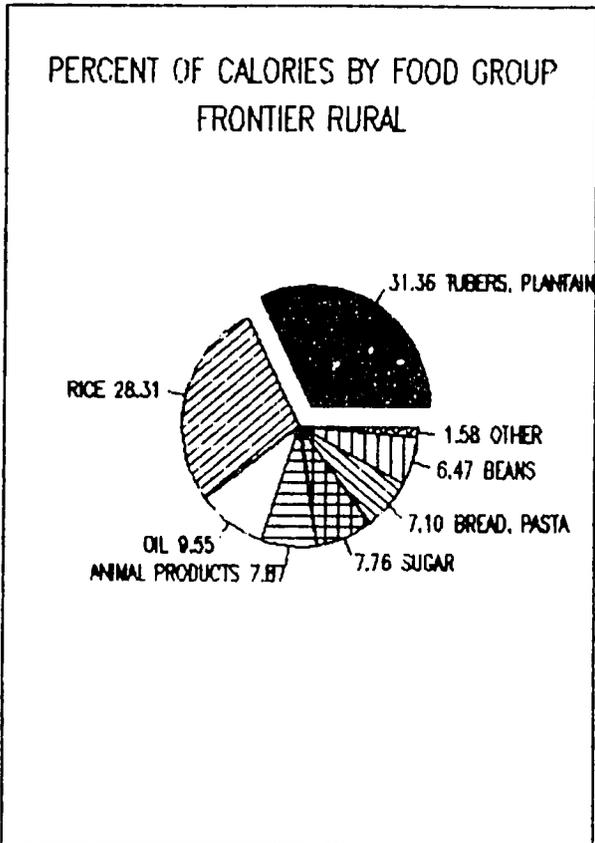


FIGURE 3.4

PERCENT OF PROTEIN FROM EACH FOOD GROUP
BY REGION

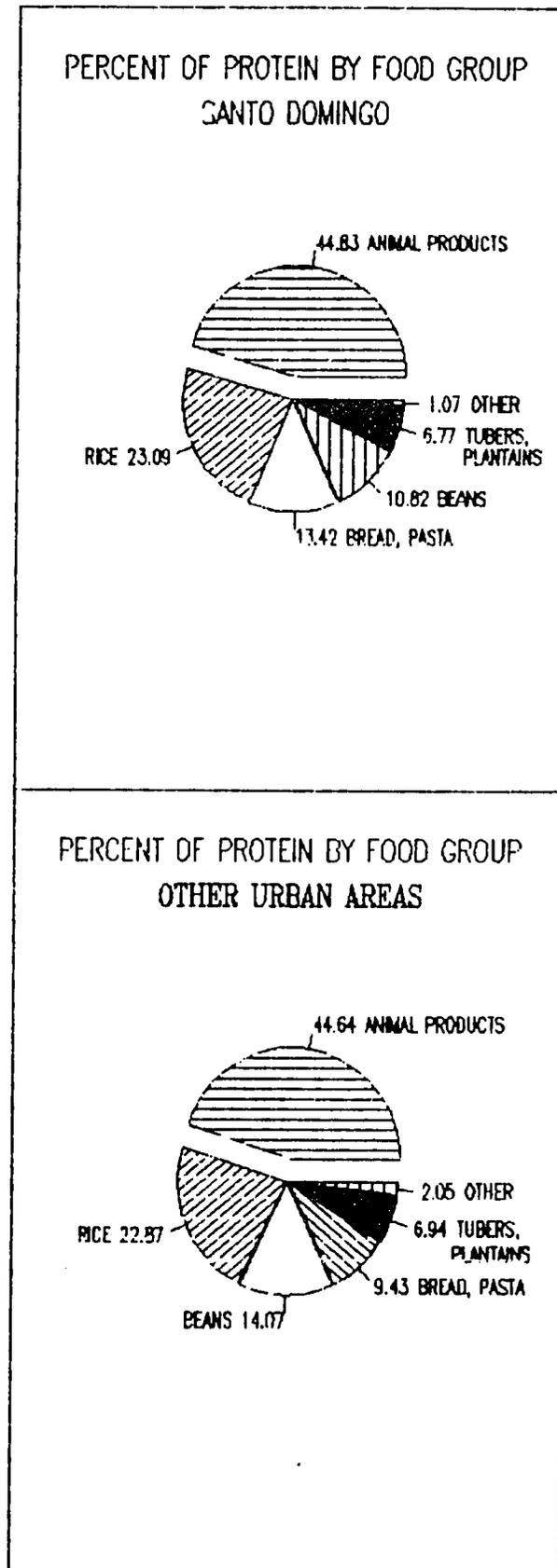
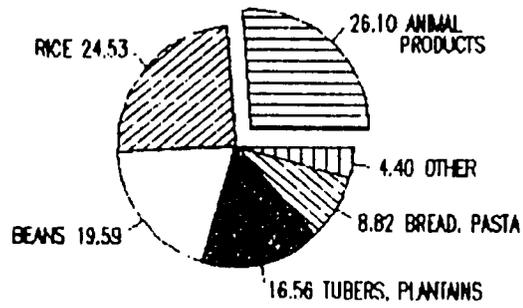


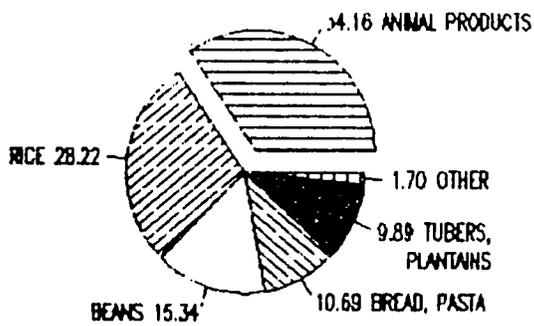
FIGURE 3.4 CONT.

PERCENT OF PROTEIN FROM EACH FOOD GROUP BY REGION

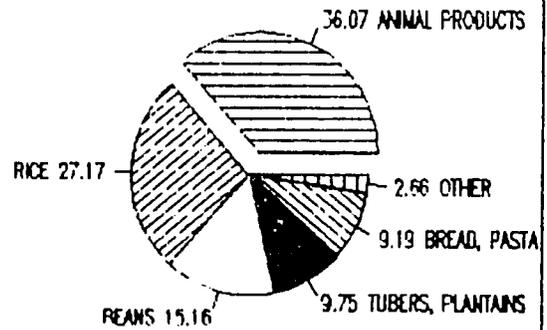
PERCENT OF PROTEIN BY FOOD GROUP
FRONTIER RURAL



PERCENT OF PROTEIN BY FOOD GROUP
SUGAR CANE AND LIVESTOCK RURAL



PERCENT OF PROTEIN BY FOOD GROUP
OTHER RURAL AREAS



TOP 10 CONTRIBUTORS TO CALORIES
BY REGION

	TOTAL POPULATION	SANTO DOMINGO	OTHER URBAN AREAS	FRONTIER RURAL	SUGAR CANE AND LIVESTOCK RURAL	OTHER RURAL AREAS
	FOOD %	FOOD %	FOOD %	FOOD %	FOOD %	FOOD %
1.	Common Rice 25.45	Common Rice 19.92	Common Rice 22.92	Common Rice 26.20	Common Rice 31.05	Common Rice 28.89
2.	Veg. Oil 13.18	Veg. Oil 14.02	Veg. Oil 13.76	Cassava 16.96	Veg. Oil 13.03	Veg. Oil 12.39
3.	Plantain 7.91	Select Rice 9.32	Plantain 7.11	Veg. Oil 9.18	Plantain 10.45	Raw Sugar 10.02
4.	Raw Sugar 7.03	Plantain 8.51	Select Rice 6.00	Raw Sugar 7.84	Raw Sugar 7.50	Plantain 6.59
5.	Select Rice 4.53	Bread Rolls 6.45	Raw Sugar 5.81	Plantain 6.35	Cassava 6.63	Cassava 4.45
6.	Cassava 4.47	Chicken 4.60	Liquid Milk 4.73	Red Beans 5.60	Liquid Milk 5.10	Liquid Milk 4.40
7.	Liquid Milk 4.13	Raw Sugar 4.56	Red Beans 4.50	Pasta 4.81	Red Beans 4.03	Red Beans 4.10
8.	Red Beans 4.03	Pasta 4.04	Bread Rolls 4.08	Green Banana 4.43	Pasta 3.83	Pasta 3.69
9.	Pasta 3.71	Red Beans 3.21	Chicken 3.73	Mature Coconut 4.35	Chicken 2.17	Chicken 2.51
10.	Bread Rolls 3.67	Liquid Milk 2.60	Cassava 3.50	Liquid Milk 2.37	Wheat Flour 1.89	Bread Rolls 2.49

TABLE 3.14

TOP 10 CONTRIBUTORS TO PROTEIN
BY REGION

	TOTAL POPULATION	SANTO DOMINGO	OTHER URBAN AREAS	FRONTIER RURAL	SUGAR CANE AND LIVESTOCK RURAL	OTHER RURAL AREAS
	FOOD %	FOOD %	FOOD %	FOOD %	FOOD %	FOOD %
1.	Common Rice 21.36	Common Rice 15.76	Common Rice 18.18	Common Rice 23.26	Common Rice 27.16	Common Rice 25.25
2.	Red Beans 11.90	Chicken 13.07	Red Beans 12.39	Red Beans 17.45	Red Beans 12.85	Red Beans 12.59
3.	Chicken 9.65	Red Beans 9.15	Chicken 10.73	Cassava 8.60	Liquid Milk 11.04	Liquid Milk 9.85
4.	Liquid Milk 8.60	Bread Rolls 8.32	Liquid Milk 9.09	Pasta 5.91	Chicken 7.03	Chicken 8.00
5.	Bread Rolls 4.85	Select Rice 7.16	Bread Rolls 5.17	Liquid Milk 5.56	Plantain 4.83	Pasta 4.11
6.	Beef 4.61	Beef 5.55	Beef 4.90	Chicken 3.59	Pasta 4.20	Beef 4.01
7.	Pasta 3.93	Liquid Milk 5.04	Dried Fish 4.44	Beef 3.11	Beef 4.10	Bread Rolls 3.50
8.	Select Rice 3.40	Pasta 4.14	Select Rice 4.25	Green Banana 2.83	Cassava 2.76	Plantain 2.85
9.	Dried Fish 3.31	Dried Fish 3.53	Pasta 3.18	Plantain 2.73	Dried Fish 2.59	Eggs 2.70
10.	Plantain 3.28	Powdered Milk 3.43	Plantain 2.70	Dried Fish 2.40	Wheat Flour 2.51	Dried Fish 2.55

16% of protein consumption, compared with six to nine percent elsewhere. We have noted, too, that the proportion of protein from animal sources is considerably lower in the Frontier than in the other regions. Yuca is a more important source of both calories and protein in the Frontier than anywhere else. Only in the Frontier is mature coconut among the top ten calorie sources, and pigeon peas, while not in the top ten, are a significant source of protein only in this region. Green bananas also appear among the top ten foods for both calories and protein. Mature coconut is used as a substitute for oil in this part of the country, and its consumption represents a genuine regional difference in food habits. Pigeon peas are a food which tends to be grown in home gardens for home consumption, which explains its greater importance in the frontier. The same is true of yuca. Aside from these, the foods which are disproportionately consumed in the frontier are typical of low-income Dominican households anywhere in the country.

The high level of consumption of starchy tubers and plantain is also partly explainable by the fact that these goods are generally very much cheaper in the Frontier than elsewhere (See Chapter 8).

3.2.2 Urban/Rural Differences

There are notable differences among the regions in absolute quantities of food consumed. These are most clearly reflected in the figures on caloric and protein adequacy of the diet (Chapter 5). Table 3.15 shows the amounts of certain individual foods consumed per person per day, by region. Per capita consumption of rice is higher in rural areas, except the frontier, than in cities. Egg consumption is not high anywhere, but it appears to be higher in urban than rural areas. We have noted that more bread is consumed in urban areas. Chicken is also consumed more in the urban areas, with much lower consumption in the Frontier. These patterns are noteworthy because chickens are commonly raised in the courtyards of rural households, so one might anticipate greater chicken and egg consumption in rural areas; but this is not the case.

The main conclusion to be drawn from these results is that there are few strong regional or urban-rural differences in food habits or food

TABLE 3.15

PER CAPITA CONSUMPTION OF SELECTED FOODS
BY REGION
(lbs/day)

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	lbs	SD	lbs	SD	lbs	SD	lbs	SD	lbs	SD	lbs	SD	
COMMON RICE	.308	.237	.205	.171	.260	.217	.304	.189	.417	.262	.371	.241	.0000
SELECT RICE	.058	.139	.103	.157	.079	.145	.004	.020	.014	.096	.030	.131	.0000
ALL RICE	.370	.217	.308	.129	.345	.178	.311	.189	.443	.290	.403	.236	.0000
RED BEANS	.055	.052	.038	.030	.060	.061	.069	.062	.056	.043	.060	.056	.0000
OTHER BEANS	.010	.028	.007	.021	.008	.025	.006	.017	.014	.042	.010	.024	.0062
GREEN PIGEON PEA	.016	.050	.008	.017	.021	.050	.020	.047	.005	.033	.025	.071	.0000
DRIED PIGEON PEA	.003	.014	.001	.008	.002	.012	.009	.025	.004	.016	.003	.015	.0000
PLANTAIN (b)	.448	.613	.405	.339	.380	.399	.322	.491	.702	1.040	.392	.545	.0000
YUCA	.210	.413	.096	.135	.147	.242	.732	1.045	.310	.427	.249	.510	.0000
GREEN BANANA (c)	.132	.545	.067	.166	.072	.237	.258	.478	.066	.324	.279	.941	.0000
SWEET POTATO	.070	.324	.016	.055	.048	.216	.098	.508	.055	.271	.144	.501	.0001
POTATO	.044	.106	.065	.130	.068	.147	.002	.014	.018	.037	.021	.040	.0000
YAUTIA	.026	.143	.024	.059	.018	.058	.011	.088	.023	.176	.040	.216	.1609
SQUASH	.022	.114	.015	.057	.028	.180	.015	.061	.030	.109	.015	.053	.2688
NONE	.015	.109	.009	.064	.019	.147	.017	.102	.007	.054	.019	.122	.4826
CHICKEN	.088	.097	.196	.097	.093	.089	.035	.054	.070	.099	.081	.101	.0000
BEEF	.050	.078	.047	.069	.053	.072	.029	.104	.056	.084	.044	.084	.0043
PORK	.014	.036	.013	.032	.018	.037	.001	.009	.012	.034	.012	.039	.0000
GOAT	.003	.019	.002	.013	.005	.021	.016	.057	.001	.015	.002	.013	.0000
FRESH FISH	.015	.074	.008	.036	.018	.067	.007	.029	.009	.035	.020	.116	.0604
DRIED FISH	.010	.023	.009	.017	.014	.033	.007	.027	.008	.013	.008	.019	.0029
SALAMI	.009	.017	.009	.015	.009	.020	.005	.009	.011	.021	.006	.010	.0004
SARDINES	.004	.017	.003	.008	.003	.008	.005	.013	.005	.012	.004	.029	.2722
EGGS (a)	.212	.266	.258	.230	.213	.278	.084	.145	.142	.203	.219	.290	.0000
LIQUID MILK (a)	.132	.184	.077	.123	.139	.180	.067	.114	.169	.201	.151	.210	.0000
POWDERED MILK	.007	.023	.012	.025	.008	.022	.004	.013	.001	.009	.005	.026	.0000
EVAPORATED MILK	.007	.025	.008	.027	.013	.036	.002	.025	.001	.007	.001	.007	.0000
CHEESE	.008	.024	.011	.032	.008	.024	.006	.036	.004	.017	.005	.013	.0176
BUTTER	.001	.006	.002	.006	.002	.006	.000	.000	*	.001	.001	.005	.0000
VEGETABLE OIL	.069	.048	.064	.042	.070	.049	.043	.031	.073	.051	.071	.050	.0000
MATURE COCONUT (d)	.024	.071	.006	.024	.028	.077	.079	.151	.023	.067	.029	.077	.0000
BREAD ROLLS	.054	.062	.086	.065	.064	.068	.014	.029	.028	.037	.037	.050	.0000
PASTA	.030	.034	.028	.026	.026	.033	.038	.043	.032	.036	.032	.038	.0008
REFINED SUGAR	.014	.038	.018	.037	.028	.053	*	*	.001	.007	.004	.024	.0000
SEMI-REFINED SUGAR	.014	.044	.022	.045	.020	.055	*	*	.001	.005	.009	.042	.0000
RAW SUGAR	.082	.088	.042	.056	.064	.087	.076	.063	.094	.088	.125	.093	.0000
Number of Cases	1397		322		374		210		231		260		

(a) All figures are in pounds/day except Fresh Milk, which is in litres/day and Eggs, which are in units/day.

(b) A medium plantain weighs .563 lbs.

(c) A small green banana weighs .125 lbs.

(d) A medium mature coconut weighs 1.57 lbs.

* = Less than .001 lbs.

preferences. The culture, at least as reflected in food consumption patterns, is fairly homogeneous throughout the Dominican Republic, and with a few exceptions, regional differences can be largely attributed to differences in income levels, prices, availability, and access to a home garden.

3.3 Consumption of Home-Produced Food

About a third of the households in the survey had access to some food which they produced themselves. Of course, this was more common in rural than urban areas, and it was most common in the frontier. (See Ch 7 Table 7.7 for a breakdown of home consumption by region, and Table 7.8 for a breakdown by income class.) At every income level, households which made use of home consumption had higher levels of protein and calorie intake than those which did not (see Chapter 5). Figures 3.5 and 3.6 and Tables 3.16 and 3.17 show the percentage contribution of each food group to total calorie and protein consumption of households which did and did not make use of home-produced food. There are a few notable differences in the consumption patterns of households with home production. Tubers and plantains are a significantly more important calorie and protein source in households which consume home-produced food. The category "other grains", which includes pigeon peas (following the Dominican Agricultural Secretariat's definition) is also more important in home-consuming households. Tubers, plantains and bananas, and pigeon peas are among the foods most commonly produced in home garden plots. It is perhaps surprising that eggs and milk are more important in the diets of households which do not home-consume, even though eggs are the food which the highest proportion of households (15%) home-consume; meat and fish are much more important in such households. These differences are not explained by income, since about the same proportion of households consume home-produced food in every income quartile. The explanation may be that home-produced foods from the garden displace these other foods, which would have to be purchased.

As would be expected, these differences are almost identical to the differences between farm and non-farm households, where a farm household is defined as one which derived any income at all from sale of crops, animals,

FIGURE 3.5

PERCENT OF CALORIES FROM EACH FOOD GROUP BY HOME CONSUMPTION

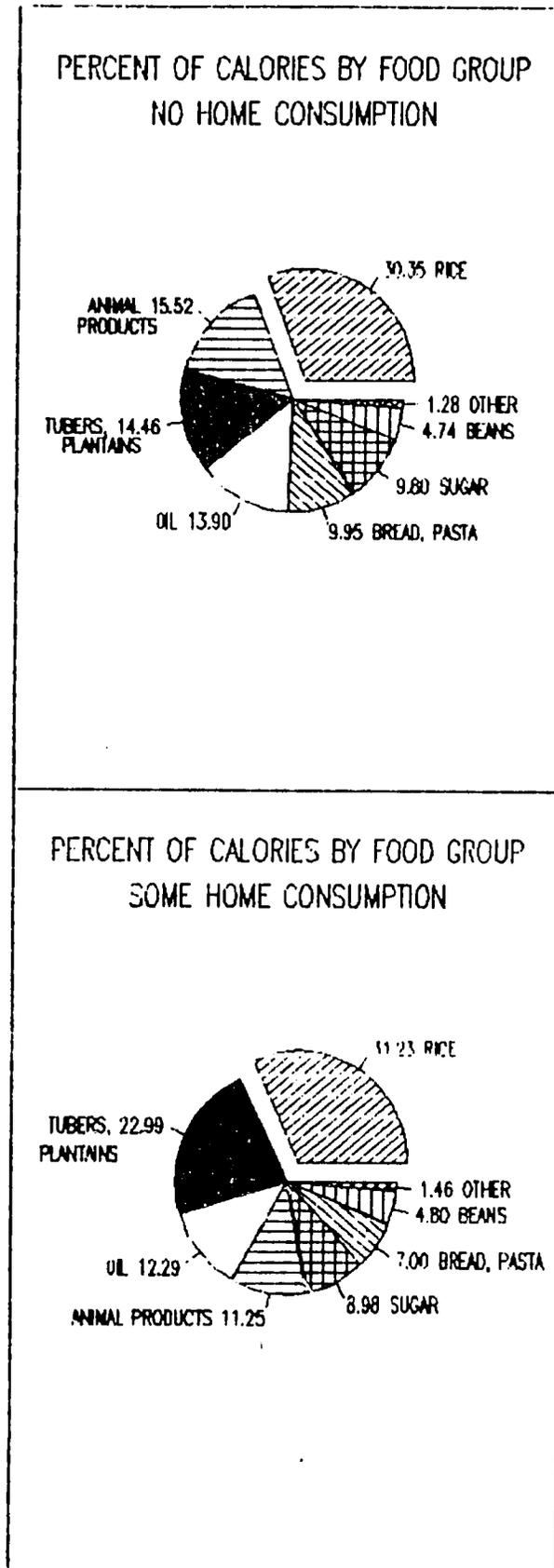


FIGURE 3.6

PERCENT OF PROTEIN FROM EACH FOOD GROUP
BY HOME CONSUMPTION

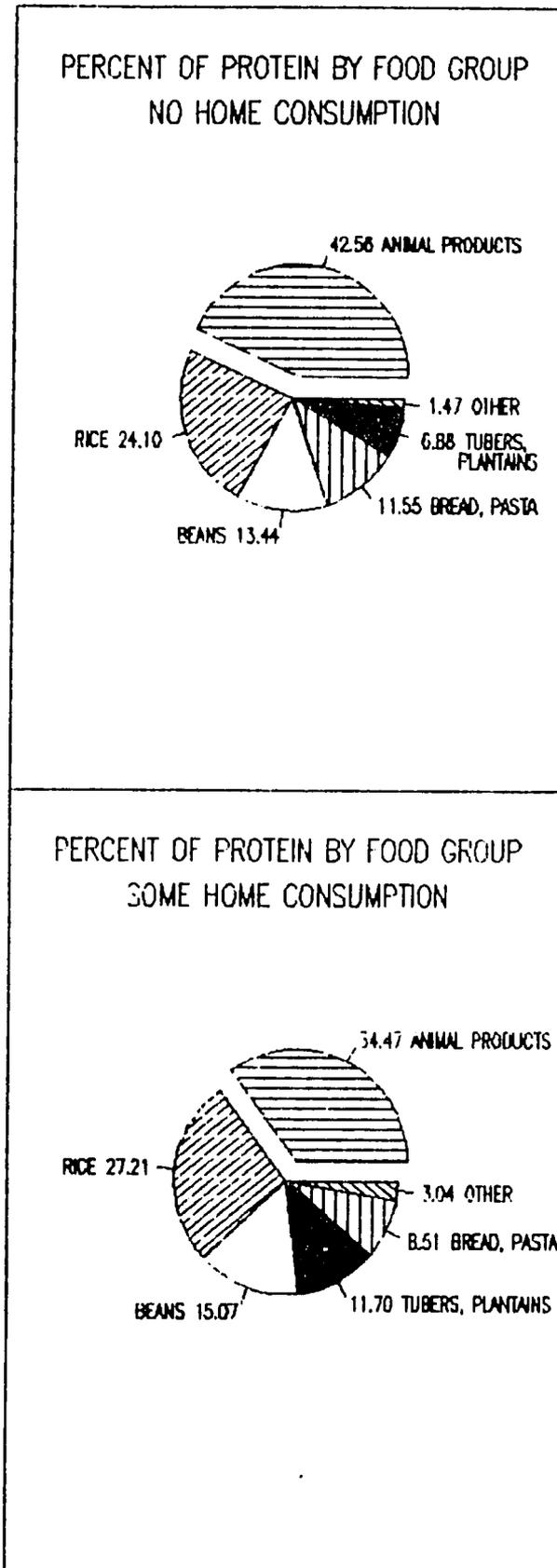


TABLE 3.16

PERCENT OF CALORIES FROM EACH FOOD GROUP
BY HOME CONSUMPTION

	NO HOME CONSUMPTION		ANY HOME CONSUMPTION		F SIG.
	%	SD	%	SD	
RICE	30.35	12.25	31.23	10.65	.1930
BEANS	4.74	3.85	4.80	3.32	.7784
OTHER GRAINS	.61	2.18	1.10	2.26	.0001
TUBERS, PLANTAINS	14.46	9.68	22.99	14.46	.0000
MEAT, FISH, POULTRY	8.23	5.37	5.45	4.16	.0000
MILK, MILK PRODUCTS	6.49	7.82	5.16	5.51	.0013
EGGS	.80	.97	.64	.65	.0018
BREAD, FLOUR, PASTA	9.95	7.95	7.00	6.09	.0000
OIL	13.90	6.64	12.29	5.33	.0000
SUGAR	9.80	7.49	8.98	5.43	.0415
OTHER FATS	.63	1.48	.30	1.49	.0001
N OF CASES	895		450		

TABLE 3.17

PERCENT OF PROTEIN FROM EACH FOOD GROUP
BY HOME CONSUMPTION

	NO HOME CONSUMPTION		ANY HOME CONSUMPTION		F SIG.
	%	SD	%	SD	
RICE	24.10	11.86	27.21	10.51	.0000
BEANS	13.44	9.64	15.07	9.10	.0030
OTHER GRAINS	1.41	4.36	3.00	5.99	.0000
TUBERS, PLANTAINS	6.88	5.99	11.70	9.06	.0000
MEAT, FISH, POULTRY	26.48	14.05	20.16	12.50	.0000
MILK, MILK PRODUCTS	13.46	13.33	11.92	11.73	.0379
EGGS	2.62	3.27	2.39	2.50	.1910
BREAD, FLOUR, PASTA	11.55	9.75	8.51	7.24	.0000
OTHER FATS	.01	.03	.00	.03	.0000
N OF CASES	895		450		

TABLE 3.18

PERCENT OF VALUE OF FOOD CONSUMED FROM EACH FOOD GROUP
BY HOME CONSUMPTION

	NO HOME CONSUMPTION		ANY HOME CONSUMPTION		F SIG.
	%	SD	%	SD	
RICE	12.23	8.61	14.47	8.11	.0000
BEANS	5.71	5.87	6.30	4.70	.0619
OTHER GRAINS	1.18	4.37	2.17	5.06	.0002
TUBERS, PLANTAINS	10.53	7.79	16.32	11.19	.0000
MEAT, FISH, POULTRY	41.51	16.94	35.63	17.11	.0000
MILK, MILK PRODUCTS	9.57	10.78	7.07	7.80	.0000
EGGS	2.37	2.90	2.50	2.58	.4139
BREAD, FLOUR, PASTA	5.02	5.07	3.47	3.16	.0000
OIL	9.20	6.13	9.69	4.57	.1363
SUGAR	2.40	2.46	2.16	1.56	.0608
OTHER FATS	.23	.72	.16	1.19	.1696
N OF CASES	895		450		

or animal products (milk, eggs). It is noteworthy, though, that the general pattern of the diet is still quite similar between the two groups, those with and without home production.

4. Estimating Price and Income Parameters of Consumption

The purpose of estimating price and income elasticities of demand is to be able to predict, for policy purposes, the effects on food consumption resulting from a change in income or in the price of a given food. Elasticities measure the expected change in consumption of a particular food in response to a one-percent change in income, in the price of the food, or in the price of another food. By introducing additional variables into the equations used to estimate elasticities, one can control for the effects of other variables, including other prices, demographic factors, geographic factors, and the general level of inflation, so that each coefficient, representing the elasticity, measures the effect that might be expected from a change in real income or prices (adjusted for inflation), with the other variables held constant. Elasticities can be used to predict the effects of an income or price policy on the consumption of a food and on market demand for the food. These predictions may be used to assess expected changes in household dietary adequacy and quality, as well as changes in demand pressures on national food supplies.

4.1 Method*

It is well recognized that both price and income elasticities are variable across income groups. Generally speaking, low-income households are more responsive to changes in these variables (i.e., they have higher absolute values of all elasticities) than are well-off households. (Alderman, 1986 reviews existing studies of this phenomenon.) From a policy point of view, it is important to estimate separately the consumption effects of price and income changes on the low-income population, because these are the households which are most vulnerable to nutritional inadequacy and least able to protect themselves from the

*Analysis was performed on the VAX-780 at Tufts University using the SPSS-X package program, Probit and Regression procedures.

effects of adverse economic changes. For this reason, we have estimated the elasticities both for the population as a whole and for each expenditure quartile (as a proxy for income) separately. This was felt to be preferable for the estimation of price elasticities because it imposes no outside constraint on the relationship of income level to price responsiveness. The alternative of introducing an interaction term between income and each price was not feasible because of the collinearity introduced by this technique.

For estimation of the expenditure elasticities, it was possible to introduce a quadratic term for expenditure into the equation, permitting the elasticity to vary with expenditure level. (The quadratic, or squared term, permits the relationship between the dependent and independent variables to be non-linear. Leaving out the quadratic would constrain the elasticity to be constant across income groups, which is unlikely to be the case for most goods.) While expenditure was included in the separate estimation of price elasticities by quartile, this was as a control variable. Expenditure elasticities were computed from the coefficients of the expenditure and expenditure squared terms estimated for the whole population. Collinearity is not a problem in this case, because only one term (expenditure) is multiplied by expenditure, rather than several prices. The advantage of this approach is that the distribution of the log of income in the population tends to approach normality, which is one of the underlying assumptions in regression analysis. In each quartile, of course, income cannot be normally distributed, because the quartiles are truncated at each quartile boundary.

4.1.1 The Model

The model employed in the analysis is of the following double-logarithmic form:

$$\lg \frac{Q_i}{N} = a_0 + a_1 \lg \frac{Y}{N} + a_2 \left(\lg \frac{Y}{N} \right)^2 + \sum_j a_{ij} \lg P_j + a_3 \lg P$$

$$+ a_4 \lg N + a_5 \lg \frac{A}{N} + a_6 H + \sum_r a_r R + a_7 M \quad \dots(1)$$

where Q_i is consumption of commodity i

Y is household total expenditure (including the value of food consumed from unpaid sources)

N is number present in the household

P_j is the price of commodity i through n

P is the Stone's Index of prices

A is the number of adult equivalents in the household

H is a dummy variable indicating whether or not the household produces its own food

R is a regional dummy variable

M is the inverse of the Mills Ratio (See Technical Appendix)

The quadratic term $\left(\lg \frac{y}{N}\right)^2$ is included in equation (1) to allow the elasticity of demand with respect to household expenditure to vary with Y/N (per capita expenditure level). This elasticity is given by

$$\eta = a_1 + 2a_2 \lg\left(\frac{\bar{Y}}{N}\right)$$

where a_1 is the coefficient of the log of per capita expenditure

a_2 is the coefficient of the log of per capita expenditure squared

\bar{Y}/N is the mean per capita expenditure level in the group for which an estimate is being made

Equation (1) was estimated separately for each per capita expenditure quartile to estimate price elasticities and other parameters which vary by expenditure class.

Because the variation in per capita expenditure is substantially lower within each quartile than for the sample as a whole, the estimates of expenditure elasticities by quartile were often inconsistent with the estimates obtained using equation (1) for the entire sample. The latter estimates, which take into account the full range of expenditure (assumed to reflect income) are believed to be more reliable and are the ones reported below. They vary by quartile because of the quadratic term.

Own and cross price elasticities were obtained directly from the a_{ij} 's estimated separately for each quartile using equation (1). Estimation of the price elasticities for each quartile is thus independent of the estimates for the other quartiles.

4.1.2 Correction for Inflation

The Stone's Index of prices is included in the equation to control for the effects of inflation and of consistent regional price differences. Including this index means that the elasticity estimates represent the degree of change in consumption due to a change in income or in prices relative to all other prices, that is, measured in constant-peso terms.

The Stone's Index, using expenditure shares as weights, was calculated for each cluster by combining the consumer price index for all food and beverages with the indices for four other classes of expenditure, in the relevant municipio. The index varies spatially by cluster and over time by the month in which households within a given cluster were interviewed. The base for the index is the average of all clusters in Santo Domingo in January 1986. Since the data covers only one year, there is relatively little variation in this index.

4.1.3 Household Characteristics

The number present in the household is employed as a separate variable despite the fact that the dependent variable, consumption, is expressed in per capita terms in order to test for the existence of scale economies in household consumption. The composition of the household is introduced separately through the ratio of number of adult equivalents to number present in the household.

The dummy variable H equals one if the household produces any of its own food and zero if it does not. This variable indicates the exogenous possibility of growing food rather than the endogenous decision of how much to grow, thus avoiding the problem of simultaneity. The other dummy variables correct for independent regional influences on consumption.

4.1.4 Two-Stage Approach

Elasticities are estimated by means of regression analysis. One of the underlying assumptions of regression analysis is that the variables are normally distributed. In the case of household consumption data for most

foods the assumption of normality does not hold because a substantial number of households did not consume any of the commodity during the reference week of the survey. Thus quantities consumed above zero are normally distributed, but there is a cluster of cases with zero values. This results in a downward bias in the parameter estimates if analysis is performed only on the truncated sample (non-zero observations only).

To correct for this bias, a two-stage approach was used, based on the work of Heckman (1976). The first stage of the estimation uses Probit analysis on the entire sample, to determine the probability of the household consuming any of the food in question. The results of the Probit are used to compute the inverse of the Mills Ratio, a term which is then included as a regressor in an ordinary least squares regression run on the truncated sample (only those households which consumed the food). Inclusion of this term corrects for the bias in estimation of the parameters (See Technical Appendix 4.A for full explanation of the technique.) Table 4.1 shows the percent of households with zero consumption for all the foods of interest in this study. Only total rice (but not each variety separately), vegetable oil, and red beans were consumed by more than 85% of the households in the sample. This is an indication of the importance of correcting for bias in the estimation.

The Heckman two-stage procedure was used for estimating the expenditure and price elasticities of all ten foods. In the cases of oil, total rice, and beans, the correction term was not statistically significant.

The ten most important foods in the Dominican diet have been selected for estimation of a complete matrix of expenditure and own cross-price income elasticities. These are: common rice, red beans, plantain, yuca, vegetable oil, chicken, beef, liquid milk, pasta, and raw sugar. An equation was estimated with consumption of total rice as a dependent variable, but only common rice price was introduced as an independent variable, because inclusion of select rice price resulted in the loss of too many cases.* In each equation, the dependent variable is consumption

* In the regression analysis, a case is dropped if it does not have a value for every variable in the equation. Only 660 households had non-missing values for all variables including both rice prices.

TABLE 4.1

PERCENT OF HOUSEHOLDS WITH ZERO CONSUMPTION OF MAJOR FOODS

FOOD	PERCENT OF HOUSEHOLDS
COMMON RICE	18.3
SELECT RICE	79.6
TOTAL RICE	1.8
RED BEANS	15.4
WHITE BEANS	92.0
BLACK BEANS	92.6
PINTO BEANS	92.9
ALL BEANS	7.6
DRIED PIGEON PEA	92.3
GREEN PIGEON PEA	73.6
PLANTAIN	22.1
YUCA	36.7
GREEN BANANA	74.9
POTATO	56.7
SWEET POTATO	80.0
SQUASH	65.3
YAUTIA	82.6
NAME	93.0
CHICKEN	29.7
BEEF	45.8
PORK	78.7
GOAT	95.3
SALAMI	54.9
FRESH FISH	88.8
DRIED FISH	59.8
CANNED SARDINES	78.7
LIQUID MILK	39.3
POWDERED MILK	79.1
EVAPORATED MILK	84.7
CHEESE	70.4
BUTTER	80.6
EGGS	29.1
VEGETABLE OIL	6.7
MATURE COCONUT	80.6
BREAD ROLLS	26.1
PASTA	27.7
WHEAT FLOUR	84.6
CORN FLOUR	85.9
REFINED SUGAR	81.7
SEMI-REFINED SUGAR	82.3
RAW SUGAR	27.3
MARGARINE	78.5
LARD	98.9

per capita, which includes both purchases and quantities consumed from home consumption, gifts, in-kind pay, own business stocks and free government sources. Thus, the elasticities measure, not effects on market demand, but the net effect on consumption of the influence of price on purchases and on decisions regarding home consumption, gifts, and sale. Estimation of the same model using purchases rather than consumption as the dependent variable yielded very similar results.

4.2. Expenditure Elasticities

Table 4.2 presents the computed expenditure elasticities of consumption by quartile for all eleven foods of interest.

Over the whole population, the highest expenditure elasticities observed were for vegetable oil (.517) and chicken (.520). Plantain also shows a relatively high elasticity. No commodity at any income level showed income-elastic consumption (that is, elasticity greater than 1.0). This indicates that a change in income (measured here by expenditure) results in a less than proportional change in consumption of all the foods measured. One would not expect to observe income elasticities greater than 1.00 in a population which is not absolutely constrained by income from achieving dietary adequacy. The proportion of income devoted to food, which averages 59%, and the proportion of expenditure on the relatively expensive animal foods even in the lowest quartile, suggests that the income constraint on consumption, while severe, is not absolute.

Total rice, common rice, and vegetable oil showed expenditure elasticities which declined with rising expenditure level. Of these foods, vegetable oil has the greatest decline in elasticity. Common rice consumption per capita is more expenditure elastic than that of total rice, because of the increasing quantities of select rice consumed at higher incomes.

The expenditure elasticities of consumption of red beans and raw sugar are not significantly different from zero, indicating that changes in income (measured by total expenditure) do not affect per capita consumption of these foods. This is undoubtedly because in both cases, income

TABLE 4.2
EXPENDITURE ELASTICITY OF DEMAND FOR ELEVEN MAJOR FOODS
BY EXPENDITURE CLASS

FOOD	TOTAL POPULATION	QUARTILE			
		1	2	3	4
TOTAL RICE	.190****	.307	.213	.151	.057
COMMON RICE	.235***	.307	.243	.203	.138
RED BEANS	.385	.357	.379	.394	.417
PLANTAIN	.481****	.397	.457	.501	.568
YUCA	.388****	.320	.372	.407	.459
VEGETABLE OIL	.517****	.745	.571	.449	.253
CHICKEN	.520****	.426	.491	.540	.614
BEEF	.406****	.330	.381	.416	.474
LIQUID MILK	.265**	.214	.250	.274	.312
PASTA	.095*	.095	.095	.095	.095
RAW SUGAR	.293	.327	.297	.276	.245

**** = T significant at $p < .001$
 *** = T significant at $p < .01$
 ** = T significant at $p < .05$
 * = T significant at $p < .10$

increases are devoted to higher quality foods occupying a similar place in the diet: animal protein sources in the case of red beans, and refined sugar in the case of raw sugar.

The animal protein sources, chicken, beef, and milk show significantly rising expenditure elasticities at higher levels, as does plaintain. These are all preferred foods, whose consumption rises sharply with income. More surprising is the fact that the expenditure elasticity for yuca is higher at higher income levels. This result is counterintuitive, since both absolute consumption and the relative nutrient contribution of yuca declines in the third and fourth quartiles.

A very high proportion of starchy staple consumption comes from unpaid sources. Forty-four percent of consumption in the bottom decile, and 47% in the bottom quartile (declining to 16% in the top decile) comes from home production and gifts. To see whether the expenditure elasticity of purchased yuca followed the same pattern as the expenditure elasticity of consumption, a regression was run using the same model, with per capita purchase as the dependent variable. In this estimation, the expenditure elasticity of market demand was .440 (significantly different from zero at $P < .001$), and was constant across income groups. This relatively high elasticity (in comparison with other foods generally considered to be more prestigious and preferred) is surprising, and suggests that yuca, which is believed to be an inferior food in most places, is not self-targeting toward the poor in the Dominican Republic.

4.3 Price Elasticities

Tables 4.3 and 4.4 show the price elasticity of consumption for the ten major foods of interest, broken down by income class.

For the population as a whole, the price elasticity of common rice is $-.419$. This figure, derived from our cross-sectional data, is strikingly close to an earlier estimate of $-.51$ based on longitudinal data of the Secretariat of Agriculture from 1966 to 1984 (Unidad de Estudios Agropacuarios, 1986). It is interesting to note, however, that the elasticity consistently rises with rising income, reaching statistical

TABLE 4.3

OWN AND CROSS PRICE ELASTICITIES OF PER CAPITA CONSUMPTION FOR ELEVEN FOODS
(TOTAL POPULATION)

ELASTICITIES	TOTAL RICE	COMMON RICE	RED BEANS	PLANTAIN	YUCA	VEGETABLE OIL	CHICKEN	BEEF	LIQUID MILK	PASTA	RAW SUGAR
OWN PRICE	-.355***	-.419**	-.528****	-.908****	-1.769****	-.732****	-1.369****	-.920****	-1.134****	-.192	.024
CROSS PRICES:											
COMMON RICE	-.355***	-.419**	-.581**	-.071	-.052	.344**	.316	-.027	.176	.789****	-.659**
RED BEANS	.217***	.141	-.528****	-.116	-.136	-.027	-.028	-.121	-.078	-.191	-.317**
PLANTAIN	.024	.121**	-.011	.908****	1.873****	.096*	-.071	.069	-.513****	-.051	-.083
YUCA	-.188**	-.246**	-.287**	.250	-1.769****	.041	-.097	.004	.864****	-.127	.328**
VEGETABLE OIL	-.620****	-.251	-1.197****	-.304	-.475	-.732****	.371	-.601**	1.101***	-.220	.144
CHICKEN	.540****	.817****	.627**	1.072***	-3.219****	-.107	-1.369****	-.171	.698	.479	1.878****
BEEF	-.175	-.008	-.340	-.431	.434	-.219	-.249	-.920****	-1.071***	.080	-.586**
LIQUID MILK	.193**	-.089	-.587****	-.326	1.001****	-.162	-.169	.338	-1.134****	.610***	-1.063****
PASTA	1.028****	.849****	1.624****	.074	-.586	-.128	-.706	.729	-1.617***	-.195	-1.246****
RAW SUGAR	.207**	.328**	.441***	.739****	.406	.122	-.021	.131	-.028	.087	.024

**** = T significant at p < .001

*** = T significant at p < .01

** = T significant at p < .05

* = T significant at p < .10

TABLE 4.4
 OWN AND CROSS PRICE ELASTICITIES OF PER CAPITA CONSUMPTION FOR ELEVEN FOODS
 BY EXPENDITURE CLASS

ELASTICITIES BY PER CAPITA EXPENDITURE QUARTILE		TOTAL RICE	COMMON RICE	RED BEANS	PLANTAIN	YUCA	VEGETABLE OIL	CHICKEN	BEEF	LIQUID MILK	PASTA	RAW SUGAR
OWN PRIC	QUARTILE 1	.345	.095	-.514*	-2.156****	-1.824***	-1.566****	-1.647*	-.344	-1.806***	-.084	-.757**
	QUARTILE 2	-.511*	-.238	-.785****	-1.445****	-2.077****	-.897***	-1.957***	-1.360**	-1.975***	-1.017	-.124
	QUARTILE 3	-.886****	-.373	-.289	-.806****	-1.667****	-.797***	-1.940***	-.496	-.644	-1.104	1.076*
	QUARTILE 4	.558	-1.396**	-.505*	-.883****	-.041	-1.554****	1.122	-.447	-1.070	-.735	-.527
CROSS PRICES:												
COMMON RICE	QUARTILE 1	.345	.095	.884	.530	-3.985***	-.268	3.665***	3.118	-.699	-.180	-1.627**
	QUARTILE 2	-.511*	-.238	-1.378**	.420	.990	-.071	.397	-.454	1.315	-.853	-.097
	QUARTILE 3	-.886****	-.373	-.709	.097	-.063	.088	-.237	-4.092***	.854	-.078	-1.994**
	QUARTILE 4	.558	-1.396**	-.566	-.095	-.030	.268	-.024	.314	.643	.825	-.984
RED BEANS	QUARTILE 1	.290**	.243	-.514*	-.684*	.153	.038	.315	-.941	.209	.209	-.037
	QUARTILE 2	.129	.076	-.785****	-.541*	-.438	-.257**	.052	.278	-.699	-.256	-.434*
	QUARTILE 3	.402***	.257	-.289	.499*	-.802**	.011	-.080	-1.062***	-.738	-.213	-.380
	QUARTILE 4	.125	-.032	-.505*	-.071	.532	-.388*	-.221	-.027	-.493	.024	-1.265**
PLANTAIN	QUARTILE 1	.210**	.196*	-.080	-2.156****	1.131*	.297**	-.158	.796*	-.545	-.539**	-.333**
	QUARTILE 2	.100	.263**	.140	-1.445****	1.479****	-.021	-.067	-.356	-.120	-.075	-.311*
	QUARTILE 3	-.169	-.117	.019	-.806****	1.137**	-.214**	-.058	.868**	-.203	.106	.501**
	QUARTILE 4	-.110	.059	-.406*	-.883****	1.259*	-.280*	-.253	-.207	-1.000****	.306	.208
YUCA	QUARTILE 1	-.536****	-.497***	-.068	.908**	-1.824***	-.207	-.115	-.374	.981**	.024	.455**
	QUARTILE 2	-.196	.076	-.458	.490	-2.077****	.262	-.309	-.057	.357	-.234	.292
	QUARTILE 3	-.270	-.195	-.210	.173	-1.667****	-.021	.409	1.045**	.836	-.390	-.545
	QUARTILE 4	-.061	.036	-.159	.191	.041	.645	-.138	.265	-.578	.652	.779
VEGETABLE OIL	QUARTILE 1	-.522*	-.399	-.821	.640	2.006*	-1.566****	-.927	-1.144	3.842**	-1.174**	-.023
	QUARTILE 2	-.816***	-.724*	-1.537***	.657	.104	-.897***	-.195	-1.256**	-.675	.614	-1.750***
	QUARTILE 3	-.707**	-.402	-1.464***	-.640	.662	-.797***	.885	-.965*	1.977***	.293	.298
	QUARTILE 4	.038	-.431	-.115	-.814	-1.433	-1.554****	1.233	-1.204	3.005****	.220	1.588
CHICKEN	QUARTILE 1	.821**	.994**	.241	2.918***	-2.064	.615	-1.647*	-3.197*	-1.402	1.317*	2.528****
	QUARTILE 2	.498*	.651*	.915	1.499**	-1.020	-.227	-1.957***	-.741	1.276	-.501	2.064***
	QUARTILE 3	.507	.662	.941	.992	-3.130***	-.114	-1.940***	3.234***	.125	-.365	2.091***
	QUARTILE 4	.702	.135	.575	.049	-3.299**	.164	1.122	-.578	1.419	1.536	.932
BEEF	QUARTILE 1	.878***	.984***	-.243	-1.152	.414	-.087	-.131	-.344	-1.356*	-.866	-.351
	QUARTILE 2	-.032	.214	.146	-.544	1.364**	-.161	-.498	-1.360**	-.532	.439	-.767*
	QUARTILE 3	-.068	-.012	-.330	-.069	-.228	.146	-.649	-.496	.051	-.123	.337
	QUARTILE 4	-1.964****	-1.454**	-1.747**	-1.754**	-1.704	-.644	.831	-.447	-1.428*	-.476	-1.687*
LIQUID MILK	QUARTILE 1	.163	-.059	-.765*	-.355	.479	-.307	-.036	2.534*	-1.806***	.401	-.991***
	QUARTILE 2	.195	-.002	-.476	-.767*	.004	.092	.231	1.234***	-1.975***	.297	-.482
	QUARTILE 3	.136	-.070	-.726**	-.369	.650	-.508**	-.649*	-.552	-.644	.772*	-1.762***
	QUARTILE 4	.718**	-.450	-.721	1.393***	2.351***	.730**	-.230	-.023	-1.070	.153	-1.904**
PASTA	QUARTILE 1	.923**	1.097**	.688	-1.073	-1.615	.730	-4.032*	1.632	-3.251	-.084	1.015
	QUARTILE 2	1.149***	1.523***	2.103***	-.436	-3.163***	.042	-.076	1.226	.324	-1.017	-.009
	QUARTILE 3	1.460****	1.110*	1.579**	.999	.648	.204	-1.892**	2.519***	-2.904**	-1.104	-2.102**
	QUARTILE 4	-.647	.314	.048	.577	2.468	2.030**	-.881	1.621	-5.966****	-.735	-4.849***
RAW SUGAR	QUARTILE 1	.092	.155	-.253	.759	1.346*	.645**	-1.352**	1.523*	-.995*	.065	-.757**
	QUARTILE 2	.148	.044	.679*	.545	.965	-.143	-.518	-1.077**	-.273	.432	-.124
	QUARTILE 3	-.382*	-.328	.622	-.541	.522	.127	-.226	2.412***	1.276**	.219	1.076*
	QUARTILE 4	-.317	.557*	.653*	-.464	-.515	-.319	.929**	-.925**	.228	.713	-.527

**** = T significant at p < .001
 *** = T significant at p < .01
 ** = T significant at p < .05
 * = T significant at p < .10

significance only in the fourth quartile. The reason for this is that rice is a basic necessity with virtually no good substitutes from the Dominican point of view. These characteristics are typical of a food with low price elasticity. Among the poor, select rice is not a realistic alternative to common rice (possibly unless no common rice is available on the market); in better-off households, select rice is a near-perfect substitute for common rice, and so the price elasticity for common rice is quite high. This explanation is confirmed by the cross elasticities of common rice price with total rice consumption, which is $-.355$ ($P < .01$) for the population as a whole, but is not significantly different from zero in Quartile 4, because the reduction in common rice consumption is balanced by an increase in consumption of select rice.

The price elasticities of purchased quantities of rice show the same pattern. The elasticity of common rice purchase with respect to common rice price is $-.628$ for the whole population, and among the quartiles is significantly different from zero only in Quartile 2. The elasticity of total rice purchase is $-.426$ with respect to common rice price, and is significant only in Quartile 3.

An estimation which included the prices of both select and common rice was performed for Quartile 3 and 4 (the only expenditure classes in which enough households purchased both commodities to make estimation possible). It is noteworthy that only common rice price had a significant effect on total rice purchase, and only in Quartile 3. (See the Appendix for complete regression results.)

All the price elasticities have the expected negative sign, and with the exception of oil and, as already discussed, common rice, the price elasticities fall as income rises, often losing all statistical significance in the fourth Quartile. Consumption of both plantain and yuca is very price elastic, well above 1.0 in the lower income quartiles, probably because both of these starchy staples, and several others, occupy a similar place in the Dominican diet, so that there are numerous possibilities for substitution as the price of one of them changes.

As was mentioned earlier, the starchy staples (tubers and plantain) are

characterized by a high proportion of consumption not purchased. About 10.5% of households home-produce yuca and plantain, the highest percentages for any major food except eggs. As would be expected, the price elasticity of purchase for these foods is lower: $-.614$ ($P < .01$) for yuca and $-.498$ ($P < .001$) for plantain. In the lowest quartile, plantain is more price elastic (-1.38 , $P < .01$) than yuca, probably because yuca, being cheaper, is more of a staple in these households, and plantain relatively more of a luxury. Also, a greater proportion of yuca than of plantain is consumed from unpaid sources (57.8%, compared to 41.8% for plantain), and thus may be less influenced by price changes.

The price elasticity of consumption for liquid milk is quite high (above 1.0) in the two lower Quartiles, and drops to insignificance in the higher Quartiles. This is of policy interest, since milk is and has been one of the staple foods provided by the government at controlled prices. Apparently we may conclude that such a price subsidy increases milk consumption in lower-income households. Milk is of particular interest to those concerned with health and nutrition, because it is one food which, apparently, is disproportionately given to children. Per capita consumption of milk rises with increasing numbers of children in households.

Oil is another food which shows relatively high price elasticity of consumption, above 1.0 in Quartiles 1 and 4, and close to 1.0 in the other groups. This is of interest because oil was until recently (1985) sold at a price which was artificially inflated by importing it at the official exchange rate (\$1 U.S. = \$1 Dominican) and pricing it for sale at the market exchange rate (\$1 U.S. = \$3 Dominican in 1985). The profit from this transaction was used to fund the rice subsidies implemented by INESPRES. The policy of cross-subsidizing rice with the margin charged for oil was abandoned in 1985, and in recent years (since the survey was completed in 1986) oil is one of few foods whose price has not risen substantially, according to local reports. Since oil price is inversely related to total calorie consumption (see Chapter 4), this price stability is probably beneficial in terms of caloric adequacy.

Chicken has a very high price elasticity of consumption, well over 1.0

in all income classes, except not significantly different from zero in Quartile 4. This high elasticity is especially important because the price of chicken is inversely related to both calorie and protein consumption. This means that, as the price of chicken falls, consumers at all income levels increase their consumption more than proportionately, apparently at the sacrifice of greater quantities of other foods which would provide more of both calories and protein.* Chicken is considered something of a basic necessity in Dominican food policy. During the period of the survey, there were substantial importations of chicken at below-market prices as a means of alleviating what was seen as a temporary shortage. Even now (1988), some chicken is available from INESPRES at prices below those on the open market. Such a policy of subsidizing chicken may be quite important in terms of satisfying consumers' demands, but may not be important as a protector of dietary adequacy.

4.4. Cross-Price Elasticities

Cross-price elasticities are interesting for what they reveal about the patterns of substitution among various foods. It is important to recognize that a price change affects consumption not only of the good whose price has changed, but of others as well. Foods which have positive cross-price elasticities with each other may be viewed as substitutes. When the price of one good rises, consumption of the other good increases, presumably to replace (to some degree) the good whose price has changed. For example, rice is a substitute for pasta in most income classes: when the price of pasta falls, people eat more pasta and reduce their rice consumption; when the price rises, consumers shift away from pasta toward rice. Foods tend to be substitutes if they occupy similar places in the diet (plantain and yuca for example), or if two foods normally eaten together can be traded off, one for the other, in quantity (as is the case with rice when the price of beans or pasta changes).

*The quality of protein in animal sources is superior to that in vegetable sources, so that there might be some nutritional advantage to consuming some chicken. However, even in the lowest income classes, a substantial proportion (25%) of protein comes from animal sources, especially milk, already. Further, both protein and calories are in deficit in low-income households, suggesting that quantity of food should be the primary focus of policy.

Foods which have negative cross-price elasticities are seen as complements. These tend to be foods which are eaten together in relatively fixed proportions, so that if the price of one good rises, and its consumption therefore falls, consumption of its complement will also fall, because consumption of the two goes together. In Dominican consumption, milk and sugar are complementary, since milk is commonly sweetened with sugar, especially when given to children.

It is not surprising that yuca and plantain are substitutes for each other. Both have similar places in the diet, though plantain is consumed in more different ways than yuca. This means that plantain can substitute for yuca in its usual uses more readily than yuca can substitute for plantain. The price of plantain has a very high (above 1.0) positive cross-elasticity with yuca consumption. At every income level, as the price of plantain rises, consumption of plantain falls, but consumption of yuca rises. The net effect of a price change will be the sum of these two effects. In the lowest income quartile, for example, a one percent increase in the price of plantain will reduce plantain consumption by about 2%, while yuca consumption will rise by 1.4%. Using the average per capita daily consumption of these two foods, we can calculate that a 10% increase in plantain price would reduce plantain consumption by .78 ounces per person per day, while yuca consumption would increase by .37 ounces, resulting in a net reduction of .41 ounces in the consumption of starchy staples. The same pattern is observed when only purchased quantities are considered.

Calculating the effect of a single price change on overall dietary adequacy would require computing its effects on every food individually. As an alternative, we have calculated reduced form equations estimating the net effects of several prices on calorie and protein consumption. These estimates are presented in Chapter 5.

Table 4.3 presents the matrix of cross-price elasticities for the ten major foods of interest and for total rice consumption, estimated for the entire sample. Table 4.4 shows the elasticities estimated separately by income quartile.

The price of chicken is inversely related to consumption of rice, beans, and plantain, indicating that chicken is substituted for all these foods if its price falls. This relationship is stronger in the lower quartiles where dietary adequacy is a concern. Interestingly, chicken appears to act as a complement to yuca, though the effect is significant only in the top two quartiles. (This effect is equally strong when only purchased yuca is considered.) These relationships suggest why a lower chicken price is associated with lower overall food consumption in low-income households.

The price of rice has an even greater effect on chicken consumption in the lowest quartile. An increase in the price of rice results in a much greater than proportional increase in chicken consumed, and a 1% fall in the rice price similarly reduces chicken consumption by 3%. Vegetable oil appears to act as a complement to rice, beans, and beef, and to pasta in Quartile 1. A decrease in oil price would increase not only oil consumption, but consumption of these foods as well. Oil appears to be a substitute for yuca in Quartile 1: as oil price falls, oil consumption rises and yuca consumption falls, possibly because other foods are substituted which use more oil in preparation.

Except for its effect on sugar consumption, the price of milk has fairly weak and inconsistent effects on other foods.

4.5. Demographic Factors

4.5.1. Household Size and Composition

Household size (number of members) has a relatively weak effect on per capita consumption of most foods. The effect of household size on consumption is positive for rice in Quartile 1 and for beans and plantain in Quartile 3 only. Larger households apparently have lower per capita consumption of most other foods, including yuca (Quartile 3), and vegetable oil, chicken, beef, milk, pasta, and sugar. These negative effects suggest that, controlling for income, larger households tend to have lower consumption per capita and thus may be at greater nutritional risk.

Household composition was measured by the ratio of adult-equivalents to

members in the household. The closer this ratio is to 1.00, the more adults and adult males are present; the lower the ratio, the more children, whose nutritional requirements are lower. Generally one would expect to see positive coefficients of this ratio, indicating that per capita consumption of most foods increases as the food requirements of the household increase. This is the case for almost all foods for which a significant coefficient was estimated. The exception is liquid milk, which has an inverse relationship with the adult-equivalent ratio. That is, per capita consumption of milk increases as the ratio falls, when more children and fewer adults are present. This effect is especially strong in the first Quartile, indicating that low-income households strongly favor children in their allocation of milk; and perhaps that households are more likely to purchase milk at all if there are children in the household.

4.5.2 Access to Home Consumption

The positive effect of access to home consumption on food consumption persists in these regressions when the influence of other factors (including region and expenditure level) is controlled. As expected, the effect is greatest on consumption of the foods which are typically home-produced: plantain, yuca, and liquid milk. As we have seen, the effect is positive, though smaller, even for foods which are not commonly home-produced (rice, oil, chicken, beef, and sugar). This suggests that home production of some foods alleviates some constraints on the food budget, permitting larger purchases of other foods.

4.5.3 Region

After controlling for income, prices, household size and composition, and access to home consumption, relatively few regional differences in food consumption persist. Using consumption in Santo Domingo as the comparison, households in the Frontier region consume less of rice, beans, plantain, oil, and (in Quartile 2 and 3 only) milk, and more of yuca (especially in Quartiles 1 and 2).

The sugar cane and livestock region consumes more yuca (Quartile 1) and beef (in Quartiles 2, 3 and 4); the other rural areas (primarily the

rice-producing Cibao and San Juan valleys) consume less of rice and beans, and more of milk, pasta, and sugar. In the "other urban" region, less of beans is consumed per capita, and more of beef and milk, compared with the capital. Table 4.5 shows the coefficients of the regional dummy variables for each food, broken down by income quartile.

In the Appendix to this Chapter, the complete results of the individual demand equations are presented, with their significance levels and the adjusted R^2 . In the following Chapter are presented estimates of the net effect of individual food prices on overall dietary adequacy.

5. Caloric and Protein Adequacy

The nutritional adequacy of caloric and protein consumption was calculated by computing the total caloric and protein content of the foods consumed by the household in the reference week, and dividing by the number of recall days and then by the number of adult-equivalents in the household (that is, the number of household members, adjusted for calorie and protein requirements by age and sex), to compute average daily protein and calorie availability per adult equivalent. This availability was compared with the FAO/WHO requirements for adult males (FAO/WHO, 1985) to calculate the percent of recommended intake levels available to the household. Because no measures of plate waste were made, availability represents an upper bound on consumption by household members. (See Chapter 2 for details.) The recommended level of calorie intake used was 2300 kcals/day. The recommended protein level was 52.3 gms/day, based on the requirements of an adult male of 145 pounds, of moderate activity.

The foods which were not quantified - fruits other than plantain and banana; vegetables other than the starchy roots, squash and pigeon peas; and packaged and processed foods other than sardines - were left out of the calculation of calorie and protein consumption. It was felt that these categories, which might be important sources of micronutrients, represent insignificant amounts of calories and of protein. However, some underestimation of consumption is possible. The underestimation is probably greatest in the capital, where 19% of food expenditure went to the "processed and packaged" category, compared with 10-12% elsewhere. Overall, 28% of food expenditure went to non-measured quantities of food in

TABLE 4.5
EFFECTS OF REGION ON PER CAPITA CONSUMPTION OF ELEVEN FOODS
BY EXPENDITURE CLASS

	TOTAL RICE	COMMON RICE	RED BEANS	PLANTAIN	YUCA	VEGETABLE OIL	CHICKEN	BEEF	LIQUID MILK	PASTA	RAW SUGAR
OTHER URBAN	TOTAL POP. .026	-.069	-.140 ^M	-.083	.106	.042	-.087	.251 ^{MM}	.375 ^{MM}	.084	-.154
	QUARTILE 1 -.122	-.052	-.076	-.155	.356	-.440 ^{MM}	-.125	1.356 ^{MM}	.685 ^{MM}	.073	-.064
	QUARTILE 2 .028	.067	-.170	-.232	.684 ^{MM}	.176 ^M	-.184	.380 ^M	-.297	.136	-.027
	QUARTILE 3 -.040	-.066	-.041	-.066	-.223	-.005	.110	-.473 ^{MM}	.759 ^{MM}	.142	-.414 ^M
	QUARTILE 4 .184	-.353 ^M	-.002	.038	.213	.451 ^{MM}	-.313 ^M	.501 ^{MM}	-.094	.426 ^{MM}	-.405
FRONTIER RURAL	TOTAL POP. -.196 ^{MM}	-.343 ^{MM}	-.559 ^{MM}	-.522 ^{MM}	.494 ^M	-.336 ^{MM}	-.003	.090	.122	.213	-.277
	QUARTILE 1 -.350	-.367	-.258	-.558	1.267 ^M	-.932 ^{MM}	.082	1.656	.828	.110	-.559
	QUARTILE 2 -.230	-.242	-.396	-1.260 ^{MM}	.884 ^M	-.024	-.477	.509	-1.398 ^{MM}	.000	-.307
	QUARTILE 3 -.098	-.206	-.341	-.179	.211	-.428 ^{MM}	.631 ^M	-3.473 ^{MM}	1.495 ^{MM}	.868 ^{MM}	-.322
	QUARTILE 4 -.358	-1.009 ^{MM}	-.651	-.906	-1.285	.242	-.780	.957	-.193	-.605	-.933
SUGAR CANE AND LIVESTOCK	TOTAL POP. .267 ^{MM}	.126	-.003	.049	.847 ^{MM}	.127	-.073	.493 ^{MM}	-.040	.248	-.166
	QUARTILE 1 -.270	-.277	.039	.216	1.234 ^{MM}	-.306	-.663	1.353	.149	.307	-.139
	QUARTILE 2 .337 ^{MM}	.346 ^M	.277	-.452	.502	.566 ^{MM}	-.143	1.235 ^{MM}	-.540	-.140	.065
	QUARTILE 3 .640 ^{MM}	.511 ^{MM}	.278	-.061	-.052	.095	.231	-.748 ^M	.503	.495	-.126
	QUARTILE 4 .411 ^{MM}	-.331	-.467	.834 ^{MM}	.945	.369 ^M	-.629 ^M	.821 ^M	-.073	.278	-1.065
OTHER RURAL	TOTAL POP. .050	.020	-.249 ^{MM}	-.284 ^{MM}	.260	.004	-.015	.230	.573 ^{MM}	.299 ^M	.225 ^M
	QUARTILE 1 -.122	-.128	-.422	.054	1.322 ^{MM}	-.726 ^{MM}	-.417	1.160	1.266 ^{MM}	.357	.220
	QUARTILE 2 .166	.163	-.105	-.553 ^{MM}	-.269	.399 ^{MM}	.030	.674 ^{MM}	-.169	.247	.391
	QUARTILE 3 .154	.148	-.155	-.355	-.158	.023	.299	-1.352 ^{MM}	.832 ^{MM}	.374	.005
	QUARTILE 4 .326 ^M	-.245	-.097	-.139	.551	.286	-.635 ^{MM}	.742	.310	.215	-.232

* These are the coefficients of each of the dummy variables indicating region.
The coefficients indicate differences from the consumption levels in the capital city.

MMMM = T significant at $p < .001$

MMM = T significant at $p < .01$

MM = T significant at $p < .05$

M = T significant at $p < .10$

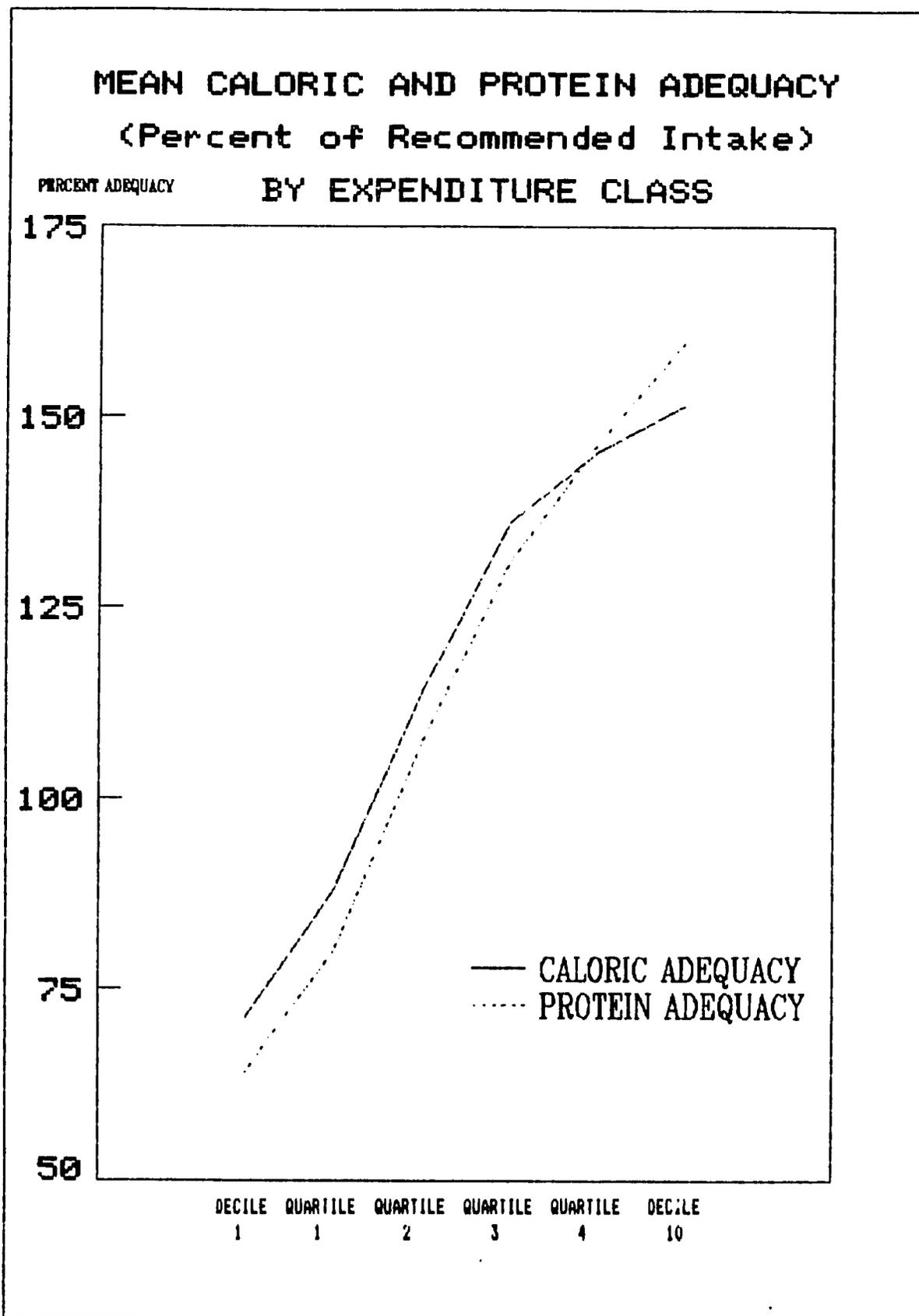
the capital, compared with 20% in other urban areas and 16-17% in the rural regions. The proportion of food expenditures devoted to the excluded categories ranged from 18% to 23%, but did not show any consistent variation by expenditure quartile. These expenditure figures overestimate the contribution of excluded goods to calorie and protein consumption, as they tend to be the foods which are more expensive sources of calories and protein (coffee, chocolate, garlic, Maggi cubes). Thus they represent a greater proportion of expenditure than they do of calories and protein. This suggests that while there may be some inaccuracy in the absolute numbers in each category of calorie and protein adequacy, the relative status of the income groups and of the regions is accurately reflected in these results.

5.1 Income

Average levels of caloric and protein adequacy are well below 100% in the bottom quartile, and below 75% in the lowest decile, indicating a potentially serious nutritional risk among low-income Dominicans. Figure 5.1 and Table 5.1 show these levels broken down by income class. Figure 5.1 shows that the levels of caloric and protein adequacy rise sharply with increasing expenditure level through the third quartile. Above the third

TABLE 5.1					
PERCENT OF CALORIC AND PROTEIN ADEQUACY CONSUMED, BY EXPENDITURE CLASS					
	CALORIES		PROTEIN		N OF
	%	SD	%	SD	CASES
TOTAL POPULATION	120.35	66.65	115.92	64.71	1343
DECILE 1	71.23	35.75	64.05	31.80	109
QUARTILE 1	87.82	41.48	79.79	42.52	301
QUARTILE 2	113.99	46.57	107.38	50.84	313
QUARTILE 3	136.05	70.36	130.91	62.42	311
QUARTILE 4	145.33	84.98	146.26	78.60	310
DECILE 10	151.43	106.63	159.60	99.29	122
F SIG.	.0000		.0000		

FIGURE 5.1



quartile, the rate of increase in level of adequacy drops off, although average adequacy continues to rise through the highest decile of expenditure. The decrease in the rate of increase is greater for calories than for protein, indicating that while calorie demands may be becoming satiated at higher income levels, protein demand continues to rise.

At low income levels, protein requirements are less well satisfied than calorie requirements. As income rises, protein levels increase faster than calories, so that above the third quartile, households consume more of their protein than their calorie requirements. (Note that, at this level of income, average protein and calorie consumption are both well over 100% of requirements).

Average adequacy levels for calories and protein reach 100 percent in quartile 2; however, these averages mask the fact that significant numbers of households at higher income levels consume less than recommended levels of calories and protein. Tables 5.2 and 5.3 present a breakdown of households by income class, showing those consuming less than 75% of protein and calorie requirements; those consuming 75 to 100%, and those consuming more than 100%. Recognizing the many inaccuracies involved in the measurement of these adequacy levels, we can still assume that households consuming below 75% of calorie and protein requirements face a serious risk of nutritional deficiency.*

The percentage of households with deficient protein intake (defined as less than 75% of requirement) is consistently higher than the percentage with deficient calorie intake. This reflects the fact that households with deficient intakes seek to increase quantity before quality, and that it is the higher quality foods which are both more expensive and more protein-dense.

The proportion of households with deficient intakes of both calories and protein declines sharply with rising income (measured here by per capita expenditure). In the lowest decile, 60% of households are deficient

*Johnson (1987), in a follow-up study on the same households, found a significant correlation between our measures of calorie and protein adequacy, and the nutritional status of children under 6.

TABLE 5.2

PERCENT OF HOUSEHOLDS IN CALORIC ADEQUACY GROUPS
BY EXPENDITURE CLASS

CALORIC ADEQUACY	TOTAL POP.	DECILE 1	PER CAPITA EXPENDITURE QUARTILE				DECILE 10
			1	2	3	4	
Less than 75%	17.2	59.8	37.2	14.9	8.2	8.4	11.4
Between 75% and 100%	23.6	20.4	31.2	26.8	18.8	15.8	14.6
Greater than 100%	59.2	19.9	31.6	58.2	73.1	75.8	74.0
N of Cases	1345	109	301	313	311	310	122

Chi Square Sig. .0000

TABLE 5.3

PERCENT OF HOUSEHOLDS IN PROTEIN ADEQUACY GROUPS
BY EXPENDITURE CLASS

PROTEIN ADEQUACY	TOTAL POP.	DECILE 1	PER CAPITA EXPENDITURE QUARTILE				DECILE 10
			1	2	3	4	
Less than 75%	23.5	70.0	50.4	22.3	10.8	10.6	12.6
Between 75% and 100%	23.1	18.2	27.0	29.5	23.3	11.8	6.2
Greater than 100%	53.4	11.8	22.6	48.2	65.9	77.6	81.2
N of Cases	1345	109	301	313	311	310	122

Chi Square Sig. .0000

in calories, and almost three quarters are deficient in protein. What is more surprising is that about 10 percent of households in quartile three and above appear to have deficient caloric consumption, and a slightly higher proportion (up to 12.6%) have deficient protein consumption.

Income is clearly the major determinant of dietary adequacy, and the most important constraint on food consumption in poor families. Table 5.4 shows that wealthier households devote a smaller proportion of their consumption spending to food than do poor families, but it is noteworthy that households in the lowest decile spend slightly less of their income on food than those in the lowest quartile. This suggests that at the very lowest income level, relatively fixed cash needs for other goods constrain food purchases and that any increment in income is fully devoted to food. Similar results have been reported for very poor countries in Asia (eg. Sahn, 1986), but it is surprising to find these "ultra poor" households in a country like the Dominican Republic, which is usually considered in the middle range of poor countries. This is an indication of the seriousness of the nutrition situation.

5.2 Regional Differences

There are significant regional differences in the adequacy of calorie and protein consumption. Figure 5.2 and Table 5.5 show the average caloric and protein adequacy among the five regions. In terms of calories, the capital is distinctly lower than average; rural areas other than the Frontier are distinctly higher. In terms of protein, the capital and the Frontier stand out as lower than the other regions.

Income levels are lower in the Frontier than elsewhere, and the consumption pattern in the Frontier includes less of protein-dense foods and more of starchy staples which are low-protein sources of calories. These foods are cheaper in the Frontier region than elsewhere in the country, and they are also foods which tend to be available from home production. These factors explain the relatively lower protein consumption, both compared to other regions and compared to its own level of caloric adequacy.

TABLE 5.4

PERCENT OF CONSUMPTION EXPENDITURE ON FOOD
BY EXPENDITURE CLASS

	%	SD	N
TOTAL POPULATION	61.79	17.63	1287
DECILE 1	60.48	27.54	128
QUARTILE 1	65.62	20.66	322
QUARTILE 2	66.72	13.59	321
QUARTILE 3	63.16	14.45	322
QUARTILE 4	51.65	16.78	322
DECILE 10	42.40	15.87	128
F. SIGNIFICANCE	.0000		

FIGURE 5.2

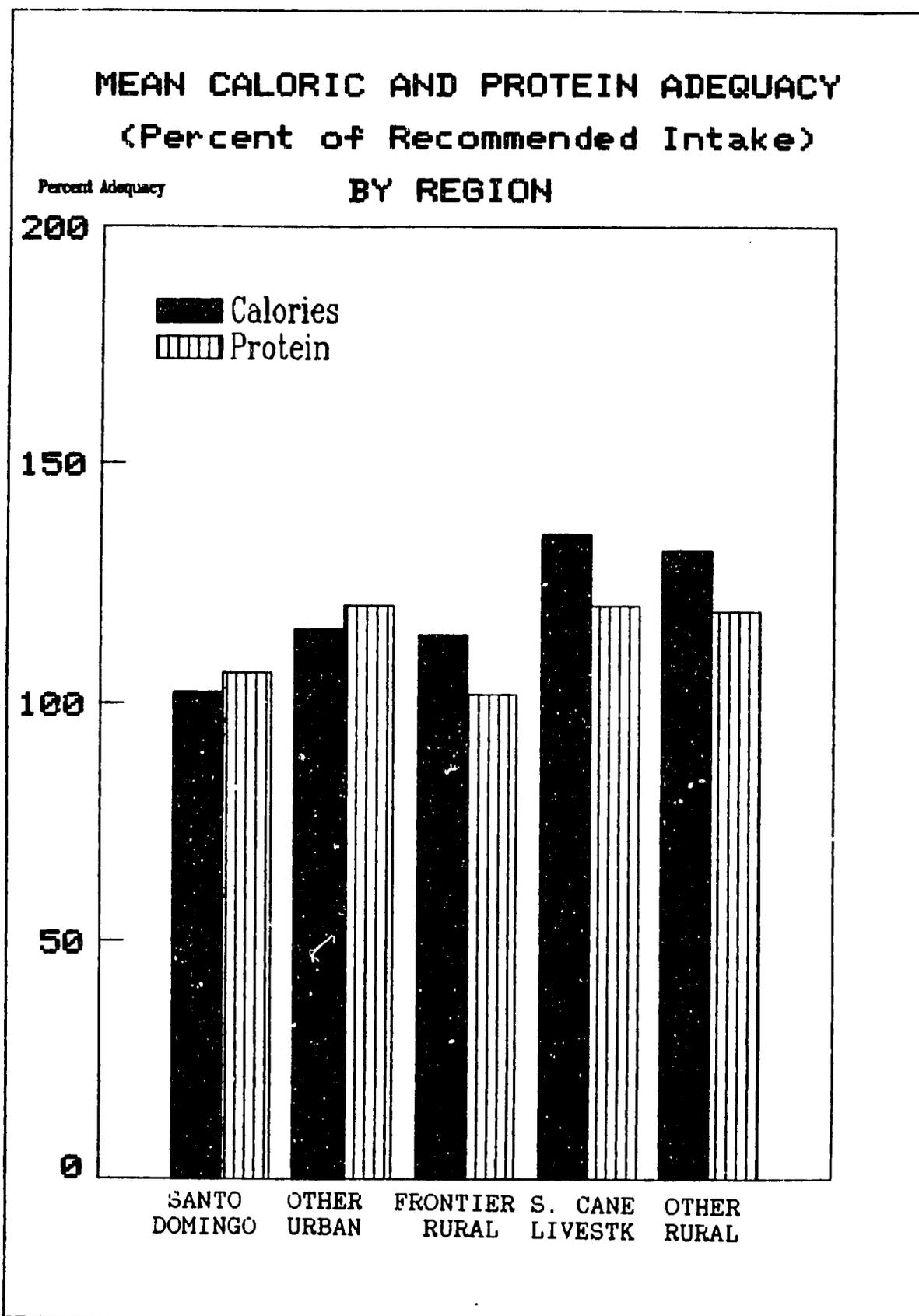


TABLE 5.5

CALORIC AND PROTEIN ADEQUACY
(PERCENT OF RECOMMENDED INTAKE)

BY REGION

	CALORIES		PROTEIN		N OF CASES
	%	SD	%	SD	
TOTAL POPULATION	120.35	66.65	115.92	64.71	1346
SANTO DOMINGO	102.22	35.21	106.09	43.78	318
OTHER URBAN	115.23	57.83	120.05	62.45	366
FRONTIER RURAL	114.00	56.11	101.77	57.82	200
CANE AND LIVESTOCK	135.16	87.06	120.05	77.75	223
OTHER RURAL	131.83	76.00	118.98	71.94	239
F SIG.	.0000		.0006		

TABLE 5.6

PERCENT OF CONSUMPTION EXPENDITURE ON FOOD
BY REGION

	%	SD	N
TOTAL POPULATION	61.79	17.63	1237
SANTO DOMINGO	58.81	15.62	289
OTHER URBAN	56.88	16.79	337
FRONTIER RURAL	67.96	18.09	200
CANE AND LIVESTOCK	65.93	13.80	207
OTHER RURAL	65.22	20.18	253
F. SIGNIFICANCE	.0000		

The relatively lower consumption levels in the capital are harder to explain. Cash needs for non-food goods tend to be higher in urban than rural areas, and in fact the share of consumption spending devoted to food is slightly lower in the two urban areas than in the rural regions (Table 5.6.) Cash expenditure on food (as a proportion of total spending) is higher in urban areas than in rural, but home consumption makes up some of the difference in rural areas. Food purchased for cash is a higher proportion of total food consumption in the capital than elsewhere in the country. The greater availability of unpaid food sources such as gifts and home production may explain the higher caloric consumption of these other regions, even with lower income. It is possible also that caloric intake is underestimated because of the excluded food categories. Johnson (1987, p. 18) found that 38.5 percent of children in the capital showed some degree of malnutrition (using the Gomez classification), a slightly lower proportion than in the other regions (which ranged from 55.2% in the Frontier to 39.3% in the other urban areas).

Tables 5.7 and 5.8 show the distribution of households by region among three adequacy categories: less than 75%, 75-100% and over 100%. Once again, it is clear that average figures mask some of the differences among regions. The capital, with the lowest average caloric adequacy, does not have a higher than average proportion of households in the high-risk category (below 75% of caloric requirements). The Frontier has the highest proportion of households in this category for calories, and (as expected) a much higher proportion in the high-risk category for protein. It is cause for concern that by this very conservative measure, 17% of Dominican households are at risk of inadequate caloric intake, and 24% are at risk for inadequate protein.

5.3 Home Consumption

The most consistent explanatory factor other than income determining calorie adequacy levels is a household's access to home consumption. A household was defined as having access to home consumption if the value of food consumed from home production during the reference week was greater than zero. This is a very liberal definition, chosen to make this variable as independent as possible from the other determinants of food consumption.

TABLE 5.7

PERCENT OF HOUSEHOLDS IN CALORIC ADEQUACY GROUPS
BY REGION

REGION	Total Pop.	Santo Domingo	Other Urban	Front. Rural	S. Cane Livestk	Other Rural
CALORIC ADEQUACY						
Less than 75%	17.2	18.9	18.0	22.0	15.2	15.9
Between 75% and 100%	23.6	34.0	21.6	21.0	17.5	20.9
Greater than 100%	59.2	47.2	60.4	57.0	67.3	63.2
Number of Cases	1346	318	366	200	223	239

Chi Square Significance .0000

TABLE 5.8

PERCENT OF HOUSEHOLDS IN PROTEIN ADEQUACY GROUPS
BY REGION

REGION	Total Pop.	Santo Domingo	Other Urban	Front. Rural	S. Cane Livestk	Other Rural
PROTEIN ADEQUACY						
Less than 75%	23.5	23.0	20.2	32.0	24.7	25.5
Between 75% and 100%	23.1	26.7	22.4	24.5	20.2	22.6
Greater than 100%	53.4	50.3	57.4	43.5	55.2	51.9
Number of Cases	1346	318	366	200	223	239

Chi Square Significance .0429

It was assumed that variation in the absolute quantity or total value of home-produced food would be closely related to variations in income, expenditure, and food consumption.

Simple access to any home-produced food (measured as a yes-no dichotomy) did not vary significantly by expenditure class. The relative importance of home-produced food, measured as a percentage of total food consumption, also showed no significant association with per capita expenditure level, controlling for region, household size, and land area farmed. Of course variation by region was very noticeable (see Ch. 7 Tables 7.7 and 7.8), with the urban areas having fewer home-consuming households, the rural areas more, and the Frontier the most.

Tables 5.9 and 5.10 show the distribution of households in the three adequacy groups for calories and protein, broken down by expenditure quartile and by access to home consumption. In every quartile, fewer households with access to home consumption fell into the high-risk (below 75%) adequacy category for calories and protein. This suggests that households at every income level, even the highest, are more likely to consume food from home production than to use income from other sources (that is, income in a form other than food) for food consumption.

5.4 Relation of Calorie to Protein Adequacy

Calorie and protein adequacy levels are very closely related to each other. There is good agreement between adequacy level as measured by calories and that measured by protein.

Almost no household with a high level of protein intake had low calorie intake, and only 2.2% with high caloric consumption had low protein intake. Tables 5.11 and 5.12 show, for the whole study population, the breakdown of households into caloric and protein adequacy groups. This table also indicates that more households achieve adequate calories without adequate protein than vice versa. Once caloric adequacy has been reached, further consumption increases may be needed to achieve protein adequacy, but it is very unusual to find protein needs adequately met while calories are still marginal or deficient. On the whole, though, we may conclude that calorie

TABLE 5.9

PERCENT OF HOUSEHOLDS IN CALORIC ADEQUACY GROUPS
BY EXPENDITURE QUARTILE AND HOME CONSUMPTION

	TOTAL POPULATION		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4	
	HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION	
	NO	YES								
LESS THAN 75%	20.5	10.7	49.2	22.0	19.6	7.4	10.0	4.4	9.9	3.1
BTWN 75 AND 100%	26.8	17.1	32.8	29.0	32.6	17.7	24.2	7.5	19.3	3.4
GREATER THAN 100%	52.7	72.2	15.0	49.0	47.8	74.9	65.8	88.1	70.8	93.5
N OF CASES	894	448	169	132	192	121	210	101	241	68

Chi Square Significance = .0000

TABLE 5.10

PERCENT OF HOUSEHOLDS IN PROTEIN ADEQUACY GROUPS
BY EXPENDITURE QUARTILE AND HOME CONSUMPTION

	TOTAL POPULATION		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4	
	HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION		HOME CONSUMPTION	
	No	Yes								
LESS THAN 75%	24.8	20.8	48.9	61.3	23.2	26.4	12.5	9.7	15.3	2.6
BTWN 75 AND 100%	23.8	21.8	19.8	47.0	33.1	31.9	29.8	17.3	17.4	3.9
GREATER THAN 100%	51.4	57.4	7.9	14.3	19.6	28.0	30.4	31.7	42.1	25.9
N OF CASES	894	448	169	132	192	121	210	101	241	68

Chi Square Significance = .1024

TABLE 5.11

PERCENT OF HOUSEHOLDS IN CALORIC ADEQUACY GROUPS
BY PROTEIN ADEQUACY GROUP

CALORIC ADEQUACY	PROTEIN ADEQUACY			TOTAL
	LESS THAN 75%	75 TO 100%	GREATER THAN 100%	
LESS THAN 75%	88.3	11.2	.4	100
75 TO 100%	29.5	50.2	20.3	100
GREATER THAN 100%	2.2	15.8	82.0	100

TABLE 5.12

PERCENT OF HOUSEHOLDS IN PROTEIN ADEQUACY GROUPS
BY CALORIC ADEQUACY GROUP

PROTEIN ADEQUACY	CALORIC ADEQUACY			TOTAL
	LESS THAN 75%	75 TO 100%	GREATER THAN 100%	
LESS THAN 75%	64.9	29.6	5.5	100
75 TO 100%	8.4	51.2	40.5	100
GREATER THAN 100%	.1	8.9	90.9	100

and protein adequacy vary together, any policy which increased consumption of one would similarly affect the other.

5.5 Multivariate Estimation of Determinants of Calorie and Protein Intakes

To measure the independent effects of income, home consumption, household size and composition, region, and selected prices on caloric and protein consumption, a series of reduced-form regression equations were estimated, using calories per adult-equivalent and protein per adult-equivalent as dependent variables. The regressions were specified in double log format, so that an elasticity of calorie (protein) consumption could be derived directly from the equations. Because it is known that the relationship between income and nutrient consumption is non-linear, a quadratic term in income was added to the equation, to permit the income elasticity of calorie (protein) consumption to vary by income level.

The equation was specified as follows:

$$\begin{aligned} \text{LNCALS} = & \alpha + \beta_1 \text{LNPCEXP} + \beta_2 (\text{LNPCEXP})^2 + \beta_3 \text{LNPRESNT} + \\ & \beta_4 \text{LNCADERAT} + \beta_{5i} \text{Price}_i + \beta_{6j} \text{Stratum} + \beta_7 \text{HOMECONS} \\ & + \beta_8 \text{Stones} + \epsilon \end{aligned}$$

where

LNCALS = log of calories consumed per adult equivalent per day

LNPCEXP = log of per capita monthly expenditure (used as a measure of income).

(LNPCEXP)² = log of per capita monthly expenditure, squared

LNPRESNT = log of number of household members

LNCADERAT = log of the ratio of adult-equivalents to members. The higher this ratio (that is, the closer it gets to 1.00), the greater the caloric and protein needs of the household, controlling for household size.

PRICE = the prices of the ten most important foods, entered into the equation in log form. These foods are: common rice, red beans, plaintain, yuca, vegetable oil, chicken, beef, liquid milk, pasta, and raw sugar.

STRATUM = a series of dummies which take a value of 1 if the case is in the stratum, 0 otherwise. The strata are:

OTHURB = urban other than Santo Domingo

FRONT = Frontier region, rural

CANA = sugar cane and livestock region

RESTO = other rural areas

HOMECONS = a dummy variable equal to 1 if the household consumed any food from home production in the reference week, 0 otherwise.

STONES = Stone's Index of the level of prices in each region and season which was used to control for inflation. Use of the Stone's index allows the price coefficients to be interpreted as measuring the effect of real price changes, that is, changes in the price of that food relative to all other prices.

The same specification was used for an equation with the dependent variable LNPRO, log of protein consumed per adult-equivalent per day.

These equations were estimated for the whole population. The sample was then divided into quartiles to identify the different effects of income and various prices in different expenditure classes. The results of these estimations are shown in Table 5.13 (calories) and Table 5.14 (protein).

Note that caloric and protein consumption are measured in adult equivalent terms, as it is the adequacy in relation to biological requirements which is the relevant policy concern. Income (measured by expenditure) is measured in per capita terms, since this is the more relevant variable for policy-making. Results are quite similar when calorie and protein consumption per capita are used instead.

5.5.1 Effect of Income

The calorie demand equations show the declining importance of income in determining calorie consumption as income rises. The significant negative coefficient of the quadratic term in income shows that marginal increases in income have a smaller effect on caloric adequacy as income rises. The computed calorie elasticity is .523 at the mean income of the bottom quartile, but declines to .287 in the highest quartile.

TABLE 5.13

REDUCED-FORM REGRESSION RESULTS

DEPENDENT VARIABLE: CALORIES PER ADULT EQUIVALENT^a

	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	1.040****	.517****	.526****	.282*	.073
PER CAPITA EXPENDITURE ²	.070****				
COMPUTED EXPENDITURE ^b ELASTICITY	.413****	.523****	.436****	.378****	.287****
NUMBER PRESENT RATIO ADULT EQUIVS/PRESENT	.046*	.230****	-.047	-.053	.039
	-.841****	-1.063****	-.138	-1.028****	-.609**
PRICES:					
COMMON RICE	.141	-.333	.192	-.132	.492*
RED BEANS	-.088	.056	-.204**	.031	-.040
PLANTAIN	-.072	-.148*	-.035	-.092	.037
YUCA	-.144*	-.380***	-.138	-.240	.308
VEGETABLE OIL	-.299**	-.392	-.644****	-.234	-.456
CHICKEN	.247	1.047****	.197	-.016	.940**
BEEF	-.318**	.194	-.180	-.119	-.838**
LIQUID MILK	.027	-.099	-.012	-.126	.453*
PASTA	-.103	-.040	.264	-.086	.340
RAW SUGAR	-.108	-.169	-.195	-.146	.193
HOME CONSUMPTION	.193****	.209****	.149***	.105**	.199****
REGION:					
OTHER URBAN	.014	-.071	.008	.038	.143
FRONTIER	-.135	-.182	-.294**	.018	.052
SUGAR CANE	.201***	.041	.107	.299**	.362***
OTHER RURAL	.102	.044	.063	.095	.185
STONES INDEX	.080	-.025	-.184****	-.101	.465
CONSTANT	3.862****	3.121**	6.769	6.286****	7.063***
ADJUSTED R ²	.33672	.48608	.22656	.33939	.16768
STD. ERROR.	.39154	.32580	.29441	.30293	.36781
F	27.72824	14.49026	5.19337	8.13839	3.20554
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	1054	272	273	265	209
MEAN DAILY CALORIES CONSUMPTION PER ADULT EQUIVALENT	2768	2020	2621	3129	3342

a. Expenditure, prices, household size, adult equivalent ratio, and calories per adult equivalent are expressed in logarithmic form.

b. Computed from the coefficients of the expenditure and expenditure squared terms estimated for the whole population using the formula:

$$= a_1 + 2a_2(\log Y/N). \text{ (See 4.1.1)}$$

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

TABLE 5.14

REDUCED-FORM REGRESSION RESULTS

DEPENDENT VARIABLE: PROTEIN PER ADULT EQUIVALENT*

	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	1.048****	.457****	.581****	.268	.138*
PER CAPITA EXPENDITURE ²	-.063****				
COMPUTED EXPENDITURE ^b ELASTICITY	.484****	.584****	.505****	.453****	.371****
NUMBER PRESENT RATIO ADULT EQUIVS/PRESENT	.049*	.154***	.055	-.071	.074
	-.845****	-1.016****	-.570****	-.958****	-.506**
PRICES:					
COMMON RICE	.359**	.470	.625**	-.179	.672**
RED BEANS	-.127*	-.090	-.195*	-.085	-.074
PLANTAIN	-.083*	-.088	-.039	-.057	-.149
YUCA	-.074	-.224	-.210	-.144	.314
VEGETABLE OIL	-.179	-.291	-.447*	-.023	-.124
CHICKEN	.077	.640*	-.260	.118	.550
BEEF	-.405****	.152	-.191	-.113	-.989****
LIQUID MILK	-.110	-.279	.099	-.155	.307
PASTA	-.172	.038	.143	-.226	.155
RAW SUGAR	-.156	-.366*	-.413**	-.070	.099
HOME CONSUMPTION	.161****	.227****	.094*	.064	.209****
REGION:					
OTHER URBAN	.005	-.146	-.056	.082	.106
FRONTIER	-.222**	-.325	-.180	-.085	-.265
SUGAR CANE	.034	-.199	.077	.255*	.123
OTHER RURAL	-.024	-.145	.055	.057	.073
STONES INDEX	.280	.145	.254	.001	.456
CONSTANT	-.697	-.141	.602	2.128	2.844
ADJUSTED R ²	.38005	.44957	.19474	.27911	.18410
STD. ERROR.	.40737	.35225	.31944	.33359	.37490
F	33.27683	12.73567	4.44935	6.37965	3.48210
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	1054	274	272	265	210
MEAN DAILY PROTEIN (GM.) CONSUMPTION PER ADULT EQUIVALENT	60.86	41.89	56.37	68.73	76.78

- a. Expenditure, prices, household size, adult equivalent ratio, and protein per adult equivalent are expressed in logarithmic form.
- b. Computed from the coefficients of the expenditure and expenditure squared terms estimated for the whole population using the formula:

$$= a_1 + 2a_2(\log Y/N). \text{ (See 4.1.1)}$$

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

5.5.2 Household Size and Composition

Controlling for the effect of income, household size shows a positive association with calorie consumption per adult equivalent, while the ratio of adult-equivalents to members is, as expected, negative. It is not obvious why calories per adult-equivalent should increase with household size, unless one can suppose that, at a given level of per capita income, more members represent more resources to the household in the form of members' time or nonremunerated labor. Controlling for income and household size, it is not surprising that calorie adequacy should decline as caloric needs (represented by the adult-equivalent ratio) rise.

5.5.3 Effect of Home Consumption

As we have discussed, the dummy variable for home consumption is positive and highly significant, and of roughly the same magnitude in every expenditure quartile. The effect of home consumption increasing caloric intake is consistent and clearly independent of income level.

5.5.4 Effect of Prices

The price of common rice did not show a significant effect on caloric intake except in the highest quartile, where caloric adequacy is not a significant problem. This counterintuitive result is explained by the fact that the price of common rice is controlled by law, so that in our data it did not exhibit sufficient variation to permit an estimate of elasticity. Since rice accounts for 26% of value eaten in the bottom decile and 23% in the bottom quartile, it is likely that a substantial change in rice price would affect calorie intake, but such price variation was not observed.

In the estimation for the whole population, the prices of yuca, oil, and beef showed a negative relationship with calorie intake. That is, higher prices result in lower calorie consumption. The effect of yuca price is negative and significant only in the lowest quartile. This is to be expected since yuca is a less important contributor to calorie consumption at higher incomes. Interestingly, the price of chicken shows a very highly significant positive relationship with calorie consumption in

the lowest quartile. This suggests that when chicken is less expensive, the poor choose to upgrade the perceived quality of their diets by buying small quantities of chicken, at the sacrifice of relatively larger quantities of lower-cost foods which could have provided more calories. The same effect is observed in the top quartile, but here it is less important from a policy point of view since caloric inadequacy is less of a problem in this group.

5.5.5 Regional Differences

It is noteworthy that, once the effects of income, prices, household size and composition, and home consumption are accounted for, the differences among the regions are generally not significant. (The exception is the sugar cane and livestock region, which shows higher calorie consumption than the comparison group, Santo Domingo). This confirms the suggestion that observed regional differences in consumption patterns are explained more by these factors than by differences in food availability or in local tastes and preferences.

5.5.6 Determinants of Protein Consumption

The results of the estimation for protein consumption are quite similar to those for calories, with only a few exceptions. Controlling for all other variables, the Frontier region still has significantly lower protein intake than other parts of the country. The price of rice is positively associated with protein intake, suggesting that as rice prices rise, consumers may substitute more protein-dense foods for rice in large enough quantities to increase total protein. The price of beef is negatively associated with protein consumption in the whole population, but the separate estimations by quartile show that this effect is significant only in the top quartile, where protein consumption is generally adequate in any case. It is noteworthy that in the lowest quartile, chicken price has the same positive association with protein intake as it had with calories, once again suggesting that as chicken price rises, poor households substitute larger quantities of less preferred foods. This is important because it suggests that even though chicken is more protein-dense than its less-expensive substitutes, the substitution of the other foods for chicken

does not reduce protein consumption as it increases calories, but rather increases consumption of both nutrients.

The price of raw sugar also shows a negative association with protein intake in the bottom two quartiles. This suggests that as the price of sugar rises, the whole food budget is constrained and consumption of protein sources declines.

It is also notable that the variables in these equations explain a greater proportion of the variation in nutrient intake for the lowest expenditure group than for the other quartiles. This makes intuitive sense, since low-income households are more constrained in their consumption behavior by income, prices, and the food needs of their members. Higher-income households are more able to vary their consumption based on tastes and preferences due to non-economic factors.

5.6 Differential Effect of Different Income Sources

Home consumption of home-produced food is significantly associated with higher caloric and protein intake, even when income is taken into account. This result suggests that income in the form of home-produced food has a greater positive effect on food consumption than does income in other forms.

In order to test this hypothesis, a regression was estimated using calories consumed per adult-equivalent as the dependent variable, and with expenditure, household size and adult-equivalent ratio, regional dummies and the percent of income received from farming (that is, farm sales) and from home consumption of home-produced food. The value of home-produced food was imputed using the average consumer price. This overestimates its value in terms of income forgone because the potential income represented by home-produced food would be calculated using the lower producer price. The equation was specified as follows:

$$\begin{aligned} \text{LNCALS} = & \alpha + B_1 \text{ LNPCEXP} + B_2 (\text{LNPCEXP})^2 + \\ & B_3 \text{ LNPRESNT} + B_4 \text{ LNCADKAT} + \\ & \sum B_{5i} \text{ Stratum} + B_6 \text{ FARM PCT} + \\ & B_7 \text{ HOME PCT} \end{aligned}$$

where

FARM PCT = percent of real income derived from farm sales

HOME PCT = percent of real income received in the form of food produced and consumed at home (evaluated at the consumer price)

This specification introduces the two terms representing separate income sources as independent of the two income terms (expenditure and expenditure squared) in the equation. The results are shown in Table 5.15. The coefficients of both percent of income from farm sales and percent of income from home-consumption are positive and highly significant.

5.7 Consumption Patterns: Variation by Nutrient Adequacy

The association of caloric and protein adequacy with income level is clearly reflected in the consumption patterns of the three adequacy categories. Tables 5.16 and 5.17 show how the percentage contribution of each food group to total calorie and protein intake varies by adequacy level. The importance of rice declines as caloric adequacy rises, reflecting the fact that consumption of other foods increases more rapidly than rice with rising income. It is noteworthy that the contribution of starchy roots and plantains is very significantly greater in the higher caloric adequacy group. This is similar to the pattern observed with expenditure class, where the contribution of this food group rose with expenditure in the below-median classes. The contribution of oil also rises sharply with caloric adequacy, as it does with income. The meat, chicken, fish group shows a greater contribution to calories in the two higher adequacy groups, but no consistent pattern is seen with the milk group. Although raw sugar is a cheap source of calories, its importance is not significantly greater in higher calorie-consuming households, no doubt because its consumption is lower in higher income households.

TABLE 5.15

REGRESSION RESULTS:

EFFECT OF INCOME SOURCE ON
CALORIES AND PROTEIN PER ADULT EQUIVALENT

DEPENDENT VARIABLE:	CALORIES	PROTEIN
PER CAPITA EXPENDITURE	1.019****	1.028****
PER CAPITA EXPENDITURE ²	-.069****	-.062****
COMPUTED EXPENDITURE ELASTICITY AT POPULATION MEAN EXPENDITURE LEVEL	.404****	.475****
NUMBER PRESENT	.075***	.051*
RATIO ADULT EQUIVALENTS/ NUMBER PRESENT	-.841****	-.884****
<u>REGION:</u>		
OTHER URBAN	.058*	.088**
FRONTIER	.022	-.012
CANE AND LIVESTOCK	.211****	.104**
OTHER RURAL	.153****	.063
PERCENT OF INCOME FROM FARM SALES	.002****	.002****
PERCENT OF INCOME FROM HOME PRODUCTION	.009****	.004****
CONSTANT	4.138****	.235
ADJUSTED R ²	.32802	.38452
STD. ERROR	.40385	.41008
F	57.03882	72.72154
SIGNIF. F	.0000	.0000
N	1149	1149
MEAN CALORIES/PROTEIN PER ADULT EQUIVALENT PER DAY	2748 kcals.	60.86 gms.

**** = T significant at p < .001
 *** = T significant at p < .01
 ** = T significant at p < .05
 * = T significant at p < .10

TABLE 5.16

PERCENT OF CALORIES FROM EACH FOOD GROUP
BY CALORIC ADEQUACY GROUP

FOOD GROUPS	CALORIC ADEQUACY						F. SIG.
	LESS THAN 75%		BTWN 75 & 100%		GREATER THAN 100%		
	%	SD	%	SD	%	SD	
RICE	34.06	17.31	32.37	11.55	28.96	9.26	.0000
BEANS	5.07	4.87	4.67	4.24	4.70	2.97	.3626
OTHER GRAINS	1.42	4.14	.64	1.45	.64	1.54	.0000
STARCHY TUBERS, PLANTAINS	13.80	12.84	15.90	10.93	18.83	12.14	.0000
MEAT, FISH, POULTRY	6.58	6.84	7.44	4.83	7.47	4.70	.0622
MILK & MILK PRODUCTS	6.93	12.27	4.95	5.07	6.24	5.66	.0031
EGGS	.61	1.06	.72	.80	.79	.84	.0302
BREAD, PASTA, FLOUR	9.92	11.36	10.13	6.84	8.25	6.17	.0001
VEGETABLE OIL	10.97	7.95	13.46	5.24	14.01	5.93	.0000
SUGAR	10.05	11.39	9.04	5.59	9.57	5.46	.2295
OTHER FATS	.53	1.99	.61	1.35	.48	1.37	.4293
N OF CASES	231		316		795		

TABLE 5.17

PERCENT OF PROTEIN FROM EACH FOOD GROUP
BY PROTEIN ADEQUACY GROUP

FOOD GROUPS	PROTEIN ADEQUACY						F. SIG.
	LESS THAN 75%		BTWN 75 & 100%		GREATER THAN 100%		
	%	SD	%	SD	%	SD	
RICE	29.73	15.54	28.29	10.68	21.73	8.22	.0000
BEANS	14.08	11.40	13.96	8.47	13.94	8.96	.9761
OTHER GRAINS	2.87	7.64	1.84	3.85	1.57	3.84	.0006
STARCHY TUBERS, PLANTAINS	8.88	9.10	8.65	7.50	8.17	6.56	.3157
MEAT, FISH, POULTRY	18.33	14.84	22.82	12.84	27.75	12.80	.0000
MILK & MILK PRODUCTS	11.65	17.71	10.49	9.79	14.62	11.12	.0000
EGGS	2.44	3.74	2.60	2.93	2.56	2.72	.7639
BREAD, PASTA, FLOUR	11.98	13.40	11.30	7.86	9.60	6.90	.0001
OTHER FATS	.01	.04	.01	.03	.01	.03	.8695
N OF CASES	231		316		795		

A somewhat different pattern emerges in the different protein adequacy groups. Not surprisingly, both the meat, chicken, fish group and the milk group are very much more important contributors of protein in the higher adequacy groups. The importance of rice as a protein source declines quite sharply as protein adequacy rises; this is a more pronounced effect than in the calorie adequacy groups. Among the protein adequacy groups, there is no difference in the percentage contribution of starchy roots and plantain.

Beans are an important protein source (contributing about 14%) in all the protein adequacy groups, but the relative contribution of beans does not vary across adequacy groups with respect to either calories or protein.

The most salient characteristics of the high caloric adequacy group are lower relative contribution of rice and higher contribution of oil, starchy staples and, to some extent, meat, chicken and fish. The salient characteristics of the high protein group are much lower contribution of rice and higher contribution of meat, chicken, fish and milk and milk products. The relative importance of beans is constant across all adequacy groups.

6. Food Procurement Patterns

There are very distinct patterns to the distribution of sources from which households obtain food. The sources vary significantly in importance both by expenditure class and by region. Furthermore, there is significant interaction between region and expenditure class, with different expenditure-related patterns evident in different regions of the country.

Private retail outlets are the dominant source of food throughout the country, accounting for 78% of the value of food consumed, and 78% of the calories consumed. Of the food purchased, about 59% by value is purchased at "colmados", small local retail stores located within neighborhoods or villages, usually only a short walk from the households which are its clients. The frequency of purchase at colmados is far greater than at other retail outlets. Typically, households make small purchases several times a day at the local colmado, often buying food separately for each meal. The Dominicans use the word "chelear" to describe this process of

spending little bits of small change as they obtain them during the day.

The dominance of the colmado in purchasing patterns is important because of what it indicates about the possibility of establishing alternative distribution systems in the Dominican Republic. People use the colmado because it is close and convenient, because they tend to buy small amounts of food frequently, using small amounts of cash, and because they usually have a personal relationship with the seller which permits them to buy on credit. These are powerful reasons. A less convenient source of food would need to provide a very significant incentive to promote its use.

Prices in the colmado are comparable to those paid in other retail outlets. For some items the prices are a little higher than the public market of the supermarket, and for some a little lower. Among the foods analyzed in this study, none showed a substantial price difference between the colmado and alternative private sector outlets. (See Chapter 8, Table 8.4.)

Purchases at the public market, the third most important retail source (by value), are larger and less frequent, reflecting the fact that markets are usually further away, so that time and transportation costs need to be spread over larger quantities purchased. Markets in many areas occur only on a weekly basis. Purchases in the market represent 6.2% of all commercial purchases.

The second most important source of food in value terms is the butcher (14%). This is due to the more expensive purchases being made here. The other commercial sources, supermarkets, bakeries, street vendors, and take-out stores, together account for 17% of commercial purchases of food.

After commercial sources, the second most important food source on average for the whole country is private gifts, that is, gifts of food among individual households. This source accounts for about 7.5% of calories and about 8% of the value of food consumed. Home production is the third in importance, accounting on average for 5.8% of calories and of value. The least important sources of food are government free and

subsidized food distribution programs, which together account for less than 1.5% of all food consumed, in terms of both calories and value.

6.1 Variation by Income

The relative importance of the different food sources shows very significant variation by income level (measured by expenditure quartile). These results are shown in Tables 6.1 through 6.3.

Commercial sources rise very sharply in importance with rising income, from 60% of total value in the lowest decile to 85% in the highest. Among commercial sources, the major ones, colmado and public market, did not show much variation in importance by expenditure class. As might be expected, higher income households made greater use of supermarkets, but even in the highest quartile, these accounted for only 4.6% of the value of food consumed.

Private gifts show a very highly significant decline in importance with rising income. Gifts represent 13.5 percent of all calories consumed, and 15 percent of value, in the lowest quartile. These figures rise to 22 percent of calories and 23 percent of value in the bottom decile. By contrast, in the top quartile, only 5.1 percent of calories (5.7 percent of value) come from gifts.

Evidently, gifts constitute an important element in the survival strategy of poor households. The importance of gifts in low-income households' food consumption suggests that these gifts might be a sort of informal welfare system whereby relatively better-off households transfer resources to the poor. To test this hypothesis, we computed the difference between the value of gifts given and those received. This difference would be positive for households which gave more than they received, and negative for households which were net receivers of gifts. (This difference was dubbed the "carifio" or "affection" measure, since our respondents repeatedly assured us that gifts were given not as payment or transfer, but out of simple "cariño"). If gifts act as an informal transfer program from the rich to the poor, then high-income households would be net givers, with positive values, and poor households would be net receivers.

TABLE 6.1

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	78.37	25.21	65.10	30.70	70.88	26.67	77.29	23.81	81.73	22.43	83.37	24.17	86.81	20.41	.0000
OWN BUSINESS	3.36	14.66	2.39	12.57	2.59	12.62	2.89	14.05	3.26	14.02	3.03	13.63	1.21	8.12	.9423
PRIVATE PRODUCER	1.74	4.74	2.59	6.13	2.01	4.81	2.11	5.92	1.80	4.64	1.24	3.73	.63	2.02	.1113
HOME PRODUCTION	5.80	12.83	5.06	12.02	7.83	14.76	6.08	13.16	5.68	12.36	4.20	10.81	3.88	11.40	.0065
IN-KIND PAY	.63	4.97	.10	.96	.84	6.49	1.16	6.92	.43	3.37	.32	2.42	.10	1.09	.1522
PRIVATE GIFTS	7.68	15.77	22.06	29.33	13.03	21.86	8.43	15.05	4.92	11.34	5.08	12.36	3.99	9.16	.0000
STATE RETAIL	.60	4.24	.56	3.14	.83	5.20	.83	4.74	.43	4.00	.42	3.37	.33	2.82	.4399
STATE GIFTS	.23	1.44	.75	2.85	.48	2.24	.29	1.56	.17	1.17	.04	.34	.04	.34	.0028
OTHER	1.53	6.57	1.34	4.00	1.47	4.98	.88	3.17	1.55	6.37	2.26	10.25	2.97	11.89	.0851
N OF CASES	1345		110		301		314		311		311		122		

TABLE 6.2

PERCENT OF PROTEIN CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	76.17	25.55	61.18	30.78	68.33	26.90	74.77	24.63	79.91	22.88	81.20	24.75	83.76	22.39	.0000
OWN BUSINESS	3.12	13.38	2.34	12.25	2.22	11.06	2.68	12.77	3.16	13.29	2.91	12.31	1.57	7.91	.9123
PRIVATE PRODUCER	3.05	7.64	3.65	6.92	3.38	6.69	3.97	10.82	2.89	6.52	2.25	5.91	1.25	3.86	.0415
HOME PRODUCTION	5.76	12.39	5.09	11.57	7.34	14.05	6.60	13.63	5.57	11.45	4.18	10.31	4.52	12.04	.0112
IN-KIND PAY	.67	5.03	.22	1.60	.82	5.77	1.05	6.60	.40	3.36	.62	4.54	.20	2.11	.4631
PRIVATE GIFTS	8.38	16.64	23.31	29.07	14.19	22.22	8.78	15.19	5.55	13.53	5.71	13.60	4.69	12.96	.0000
STATE RETAIL	.49	3.59	.67	3.50	.82	5.24	.59	3.60	.24	2.41	.40	2.94	.30	2.03	.2423
STATE GIFTS	.49	3.09	1.57	6.47	1.00	4.74	.59	3.27	.39	2.71	.10	.81	.07	.55	.0053
OTHER	1.82	6.73	1.93	6.21	1.85	5.83	.94	3.12	1.84	6.49	2.57	10.00	3.60	11.88	.0292
N OF CASES	1345		110		301		314		311		311		122		

TABLE 6.3

PERCENT OF VALUE OF FOOD CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	77.93	24.33	60.63	30.37	68.59	26.30	77.16	22.97	82.32	21.66	83.26	22.85	84.65	21.49	.0000
OWN BUSINESS	2.84	12.10	2.12	11.41	2.12	10.41	2.28	10.97	3.05	12.63	2.60	10.91	1.72	9.21	.7445
PRIVATE PRODUCER	2.10	5.75	3.25	7.14	2.60	5.92	2.57	7.58	1.76	3.96	1.56	4.74	1.27	4.57	.0405
HOME PRODUCTION	5.86	12.28	5.88	12.28	8.22	14.51	7.04	13.72	5.34	11.27	3.42	8.60	3.48	9.54	.0000
IN-KIND PAY	.58	4.28	.26	2.29	.81	5.17	.89	5.54	.38	2.72	.44	3.84	.12	1.29	.3886
PRIVATE GIFTS	8.18	16.45	24.21	29.47	14.80	22.60	8.09	14.28	4.66	12.03	5.86	14.04	5.14	12.91	.0000
STATE RETAIL	.37	2.57	.47	2.63	.48	2.80	.55	3.27	.19	1.82	.31	2.45	.21	1.77	.3154
STATE GIFTS	.39	2.57	1.39	5.35	.78	3.79	.45	2.48	.39	2.81	.07	.60	.05	.45	.0121
OTHER	1.70	6.45	1.76	5.69	1.55	4.76	.92	3.32	1.84	6.51	2.44	9.80	3.32	11.22	.0344
N OF CASES	1345		110		301		314		311		311		122		

This was not the case. We found that the difference within each quartile was very close to zero, ranging from $-.32$ pesos per day (representing 4.8% of the total daily value of food consumed) in the lowest, to $-.28$ pesos per day (2.6% of total value) in the highest quartile. Interestingly, in every income group, people reported receiving very slightly more than they gave. This result suggests that gifts are exchanged among households within an income class, possibly as a way of reinforcing the mutual social support networks which are especially important to the survival of the poor. It is likely that, within each income group, gifts do represent transfers to those temporarily worse off from those temporarily in a better situation.

Home production also shows an interesting relationship with income class. The relative importance of home production decreases as income rises from quartile 1 to quartile 4, but home production is noticeably less important in the bottom decile than in the bottom quartile. This suggests that the very poorest households lack the resources (access to land) to produce their own food, while richer households can make greater use of cash purchases.

Government subsidized food sales do not vary in importance by income class, while government free distribution is significantly more important in the lower income classes. (See Sec. 6.4 for detailed discussion.)

6.2 Regional Variation

It is not surprising to observe that commercial retail outlets are more important sources of food in urban than in rural areas. Tables 6.4 through 6.6 show the relative importance (in terms of calories, protein, and value) of different food sources by region of the country. Commercial sources account for 89% of calories consumed in Santo Domingo, and 85% of calories in the other urban areas. They are least important in the Frontier region, accounting for only about half of all calories consumed.

Home production, of course, is a much more important source of food in rural than urban areas. It is not at all significant in the capital and accounts for only about 2% of calories in the other urban areas. What is

TABLE 6.4

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	78.37	25.21	89.21	18.92	85.19	21.91	52.06	23.52	71.45	23.50	69.52	27.81	.0000
OWN BUSINESS	3.36	14.66	2.63	13.31	3.08	13.96	2.55	11.61	3.57	14.62	4.21	16.69	.6761
PRIVATE PRODUCER	1.74	4.74	.25	1.34	1.25	3.25	3.42	7.39	1.99	3.91	3.21	7.05	.0000
HOME PRODUCTION	5.80	12.83	.08	.65	2.23	7.35	27.46	23.47	10.66	15.11	8.80	14.91	.0000
IN-KIND PAY	.63	4.97	.34	5.25	.13	1.52	.47	3.02	.97	4.88	1.19	6.81	.0324
PRIVATE GIFTS	7.68	15.77	4.85	10.66	5.32	12.47	7.57	13.33	9.80	16.02	11.11	20.93	.0000
STATE RETAIL	.60	4.24	1.38	6.26	.36	2.30	2.86	10.80	.02	.23	.34	3.64	.0000
STATE GIFTS	.23	1.44	.13	.76	.43	2.02	1.62	4.33	.00	.00	.14	.92	.0000
OTHER	1.53	6.57	1.09	6.08	1.98	7.92	1.95	3.88	1.50	5.20	1.44	6.55	.3848
N OF CASES	1345		318		367		201		223		240		

TABLE 6.5

PERCENT OF PROTEIN CONSUMED FROM DIFFERENT SOURCES
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	76.17	25.55	88.81	18.00	82.50	22.70	48.97	24.47	69.66	23.67	66.05	27.68	.0000
OWN BUSINESS	3.12	13.38	2.42	12.01	3.04	13.09	2.05	9.08	3.29	13.29	3.81	15.16	.5889
PRIVATE PRODUCER	3.05	7.64	.49	2.56	2.25	5.70	4.35	8.67	4.10	8.24	5.24	10.50	.0000
HOME PRODUCTION	5.76	12.39	.17	1.20	2.29	6.78	24.96	22.52	9.50	13.19	9.57	15.62	.0000
IN-KIND PAY	.67	5.03	.24	4.44	.13	1.04	.61	3.55	1.08	5.19	1.32	7.36	.0073
PRIVATE GIFTS	8.38	16.64	5.25	11.41	6.02	14.13	10.23	16.99	10.85	17.20	11.60	21.04	.0000
STATE RETAIL	.49	3.59	.97	4.75	.38	2.19	1.76	6.46	.08	1.07	.35	4.16	.0001
STATE GIFTS	.49	3.09	.25	1.47	.89	4.13	3.83	10.21	.00	.00	.28	1.92	.0000
OTHER	1.82	6.73	1.36	5.61	2.45	8.24	3.19	7.29	1.41	4.93	1.74	6.94	.0137
N OF CASES	1345		318		367		201		223		240		

TABLE 6.6

PERCENT OF VALUE OF FOOD CONSUMED FROM DIFFERENT SOURCES
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	77.93	24.33	88.41	18.05	83.60	22.16	48.88	23.81	71.46	21.69	70.33	26.73	.0000
OWN BUSINESS	2.84	12.10	2.42	11.81	2.80	12.17	1.77	8.02	2.81	11.20	3.39	13.21	.6716
PRIVATE PRODUCER	2.10	5.75	.35	1.99	1.64	4.56	4.54	9.04	2.82	6.30	3.35	7.49	.0000
HOME PRODUCTION	5.86	12.28	.36	2.84	2.33	7.15	26.36	23.99	9.98	12.75	9.25	14.81	.0000
IN-KIND PAY	.58	4.28	.23	3.72	.11	1.13	.62	4.19	1.06	4.72	1.04	6.02	.0097
PRIVATE GIFTS	8.18	16.45	5.90	12.54	5.88	13.73	8.79	15.28	10.39	16.71	10.90	20.81	.0000
STATE RETAIL	.37	2.57	.87	4.01	.23	1.55	1.65	6.20	.05	.47	.17	1.82	.0000
STATE GIFTS	.39	2.57	.24	1.46	.77	3.69	3.01	7.84	.00	.00	.15	1.18	.0000
OTHER	1.70	6.45	1.18	4.46	2.39	8.48	4.33	9.19	1.38	4.75	1.39	6.13	.0000
N OF CASES	1345		318		367		201		223		240		

more interesting is that home production is far more important in the Frontier, where it accounts for over 27% of all calories consumed, than in either of the other rural regions, where less than 10% of calories and value come from home production. We have mentioned in Chapter 3 the implications that this has for consumption: a greater dependence on starchy staples and pigeon peas and lower animal protein consumption, since most animal protein sources are purchased. It also raises the possibility that certain kinds of market interventions, such as establishing special retail outlets or manipulating some prices, may have proportionately less effect on total consumption, since they affect only the purchased proportion of food. It should be noted, however, that the Frontier has the greatest proportion of poor and nutrient-deficient households, so that one might expect any policies affecting consumption to have a more significant impact in terms of reducing nutritional risk.

Purchases directly from the producer are more important in rural than urban areas. Such purchases account for a little over 3 percent of calories consumed in the Frontier and in the Cibao and San Juan regions. These purchases account for between 4 and 5% of protein consumption in all rural areas, reflecting the fact that the majority of such direct purchases are fresh milk.

Private gifts are about twice as important in rural as in urban areas, accounting for about 5% of calories in urban areas and 8 to 11% in rural areas. The figures for percent of value are slightly higher, indicating that gifts do not concentrate in the low-value foods. These figures undoubtedly reflect the different, more communal style of life in rural than in urban areas.

Finally, it is noteworthy that government subsidized outlets are a significant source of food only in Santo Domingo and in the Frontier (1.38 and 2.86% of calories, respectively), and that government free distribution reaches above one percent of calories (4% of protein) only in the Frontier.

6.3 Variation in Income-Related Patterns by Region

There are a few instances in which the income-related pattern in the

importance of a food source is reversed from one region to another. These are interesting for what they imply about the differing economics of the regions. The detailed breakdown is shown in Table 6.7.

The Frontier is the only region in which dependence on commercial sources shows no consistent relation to income level: the proportion of calories is about half of the total in every expenditure class. In all other regions, higher income is associated with a greater reliance on commercial sources, though the urban-rural difference holds at every income level. Possibly this indicates that the less well-developed marketing infrastructure in the Frontier affects all income classes equally.

The importance of private (household-to-household) gifts declines with rising income in urban areas, but shows no significant relationship to income in the rural areas.

Another notable difference is that the relative importance of home production as a food source declines very significantly with rising income in the Frontier, while it is relatively stable in the sugar cane and livestock and the rice-growing regions. In the Frontier, high-income households obtain more food from the stocks of their own stores. In other regions, there is no relationship between income level and the use of food from one's own business stocks.

Tables showing the detailed breakdown of the use of various food sources by region and expenditure class may be found in Appendix A to this chapter.

6.4 Procurement Patterns for Individual Foods

The colmado or local store is by far the most important source for all the major staple foods: about 89% of expenditures on rice, 77% of beans, 90% of oil, and 93% of sugar are made at the colmado. About 87% of bread expenditures are also made at the colmado.

The use of the colmado for rice, oil, and vegetables decreases with rising income. Use of supermarkets increases with income for these and for

TABLE 6.7

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	78.17	32.88	82.94	26.34	87.51	17.50	91.35	16.80	92.81	13.44	95.59	6.78	.0147
OWN BUSINESS	10.69	32.08	4.42	18.26	2.36	11.51	1.74	10.86	1.47	7.59	.64	2.76	.5519
PRIVATE PRODUCER	.00	.00	.12	.75	.12	1.09	.21	1.15	.43	1.81	.48	1.97	.4190
HOME PRODUCTION	.00	.00	.02	.17	.04	.41	.19	1.20	.07	.37	.06	.34	.4804
IN-KIND PAY	.00	.00	1.90	13.22	.00	.00	.20	1.75	.00	.00	.00	.00	.2107
PRIVATE GIFTS	11.13	17.87	9.06	16.99	7.52	12.02	2.86	7.88	2.29	5.37	1.28	3.43	.0003
STATE RETAIL	.00	.00	.15	.98	2.01	7.17	1.56	7.62	1.50	6.49	.98	5.49	.4628
STATE GIFTS	.00	.00	.29	1.30	.17	.76	.09	.49	.02	.23	.00	.00	.2119
OTHER	.00	.00	1.05	6.88	.23	1.22	1.76	8.45	1.37	6.86	.94	1.77	.4863
N OF CASES	9		49		80		76		80		31		

OTHER URBAN AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	73.93	27.05	79.19	22.85	83.83	19.91	84.30	22.34	89.63	20.33	91.70	16.56	.0246
OWN BUSINESS	.64	2.57	.92	3.88	1.72	8.53	4.43	17.27	2.45	12.25	1.87	11.01	.3295
PRIVATE PRODUCER	1.36	3.91	.97	2.95	1.46	3.49	1.89	4.06	.87	2.71	.69	2.27	.1443
HOME PRODUCTION	.18	.58	1.79	5.78	3.73	10.36	2.49	7.53	1.85	6.79	1.36	5.80	.4146
IN-KIND PAY	.00	.00	.03	.23	.61	3.58	.03	.25	.00	.00	.00	.00	.0678
PRIVATE GIFTS	19.34	26.34	12.70	21.21	5.89	12.00	4.25	9.63	2.37	6.47	2.02	6.15	.0000
STATE RETAIL	.85	2.62	1.60	5.25	.58	2.15	.01	.16	.00	.07	.00	.00	.0002
STATE GIFTS	2.02	4.37	1.44	3.59	.66	2.49	.31	1.75	.01	.13	.02	.19	.0004
OTHER	1.63	3.82	1.32	3.06	1.48	3.42	2.24	7.95	2.78	11.82	2.31	9.03	.6602
N OF CASES	29		56		65		98		110		55		

TABLE 6.7 CONT.

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

FRONTIER RURAL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	52.59	20.56	51.67	22.20	51.08	26.44	58.36	24.29	47.04	22.81	40.51	44.04	.4546
OWN BUSINESS	.04	.31	1.38	7.72	3.92	14.07	1.57	8.84	20.00	34.36	38.19	54.01	.0006
PRIVATE PRODUCER	4.17	11.07	3.33	8.40	4.23	7.79	2.81	3.94	4.80	4.72	5.14	7.28	.8158
HOME PRODUCTION	31.93	24.52	30.37	24.70	20.75	21.04	23.02	20.84	18.49	17.44	5.55	7.85	.0648
IN-KIND PAY	.73	3.17	.73	3.91	.00	.00	.58	2.49	.00	.00	.00	.00	.5833
PRIVATE GIFTS	7.01	10.24	7.02	10.23	9.93	14.52	7.10	18.25	3.30	4.32	4.39	6.21	.4718
STATE RETAIL	.05	.39	1.95	9.24	6.64	16.02	2.13	8.41	.26	.68	.91	1.28	.0912
STATE GIFTS	1.68	4.89	1.79	5.19	1.64	3.48	1.69	3.25	.84	2.23	.00	.00	.9583
OTHER	1.75	3.73	1.71	3.79	1.75	3.62	2.71	4.18	5.24	6.25	5.27	3.04	.0919
N OF CASES	48		106		45		32		7		2		

RURAL SUGAR CANE AND LIVESTOCK REGIONS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	61.18	30.10	67.27	25.95	77.21	15.24	75.76	19.76	71.47	23.59	73.18	22.83	.0582
OWN BUSINESS	3.53	15.39	3.79	15.32	.14	.54	1.79	8.95	4.07	16.18	.29	.56	.3019
PRIVATE PRODUCER	3.19	5.11	2.13	3.66	2.28	4.69	1.93	3.75	1.97	4.19	.00	.00	.9744
HOME PRODUCTION	6.86	8.91	10.47	14.37	9.11	13.86	11.43	15.10	10.53	16.56	15.13	22.35	.8944
IN-KIND PAY	.05	.24	1.52	6.62	.51	3.25	1.33	5.89	.78	2.68	.94	3.28	.7064
PRIVATE GIFTS	24.30	29.19	13.02	21.17	9.53	13.91	6.84	12.32	9.24	13.78	7.64	11.61	.2707
STATE RETAIL	.00	.00	.00	.07	.00	.00	.00	.00	.10	.57	.28	.98	.1680
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	.85	2.67	1.76	5.67	1.17	5.24	.89	3.09	1.81	4.79	2.49	6.79	.7650
N OF CASES	20		70		55		41		36		12		

TABLE 6.7 CONT.

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	54.48	32.65	66.80	26.74	66.80	28.85	74.90	23.67	71.54	30.07	71.18	26.61	.3073
OWN BUSINESS	1.98	10.11	1.89	10.68	5.77	21.32	4.21	14.97	4.62	17.72	.22	.83	.6149
PRIVATE PRODUCER	4.53	6.62	3.21	6.16	3.89	8.86	3.01	6.90	2.15	5.55	2.12	3.73	.6247
HOMR PRODUCTION	5.57	10.33	8.49	14.35	9.43	16.18	10.01	15.85	8.28	13.90	10.43	15.58	.9231
IN-KIND PAY	.28	1.43	.25	1.78	3.01	11.66	.59	4.42	.87	4.40	.00	.00	.1046
PRIVATE GIFTS	29.59	33.78	16.51	26.19	10.05	19.31	6.35	14.21	9.68	19.57	7.47	10.07	.0546
STATE RETAIL	.83	4.27	1.19	7.05	.06	.48	.00	.00	.07	.54	.20	.76	.2197
STATE GIFTS	.51	2.65	.14	.83	.21	1.41	.07	.56	.12	.56	.21	.79	.8850
OTHER	1.63	5.18	1.48	4.40	.74	2.10	.82	2.11	2.62	12.77	7.89	23.92	.4180
N OF CASES	26		63		64		55		51		14		

most other goods. The public market is an important source of starchy tubers and plantains, and vegetables and fruits, but more of all these goods is purchased in the colmado and from street stands. The colmado is the single most important source of all the food groups except meat, for which the butcher is the main source, and the colmado is second. Rice, milk, eggs, oil, sugar, and bread are hardly bought in the public market at all. Private producers are a significant source of very few foods: milk is the most important (24% of milk expenditures go directly to the producer). In the Frontier and in the sugar cane regions, starchy tubers and plantains are obtained directly from the producers (32% and 23% of all purchases of these foods respectively), and more meat (9%) is purchased directly from the producer in the Frontier than anywhere else. These patterns tend to confirm the dominance of the colmado for most consumers.

Home consumption is important primarily for yuca, plantain, and eggs. About 10.5% of households consume the two starchy staples; 14.9% home-consume eggs, and about 7.4% consume their own milk. Almost 5% of households consume home-grown chicken. The figures for the most important home-produced foods are shown in Table 6.8.

TABLE 6.8
PERCENT OF HOUSEHOLDS WITH ANY HOME CONSUMPTION

PRODUCT	%
EGGS	14.9
YUCA	10.5
PLANTAIN	10.4
MILK	7.4
PIGEON PEA	4.8
CHICKEN	4.8
MATURE COCONUT	3.8
BEANS	3.6
SQUASH	2.9
RICE	2.2
SWEET POTATO	2.1
YAUTIA	1.3
GOAT	.3
CHEESE	.2

In general, very few households (about 2%) also purchase the foods which they produce at home. This means that changes in the market price may have limited impact on home-consuming households.

The foods most often given and received as gifts are rice and beans, often given in cooked form. Starchy staples, particularly plantains and bananas, are also exchanged as gifts.

6.5 Use of Government Social Programs

There are several government-run programs which distribute food either free or at subsidized prices in some parts of the Dominican Republic. The current study investigated the use of three of these programs in detail:

1. The Programa Nacional de Afiliados permits households affiliated with the government in some way to buy items handled by INESPRES at special outlets at controlled prices. These products include rice, milk, oil, and a few less important foods.
2. The Ventas Populares are special stores which sell subsidized rice, oil, sugar, powdered milk, and other goods at below-market prices. Quantities are limited, and households are supposed to present a ticket showing that they are eligible in order to use the stores. However, many households reported using the VP store without a ticket. This program is currently (1988) expanding the number of stores.
3. The Mercado de Productores, a program started by INESPRES in 1986, established a few farmers' markets in Santo Domingo and one or two other cities. Farmers are provided subsidized transportation to these weekly markets, and prices to consumers tend to be somewhat lower than in other public markets, although no direct price subsidy is given. This program is also being expanded.
4. The Programa de Productos Lacteos, operated by INESPRES with milk, butter, and cheese supplied as food aid by the United

States, distributes a free monthly ration to households certified as needy. The program was gradually phased out during the year of the survey (1986), and no longer operates.

Other programs, including the distribution of weaning foods in government MCH clinics, and The School Milk Program, were included in the general category "Government Free Food".

6.5.1 Importance of Government Distribution Programs*

Overall in the country, government free and subsidized food distribution accounts for less than one percent of the value of all food consumed. The relative contribution of state subsidized food does not vary by expenditure class, and in no class does it account for more than 0.6% of the value of food consumed (up to 0.8% of calories). Free distribution is very significantly skewed toward the lower income groups, but in the lowest expenditure decile accounts for only 1.4% of value and 0.75% of calories consumed.

Subsidized distribution exceeds one percent of calories and value only in the capital and the Frontier, and free distribution reaches this level only in the Frontier. Just under 4% of protein comes from government free distribution in the Frontier (4.7% in the lowest decile). These are the two regions in which government intervention is logically targeted: the capital because of its large population, the Frontier because of its level of need.

6.5.2 Programa Nacional de Afiliados

Fewer than two percent of households had a Programa Nacional de Afiliados outlet available to them; this figure was highest in the capital, at 3% of households. Because of this low level of availability, no further analysis was made of the use of this program.

* Note that these results describe the situation during calendar 1986.

6.5.3 Ventas Populares

About 50% of households nationally reported that there was a Ventas Populares outlet available to them. Table 6.9 shows how this percentage varied by region: almost all the Frontier households said they had access to a V.P. as did a larger porportion of households in the "other urban" and the rice-growing regions. The time required to get to the store also varied by region, and was greatest in the Frontier. (This is not surprising, given the greater difficulty of transportation in the region.) Access to a V.P. store did not show significant variation by household's income level.

These figures on accessibility are misleading, however, because a significant number of the V.P. stores were closed at the time of the survey. The percent open in each region is reported in Table 6.10. Table 6.11 shows the percent of respondent households which said they had ever used a V.P. These figures are quite low, except in the Frontier, where 25% of households made use of a V.P. outlet. Fewer than half of the households which used the V.P. did so with their own ticket. The rest bought without a ticket (50%), or used a borrowed one.

The V.P. program declined in importance during the year of the survey: more households reported the V.P. closed, and fewer reported using the V.P. in the later months of the survey. At the present time, however, the use of this distribution system is once again being expanded.

6.5.4 Programa de Productos Lacteos

The Programa de Productos Lacteos served about 9% of households nationally, but 45% of households in the Frontier region. Use of the program was lower in the top expenditure quartile (3.7%), but did not vary significantly in the lower three quartiles (10-12%). The program consistently distributed powdered milk, butter, and cheese, all U.S. government donations. A relatively small percentage of households received vegetable oil as well in the later months of the survey.

TABLE 6.9
 PERCENT OF HOUSEHOLDS WITH A VENTA POPULAR AVAILABLE,
 AND MEAN DISTANCE TO THE STORE
 BY REGION

	%	MINUTES TO GET TO VP	SD	N
TOTAL POPULATION	48.89	24.52	25.8	685
NACIONAL DISTRICT	23.86	15.22	8.1	73
OTHER URBAN AREAS	78.65	16.65	23.1	280
FRONTIER REGION, RURAL	97.14	46.61	40.9	204
SUGAR CANE AND LIVESTOCK REGION, RURAL	29.57	38.59	31.8	68
OTHER RURAL AREAS	56.4	27.4	20.2	141

TABLE 6.10
 PERCENT OF HOUSEHOLDS WITH A VENTA POPULAR OPEN
 AT THE TIME OF THE INTERVIEW*
 BY REGION

	%	N
TOTAL POPULATION	72.8	201
NACIONAL DISTRICT	73.1	19
OTHER URBAN AREAS	74.0	94
FRONTIER REGION, RURAL	51.4	54
SUGAR CANE AND LIVESTOCK REGION, RURAL	91.3	21
OTHER RURAL AREAS	70.0	35

* Only 40% of households knew whether or not the Venta Popular store was open.

TABLE 6.11

PERCENT OF HOUSEHOLDS WHICH USED A VENTA POPULAR
AT THE TIME OF THE INTERVIEW

BY REGION

	%
TOTAL POPULATION	6.3
NACIONAL DISTRICT	5.9
OTHER URBAN AREAS	11.9
FRONTIER REGION, RURAL	25.6
SUGAR CANE AND LIVESTOCK REGION, RURAL	1.3
OTHER RURAL AREAS	3.6
N OF CASES	82

These food donations were controversial in the Dominican Republic because of their potential conflict with the domestic dairy industry. The program was phased out during the year of the survey, as indicated by a declining percentage of households reporting receipt of the commodities in later months of the year.

Given the small reach of the programs and their declining role, the significance of these programs in the overall consumption pattern of the Dominican Republic, even among the poor, is apparently small. Tables 6.12 and 6.14 show the percent of calories and protein obtained from government free and subsidized sources, including only those households which made use of food from those sources. The highest level of contribution is in the Frontier, where subsidized food provides 21% of calories for the 13% of households which consumed food from these sources. Free distribution, obtained by 29% of the Frontier households, provided 5% of the calories and 12% of the protein they consumed. These quantities are quite significant, but the number of households reached by the programs is small; coverage would have to be greatly improved if these distribution systems were to have any significant effect on the adequacy of food consumption in the Dominican Republic.

7. Socio-economic Characteristics of the Population

7.1 Income Level

Most of the analysis reported in this study measures household income in terms of the household's own estimate of cash expenditure on several categories of consumption goods (housing, clothing, transportation, etcetera), to which was added the estimated value of food consumed from home production, gifts, and other sources not paid in cash. This total (regular cash expenditure plus unpaid food) was divided by the number of household members to obtain a monthly per capita consumption figure which was used to estimate the economic level of the household.

This measure excludes gifts and transfers other than food, and medical expenses. The first was deemed too difficult to evaluate in monetary terms; the latter was felt to be so variable based on random circumstances that it would distort the estimate of the household's economic level. The

TABLE 6.12

PERCENT OF CALORIES, PROTEIN AND VALUE OF FOOD CONSUMED FROM STATE RETAIL OUTLETS,
FOR THOSE HOUSEHOLDS WHICH USED THESE SOURCES

BY REGION

	CALORIES		PROTEIN		VALUE		% OF CASES
	%	SD	%	SD	%	SD	
TOTAL POPULATION	13.41	15.17	11.02	13.10	8.34	9.03	4.5
SANTO DOMINGO	16.29	15.01	11.45	12.27	10.28	9.78	8.5
OTHER URBAN	6.99	7.67	7.40	6.53	4.62	5.25	5.2
FRONTIER RURAL	21.34	22.10	13.15	12.86	12.31	12.64	13.4
CANE AND LIVESTOCK	1.48	1.68	6.22	8.46	4.01	1.18	1.3
OTHER RURAL	20.73	22.28	21.36	28.01	10.49	11.04	1.7
F. SIGNIFICANCE	.0383		.2392		.1132		

TABLE 6.13

PERCENT OF CALORIES, PROTEIN AND VALUE OF FOOD CONSUMED FROM STATE RETAIL OUTLETS,
FOR THOSE HOUSEHOLDS WHICH USED THEM

BY EXPENDITURE CLASS

	CALORIES		PROTEIN		VALUE		% OF CASES
	%	SD	%	SD	%	SD	
TOTAL POPULATION	13.41	15.17	11.02	13.10	8.34	9.03	4.5
DECILE 1	13.18	8.78	15.60	7.93	10.96	7.44	4.3
QUARTILE 1	15.06	16.95	14.83	17.38	8.70	8.58	5.6
QUARTILE 2	14.88	14.19	10.57	11.51	9.92	10.11	5.6
QUARTILE 3	11.98	18.30	6.88	11.30	5.50	8.29	3.6
QUARTILE 4	12.01	14.07	11.42	11.35	8.86	10.12	3.5
DECILE 10	10.63	13.81	9.58	7.37	6.70	8.62	3.2
F. SIGNIFICANCE	.9235		.4950		.6619		

TABLE 6.14

PERCENT OF CALORIES, PROTEIN AND VALUE OF FOOD CONSUMED FROM STATE GIFTS,
FOR THOSE HOUSEHOLDS WHICH RECEIVED THEM

BY REGION

	CALORIES		PROTEIN		VALUE		% OF CASES
	%	SD	%	SD	%	SD	
TOTAL POPULATION	4.38	4.57	9.11	9.99	7.37	8.51	5.4
SANTO DOMINGO	2.45	2.24	4.53	4.47	4.29	4.67	5.7
OTHER URBAN	5.73	4.90	11.70	10.04	10.16	9.27	7.6
FRONTIER RURAL	5.51	6.54	13.05	15.40	10.28	11.67	29.4
OTHER RURAL	3.36	3.24	6.90	6.91	3.75	4.73	4.2
F. SIGNIFICANCE	.1282		.0610		.0467		

TABLE 6.15

PERCENT OF CALORIES, PROTEIN AND VALUE OF FOOD CONSUMED FROM STATE GIFTS,
FOR THOSE HOUSEHOLDS WHICH RECEIVED THEM

BY EXPENDITURE CLASS

	CALORIES		PROTEIN		VALUE		% OF CASES
	%	SD	%	SD	%	SD	
TOTAL POPULATION	4.38	4.57	9.11	9.99	7.37	8.51	5.4
DECILE 1	6.45	5.88	13.44	14.54	11.89	11.31	11.7
QUARTILE 1	5.61	5.53	11.66	11.87	9.10	9.68	8.6
QUARTILE 2	4.26	4.42	8.60	9.50	6.67	7.11	6.9
QUARTILE 3	3.95	4.08	8.73	9.88	8.82	10.41	4.5
QUARTILE 4	2.16	1.09	5.01	2.68	3.33	2.61	2.2
DECILE 10	2.31	.93	3.77	1.23	2.66	2.14	2.1
F. SIGNIFICANCE	.3397		.4446		.4109		

adjustment for household size is also imperfect, because larger households may be able to achieve economies of scale in consumption which permit them to reach higher levels of welfare for the same per capita expenditure. Nonetheless, this alternative is preferable to using household income without adjusting for household size.

Expenditure is believed by many to be a more accurate indicator of economic status than income itself, because income must be measured over some fixed reference period, and irregular fluctuations in the flow of income during that time may result in seriously over- or understating the usual income of the household. According to the permanent income hypothesis, expenditures tend to fluctuate less than income. This study obtained estimates of annual income, using the previous 12 months as a reference period, in order to estimate the proportion of income received from each separate source and earner. This is important for predicting the effects of a given policy affecting one type of income on the total income of households.

7.1.1 Variation in Income Levels by Region

The mean monthly expenditure level (including the value of unpaid food) for the study sample was RD \$510.68 per household, or RD \$99.16 per capita.* Table 7.1 shows how these average expenditure levels vary among the geographic regions of the country. The urban areas have higher expenditure levels on average than the rural areas, in both household and per capita terms. Households in the capital have somewhat lower average expenditure than in the other urban areas of the country. Among the rural areas, the Frontier region has the lowest expenditure levels and the largest households. The low expenditure level of the Frontier is reflected in its dietary patterns and in the levels of calories and protein consumed relative to estimated nutritional need.

For comparison, Table 7.2 shows household and per capita income levels as measured by the household's report of the previous year's income including the imputed value of unpaid food consumed.

*In 1976-77 constant pesos, this is equivalent to monthly expenditure level of RD \$160.92. This may be compared with an estimated average monthly household income in 1976-77 of about RD \$175 (Musgrove, 1983).

TABLE 7.1

HOUSEHOLD AND PER CAPITA MONTHLY EXPENDITURE LEVEL
BY REGION

	MONTHLY HOUSEHOLD EXPENDITURE	SD	MONTHLY PER CAPITA EXPENDITURE	HOUSEHOLD SIZE	N OF CASES
TOTAL POPULATION	510.68	354.18	99.16	5.15	1287
NACIONAL DISTRICT	589.38	366.21	108.94	5.41	289
OTHER URBAN AREAS	619.11	409.02	118.38	5.23	337
FRONTIER REGION, RURAL	370.16	292.15	60.78	6.09	200
SUGAR CANE AND LIVESTOCK REGION, RURAL	388.53	278.90	78.81	4.93	207
OTHER RURAL AREAS	444.15	292.71	90.27	4.92	253
F SIGNIFICANCE = .0000					

TABLE 7.2

HOUSEHOLD AND PER CAPITA MONTHLY INCOME LEVEL
BY REGION

	MONTHLY HOUSEHOLD INCOME	SD	MONTHLY PER CAPITA INCOME	HOUSEHOLD SIZE	N OF CASES
TOTAL POPULATION	675.28	772.88	131.12	5.15	1281
NACIONAL DISTRICT	907.89	819.12	167.82	5.41	296
OTHER URBAN AREAS	735.07	790.04	140.55	5.23	351
FRONTIER REGION, RURAL	455.64	686.25	94.82	6.09	207
SUGAR CANE AND LIVESTOCK REGION, RURAL	444.72	643.81	90.21	4.93	202
OTHER RURAL AREAS	595.35	743.40	121.01	4.92	238
F SIGNIFICANCE = .0000					

TABLE 7.3

PROPORTION OF HOUSEHOLDS IN EACH PER CAPITA EXPENDITURE CLASS
BY REGION

	DECILE 1 %	QUARTILE 1 %	QUARTILE 2 %	QUARTILE 3 %	QUARTILE 4 %	DECILE 10 %	N
NACIONAL DISTRICT	3.1	17.0	28.0	27.3	27.7	10.7	289
OTHER URBAN AREAS	8.9	17.2	19.3	29.7	33.8	16.6	337
FRONTIER REGION, RURAL	26.5	56.0	23.5	17.0	3.5	1.0	200
SUGAR CANE AND LIVESTOCK REGION, RURAL	10.1	34.3	27.1	20.3	18.4	6.8	207
OTHER RURAL AREAS	14.2	29.2	26.5	22.9	21.3	6.3	253

Income estimates are consistently higher than estimates of expenditure. Furthermore, the relative positions of Santo Domingo and the other urban areas are reversed. The Frontier still emerges as the poorest in per capita terms, although household income is about equal in the Frontier and the Sugar Cane/Livestock region.

Much of the information in this study is presented in terms of per capita expenditure classes: deciles and quartiles. These were calculated based on the distribution of expenditure in the entire national sample. Therefore, not all regions have the same distribution of households across the quartiles and deciles of expenditure. Table 7.3 shows the proportion of households in each region which fall into each of the expenditure classes. The table confirms the relative positions of the regions indicated by the average expenditure figures: the urban areas have more households in the richest categories, with urban areas outside Santo Domingo having the highest proportion in top quartile and decile. The Frontier has the smallest proportion of high-income households. More than half its households are in the lowest quartile, and more than a fourth are in the bottom decile of expenditure. It is interesting to note that Santo Domingo, which has relatively fewer households in the highest decile, also has significantly fewer households in the lowest decile than the other urban areas of the country, although the proportions in the bottom quartile are about equal.

7.1.2 Variation by Occupation of Household Head

Table 7.4 shows how household monthly expenditure varies according to the principal activity of the household head. Principal activity was defined in terms of the proportion of time spent, not proportion of income earned.

About 25% of household heads defined themselves as having no remunerative activity.* Except for households headed by agricultural

* Unpaid family labor is counted as a remunerative activity, since it is assumed that these households receive income from a family business as a direct result of this work.

laborers, these households have the lowest expenditure levels, even though they received significant wage and transfer of income. Agricultural laborers head 6.3% of households, and these households have significantly lower incomes on average than any other occupational category. Households headed by farmers and ranchers appear to have lower incomes than those headed by salaried or wage employees.

7.1.3 Variation by Sex of Household Head

The self-reported occupational distribution varies significantly between male-headed and female headed households. Of the 25% of households headed by women, 55% were headed by housewives; another 9% were not employed. Of male heads of household, only 9% described themselves as not working or taking care of the house. Table 7.5 shows this occupational breakdown by sex of the household head. It is important to note that primary activity was self-defined by the survey respondent. It is well documented that women who work significant amounts of time in agriculture or in other paid work often define themselves as "not working" (Beneria, 1982), so that the information in this table may not be accurate.

What is more interesting is that there was no significant difference in average income level between male and female-headed households. Average per capita expenditure was RD\$120.30 in households headed by men, and RD\$114.65 in households headed by women.

7.2 Income Distribution

There appears to be a considerable inequality in the distribution of income based on the study sample. The lowest 10% of the population accounts for about 3.5% of total expenditure, while the top decile accounts for 20.7% of all consumption spending. Table 7.6 shows the proportion of total consumption expenditure accounted for by each quartile, and the top and bottom deciles of the population.

TABLE 7.4

MEAN MONTHLY REAL EXPENDITURE
BY PRINCIPAL ACTIVITY OF HOUSEHOLD HEAD

PRINCIPAL ACTIVITY OF HH HEAD	MEAN HH MONTHLY EXPEND.	SD	MEAN PER CAP. EXPEND.	N	% of HH
Total Population	512.02	355.30	118.77	1276	100.0
Housewife	385.70	273.96	107.10	193	15.1
At home, not looking for work	453.91	422.40	107.16	90	7.0
Looking for work	530.96	331.85	120.55	23	1.8
Public employee	572.06	282.91	119.68	137	10.7
Private employee	610.52	378.77	152.16	236	18.5
Farmer or Rancher(a)	468.49	301.76	98.51	242	19.0
Agricultural worker	335.91	168.72	82.62	81	6.3
Own business	588.77	410.03	130.24	254	19.9
Unpaid family labour	1018.47	665.27	164.38	7	.5
Student	593.99	502.46	156.40	6	.5
Other	350.26	181.44	66.64	8	.6
F Significance of Expenditure Difference = .0000					

(a) Ranchers were only .5% of sample households.

TABLE 7.5

PRINCIPAL ACTIVITY OF THE HOUSEHOLD HEAD
BY SEX OF THE HOUSEHOLD HEAD

	MALE %	FEMALE %
Housewife	.7	55.5
At home, not looking for work	6.4	8.6
Looking for work	1.9	.6
Public employee	12.4	5.5
Private employee	22.5	9.4
Farmer or Rancher (a)	24.8	.8
Agricultural worker	7.9	.6
Own business	21.5	18.1
Unpaid family labour	.7	.1
Student	.4	.6
Other	.8	.3
N of cases	1036	350
Chi Square Significance = .0000		

(a) Ranchers were only .5% of sample households.

7.3 Income Sources

7.3.1 Variation in Income Sources by Region

Household income was divided into eight different categories: wages and salaries; farm sales (proceeds from the sale of crops, animal products, and animals, net of some production costs); home consumption (the value of food produced and consumed at home*); other "free" food (the value of gifts, in-kind pay, and government free food); income from own business; pensions; transfers (e.g. from relatives or other people living outside the household); and other sources (including income from interest, dividends, and other miscellaneous sources).

Table 7.7 shows the proportion of income received from each source for the country as a whole and for each region. On average, about 60% of income is derived from formal sector wages and salaries. Farm sales account for only 10.5% of income at the national level, with another 4.2% of income from farming received in the form of home-produced food. About 12.7% of income is received from income transfers.

The pattern of income sources varies significantly by region. It is not surprising that wage income is most important in urban areas, and more important in the capital (the most urbanized area) than elsewhere. It is noteworthy that wages account for about half of all income in the rural areas other than the Frontier, even though these are considered primarily agricultural regions. Wage income is least important in the Frontier, reflecting its lower level of integration into the modern, formal sector of the national economy.

Farm sales and home consumption are, of course, negligible sources of income in the capital, and account for about 7% of income in other urban areas. This reflects the fact that some urban areas are not completely built up, and households have access to land for farming. In the rural areas, farm sales are, naturally, more important, accounting for 16% of income in the Sugar Cane/Livestock region and 20% of income in the rest of

* Computed using the average price paid by the household for quantities it purchased or, if none was purchased by the household, using the average price paid in the cluster.

TABLE 7.6

PROPORTION OF TOTAL EXPENDITURE ACCOUNTED FOR
BY EACH EXPENDITURE CLASS

	TOTAL EXPENDITURE		HH SIZE	PER CAP EXPEND.	% OF EXPEND	N
	MEAN	SD				
TOTAL POPULATION	510.68	354.18	5.15	99.16	100.0	1287
DECILE 1	180.18	118.06	6.47	27.85	3.5	128
QUARTILE 1	276.03	163.48	5.70	41.19	13.6	322
QUARTILE 2	408.34	164.71	5.52	73.97	19.9	321
QUARTILE 3	539.39	220.67	4.75	113.56	26.4	322
QUARTILE 4	818.92	488.45	3.55	230.42	40.1	322
DECILE 10	1063.34	581.05	3.10	343.01	20.7	128

TABLE 7.7

PERCENT OF INCOME FROM DIFFERENT SOURCES
BY REGION

INCOME SOURCE:	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE & LIVESTOCK		OTHER RURAL AREAS		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	59.11	39.08	76.42	29.86	64.32	38.23	35.25	37.34	52.19	38.13	46.32	40.84	.0000
Farm sales	10.55	25.21	.22	3.44	4.49	17.18	32.69	33.76	15.62	25.97	19.63	33.87	.0000
Home consumption	4.20	11.76	.07	.67	2.11	8.67	17.33	19.93	7.11	12.61	6.47	15.15	.0000
Other "free" food	6.58	14.84	2.72	8.01	6.48	16.24	8.27	12.88	8.54	15.61	8.52	16.84	.0000
Own Business	3.28	13.40	3.79	15.78	3.69	14.10	1.46	6.11	1.31	6.11	3.91	14.35	.0450
Pensions	1.70	9.02	2.32	10.88	2.88	10.84	1.39	8.08	.95	7.76	.52	5.15	.0157
Transfers	12.67	24.69	11.52	20.76	13.91	26.75	3.35	11.71	13.21	25.56	13.08	25.94	.0000
Other	1.87	8.50	2.90	9.35	2.08	9.02	.22	2.60	1.04	7.68	1.51	8.06	.0037
N of cases	1254		294		345		203		196		230		

the country. All farming, that is, farm sales and home-consumed food together account for only about a quarter of the income received in rural areas, except in the Frontier, where 50% of all income is derived from farming.

Another notable difference in the pattern of income is that transfer income is very significantly lower in the Frontier, accounting for only 3% of income, compared with 12 - 14% in all the other regions. Since much transfer income is received from family members working in other cities or outside the country, these figures suggest that perhaps it is harder for members of Frontier households, with their lower levels of education (see Sec. 7.53) and relative lack of integration into the modern economy, to obtain such work.

7.3.2 Variation in Income Sources by Income Level

As income rises, the relative contribution of wages and salaries also rises, while the relative importance of home consumption and of gifts declines. There is no significant difference in the relative contribution of farm sales to total income by income level. Transfer income also makes about the same contribution to income at all levels, as does income from a family business.

This suggests that one cannot associate particular categories of income, such as farming or own business, with low- or high-income households. Policies affecting farm income levels or business incentives will reach all income levels about equally.

Table 7.8 shows the relative contribution of income sources broken down by income class.

7.3.3 Variation in Income Sources by Occupation of Household Head

Table 7.9 shows the relative contribution of the various income sources according to the principal occupation of the household head.* Wages and salaries are, not surprisingly, the dominant income source in households

* The household head was defined by the respondents.

TABLE 7.8

PERCENT OF INCOME FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	59.11	39.08	55.02	38.53	53.83	38.24	57.75	39.37	60.43	36.88	64.88	40.19	65.16	41.63	.0061
Farm sales	10.55	25.21	9.93	23.57	12.22	25.29	11.29	26.24	10.31	25.77	8.58	23.80	5.81	19.80	.3494
Home consumption	4.20	11.76	5.49	15.35	6.47	14.95	4.90	11.83	3.91	11.85	1.22	3.99	.93	2.84	.0000
Other "free" food	6.58	14.84	11.97	18.41	9.27	16.61	7.36	14.90	4.13	10.47	4.75	13.75	4.14	14.68	.0000
Own Business	3.28	13.40	2.04	7.93	3.57	12.33	3.18	13.25	3.21	13.19	3.60	15.13	4.83	19.40	.9687
Pensions	1.70	9.02	.69	5.04	.76	6.47	1.36	8.47	2.14	8.26	2.26	10.92	3.37	13.69	.1285
Transfers	12.67	24.69	11.43	21.34	12.14	22.66	12.99	24.40	13.88	25.89	12.22	25.74	13.68	27.88	.8161
Other	1.87	8.50	3.39	15.48	1.70	9.99	1.12	5.27	1.56	8.97	2.44	8.50	2.04	7.93	.2726
N of cases	1254		110		284		306		292		292		117		

TABLE 7.9

PERCENT OF INCOME FROM DIFFERENT SOURCES
BY PRINCIPAL ACTIVITY OF THE HOUSEHOLD HEAD

ACTIVITY OF HOUSEHOLD HEAD:	INCOME SOURCE														N		
	WAGES		FARM SALES		HOME CONSUMPTION		OTHER "FREE" FOOD		OWN BUSINESS		PENSIONS		TRANSFERS			OTHER	
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Housewife	39.65	38.35	5.89	19.01	2.57	9.32	9.88	17.50	1.62	7.79	1.20	7.32	36.97	35.73	2.19	8.00	183
At home, not looking for work	33.23	34.95	5.22	19.68	2.19	7.77	8.91	18.88	.66	4.13	12.39	23.93	29.89	32.37	7.46	20.96	80
Looking for work	74.89	32.56	-2.81 ^a	10.12	11.14	25.56	3.06	4.40	4.87	20.09	.00	.00	3.95	8.57	4.87	13.85	20
Public employee	83.98	20.38	3.31	12.33	.90	2.92	3.17	6.06	1.55	6.71	.78	5.17	4.94	10.35	1.33	7.27	136
Private employee	85.35	19.84	1.21	6.27	1.29	7.55	3.27	9.37	1.01	4.07	1.20	5.68	5.34	12.45	1.29	4.61	252
Farmer	23.39	31.18	46.42	35.65	13.71	18.16	4.74	9.60	1.76	6.85	.80	6.94	8.13	19.13	1.00	5.53	223
Agricultural worker	80.71	25.20	2.13	11.51	1.51	3.35	11.46	21.10	.25	2.09	.00	.00	3.79	8.40	.12	.83	82
Own Business	66.01	37.18	1.55	8.13	2.78	9.52	9.07	19.00	11.02	25.62	1.06	7.01	6.89	18.35	1.58	7.26	250
Unpaid family labour	73.79	18.60	.82	4.19	15.14	19.71	.25	.40	9.40	18.06	.00	.00	.57	1.11	.00	.00	4
Student	43.68	39.49	.00	.00	.00	.00	3.83	5.04	.00	.00	11.33	17.62	37.95	43.40	3.18	7.80	6
Other	65.86	36.63	9.63	22.22	1.26	3.01	14.35	30.36	.00	.00	.00	.00	4.57	12.52	4.31	7.49	8
P. Significance	.0000		.0000		.0000		.0000		.0000		.0000		.0000		.0000		

^a Percent is negative due to farm returns being less than expenditure on inputs (negative income).

with heads employed in the public or private sector, as well as for households headed by agricultural laborers. Wage income accounts for two thirds of income in households where the head has his or her own business, and three fourths of the income where the head is an unpaid worker in a family business. This suggests that few families fully depend on the family business to provide for the needs of the household. In fact, family businesses provide only about 10% of household income in households headed by owners of business or by unpaid family workers, and thus may be seen almost as a supplement to the main income source.

Transfer income is most important in households headed by people whose primary activity is not paid work. Households headed by students, housewives, and persons not looking for work depend on transfers for 30% to 40% of their incomes. Wages are approximately equal to transfers in importance in these households. Households headed by farmers or ranchers derive 46% of their income from farm sales, and another 14% in the form of home-consumed food. This means that 40% of the incomes of these households is received from wages (24%), transfers (8%), and other non-farm sources.

About 19% of Dominican households are headed by a farmer or a rancher. About 38% of households derived some income from the sale of crops, animals, or animal products (the study's definition of "farm family"). However, only about 3% of households depend on farming for more than 90% of their income. Of course, this percentage varies by region, as shown in Table 7.10. In the Frontier and in the other rural areas, 7-8% of households depend almost entirely on income from farm sales.

These figures rise if farm sales plus home consumption are considered. About 6% of the country's households derive 90% or more of their livelihood from the sale and home consumption of their farm products. The percentage is quite low in both urban regions (zero in the capital) and in the Sugar Cane/Livestock region, but reaches 25.6% in the Frontier, and 14.8% in the other rural areas. In the Frontier, the proportion of households totally dependent on their farms does not vary by income level: one cannot predict economic level by the degree of dependence on farming. In the other rural areas, there is a weak relationship between income class and dependence on farming, with a higher proportion of such households falling in the middle two quartiles.

TABLE 7.10

PROPORTION OF HOUSEHOLDS DERIVING MORE THAN 90% OF INCOME
FROM FARM SALES OR FROM FARM SALES AND HOME CONSUMPTION

BY REGION AND EXPENDITURE CLASS

	FARM SALES	FARM SALES + HOME CONSUMPTION
TOTAL POPULATION	3.1	6.4
SANTO DOMINGO	0.0	0.0
OTHER URBAN AREAS	2.0	2.3
FRONTIER RURAL	7.9	25.6
CANE AND LIVESTOCK	1.5	4.6
OTHER RURAL AREAS	7.4	14.8
F SIGNIFICANCE OF REGIONAL DIFFERENCES	.0000	.0000
OTHER URBAN AREAS		
DECILE 1	0.0	0.0
QUARTILE 1	1.9	1.9
QUARTILE 2	0.0	0.0
QUARTILE 3	1.0	2.1
QUARTILE 4	4.6	4.6
DECILE 10	3.8	3.8
F SIGNIFICANCE OF EXPENDITURE LEVEL DIFF.	.1842	.3090
FRONTIER RURAL		
DECILE 1	3.9	19.6
QUARTILE 1	3.9	20.6
QUARTILE 2	10.9	21.7
QUARTILE 3	15.2	30.3
QUARTILE 4	14.5	28.6
DECILE 10	0.0	0.0
F SIGNIFICANCE OF EXPENDITURE LEVEL DIFF.	.1133	.6771
SUGAR CANE AND LIVESTOCK		
DECILE 1	0.0	5.9
QUARTILE 1	0.0	5.3
QUARTILE 2	1.9	5.7
QUARTILE 3	2.8	2.8
QUARTILE 4	2.9	2.9
DECILE 10	7.7	7.7
F SIGNIFICANCE OF EXPENDITURE LEVEL DIFF.	.6676	.8682
OTHER RURAL AREAS		
DECILE 1	3.3	3.3
QUARTILE 1	3.1	10.8
QUARTILE 2	9.4	23.4
QUARTILE 3	12.5	18.8
QUARTILE 4	6.4	6.4
DECILE 10	0.0	0.0
F SIGNIFICANCE OF EXPENDITURE LEVEL DIFF.	.2629	.0523

7.4 Expenditure Patterns

7.4.1 Variation in Expenditure Pattern by Income Level

Households in the Dominican Republic devote an average of 59% of their cash expenditure to food. This represents a substantial increase in the share of food in consumption since the 1976-77 Central Bank Survey of household income and expenditure, which found that an average of 39% of expenditure was devoted to food. The proportion of total expenditure devoted to food, surprisingly, rises with increasing income up to the second quartile, and then declines significantly in the higher income groups. (See Table 7.11.) It is not unusual in very poor countries to observe that the proportion of income devoted to food rises with marginal income increments at the lowest income levels (see, e.g. Sahn, 1987), but it is surprising to observe this pattern in a middle-income poor country like the Dominican Republic, at expenditure levels at which an absolute cash constraint on food consumption cannot be said to exist. Even when unpaid food consumption is considered along with cash food expenditure, food consumption as a proportion of total consumption (cash spent on food plus the value of unpaid food) follows the same pattern: the proportion of total consumption devoted to food rises from Decile 1 to Quartile 2 and then falls. These figures are shown in Chapter 5, Table 5.4.

As would be expected, proportional expenditure on lodging and transportation rises as income rises, throughout the income range. This is also the case with payment for domestic help.

At all income levels, a surprisingly high proportion of income is devoted to gambling: about 6.5%, with no significant variation by income level. Households often reported setting aside a fixed amount daily or weekly for this purpose.

7.4.2 Regional Variation in Expenditure Patterns

The proportion of cash expenditure devoted to food varies significantly by region, as shown in Table 7.12. Households in urban areas spend proportionally somewhat less on food, and considerably more on lodging, than do those in rural areas. These differences reflect the differing cash

TABLE 7.11

PERCENT OF MONTHLY CASH EXPENDITURE ON SELECTED ITEMS
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
FOOD	58.78	18.43	50.20	29.61	58.92	23.51	63.86	14.53	61.69	14.69	51.31	16.58	43.62	16.60	.0000
LODGING	2.98	7.31	1.10	4.95	1.37	5.15	2.35	6.49	2.51	5.35	5.31	10.28	6.74	13.01	.0000
TRANSPORTATION	5.61	8.33	3.79	7.74	3.87	6.71	4.72	7.75	5.06	5.74	8.82	11.44	11.60	13.69	.0000
UTILITIES	2.96	6.38	5.99	14.24	3.43	9.42	2.30	3.09	2.86	6.76	3.10	3.44	3.70	3.84	.1341
FUEL	3.37	3.75	3.23	6.73	3.64	5.68	3.63	3.45	3.40	2.78	2.79	2.13	2.37	1.54	.0130
HYGIENE	5.80	7.23	12.66	18.34	8.49	12.24	5.23	2.66	4.84	2.70	4.54	5.61	5.01	8.32	.0000
DOMESTIC SERVANTS	.99	3.00	.01	.36	.08	.98	.46	2.50	.84	3.45	2.50	3.64	3.54	4.05	.0000
ENTERTAINMENT	4.99	8.01	7.52	15.97	5.14	11.08	4.06	6.24	3.99	5.23	6.56	7.54	8.00	8.22	.0001
GAMBLING	6.44	10.08	6.03	13.66	6.09	10.56	5.90	9.15	6.90	9.88	7.00	11.03	7.20	11.80	.4088
CLOTHING	5.85	6.15	7.22	11.41	6.59	8.46	5.24	4.61	5.59	4.60	6.05	6.01	6.50	5.84	.0329
SCHOOL	1.41	2.56	1.14	2.57	1.44	2.73	1.49	2.29	1.56	2.23	1.19	2.93	.91	2.22	.2944
LINEN	.77	1.33	1.05	2.73	.88	1.93	.70	1.10	.72	.98	.78	1.11	.76	1.11	.3047
N OF CASES	1319		125		319		321		322		322		128		

TABLE 7.12

PERCENT OF MONTHLY CASH EXPENDITURE ON SELECTED ITEMS
BY REGION

	TOTAL POPULATION		NACIONAL DISTRICT		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS		SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
FOOD	58.78	18.43	57.13	16.21	55.04	17.51	60.33	19.75	61.84	15.90	61.28	21.31	.0000
LODGING	2.98	7.31	7.23	9.26	3.34	7.80	.33	2.22	.74	2.42	1.08	5.98	.0000
TRANSPORTATION	5.61	8.33	5.67	6.83	6.23	9.75	5.45	10.94	5.39	8.15	5.18	7.79	.6387
UTILITIES	2.96	6.38	1.74	3.02	4.53	8.40	1.36	2.79	1.48	2.62	3.58	7.60	.0000
FUEL	3.37	3.75	3.70	3.42	4.82	4.58	2.02	3.99	2.71	3.26	2.37	2.88	.0060
HYGIENE	5.80	7.23	5.51	2.93	4.97	5.17	7.24	6.03	4.57	2.59	7.37	11.61	.0000
DOMESTIC SERVANTS	.99	3.00	1.38	3.81	1.79	3.76	.24	1.14	.56	2.02	.32	1.68	.0000
ENTERTAINMENT	4.99	8.01	4.48	6.78	5.13	6.76	6.24	8.74	4.82	5.95	5.24	10.57	.1654
GAMBLING	6.44	10.08	4.77	6.72	6.12	10.31	4.63	8.60	8.75	11.47	6.72	10.95	.0000
CLOTHING	5.85	6.15	5.49	6.46	5.87	6.45	8.23	7.74	7.07	5.56	5.11	5.63	.0000
SCHOOL	1.41	2.56	2.38	3.82	1.23	1.68	2.08	4.04	.97	1.65	1.04	2.02	.0000
LINEN	.77	1.33	.45	.95	.87	1.60	1.79	2.39	1.03	1.20	.66	1.13	.0000
N OF CASES	1319		297		345		205		216		256		

needs of urban areas, as well as the income differences among the different regions.

The Frontier region does not devote a higher proportion of its cash expenditure to food than do the other two rural regions, but when unpaid food consumption is added, the Frontier's food consumption as a proportion of total consumption is significantly higher, as would be expected given its lower income level (68%, compared with 66% and 65% in the Sugar Cane and other rural regions respectively). These figures are shown in Chapter 5, Table 5.6.

7.5 Household Composition

7.5.1 Household Size

Average household size in the Dominican Republic is 5.15 members. The Frontier has significantly larger households (mean number of members is 6.09), and the two other rural regions have smaller households than the urban regions (see Table 7.13). The higher income classes have smaller households according to our measure, but this is an artifact of the computation of income class based on household expenditure divided by the number of members. Naturally, smaller households tend to have higher per capita incomes.*

7.5.2 Sex of the Household Head

About 25% of households in the Dominican Republic are headed by women. Table 7.14 shows the distribution of male and female headed households by geographic region. Urban areas have more female headed households (29%) than rural areas. The Frontier has far lower proportion of such households (11%) than any other part of the country.

Female headed households are disproportionately represented in the lowest expenditure decile (38%). However, there is no difference between female and male headed households in average household per capita expenditure or household per capita income. Mean expenditure is RD \$120.30

* Household incomes tend to be higher in larger households because of the larger number of earners. However, it was felt that per capita income is a more meaningful measure of economic status.

TABLE 7.13
AVERAGE HOUSEHOLD SIZE
BY REGION

	NUMBER OF MEMBERS	SD	N
TOTAL POPULATION	5.15	2.6	1402
SANTO DOMINGO	5.41	2.5	322
OTHER URBAN AREAS	5.23	2.5	375
FRONTIER REGION, RURAL	6.09	2.7	212
SUGAR CANE AND LIVESTOCK REGION, RURAL	4.93	3.2	231
OTHER RURAL AREAS	4.92	2.4	262
F SIGNIFICANCE = .0000			

TABLE 7.14
SEX OF HOUSEHOLD HEAD
BY REGION

	MALE		FEMALE	
	N	%	N	%
TOTAL POPULATION	1036	74.7	351	25.3
NACIONAL DISTRICT	229	71.1	93	28.9
OTHER URBAN AREAS	263	71.3	106	28.7
FRONTIER REGION, RURAL	188	89.1	23	10.9
SUGAR CANE AND LIVESTOCK REGION, RURAL	175	76.1	55	23.9
OTHER RURAL AREAS	202	78.6	55	21.4

(SD 105.52) per person per month in male headed households, and RD \$114.65 (SD 92.6) in female headed households. Female and male headed households do have very noticeably different income sources, however.

Female headed households tend to be smaller than male headed households (5.40 in male, compared with 4.42 members in female headed households).

It is noteworthy that there is no significant difference between male and female headed households in the proportion of total expenditure devoted to food, except in the highest income classes (Quartile 4 and Decile 4), where a slightly higher percent of income is spent on food in female headed households.

7.5.3 Education of Household Head

Heads of households in urban areas had significantly higher educational achievement than those in rural areas. Average educational level was highest (5.9 years) in the capital (see Table 7.16). Not surprisingly, higher educational level was very highly associated with income level. Household heads in the highest decile had an average of 7.7 years of schooling; in the lowest decile, the figure is 2.1, and the relationship of education to income is consistent throughout the observed range (Table 7.17).

7.5.4 Average Age of Household Head

Heads of households are younger on average in the capital than elsewhere in the country: 42.7 years, compared with an average of 46.8. Lower income households tend to have older heads (Table 7.19): age of household head falls steadily from 50.4 to 43.7 years with rising income from Decile 1 through Decile 10.

7.5.5 Dependency Ratio

On average, three of the five household members (60%) do not work either for pay or in a family owned business. This dependency ratio (proportion of household members who do not work) is slightly lower in the

TABLE 7.15

PERCENT OF TOTAL EXPENDITURE ON FOOD
BY EXPENDITURE CLASS AND SEX OF HOUSEHOLD HEAD

	MALE		FEMALE		F SIG.
	%	SD	%	SD	
TOTAL POPULATION	61.50	17.17	62.34	19.03	.4607
DECILE 1	58.28	26.77	63.82	28.99	.2738
QUARTILE 1	65.70	19.44	65.35	24.01	.8958
QUARTILE 2	66.74	13.11	66.29	15.19	.8018
QUARTILE 3	63.26	13.85	63.27	16.29	.9927
QUARTILE 4	50.15	16.53	54.72	16.49	.0299
DECILE 10	40.77	14.64	47.58	18.59	.0380
N OF CASES	947		326		

TABLE 7.16

AVERAGE NUMBER OF YEARS OF EDUCATION OF HOUSEHOLD HEAD
BY REGION

	YEARS OF EDUCATION	SD	N
TOTAL POPULATION	4.36	4.2	1362
SANTO DOMINGO	5.93	4.3	319
OTHER URBAN AREAS	5.46	4.9	361
FRONTIER REGION, RURAL	2.33	2.8	211
SUGAR CANE AND LIVESTOCK REGION, RURAL	2.90	3.0	222
OTHER RURAL AREAS	3.20	3.2	254
F SIGNIFICANCE = .0000			

TABLE 7.17

AVERAGE NUMBER OF YEARS OF EDUCATION OF HOUSEHOLD HEAD
BY EXPENDITURE CLASS

	YEARS OF EDUCATION	SD	N
TOTAL POPULATION	4.36	4.2	1362
DECILE 1	2.11	2.6	128
QUANTILE 1	2.51	2.8	316
QUANTILE 2	3.46	3.2	309
QUANTILE 3	4.71	3.9	319
QUANTILE 4	6.66	5.1	313
DECILE 10	7.74	5.4	126
F SIGNIFICANCE = .0000			

TABLE 7.18
AVERAGE AGE OF HOUSEHOLD HEAD
BY REGION

	AGE	SD	N
TOTAL POPULATION	46.8	15.0	1369
SANTO DOMINGO	42.7	14.1	319
OTHER URBAN AREAS	47.0	15.3	368
FRONTIER REGION, RURAL	47.1	14.4	212
SUGAR CANE AND LIVESTOCK REGION, RURAL	48.7	14.4	224
OTHER RURAL AREAS	48.8	15.2	252
F SIGNIFICANCE = .0000			

TABLE 7.19
AVERAGE AGE OF HOUSEHOLD HEAD
BY EXPENDITURE CLASS

	AGE	SD	N
TOTAL POPULATION	46.8	15.0	1369
DECILE 1	50.4	17.2	127
QUARTILE 1	49.3	15.4	315
QUARTILE 2	47.4	14.8	312
QUARTILE 3	45.8	14.0	318
QUARTILE 4	44.3	15.3	319
DECILE 10	43.7	15.0	128
F SIGNIFICANCE = .0002			

Sugar Cane and Livestock region than elsewhere in the country. The dependency ratio is very much lower in the higher income classes (see Table 7.21). This is partly a reflection of the smaller household size and the smaller number of children in higher income households.

Higher income households are also more likely to contain working women. 52 % of households in the highest quartile and decile contained at least one working woman, compared with 46 to 48 % in the lower income groups (see Table 7.22). There are more households with working women in urban than rural areas; this number is much lower in the Frontier than even in the other rural regions of the country (see Table 7.23).

It is hardly surprising that higher levels of per capita income are associated with more workers, including more women workers, in the household, and with fewer dependents.

7.6 Availability of Utilities and Services

7.6.1 Water and Sanitation

Table 7.24 shows the source of water of households in different regions of the country. In urban areas, 90% of households or more have access to piped water. This figure is much lower in rural areas: about 50%, except in the Frontier where only 30% of households use piped water. Households in the Frontier have much lower access to protected water sources than do households in the rest of the country. Forty percent of Frontier households use river water, compared with less than 20% in the other rural regions, and close to zero in urban areas.

Of course, water sources are very significantly different for low and high income households. In the lowest decile, only 54% of households have access to piped water, while three quarters of above-median-income households use piped water. Use of river water declines from 20% in Decile 1 to 3% in Decile 10.

These results are significant because of the higher risk of water-borne infection if unprotected water sources such as a river are used. Nutritional status is known to be negatively affected by the presence of

TABLE 7.20
PERCENT OF HOUSEHOLD NOT WORKING
BY REGION

	% DEPENDENT	SD	N
TOTAL POPULATION	60.13	26.2	1402
SANTO DOMINGO	61.52	22.2	322
OTHER URBAN AREAS	61.78	24.9	375
FRONTIER REGION, RURAL	59.47	22.1	211
SUGAR CANE AND LIVESTOCK REGION, RURAL	53.44	31.1	231
OTHER RURAL AREAS	61.89	26.5	262
F SIGNIFICANCE = .0005			

TABLE 7.21
PERCENT OF HOUSEHOLD NOT WORKING
BY EXPENDITURE CLASS

	% DEPENDENT	SD	N
TOTAL POPULATION	60.13	26.2	1402
DECILE 1	67.17	25.3	128
QUARTILE 1	65.73	23.9	322
QUARTILE 2	65.08	21.7	321
QUARTILE 3	60.27	24.4	322
QUARTILE 4	49.13	21.2	322
DECILE 10	45.56	33.8	128
F SIGNIFICANCE = .0000			

TABLE 7.22

PERCENT OF HOUSEHOLDS WITH AT LEAST ONE WORKING FEMALE
BY EXPENDITURE CLASS

	%
TOTAL POPULATION	47.9
DECILE 1	48.4
QUARTILE 1	46.5
QUARTILE 2	44.9
QUARTILE 3	48.1
QUARTILE 4	52.0
DECILE 10	51.7
F SIGNIFICANCE = .2992	

TABLE 7.23

PERCENT OF HOUSEHOLDS WITH AT LEAST ONE WORKING FEMALE
BY REGION

	%
TOTAL POPULATION	47.9
SANTO DOMINGO	57.5
OTHER URBAN AREAS	53.9
FRONTIER REGION, RURAL	33.0
SUGAR CANE AND LIVESTOCK REGION, RURAL	44.2
OTHER RURAL AREAS	38.5
F SIGNIFICANCE = .0000	

infection, and the ability to recover from an infection is related to overall health and nutritional status. Poor households and those in the Frontier are at heightened risk of both inadequate food consumption (Chapter 5) and poor sanitation.

This vulnerability is confirmed by data on sanitary facilities (Tables 7.26 and 7.27) which show that access to a toilet is very highly related to income, while the use of "no sanitary facilities" declines with rising income from 25% to Decile 1 households to 2.8% of those in Decile 10. The Frontier region has the highest proportion of households (32.5%) having no sanitary facilities. The Sugar Cane and Livestock region has the second highest (24%).

7.6.2 Services and Utilities

Tables 7.28 and 7.29 show the distribution of availability of electricity and regular garbage collection service. As would be expected, almost all urban households have electricity. The proportion of households with electricity is lowest in the Frontier (39.6%), and next lowest in the Cane and Livestock areas (45%). Garbage collection service is available to about half of urban households, and to virtually no rural households. The availability of these services is very strongly related to income level.

The main types of cooking fuel used in the Dominican Republic are propane gas (31.5% of households), charcoal (36.7%), and firewood (29.6%). Firewood is a very important fuel in rural areas, used by half or more of rural households. Fully 75% of households in the Frontier depend on firewood, and all the remaining households use charcoal. In all the rural areas, only wood and charcoal are significant sources of fuel. Even in urban areas, charcoal is the main cooking fuel for a substantial proportion of households (see Table 7.30). This is important because of the potential for environmental degradation due to deforestation as wood is gathered in the countryside and used both for firewood and to make charcoal.

As income rises, the use of firewood and charcoal decline, and the use of propane rises significantly (Table 7,31).

TABLE 7.24
SOURCE OF WATER
BY REGION

	TOTAL POPULATION		SANTO DOMINGO		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS	
	%	N	%	N	%	N	%	N	%	N	%	N
FAUCET INSIDE HOUSE	23.2	324	26.7	86	44.5	167	0.5	1	12.1	28	9.6	25
FAUCET OUTSIDE HOUSE	26.1	366	23.3	75	31.5	118	16.5	35	21.6	50	27.2	71
FAUCET IN THE STREET	9.1	128	27.3	88	3.7	14	1.9	4	8.2	19	0.8	2
FAUCET IN ANOTHER HOUSE	12.0	168	12.7	41	16.0	60	11.3	24	7.4	17	10.7	28
RIVER	10.0	140	0.0	0	0.0	0	39.2	83	19.0	44	18.8	49
WELL	8.0	112	0.0	0	0.3	1	19.3	41	11.7	27	18.4	48
SPRING	2.9	40	0.0	0	0.0	0	1.4	3	6.9	16	5.4	14
CISTERN	2.4	33	9.9	32	0.3	1	0.0	0	0.0	0	0.0	0
TANK, BARREL	1.6	23	0.0	0	0.3	1	7.1	15	2.6	6	3.1	8
OTHER	4.7	66	0.0	0	3.5	13	2.8	6	10.4	24	6.1	16

TABLE 7.25
SOURCE OF WATER
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N
FAUCET INSIDE HOUSE	23.2	324	3.9	5	6.5	71	15.9	51	29.1	94	38.4	123	49.9	64
FAUCET OUTSIDE HOUSE	26.1	366	21.5	27	21.7	70	29.1	94	29.4	95	22.3	71	11.7	15
FAUCET IN THE STREET	9.1	128	6.0	8	11.0	35	10.4	33	8.3	27	8.1	26	6.3	8
FAUCET IN ANOTHER HOUSE	12.0	168	22.8	29	18.1	58	10.3	33	11.6	38	8.5	27	8.5	11
RIVER	10.0	140	19.6	25	17.0	55	14.1	45	6.6	21	4.3	14	3.0	4
WELL	8.0	112	20.9	27	16.8	54	7.8	25	6.2	20	2.9	9	0.1	*
SPRING	2.9	40	2.1	3	3.8	12	3.2	10	3.1	10	2.4	8	1.2	2
CISTERN	2.4	33	0.0	0	0.3	1	0.9	3	0.6	2	6.3	20	11.8	15
TANK, BARREL	1.6	23	1.6	2	1.1	4	2.3	7	1.1	4	1.7	5	2.4	3
OTHER	4.7	66	1.6	2	3.7	12	5.9	19	4.0	13	5.1	16	5.2	7

* = Less than 1 weighted case

TABLE 7.26
SANITARY FACILITIES
BY REGION

	TOTAL POPULATION		SANTO DOMINGO		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS	
	%	N	%	N	%	N	%	N	%	N	%	N
PRIVATE TOILET	23.3	325	38.9	123	42.2	157	2.4	5	2.2	5	9.2	24
SHARED TOILET	5.0	69	13.0	41	5.4	20	6.1	13	0.9	2	0.8	2
PRIVATE LETRINE	42.0	585	19.0	60	29.6	110	18.4	39	56.3	130	64.9	170
SHARED LETRINE	19.2	268	29.1	92	15.6	58	40.6	86	16.5	38	14.5	38
NO FACILITIES	10.5	146	0.0	0	7.3	27	32.5	69	24.2	56	10.7	28

TABLE 7.27
SANITARY FACILITIES
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N
PRIVATE TOILET	23.3	325	5.3	7	6.1	20	14.0	45	26.9	86	42.2	134	56.4	71
SHARED TOILET	5.0	69	5.0	6	3.4	11	6.3	20	5.6	18	5.3	17	4.1	5
PRIVATE LETRINE	42.0	585	46.8	60	46.6	149	45.3	146	43.3	139	31.9	101	22.6	29
SHARED LETRINE	19.2	268	18.1	23	23.3	75	22.7	73	16.9	54	16.2	51	14.0	18
NO FACILITIES	10.5	146	24.8	32	20.6	22	11.7	38	7.4	24	4.4	14	2.8	4

TABLE 7.28
SERVICES AND UTILITIES
BY REGION

	PERCENT OF HOUSEHOLDS WITH ELECTRICITY		PERCENT OF HOUSEHOLDS WITH REGULAR GARBAGE COLLECTION	
	%	N	%	N
TOTAL POPULATION	80.5	1119	28.0	386
SANTO DOMINGO	100.0	315	54.3	171
OTHER URBAN AREAS	95.2	354	52.8	197
FRONTIER REGION, RURAL	39.6	84	1.0	2
SUGAR CANE AND LIVESTOCK REGION, RURAL	45.0	103	0.0	0
OTHER RURAL AREAS	78.6	206	3.9	10

TABLE 7.29
SERVICES AND UTILITIES
BY EXPENDITURE CLASS

	PERCENT OF HOUSEHOLDS WITH ELECTRICITY		PERCENT OF HOUSEHOLDS WITH REGULAR GARBAGE COLLECTION	
	%	N	%	N
TOTAL POPULATION	80.5	1119	28.0	386
DECILE 1	66.4	83	13.3	16
QUARTILE 1	68.0	217	12.4	39
QUARTILE 2	76.9	247	21.3	68
QUARTILE 3	86.4	275	28.0	89
QUARTILE 4	89.3	285	45.5	114
DECILE 10	91.8	117	55.5	70

TABLE 7.30

PRIMARY FUEL
BY REGION

	TOTAL POPULATION		SANTO DOMINGO		OTHER URBAN AREAS		FRONTIER RURAL		SUGAR CANE AND LIVESTOCK		OTHER RURAL AREAS	
	%	N	%	N	%	N	%	N	%	N	%	N
ELECTRIC STOVE	0.2	3	0.0	0	0.0	0	0.0	0	0.0	0	0.8	2
ELECTRIC HOT PLATE	1.3	18	3.5	11	0.3	1	0.0	0	0.4	1	1.2	3
PROPANE GAS	31.5	424	68.8	216	41.9	152	0.0	0	4.8	11	11.1	27
GAS HOT PLATE	0.2	3	0.0	0	0.0	0	0.0	0	0.4	1	0.4	1
CHARCOAL	36.7	494	27.4	86	47.4	172	25.1	50	35.1	80	36.2	88
FIREWOOD	29.6	398	0.0	0	9.9	36	74.9	149	57.9	132	49.8	121
KEROSINE	0.1	2	0.0	0	0.0	0	0.0	0	0.0	0	0.4	1
OTHER	0.4	5	0.3	1	0.6	2	0.0	0	1.3	3	0.0	0

TABLE 7.31

PRIMARY FUEL
BY EXPENDITURE CLASS

	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N
ELECTRIC STOVE	0.2	3	0.0	0	0.0	0	0.0	0	0.5	2	0.0	0	0.0	0
ELECTRIC HOT PLATE	1.3	18	0.9	1	1.7	5	1.2	4	1.0	3	1.2	4	0.9	1
PROPANE GAS	31.5	424	4.5	5	8.7	26	22.5	71	36.6	115	54.5	165	67.5	79
GAS HOT PLATE	0.2	3	0.0	0	0.4	1	0.0	0	0.0	0	0.5	2	0.0	0
CHARCOAL	36.7	494	30.8	35	32.9	100	38.1	121	40.5	127	33.4	101	25.2	30
FIREWOOD	29.6	398	60.5	70	55.1	167	37.9	120	21.2	67	10.5	32	6.5	8
KEROSINE	0.1	2	1.3	2	0.5	2	0.0	0	0.0	0	0.0	0	0.0	0
OTHER	0.4	5	2.0	2	0.7	2	0.3	1	0.3	1	0.0	0	0.0	0

8. Prices

Prices were computed by calculating the price per pound paid for each transaction in which an item was purchased for cash. Quantities were estimated using food models,* they were reported in pounds or liters. The average price was calculated by weighting each transaction's price by the quantity purchased. Items obtained free (gifts, payment in kind, home production) are of course not included in the calculation of price.

8.1 Regional Variation in Prices

Average prices paid for the major foods in the Dominican food basket during the year of the survey (January-November 1985) are presented in Table 8.1 for the country as a whole and for each of the five regions. There are no clear generalizations which can be made about price in one region or another: some foods appear to be more expensive in urban areas (eg. red beans, green bananas, yuca, cheese), and others are more expensive in the rural areas (eg. common rice, pasta, raw sugar). Only in the Frontier do prices appear to be lower for many foods, although certain foods (eg. chicken) are more expensive than in the other regions of the country.

The price of common rice is slightly higher in the rural than the urban areas, and is everywhere slightly above the legal control price of 45 centavos a pound. The price of common rice is less variable by region and season than most other prices, which is to be expected because of the official control on this price. The price differential between common and select rice ranges from 22 percent to 28 percent. (The Frontier region is excluded because there were so few observations of the purchase of select rice.) Raw sugar is also somewhat cheaper in the urban areas. Both rice and sugar had controlled prices at the time of the survey, so these price differences may possibly reflect better enforcement, or more awareness on the part of the consumers, of these legal price limits. Eggs are cheaper in the capital than elsewhere in the country, which may be one reason that eggs are more commonly consumed in urban than rural areas. Apparently, the casual sale of eggs from chickens kept at home in rural areas is not of

*See Chapter 2 for a complete description of the method.

TABLE 8.1

WEIGHTED AVERAGE PRICE OF SELECTED FOODS
BY REGION

	TOTAL POPULATION			SANTO DOMINGO			OTHER URBAN AREAS			PROVINCIAL RURAL			SUGAR CANE AND LIVESTOCK			OTHER RURAL AREAS			T SIG.
	RD\$/LB	SD	N	RD\$/LB	SD	N	RD\$/LB	SD	N	RD\$/LB	SD	N	RD\$/LB	SD	N	RD\$/LB	SD	N	
COMMON RICE	.549	.089	775	.526	.089	153	.525	.087	187	.555	.085	155	.595	.094	159	.544	.069	147	.0000
SELECT RICE	.658	.103	156	.643	.069	82	.673	.141	46	.600	.000	1	.725	.086	4	.670	.117	15	.2914
RED BEANS	1.642	.440	714	1.753	.412	165	1.468	.398	189	1.321	.449	89	1.841	.458	124	1.599	.399	132	.0000
WHITE BEANS	1.353	.258	70	1.380	.231	23	1.276	.328	17	1.265	.309	4	1.380	.376	5	1.378	.193	15	.7019
BLACK BEANS	1.232	.329	59	1.310	.322	16	.981	.222	9	1.210	.434	3	1.098	.434	13	1.395	.116	12	.0258
PINTO BEANS	1.778	.424	77	1.690	.295	16	1.611	.470	14	1.000	.000	1	2.020	.487	20	1.712	.319	16	.0111
GREEN PIGEON PEA	1.489	.738	173	1.814	.682	64	1.278	.727	51	1.000	.000	1	.640	.000	1	1.381	.640	17	.0002
DRIED PIGEON PEA	.965	.307	42	1.141	.239	10	.846	.217	11	.714	.135	7	1.012	.394	12	.840	.224	4	.0244
PLANTAIN (1)	.296	.117	746	.279	.104	251	.301	.128	219	.256	.132	59	.315	.125	70	.307	.111	120	.0057
YUCA	.318	.120	580	.390	.147	187	.300	.091	199	.201	.092	19	.291	.097	48	.257	.053	88	.0000
SQUASH	.656	.373	341	.789	.420	125	.601	.314	123	.498	.309	20	.407	.200	9	.565	.332	51	.0000
GREEN BANANA (2)	.156	.128	171	.182	.097	64	.192	.163	50	.097	.088	22	.120	.056	2	.092	.100	33	.0003
POTATO	.498	.092	464	.461	.079	168	.515	.108	112	.527	.090	9	.521	.092	48	.520	.074	83	.0000
SWEET POTATO	.215	.087	181	.231	.074	44	.212	.104	58	.080	.060	10	.256	.087	7	.204	.074	45	.0000
YAUTIA	.412	.151	170	.409	.121	78	.425	.163	47	.331	.239	7	.382	.185	14	.419	.185	18	.5829
BAMB	.463	.203	63	.359	.140	11	.500	.094	25	.400	.000	1	.402	.077	5	.488	.313	14	.2565
GOAT	2.635	.714	44	2.948	.569	5	2.788	.614	27	2.053	.152	16	2.750	.456	4	1.650	1.068	3	.0001
CHICKEN	1.980	.280	807	1.932	.208	230	1.957	.304	239	2.239	.286	57	2.020	.331	110	2.024	.273	131	.0000
PORK	2.966	.503	265	3.082	.476	65	2.954	.584	87	2.525	.252	6	2.873	.354	39	2.935	.491	44	.0496
BEEF	2.585	.595	635	2.858	.561	163	2.579	.627	184	1.970	.355	52	2.379	.583	116	2.510	.476	95	.0000
FRESH FISH	1.374	.875	106	2.305	.965	16	1.338	.924	36	.855	.840	17	1.502	.495	15	.949	.531	22	.0000
DRIED FISH	3.775	1.125	443	3.666	.685	115	3.700	.877	110	4.333	.485	30	3.900	1.321	87	3.823	1.482	74	.0236
SARDINES	1.892	1.146	224	1.975	2.149	60	1.825	.377	51	1.869	.272	59	1.890	.219	42	1.867	.371	35	.9653
SALAMI	3.379	1.137	485	3.387	1.005	138	3.283	1.203	116	3.040	1.074	32	3.288	1.285	89	3.595	1.069	74	.0391
LIQUID MILK (4)	.794	.209	615	.987	.099	150	.829	.216	199	.562	.149	31	.620	.116	97	.688	.146	97	.0000
POWDERED MILK	3.042	1.432	93	2.962	1.178	40	3.083	1.383	37	3.665	2.792	8	3.812	2.032	2	2.954	2.133	8	.7559
EVAPORATED MILK	2.112	.387	145	2.049	.301	63	2.047	.456	42	2.606	.508	5	2.262	.389	15	2.280	.393	14	.0035
CHEESE	3.949	.958	281	4.207	.657	123	4.065	1.235	74	3.948	2.170	6	3.525	.700	34	3.584	1.235	44	.0002
BUTTER	4.621	2.833	176	5.023	2.573	51	4.645	2.994	62	3.750	.000	1	4.127	2.252	20	4.347	3.226	26	.7400
EGGS (5)	.226	.026	663	.207	.015	218	.230	.026	190	.246	.016	50	.233	.026	68	.241	.019	109	.0000
VEGETABLE OIL	2.491	.572	885	2.322	.455	207	2.462	.455	205	2.551	.412	159	2.827	.754	164	2.399	.501	167	.0000
NATURE COCONUT (3)	.251	.076	172	.276	.078	26	.252	.084	72	.261	.091	60	.257	.054	13	.266	.061	31	.7382
MARGARINE	2.573	1.413	227	2.254	1.479	112	2.775	.750	35	NO PURCHASES			3.741	2.006	19	2.634	1.063	38	.0002
BREAD ROLLS	.881	.226	951	.878	.196	273	.893	.246	293	.924	.301	71	.796	.034	122	.916	.275	151	.0001
PASTA	.613	.235	786	.557	.049	197	.617	.083	186	.699	.117	125	.680	.497	134	.603	.094	143	.0000
WHEAT FLOUR	.533	.430	155	.444	.108	26	.553	.550	36	.491	.121	26	.555	.471	59	.547	.368	14	.7822
CORN FLOUR	.457	.088	118	.439	.071	17	.489	.072	27	.471	.151	9	.466	.050	35	.427	.125	21	.1368
REFINED SUGAR	.639	.146	122	.627	.109	46	.693	.088	46	NO PURCHASES			.437	.213	10	.657	.191	12	.0000
SEMI-REFINED SUGAR	.496	.132	173	.512	.110	74	.468	.152	63	NO PURCHASES			.575	.154	11	.479	.105	15	.0420
RAW SUGAR	.304	.072	821	.287	.053	145	.274	.073	186	.314	.080	15	.331	.064	166	.313	.076	177	.0000

(1) Average medium plantain weighs .563 lb.

(2) Average small green banana weighs .125 lb.

(3) Average medium coconut weighs 1.57 lbs.

(4) Price is RD\$/litre.

(5) Price is RD\$/Unit.

great enough importance to make eggs cheaper in rural than urban areas.

Liquid milk is significantly less expensive in rural than in urban areas, reflecting the fact that, in rural areas, much of the liquid milk consumed is purchased direct from producers and is not processed, while a good proportion of urban milk purchases are of processed packaged milk. Evaporated milk, by contrast, is less expensive in the cities, possibly because the cost of transportation is lower to urban centers than to more peripheral areas.

A number of foods are significantly less expensive in the Frontier region than in other areas. These include yuca, red beans, dried pigeon peas, plantains and green bananas, fresh fish, and dried fish. Yuca, pigeon peas, plantains, and green bananas are produced locally, and it is quite likely that the relatively high marketing costs for transportation outside this remote region keep supplies abundant and prices low within the region. Similarly, the fresh fish sold in the Frontier is probably locally caught and sold quickly because of the difficulties of storage. Quality may be a factor in the low prices of beans and dried fish: since the Frontier is quite poor relative to the rest of the country it is likely that lower quality foods reach the market there.

Plantain is generally considered to be a more desirable food than yuca, these being the two major starchy staples, although the price per pound as purchased appears to be generally higher for yuca than plantain. Because of differing nutrient densities, yuca provides about 8% more calories per peso of expenditure than plantain on average. This varies by region, however. In the capital, yuca is a more expensive source of calories and protein, providing 77% as many calories per peso as plantain. In the Frontier, yuca is very much cheaper, providing 226% as many calories per peso. In the other regions, the difference is from 12% to 20%.

Table 8.2 shows the overall cost of calories and protein by region of the country. The figures indicate how many calories and grams of protein are obtained for a peso of value of food eaten in each region. These figures of course represent consumer choice as well as general price differences in the regions: wealthier consumers, choosing more expensive

varieties of food, pay more for their nutrients than those choosing cheaper foods. Clearly, rural areas obtain more of both calories and protein per peso of value than urban areas. Consumers in the Frontier region pay the least for their calories and protein, a reflection of significantly lower prices for many items, lower proportion of the relatively expensive animal foods in the dietary pattern in the region, and larger proportion of calories and protein from home production and gifts.

8.2 Variation in Prices Paid by Income Level

Table 8.3 shows the average cost of calories and protein paid by each income class. It is not surprising that higher-income households pay very significantly more for their food than do low-income households. This is due in part to quality differences in the specific foods purchased (for example, better cuts of meat, fresher or better quality plantains), and also to the selection of more expensive sources of nutrients (meat and chicken instead of beans; select rice rather than common).

We have already seen that the dietary patterns of better-off households contain proportionally more of the more expensive nutrient sources. Regression analysis of the effect of income on price paid, controlling for region, season, and household size, confirmed that better-off households pay slightly but significantly more per pound for plantain, yuca, beef, chicken, and beans. These differences in price might be due to quality and to the fact that wealthier households are more likely to shop in supermarkets and specialty stores, which are more expensive than public markets and colmados.

8.3 Seasonal Variation in Prices

The monthly variation in prices paid for ten major foods are presented in Figure 8.1. The prices of common rice, red beans, and raw sugar rose consistently throughout the period of the survey. Other prices, including plantain, yuca, oil, chicken, beef, and milk, showed more cyclic variation. These variations cannot necessarily be attributed to annual seasonal cycles of climate, however. Many external factors affected the level of prices between January and October 1986. The last phase of a major devaluation of

TABLE 8.2
CALORIES AND PROTEIN PER PESO OF VALUE EATEN
BY REGION

	CALORIES		PROTEIN(GMS)		N
	MEAN	SD	MEAN	SD	
TOTAL POPULATION	1193.46	451.98	26.92	8.26	1345
SANTO DOMINGO	1022.95	381.14	24.36	7.06	318
OTHER URBAN	1077.55	394.33	26.24	8.47	367
FRONTIER RURAL	1736.95	779.72	34.73	10.74	201
CANE AND LIVESTOCK	1284.84	364.11	27.43	7.38	223
OTHER RURAL	1340.10	466.81	28.67	8.38	240
F SIGNIFICANCE	.0000		.0000		

TABLE 8.3
CALORIES AND PROTEIN PER PESO OF VALUE EATEN
BY EXPENDITURE CLASS

	CALORIES		PROTEIN(GMS)		N
	MEAN	SD	MEAN	SD	
TOTAL POPULATION	1193.46	451.98	26.92	8.26	1345
DECILE 1	1746.26	600.76	37.71	9.87	110
QUARTILE 1	1570.85	496.58	33.26	8.90	301
QUARTILE 2	1275.42	384.48	28.18	7.40	314
QUARTILE 3	1064.95	301.19	24.76	5.88	311
QUARTILE 4	903.09	318.23	22.16	6.02	311
DECILE 10	849.97	351.87	21.58	6.33	122
F SIGNIFICANCE	.0000		.0000		

the peso against the dollar (from RD \$1 = US \$1 to RD \$3 = US \$1) was completed in January, raising the price of imported foods including vegetable oil. Elections were held in May, 1986 and the new government took office in August. These events may have influenced prices in a variety of ways: through variation in the enforcement of price controls (for example of rice and raw sugar); through import policy; (for example, a large importation of chicken from the United States at prices well below market took place in the spring of 1986 as a response to market scarcity, lowering the price); through hoarding as a response to uncertainty before the new government took office.

Figure 8.2 shows the monthly price variation for the ten major commodities by region. With a few exceptions, the monthly fluctuations follow similar patterns in the regions. Both plantain and yuca have distinct patterns of price change by region, possibly indicating that the market for these goods is less well integrated than for some others. The occasional peaks observed in the prices of some goods may be due simply to isolated local conditions which occurred by chance during the survey period in one location.

8.4 Price Variation by Source of Food

Table 8.4 shows the average prices paid for twelve major foods in the various retail outlets. Except for chicken, most foods are less expensive when purchased directly from the producer. It is noteworthy that there is no consistent pattern in relative price among the major retail outlets, the colmado, public market, and supermarket. Prices are quite close for most foods, and no one outlet appears consistently cheaper or more expensive than the others.

8.5 Price of Calories and Protein in Selected Foods

8.5.1 Calories

Tables 8.5 and 8.6 show the amounts of calories and protein obtained for a peso of expenditure on selected foods. The cheapest sources of calories among the major foods in the Dominican diet are raw sugar, mature coconut, green bananas, pasta, and common rice. Surprisingly, yuca is a

FIGURE 8.1

PRICE BY MONTH FOR SELECTED FOODS

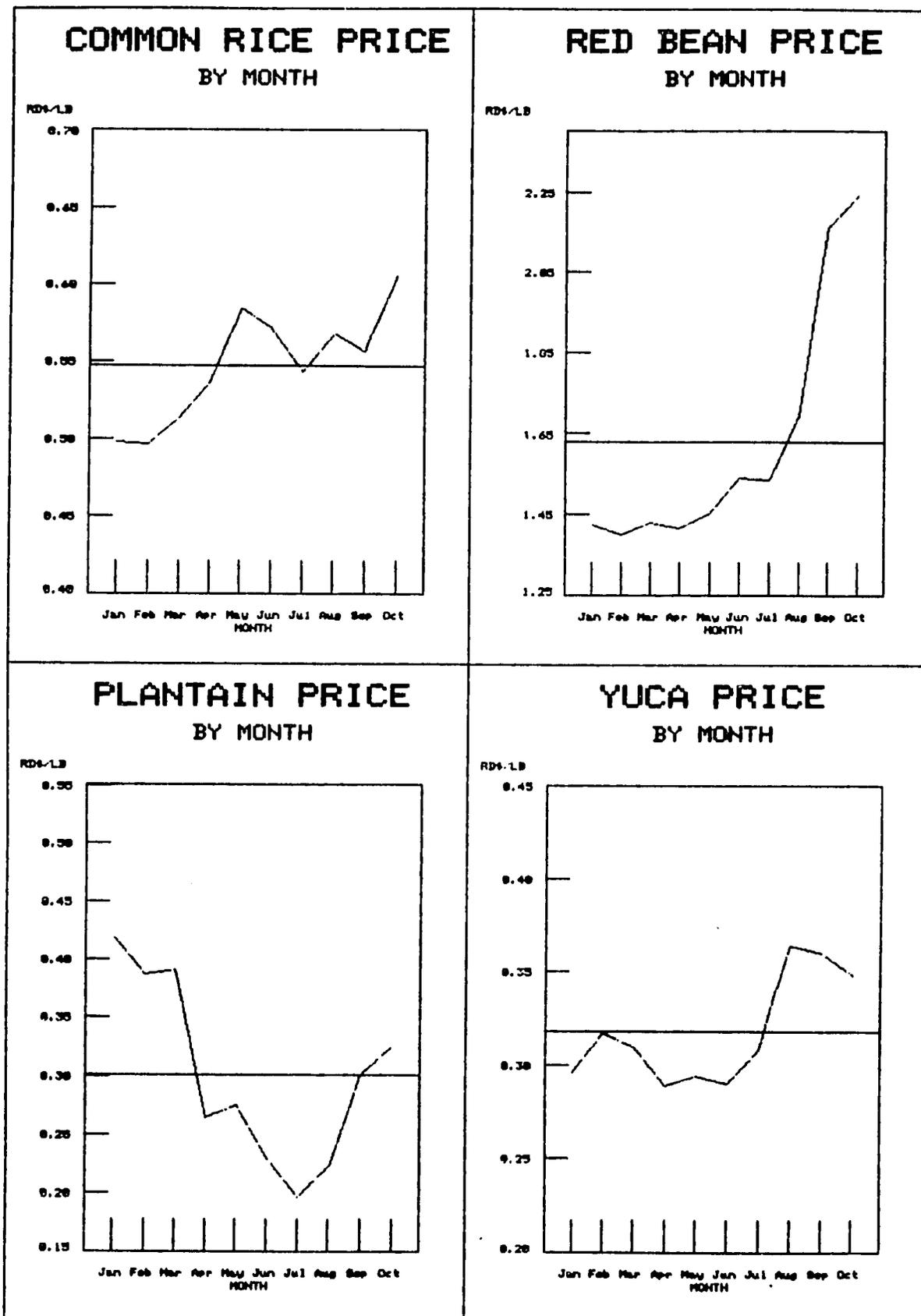


FIGURE 8.1 CONT.

PRICE BY MONTH FOR SELECTED FOODS

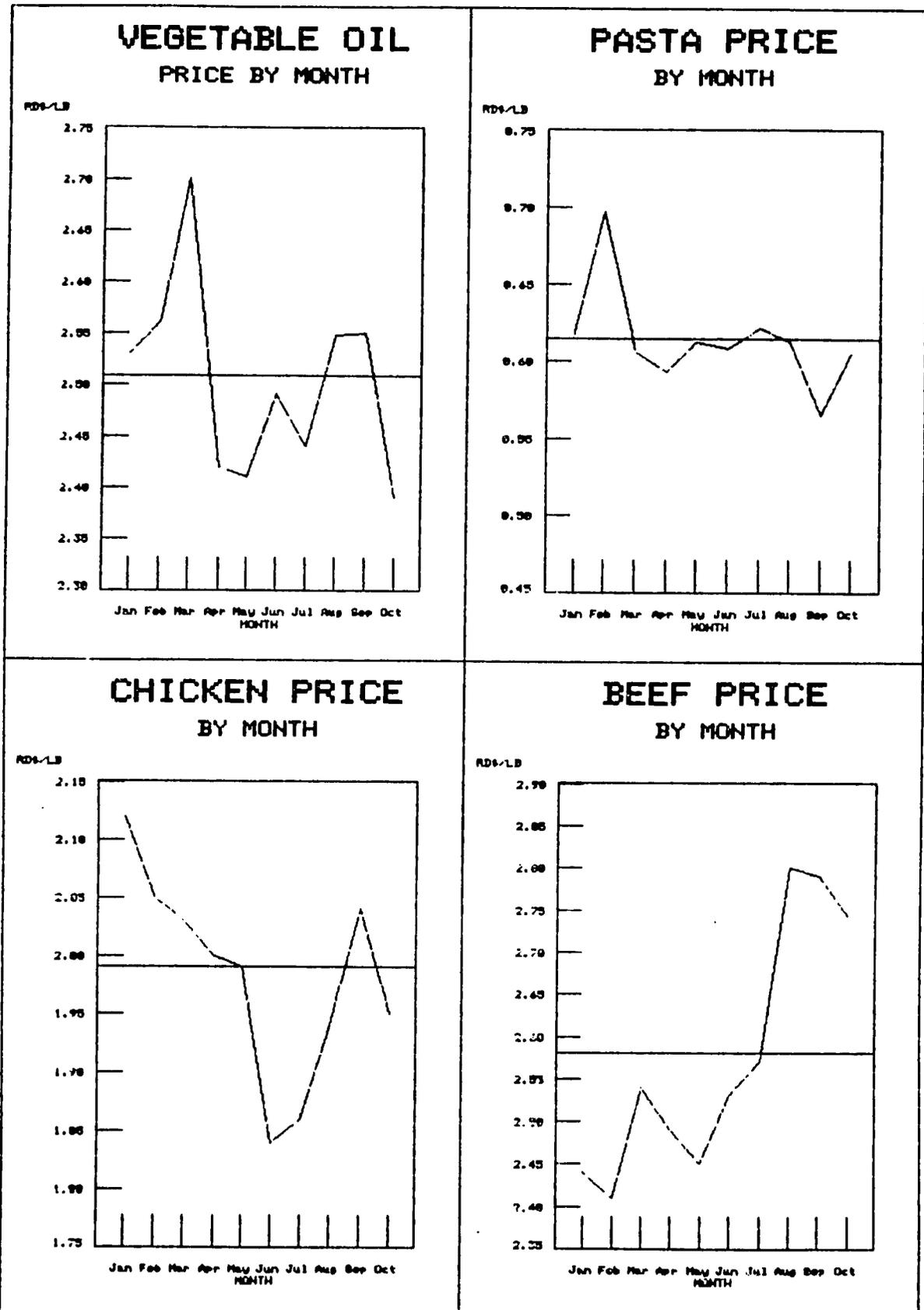


FIGURE 8.1 CONT.

PRICE BY MONTH FOR SELECTED FOODS

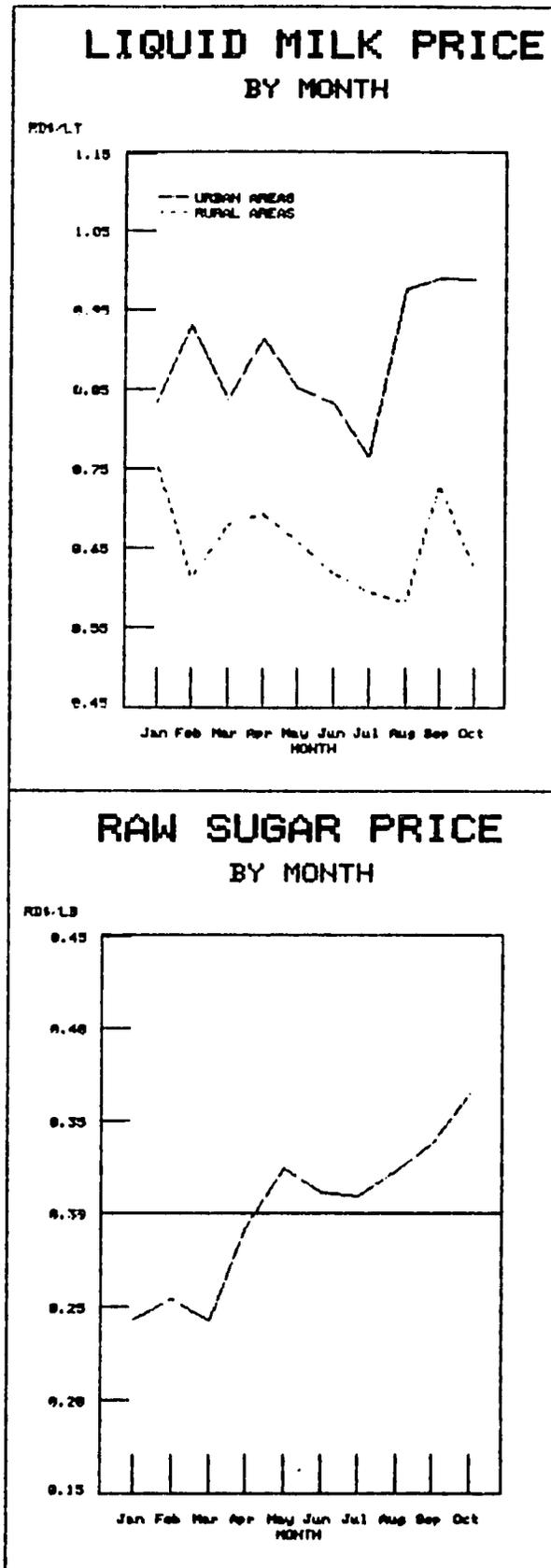


FIGURE 8.2a

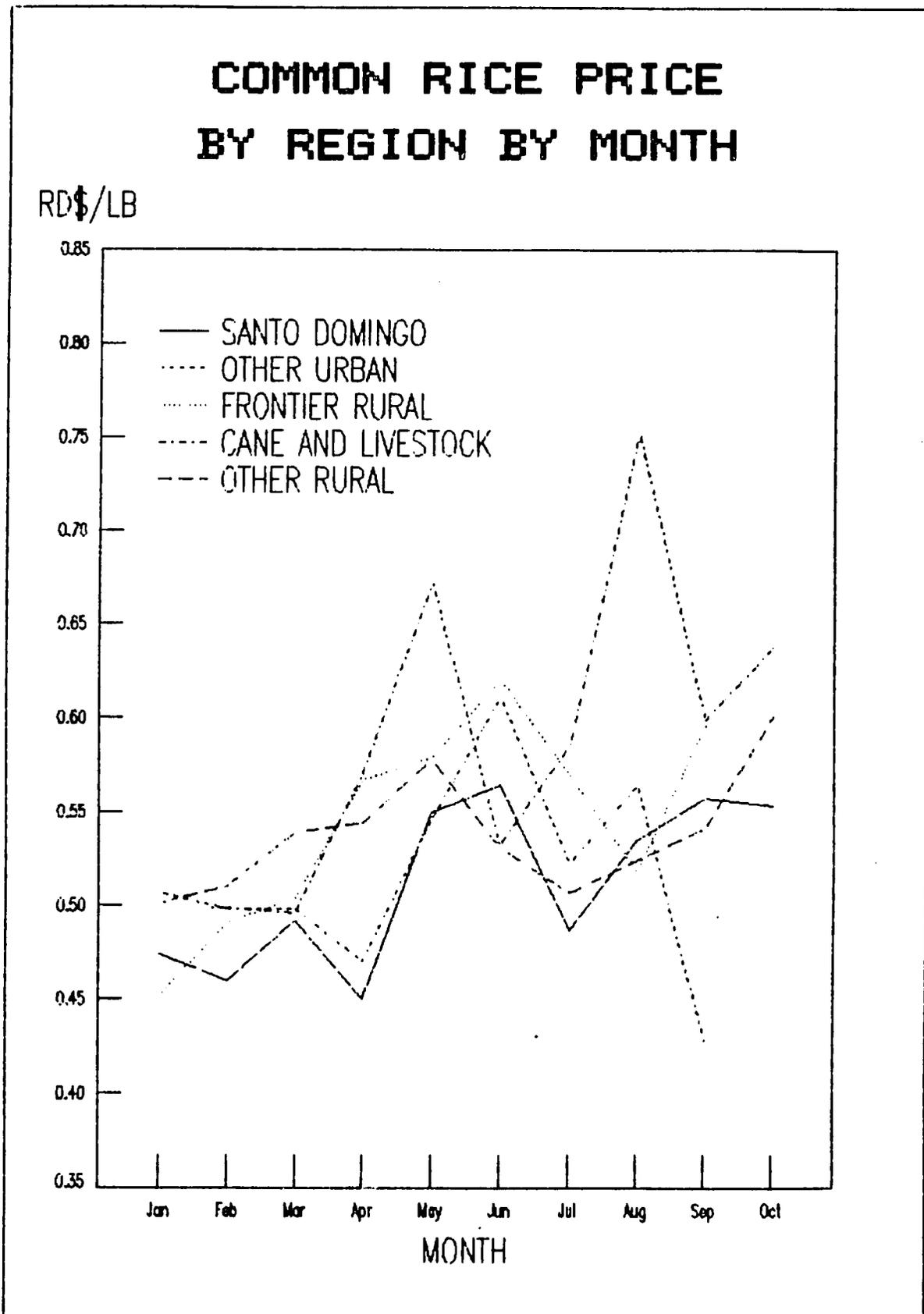


FIGURE 8.2b

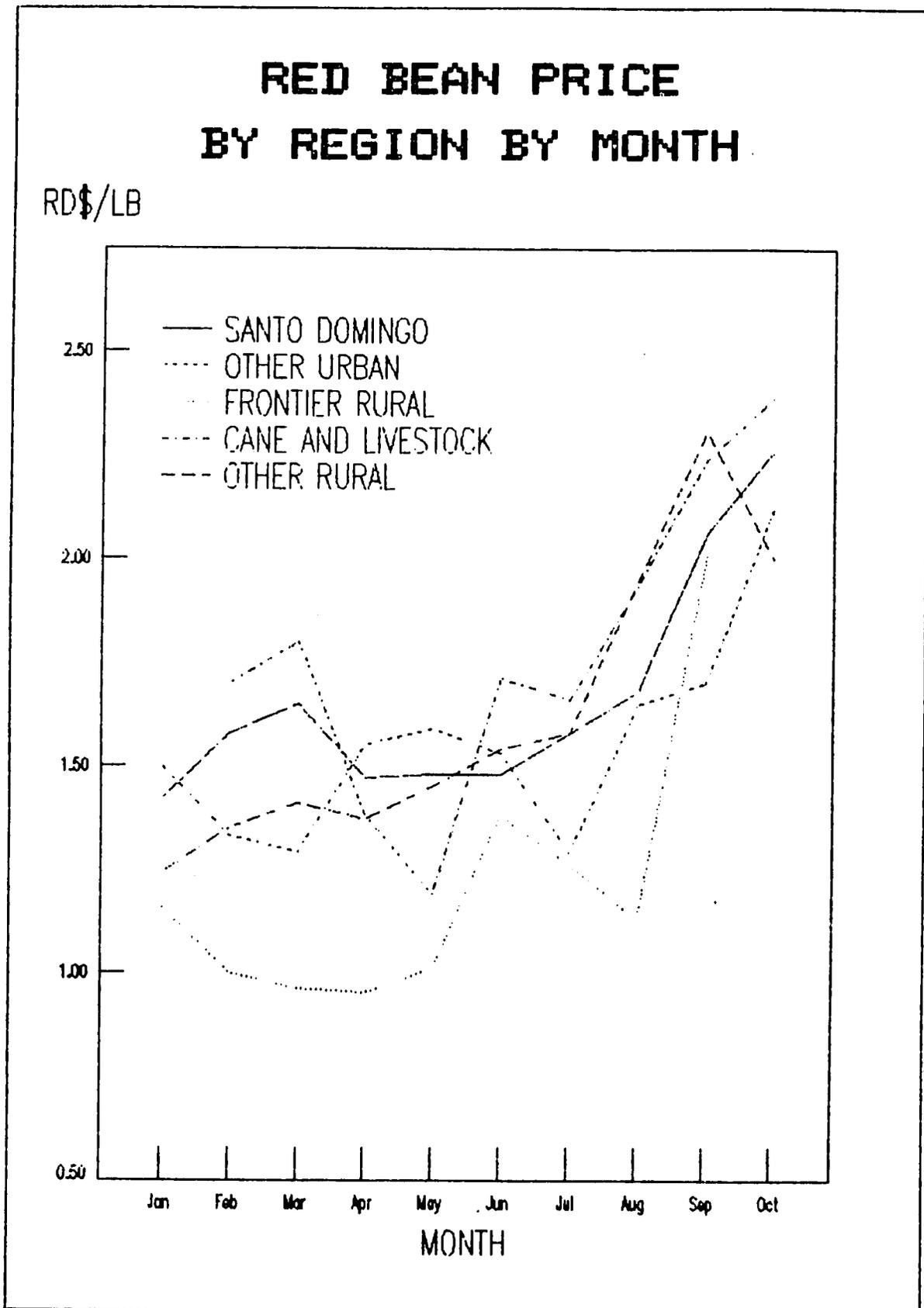


FIGURE 8.2c

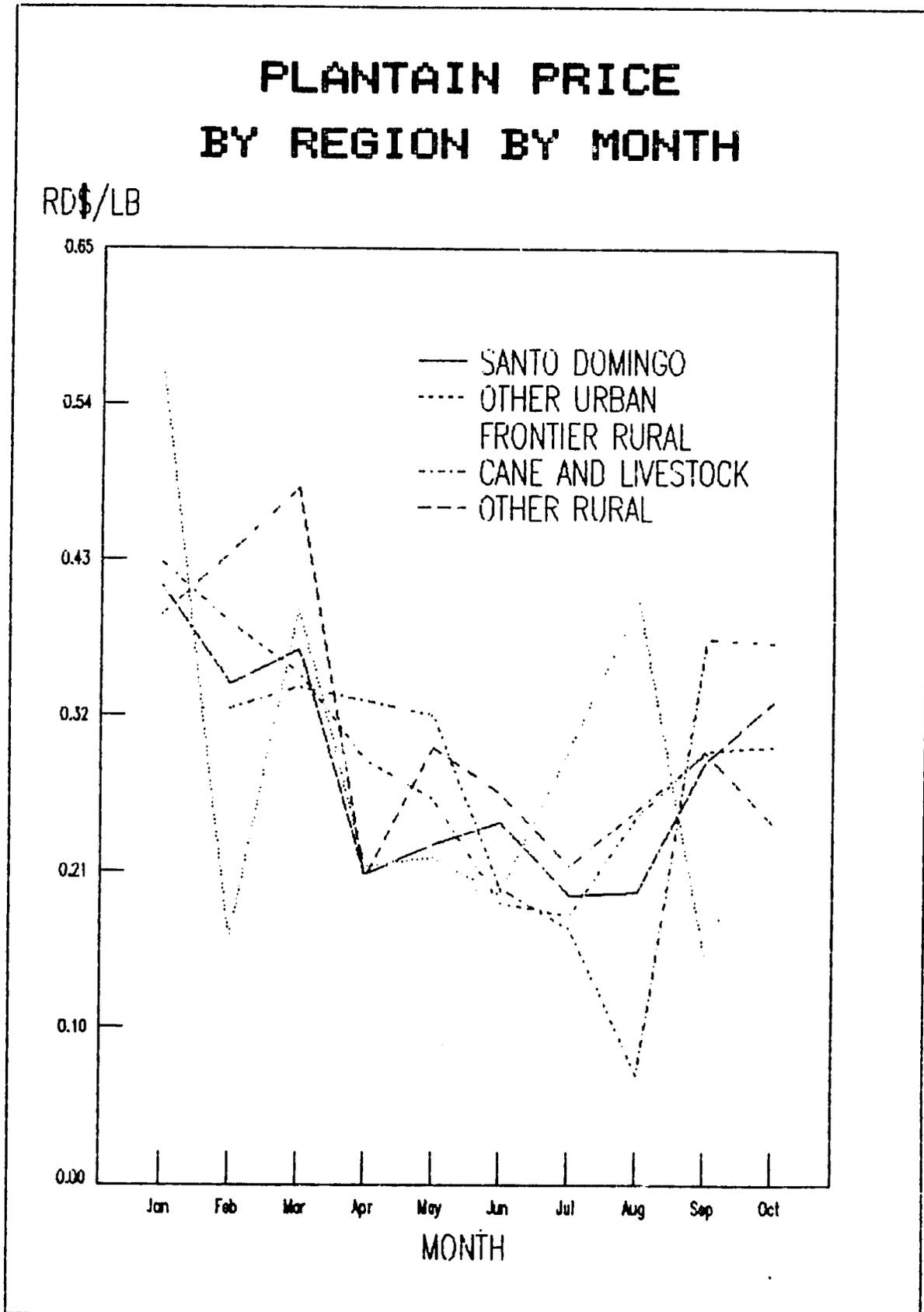


FIGURE 8.2d

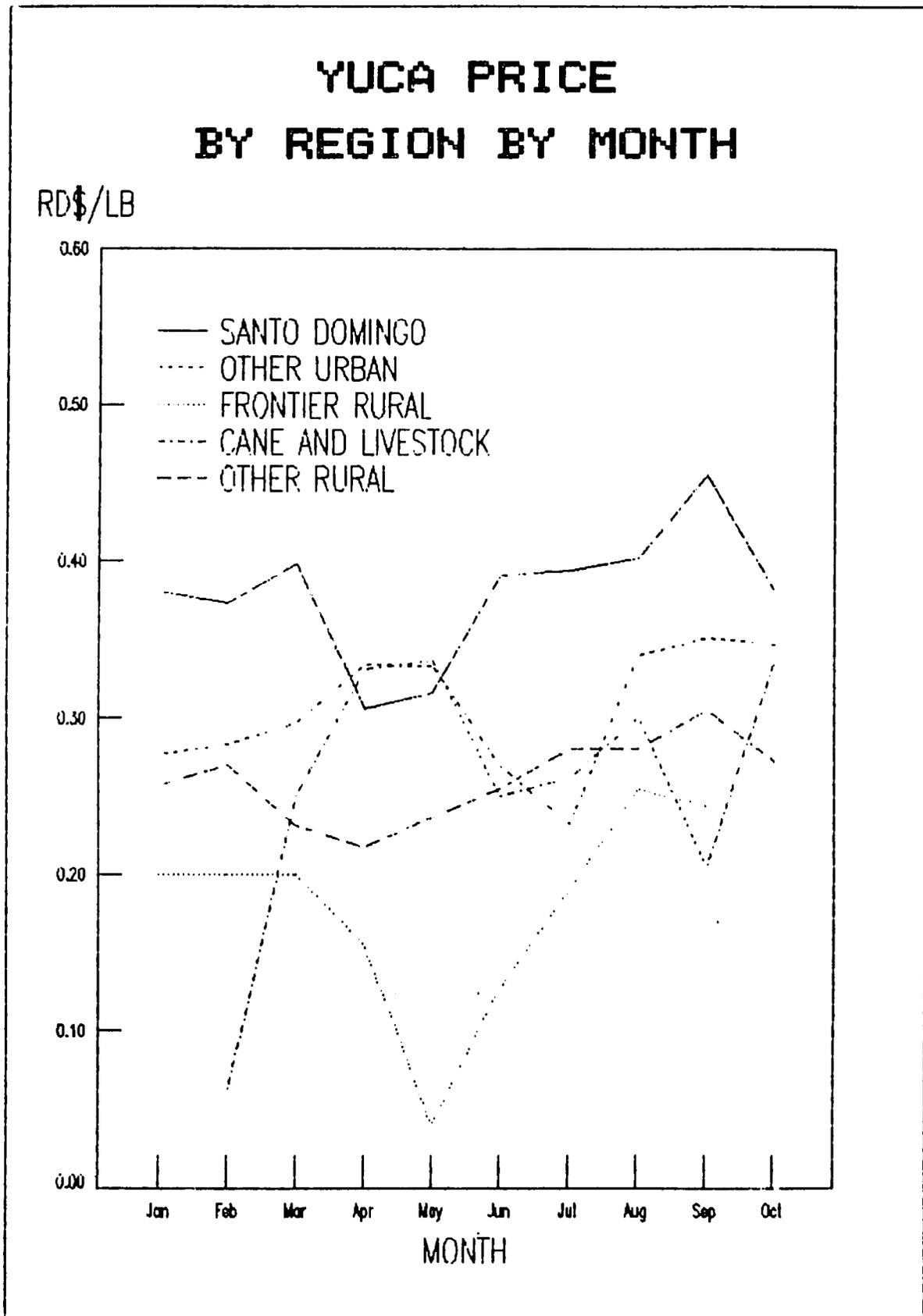


FIGURE 8.2e

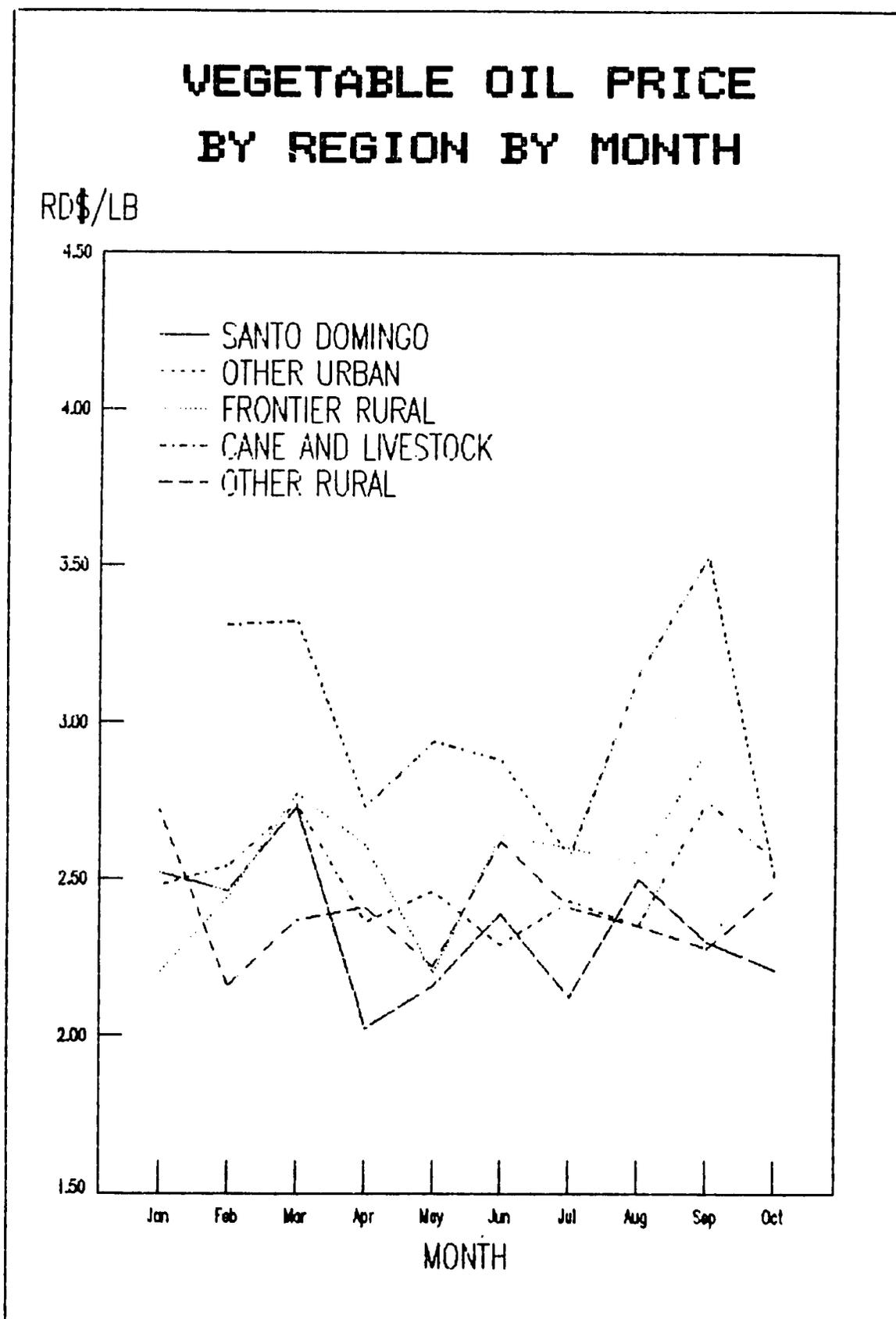


FIGURE 8.2f

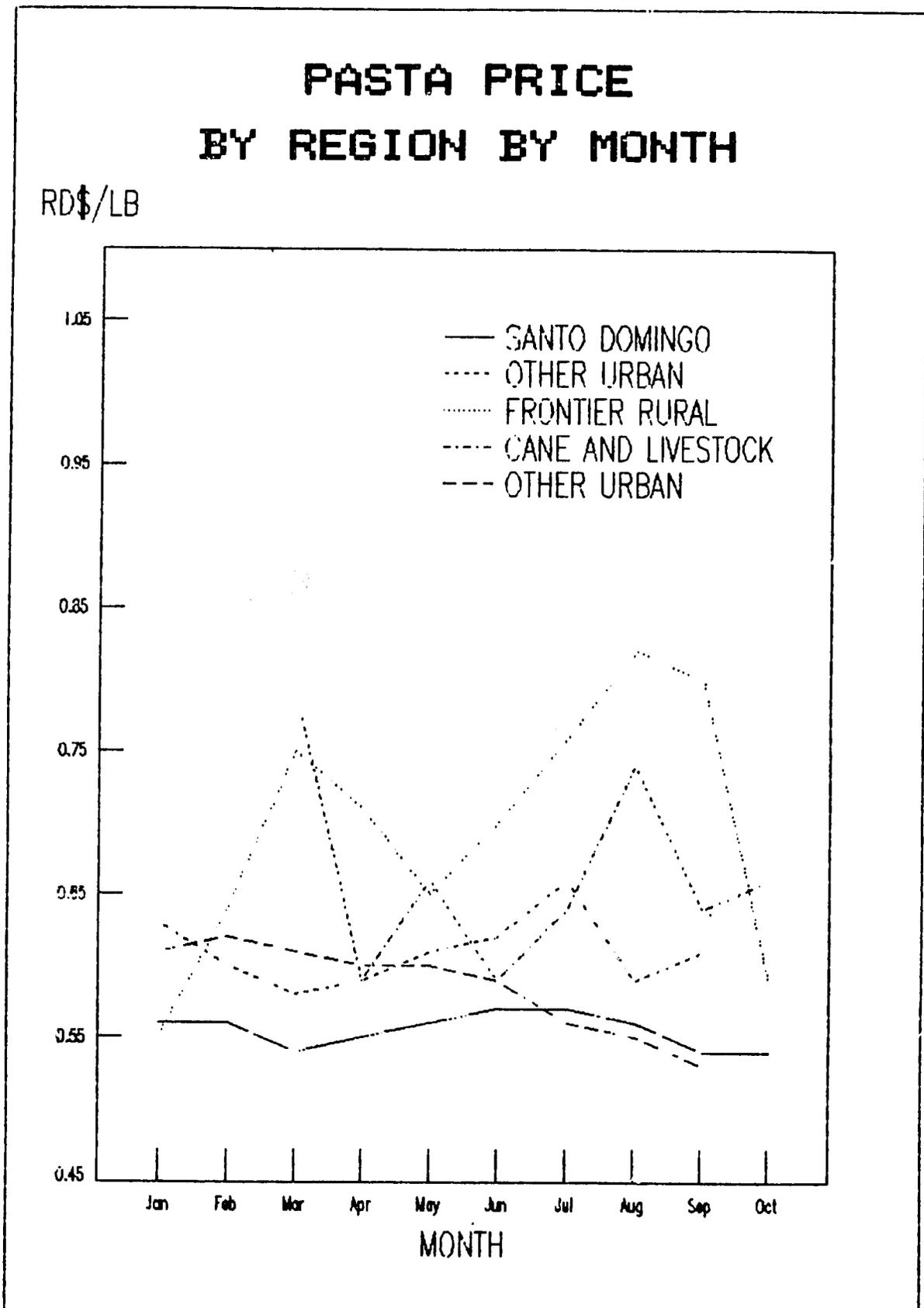


FIGURE 8.2g

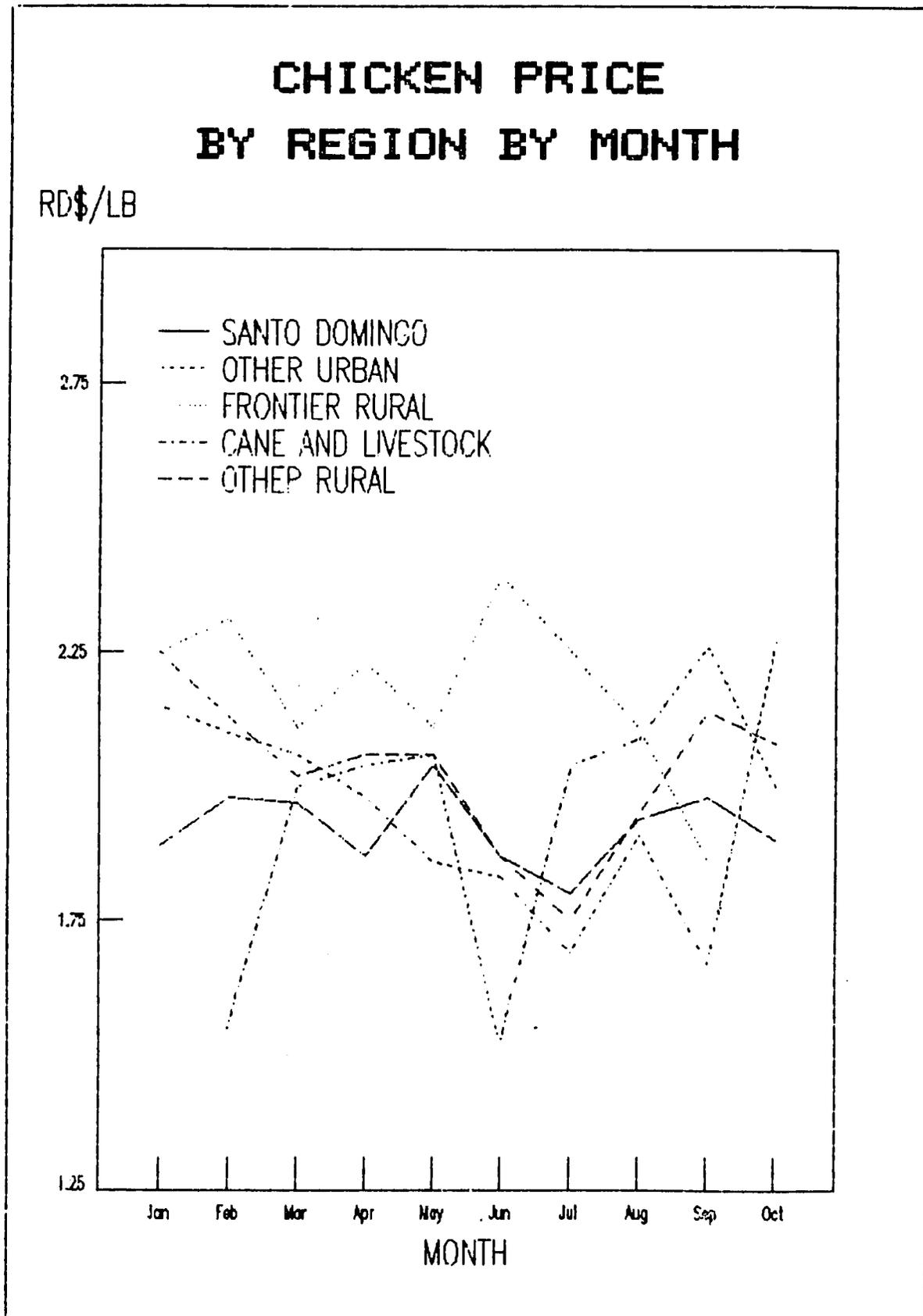


FIGURE 8.2h

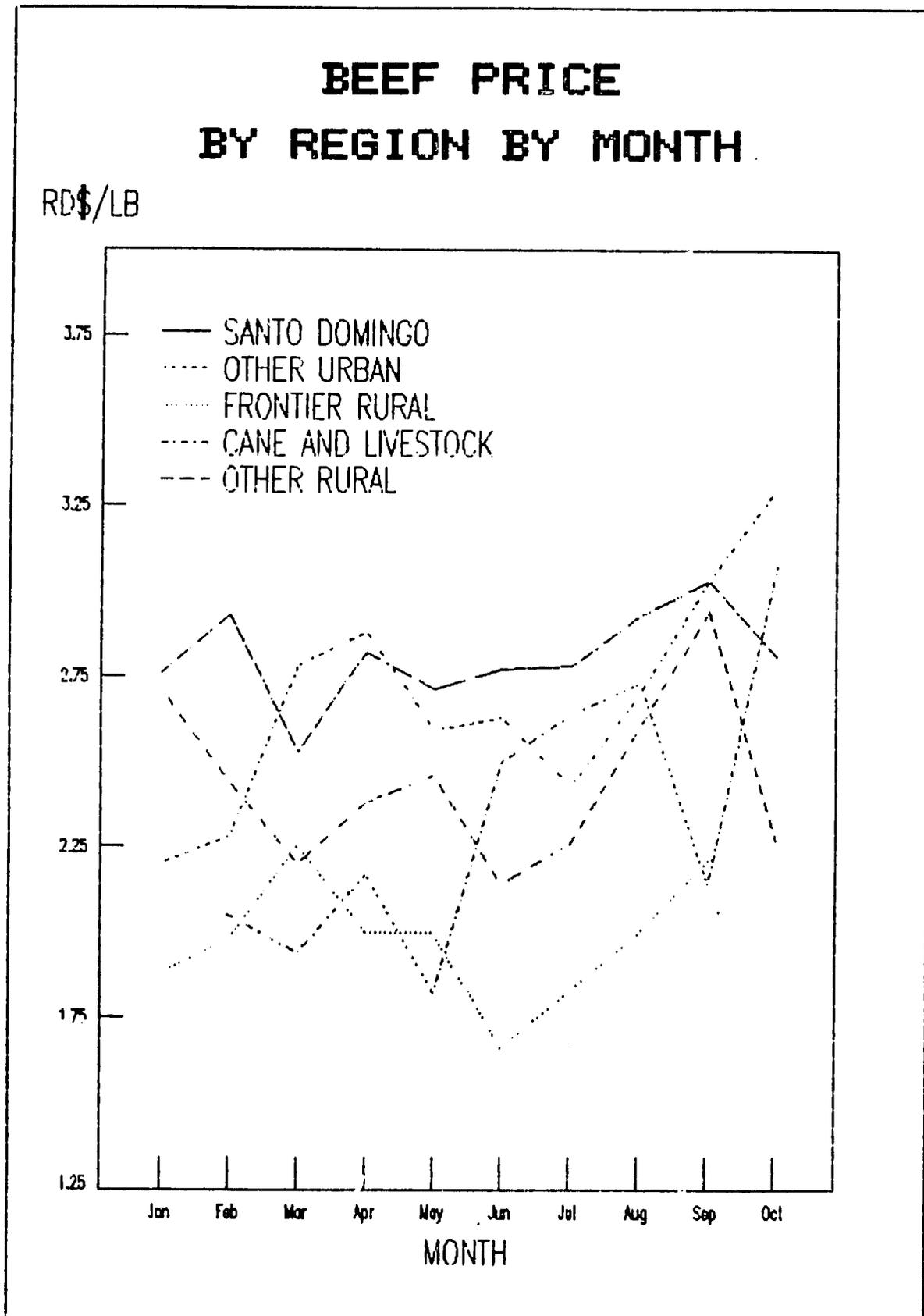


FIGURE 8.2i

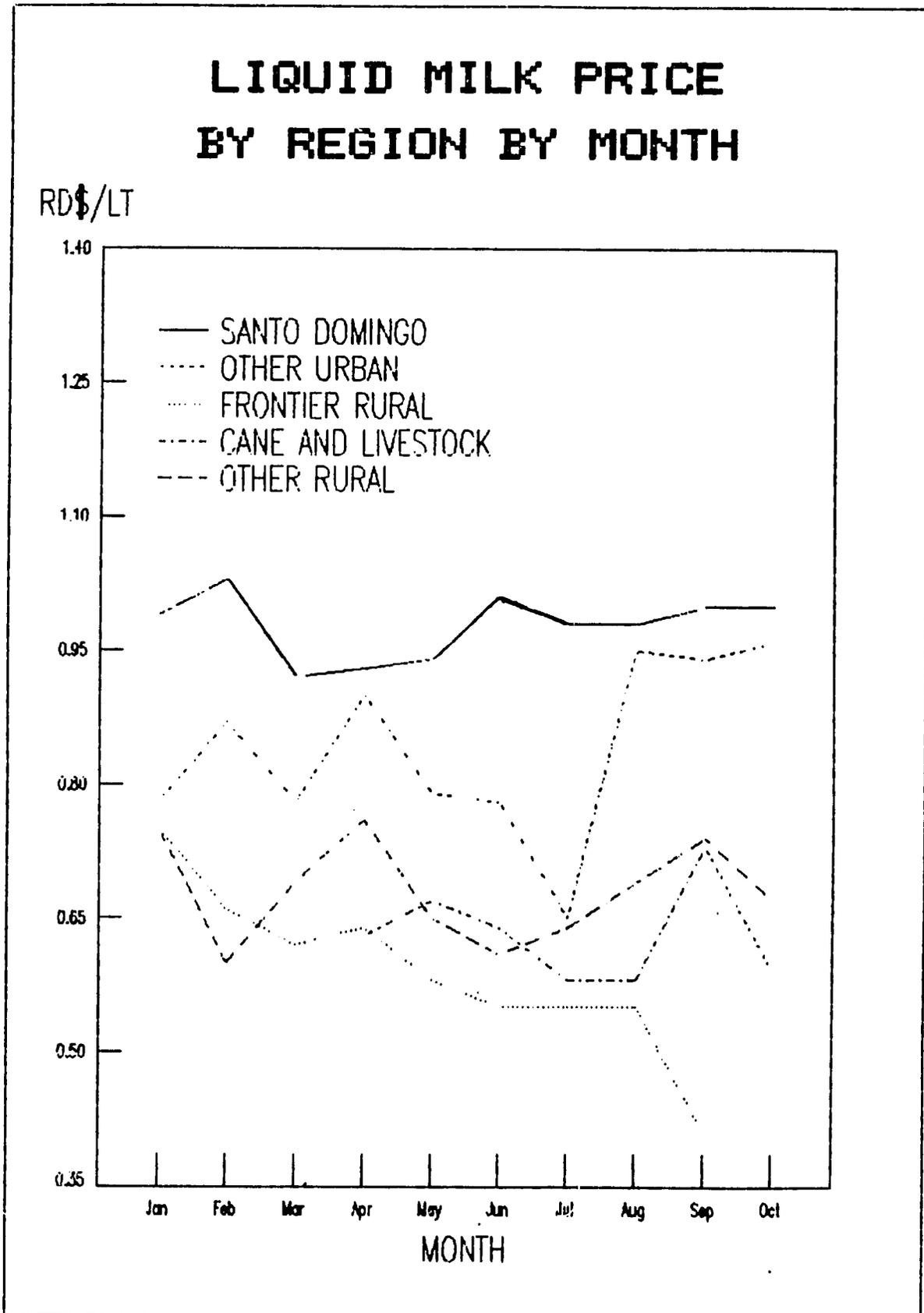
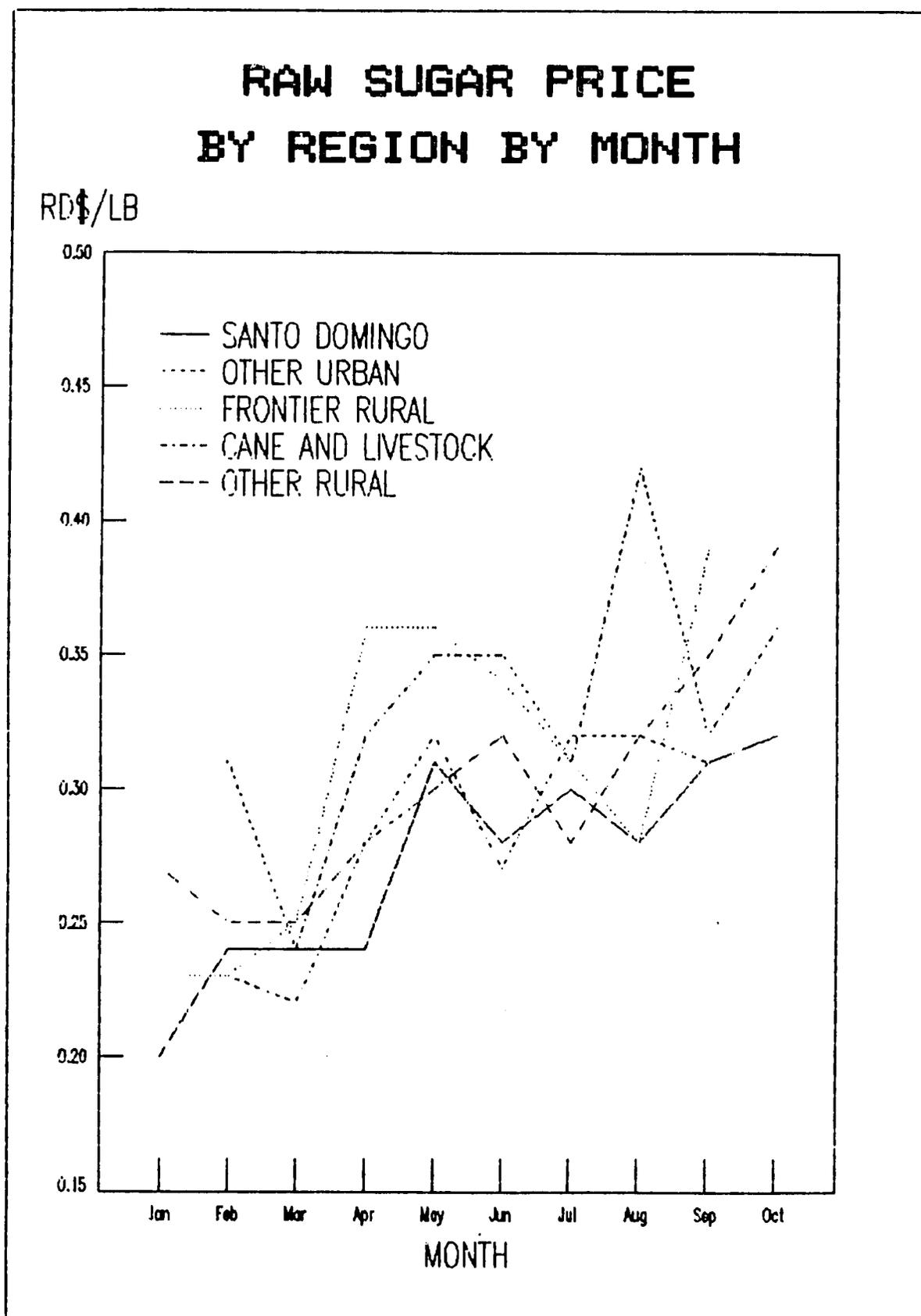


FIGURE 8.2j



slightly more expensive calorie source than rice. Plantain is only slightly more expensive than yuca. In the Frontier, however, yuca provides 38% more calories per peso than rice and more than twice as many calories per peso as plantain. These price differences account for the distinct consumption patterns in the Frontier. Regional differences in the cost of calories and protein in individual foods are shown in Tables 8.7 and 8.8.

Vegetable oil is a much more expensive calorie source than mature coconut, which can be used as a substitute for oil. However, use of mature coconut is significant only in the Frontier region.

8.5.2 Protein

The cheapest sources of protein in the Dominican Republic are wheat flour, pigeon peas (dried), pasta, fresh fish, mature coconut, red beans, and rice, in that order. Wheat is obtained from the United States at subsidized prices, which explain its low cost, but it is not a major contributor of protein in the Dominican diet, except as pasta.

Rice, the most important food in the Dominican diet at every income level in every region except the Frontier, is a relatively inexpensive source of both calories and protein. Only pasta and wheat flour are less expensive for both macronutrients, and these are not as central a part of the traditional local diet.

The least expensive animal protein source is fresh fish, which is not as important a contributor to the diet as milk (the most important animal protein source) or chicken. This is probably due to erratic availability as well as to tastes and preferences.

9. Summary and Conclusions

9.1 Nutritional Adequacy

The results of this study indicate that a significant problem of dietary adequacy exists in the Dominican Republic. On average, 17% of households are at risk of inadequate caloric intake (below 75% of recommended levels), and 24% are at risk for deficient protein.

TABLE 8.4

AVERAGE PURCHASE PRICE OF SELECTED FOODS
AT DIFFERENT RETAIL SOURCES

Food	Common Rice	Select Rice	Red Beans	Plantain	Yuca	Vegetable Oil
Source	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)
Total Population	.549 .097 (3597)	.663 .0920 (601)	1.671 .472 (2014)	.301 .126 (2315)	.318 .149 (1209)	2.512 .750 (5079)
Public Market	.562 .080 (58)	.683 .0763 (3)	1.404 .376 (208)	.292 .163 (328)	.274 .100 (163)	2.259 .416 (56)
Supermarket	.556 .105 (23)	.638 .1003 (27)	1.675 .505 (31)	.241 .122 (6)	N.A.	3.306 3.395 (41)
Warehouse	.507 .061 (29)	.585 .0703 (6)	1.599 .264 (25)	.360 .089 (3)	.250 .000 (1)	2.151 .433 (36)
Colmado	.550 .096 (3447)	.666 .0906 (561)	1.729 .461 (161)	.315 .119 (1038)	.335 .175 (556)	2.512 .688 (4913)
Street Stand	.527 .059 (6)	.600 .0000 (1)	1.407 .487 (58)	.300 .115 (659)	.319 .084 (381)	2.470 .538 (20)
Roving Sellers	.532 .062 (5)	.533 .1793 (3)	1.290 .585 (49)	.279 .116 (220)	.322 .111 (66)	3.107 1.024 (2)
Bakery	.500 .000 (2)	N.A.	1.420 .000 (1)	.170 .000 (1)	N.A.	N.A.
Butcher	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Private Producer	.519 .157 (3)	N.A.	1.038 .398 (4)	.181 .112 (41)	.232 .348 (29)	N.A.
Other Private Retail	.077 .340 (2)	N.A.	1.663 .365 (18)	.365 .121 (10)	.333 .216 (7)	2.387 .000 (1)
Venta Popular	.395 .025 (17)	N.A.	N.A.	N.A.	N.A.	N.A.
INESPRE Farmers Mkt.	.463 .000 (1)	N.A.	1.252 .270 (18)	.174 .086 (9)	.296 .040 (6)	1.547 .796 (2)
INESPRE Warehouse	.380 .000 (2)	N.A.	N.A.	.170 .000 (2)	N.A.	N.A.
Other State Retail	.492 .012 (5)	N.A.	N.A.	N.A.	N.A.	2.294 .320 (6)

TABLE 8.4 CONT.

AVERAGE PURCHASE PRICE OF SELECTED FOODS
AT DIFFERENT RETAIL SOURCES

Food	Chicken	Beef	Liquid Milk(a)	Powdered Milk	Pasta	Raw Sugar
Source	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LT SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)	RD\$/LB SD (N)
Total Population	1.980 .278 (1847)	2.599 .641 (1097)	.774 .220 (2766)	2.867 1.367 (128)	.611 .180 (1610)	.309 .170 (3835)
Public Market	1.909 .542 (116)	2.359 .654 (146)	.836 .137 (11)	3.401 1.372 (9)	.629 .094 (23)	.279 .065 (36)
Supermarket	1.655 .522 (5)	3.101 .629 (12)	.910 .259 (23)	3.603 1.269 (17)	.553 .036 (31)	.256 .136 (11)
Warehouse	1.691 .526 (2)	2.500 .000 (1)	.738 .050 (3)	3.146 1.123 (6)	.585 .058 (21)	.251 .059 (16)
Colmado	2.005 .221 (365)	2.432 .780 (62)	.949 .152 (865)	2.902 1.230 (81)	.612 .182 (1526)	.310 .172 (3749)
Street Stand	1.969 .276 (342)	2.881 .444 (6)	.647 .295 (3)	2.515 .162 (2)	.448 .495 (4)	.273 .047 (9)
Roving Sellers	1.871 .445 (31)	2.359 .443 (31)	.761 .152 (549)	2.500 .000 (1)	N.A.	.300 .000 (2)
Bakery	2.000 .000 (1)	2.990 .000 (1)	1.012 .056 (48)	N.A.	N.A.	.300 .000 (1)
Butcher	1.977 .224 (919)	2.665 .616 (816)	N.A.	N.A.	N.A.	N.A.
Private Producer	2.286 .636 (13)	2.254 .524 (21)	.676 .150 (1123)	N.A.	N.A.	N.A.
Other Private Retail	2.111 .241 (54)	1.500 1.410 (2)	.632 .251 (55)	.546 1.370 (6)	.715 .090 (1)	.500 .000 (1)
Venta Popular	N.A.	N.A.	N.A.	2.240 .043 (2)	.600 .000 (0)	.168 .004 (2)
INESPRE Farmers Mkt.	2.290 .000 (0)	1.700 .000 (0)	N.A.	2.250 .000 (2)	.450 .000 (2)	.228 .000 (1)
INESPRE Warehouse	N.A.	N.A.	.720 .000 (1)	N.A.	N.A.	N.A.
Other State Retail	N.A.	N.A.	.093 .145 (54)	.041 .132 (2)	.825 .163 (1)	.273 .140 (6)

(a) All prices are RD\$/LB except for Liquid Milk, which is RD\$/LITRE.

TABLE 8.5

CALORIES PER PESO VALUE OF SELECTED FOODS

	CALS/PESO	SD	N
1. Raw Sugar	6042.56	1289.98	1017
2. Mature Coconut	5194.92	1488.33	272
3. Corn Flour	4217.00	1965.89	197
4. Green Banana	4024.69	2958.18	352
5. Pasta	3923.70	625.55	1013
6. Semi-Refined Sugar	3790.73	1342.61	248
7. Wheat Flour	3637.69	1483.54	216
8. Common Rice	3070.46	454.25	1144
9. Refined Sugar	2684.12	924.18	257
10. Sweet Potato	2595.01	1814.72	281
11. Select Rice	2506.21	306.50	286
12. Yuca	1763.28	1013.47	887
13. Dried Pigeon Pea	1707.64	462.84	107
14. Vegetable Oil	1663.93	310.70	1306
15. Plantain	1628.13	803.81	1091
16. Bread	1483.91	13.06	1034
17. Margarine	1423.66	421.13	301
18. Yautia	1416.71	931.32	244
19. Black Beans	1304.19	320.83	103
20. Name	1260.19	1834.06	99
21. White Beans	1138.13	205.26	112
22. Butter	1029.62	2166.87	272
23. Red Beans	971.68	245.12	1185
24. Pinto Beans	910.81	289.52	99
25. Powdered Milk	900.00	1030.64	292
26. Fresh Milk	896.70	302.92	850
27. Potato	632.42	186.38	606
28. Canned Sardines	538.99	561.25	298
29. Fresh Pigeon Pea	484.64	220.25	370
30. Salami	464.14	186.45	631
31. Chicken	394.69	122.88	985
32. Cheese	381.84	187.73	414
33. Fresh Fish	329.77	186.41	157
34. Eggs	321.41	35.91	993
35. Squash	299.93	772.16	487
36. Evaporated Milk	297.62	277.60	214
37. Beef	294.70	119.82	758
38. Dried Fish	251.86	73.98	563
39. Pork	240.92	149.58	298
40. Goat	146.49	75.60	66

TABLE 8.6

GRAMS PROTEIN PER PESO VALUE OF SELECTED FOODS

	GMS. PROT/PESO	SD	N
1. Wheat Flour	107.38	43.79	216
2. Dried Pigeon Pea	97.26	26.36	107
3. Pasta	92.08	14.68	1013
4. Corn Flour	92.02	42.90	197
5. Black Beans	90.47	22.25	103
6. White Beans	78.95	14.24	112
7. Fresh Fish	67.72	37.97	157
8. Mature Coconut	67.71	19.39	272
9. Red Beans	67.41	17.00	1185
10. Pinto Beans	63.18	20.08	99
11. Common Rice	56.64	8.38	1144
12. Green Banana	51.21	37.62	352
13. Canned Sardines	51.16	53.27	298
14. Dried Fish	47.96	20.03	563
15. Bread	47.31	7.95	1034
16. Powdered Milk	46.74	53.53	292
17. Liquid Milk	46.45	15.69	850
18. Select Rice	46.23	5.65	286
19. Cheese	29.98	12.92	414
20. Name	29.40	42.79	99
21. Chicken	29.04	9.04	985
22. Green Pigeon Pea	28.74	13.06	370
23. Salami	28.12	11.29	631
24. Sweet Potato	27.73	20.07	281
25. Eggs	25.44	2.84	993
26. Yautia	20.38	16.14	244
27. Beef	19.68	7.99	758
28. Evaporated Milk	19.02	17.74	214
29. Goat	16.60	8.56	66
30. Potato	15.14	4.45	606
31. Plantain	14.89	8.17	1091
32. Pork	14.57	9.05	298
33. Yuca	14.51	8.36	887
34. Squash	14.49	37.58	487

TABLE 8.7

CALORIES FOR A PESO OF VALUE OF SELECTED FOODS
BY REGION

	SANTO DOMINGO			OTHER URBAN AREAS			FRONTIER RURAL			SUGAR CANE AND LIVESTOCK REGION			OTHER RURAL AREA			SIG.
	CALS/RD\$	SD	#	CALS/RD\$	SD	#	CALS/RD\$	SD	#	CALS/RD\$	SD	#	CALS/RD\$	SD	#	
COMMON RICE	3184.34	493.58	238	3194.14	383.19	285	3009.22	435.91	197	2827.72	401.32	213	3073.63	451.65	223	.0000
SELECT RICE	2588.94	220.91	119	2447.89	247.49	113	2746.92	.00	11	2400.03	298.37	8	2437.67	543.98	27	.0000
RED BEANS	886.99	178.87	272	1056.49	262.09	331	1325.07	389.26	175	871.41	216.36	196	988.95	204.71	212	.0000
WHITE BEANS	1085.70	139.48	31	1223.68	264.45	38	1321.37	60.81	18	1147.66	271.72	5	1069.20	125.14	22	.0001
BLACK BEANS	1133.07	213.84	22	1477.27	178.36	19	1328.18	424.49	10	1545.60	380.02	26	1084.80	73.74	20	.0000
PINTO BEANS	887.46	129.80	23	1140.53	503.04	19	NOT AVAILABLE			769.93	180.93	22	900.41	179.24	21	.0007
GREEN PIGEON PEA	334.59	106.23	98	547.04	288.81	121	535.77	.00	59	837.14	.00	20	472.90	101.18	76	.0900
DRIED PIGEON PEA	1354.60	242.80	19	1848.93	607.88	26	2183.47	213.11	37	1633.08	345.44	27	1790.46	405.22	16	.0000
PLANTAIN	1631.09	827.22	296	1526.43	728.75	309	1828.72	671.72	125	1710.85	829.07	172	1665.48	1161.18	173	.0112
YUCA	1268.82	344.16	231	1733.48	887.74	250	4149.26	3620.48	119	2064.21	980.33	138	1860.38	437.55	147	.0000
SQUASH	190.06	113.65	146	229.85	114.90	159	321.38	306.02	43	406.35	298.85	52	485.32	1565.62	74	.0089
GREEN BANANA	2342.59	1008.46	97	3202.09	2505.11	93	4504.38	2481.45	98	3402.87	682.97	21	6104.25	3461.07	78	.0000
SWEET POTATO	2232.45	644.69	46	2964.12	2759.99	82	6743.86	4120.20	22	1826.58	423.44	31	2560.82	943.93	74	.0000
POTATO	706.44	227.62	206	616.99	118.65	174	415.02	281.44	17	594.57	126.80	67	569.74	176.00	95	.0000
YAUTIA	1366.53	772.69	96	1357.70	767.23	65	1171.01	526.64	10	1704.83	1804.43	20	1462.16	872.85	38	.5106
WAVE	1114.17	561.59	19	731.04	120.74	38	878.15	1.02	13	896.75	170.31	10	2284.02	3287.55	18	.0062
CHICKEN	411.34	106.00	272	416.14	113.02	287	301.68	150.32	94	393.11	128.95	138	359.02	134.45	163	.0000
BEEF	300.30	96.48	199	277.85	108.16	223	420.58	159.72	64	260.15	122.11	124	327.78	137.49	119	.0000
PORK	273.28	194.97	75	236.61	152.17	105	211.28	104.53	7	207.88	102.76	40	234.50	106.33	46	.2256
GOAT	170.12	55.05	14	137.86	82.27	32	154.74	82.45	30	87.08	10.51	4	164.81	82.06	6	.3254
FRESH FISH	210.33	145.27	26	354.85	232.39	55	605.00	229.60	19	256.86	89.37	23	387.85	116.65	30	.0000
DRIED FISH	251.63	41.19	135	253.27	52.29	169	214.97	21.04	42	246.83	99.45	99	256.61	96.64	90	.0158
SARDINES	502.53	94.85	76	575.06	659.93	69	473.04	37.52	67	473.24	75.23	49	595.98	868.04	55	.4810
SALAMI	444.50	157.90	165	487.15	200.95	177	513.54	163.28	86	498.63	228.03	110	423.54	148.82	96	.0012
LIQUID MILK	651.37	73.91	171	854.09	420.21	250	1101.63	303.17	94	1072.04	178.53	162	972.42	175.04	148	.0000
POWDERED MILK	808.34	180.66	130	826.76	401.73	89	1187.22	2689.32	54	602.23	185.38	17	1400.82	2223.16	28	.0795
EVAPORATED MILK	286.82	143.90	88	335.29	424.13	80	232.53	35.66	10	261.97	41.90	15	245.71	42.03	17	.5681
CHEESE	305.80	100.03	155	368.53	137.12	128	362.91	119.30	17	484.67	105.86	40	492.96	311.02	53	.0000
BUTTER	733.79	451.97	79	1144.05	3154.54	119	NOT AVAILABLE			952.13	317.80	28	1328.44	1235.68	27	.5290
EGGS	347.87	30.07	265	317.73	38.62	275	298.32	22.98	100	320.60	33.66	138	301.45	21.98	180	.0000
VEGETABLE OIL	1743.71	316.32	312	1654.28	295.14	356	1625.80	244.26	197	1501.76	334.17	219	1721.58	262.91	229	.0000
MATURE COCONUT	4724.15	1430.36	34	5316.61	1491.45	80	5615.13	2530.06	80	5708.18	1562.16	50	4853.31	1023.30	56	.0164
MARGARINE	1645.50	424.32	133	1247.92	257.85	74	NOT AVAILABLE			966.26	422.56	20	1334.59	304.90	46	.0000
BREAD ROLLS	1512.74	231.82	291	1471.31	267.24	315	1434.80	285.03	82	1565.61	81.78	134	1421.32	302.05	169	.0000
PASTA	4191.59	367.01	258	3858.88	551.11	264	3385.33	508.47	158	3713.44	902.48	169	3938.74	553.24	175	.0000
WHEAT FLOUR	4064.27	883.57	41	3519.84	936.30	57	3653.43	2217.79	41	3555.48	816.82	66	3500.28	2977.47	23	.4165
CORN FLOUR	3817.12	268.52	38	3652.02	467.72	40	4877.29	4795.26	22	3861.03	325.57	54	5287.70	3287.70	35	.0039
REFINED SUGAR	2653.15	279.92	98	2487.15	178.41	119	NOT AVAILABLE			5391.92	3076.58	11	2407.30	234.14	17	.0000
SEMI-REFINED SUGAR	3483.24	315.30	105	4366.93	2036.39	83	NOT AVAILABLE			3154.93	894.19	21	3777.97	904.57	23	.0000
RAW SUGAR	6324.14	1189.16	183	6670.10	1514.40	234	5869.58	1396.00	188	5441.82	957.87	206	5881.52	1121.73	216	.0000

TABLE 8.8

GRAMS PROTEIN FOR A PESO OF VALUE OF SELECTED FOODS
BY REGION

	SANTO DOMINGO			OTHER URBAN AREAS			FRONTIER RURAL			SUGAR CANE AND LIVESTOCK REGION			OTHER RURAL AREAS			SIG.
	GMS/RD\$	SD	#	GMS/RD\$	SD	#	GMS/RD\$	SD	#	GMS/RD\$	SD	#	GMS/RD\$	SD	#	
COMMON RICE	58.74	9.10	238	58.73	7.06	285	55.51	8.04	197	52.16	7.40	213	56.69	8.33	223	.0000
SELECT RICE	47.75	4.07	119	45.15	4.56	113	50.67	.00	11	44.27	5.50	8	44.96	10.03	27	.0000
RED BEANS	61.53	12.40	272	73.29	18.18	331	91.92	27.00	175	60.45	15.01	196	68.60	14.20	212	.0000
WHITE BEANS	75.32	9.67	31	84.89	18.34	38	91.67	4.21	18	79.61	18.85	5	74.17	8.68	22	.0001
BLACK BEANS	78.60	14.83	22	102.48	12.37	19	92.14	29.44	10	107.22	26.36	26	75.25	5.11	20	.0000
PINTO BEANS	61.56	9.00	23	79.12	34.89	19	NOT AVAILABLE			53.41	12.55	22	62.46	12.43	21	.0007
GREEN PIGEON PEA	19.84	6.30	98	32.44	17.12	121	31.77	.00	59	49.65	.00	20	28.04	6.00	76	.0000
DRIED PIGEON PEA	77.15	13.83	19	105.31	34.62	26	124.56	12.13	37	93.01	19.67	27	101.98	23.08	16	.0000
PLANTAIN	14.92	7.65	296	13.94	6.67	309	16.58	6.08	125	15.76	7.62	172	15.18	10.50	173	.0099
YUCA	10.43	2.86	231	14.26	7.34	250	34.23	29.77	119	16.98	8.07	138	15.31	3.61	147	.0000
SQUASH	9.05	5.43	146	11.10	5.59	159	15.53	14.90	43	19.79	14.60	52	23.55	76.18	74	.0081
GREEN BANANA	29.80	12.82	97	40.79	31.87	93	57.38	31.58	98	43.33	8.70	21	77.62	44.02	78	.0000
SWEET POTATO	23.57	6.69	46	31.76	30.69	82	74.79	45.94	22	19.52	4.56	31	27.32	10.01	74	.0000
POTATO	16.92	5.43	206	14.76	2.83	174	9.93	6.74	17	14.24	3.03	67	13.65	4.22	95	.0000
YAUTIA	18.81	12.75	96	19.40	13.42	65	19.12	8.11	10	24.30	32.29	20	22.63	15.05	38	.5264
MAIZE	25.99	13.10	19	17.05	2.81	38	20.48	.01	13	20.91	3.97	10	53.29	76.71	18	.0062
CHICKEN	30.26	7.80	272	30.61	8.31	287	22.19	11.06	94	28.92	9.48	138	26.42	9.89	163	.0000
BEEF	20.05	6.44	199	18.55	7.21	223	28.08	10.65	64	17.37	8.14	124	21.88	9.17	119	.0000
GOAT	19.28	6.23	14	15.52	9.32	32	17.53	9.34	30	9.86	1.19	4	18.67	9.30	6	.3254
PORK	16.53	11.80	75	14.31	9.21	105	12.78	6.33	7	12.57	6.22	40	14.18	6.44	46	.2249
FRESH FISH	43.57	29.79	26	72.75	47.40	55	123.65	46.97	19	53.14	18.23	23	79.39	23.78	30	.0000
DRIED FISH	49.95	11.71	135	51.27	15.83	169	49.66	4.86	42	41.90	24.77	99	46.74	25.70	90	.0013
SARDINES	47.70	9.00	76	54.58	62.64	69	44.90	3.56	67	44.92	7.14	49	56.57	82.39	55	.4810
SALAMI	26.93	9.56	165	29.52	12.17	177	31.12	9.89	86	30.21	13.81	110	25.66	9.01	96	.0012
LIQUID MILK	33.74	3.82	171	44.24	21.76	250	57.07	15.70	94	55.53	9.24	162	50.37	9.06	148	.0000
POWDERED MILK	41.98	9.38	130	42.94	20.86	89	61.66	139.68	54	31.28	9.62	17	72.75	115.47	28	.0795
EVAPORATED MILK	18.33	9.19	88	21.42	27.10	80	14.86	2.27	10	16.74	2.67	15	15.70	2.68	17	.5681
CHEESE	24.78	4.83	155	29.35	8.30	128	32.26	7.87	17	37.43	6.64	40	36.78	23.52	53	.0000
EGGS	27.53	2.38	265	25.15	3.05	275	23.61	1.81	100	25.38	2.66	138	23.86	1.74	180	.0000
BREAD ROLLS	47.63	7.12	291	46.95	8.42	315	46.20	9.14	82	50.15	2.41	134	45.77	9.70	169	.0000
PASTA	98.36	8.61	258	90.55	12.93	264	79.44	11.93	158	87.14	21.17	169	92.43	12.98	175	.0000
WHEAT FLOUR	119.97	26.08	41	103.90	27.63	57	107.84	65.46	41	104.95	24.11	66	103.32	87.89	23	.4165
CORN FLOUR	83.29	5.85	38	79.69	10.20	40	106.43	104.64	22	84.25	7.10	54	115.38	71.74	35	.0039
NATURE COCONUT	61.57	18.64	34	69.29	19.43	80	73.18	32.97	80	74.40	20.36	50	63.25	13.33	56	.0164

The major determinant of dietary inadequacy is household income (as measured by household total expenditures, including the value of food consumed from unpaid sources). In the lowest expenditure quartile, 37% of households are at risk of deficient caloric intake, and in the lowest decile, 60% are at risk, compared with only 8.4% in the highest quartile.

Regional variation in the risk of caloric and protein deficiency is primarily due to regional variation in income level. The Frontier region has the highest proportion of households in the high-risk category for both calories and protein; it also has the lowest average expenditure level and the highest proportion of households in the lowest expenditure classes.

Urban areas had a slightly higher proportion of households at risk of deficient caloric intake than rural households, in spite of the slightly higher average income levels in the cities; but rural areas had a slightly higher proportion of protein deficient households.

These differences reflect minor regional differences in consumption patterns: in urban areas, households consume somewhat more of the more protein-dense animal foods (milk, eggs, chicken), which provide more protein, but fewer calories per peso of expenditure. The Frontier region consumes less of these foods, and more of the starchy roots and plantains than the other regions.

9.2. Income Constraint on Diet

The fact that low income is a major determinant of dietary inadequacy is indicated first by the fact that caloric and protein adequacy rise sharply with rising expenditure level. A second indicator is the fact that the proportion of total household expenditure devoted to food actually rises from the bottom decile to the bottom quartile of expenditure, and this proportion does not begin to decline until the third quartile of expenditure. This suggests that, up to the median level of expenditure, households have not reached the level of affluence at which their food preferences are satisfied, and they devote a larger proportion of any increased income to non-food goods. Below-the-median households do tend to increase the quantity, the diversity, and the quality of their diets by

purchasing more expensive foods such as milk, oil, and chicken in addition to larger amounts of rice, beans, yuca, and plantain.

9.3 Home Consumption of Home Produced Food

Households with access to home produced food achieve higher levels of caloric and protein consumption than do comparable households without home consumption. At similar expenditure level, fewer households with access to home produced food are at risk of dietary inadequacy.

However, access to home production is by no means a guarantee of nutritional adequacy. The Frontier, with the highest proportion of households consuming home production, also has the highest proportion of households at risk, because of their low income.

Access to home production is largely confined to rural areas; within each region, access to home produced food is not related to expenditure level, but is evenly distributed among expenditure classes.

9.4 Consumption Patterns

Rice is the dominant food in the Dominican diet at all income levels and in almost every region, contributing 31% of calories and 25% of protein consumed on average in the country. Only in the Frontier is the caloric contribution of rice exceeded by that of starchy tubers and plantain and green banana; rice is the second most important food.

The composition of the diet is remarkably uniform throughout the country. The same foods appear as the top ten contributors to calorie and protein intake at all income levels and in all regions.

The relative importance of these foods varies because at higher income, more expensive foods become a more important part of the diet. Most regional differences in consumption patterns are explained by the variation in income level.

The Frontier is the only region with a somewhat distinct pattern, in

particular a greater dependence on yuca, plantain, and green banana as staple foods; greater use of pigeon peas; lower use of animal foods. These differences are due not only to lower income but also to the greater dependence on home-produced foods and the much lower than average prices of the starchy tubers and fruits.

The relative contribution of rice is greatest in lower-income households. In the lowest expenditure quartile, rice contributes 37% of calories (32% of protein) compared with 25% of calories (19% of protein) in the highest quartile.

This diminishing proportion does not represent a diminishing quantity of rice consumed per capita. At higher income levels, households consume more rice per capita, but their consumption of other foods rises more. The foods which show the most marked increase in consumption with rising income are animal protein sources, especially chicken and beef, and milk; plantain, and vegetable oil are also consumed in greater amounts, and increase their relative contribution to the diet, at higher incomes.

There are very few foods in the Dominican diet which can be characterized as inferior, that is whose consumption declines as income rises. The most important of these is corriente or common rice. Common rice shows a declining expenditure elasticity of demand as income rises; its consumption declines, and that of select rice increases, as income rises. This suggests that Dominican consumers are sensitive to quality differences in rice, and that quality can be used as a mechanism to target a variety of rice to the low income population. Brown sugar is the other food whose consumption declines as income rises.

Yuca and plantain are distinctly not inferior foods; they show a rising expenditure elasticity of demand as income rises. Red beans are consumed at approximately the same level in all expenditure classes.

Milk is the most important animal protein source in the lowest expenditure classes. Milk is not at all an inferior food: consumption is very responsive both to income and to price. Milk is also the only major food whose consumption per capita increases significantly when there are more children in the household.

9.5 Price Effects on Food Consumption

There are a few foods whose prices affect the overall caloric and protein adequacy of the household. The prices of both yuca and oil are directly related to caloric and protein consumption per adult equivalent. When the prices of these foods fall, the overall level of the diet (and not only consumption of these foods) increases significantly.

Notably, the price of chicken has the opposite effect: when the price of chicken falls, consumption of chicken rises, but the level of both calorie and protein consumption falls. This effect is highly significant in the lowest expenditure quartile, where protein and calorie consumption are most likely to be deficient. Apparently, when the price of chicken is low, consumers substitute chicken for some of the rice, beans, plantain, and sugar they would otherwise be eating. The increase in perceived quality from eating some chicken comes at the cost of a net reduction in the calories and protein consumed.

The study did not observe a significant effect of the price of rice on total calorie or protein consumption, possibly because there was insufficient observed variation in the price of common rice due to price controls, as well as because consumers may adjust their consumption to compensate for price changes in rice by substituting other foods such as pasta. As rice is the preferred dietary staple, this adjustment, which protects dietary adequacy, may result in a lower perceived quality of the food consumed. The price elasticity of demand for common rice was calculated to be $-.419$. Consumption of all rice showed an elasticity with respect to common rice price of $-.335$.

9.6 Purchasing Patterns

About half of all food expenditure in the Dominican Republic takes place at colmados, small, local neighborhood stores which sell food in very small quantities at a time, and where credit is often extended to purchasers. More than 80% of all transactions (food purchases) take place at the colmado. The typical purchasing pattern of Dominicans is to buy small amounts of food, often several times a day. This pattern depends on the availability of the colmado close by.

This pattern has significant implications for the design of any food distribution program. The centralized distribution of food in relatively large quantities at infrequent intervals does not conform very well to Dominican purchasing patterns. The benefits of such a centralized distribution program would have to be quite substantial for people to invest their time. Furthermore, many consumers may not have the cash to buy large quantities at one time.

Virtually every neighborhood is served by at least one colmado. Prices at the colmado for basic items such as rice, yuca, plantain, sugar, and vegetable oil are the same as or only very slightly higher or lower than prices at the public market.

9.7 Use of Public Food Distribution Systems

Publicly distributed free and subsidized food accounts for less than 1% of calorie and protein consumption on average.* The importance of these sources exceeds 1% only in the Frontier (the poorest region of the country) and in the capital, where they account for 1.5% and 4.4% of calories, respectively.

Free distribution of food shows significant degree of targeting toward the low-income population in the Frontier and the capital. The subsidized program (the Ventas Populares) was used to about the same degree by all expenditure classes.

9.8 Income Sources

Virtually all households rely on a variety of sources for their incomes. One of the striking results of the study is the small number of households which depend exclusively on farming for their livelihood. Only 6.4% of households receive more than 90% of their income (including the value of home-consumed food) from farming. The highest proportion is in the Frontier, where 25.6% of households fall in this category. On average, households whose heads are farmers derive fully 40% of their income

*These results apply to the period of the survey, Jan. - Nov. '986.

(calculated to include home-consumption of food) from non-farm sources including wages, transfers, and income from a family business.

Households headed by agricultural laborers have the lowest average income level of all occupational categories. Households headed by formal-sector employees receiving regular salaries or wages have above-average incomes; farm households (those headed by farmers) have incomes close to the average for the Dominican Republic.

9.9 Policy Implications

The study suggests that there is a need for policies to protect the food consumption level of the poor. The current policy focus on rice, particularly on common rice, seems to be justified both by the dominance of rice in the diet and by the fact that common rice (not all rice) acts as an inferior food. The price of oil has been subject to government manipulation in the past. The price of oil is directly related to dietary adequacy; a policy which raises its price might have a negative effect on the calorie and protein consumption of the poor. In contrast, the price of chicken is inversely related to caloric and protein adequacy among the poor. Policies which reduce the price of chicken might have adverse effects on the dietary adequacy of low-income groups.

The purchasing pattern of Dominican consumers is oriented toward frequent, (more than daily) small purchases at convenient local stores. These stores, the colmados, charge prices which are not notably higher than the prices at public markets and other retail outlets. It might be useful to explore the possibility of using the very widespread network of these private-sector outlets in implementing any public food distribution policy.

The variety of income sources in individual Dominican households is striking. In particular, few households depend entirely on farming for their livelihood. This suggests that there is a wide range of income-related policies which would affect the incomes of farm households; farm-price related strategies are not the only ones which would reach them.

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Determinants of Food Consumption
in the Dominican Republic

Volume II: Appendices

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APPENDIX 2.A

BREAKDOWN OF SURVEY SAMPLE BY REGION

SANTO DOMINGO

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Tropical	1	01	14	01	5	1.006	181.683	9/02
	1	01	14	02	8	1.006	181.683	8/18
	1	01	14	03	8	1.006	181.683	8/25
Mejoramiento Social	1	01	44	01	8	1.006	3457.402	10/21
	1	01	44	04	8	1.006	3457.402	10/13
	1	04	44	08	1	1.006	3457.402	10/29
Domingo Savio	1	01	48	02	8	1.006	491.781	6/26
	1	04	48	11	8	1.006	491.781	6/16
	1	01	48	18	8	1.006	491.781	7/05
La Zurza	1	01	54	01	8	1.006	385.371	5/06
	1	04	54	09	8	1.006	385.371	4/19
	1	01	54	17	8	1.006	385.371	4/28
Capotillo	1	01	55	10	8	1.006	571.814	2/06
	1	01	55	15	8	1.006	571.814	1/19
	1	01	55	20	8	1.006	571.814	1/28
Cristo Rey	1	01	58	02	8	1.006	405.955	10/30
	1	01	58	26	8	1.006	405.955	10/22
	1	01	58	28	7	1.006	405.955	10/13
	1	01	59	01	7	1.006	405.955	8/24
	1	01	59	03	7	1.006	405.955	9/04
	1	01	59	13	6	1.006	405.955	8/18
Enriquillo	1	01	65	01	8	1.006	1053.847	2/16
	1	01	65	03	8	1.006	1053.847	2/25
	1	01	65	06	8	1.006	1053.847	3/06
Buenos Aires de Herrera	1	01	66	02	8	1.006	216.214	7/31
	1	01	66	04	8	1.006	216.214	7/14
	1	01	66	07	8	1.006	216.214	7/23
Herrera	1	01	68	01	8	1.006	292.085	5/19
	1	01	68	09	8	1.006	292.085	5/28
	1	01	68	10	8	1.006	292.085	6/07

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on
the household level
(8) Date of the first interview

APPENDIX 2.A CONT.

SANTO DOMINGO CONT.

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Villa Duarte	1	01	75	03	8	1.006	474.238	9/23
	1	01	75	07	8	1.006	474.238	10/01
	1	01	75	10	8	1.006	474.238	9/15
Alma Rosa	1	01	82	01	8	1.006	2072.691	3/31
	1	01	82	02	8	1.006	2072.691	4/09
	1	01	82	05	8	1.006	2072.691	3/16
Los Minas Morte	1	01	86	11	8	1.006	776.888	9/04
	1	01	86	24	8	1.006	776.888	8/27
	1	01	86	26	8	1.006	776.888	8/18
Jardines del Ozama	1	01	87	06	8	1.006	195.278	9/29
	1	01	87	10	8	1.006	195.278	9/15
	1	01	87	12	8	1.006	195.278	9/22

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on the household level
(8) Date of the first interview

APPENDIX 2.A CONT.

OTHER URBAN AREAS

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Nevba								
Barrio Santa Cruz	2	03	01	02	8	1.005	582.315	7/21
	2	03	01	07	8	1.005	582.315	7/28
	2	03	01	11	8	1.005	582.315	7/14
Barahona	2	04	01	15	8	1.005	796.563	7/01
	2	04	01	24	8	1.005	796.563	6/24
	2	04	01	32	8	1.005	796.563	6/17
San Francisco de Macoris								
San Martin de Porres	2	06	01	15	7	1.005	1186.797	2/25
La Ceniza	2	06	01	19	8	1.005	1186.797	2/16
Ens. Mirabal	2	06	01	23	8	1.005	1186.797	3/07
Jimani								
El Cerro	2	10	01	01	8	1.005	154.142	1/28
El Cerro	2	10	01	02	8	1.005	154.142	1/19
Jimani Viejo	2	10	01	04	8	1.005	154.142	
La Romana								
Katanga	2	12	01	07	8	1.005	1383.055	5/27
Villa Verde	2	12	01	13	7	1.005	1383.055	6/04
Ens. Villa Rol	2	12	01	16	7	1.005	1383.055	5/19
Bonao	2	15	01	08	8	1.005	730.102	9/01
	2	15	01	12	8	1.005	730.102	8/18
	2	15	01	16	8	1.005	730.102	8/25
Villa Vasquez	2	16	06	04	8	1.005	184.896	3/07
	2	16	06	09	8	1.005	184.896	2/25
	2	16	06	12	8	1.005	184.896	2/16
Bayaguana	2	18	03	03	8	1.005	115.186	3/16
	2	18	03	05	8	1.005	115.186	4/09
	2	18	03	08	8	1.005	115.186	3/31
Puerto Plata								
Barrio D, Central	2	20	01	01	8	1.005	703.397	8/25
	2	20	01	07	8	1.005	703.397	8/18
	2	20	04	17	8	1.005	703.397	9/01

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on the household level
(8) Date of the first interview

APPENDIX 2.A CONT.

OTHER URBAN AREAS CONT.

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
San Cristobal								
Barrio B	2	23	01	03	8	1.005	756.825	4/19
Barrio Lava Pie 2do.	2	23	01	16	8	1.005	756.825	4/28
Barrio A	2	23	01	29	8	1.005	756.825	5/07
San Juan	2	24	01	01	8	1.005	823.428	2/06
	2	24	01	17	8	1.005	823.428	1/19
	2	24	01	23	8	1.005	823.428	1/28
San Pedro de Macoris								
Toconal	2	25	01	02	8	1.005	1100.069	1/19
Urb. Villa Progreso	2	25	01	11	8	1.005	1100.069	2/06
La Primavera	2	25	01	13	6	1.005	1100.069	1/29
Fantino	2	26	03	02	8	1.005	93.326	6/06
	2	26	03	03	8	1.005	93.326	5/19
	2	26	03	04	8	1.005	93.326	5/27
Santiago								
Barrio El Despertar	2	27	01	02	8	1.005	1480.221	10/29
Barrio El Despertar	2	27	01	03	6	1.005	1480.221	10/13
Villa Olga	2	27	01	06	8	1.005	1480.221	10/28
El Hoyo de la Viuda	2	27	02	04	8	1.005	1480.221	6/16
Barrio El Ejido	2	27	02	18	8	1.005	1480.221	7/02
Barrio El Ejido	2	27	02	22	8	1.005	1480.221	6/25
Altos del INVI	2	27	03	01	7	1.005	1480.221	3/16
Barrio Las Colinas	2	27	03	08	8	1.005	1480.221	4/09
Barrio Las Colinas	2	27	03	09	8	1.005	1480.221	4/01

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on the household level
(8) Date of the first interview

APPENDIX 2.A CONT.

FRONTIER RURAL

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Neyba (Estero)	3	03	01	02	24	.189	230.733	2/16,2/25,3/06
Neyba (Batey 2)	3	03	01	03	24	.189	230.733	9/15,9/22
Partido Arriba	3	05	03	02	24	.189	90.267	1/19,1/28,2/06
Restauración (Los Cerezos)	3	05	04	04	24	.189	175.104	5/19,5/27,6/04
Pedro Santana (Las Palmas)	3	07	05	01	24	.189	201.231	5/19,5/27,6/02
Jimani (El Limón)	3	10	01	03	24	.189	113.458	6/16,6/23,6/30
La Descubierta (Guayabal)	3	10	03	02	24	.189	94.671	4/19,4/28,5/04
Pedernales (Las Mercedes)	3	17	01	01	21	.189	62.233	3/16,3/31,4/09
Pedernales (Mencia)	3	17	01	02	24	.189	62.233	8/18,8/25

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on the household level
(8) Date of the first interview

APPENDIX 2.A CONT.

SUGAR CANE AND LIVESTOCK RURAL

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Boca Chica (La Vigia)	4	01	01	01	24	1.134	2775.268	10/13,10/20
Margarin (Peña Blanca Afuera)	4	08	01	04	23	1.134	697.397	2/16,2/25,3/06
Higüey (La Piñita)	4	11	01	04	22	1.134	314.774	4/19,4/28,5/05
Higüey (El Salado)	4	11	04	04	24	1.134	314.774	7/14,7/23,8/01
Bayaguana (Comatillo)	4	18	02	03	24	1.134	283.338	6/16,6/25
Yamasá	4	18	05	06	20	1.134	593.993	9/15,9/23,9/30
Los Hidalgos (La Boca de Unijica)	4	20	05	03	24	1.134	139.623	4/19,4/28,5/07
Scsua (Sabaneta de Yásica)	4	20	07	03	24	1.134	134.536	7/14,7/23,7/31
Yaguatero (Los Sanchez)	4	23	04	03	24	1.134	213.665	7/15,7/21,7/28
Los Llanos (Batey San Jose)	4	25	02	01	22	1.134	396.087	10/12,10/19,10/23

- (1) Stratum (2) Province (3) Sector (4) Cluster
 (5) Number of completed interviews
 (6) Weight in the total sample
 (7) Expansion factors, used for estimating total population quantities on the household level
 (8) Date of the first interview

APPENDIX 2.A CONT.

OTHER RURAL AREAS

WORK SITE	CODE				(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)				
Barahona (La Ciénaga)	5	04	01	05	02	1.523	803.497	3/16,4/01,4/09
Villa Rivas (Chiringo)	5	06	06	02	24	1.523	970.623	9/22,10/01
Cayetano Germasén (La Guama)	5	09	02	01	23	1.523	130.103	7/15,7/22
Jarabacoa (Bella Vista)	5	13	03	01	24	1.523	952.112	1/19,1/28,2/07
Cabrera (La Entrada)	5	14	02	03	24	1.523	834.582	6/16,6/25,7/04
Jima Abajo	5	15	04	01	24	1.523	453.004	4/19,4/28,5/07
Castañuelas	5	16	02	02	24	1.523	224.057	5/20,5/28,6/04
Bani (Villa Guera)	5	19	01	16	24	1.523	1896.540	2/16,2/25,3/06
Tenares (Palma Sola)	5	21	02	02	24	1.523	863.746	3/16,3/31,4/09
San Juan (Hato Nuevo)	5	24	01	04	24	1.523	2113.961	10/13,10/20
Santiago (Pedro Garcia)	5	27	01	25	23	1.523	3327.852	9/15,9/23,9/29

- (1) Stratum (2) Province (3) Sector (4) Cluster
(5) Number of completed interviews
(6) Weight in the total sample
(7) Expansion factors, used for estimating total population quantities on the household level
(8) Date of the first interview

APPENDIX 4

PERCENT OF CALORIES CONSUMED FROM EACH FOOD GROUP
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

FOOD GROUP	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	33.47	16.66	35.81	16.72	32.41	9.64	36.87	9.56	23.27	6.65	20.73	7.05	.0000
BEANS	3.39	1.79	3.59	2.31	4.41	3.16	3.88	2.25	3.40	2.33	3.44	2.30	.0817
OTHER GRAINS	.58	.96	.55	.98	.52	.87	.26	.49	.48	1.20	.11	.46	.2409
TUBERS, PLANTAINS	6.50	6.24	11.00	6.89	15.21	8.04	15.10	7.10	16.34	6.26	14.51	9.10	.0017
MEAT, FISH	4.86	3.20	4.79	2.66	8.60	4.57	9.58	3.71	12.37	5.24	15.12	5.77	.0000
MILK, MILK PRODUCTS	6.00	12.69	5.22	10.86	4.57	5.57	5.10	3.99	7.56	5.19	8.17	5.11	.0177
EGGS	.44	.68	.72	.65	1.00	.91	1.05	1.02	1.31	1.22	1.39	1.26	.0149
BREAD, FLOUR, PASTA	21.07	21.62	15.53	16.82	11.79	6.52	16.33	6.04	10.17	5.30	11.12	6.11	.0001
OIL	12.43	5.44	13.13	4.54	12.53	4.56	14.33	4.45	15.30	6.26	16.74	5.65	.0003
SUGAR	6.77	4.73	8.50	4.77	8.14	5.17	8.43	6.64	8.18	4.46	7.92	4.40	.9734
OTHER FATS	.64	.77	1.11	1.48	.80	1.76	1.01	1.66	.98	1.83	.69	1.03	.7673
N of Cases	9		49		50		75		80		11		

OTHER URBAN AREAS

FOOD GROUP	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	39.06	12.09	35.99	11.19	31.88	11.02	28.14	10.43	24.54	9.45	23.47	9.30	.0000
BEANS	6.99	5.42	6.65	4.62	5.51	4.04	4.05	3.41	4.29	3.33	3.55	3.17	.0016
OTHER GRAINS	.86	1.46	1.32	2.44	.92	1.76	1.15	2.36	.52	.39	.50	.74	.0123
TUBERS, PLANTAINS	8.85	7.86	10.90	8.10	18.90	13.62	14.66	8.20	14.56	6.06	15.81	8.99	.0002
MEAT, FISH	4.33	6.54	5.72	5.89	6.93	4.54	8.24	4.16	11.38	6.02	13.81	6.31	.0000
MILK, MILK PRODUCTS	10.54	16.53	7.15	12.55	4.81	4.53	6.34	7.05	5.26	6.78	8.74	6.00	.0202
EGGS	.19	.36	.33	.59	.68	.98	.59	.56	1.13	1.05	1.34	1.25	.0000
BREAD, FLOUR, PASTA	8.22	6.66	7.51	6.40	7.60	6.94	9.35	5.94	8.07	5.08	7.26	4.71	.2066
OIL	9.44	6.33	10.95	5.83	12.87	4.98	14.21	6.68	16.07	8.12	16.32	6.37	.0000
SUGAR	11.14	6.52	10.09	5.49	9.46	4.97	10.08	6.56	10.04	7.99	10.24	9.85	.9316
OTHER FATS	.34	.89	.27	.72	.17	.56	.52	.83	.38	1.47	1.13	1.66	.0601
N of Cases	29		56		65		98		110		55		

APPENDIX 3.A CONT.

PERCENT OF CALORIES CONSUMED FROM EACH FOOD GROUP
BY REGION AND EXPENDITURE CLASS

FRONTIER RURAL

FOOD GROUP	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	26.20	15.90	28.02	15.68	29.53	9.66	29.58	9.56	31.15	9.11	34.74	11.48	.5452
BEANS	5.67	5.93	5.84	5.35	8.06	5.33	7.01	6.49	7.05	4.17	9.47	5.96	.1444
OTHER GRAINS	2.30	3.90	1.85	3.41	1.70	1.11	1.02	1.69	1.84	2.23	1.00	1.00	.0942
TUBERS, PLANTAINS	38.20	23.27	34.15	21.53	25.98	14.58	26.68	15.90	21.24	13.85	7.20	7.60	.0267
MEAT, FISH	2.39	2.33	2.84	2.81	4.46	3.89	6.91	7.19	11.81	6.60	14.10	3.36	.0000
MILK, MILK PRODUCTS	3.01	5.45	3.30	5.54	3.64	4.27	3.80	3.53	4.76	4.06	8.82	1.64	.8527
EGGS	.20	.28	.25	.30	.27	.48	.33	.50	.49	.55	.00	.00	.2714
BREAD, FLOUR, PASTA	5.72	5.62	7.10	6.58	7.62	5.95	7.02	6.58	2.37	3.06	4.43	5.97	.2471
OIL	7.36	4.35	8.53	4.29	11.25	5.29	9.80	4.45	15.73	4.24	15.36	2.81	.0000
SUGAR	8.28	12.68	8.02	10.26	8.31	5.32	7.77	4.53	4.48	2.66	5.80	3.69	.7277
OTHER FATS	.00	.02	.09	.85	.11	.35	.03	.09	.02	.05	.03	.04	.9507
N of Cases	46		106		45		32		7		2		

RURAL SUGAR CANE AND LIVESTOCK

FOOD GROUP	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	45.24	13.13	38.11	14.45	33.28	8.55	31.32	10.73	24.50	11.65	25.65	12.72	.0000
BEANS	7.23	6.29	5.39	4.04	4.75	2.75	4.39	2.60	4.40	2.80	7.14	7.92	.3200
OTHER GRAINS	3.21	8.54	1.31	4.73	1.40	1.40	1.48	1.11	1.29	1.88	1.41	1.00	.2209
TUBERS, PLANTAINS	16.05	14.95	19.61	15.71	19.38	13.04	20.41	13.91	20.37	12.04	17.57	12.24	.9700
MEAT, FISH	2.78	2.49	3.49	2.84	5.06	3.17	6.88	3.38	7.31	4.63	6.43	3.90	.0000
MILK, MILK PRODUCTS	2.17	2.93	3.19	3.06	6.16	6.71	5.73	5.31	10.43	16.38	8.51	7.10	.0002
EGGS	.17	.31	.28	.41	.43	.53	.53	.56	.56	.63	.45	.61	.0286
BREAD, FLOUR, PASTA	7.80	5.55	9.79	8.12	7.72	6.07	8.34	10.45	9.42	11.01	12.87	15.03	.5632
OIL	9.70	6.26	11.40	5.21	13.92	7.62	13.61	4.39	13.86	6.21	13.72	8.03	.0626
SUGAR	5.50	3.79	7.32	5.36	8.79	7.87	8.14	5.90	8.45	7.91	9.47	10.48	.6510
OTHER FATS	.09	.37	.06	.24	.05	.13	.11	.16	.15	.46	.02	.09	.2816
N of Cases	20		70		55		41		36		12		

APPENDIX 3.A CONT.

PERCENT OF CALORIES CONSUMED FROM EACH FOOD GROUP
BY REGION AND EXPENDITURE CLASS

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	43.13	15.09	38.16	13.88	32.10	11.59	27.15	7.36	26.67	11.58	22.58	12.48	.0000
BEANS	5.49	4.26	4.65	3.72	5.64	3.97	4.92	3.17	4.23	2.74	3.11	2.08	.1666
OTHER GRAINS	1.49	3.46	1.08	2.63	1.54	3.44	.47	.98	.39	3.17	.97	2.62	.2155
TUBERS, PLANTAINS	13.87	14.76	16.72	13.92	18.42	13.80	19.82	13.28	19.46	12.73	23.18	14.17	.0000
MEAT, FISH	2.43	2.24	3.78	3.36	5.38	4.85	6.59	4.58	7.92	5.54	7.92	4.77	.0000
MILK, MILK PRODUCTS	4.81	6.70	4.42	5.75	4.93	7.11	6.42	5.60	6.41	6.01	6.41	5.13	.1908
EGGS	.28	.32	.64	.40	.69	.76	.37	.74	1.09	1.40	1.77	1.57	.0000
BREAD, FLOUR, PASTA	11.17	9.34	10.38	9.69	6.57	5.57	5.74	4.49	7.59	8.22	11.42	13.38	.0036
OIL	6.01	7.59	10.23	7.45	12.62	5.85	13.95	5.84	14.02	5.61	11.60	4.65	.0024
SUGAR	8.46	5.67	9.57	6.46	11.70	8.61	10.25	7.29	11.91	6.61	10.67	5.82	.0558
OTHER FATS	.81	3.66	.61	2.66	.86	1.61	.26	.55	.61	1.45	.30	.54	.6862
N of Cases	26		63		64		64		61		14		

APPENDIX 3.6

PERCENT OF PROTEIN CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	28.38	15.12	30.83	10.92	25.24	8.47	24.03	8.87	16.72	6.69	13.65	6.31	.0000
BEANS	10.68	5.74	11.35	7.02	12.58	8.09	10.43	6.28	8.83	6.19	8.01	5.52	.0000
OTHER GRAINS	1.46	2.50	1.37	2.41	1.22	2.04	.68	1.26	1.11	2.90	.29	1.71	.3191
TUBERS, PLANTAINS	4.02	2.68	5.48	4.22	6.99	4.30	6.81	3.87	7.22	4.10	6.44	4.00	.1164
MEAT, FISH	16.86	10.70	18.04	9.66	27.77	11.36	30.73	9.93	36.33	11.98	42.12	10.61	.0000
MILK, MILK PRODUCTS	10.06	20.86	10.09	15.46	9.27	9.65	11.17	7.87	14.92	9.31	14.68	8.96	.0045
EGGS	1.59	2.30	2.70	2.45	3.32	3.09	3.44	3.32	3.80	3.60	3.64	3.16	.3032
BREAD, FLOUR, PASTA	26.89	28.51	20.06	14.65	13.64	7.28	12.15	7.10	11.91	5.81	11.15	6.20	.0000
OIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
SUGAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER FATS	.02	.03	.04	.05	.01	.03	.03	.06	.02	.03	.02	.03	.0345
N of Cases	9		49		80		76		80		31		

OTHER URBAN AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	31.18	12.60	30.92	11.60	25.60	10.11	21.09	9.31	17.74	10.61	16.90	13.05	.0000
BEANS	20.06	14.97	18.98	12.62	15.96	10.60	12.46	8.56	11.13	8.26	8.85	7.14	.0000
OTHER GRAINS	2.03	3.33	3.24	5.86	2.40	4.82	2.62	4.97	.72	1.71	.69	1.75	.0010
TUBERS, PLANTAINS	4.05	3.52	4.85	3.61	8.68	7.37	6.68	5.12	7.15	6.09	7.83	6.93	.0003
MEAT, FISH	13.93	13.24	18.79	13.54	25.01	13.41	27.84	12.67	34.11	13.41	35.62	14.48	.0000
MILK, MILK PRODUCTS	18.88	20.62	13.45	16.64	10.43	9.26	16.83	11.77	10.85	13.81	18.41	13.47	.0050
EGGS	.65	1.24	1.30	1.91	2.57	4.37	1.91	1.31	3.49	3.60	4.11	4.48	.0001
BREAD, FLOUR, PASTA	9.17	7.29	8.42	6.33	9.30	8.71	10.50	6.28	8.64	5.70	7.52	4.91	.1452
OIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
SUGAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER FATS	.01	.03	.00	.02	.00	.01	.01	.02	.02	.04	.03	.05	.0001
N of Cases	29		56		65		98		110		55		

APPENDIX 3.B CONT.

PERCENT OF PROTEIN CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDITURE CLASS

FRONTIER RURAL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	24.36	13.48	25.28	12.31	25.68	7.93	23.40	8.20	21.65	6.81	17.85	8.17	.7249
BEANS	18.10	17.08	18.49	15.15	24.24	13.24	18.90	12.27	17.69	11.47	18.03	4.29	.1361
OTHER GRAINS	7.18	11.14	5.52	9.63	2.13	5.71	2.91	4.97	2.43	6.43	.00	.00	.0654
TUBERS, PLANTAINS	21.51	17.15	18.67	15.17	12.82	8.88	13.02	9.23	8.85	6.33	1.60	1.51	.0162
MEAT, FISH	12.06	12.58	13.28	13.30	16.64	11.80	23.75	14.63	36.77	18.26	47.32	10.03	.0000
MILK, MILK PRODUCTS	8.27	16.46	8.47	13.88	9.05	10.65	8.38	8.56	8.86	7.69	12.51	2.62	.9929
EGGS	1.01	1.43	1.01	1.32	1.07	2.03	1.24	1.94	1.76	2.08	.00	.00	.6517
BREAD, FLOUR, PASTA	7.49	7.38	9.23	8.64	9.12	7.15	7.76	7.80	1.96	1.89	2.66	3.53	.1181
OIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
SUGAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER FATS	.00	.00	.00	.04	.00	.01	.00	.00	.00	.00	.00	.00	.3521
N of Cases	48		106		45		32		7		2		

RURAL SUGAR CANE AND LIVESTOCK

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	39.35	12.76	34.17	13.05	29.09	8.74	26.50	10.06	19.34	10.14	21.06	13.09	.0060
BEANS	20.88	14.98	17.49	10.78	15.35	8.57	13.48	7.47	12.07	7.20	14.98	9.56	.0479
OTHER GRAINS	6.64	14.34	3.07	8.36	1.12	3.68	1.37	3.18	.75	2.28	1.02	2.59	.1147
TUBERS, PLANTAINS	8.04	8.60	10.14	9.10	9.23	7.07	9.35	7.58	9.55	6.58	9.09	7.96	.9287
MEAT, FISH	10.62	9.69	13.61	10.08	19.85	12.10	23.97	8.61	23.26	13.49	20.67	10.07	.0000
MILK, MILK PRODUCTS	5.03	6.52	8.26	7.96	14.30	14.01	13.25	11.67	21.64	19.48	19.56	16.03	.0000
EGGS	.65	1.25	1.18	1.76	1.75	2.39	1.84	1.80	2.01	2.44	1.63	2.31	.1661
BREAD, FLOUR, PASTA	8.75	5.92	12.05	9.95	9.26	6.98	9.59	10.58	9.75	10.57	11.95	13.20	.3385
OIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
SUGAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER FATS	.00	.01	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.4417
N of Cases	20		70		55		41		36		12		

APPENDIX 3.B CONT.

PERCENT OF PROTEIN CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDTURE CLASS

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	36.87	14.12	33.59	13.28	28.55	12.50	23.37	8.43	21.64	9.99	17.37	9.05	.0000
BEANS	16.41	11.05	14.12	9.83	17.71	9.59	15.19	8.32	12.61	7.86	9.00	5.83	.0234
OTHER GRAINS	3.40	6.86	2.67	5.76	3.85	8.14	1.32	2.86	2.53	7.75	2.75	7.82	.2141
TUBERS, PLANTAINS	9.22	11.70	9.44	9.38	9.80	9.26	10.14	8.55	9.30	9.11	11.17	8.09	.3803
MEAT, FISH	9.62	9.45	15.60	12.71	18.43	13.48	24.59	11.72	26.60	15.90	27.52	16.24	.0000
MILK, MILK PRODUCTS	10.61	12.37	10.30	12.03	11.12	16.43	14.57	11.28	14.22	11.84	14.05	11.10	.2026
EGGS	1.05	1.19	1.34	1.65	2.58	2.84	3.63	2.84	4.18	4.87	6.01	5.11	.0002
BREAD, FLOUR, PASTA	12.78	9.64	12.90	13.34	7.92	6.63	7.25	5.89	8.65	8.64	12.07	13.30	.0033
OIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
SUGAR	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER FATS	.00	.01	.00	.02	.00	.04	.01	.02	.02	.05	.00	.01	.2150
N of Cases	26		63		64		55		51		14		

APPENDIX 3.C

PERCENT OF VALUE OF FOOD CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F Sig.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	13.82	7.27	16.02	6.33	12.21	5.71	10.58	4.55	6.51	3.09	5.17	2.59	.0000
BEANS	5.07	2.75	5.44	3.54	5.16	3.93	4.05	2.56	3.09	2.44	2.58	1.31	.0000
OTHER GRAINS	1.62	2.55	1.27	2.51	1.25	2.00	.64	1.20	.81	1.59	.39	1.77	.1032
TUBERS, PLANTAINS	9.18	6.48	10.08	7.07	11.56	7.56	10.83	5.03	10.82	6.05	9.22	6.41	.6520
MEAT, FISH	31.98	19.96	30.47	14.22	43.42	11.97	47.67	10.38	52.24	12.01	56.97	11.41	.0000
MILK, MILK PRODUCTS	8.31	18.43	9.07	12.60	7.28	7.79	8.51	6.42	10.07	7.32	9.37	5.86	.2079
EGGS	1.84	2.83	2.38	2.72	3.16	3.10	2.77	2.58	2.74	2.72	2.62	2.42	.7560
BREAD, FLOUR, PASTA	14.07	18.80	10.89	9.78	6.00	4.02	4.96	3.49	4.17	2.69	4.18	2.22	.0000
OIL	11.49	10.39	10.49	5.45	7.81	3.08	7.79	2.90	7.58	4.70	7.61	4.08	.0003
SUGAR	1.94	1.35	2.36	1.90	1.79	1.25	2.00	1.82	1.83	1.15	1.79	1.19	.1720
OTHER FATS	.61	.94	.87	1.44	.30	.52	.34	.61	.10	.21	.05	.13	.0000
N of Cases	9		49		80		76		80		31		

OTHER URBAN AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F Sig.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	20.43	11.16	18.59	9.40	13.02	6.82	9.77	9.94	7.41	4.79	7.12	5.85	.0000
BEANS	10.61	9.44	8.77	7.57	6.32	5.59	4.45	4.21	3.67	3.57	3.02	1.91	.0000
OTHER GRAINS	1.78	2.90	1.91	2.95	1.89	4.39	1.95	3.48	.48	1.04	.49	1.23	.0011
TUBERS, PLANTAINS	7.58	6.85	8.75	6.48	12.60	8.63	10.94	7.75	10.59	7.52	10.87	6.74	.0542
MEAT, FISH	24.85	19.78	32.87	18.20	40.17	15.16	43.60	14.90	48.91	15.50	48.87	17.06	.0000
MILK, MILK PRODUCTS	16.97	20.24	11.33	16.00	6.66	6.65	11.68	8.93	11.83	11.10	13.09	12.38	.0114
EGGS	1.03	2.00	1.61	2.21	2.67	4.58	1.74	1.70	2.85	2.38	3.24	3.74	.0112
BREAD, FLOUR, PASTA	5.09	3.64	4.39	3.31	4.79	5.76	4.46	2.91	2.97	2.23	2.40	1.60	.0023
OIL	8.54	5.83	9.00	4.96	9.51	4.64	8.83	5.62	8.78	7.18	8.23	7.46	.8713
SUGAR	3.02	1.72	2.65	1.64	2.24	1.51	2.38	1.32	2.27	2.58	2.45	3.40	.6786
OTHER FATS	.05	.22	.07	.29	.07	.20	.14	.43	.19	.71	.16	.28	.3595
N of Cases	29		56		65		68		110		55		

APPENDIX 3.C CONT.

PERCENT OF VALUE OF FOOD CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDTURE CLASS

FRONTIER RURAL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	17.78	10.92	17.18	10.49	15.77	7.91	13.16	7.33	11.40	5.88	9.98	6.49	.0975
BEANS	8.49	10.17	3.75	9.73	9.97	8.04	7.15	5.91	6.62	4.80	8.55	6.14	.4974
OTHER GRAINS	4.74	9.99	3.63	7.82	1.64	2.73	1.63	2.77	1.42	3.77	.00	.00	.1784
TUBERS, PLANTAINS	22.13	15.78	22.06	15.66	18.34	11.49	16.52	11.81	9.30	7.67	3.01	3.17	.0319
MEAT, FISH	22.01	22.10	23.46	21.53	28.96	16.04	39.84	18.07	52.20	16.07	63.06	11.11	.0000
MILK, MILK PRODUCTS	6.38	12.35	6.52	10.79	6.45	7.85	7.18	8.36	4.28	3.81	5.23	.68	.9112
EGGS	1.84	3.10	1.67	2.51	1.31	2.48	1.37	2.17	1.78	1.91	.00	.00	.8155
BREAD, FLOUR, PASTA	3.68	3.71	4.50	4.71	4.69	4.04	3.33	1.84	.79	.76	1.04	1.47	.0929
OIL	9.92	5.62	9.62	5.38	10.34	4.35	8.03	3.78	11.24	3.70	8.06	1.40	.1642
SUGAR	2.98	5.47	2.56	4.06	2.45	2.26	1.69	1.13	.31	.63	1.03	1.04	.3749
OTHER FATS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
N of Cases	48		106		45		32		7		2		

RURAL SUGAR CANE AND LIVESTOCK

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	27.35	12.64	21.09	11.27	15.24	5.96	12.68	5.41	10.00	7.39	11.50	8.42	.0000
BEANS	13.94	13.45	10.07	8.64	7.27	5.79	5.37	3.48	4.26	2.52	4.70	3.28	.0000
OTHER GRAINS	4.77	14.49	1.91	7.94	.37	1.15	.46	1.08	.21	.63	.34	.81	.1809
TUBERS, PLANTAINS	12.99	14.10	16.47	13.72	14.55	9.56	14.84	9.66	12.89	8.13	11.04	8.33	.4471
MEAT, FISH	20.91	17.12	26.14	15.57	35.06	14.42	43.51	12.33	41.99	16.05	38.19	16.46	.0000
MILK, MILK PRODUCTS	3.43	4.75	5.00	4.99	8.02	9.01	6.38	5.08	12.71	17.11	11.30	10.96	.0010
EGGS	.71	1.35	1.26	1.80	1.58	2.00	1.78	1.75	1.86	2.14	1.80	2.61	.3717
BREAD, FLOUR, PASTA	3.80	2.87	4.70	3.89	3.50	2.97	3.27	3.46	3.56	4.96	4.91	6.28	.1600
OIL	10.24	6.37	11.17	5.12	11.99	7.18	9.88	3.06	10.78	7.59	13.77	11.85	.3831
SUGAR	1.76	1.33	2.12	1.69	2.33	2.58	1.69	1.35	1.67	1.66	2.34	2.41	.2585
OTHER FATS	.05	.24	.01	.13	.04	.17	.09	.18	.02	.12	.06	.21	.0734
N of Cases	20		70		55		41		30		12		

APPENDIX 3.C CONT.

PERCENT OF VALUE OF FOOD CONSUMED FROM EACH FOOD GROUPS
BY REGION AND EXPENDTURE CLASS

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SD
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	26.30	13.06	21.48	12.15	15.31	9.11	11.24	5.49	10.24	6.73	8.92	7.34	.0000
BEANS	8.85	7.02	7.12	5.80	7.58	5.04	5.86	4.42	4.95	3.51	3.42	3.09	.0168
OTHER GRAINS	4.07	8.80	2.86	6.67	3.36	8.37	1.15	2.44	2.38	6.45	3.08	3.38	.3564
TUBERS, PLANTAINS	11.43	14.25	12.58	12.49	14.14	11.90	12.48	7.70	12.70	10.26	14.02	8.38	.8113
MEAT, FISH	18.26	13.99	27.20	18.19	31.96	18.39	42.60	13.91	43.44	17.02	43.61	16.54	.0000
MILK, MILK PRODUCTS	9.77	12.54	8.14	11.05	7.33	11.72	7.69	6.25	8.36	7.52	8.07	6.49	.9407
EGGS	1.59	1.72	1.78	2.03	2.95	3.50	3.47	2.49	3.31	4.05	5.12	4.18	.0135
BREAD, FLOUR, PASTA	7.38	7.11	6.20	6.90	3.48	3.17	2.83	2.14	3.42	3.59	4.42	5.35	.0001
OIL	8.77	8.35	9.13	6.55	10.44	6.43	9.57	4.08	8.55	3.29	7.10	2.68	.2868
SUGAR	2.97	2.51	3.01	3.05	3.26	3.74	2.82	1.82	2.20	1.37	2.10	1.37	.2160
OTHER FATS	.57	2.54	.40	1.33	.13	.74	.17	.40	.41	1.91	.07	.28	.5967
N of Cases	26		63		64		55		51		14		

APPENDIX 3.D

AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY EXPENDITURE CLASS
(ED\$/DAY)

FOOD GROUP	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	EXPEND	SD	EXPEND	SD	EXPEND	SD	EXPEND	SD	EXPEND	SD	EXPEND	SD	EXPEND	SD	
RICE	.81	1.10	.86	.81	.93	.87	.93	1.22	.91	1.24	.49	.89	.46	1.09	.0000
BEANS	.33	.46	.32	.44	.37	.52	.38	.46	.34	.38	.23	.48	.14	.36	.0002
OTHER GRAINS	.05	.15	.04	.11	.04	.13	.05	.16	.07	.21	.04	.10	.04	.13	.0446
STARCHY TUBERS, PLANTAINS	.50	.64	.21	.30	.28	.49	.50	.69	.66	.64	.56	.69	.43	.48	.0000
VEGETABLES	.36	.37	.14	.16	.25	.28	.35	.31	.45	.41	.41	.41	.40	.45	.0000
FRUIT	.13	.25	.05	.12	.06	.13	.10	.23	.15	.23	.19	.34	.26	.34	.0060
MEAT, FISH, POULTRY	1.76	1.77	.50	.60	.89	.95	1.59	1.58	2.20	1.85	2.28	2.12	2.10	1.99	.0000
MILK, MILK PRODUCTS	.49	.77	.18	.30	.26	.43	.34	.51	.62	.90	.73	.98	.78	1.10	.0000
EGGS	.14	.24	.04	.09	.08	.16	.12	.20	.19	.25	.17	.33	.16	.30	.0000
BREAD, PASTA, FLOUR	.36	.47	.24	.23	.32	.35	.34	.38	.43	.66	.35	.46	.35	.53	.0368
VEGETABLE OIL	.61	.84	.42	.50	.51	.57	.75	.95	.69	.74	.54	.94	.54	1.11	.0021
SUGAR	.17	.22	.12	.09	.15	.15	.19	.26	.20	.23	.14	.23	.10	.20	.0014
OTHER FATS	.01	.06	.02	.12	.01	.10	.00	.02	.01	.04	.00	.03	.00	.02	.0266
OTHER	.65	.77	.40	.32	.52	.48	.65	.55	.80	.82	.60	.93	.53	1.04	.0000
N OF CASES	1311		103		287		308		306		306		121		

APPENDIX 3.E

PERCENT OF AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY EXPENDITURE CLASS

FOOD GROUP	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
RICE	12.14	11.99	21.69	15.44	19.58	14.40	13.29	10.83	10.79	9.88	6.32	9.05	6.47	10.82	.0000
BEANS	4.73	6.04	6.99	8.37	6.76	7.95	5.42	5.39	4.28	4.96	2.85	5.08	1.97	5.21	.0000
OTHER GRAINS	.74	2.14	1.31	3.41	.86	2.55	.73	2.24	.88	2.21	.53	1.52	.56	1.30	.1749
STARCHY TUBERS, PLANTAINS	7.45	7.77	4.69	5.94	4.93	6.67	7.67	8.00	8.20	7.00	8.45	6.53	7.66	8.50	.0000
VEGETABLES	6.07	7.36	3.77	3.56	4.76	4.39	5.75	4.92	6.78	9.79	7.09	4.17	7.15	8.13	.0005
FRUIT	2.11	4.70	1.58	2.90	1.45	2.91	1.71	4.11	1.94	2.76	3.31	7.47	5.39	10.95	.0000
MEAT, FISH, POULTRY	26.83	20.19	12.14	14.12	18.11	17.93	25.46	14.98	26.31	16.09	35.85	22.24	31.97	24.58	.0000
MILK, MILK PRODUCTS	8.00	12.05	7.43	15.34	6.15	11.65	5.33	7.98	7.84	8.36	11.78	16.02	14.56	18.77	.0000
EGGS	2.18	4.42	1.01	2.19	1.57	2.79	1.98	3.67	2.11	2.42	2.74	6.86	2.48	4.67	.0080
BREAD, PASTA, FLOUR	6.86	10.28	9.55	13.42	8.36	11.59	8.92	11.37	5.81	5.53	6.31	11.20	6.95	7.66	.0178
VEGETABLE OIL	8.87	8.61	11.14	9.74	10.70	8.31	10.62	9.31	8.82	8.28	6.17	7.85	5.79	3.13	.0000
SUGAR	3.15	5.26	5.04	8.20	4.37	8.47	3.20	3.13	2.77	3.22	2.23	3.37	1.94	4.18	.0000
OTHER FATS	.24	2.22	.96	7.11	.61	4.63	.13	.43	.15	.42	.09	.48	.06	.35	.0178
OTHER	10.35	8.66	12.28	9.52	11.50	8.20	11.39	9.30	10.71	7.99	8.23	8.43	7.30	9.68	.0000
N OF CASES	1311		103		287		308		306		306		121		

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APPENDIX 3.F

AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY REGION
(RD\$/DAY)

FOOD GROUP	TOTAL POPULATION EXPEND		SANTO DOMINGO EXPEND		OTHER URBAN AREAS EXPEND		RURAL FRONTIER RD\$		SUGAR CANE LIVESTOCK RD\$		OTHER RURAL AREAS RD\$		F SIG.
		SD		SD		SD		SD		SD		SD	
RICE	.81	1.10	.79	.84	.70	1.19	.92	1.28	1.01	1.30	.77	1.03	.0065
BEANS	.33	.46	.32	.43	.36	.48	.32	.67	.39	.51	.31	.39	.0022
OTHER GRAINS	.05	.15	.06	.14	.08	.21	.01	.08	.02	.13	.03	.10	.0000
STARCHY TUBERS, PLANTAINS	.50	.64	.73	.65	.55	.66	.17	.33	.23	.49	.49	.64	.0000
VEGETABLES	.36	.37	.54	.41	.38	.36	.15	.19	.24	.31	.29	.30	.0000
FRUIT	.13	.25	.26	.32	.15	.29	.07	.13	.01	.06	.07	.14	.0000
MEAT, FISH, POULTRY	1.76	1.77	2.10	1.75	2.04	2.02	.83	1.15	1.46	1.44	1.49	1.68	.0000
MILK, MILK PRODUCTS	.49	.77	.69	.94	.63	.91	.10	.33	.27	.40	.38	.57	.0000
EGGS	.14	.24	.23	.30	.14	.23	.04	.11	.06	.15	.13	.24	.0000
BREAD, PASTA, FLOUR	.36	.47	.52	.45	.40	.63	.21	.26	.26	.31	.27	.36	.0000
VEGETABLE OIL	.61	.84	.64	.76	.52	.89	.54	.70	.72	.88	.61	.82	.0493
SUGAR	.17	.22	.16	.21	.17	.26	.12	.11	.15	.15	.19	.24	.0082
OTHER FATS	.01	.06	.02	.05	.00	.03	.00	.01	.00	.01	.01	.09	.0000
OTHER	.65	.77	.90	.83	.61	.33	.46	.44	.56	.58	.56	.62	.0000
N OF CASES	1311		309		360		195		221		236		

APPENDIX 3.G

PERCENT OF AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY REGION

FOOD GROUP	TOTAL POPULATION %		SANTO DOMINGO %		OTHER URBAN AREAS %		RURAL FRONTIER %		SUGAR CANE & LIVESTOCK %		OTHER RURAL AREAS %		F SIG.
		SD		SD		SD		SD		SD		SD	
RICE	12.14	11.99	9.57	8.36	9.22	10.25	21.29	15.06	16.32	14.09	13.02	12.74	.0000
BEANS	4.73	6.04	3.49	4.22	4.15	5.75	6.04	8.32	5.98	7.09	5.38	6.25	.0000
OTHER GRAINS	.74	2.14	.83	1.86	1.12	2.56	.68	3.42	.48	2.20	.46	1.57	.0041
STARCHY TUBERS, PLANTAINS	7.45	7.77	9.35	6.97	8.22	7.78	4.49	7.79	3.89	6.33	7.80	6.47	.0000
VEGETABLES	6.07	7.36	7.07	4.70	6.70	8.11	3.88	3.99	4.32	4.11	6.00	9.85	.0000
FRUIT	2.11	4.70	3.46	4.26	2.69	6.45	1.74	3.17	.33	1.15	1.63	4.15	.0000
MEAT, FISH, POULTRY	26.83	26.19	25.75	15.92	23.19	19.89	19.15	21.11	28.50	23.64	25.66	21.22	.0000
MILK, MILK PRODUCTS	8.00	12.05	8.86	11.60	10.76	14.30	2.55	9.37	5.70	9.36	6.64	10.84	.0000
EGGS	2.18	4.42	2.96	4.37	2.27	4.16	.85	1.96	1.19	2.85	2.22	5.51	.0000
BREAD, PASTA, FLOUR	6.86	10.28	7.42	6.74	7.06	10.31	6.61	8.29	6.43	12.30	6.51	11.38	.7465
VEGETABLE OIL	8.87	8.61	6.98	5.84	6.74	7.62	13.59	9.84	11.65	9.92	10.23	9.44	.0000
SUGAR	3.15	5.26	2.34	4.09	2.60	3.28	5.66	13.13	3.42	7.26	3.98	4.48	.0000
OTHER FATS	.24	2.22	.33	.75	.09	.53	.31	3.26	.08	.54	.41	4.01	.2748
OTHER	10.35	8.66	11.45	7.52	8.80	8.60	12.77	9.15	10.68	9.27	10.50	8.35	.0000
N OF CASES	1311		309		360		195		221		236		

APPENDIX 3.H

AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY ACCESS TO HOME CONSUMPTION
(RD\$/DAY)

FOOD GROUP	ANY HOME CONSUMPTION?				F SIG.
	NO EXPEND SD		YES EXPEND SD		
RICE	.78	1.08	.86	1.12	.1900
BEANS	.31	.45	.36	.49	.0791
OTHER GRAINS	.05	.16	.04	.13	.0585
STARCHY TUBERS, PLANTAINS	.59	.68	.33	.50	.0000
VEGETABLES	.39	.38	.30	.32	.0000
FRUIT	.16	.26	.06	.19	.0000
MEAT, FISH, POULTRY	1.85	1.79	1.60	1.72	.0164
MILK, MILK PRODUCTS	.60	.86	.28	.46	.0000
EGGS	.16	.26	.09	.19	.0000
BREAD, PASTA, FLOUR	.41	.52	.27	.36	.0000
VEGETABLE OIL	.58	.82	.67	.83	.0853
SUGAR	.17	.21	.18	.24	.3640
OTHER FATS	.01	.04	.01	.08	.3238
OTHER	.70	.82	.55	.65	.0009
N OF CASES	872		439		

APPENDIX 3.I

PERCENT OF AVERAGE DAILY CASH EXPENDITURE ON FOOD
SPENT ON EACH FOOD GROUP
BY ACCESS TO HOME CONSUMPTION

FOOD GROUP	ANY HOME CONSUMPTION?				F SIG.
	NO % SD		YES % SD		
RICE	10.95	11.09	14.52	13.33	.0000
BEANS	4.16	5.23	5.86	7.29	.0000
OTHER GRAINS	.75	1.92	.72	2.54	.8360
STARCHY TUBERS, PLANTAINS	8.22	7.33	5.90	8.39	.0000
VEGETABLES	6.07	6.16	6.05	9.33	.9638
FRUIT	2.39	4.45	1.56	5.12	.0025
MEAT, FISH, POULTRY	26.37	18.82	27.74	22.68	.2459
MILK, MILK PRODUCTS	9.61	13.41	4.78	7.77	.0000
EGGS	2.50	4.96	1.53	2.93	.0002
BREAD, PASTA, FLOUR	7.16	10.38	6.26	10.04	.1351
VEGETABLE OIL	8.04	8.21	10.53	9.13	.0000
SUGAR	2.90	4.64	3.67	6.31	.0121
OTHER FATS	.18	.59	.35	3.77	.1798
OTHER	10.39	8.37	10.28	9.22	.8207
N OF CASES	872		439		

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APPENDIX 3.J

AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY CALORIC ADEQUACY GROUPS
(RD\$/DAY)

FOOD GROUP	CALORIC ADEQUACY						F SIG.
	LESS THAN 75% EXPEND SD		BTWN 75 AND 100% EXPEND SD		GREATER THAN 100% EXPEND SD		
RICE	.64	.80	.82	.88	.85	1.23	.0455
BEANS	.24	.40	.30	.42	.36	.49	.0013
OTHER GRAINS	.03	.10	.05	.14	.05	.16	.2678
STARCHY TUBERS. PLANTAINS	.28	.43	.50	.58	.57	.69	.0000
VEGETABLES	.22	.28	.37	.38	.40	.37	.0000
FRUIT	.06	.14	.14	.26	.14	.26	.0000
MEAT, FISH, POULTRY	.70	.82	1.66	1.64	2.11	1.90	.0000
MILK, MILK PRODUCTS	.26	.68	.44	.55	.59	.85	.0000
EGGS	.08	.17	.15	.24	.15	.26	.0003
BREAD, PASTA, FLOUR	.24	.36	.41	.43	.38	.51	.0001
VEGETABLE OIL	.40	.61	.58	.75	.69	.92	.0000
SUGAR	.10	.13	.17	.24	.19	.23	.0000
OTHER FATS	.01	.09	.01	.04	.01	.04	.1553
OTHER	.49	.61	.71	.87	.67	.76	.0018
N OF CASES	221		305		777		

APPENDIX 3.K

PERCENT OF AVERAGE DAILY CASH EXPENDITURE ON FOOD
SPENT ON EACH FOOD GROUP
BY CALORIC ADEQUACY GROUPS
(RD\$/DAY)

FOOD GROUP	CALORIC ADEQUACY						F SIG.
	LESS THAN 75% % SD		BTWN 75 AND 100% % SD		GREATER THAN 100% % SD		
RICE	14.75	14.96	13.53	11.56	10.77	10.96	.0000
BEANS	4.68	6.10	4.59	5.80	4.83	6.17	.8249
OTHER GRAINS	.81	2.37	.83	2.17	.67	1.99	.4355
STARCHY TUBERS, PLANTAINS	6.38	7.55	7.40	6.52	7.81	8.28	.0558
VEGETABLES	5.56	5.48	5.81	4.64	6.34	8.62	.2948
FRUIT	1.39	2.92	2.25	4.14	2.27	5.30	.0425
MEAT, FISH, POULTRY	16.56	17.24	25.98	18.92	30.17	20.37	.0000
MILK, MILK PRODUCTS	8.86	16.76	7.49	11.41	8.03	10.60	.4362
EGGS	2.58	7.04	2.22	3.69	2.04	3.67	.2778
BREAD, PASTA, FLOUR	9.24	16.38	6.86	6.20	6.05	8.29	.0001
VEGETABLE OIL	10.13	9.98	8.62	7.37	8.53	8.43	.0415
SUGAR	4.74	9.98	2.87	3.71	2.80	3.42	.0000
OTHER FATS	.61	5.10	.25	.79	.13	.86	.0185
OTHER	13.45	11.78	11.09	8.02	9.21	7.57	.0000
N OF CASES	221		305		777		

APPENDIX 3.L

AVERAGE DAILY CASH EXPENDITURE ON FOOD SPENT ON EACH FOOD GROUP
BY PROTEIN ADEQUACY GROUPS
(RDS/DAY)

FOOD GROUP	PROTEIN ADEQUACY						F SIG.
	LESS THAN 75% EXPEND SD		BTWN 75 AND 100% EXPEND SD		GREATER THAN 100% EXPEND SD		
RICE	.74	.76	.85	.91	.82	1.28	.4455
BEANS	.25	.37	.33	.48	.36	.49	.0031
OTHER GRAINS	.02	.10	.06	.18	.05	.15	.0105
STARCHY TUBERS, PLANTAINS	.30	.50	.51	.64	.59	.67	.0000
VEGETABLES	.23	.27	.37	.39	.42	.38	.0000
FRUIT	.05	.13	.13	.23	.16	.28	.0000
MEAT, FISH, POULTRY	.75	.94	1.54	1.34	2.30	1.99	.0000
MILK, MILK PRODUCTS	.23	.58	.44	.58	.64	.87	.0000
EGGS	.11	.23	.12	.19	.16	.27	.0009
BREAD, PASTA, FLOUR	.26	.37	.36	.37	.41	.54	.0000
VEGETABLE OIL	.47	.61	.63	.79	.67	.93	.0033
SUGAR	.13	.14	.19	.24	.18	.24	.0017
OTHER FATS	.01	.08	.01	.07	.00	.03	.0440
OTHER	.53	.72	.66	.66	.69	.83	.0095
N OF CASES	300		302		701		

APPENDIX 3.M

PERCENT OF AVERAGE DAILY CASH EXPENDITURE ON FOOD
SPENT ON EACH FOOD GROUP
BY PROTEIN ADEQUACY GROUPS
(RDS/DAY)

FOOD GROUP	PROTEIN ADEQUACY						F SIG.
	LESS THAN 75% % SD		BTWN 75 AND 100% % SD		GREATER THAN 100% % SD		
RICE	9.70	10.38	13.16	11.65	16.58	14.16	.0000
BEANS	4.60	6.03	4.90	6.22	4.94	6.00	.6419
OTHER GRAINS	.65	1.67	.99	2.79	.66	2.18	.0568
STARCHY TUBERS, PLANTAINS	7.87	7.87	7.68	7.82	6.31	7.46	.0128
VEGETABLES	6.35	8.06	6.19	7.69	5.35	5.00	.1370
FRUIT	2.41	5.45	2.01	3.31	1.53	3.99	.0225
MEAT, FISH, POULTRY	32.03	20.21	25.55	18.98	16.20	16.43	.0000
MILK, MILK PRODUCTS	8.68	11.00	7.42	11.59	7.18	14.52	.1155
EGGS	2.01	3.43	2.15	4.33	2.59	6.23	.1571
BREAD, PASTA, FLOUR	6.00	7.19	6.75	8.84	8.64	14.69	.0005
VEGETABLE OIL	7.71	7.88	9.10	8.34	11.13	9.51	.0000
SUGAR	2.53	3.74	3.05	2.73	4.68	8.74	.0000
OTHER FATS	.10	.33	.23	1.32	.58	4.43	.0069
OTHER	9.01	7.72	10.56	7.37	13.38	10.93	.0000
N OF CASES	300		302		701		

Technical Appendix to Chapter 4

Estimation of Consumption Parameters on a Censored Sample

Direct estimation of the model given in equation (1), Chapter 4 using ordinary least squares regression analysis results in downward bias in the parameter estimates because the sample is censored, i.e., some of the households did not consume any of the commodity being analysed over the period of the interview.*

To see this suppose that equation (1), without the inverse of the Mill's Ratio term, is expressed as

$$\begin{aligned}y_i &= \beta'x_i + u_i \text{ if the right-hand side } > 0 \\y_i &= 0 \text{ otherwise} \end{aligned} \quad \dots(2)$$

where B is a vector of unknown parameters, x_i is a vector of known independent variables, and u_i are residuals that are independently and normally distributed with mean zero and variance σ^2 . If least squares regression analysis were to be performed on (2) using the entire sample, the resulting estimates of B would be biased since the expected value of $u_i = y_i - Bx_i \neq 0$ where $y_i \geq 0$ for all cases. Instead, the expected value of y for all cases in which $y > 0$ is given by

$$\begin{aligned}E(y_i/y_i > 0) &= \beta'x_i + E(u_i | u_i > \beta'x_i) \\ &= \beta'x_i + \sigma \frac{\phi_i}{\Phi_i} \end{aligned} \quad \dots(3)$$

*Most of this discussion is taken from Maddala, 1983, which provides an excellent review of the literature on censored and truncated samples.

where ϕ_i and Φ_i are the density function and the cumulative distribution function of the standard normal distribution evaluated at $\beta'x_i/\sigma$. The ratio ϕ_i/Φ_i is also described as the inverse of the Mill's ratio. Equation (3) can be then written as

$$y_i = \beta'x_i + \sigma \frac{\phi_i}{\Phi_i} + v_i \quad \dots(4)$$

where $E(v_i) = 0$

The problem is to estimate the second term on the right-hand side of the equation (4). Following Heckman (1976), we define a dummy variable

$$I_i = 1 \quad \text{if } y_i > 0$$

$$I_i = 0 \quad \text{otherwise}$$

Probit analysis is used to obtain the maximum likelihood estimates of β/σ from equation (1) with I_i used as the dependent variable in place of $\lg(Q/N)$. These are in turn used to generate a predicted value of the dependent variable and the distribution of the predicted value is used to calculate ϕ_i and Φ_i . These values are then employed as explanatory variables in equation (4) to obtain consistent estimates of β and σ using ordinary least-squares regression analysis performed on the truncated sample for which $y_i > 0$.

This procedure could then be iterated using the new estimates of β and σ , leading, on convergence, to the maximum likelihood estimates. Earlier work suggests, however, that the first-round estimates are reasonably close approximations (Heckman, 1976, p. 490). In addition, the standard errors obtained from the second-stage OLS analysis of equation (3) underestimate the true standard errors that would be obtained if some of the explanatory variables used in this equation were not estimated. The differences, however, are generally not very great (Maddala, 1983, p. 238). Finally, it is important to interpret the estimates of β obtained by this procedure correctly. Although these estimates predict the impact of a change in x on y given $y_i > 0$, they do not predict the probability of $y_i > 0$ or the effect of a change in x on that probability (Alderman, 1987).

APPENDIX 4.B

DEPENDENT VARIABLE: PER CAPITA YUCA PURCHASE (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.440****	.198	1.519**	.410	.338
PER CAPITA EXPENDITURE ²	.000				
INCOME ELASTICITY ^b	.440****	.440	.440	.440	.440
NUMBER PRESENT	.039	-.548	-.203	.142	-.353
RATIO ADULT EQUIVS/PRESENT	.852***	2.052**	1.361	1.592***	-.166
YUCA PRICE	-.614**	-.594	-.346	-1.723***	-.939
CROSS PRICES:					
COMMON RICE	.645	2.501	2.224*	1.846**	.007
RED BEANS	.218	1.588***	-.886	.902**	.751
PLANTAIN	1.605****	.305	1.086***	1.448***	1.225*
VEGETABLE OIL	-.164	1.030	1.158	-.137	-.076
CHICKEN	-2.587***	1.034	-1.751	-2.534***	-3.319
BEEF	-.231	1.929	.402	.218	-.824
LIQUID MILK	.608*	2.145	.544	-.297	2.082**
PASTA	.410	.929	-2.495	-.096	3.078
RAW SUGAR	.479	-2.382*	-.571	1.728*	-.297
HOME CONSUMPTION	-.259**	-.460	-.299	.394**	-.281
REGION:					
OTHER URBAN	.137	1.074**	.713**	-.242	.035
FRONTIER	-.808*	3.264**	-.498	-1.826	-1.014
SUGAR CANE	-.058	1.572*	.187	-1.120*	.736
OTHER RURAL	.033	2.356**	.557	-1.142***	.628
STONES INDEX	-2.346****	2.318	-1.789	-2.354**	-3.335
MILLS RATIO	1.196	-1.168	2.098	.304	-1.681
CONSTANT	10.433****	-16.881*	-.472	10.809*	16.050
ADJUSTED R ²	.29952	.43479	.31325	.30511	.44754
STD. ERROR.	.73865	.57039	.77414	.66528	.69043
F	11.09112	3.50007	3.82803	4.33695	5.33398
SIGNIF. F	.0000	.0002	.0000	.0000	.0000
N	473	66	125	153	108
MEAN PER CAPITA PURCHASES (LBS) (GT 0 PURCHASES)	.115	.081	.102	.118	.152
PERCENT OF HOUSEHOLDS WHICH HAD ZERO PURCHASES	54.0	73.3	53.5	42.5	48.5

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA TOTAL RICE CONSUMPTION (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.851****	.356****	-.043	-.202	.021
PER CAPITA EXPENDITURE ²	-.074****				
INCOME ELASTICITY ^b	.190****	.307	.213	.151	.057
NUMBER PRESENT	-.007	.148***	.018	.029	-.044
RATIO ADULT EQUIVS/PRESENT	.511****	.168	.957****	.466**	1.112****
COMMON RICE PRICE	-.355**	.345	-.511*	-.886***	.558
CROSS PRICES:					
RED BEANS	.217***	.290**	.129	.402****	.125
PLANTAIN	.024	.210**	.100	-.169	-.110
YUCA	-.188**	-.536****	-.196	-.270	-.061
VEGETABLE OIL	-.620****	-.522*	-.816***	-.707**	.038
CHICKEN	.540***	.821**	.498*	.507	.702
BEEF	-.175	.878***	-.032	-.068	-1.964****
LIQUID MILK	.193*	.163	.195	.136	.718**
PASTA	1.028****	.923**	1.149***	1.460****	-.647
RAW SUGAR	.207**	.092	.148	-.382*	.317
HOME CONSUMPTION	.111****	.124**	.012	-.056	.192*
REGION:					
OTHER URBAN	.026	-.122	.028	-.040	.184
FRONTIER	-.196**	-.350	-.230	-.098	-.358
SUGAR CANE	.267****	-.270	.337**	.640****	.411**
OTHER RURAL	.050	-.122	.166	.154	.326*
STONES INDEX MILLS RATIO	.090 (ratio=0)	-.321 (ratio=0)	.092 (ratio=0)	-.210 (ratio=0)	.812 -1383.13
CONSTANT	-3.036***	-1.892	-.385	.233	-2.795
ADJUSTED R ²	.20652	.23186	.19526	.20047	.32551
STD. ERROR.	.40128	.36956	.35792	.39051	.45231
F	14.03976	5.22582	4.40980	4.41795	5.77772
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	1003	267	268	260	199
MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.338	.298	.337	.364	.364
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	1.8	2.1	.8	.7	3.3

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA COMMON RICE CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.666***		.148	-.477	.136
PER CAPITA EXPENDITURE ²	-.049**	.056****			
INCOME ELASTICITY ^b	.235***	.307	.243	.203	.138
NUMBER PRESENT	.049	.207****	.076	-.052	.050
RATIO ADULT EQUIVS/PRESENT	.507****	.257	1.083****	-.016	.705*
COMMON RICE PRICE	-.419*	.095	-.238	-.373	-1.396**
CROSS PRICES:					
RED BEANS	.141	.243	.076	.257	-.032
PLANTAIN	.121*	.196*	.263**	-.117	.059
YUCA	-.246**	-.497***	-.189	-.195	.036
VEGETABLE OIL	-.251	-.399	-.724*	-.402	.431
CHICKEN	.817****	.994**	.651*	.662	.135
BEEF	-.008	.984***	.214	-.012	-1.454**
LIQUID MILK	-.089	-.059	-.002	-.070	-.450
PASTA	.849***	1.097**	1.523***	1.110*	.314
RAW SUGAR	.328**	.155	.044	-.328	.557*
HOME CONSUMPTION	.087**	.176**	.047	.002	.070
REGION:					
OTHER URBAN	-.069	-.052	.067	-.066	-.353*
FRONTIER	-.343***	-.387	-.242	-.206	-1.009**
SUGAR CANE	.126	-.277	.346*	.511**	-.331
OTHER RURAL	.020	-.128	.163	.148	-.245
STONES INDEX	.283	-.225	-.047	-.319	.385
MILLS RATIO	-1.992**	1.285	7.390	.149	-2.094***
CONSTANT	-4.204***	-2.268	-.781	1.869	-1.877

ADJUSTED R ²	.17949	.20576	.20248	.12993	.25050
STD. ERROR.	.49206	.42971	.45167	.49724	.51540
F	10.13582	4.35484	4.19890	2.55300	3.45660
SIGNIF. F	.0000	.0000	.0000	.0005	.0000
N	878	260	253	209	148

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.321	.289	.317	.351	.370
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	18.3	8.5	6.8	19.2	32.5

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA RED BEAN CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.224			.239	
PER CAPITA EXPENDITURE ²	.018	-.007	.052		.015
INCOME ELASTICITY ^b	.385	.357	.379	.394	.417
NUMBER PRESENT RATIO ADULT EQUIVS/PRESENT	.054 .505***	.151 .240	.330*** .414	-.008 .161	-.285** .140
RED BEAN PRICE	-.528****	-.514*	-.785****	-.289	-.505*
CROSS PRICES:					
COMMON RICE	-.581**	.884	-1.378**	-.709	-.566
PLANTAIN	-.011	-.080	.140	.019	-.406*
YUCA	-.287**	-.068	-.458	-.210	.159
VEGETABLE OIL	-1.197****	-.821	-1.537***	-1.464***	-.115
CHICKEN	.627**	.241	.915	.941	.575
BEEF	-.340	-.243	.146	-.330	-1.747**
LIQUID MILK	-.587****	-.765*	-.476	-.726**	-.721
PASTA	1.624****	.688	2.103***	1.578**	.048
RAW SUGAR	.441***	-.253	.679*	.622	.653*
HOME CONSUMPTION	.060	-.033	-.081	-.177	.181
REGION:					
OTHER URBAN	-.140*	-.076	-.170	-.041	-.002
FRONTIER	-.559***	-.258	-.396	-.341	-.651
SUGAR CANE	-.003	.039	.277	.278	-.467
OTHER RURAL	-.249**	-.422	-.105	-.155	-.097
STONES INDEX MILLS RATIO	-.296 .112	-.212 -.506	.123 -.575	-1.496** -8.846**	.277 -4.369*
CONSTANT	-1.302	-1.199	-3.447	4.334	-2.239
ADJUSTED R ²	.21934	.11848	.21293	.26673	.26354
STD. ERROR.	.66098	.70938	.63154	.65361	.61841
F	13.26911	2.63980	4.34104	5.34686	4.16700
SIGNIF. F	.0000	.0003	.0000	.0000	.0000
N	918	245	248	240	178
MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.050	.041	.050	.053	.060
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	15.4	15.3	9.9	11.3	16.6

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA PLANTAIN CONSUMPTION (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000		1.441***	.870**	.183
PER CAPITA EXPENDITURE ²	.053****	.143****			
INCOME ELASTICITY ^b	.481****	.397	.457	.501	.568
NUMBER PRESENT	.076	-.078	.263*	-.153	-.018
RATIO ADULT EQUIVS/PRESENT	.643***	-.453	1.084**	.978**	.615
PLANTAIN PRICE	-.908****	-2.156****	-1.445****	-.806***	-.883****
CROSS PRICES:					
COMMON RICE	-.071	.530	.420	.097	-.095
RED BEANS	-.116	-.684*	-.541*	.499*	-.071
YUCA	.250	.908**	.490	.173	.191
VEGETABLE OIL	-.304	.640	.657	-.640	-.814
CHICKEN	1.072***	2.918***	1.499**	.992	.049
BEEF	-.431	-1.152	-.544	-.069	-1.754**
LIQUID MILK	-.326	-.355	-.767*	-.369	1.393***
PASTA	.074	-1.073	-.436	.999	.577
RAW SUGAR	.739****	.759	.545	-.541	.464
HOME CONSUMPTION	.240****	.606****	.423***	.252*	.245*
REGION:					
OTHER URBAN	-.083	-.155	-.232	-.066	.038
FRONTIER	-.522**	-.558	-1.260***	-.179	-.906
SUGAR CANE	.049	.216	-.452	-.061	.834***
OTHER RURAL	-.284**	.054	-.553**	-.355	-.139
STONES INDEX	-.951**	.284	-.875	-1.574**	-1.841**
MILLS RATIO	-1.981***	1.874*	-1.159	-8.010**	.395
CONSTANT	2.222	-7.576	-5.121	1.060	9.036**

ADJUSTED R ²	.35519	.41616	.35366	.29012	.32938
STD. ERROR.	.74679	.78758	.74530	.71394	.59833
F	24.05303	7.55682	7.21039	5.65911	5.39578
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	838	185	228	229	180

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.362	.244	.341	.392	.527

PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	22.1	36.3	19.6	13.7	13.5

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA YUCA CONSUMPTION (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000			.011	.494**
PER CAPITA EXPENDITURE ²	.043****	.032	.107*		
INCOME ELASTICITY ^b	.388****	.320	.372	.407	.459
NUMBER PRESENT	.038	.281	-.412**	.029	-.153
RATIO ADULT EQUIVS/PRESENT	.375	-1.381***	.911	1.617****	-1.957**
YUCA PRICE	-1.769****	-1.824***	-2.077****	-1.667****	.041
<u>CROSS PRICES:</u>					
COMMON RICE	-.052	-3.985***	.990	-.063	-.030
RED BEANS	-.136	.153	-.438	.802**	.532
PLANTAIN	1.873****	1.131*	1.479****	1.137**	1.259*
VEGETABLE OIL	.475	2.006*	.104	.662	-1.433
CHICKEN	-3.219****	-2.064	-1.020	-3.130***	-3.299**
BEEF	.434	.414	1.364**	-.228	-1.704
LIQUID MILK	1.001****	.479	.004	.650	2.351****
PASTA	-.586	-1.615	-3.163***	.648	2.468
RAW SUGAR	.406	1.346*	.965	.522	-.515
HOME CONSUMPTION	.471****	.293	.645****	.426***	.419
<u>REGION:</u>					
OTHER URBAN	.106	.356	.684***	-.223	.213
FRONTIER	.494*	1.267*	.884*	.211	-1.285
SUGAR CANE	.847****	1.234**	.502	-.052	.945
OTHER RURAL	.260	1.322***	-.269	-.158	.551
STONES INDEX	-1.093**	1.054	.013	-2.590****	-5.159***
MILLS RATIO	1.042	-.205	-2.003	-1.287	-.274
CONSTANT	4.260*	-11.986**	-4.260	11.528**	24.899***

ADJUSTED R ²	.42139	.52278	.54464	.45228	.42838
STD. ERROR.	.81681	.79075	.77678	.71747	.70460
F	24.88757	8.66818	11.82446	8.80347	5.60886
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	657	141	182	190	124

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.166	.166	.160	.154	.189
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	36.7	45.1	31.8	26.7	38.6

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA VEGETABLE OIL CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	1.848****				
PER CAPITA EXPENDITURE ²	-.148****	.085****	.073***	.045**	.005
INCOME ELASTICITY ^b	.517****	.745	.571	.449	.253
NUMBER PRESENT	-.119****	.097	-.138**	-.181***	-.100
RATIO ADULT EQUIVS/PRESENT	.107	-.030	.416*	-.112	1.309****
VEGETABLE OIL PRICE	-.732****	-1.566****	-.897***	-.797***	-1.554****
CROSS PRICES:					
COMMON RICE	.344**	-.268	-.071	.088	.268
RED BEANS	-.027	.038	-.257*	.011	.338*
PLANTAIN	.096*	.297**	-.021	.214**	-.280*
YUCA	.041	-.207	.262	-.021	.445
CHICKEN	-.107	.615	-.227	-.114	.164
BEEF	-.219	.087	-.161	.146	-.644
LIQUID MILK	-.162	-.307	.092	-.508**	.730**
PASTA	-.128	.730	.042	.204	2.030**
RAW SUGAR	.122	.645**	-.143	.127	-.319
HOME CONSUMPTION	.111***	.252***	.032	-.027	.107
REGION:					
OTHER URBAN	.042	-.440***	.176*	-.005	.451****
FRONTIER	-.336****	-.932***	-.024	-.428**	.242
SUGAR CANE	.127	-.306	.566****	.095	.369*
OTHER RURAL	.004	-.726****	.399***	.023	.286
STONES INDEX	-.014	.202	.429	-.702*	-1.453**
MILLS RATIO	-1.000	321.032	105.785	(ratio=0)	-53.933
CONSTANT	-6.476****	-3.423	-4.639**	.711	6.719**

ADJUSTED R ²	.41416	.28338	.24628	.20163	.16647
STD. ERROR.	.45974	.50983	.40957	.39700	.47399
F	34.26065	6.14070	5.28046	4.41609	3.03710
SIGNIF. F	.0000	.0000	.0000	.0000	.0000
N	989	261	263	258	205

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.057	.034	.054	.072	.085
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	6.7	8.3	3.7	1.6	3.6

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA CHICKEN CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000		.067	.768*	.457***
PER CAPITA EXPENDITURE ²	.057****	.107***			
INCOME ELASTICITY ^b	.520****	.426	.491	.540	.614
NUMBER PRESENT	-.174***	-.140	.084	-.128	.021
RATIO ADULT EQUIVS/PRESENT	.253	1.014**	.256	-.028	.405
CHICKEN PRICE	-1.369****	-1.647*	-1.957***	-1.940***	1.122
CROSS PRICES:					
COMMON RICE	.316	3.665***	.397	-.237	-.024
RED BEANS	-.028	.315	.052	-.080	-.221
PLANTAIN	-.071	-.158	-.067	-.058	-.253
YUCA	-.097	-.115	-.309	.409	-.138
VEGETABLE OIL	.371	-.927	-.195	.885	1.233
BEEF	-.249	-.131	-.498	-.649	.831
LIQUID MILK	-.169	-.036	.231	-.649*	-.230
PASTA	-.706	-4.032*	-.076	-1.892**	-.881
RAW SUGAR	-.021	-1.352**	-.518	-.226	.929**
HOME CONSUMPTION	.106*	.255*	.141	.015	.116
REGION:					
OTHER URBAN	-.087	-.125	-.184	.110	-.313*
FRONTIER	-.003	.082	-.477	.631*	-.780
SUGAR CANE	-.073	-.663	-.143	.231	-.629*
OTHER RURAL	-.015	-.417	.030	.299	-.635**
STONES INDEX	.555	-.131	-.230	.887	.263
MILLS RATIO	-1.036**	2.387*	.285	-1.635	.921
CONSTANT	-5.139***	-3.558	-.760	-9.613**	-7.614

ADJUSTED R ²	.30687	.16716	.08455	.08984	.14057
STD. ERROR.	.61957	.59637	.58385	.59427	.58482
F	17.38118	2.43510	1.93281	2.08576	2.25938
SIGNIF. F	.0000	.0015	.0126	.0057	.0032
N	741	144	203	221	155

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.089	.049	.079	.102	.160
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	29.7	46.1	26.9	15.3	25.6

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA BEEF CONSUMPTION (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000		2.266**	.398	
PER CAPITA EXPENDITURE ²	.044****	.011			.001
INCOME ELASTICITY ^b	.406****	.330	.381	.416	.474
NUMBER PRESENT	-.384****	-.614	-.068	.644*	-.487****
RATIO ADULT EQUIVS/PRESENT	.370*	-.889	.735*	-1.023	1.322**
BEEF PRICE	-.920****	-.344	-1.360**	-.496	-.447
CROSS PRICES:					
COMMON RICE	-.027	3.118	-.454	-4.092***	.314
RED BEANS	-.121	-.941	.278	-1.062***	-.027
PLANTAIN	.069	.796*	-.356	.868**	-.207
YUCA	.004	-.374	-.057	1.045**	.265
VEGETABLE OIL	-.601*	-1.144	-1.256**	-.965*	-1.204
CHICKEN	-.171	-3.197*	-.741	3.234***	-.578
LIQUID MILK	.338	2.534*	1.234***	-.552	-.023
PASTA	.729	1.632	1.226	2.519***	1.621
RAW SUGAR	.131	1.523*	-1.077**	2.412***	-.925**
HOME CONSUMPTION	.125*	-.049	.084	-.020	.040
REGION:					
OTHER URBAN	.251**	1.356**	.380*	-.473**	.501**
FRONTIER	.090	1.656	.509	-3.473***	.957
SUGAR CANE	.493***	1.353	1.235***	-.748*	.821*
OTHER RURAL	.230	1.160	.674**	-1.352***	.742
STONES INDEX	.571	-.288	.093	-5.441**	.913
MILLS RATIO	-.428	-.991	.969	11.961***	-1.697
CONSTANT	-3.378	7.626	-11.947*	19.311**	-3.698

ADJUSTED R ²	.32454	.45865	.25837	.20085	.25980
STD. ERROR.	.60790	.69250	.56577	.54709	.59482
F	14.18876	4.77017	3.66505	3.03572	3.28141
SIGNIF. F	.0000	.0000	.0000	.0001	.0000

N	550	90	154	163	131

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.062	.035	.053	.063	.098

PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	45.8	64.0	42.4	38.1	33.8

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA LIQUID MILK CONSUMPTION (LITRES)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000		1.614*	.266	.397**
PER CAPITA EXPENDITURE ²	.029**	-.007			
INCOME ELASTICITY ^b	.265**	.214	.250	.274	.312
NUMBER PRESENT	-.375****	-.586**	-.150	-.414***	-.329*
RATIO ADULT EQUIVS/PRESENT	-.611**	-2.022****	-.648	.476	-.072
LIQUID MILK PRICE	-1.134****	-1.806***	-1.975***	-.644	-1.070
<u>CROSS PRICES:</u>					
COMMON RICE	.176	-.699	1.315	.854	.643
RED BEANS	-.078	.209	-.659	-.738	-.493
PLANTAIN	-.513****	-.545	-.120	-.208	-1.000****
YUCA	.864****	.981**	.557	.836	-.578
VEGETABLE OIL	1.101***	3.842**	-.675	1.977***	3.005****
CHICKEN	.698	-1.402	1.276	.125	1.419
BEEF	-1.071***	-1.356*	-.532	.051	-1.428*
PASTA	-1.617***	-3.251	.324	-2.904**	-5.966****
RAW SUGAR	-.028	-.995*	-.273	1.276**	.228
HOME CONSUMPTION	.255***	.181	.103	.309*	.418**
<u>REGION:</u>					
OTHER URBAN	.375**	.685**	-.297	.759**	-.094
FRONTIER	.122	.828	-1.398**	1.495***	-.193
SUGAR CANE	-.040	.149	-.540	.503	-.073
OTHER RURAL	.573***	1.266****	-.169	.832**	.310
STONES INDEX	.824	1.880	-2.114*	1.875	3.036***
MILLS RATIO	-1.788**	-3.068	.227	-1.445	-2.177
CONSTANT	-6.893***	-14.274***	1.166	-11.313*	-23.023****

ADJUSTED R ²	.31338	.41929	.23263	.27544	.30411
STD. ERROR. F	.82829	.63284	.89470	.85133	.72335
SIGNIF. F	15.65071	5.76544	3.30397	4.59248	4.29942
	.0000	.0000	.0000	.0000	.0000
N	643	133	153	190	152

MEAN PER CAPITA CONSUMPTION (LITRES) (GT 0 CONSUMERS)	.130	.083	.113	.156	.199
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	39.3	51.2	43.3	27.7	26.7

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA PASTA CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.095*		.430	.344	.167
PER CAPITA EXPENDITURE ²		.023			
INCOME ELASTICITY ^b	.095*	.095	.095	.095	.095
NUMBER PRESENT	-.380****	-.414****	-.204	-.545**	-.328*
RATIO ADULT EQUIVS/PRESENT	.131	.000	.446	.189	.556
PASTA PRICE	-.195	-.084	-1.017	-1.104	-.735
CROSS PRICES:					
COMMON RICE	.789***	-.180	.853	-.078	.825
RED BEANS	-.191	.209	-.256	-.213	.024
PLANTAIN	-.051	-.539**	.075	.106	.306
YUCA	-.127	.024	-.234	-.390	.652
VEGETABLE OIL	-.220	-1.174**	.614	.293	.220
CHICKEN	.479	1.317*	-.501	-.365	1.536
BEEF	.080	-.866	.439	-.123	-.476
LIQUID MILK	.610***	.401	.297	.772*	.153
RAW SUGAR	.087	.065	.432	.219	.713
HOME CONSUMPTION	.011	.075	.184	-.048	-.123
REGION:					
OTHER URBAN	.084	.073	.136	.142	.426**
FRONTIER	.213	.110	.000	.868**	-.605
SUGAR CANE	.248	.307	-.140	.495	.278
OTHER RURAL	.299*	.357	.247	.374	.215
STONES INDEX	-.569	-.493	-.282	-.152	-.826
MILLS RATIO	-.703	-3.656***	-4.959	.193	1.208
CONSTANT	-.618	-.955	-3.628	-4.142	.989
ADJUSTED R ²	.11438	.13597	.03507	.14429	.21687
STD. ERROR.	.67882	.66594	.73079	.61416	.66874
F	6.11467	2.73110	1.38712	2.64411	3.04921
SIGNIF. F	.0000	.0002	.1323	.0004	.0001
N	793	221	214	196	149
MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.031	.027	.029	.030	.038
PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	27.7	20.5	23.2	27.1	28.9

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA RAW SUGAR CONSUMPTION (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.512		.676*		
PER CAPITA EXPENDITURE ²	-.025	.058***		-.016	.033†
INCOME ELASTICITY ^b	.293	.327	.297	.276	.245
NUMBER PRESENT	-.297****	-.236**	-.163	-.256*	-.359*
RATIO ADULT EQUIVS/PRESENT	-.112	-.173	.416	-.076	-.775
RAW SUGAR PRICE	.024	-.757**	-.124	1.076*	-.527
<u>CROSS PRICES:</u>					
COMMON RICE	-.659*	-1.627**	-.097	-1.994**	.984
RED BEANS	-.317**	-.037	-.434*	-.380	-1.265**
PLANTAIN	-.083	-.333**	-.311*	.501**	.208
YUCA	.328**	.455*	.292	-.545	.779
VEGETABLE OIL	.144	-.023	-1.750***	.298	1.588
CHICKEN	1.878****	2.528****	2.064****	2.091***	.932
BEEF	-.586**	-.351	-.767*	.337	-1.687*
LIQUID MILK	-1.063****	-.991***	-.482	-1.762****	-1.904**
PASTA	-1.246***	1.015	-.009	-2.102**	-4.849***
HOME CONSUMPTION	.099*	.116	.011	-.031	.249
<u>REGION:</u>					
OTHER URBAN	-.154	-.064	-.027	-.414*	-.405
FRONTIER	-.277	-.559	-.307	-.322	-.933
SUGAR CANE	-.166	-.139	.065	-.126	-1.065
OTHER RURAL	.225*	.220	.391	.005	-.232
STONES INDEX	.615*	-.822	-.508	2.288**	.552
MILLS RATIO	-.999	5.377	7.642***	-3.547**	-2.885**
CONSTANT	-8.157****	-2.731	-2.428	-14.315***	-6.442

ADJUSTED R ²	.27298	.27713	.28868	.34798	.17924
STD. ERROR.	.68731	.56006	.61494	.77544	.84496
F	15.42881	5.63883	5.78894	5.93665	2.36492
SIGNIF. F	.0000	.0000	.0000	.0000	.0026

N	808	243	237	186	126

MEAN PER CAPITA CONSUMPTION (LBS) (GT 0 CONSUMERS)	.080	.061	.082	.091	.101

PERCENT OF HOUSEHOLDS WHICH WERE ZERO CONSUMERS	27.3	13.9	13.2	26.7	45.4

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA TOTAL RICE PURCHASE (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.910****	.338****	-.041	-.049	-.092
PER CAPITA EXPENDITURE ²	-.087****				
INCOME ELASTICITY ^b	.132****	.262	.160	.088	-.026
NUMBER PRESENT	-.093**	.041	-.025	.077	-.120
RATIO ADULT EQUIVS/PRESENT	.599****	.302	.701****	.397*	1.161****
COMMON RICE PRICE	-.426***	-.257	-.551*	-.835***	.449
CROSS PRICES:					
RED BEANS	.144**	.214	.144	.359**	-.042
PLANTAIN	-.041	.061	.015	-.157	-.222
YUCA	-.058	-.392**	-.078	-.130	.067
VEGETABLE OIL	-.433***	-.508	-.523*	-.458	-.884*
CHICKEN	.647****	1.167***	.465	.285	1.333**
BEEF	-.162	.794***	-.085	-.212	-1.365****
LIQUID MILK	.140	-.074	.133	-.009	.820**
PASTA	1.055****	1.273***	.756*	1.297***	.878
RAW SUGAR	.232**	.122	.103	-.532**	.278
HOME CONSUMPTION	.051	.066	.005	-.081	.079
REGION:					
OTHER URBAN	.084	-.119	.059	-.038	.224*
FRONTIER	-.215**	-.478**	-.178	-.186	-.447
SUGAR CANE	.239***	-.234	.304*	.534***	.481**
OTHER RURAL	.054	-.210	.124	.085	.153
STONES INDEX	-.090	-.569	-.021	-.720	.101
MILLS RATIO	-1.450	-2.226	3.109	.000	1.076
CONSTANT	-2.256*	-.918	-.381	1.620	1.577
ADJUSTED R ²	.17328	.13865	.08750	.15635	.30099
STD. ERROR.	.40013	.37144	.37112	.39402	.43287
F	10.04303	2.89145	2.18909	3.18681	4.78927
SIGNIF. F	.0000	.0001	.0031	.0000	.0000
N	907	236	249	237	177
MEAN PER CAPITA PURCHASE (LBS) (GT 0 PURCHASES)	.330	.291	.329	.365	.349
PERCENT OF HOUSEHOLDS WHICH HAD ZERO PURCHASES	11.2	14.5	8.6	8.3	12.2

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\ln Y = a_1 + 2a_2(\ln Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA TOTAL RICE PURCHASE (LBS.)
WITH COMMON AND SELECT RICE PRICE
PER CAPITA EXPENDITURE QUANTILES 3 AND 4

INDEPENDENT VARIABLES*	QUANTILE 3	QUANTILE 4
PER CAPITA EXPENDITURE	.190	-.120
NUMBER PRESENT	.079	-.184*
RATIO ADULT EQUIVS/PRESENT	.392	.821**
COMMON RICE PRICE	-.893*	.548
SELECT RICE PRICE	.033	.646
CROSS PRICES:		
RED BEANS	.495	.668
PLANTAIN	-.026	-.655
YUCA	-.205	-.265
VEGETABLE OIL	-.452	-1.172*
CHICKEN	-.129	1.013
BEEF	-.211	-1.121
LIQUID MILK	.350	.978**
PASTA	1.702*	2.388*
RAW SUGAR	-.307	-.706
HOME CONSUMPTION	-.163*	.002
REGION:		
OTHER URBAN	.046	.312*
FRONTIER	-.305	N.A.
SUGAR CANE	.666**	.882**
OTHER RURAL	-.097	.209
STONES INDEX	-2.190**	-.963
MILLS RATIO	-6.982	-4.331*
CONSTANT	7.665*	5.261

ADJUSTED R ²	.15107	.33462
STD. ERROR.	.36908	.39320
F	2.33888	4.26893
SIGNIF. F	.0019	.0000
N	159	131

MEAN PER CAPITA PURCHASE (LBS) (GT 0 PRUCHASE)	.342	.346
PERCENT OF HOUSEHOLDS WHICH HAD ZERO PURCHASES	8.3	12.2

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA COMMON RICE PURCHASE (LBS)

INDEPENDENT VARIABLES ^a	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.151****	.359*****	-.239	-.342	-.343**
PER CAPITA EXPENDITURE ²	.000				
INCOME ELASTICITY ^b	.151****	.151	.151	.151	.151
NUMBER PRESENT	-.149***	.034	.009	-.141	-.320**
RATIO ADULT EQUIVS/PRESENT	.617****	.343*	1.164*****	-.285	.927**
COMMON RICE PRICE	-.628***	-.213	-1.103**	-.168	.791
CROSS PRICES:					
RED BEAN	.067	.195	.200	.095	-.207
PLANTAIN	.029	.057	.016	-.044	.153
YUCA	-.024	-.416**	-.021	.025	.221
VEGETABLE OIL	-.262	-.645*	-.673*	-.220	.637
CHICKEN	.768*****	1.113***	.631	.436	1.072
BEEF	-.100	.819***	-.082	-.068	-1.186*
LIQUID MILK	-.106	-.013	.074	-.054	-.079
PASTA	.943*****	1.434***	.999**	1.225**	-.602
RAW SUGAR	.405***	.142	.240	-.175	.472
HOME CONSUMPTION	.043	.065	.041	-.084	.173
REGION:					
OTHER URBAN	-.047	-.147	.173	-.183	-.176
FRONTIER	-.501****	-.561**	-.072	-.365	-1.296**
SUGAR CANE	.000	-.285	.474**	.230	-.483
OTHER RURAL	-.104	-.233	.246	-.090	-.561
STONES INDEX	-.281	-.736*	.092	-.879	-1.325
MILLS RATIO	-1.385***	-1.459	-.477	-.790	-1.328
CONSTANT	.324	.045	-.075	4.790	8.735

ADJUSTED R ²	.15678	.14227	.16250	.11436	.24925
STD. ERROR.	.44582	.38136	.42755	.49174	.48787
F	8.18646	2.84946	3.22166	2.23319	3.00860
SIGNIF. F	.0000	.0001	.0000	.0030	.0001
N	774	224	230	192	122

MEAN PER CAPITA PURCHASES (LBS) (GT 0 PURCHASES)	.322	.289	.313	.353	.356
PERCENT OF HOUSEHOLDS WHICH HAD ZERO PURCHASES	28.3	23.7	17.1	28.8	44.6

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $\hat{Y} = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

2/b

APPENDIX 4.B CONT.

DEPENDENT VARIABLE: PER CAPITA PLANTAIN PURCHASE (LBS)

INDEPENDENT VARIABLES*	TOTAL POPULATION	QUARTILE 1	QUARTILE 2	QUARTILE 3	QUARTILE 4
PER CAPITA EXPENDITURE	.000	.264	1.396***	.809	.077
PER CAPITA EXPENDITURE ²	.046****				
INCOME ELASTICITY ^b	.423****	.344	.397	.435	.496
NUMBER PRESENT	-.189**	-1.220***	.313**	.107	-.134
RATIO ADULT EQUIVS/PRESENT	.705***	-.569	1.611***	.958**	1.033*
PLANTAIN PRICE	-.498****	-1.380**	-1.062***	-.862**	-.560**
CROSS PRICES:					
COMMON RICE	.385	-.512	-.871	1.510**	.705
RED BEANS	.137	.093	-.320	.452	.015
YUCA	-.117	1.415**	-.574	.808	-.413
VEGETABLE OIL	-.172	-1.449	-.521	.133	-.398
CHICKEN	.797*	3.111***	2.154**	1.549*	.264
BEEF	-.432	-.467	.391	-1.153*	-2.350***
LIQUID MILK	.022	-.516	-.249	-.454	1.970***
PASTA	-.011	-.539	.585	-1.264	-.957
RAW SUGAR	1.016****	.841	1.328**	.610	.525
HOME CONSUMPTION	-.002	-.054	.591***	-.182	.057
REGION:					
OTHER URBAN	-.110	.613*	-.146	-.165	-.048**
FRONTIER	-.618**	1.109	-.550	-1.535***	N.A.
SUGAR CANE	-.124	1.304	.426	-1.373***	.322
OTHER RURAL	-.265*	1.301**	-.357	-.710**	-.202
STONES INDEX	-.728	1.193	.452	-2.223**	-1.264
MILLS RATIO	-1.077*	-3.181	-3.057**	3.804*	.104
CONSTANT	2.288	-5.968	-11.032**	5.261	6.964

ADJUSTED R ²	.24658	.44785	.34057	.09672	.15455
STD. ERROR.	.76652	.66857	.71786	.73042	.63170
F	11.66913	5.33939	5.44161	2.02792	2.46237
SIGNIF. F	.0000	.0000	.0000	.0082	.0015
N	653	108	173	193	153

MEAN PER CAPITA PURCHASE (LBS) (GT 0 PURCHASES)	.287	.158	.264	.304	.431
PERCENT OF HOUSEHOLDS WHICH HAD ZERO PURCHASES	38.9	62.6	37.7	29.2	28.1

a. Expenditure, prices, household size, adult equivalent ratio, and consumption are expressed in logarithmic form.

b. Computed using the formula: $Y = a_1 + 2a_2(\log Y/N)$. (See 4.1.1)

**** = T significant at $p < .001$

*** = T significant at $p < .01$

** = T significant at $p < .05$

* = T significant at $p < .10$

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APPENDIX 5.A

AVERAGE DAILY CALORIES AND PROTEIN PER ADULT EQUIVALENT
BY EXPENDITURE CLASS

	CALORIES		PROTEIN (GMS.)	
	MEAN	SD	MEAN	SD
TOTAL POPULATION	2768.16	1533.09	60.86	33.97
DECILE 1	1638.33	822.44	33.63	16.69
QUARTILE 1	2020.06	954.20	41.89	22.32
QUARTILE 2	2621.78	1071.27	56.37	26.69
QUARTILE 3	3129.21	1618.40	68.73	32.77
QUARTILE 4	3342.73	1954.73	76.78	41.26
DECILE 10	3483.03	2452.55	83.79	52.13
F SIGNIFICANCE	.0000		.0000	

APPENDIX 5.B

AVERAGE DAILY CALORIES AND PROTEIN PER ADULT EQUIVALENT
BY REGION

	CALORIES		PROTEIN (GMS.)	
	MEAN	SD	MEAN	SD
TOTAL POPULATION	2768.16	1533.09	60.86	33.97
SANTO DOMINGO	2351.27	809.87	55.70	22.98
OTHER URBAN	2650.34	1330.13	63.02	32.78
FRONTIER RURAL	2622.09	1290.61	53.43	30.35
CANE AND LIVESTOCK	3108.73	2001.04	63.02	40.82
OTHER RURAL	3032.23	1748.21	62.46	37.76
F. SIG.	.0000		.0006	

APPENDIX 5.C

AVERAGE DAILY CASH EXPENDITURE PER HOUSEHOLD
BY EXPENDITURE CLASS

	RD\$/DAY	SD	N
TOTAL POPULATION	6.44	5.22	1309
DECILE 1	3.63	2.66	102
QUARTILE 1	4.74	3.64	287
QUARTILE 2	6.34	5.02	308
QUARTILE 3	7.80	5.67	305
QUARTILE 4	6.79	5.93	306
DECILE 10	6.31	5.82	121
F SIGNIFICANCE	.0000		

APPENDIX 5.D

AVERAGE DAILY CASH EXPENDITURE PER HOUSEHOLD
BY REGION

	RD\$/DAY	SD	N
TOTAL POPULATION	6.44	5.22	1309
NACIONAL DISTRICT	8.03	5.27	305
OTHER URBAN	6.74	5.75	360
FRONTIER RURAL	4.01	3.59	195
CANE AND LIVESTOCK	5.49	4.53	218
OTHER RURAL	5.67	4.81	234
F SIGNIFICANCE	.0000		

APPENDIX 5.E

AVERAGE DAILY CASH EXPENDITURE PER HOUSEHOLD
BY CALORIC ADEQUACY GROUPS

	RD\$/DAY	SD	N
TOTAL POPULATION	6.44	5.22	1309
LESS THAN 75%	3.81	3.91	221
BETWEEN 75 AND 100%	6.37	4.66	305
GREATER THAN 100%	7.24	5.50	777
F SIGNIFICANCE	.0000		

APPENDIX 5.F

AVERAGE DAILY CASH EXPENDITURE PER HOUSEHOLD
BY PROTEIN ADEQUACY GROUPS

	RD\$/DAY	SD	N
TOTAL POPULATION	6.44	5.22	1309
LESS THAN 75%	4.16	4.01	300
BETWEEN 75 AND 100%	6.26	4.51	302
GREATER THAN 100%	7.52	5.63	701
F SIGNIFICANCE	.0000		

APPENDIX 5.G

AVERAGE DAILY CASH EXPENDITURE PER HOUSEHOLD
BY HOME CONSUMPTION

	RD\$/DAY	SD	N
TOTAL POPULATION	6.44	5.22	1309
NO HOME CONSUMPTION	6.84	5.52	870
SOME HOME CONSUMPTION	5.65	4.47	439
F SIGNIFICANCE	.0001		

APPENDIX 5.H

PERCENT OF MONTHLY CASH EXPENDITURE SPENT ON FOOD
BY REGION

	%	SD	N
TOTAL POPULATION	57.79	18.73	1319
NACIONAL DISTRICT	56.54	16.21	297
OTHER URBAN	54.17	17.92	345
FRONTIER RURAL	59.71	19.77	205
SUGAR CANE AND LIVESTOCK RURAL	61.18	16.11	216
OTHER RURAL	59.65	21.87	256
F SIGNIFICANCE	.0000		

APPENDIX 5.I

PERCENT OF REAL INCOME ACCOUNTED FOR
BY CASH EXPENDITURE ON FOOD

BY REGION

	%	SD	N
TOTAL POPULATION	53.07	18.00	1287
NACIONAL DISTRICT	54.64	16.07	289
OTHER URBAN	51.55	17.25	337
FRONTIER RURAL	47.95	18.78	200
SUGAR CANE AND LIVESTOCK RURAL	54.46	15.53	207
OTHER RURAL	52.87	20.97	253
F SIGNIFICANCE	.0004		

APPENDIX 5.J

PERCENT OF MONTHLY CASH EXPENDITURE SPENT ON FOOD
BY EXPENDITURE CLASS

	%	SD	N
TOTAL POPULATION	57.79	18.73	1319
DECILE 1	50.01	29.63	125
QUARTILE 1	58.50	23.52	319
QUARTILE 2	63.15	14.70	321
QUARTILE 3	60.56	15.42	322
QUARTILE 4	49.52	16.73	322
DECILE 10	40.97	15.60	128
F SIGNIFICANCE	.0000		

APPENDIX 5.K

PERCENT OF REAL INCOME ACCOUNTED FOR
BY CASH EXPENDITURE ON FOOD

BY EXPENDITURE CLASS

	%	SD	N
TOTAL POPULATION	53.07	18.00	1287
DECILE 1	41.31	27.39	128
QUARTILE 1	50.42	22.67	322
QUARTILE 2	57.44	15.28	321
QUARTILE 3	57.07	15.02	322
QUARTILE 4	47.34	15.81	322
DECILE 10	39.78	15.06	128
F SIGNIFICANCE	.0004		

APPENDIX 6.A

PERCENT OF PROTEIN CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	79.48	29.76	83.07	23.32	87.67	16.24	91.77	16.65	91.24	14.02	93.00	9.67	.0237
OWN BUSINESS	9.86	29.58	3.39	15.03	2.15	10.21	1.77	10.63	1.66	8.10	1.56	7.73	.8244
PRIVATE PRODUCER	.00	.00	.34	2.09	.23	2.13	.52	2.51	.78	3.20	.75	2.39	.5781
HOME PRODUCTION	.00	.00	.25	1.76	.14	1.30	.20	1.13	.19	1.00	.13	.75	.9746
IN-KIND PAY	.00	.00	1.61	11.33	.00	.00	.00	.00	.00	.00	.00	.00	.1859
PRIVATE GIFTS	10.64	15.71	9.59	16.04	7.95	12.37	3.18	10.98	2.69	6.53	1.44	4.89	.0006
STATE RETAIL	.00	.00	.09	.48	1.37	5.82	.85	4.72	1.24	5.37	.46	2.57	.4880
STATE GIFTS	.00	.00	.54	2.50	.30	1.45	.17	.95	.10	.89	.00	.00	.3833
OTHER	.00	.00	1.08	6.69	.15	.89	1.50	6.68	2.06	6.34	2.63	5.28	.1776
N OF CASES	9		49		80		76		80		31		

OTHER URBAN AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	66.93	29.75	74.30	25.37	82.19	19.32	81.41	23.52	87.57	21.08	88.60	19.91	.0041
OWN BUSINESS	.17	.65	.62	3.26	1.89	8.55	4.48	16.97	2.40	10.08	2.22	9.84	.2209
PRIVATE PRODUCER	2.43	6.34	1.92	5.41	2.53	5.92	3.20	6.94	1.65	4.92	1.47	4.68	.2652
HOME PRODUCTION	.51	1.67	2.40	6.68	3.05	7.57	2.58	7.28	2.09	6.94	1.79	6.39	.8548
IN-KIND PAY	.00	.00	.04	.33	.34	1.66	.14	1.18	.00	.00	.00	.00	.1450
PRIVATE GIFTS	22.15	28.30	14.44	23.39	5.66	10.55	4.45	9.62	3.39	11.57	3.46	14.18	.0000
STATE RETAIL	1.39	4.64	1.60	4.76	.63	2.39	.05	.44	.01	.17	.00	.00	.0001
STATE GIFTS	3.74	8.12	2.60	6.53	1.41	5.21	.80	4.36	.04	.47	.09	.66	.0631
OTHER	2.64	7.19	2.04	5.41	2.26	5.11	2.86	8.67	2.81	11.21	2.34	8.36	.3217
N OF CASES	29		56		65		98		110		55		

FRONTIER RURAL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	49.88	24.27	47.47	24.22	48.66	26.59	55.53	23.78	50.20	23.84	43.44	34.97	.4509
OWN BUSINESS	.12	.89	1.38	7.49	3.22	11.49	1.27	7.20	11.44	19.99	23.65	33.44	.0348
PRIVATE PRODUCER	5.29	11.96	4.79	10.59	3.64	5.35	3.24	4.82	7.59	8.90	5.52	7.81	.5680
HOME PRODUCTION	26.87	23.04	27.16	23.69	20.68	20.08	20.98	21.07	11.76	12.61	7.45	10.53	.1212
IN-KIND PAY	1.03	4.50	.94	4.48	.00	.00	.76	3.51	.00	.00	.00	.00	.5053
PRIVATE GIFTS	9.67	16.65	10.20	15.98	12.75	18.47	9.12	19.32	4.32	5.57	7.49	10.60	.5821
STATE RETAIL	.00	.00	1.28	5.71	4.13	9.78	1.02	3.41	.00	.00	.00	.00	.0659
STATE GIFTS	4.73	15.29	4.30	12.29	4.26	8.90	3.29	6.09	1.92	5.08	.00	.00	.9125
OTHER	2.36	6.33	2.44	6.20	2.61	6.10	4.74	8.97	12.74	14.92	12.43	9.40	.0019
N OF CASES	48		106		45		32		7		2		

APPENDIX 6.A CONT.

PERCENT OF PROTEIN CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

RURAL SUGAR CANE AND LIVESTOCK REGIONS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	62.69	28.90	68.21	24.69	73.94	19.90	73.49	18.10	65.88	25.84	63.80	26.26	.2336
OWN BUSINESS	3.63	14.60	3.24	13.13	.26	1.00	1.99	10.32	3.94	14.97	.46	.86	.3617
PRIVATE PRODUCER	4.49	5.61	3.93	5.49	5.54	11.51	3.69	7.45	4.01	9.28	.00	.00	.6743
HOME PRODUCTION	3.48	4.72	8.09	10.89	8.49	13.01	11.27	12.50	9.78	15.78	16.35	23.33	.6067
IN-KIND PAY	.18	.82	1.08	4.54	.93	5.84	1.22	5.81	1.79	6.16	1.82	6.31	.9000
PRIVATE GIFTS	24.35	27.71	13.86	21.09	10.21	16.53	7.22	12.28	11.64	16.30	12.65	20.36	.2739
STATE RETAIL	.00	.00	.02	.19	.00	.00	.00	.00	.47	2.66	1.33	4.61	.1758
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	1.15	3.66	1.51	4.65	.60	2.25	1.09	3.40	2.47	7.44	3.56	11.04	.2837
N OF CASES	20		70		55		41		36		12		

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	60.70	33.76	61.70	27.28	61.96	28.16	72.64	24.28	70.32	29.3	70.81	27.23	.0611
OWN BUSINESS	1.67	3.51	1.88	10.42	5.13	19.36	3.65	12.41	4.24	16.55	.26	.97	.6703
PRIVATE PRODUCER	3.38	6.95	5.06	8.04	7.04	15.60	4.24	7.59	3.62	6.62	1.02	1.87	.3066
HOME PRODUCTION	2.64	4.76	9.12	15.99	11.88	18.22	9.73	14.90	8.23	13.12	8.80	15.20	.6316
IN-KIND PAY	.07	.40	.64	4.26	2.55	10.88	.61	4.56	1.54	7.95	.00	.00	.4251
PRIVATE GIFTS	28.72	35.05	17.51	25.85	10.29	18.32	7.82	18.61	9.06	18.12	10.72	14.98	.0486
STATE RETAIL	.93	4.75	1.31	8.09	.00	.00	.00	.00	.05	.40	.27	1.04	.2305
STATE GIFTS	.21	1.69	.45	2.54	.33	2.47	.12	.89	.23	1.04	.20	.77	.8168
OTHER	2.19	7.29	2.30	6.43	.77	2.25	1.15	3.78	2.66	12.23	8.14	22.80	.4101
N OF CASES	26		63		64		55		51		14		

APPENDIX 6.A CONT.

PERCENT OF VALUE OF FOOD CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	74.79	31.05	81.29	22.46	87.94	16.21	91.92	15.38	90.55	15.45	91.62	13.74	.0051
OWN BUSINESS	10.46	31.38	3.72	16.01	1.69	8.35	2.00	10.84	1.86	8.87	2.11	11.45	.7435
PRIVATE PRODUCER	.00	.00	.24	1.48	.21	1.95	.39	1.97	.33	1.33	.33	1.32	.9232
HOME PRODUCTION	.00	.00	.61	3.43	.27	2.42	.59	4.28	.24	1.32	.09	.55	.8189
IN-KIND PAY	.00	.00	1.36	3.43	.00	.00	.09	.84	.00	.00	.00	.00	.1374
PRIVATE GIFTS	14.74	18.06	11.85	16.77	8.07	13.75	2.96	9.64	3.73	10.05	2.12	6.68	.0002
STATE RETAIL	.00	.00	.15	.78	1.29	5.04	.73	3.59	1.07	4.71	.60	3.39	.4559
STATE GIFTS	.00	.00	.56	2.62	.33	1.72	.16	.81	.09	.83	.00	.00	.3384
OTHER	.00	.00	.18	1.15	.16	1.03	1.10	4.26	2.09	6.22	3.09	6.69	.0107
N OF CASES	9		49		80		76		80		31		

OTHER URBAN AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	67.03	29.23	75.56	25.22	83.12	19.16	82.76	23.67	89.07	13.32	90.19	17.25	.0023
OWN BUSINESS	.29	1.22	.55	2.38	1.91	8.54	4.03	16.02	2.10	8.78	2.25	10.36	.2593
PRIVATE PRODUCER	2.34	7.63	1.69	5.74	2.10	6.03	2.27	4.68	.99	3.00	1.03	3.28	.2303
HOME PRODUCTION	.30	.94	2.43	6.96	4.03	10.27	2.51	6.74	1.62	6.17	1.39	5.55	.2348
IN-KIND PAY	.00	.00	.02	.13	.35	2.32	.10	.37	.00	.00	.00	.00	.2380
PRIVATE GIFTS	23.16	27.73	14.75	22.90	5.64	9.05	4.17	3.84	3.32	10.62	3.10	11.51	.0000
STATE RETAIL	.97	3.75	.89	3.09	.48	2.18	.01	.09	.00	.09	.00	.00	.0019
STATE GIFTS	3.45	7.20	2.17	5.54	1.06	3.95	.85	4.62	.04	.44	.08	.63	.0092
OTHER	2.43	7.12	1.90	5.39	1.85	4.56	3.25	9.55	2.81	11.42	1.94	7.00	.7100
N OF CASES	29		56		65		98		110		55		

FRONTIER RURAL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	43.68	20.79	46.87	22.84	49.69	25.72	53.73	25.38	59.44	20.13	59.61	27.85	.3294
OWN BUSINESS	.07	.49	1.28	7.28	2.61	9.31	.98	5.52	10.22	17.96	21.54	30.46	.0359
PRIVATE PRODUCER	5.71	11.78	4.95	10.35	4.29	7.34	4.27	7.88	3.95	4.48	2.71	3.83	.9645
HOME PRODUCTION	27.68	23.39	29.12	24.75	21.29	21.38	20.41	21.68	9.76	12.45	3.24	4.58	.0352
IN-KIND PAY	1.38	7.17	1.01	5.62	.00	.00	.56	2.22	.00	.00	.00	.00	.5822
PRIVATE GIFTS	9.04	14.52	9.16	14.71	10.47	15.89	8.43	19.26	2.81	3.51	2.10	2.97	.6734
STATE RETAIL	.04	.34	1.14	5.27	4.24	9.85	.61	1.80	.02	.06	.08	.11	.0232
STATE GIFTS	3.71	11.49	3.39	9.34	3.36	6.82	2.67	5.42	1.08	2.87	.00	.00	.8756
OTHER	2.63	6.21	3.04	6.74	4.00	8.50	8.30	14.13	12.68	15.18	10.68	.26	.0037
N OF CASES	48		106		45		32		7		2		

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APPENDIX 6.A CONT.

PERCENT OF VALUE OF FOOD CONSUMED FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASSRURAL SUGAR CANE AND LIVESTOCK REGIONS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	58.91	29.07	65.48	24.34	76.30	16.79	76.92	14.73	72.25	23.11	66.97	25.96	.0092
OWN BUSINESS	2.98	11.48	3.28	12.53	.20	1.03	1.34	6.49	3.19	12.30	.22	.42	.2642
PRIVATE PRODUCER	5.88	8.94	3.50	6.26	3.47	7.98	1.81	3.60	1.96	4.16	.00	.00	.3405
HOME PRODUCTION	5.52	7.57	10.44	12.74	9.44	12.82	11.91	12.33	7.07	12.32	11.07	18.49	.3857
IN-KIND PAY	.38	1.70	1.41	5.21	.72	4.69	1.69	6.21	.82	2.86	1.11	3.87	.7408
PRIVATE GIFTS	25.32	29.46	14.29	21.90	8.67	13.38	5.38	8.31	12.40	17.54	16.21	23.15	.0410
STATE RETAIL	.00	.00	.06	.55	.00	.00	.00	.05	.20	.89	.39	1.36	.2368
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	1.08	3.98	1.50	4.74	1.17	3.93	.91	2.50	2.08	7.48	3.98	12.81	.7319
N OF CASES	20		70		55		41		36		12		

OTHER RURAL AREAS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	56.16	32.95	65.06	27.08	67.19	27.04	78.10	23.29	73.62	27.91	71.84	26.76	.0323
OWN BUSINESS	1.59	8.15	1.44	7.99	4.31	16.46	3.97	12.63	3.64	14.29	.39	1.48	.6153
PRIVATE PRODUCER	2.59	3.93	3.13	5.53	4.11	10.32	2.20	3.92	3.40	7.85	4.08	9.17	.5702
HOME PRODUCTION	6.55	11.12	9.35	14.95	11.89	17.45	8.28	14.53	7.25	11.16	8.99	12.34	.3692
IN-KIND PAY	.19	.97	.45	3.02	2.16	8.95	.24	1.84	1.34	7.37	.00	.00	.2853
PRIVATE GIFTS	29.97	34.43	17.96	26.60	9.59	17.58	6.13	16.59	8.30	18.17	7.85	11.38	.0096
STATE RETAIL	.58	2.97	.62	3.54	.03	.24	.00	.00	.01	.13	.06	.25	.1821
STATE GIFTS	.46	2.37	.19	1.52	.19	1.41	.12	.96	.11	.57	.09	.34	.9772
OTHER	1.87	5.95	1.76	4.95	.50	1.70	.92	3.23	2.28	11.31	6.66	21.04	.4012
N OF CASES	26		63		64		55		51		14		

APPENDIX 6.B

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS FOR INDIVIDUAL FOOD GROUPS

RICE

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	70.37	38.37	80.04	34.27	85.21	30.26	89.37	28.04	87.11	30.34	91.07	23.79	.0019
OWN BUSINESS	2.67	15.06	2.41	14.64	2.73	16.19	3.40	17.70	3.82	18.83	1.05	10.26	.7368
PRIVATE PRODUCER	.00	.00	.05	.88	.97	9.47	.00	.00	.00	.00	.00	.00	.0278
HOME PRODUCTION	.20	2.56	1.25	10.37	1.92	13.40	.77	7.47	2.46	13.68	1.46	9.54	.2913
IN-KIND PAY	.02	.71	.58	6.98	.51	5.02	.49	7.03	.00	.00	.00	.00	.5501
PRIVATE GIFTS	24.77	38.21	13.37	29.55	7.11	20.15	3.99	16.20	4.00	16.95	2.51	12.54	.0000
STATE RETAIL	.74	5.13	1.42	9.72	.90	8.29	.40	6.24	.08	1.22	.23	1.39	.1112
STATE GIFTS	.14	1.45	.05	.87	.00	.00	.00	.00	.09	1.25	.23	2.04	.3896
OTHER	.55	2.39	.78	4.58	.61	3.62	1.53	11.25	2.42	14.09	3.42	16.02	.0757
N OF CASES	107		295		312		307		299		113		

BEANS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SE	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	58.81	43.33	69.67	39.72	82.62	32.73	83.48	33.66	81.61	36.23	81.66	36.20	.0000
OWN BUSINESS	2.67	18.36	2.69	15.42	2.82	15.73	3.52	17.78	3.97	19.58	1.14	10.67	.7911
PRIVATE PRODUCER	.04	.99	.96	9.08	.27	3.42	.66	6.95	.12	1.92	.00	.00	.3397
HOME PRODUCTION	1.50	9.77	2.41	13.59	1.98	11.31	2.29	13.68	.63	5.36	.87	5.91	.2204
IN-KIND PAY	1.59	12.60	.93	3.66	.18	2.57	.04	1.74	.62	6.08	.41	3.94	.2380
PRIVATE GIFTS	22.98	40.35	21.33	34.93	11.20	26.40	7.72	23.57	6.94	23.84	6.60	23.75	.0000
STATE RETAIL	.00	.00	.54	6.59	.92	1.10	.00	.00	.43	6.38	1.08	10.40	.3847
STATE GIFTS	.07	1.59	.02	1.00	.60	.00	.00	.00	.07	1.04	.00	.00	.5242
OTHER	1.30	8.51	1.41	8.13	.87	6.23	2.25	12.94	5.59	21.73	8.01	25.86	.0001
N OF CASES	35		269		302		291		273		105		

OTHER GRAINS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	27.51	43.13	35.37	45.75	46.26	46.84	61.38	46.28	65.17	44.53	61.49	45.72	.0000
OWN BUSINESS	.00	.00	2.03	14.18	2.32	14.35	.00	.00	1.85	12.49	.00	.00	.4557
PRIVATE PRODUCER	2.20	13.80	1.90	12.26	2.14	14.44	.90	7.35	2.23	11.88	3.60	13.96	.8355
HOME PRODUCTION	9.49	28.83	15.35	33.66	16.00	34.77	10.74	30.26	7.73	24.91	14.44	33.76	.2010
IN-KIND PAY	.62	7.28	1.20	9.63	2.76	15.28	.40	2.90	1.75	13.19	.00	.00	.4526
PRIVATE GIFTS	56.04	48.75	41.17	45.56	28.58	42.45	22.12	39.51	18.47	36.19	16.74	36.33	.0000
STATE RETAIL	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	4.11	16.71	2.95	15.06	1.90	11.11	4.43	19.36	2.77	15.44	1.71	6.64	.6674
N OF CASES	42		105		120		110		87		23		

APPENDIX 6.B CONT.

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS FOR INDIVIDUAL FOOD GROUPS

STARCHY TUBERS, PLANTAINS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	46.60	44.12	44.07	43.83	59.86	42.74	68.51	39.53	73.61	38.11	79.66	34.45	.0000
OWN BUSINESS	2.57	15.29	3.07	13.26	2.92	15.14	2.60	14.78	1.67	9.25	.28	3.07	.6853
PRIVATE PRODUCER	4.67	14.83	3.23	14.26	1.33	9.28	2.02	11.73	1.40	10.54	.02	.51	.1824
HOME PRODUCTION	19.43	35.88	25.05	39.03	14.70	32.00	14.04	30.59	9.18	25.89	7.27	23.48	.0000
IN-KIND PAY	.17	3.78	1.70	12.20	2.64	15.31	.70	7.78	.15	1.53	.15	1.55	.0201
PRIVATE GIFTS	25.43	38.60	21.74	35.83	17.04	31.26	9.47	22.07	10.51	24.63	9.40	22.00	.0000
STATE RETAIL	.00	.00	.24	3.89	1.10	9.01	.95	6.88	.94	9.40	.85	9.25	.5564
STATE GIFTS	.00	.00	.02	.44	.00	.00	.00	.15	.00	.00	.00	.00	.4417
OTHER	.90	1.99	1.84	10.00	.34	3.02	1.66	8.26	2.50	12.40	2.33	12.75	.0307
N OF CASES	86		266		302		304		300		118		

MEAT, FISH, POULTRY

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	64.77	41.94	77.08	34.52	85.78	26.10	89.19	24.34	87.36	25.87	87.23	26.24	.0000
OWN BUSINESS	1.83	11.39	1.09	7.97	1.28	8.30	2.76	13.35	2.19	10.82	1.86	12.13	.1672
PRIVATE PRODUCER	2.92	13.38	1.76	10.01	1.30	9.02	.44	4.24	.60	4.59	1.03	6.61	.1062
HOME PRODUCTION	6.21	22.47	5.20	19.34	3.93	14.51	2.66	11.34	.21	4.34	.91	5.25	.0007
IN-KIND PAY	.42	4.36	.34	3.62	.00	.00	.21	2.71	.00	.00	.00	.00	.1697
PRIVATE GIFTS	23.07	37.11	13.28	28.55	6.31	18.35	2.47	12.56	5.89	19.85	4.36	17.50	.0000
STATE RETAIL	.00	.00	.11	2.70	.15	2.23	.00	.00	.04	.59	.07	.78	.6371
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	.75	5.88	1.10	6.62	1.22	7.05	2.24	11.45	3.07	13.77	4.50	16.56	.0633
N OF CASES	92		273		309		309		304		117		

MILK, MILK PRODUCTS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	37.43	44.04	42.47	43.58	53.46	45.73	56.88	43.89	69.85	41.29	76.72	37.42	.0000
OWN BUSINESS	.41	3.58	.57	4.98	1.15	10.30	2.26	12.95	2.08	11.58	.47	2.82	.2404
PRIVATE PRODUCER	21.62	37.09	22.19	37.02	17.79	33.90	15.92	32.30	11.21	27.04	7.42	21.88	.0020
HOME PRODUCTION	5.38	22.23	7.22	24.75	6.53	23.36	8.85	26.86	7.88	24.69	8.75	25.78	.7402
IN-KIND PAY	.00	.00	1.10	9.77	.58	6.99	.30	4.90	1.12	9.74	.86	8.55	.5646
PRIVATE GIFTS	14.94	34.05	14.45	31.65	9.72	26.32	8.45	25.03	4.59	18.80	3.46	16.87	.0003
STATE RETAIL	2.64	16.15	1.51	10.90	1.87	13.15	.50	6.40	.81	7.53	.02	.19	.3401
STATE GIFTS	12.11	31.16	7.64	24.49	5.32	21.40	3.65	17.78	.96	8.85	.39	4.07	.0006
OTHER	5.44	19.89	2.81	13.72	3.52	16.41	3.15	14.34	1.45	9.65	1.88	11.30	.3044
N OF CASES	76		222		253		287		287		110		

APPENDIX 5.B CONT.

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS FOR INDIVIDUAL FOOD GROUPS

EGGS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	53.58	48.08	55.11	45.44	68.07	44.14	78.29	37.98	84.36	34.18	89.86	27.35	.0000
OWN BUSINESS	2.06	14.35	3.49	18.36	3.37	17.33	4.39	19.88	3.94	19.32	1.02	10.10	.9336
PRIVATE PRODUCER	.38	6.27	.16	3.69	.94	8.77	.58	7.66	.60	6.86	.00	.00	.7592
HOME PRODUCTION	31.86	44.81	23.97	40.45	25.65	41.11	13.66	31.23	8.28	26.10	5.75	22.27	.0000
IN-KIND PAY	.00	.00	.58	7.62	.00	.00	.00	.00	.18	2.75	.47	4.38	.3485
PRIVATE GIFTS	12.10	30.80	6.10	22.21	1.40	9.30	2.93	15.35	1.58	10.66	1.61	8.38	.0055
STATE RETAIL	.00	.00	.00	.00	.00	.00	.04	.78	.00	.00	.00	.00	.4656
STATE GIFTS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
OTHER	.00	.00	.55	5.24	.55	5.43	.06	.87	1.03	7.03	1.27	9.06	.2192
N OF CASES	49		173		230		257		250		98		

BREAD, PASTA, FLOUR

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	85.68	32.27	87.65	29.68	90.64	24.78	91.98	23.21	93.51	22.49	94.29	20.67	.0177
OWN BUSINESS	4.08	18.96	4.64	20.18	3.27	16.59	5.07	20.74	3.63	17.87	2.37	13.35	.6342
PRIVATE PRODUCER	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
HOME PRODUCTION	.00	.00	.47	5.71	.00	.00	.00	.00	.00	.00	.00	.00	.1676
IN-KIND PAY	.00	.00	.53	6.64	.00	.00	.00	.00	.00	.00	.00	.00	.1327
PRIVATE GIFTS	10.65	27.55	6.46	21.44	4.54	17.57	1.68	9.30	1.85	11.92	1.69	10.94	.0005
STATE RETAIL	.00	.00	.09	1.82	.11	1.77	.03	.62	.00	.00	.00	.00	.7110
STATE GIFTS	.01	.31	.18	3.11	.07	2.42	.05	1.66	.00	.00	.00	.00	.7869
OTHER	.15	3.24	.54	4.55	1.34	8.45	1.14	5.74	.99	6.47	1.63	8.96	.5055
N OF CASES	97		278		291		295		287		110		

VEGETABLE OIL

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	91.06	24.44	92.28	23.91	93.04	22.79	94.41	21.31	93.80	22.39	96.35	15.29	.6830
OWN BUSINESS	2.46	15.01	3.27	17.23	2.83	16.63	3.07	17.01	3.66	18.75	1.00	9.99	.9466
IN-KIND PAY	.00	.00	.36	5.94	.00	.00	.32	5.71	.00	.00	.00	.00	.5396
PRIVATE GIFTS	5.21	19.38	3.22	15.63	2.04	11.74	.68	6.60	.89	8.84	.25	2.58	.0205
STATE RETAIL	.05	1.16	.23	3.86	1.18	9.88	.35	5.78	.00	.00	.00	.00	.0855
STATE GIFTS	.14	1.42	.04	.82	.18	2.71	.00	.00	.00	.00	.00	.00	.3328
OTHER	1.03	6.08	.56	4.11	.69	5.01	1.12	8.02	1.51	9.56	2.19	11.43	.3409
N OF CASES	95		285		305		308		304		119		

APPENDIX 6.B CONT.

PERCENT OF CALORIES CONSUMED FROM DIFFERENT SOURCES
BY EXPENDITURE CLASS FOR INDIVIDUAL FOOD GROUPSSUGAR

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	89.77	26.38	91.39	25.22	93.70	21.85	91.26	27.08	94.18	22.11	95.56	18.53	.3158
OWN BUSINESS	3.60	17.32	4.12	19.06	3.34	17.66	5.74	23.00	3.73	18.24	1.67	11.55	.4514
IN-KIND PAY	.00	.00	.35	5.99	.90	.00	.00	.00	.00	.00	.00	.00	.3525
PRIVATE GIFTS	5.38	19.89	3.20	15.33	2.29	12.56	1.40	10.87	.74	7.50	.40	3.50	.0695
STATE RETAIL	.00	.00	.37	4.66	.29	4.60	.43	6.54	.03	1.43	.09	2.30	.7348
OTHER	1.24	7.86	.53	4.79	.25	2.30	.92	8.36	1.19	9.37	2.20	11.74	.3424
N OF CASES	98		280		305		306		299		117		

OTHER FATS

	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
PRIVATE RETAIL	91.42	29.26	91.69	27.70	95.15	20.82	94.30	22.89	94.36	23.23	96.38	19.01	.8752
OWN BUSINESS	8.57	29.26	4.10	20.04	1.33	11.56	5.58	22.90	3.51	18.55	3.61	19.01	.5400
IN-KIND PAY	.00	.00	2.05	14.32	.00	.00	.00	.00	.00	.00	.00	.00	.1700
PRIVATE GIFTS	.00	.00	2.15	14.32	2.84	16.73	.10	1.01	2.12	14.50	.00	.00	.5051
OTHER	.00	.00	.00	.00	.66	5.77	.00	.00	.00	.00	.00	.00	.4056
N OF CASES	12		49		75		98		72		28		

APPENDIX 6.1

PERCENT OF FOOD EXPENDITURE SPENT AT DIFFERENT SOURCES
BY EXPENDITURE CLASS

SOURCE	TOTAL POPULATION		DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	6.22	14.51	7.79	17.82	5.61	14.56	8.41	17.38	6.00	12.54	4.82	13.12	4.85	14.71	.9150
Supermarket	2.23	10.27	.56	3.58	.71	3.62	1.34	7.19	1.65	8.85	4.62	15.20	7.40	20.20	.9990
Warehouse	1.72	9.69	.26	2.82	1.31	8.83	2.57	11.45	1.66	9.06	1.47	9.39	2.63	12.17	.3795
Coimado	58.73	28.12	72.28	26.22	69.64	25.80	61.32	26.61	57.82	25.29	48.30	29.44	43.89	30.39	.0000
Coimado in Market	.86	6.19	2.09	10.28	1.77	8.44	1.13	7.82	.34	2.91	.10	1.36	.17	1.90	.9022
Street Stand	5.65	10.58	3.31	7.21	4.04	9.21	5.00	9.48	7.45	12.18	5.05	8.88	3.37	6.79	.0003
Roving Sellers	4.90	9.45	1.99	5.56	3.36	7.34	3.35	8.58	4.87	9.83	7.56	12.06	8.53	13.43	.0000
Bakery	.88	4.76	.06	.43	.15	.80	.38	1.71	.65	3.13	2.44	8.79	4.77	13.09	.9000
Butcher	13.99	17.82	4.27	9.60	7.46	13.04	12.49	16.11	15.36	15.87	20.89	21.72	20.45	24.01	.0000
Restaurant	.00	.22	.00	.00	.00	.00	.00	.00	.00	.02	.00	.02	.00	.00	.5801
Private Producer	3.26	9.09	5.62	12.36	4.14	10.02	2.80	7.19	2.75	6.60	3.29	11.25	2.56	11.56	.1973
Fritura	.01	.20	.00	.00	.00	.04	.00	.15	.02	.22	.02	.31	.05	.50	.5926
Other Private Source	1.01	5.48	1.40	6.27	1.25	6.14	.51	2.47	.36	4.39	.82	4.33	.84	4.69	.2705
Venta Popular	.11	1.70	.15	1.01	.27	2.76	.18	2.11	.00	.00	.06	.89	.15	1.41	.2282
Programa de Afiliados	.00	.19	.00	.00	.00	.03	.00	.00	.00	.00	.02	.38	.00	.00	.2310
INESPRE Market	.28	3.58	.13	1.22	.09	1.79	.30	3.37	.28	2.98	.41	5.29	.27	5.02	.7515
INESPRE Warehouse	.02	.41	.00	.00	.03	.37	.01	.31	.00	.00	.04	.70	.00	.00	.6808
CENSERI	.05	1.42	.00	.00	.07	1.78	.08	1.80	.05	1.55	.00	.05	.00	.08	.8903
Min. of Health	.00	.05	.00	.00	.00	.04	.00	.11	.00	.00	.00	.00	.00	.00	.3446
Other State Source	.01	.20	.04	.45	.01	.27	.03	.28	.00	.15	.00	.00	.00	.00	.2687
N of cases	1320		104		290		310		309		306		121		

APPENDIX 6.D

PERCENT OF FOOD EXPENDITURE SPENT AT DIFFERENT SOURCES
BY REGION

SOURCE	TOTAL POPULATION		SANTO DOMINGO		OTHER URBAN		FRONTIER RURAL		SUGAR CANE & LIVESTOCK		OTHER RURAL		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	6.22	14.51	3.60	8.02	13.50	19.24	13.66	25.94	2.20	8.76	3.18	11.40	.0000
Supermarket	2.23	10.27	5.16	15.31	2.94	11.75	.01	.14	.46	3.87	.43	4.70	.0000
Warehouse	1.72	9.69	1.75	9.15	1.96	10.69	1.58	7.76	1.82	10.27	1.40	8.95	.9672
Colmado	58.73	28.12	56.63	24.90	50.62	28.36	62.02	31.79	68.60	23.17	61.49	26.89	.0000
Colmado in Market	.86	6.13	.03	.33	1.10	6.37	.06	.75	1.52	9.11	.96	6.40	.0091
Street Stand	5.65	10.58	5.40	7.17	4.27	8.96	.13	.73	3.79	16.67	9.13	13.71	.0000
Roving Sellers	4.90	9.45	6.26	9.16	5.73	11.41	3.76	7.56	3.55	8.28	3.93	8.18	.0007
Bakery	.88	4.76	1.84	5.55	1.58	7.31	.02	.40	.04	.37	.02	.39	.0000
Butcher	13.99	17.82	16.31	14.62	14.31	13.79	3.31	12.33	13.00	19.11	13.36	17.40	.0000
Restaurant	.00	.22	.00	.02	.02	.43	.00	.00	.00	.00	.00	.00	.5895
Private Producer	3.26	9.09	.53	2.26	2.48	6.81	6.69	15.32	4.75	10.79	5.01	11.61	.0000
Fritura	.01	.20	.01	.19	.02	.34	.00	.00	.00	.05	.00	.00	.3067
Other Private Source	1.01	5.43	1.27	7.84	1.24	5.26	4.64	11.01	.21	1.72	.74	3.65	.0000
Venta Popular	.11	1.70	.14	1.94	.03	.37	.32	2.36	.00	.00	.24	2.58	.2059
Programa de Afiliados	.00	.13	.00	.00	.00	.08	.00	.00	.00	.00	.02	.35	.4266
INBSPRE Market	.28	3.58	.98	6.73	.04	.70	1.25	8.15	.00	.00	.00	.00	.0014
INBSPRE Warehouse	.02	.41	.03	.70	.03	.43	.00	.00	.00	.00	.00	.11	.6894
CENSBRI	.05	1.42	.00	.00	.00	.00	.82	8.33	.00	.00	.00	.02	.0060
Min. of Health	.00	.05	.00	.00	.00	.00	.01	.13	.00	.00	.00	.10	.0918
Other State Source	.01	.20	.00	.00	.04	.36	.03	.43	.00	.00	.00	.00	.0917
N of cases	1320		309		360		136		221		230		

APPENDIX 5.E

PERCENT OF FOOD EXPENDITURE SPENT AT DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

SANTO DOMINGO

SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	3.36	8.08	3.91	7.31	3.35	6.95	2.64	5.75	4.62	12.05	2.38	7.69	.5319
Supermarket	.29	.89	2.34	5.94	3.94	11.99	3.40	13.08	8.14	19.56	11.72	25.33	.0833
Warehouse	.61	1.30	3.74	13.96	.14	.78	3.97	13.25	.72	6.08	.09	.51	.0298
Colmado	77.74	15.87	65.35	23.05	62.68	21.05	55.91	23.20	47.62	27.42	47.20	27.43	.0101
Colmado in Market	.00	.00	.09	.65	.02	.23	.04	.37	.00	.00	.00	.00	.5202
Street Stand	4.50	6.60	3.78	5.30	4.69	6.25	7.15	3.31	5.41	7.24	3.18	4.90	.0449
Roving Sellers	2.12	5.11	5.46	7.13	4.24	6.81	4.06	5.69	8.98	11.43	10.30	11.63	.0014
Bakery	.00	.00	.54	1.58	.38	2.82	1.27	3.82	4.28	8.86	7.65	12.16	.0001
Butcher	11.26	11.44	13.07	17.57	18.40	15.86	18.77	10.99	16.42	14.98	13.34	16.52	.1618
Restaurant	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00	.4681
Private Producer	.07	.14	.26	.97	.16	.56	.58	1.74	1.01	3.73	.83	2.92	.0962
Fritura	.00	.00	.01	.11	.03	.30	.00	.00	.02	.20	.05	.33	.7513
Other Private Source	.00	.00	1.38	9.36	.02	.21	.42	2.45	1.01	5.11	1.54	7.50	.4044
Venta Popular	.00	.00	.00	.00	.57	3.88	.00	.00	.00	.00	.00	.00	.2266
INBSPRE Market	.00	.00	.00	.00	.81	4.85	1.13	5.95	1.56	10.39	1.07	5.96	.6611
INBSPRE Warehouse	.00	.00	.00	.00	.00	.00	.00	.00	.15	1.39	.00	.00	.4681
N of cases	9		46		77		76		78		31		

OTHER URBAN AREAS

SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	12.97	18.34	13.70	20.52	19.51	20.65	14.81	17.75	8.95	18.27	8.84	20.45	.0050
Supermarket	.72	2.73	1.13	4.09	1.68	8.14	2.04	9.57	5.46	16.72	8.00	20.59	.0574
Warehouse	.00	.00	.00	.00	5.64	16.35	1.08	9.31	2.21	11.64	3.03	12.74	.0285
Colmado	68.86	22.84	63.93	23.02	50.86	27.08	49.73	27.37	41.96	28.88	34.85	27.41	.0000
Colmado in Market	.72	3.54	1.51	6.09	1.40	7.81	1.07	5.15	.29	2.27	.00	2.83	.4225
Street Stand	4.04	9.35	5.26	9.66	4.48	10.19	4.63	4.71	2.58	6.02	2.37	6.89	.1916
Roving Sellers	3.77	8.48	3.96	7.62	3.10	6.10	6.82	13.30	7.63	12.96	9.39	16.34	.0343
Bakery	.17	.65	.24	.98	.53	1.71	1.07	4.37	3.76	12.28	6.23	16.72	.0078
Butcher	1.79	4.09	5.28	9.04	8.38	14.07	12.98	16.97	25.03	25.29	25.19	27.59	.0000
Restaurant	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.5021
Private Producer	4.35	11.26	2.81	8.36	2.80	6.44	3.57	8.75	1.52	4.65	1.09	3.46	.2199
Fritura	.00	.00	.00	.00	.00	.00	.05	.39	.04	.50	.09	.71	.6630
Other Private Source	1.85	6.07	1.47	4.97	1.32	3.40	2.02	8.04	.44	2.65	.48	3.21	.1990
Venta Popular	.12	.64	.21	.96	.00	.00	.00	.00	.00	.00	.00	.00	.0038
Programa de Afiliados	.00	.00	.01	.07	.00	.00	.00	.00	.00	.00	.00	.00	.1732
INBSPRE Market	.43	2.29	.22	1.65	.00	.00	.00	.00	.05	.53	.00	.00	.2964
INBSPRE Warehouse	.00	.00	.11	.82	.08	.69	.00	.00	.00	.00	.00	.00	.3128
Other State Source	.16	.88	.09	.63	.15	.60	.00	.06	.00	.00	.00	.00	.0384
N of cases	28		54		64		96		109		54		

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APPENDIX 6.E CONT.

PERCENT OF FOOD EXPENDITURE SPENT AT DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

FRONTIER RURAL

SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	25.55	35.78	16.78	30.42	11.03	23.14	9.01	15.64	5.19	10.76	3.80	5.38	.3143
Supermarket	.03	.22	.02	.17	.02	.13	.00	.00	.00	.00	.00	.00	.8742
Warehouse	1.97	9.32	1.84	9.02	.17	1.00	3.61	10.26	.00	.00	.00	.00	.2812
Colmado	55.21	36.21	62.80	33.53	59.09	32.51	64.21	26.48	40.59	22.61	21.67	30.65	.3048
Colmado in Market	.00	.00	.10	1.03	.00	.00	.00	.00	.00	.00	.00	.00	.8461
Street Stand	.09	.48	.18	.87	.00	.00	.24	.93	.00	.00	.00	.00	.4365
Roving Sellers	2.19	5.99	3.24	7.31	4.40	7.83	4.45	8.21	7.64	10.03	7.10	10.05	.4331
Bakery	.11	.80	.05	.55	.00	.00	.00	.00	.00	.00	.00	.00	.8461
Butcher	3.36	10.15	2.43	8.25	5.13	15.53	2.54	5.18	24.86	34.03	42.96	60.76	.0000
Private Producer	7.21	21.03	6.22	16.38	8.05	16.73	6.63	12.02	8.28	8.01	7.51	10.62	.9181
Other Private Source	4.07	15.01	4.28	12.31	4.06	8.86	6.11	9.62	13.12	13.67	15.91	2.61	.1973
Venta Popular	.00	.00	.00	.00	1.36	4.76	.00	.00	.00	.00	.00	.00	.0108
INESPRE Market	.15	1.05	.83	6.37	3.47	13.72	.00	.00	.00	.00	.00	.00	.2269
CBNSBRI	.00	.00	1.16	6.84	3.10	10.41	2.96	11.04	.29	.76	1.01	1.43	.4928
Min. of Health	.00	.00	.02	.18	.00	.00	.01	.06	.00	.00	.00	.00	.7887
Other State Source	.00	.00	.00	.00	.00	.00	.19	1.08	.00	.00	.00	.00	.1718
N of cases	48		102		46		31		7		3		

SUGAR CANE AND LIVESTOCK RURAL

SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	2.91	8.33	1.40	5.51	4.51	14.88	1.87	6.55	1.38	4.26	.00	.00	.2320
Supermarket	1.66	7.25	.46	3.83	.02	.22	1.07	6.55	.70	4.01	.00	.00	.6538
Warehouse	.00	.00	.00	.00	4.55	16.23	.85	5.49	.00	.00	.00	.00	.0234
Colmado	70.55	37.21	76.08	28.27	67.96	27.36	69.60	21.26	67.80	31.21	77.83	29.31	.3064
Colmado in Market	7.36	20.79	3.45	13.66	1.16	8.60	.00	.00	.00	.00	.00	.00	.1608
Street Stand	.26	.71	3.65	12.89	2.42	4.98	4.01	6.87	2.78	11.90	.70	2.45	.2457
Roving Sellers	1.77	3.36	1.86	5.13	3.58	7.68	2.99	7.35	6.47	13.01	4.58	9.48	.0574
Bakery	.05	.23	.04	.23	.13	.69	.00	.00	.00	.00	.00	.00	.2868
Butcher	7.40	16.20	7.03	14.03	11.10	13.40	16.64	17.96	15.43	23.01	15.15	28.59	.0089
Private Producer	8.60	15.46	5.95	13.21	4.27	8.34	2.90	5.90	3.58	6.84	1.71	4.20	.3352
Fritura	.00	.00	.00	.00	.00	.00	.01	.12	.00	.00	.00	.00	.2762
Other Private Source	.10	.44	.02	.23	.26	1.93	.02	.13	.62	3.50	.00	.00	.1504
N of cases	19		68		55		41		26		12		

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APPENDIX 6.E CONT.

PERCENT OF FOOD EXPENDITURE SPENT AT DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

OTHER RURAL AREAS

SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Public Market	3.37	12.39	2.93	9.55	7.38	18.71	1.01	4.00	.90	3.04	1.41	3.44	.9056
Supermarket	.00	.00	.00	.00	.02	.11	.04	.32	1.99	10.14	4.40	16.47	.0813
Warehouse	.10	.51	1.84	11.27	1.42	7.87	.51	3.84	1.99	11.06	7.04	20.56	.2276
Colmado	78.80	16.99	71.20	23.60	63.09	27.71	61.89	23.58	47.79	27.53	40.81	28.57	.0001
Colmado in Market	1.08	5.30	1.71	6.61	1.90	10.40	.00	.00	.00	.03	.00	.00	.2140
Street Stand	5.06	7.94	4.58	7.56	7.67	12.66	13.31	17.39	9.53	10.39	7.94	8.97	.0024
Roving Sellers	1.08	3.16	3.25	8.60	2.58	5.82	4.27	7.07	6.59	10.93	5.40	8.60	.0599
Bakery	.00	.00	.00	.00	.09	.75	.00	.05	.00	.00	.00	.00	.4598
Butcher	2.83	4.86	7.34	11.60	12.06	18.01	15.16	16.38	21.88	20.23	21.75	17.33	.0001
Restaurant	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
Private Producer	5.81	9.28	4.90	7.90	3.48	7.74	3.35	5.97	7.96	20.33	9.32	26.27	.1405
Fritura	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
Other Private Source	1.50	5.16	1.44	5.13	.21	.91	.41	1.45	.96	5.20	.99	3.71	.2511
Venta Popular	.33	1.63	.73	4.81	.00	.00	.00	.00	.25	1.78	.90	3.37	.3654
Programa de Afiliados	.00	.00	.00	.00	.00	.00	.00	.00	.10	.76	.00	.00	.3094
INESPRES Market	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
INESPRES Warehouse	.00	.00	.02	.25	.00	.00	.00	.00	.00	.00	.00	.00	.4306
CENSERI	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.4610
Min. of Health	.00	.00	.00	.00	.02	.19	.00	.00	.00	.00	.00	.00	.4610
Other State Source	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	
N of cases	24		61		64		55		50		14		

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APPENDIX 7.A

PERCENT OF INCOME FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASSSANTO DOMINGO

INCOME SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	81.35	33.94	77.26	28.20	75.85	28.82	79.17	27.04	74.44	33.71	64.13	42.58	.0000
Farm sales	.00	.00	.00	.00	.03	.30	.06	.54	.00	.00	.00	.00	.6354
Home consumption	.00	.00	.06	.37	.08	.71	.14	1.07	.00	.00	.00	.00	.6534
Other "free" food	3.43	4.54	5.00	7.74	2.87	4.14	1.01	2.10	3.54	14.17	4.40	19.57	.0605
Own Business	.00	.00	5.52	17.83	2.93	15.01	4.36	16.65	4.07	16.87	3.53	18.00	.8550
Pensions	.00	.00	.03	.25	.86	5.99	3.49	10.30	2.11	12.60	4.93	20.16	.1422
Transfers	13.97	30.31	9.98	17.74	14.56	22.54	9.29	16.48	12.95	25.17	22.00	37.03	.3925
Other	1.22	3.47	2.11	5.71	2.78	8.42	2.43	9.39	2.85	8.33	.98	2.98	.9597
N of cases	8		48		79		75		69		26		

OTHER URBAN AREAS

INCOME SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	51.20	37.99	53.67	40.04	65.22	38.18	60.01	34.40	71.62	38.68	72.86	38.83	.0240
Farm sales	10.46	25.32	9.21	23.39	1.26	3.61	4.92	16.42	4.47	20.16	3.76	18.81	.1312
Home consumption	.37	1.67	1.48	4.63	3.67	10.26	2.76	11.49	.63	3.95	.33	1.12	.0346
Other "free" food	18.53	25.58	10.78	20.12	9.07	19.11	4.22	8.76	2.75	11.13	3.37	14.76	.0015
Own Business	2.56	11.07	5.83	16.79	5.87	18.04	3.21	12.02	1.63	9.47	2.26	12.45	.1397
Pensions	2.60	9.72	3.87	14.47	2.54	9.11	3.25	9.92	3.01	11.87	4.05	13.88	.9379
Transfers	13.66	22.77	14.63	24.94	11.23	22.36	18.59	30.13	12.99	28.00	12.24	26.72	.3414
Other	.59	3.08	.49	2.56	1.11	5.64	3.00	12.77	2.86	9.43	1.10	4.42	.2847
N of cases	28		52		60		96		109		54		

FRONTIER RURAL

INCOME SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		F SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	33.72	37.13	36.89	37.87	41.50	37.62	31.81	37.57	22.62	29.82	30.24	42.77	.5140
Farm sales	24.65	29.43	27.48	30.51	33.55	34.95	40.59	38.03	33.07	39.85	20.27	28.67	.2430
Home consumption	22.93	23.18	20.69	21.54	12.56	17.15	12.18	15.33	6.10	7.92	.18	.26	.0158
Other "free" food	10.82	17.62	9.39	14.56	7.78	8.92	5.99	8.49	11.49	24.13	1.68	.90	.5314
Own Business	.52	3.21	.98	4.10	1.02	4.64	1.92	5.67	11.61	22.32	29.20	41.29	.0002
Pensions	.57	4.13	.67	5.03	.20	1.39	4.89	16.19	5.72	15.14	.00	.00	.0218
Transfers	6.75	19.39	3.83	13.74	3.34	11.01	2.48	7.11	4.11	8.56	.00	.00	.9512
Other	.00	.00	.05	.40	.00	.00	.10	.58	5.25	13.91	18.40	26.02	.0000
N of cases	51		107		46		33		7		2		

APPENDIX 7.A CONT.

PERCENT OF INCOME FROM DIFFERENT SOURCES
BY REGION AND EXPENDITURE CLASS

SUGAR CANE AND LIVESTOCK RURAL

INCOME SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	51.97	37.67	49.88	35.64	51.74	39.60	54.22	38.16	61.05	38.73	69.90	40.62	.5672
Farm sales	2.85	5.81	11.34	20.38	17.24	27.90	18.13	28.63	15.94	27.58	13.02	27.00	.5543
Home consumption	10.09	24.90	11.30	19.33	5.98	8.44	6.82	8.40	1.90	3.57	1.99	3.66	.0057
Other "free" food	9.74	9.27	10.73	16.35	8.01	16.92	4.90	7.32	6.76	11.76	6.51	14.96	.2638
Own Business	.12	.50	2.14	8.77	1.21	5.24	.74	3.42	1.29	5.54	.00	.00	.7523
Pensions	.00	.00	.00	.00	1.42	10.38	.00	.00	3.17	13.13	.00	.00	.2514
Transfers	16.67	29.12	12.00	22.41	13.74	26.08	14.91	29.06	9.85	20.70	8.55	20.81	.8266
Other	8.54	24.66	2.57	13.75	.63	2.93	.25	1.55	.00	.00	.00	.00	.3632
N of Cases	17		57		53		36		35		3		

OTHER RURAL AREAS

INCOME SOURCE	DECILE 1		QUARTILE 1		QUARTILE 2		QUARTILE 3		QUARTILE 4		DECILE 10		P SIG.
	%	SD	%	SD	%	SD	%	SD	%	SD	%	SD	
Wages	58.43	38.61	48.53	39.11	43.52	41.22	47.56	40.40	48.18	44.07	45.91	44.42	.8982
Farm sales	11.25	26.48	17.25	30.98	21.02	35.54	21.08	37.17	18.67	32.08	12.35	25.76	.9085
Home consumption	3.88	10.47	6.17	14.45	8.25	16.49	6.98	17.24	2.85	5.34	2.76	5.11	.2678
Other "free" food	10.76	17.29	9.57	18.18	9.54	16.11	6.63	16.31	7.75	17.05	4.17	6.45	.7636
Own Business	3.22	8.71	2.88	8.84	3.12	12.11	3.49	14.54	7.31	21.98	15.06	33.49	.3760
Pensions	.00	.00	.00	.00	1.11	8.93	.25	1.76	.70	4.33	2.20	7.62	.6482
Transfers	8.43	14.48	13.65	24.99	13.21	26.97	12.78	26.37	11.78	25.91	11.02	21.94	.9852
Other	2.98	17.68	1.91	12.07	.18	1.44	1.20	3.47	2.72	9.34	6.49	15.71	.5848
N of Cases	30		65		64		48		47		15		

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