

PN-AAW-842
ISN 496052

62

Final Report

Nutritional Functional Classification Study of Panama

Raleigh, North Carolina
December, 1982

002781
005142
000142
S



SIGMA ONE CORPORATION

Final Report

Nutritional Functional Classification Study of Panama

Prepared by:

David L. Franklin¹
and
Marielouise Harrell¹

In collaboration with:

Cutberto Parillon²
and
Victor Valverde³

Prepared for:

The Ministry of Health
Republic of Panama

and

The United States Agency for International Development
Mission to Panama
Under Contract No. 525-0262-C-00-2027-0

¹Sigma One Corporation

²Ministry of Health, Republic of Panama

³Institute for Nutrition of Central America and Panama (INCAP)

Executive Summary

Nutritional Functional Classification Study
by David L. Franklin and Marielouise W. Harrell,
Sigma One Corporation, in collaboration with
Dr. Cutberto Parillon, Ministry of Health and
Dr. Victor Valverde, INCAP

A nutritional functional classification of Panama was undertaken with data from the 1980 National Nutrition Survey and available secondary data. Nearly six thousand households from a random sample that is representative at the district level were classified into fifteen functional groups. Each functional group represents a distinct category of households whose employment, income and other socioeconomic characteristics classify them into homogeneous clusters. These functional groups have been ranked in order of the prevalence of malnutrition and they have been located geographically by district. One purpose of the study is to provide the Government of Panama a more effective means for targetting programs and policies towards erradicating the pockets of malnutrition that remain in the country.

In spite of significant progress in extending the coverage of the public health system and the economic gains of the early 1970's, malnutrition persists in significant numbers in Panama. Twenty-seven percent of all households in Panama have at least one child aged nine years or younger who suffers from the growth retardation effects of malnutrition. The adult population has 22.8 percent of all males and 24.0 percent of all females classified as malnourished by weight-for-height criteria.

Over half of the malnutrition in the country is clustered

in functional groups that are economically connected to the agricultural sector. Within these groups, over 40 percent of the country's malnourished live in households in which two-thirds of the income is derived from wage work (off the farm) rather than from agricultural production activities on their own farm. These functional groups (subsistence farmers and rural wage workers) are located in the central region of the country, with their highest concentration in districts in the province of Veraguas.

While the malnutrition problem in Panama is principally a rural problem, there are large pockets of malnutrition in urban and peri-urban areas in which unskilled workers reside. These pockets are found in the districts of La Chorrera, San Miguelito, Colon and Panama, as well as in the districts of David and Santiago. Furthermore, there are concentrations of malnourished children in households headed by unskilled workers in the districts of Changinola and Baru.

The nature of the malnutrition problem is different between urban and rural areas. Children that become malnourished in the urban areas are more likely to recover. The problem in rural areas is chronic malnutrition, in part due to repeated exposure to inadequate water and sanitary conditions and recurring episodes of inadequate food availability. The causes of urban malnutrition are related to income and perhaps to inappropriate weaning practices.

In the rural areas some of the causes of malnutrition relate to the remote location of the households and the difficulty of access to the services of the public health system. Low labor

incomes and food costs which absorb the bulk of real income are important proximal causes of malnutrition among small farmers and rural wage workers.

It will be very costly to extend the coverage of the health system to the current places of residence of the functional groups with the most malnutrition. During certain periods of the year, direct feeding programs such as the PL480-II school feeding and the maternal and child health program provide the only income for an appreciable number of households in the rural functional groups with the highest rates of malnutrition. The phasing out of direct feeding programs and the difficulty in extending health system coverage will accentuate the already marked welfare (income and health) differences between urban and rural households.

Twenty districts have been identified as requiring specific nutrition oriented policies and programs. Ten of these districts are located along the Pacific Ocean side of the central mountain range in Cocle, Veraguas and Chiriqui provinces. These regions have been known historically to be the ones with serious malnutrition and poverty problems, and have received a number of public interventions, including the services of an integrated rural development project (Sona'). The impact of these interventions has undoubtedly prevented the evolution of more serious health and nutrition problems. While such programs as the supplementary feeding program and the community food production projects should continue as a direct attack on the problems, the

nature of the problem is such that only longer term policy initiatives are likely to have a self-sustaining effect. These policy initiatives will require multiple foci; on the one hand the productivity of the small farms themselves must be raised with means that are compatible with reversing the trend on deforestation and erosion. On the other hand, policy initiatives should seek to expand the productivity of labor in larger agricultural enterprises.

Given the extent and nature of the rural malnutrition problem and the importance of wage work in the incomes of the households with malnourished persons, there is need for a policy and program focus on rural employment and on increasing rural labor productivity. Analysis on the employment effect of the current structure of incentives that faces agriculture is urgently needed. For example, it is probable that the agricultural policy of supporting the price of maize and rice above import parity has had a low impact on the incomes of small maize and rice producing households. Since these households market a very small portion of their production, the principal effect of the price support policy would be through the impact of the policy on factor use in agriculture. The high maize and rice prices could lead to higher rural wages since 60 percent of rural off-farm incomes are derived from working in other agricultural enterprises. It would be necessary, however, for the structure of incentives in agriculture to not be biased against labor use for this to result in appreciable income gains. To the extent that the high product prices and other factor prices create

incentives for using non-labor inputs in agricultural production, the high support prices may be a blunt instrument for improving rural incomes and nutrition. Furthermore, some of the gains from higher labor incomes are being partially off-set by higher food costs.

Six of the priority districts are characterized by their remote nature, which inhibits the incorporation of their inhabitants into the productive processes of the country and their access to public health services. The other priority districts are urban or peri-urban with their principal problems being low wage incomes and inadequate access to public health services. The latter problem is undoubtedly due to overcrowding due to rapid rural to urban migration. The basic problem remains one of low labor incomes and chronic underemployment. For these districts, the main thrust would also be directed at increasing labor incomes.

The problems of malnutrition in Panama are linked to low wages and poor access to public services; a nutrition policy for Panama must be centered on employment and income generation first, and then on extending and maintaining public health and nutrition services, particularly for the extremely poor in the central provinces.

V

Acknowledgements

The continued support of the staff of the Directorate of Nutrition in the Ministry of Health, particularly Lic. Artemia de Pinto and Ing. Franklin Garrido have been vital to the execution of this study. Mr. Arcadio Moreno, Systems Manager of the Computer Center at the Comptroller General's Office in Panama and his staff provided valuable support and facilitated our work in Panama. We also wish to acknowledge the contribution of the Directorate for Statistics and Census for providing us with preliminary information from the 1980 census.

A special recognition goes to the Institute for Nutrition of Central America and Panama for providing the services of Dr. Victor Valverde.

Dr. Benjamin Severn, Mission Economist at USAID-Panama and Ms. Elena Brineman, Nutrition Advisor for the AID Regional Office for Central America and Panama, provided encouragement and significant professional guidance in the planning stages of the study. The financial support of the Office of Nutrition, Bureau for Science and Technology of the Agency for International Development is also gratefully acknowledged.

Responsibility for the content of this report rests with the staff of Sigma One Corporation.

Table of Contents

Section	Page	
1.0	INTRODUCTION AND OBJECTIVES.	1
1.1	The Nutrition Problem in Panama	2
1.2	The Functional Classification Approach.	4
2.0	STATISTICAL RESULTS.	9
2.1	Definition of Functional Groups	9
2.2	Distribution of Nutritional Indicator Across Functional Group	14
2.3	Socioeconomic Characteristics of the Functional Groups	22
2.4	Geographic Distribution of Malnutrition and Functional Groups	32
2.5	Food Consumption Aspects of the Nutritional Problem	41
2.5.1	Distribution of Nutritional Adequacy	42
2.5.2	Food Consumption Patterns.	45
2.5.3	Determinants of Food Consumption Levels and Patterns.	49
2.5.4	Econometric Estimates of Food Consumption Parameters	51
2.5.5	Summary of Food Consumption Analysis	54
2.5.6	Income and Employment Issues	58
3.0	TOWARDS A NUTRITION POLICY FOR PANAMA.	69
APPENDIX A:	Sampling Design of the 1980 National Nutrition Survey	
APPENDIX B:	Distribution of Functional Groups by District	

List of Tables

Table		Page
1	Functional Group by Urban/Rural Sector.	15
2	Functional Groups Ordered by Prevalence of Acute or Chronic Malnutrition in Children Aged 0-9 Years	18
3	Distribution of Malnutrition Indicator by Sector of Employment of Male Head of Household	20
4	Distribution of Selected Functional Groups by Sector of Employment of Male Head of Household. .	21
5	Income and Selected Socioeconomic Indicators by Functional Group.	23
6	Distribution of Health System Indicators by Functional Group.	24
7	Distribution of Malnutrition in Panamanian Children Aged 0-60 Months by District	25
8	Regional Distribution of Functional Groups.	33
9	Socioeconomic Characteristics in Twenty Districts With High Prevalence of Malnutrition.	36
10	Percentile Distribution of Energy Intake and Household Food Costs by Region and Urban Rural Categories.	37
11	Calorie, Protein, and Expenditure Shares for Principal Food Commodities.	44
12	Calorie, Protein, and Expenditure Shares for Principal Food Commodities.	46
13	Calorie, Protein, and Expenditure Shares for Principal Food Commodities.	47
14	Averages of Consumption Variables and Other Selected Household Variables for Urban and Rural Households by Income Food Strata.	48
15	Estimates of Income Elasticities of Selected Commodities for Rural Households.	50
16	Domestic Resource Costs	53

17	Distribution of Labor Force Participation by Region, Age Group and Sex	56
18	Distribution of Employment by Region, Age Group and Sex	61
19	Distribution of Reasons for Not Participation in the Labor Force by Sex and Urban-Rural	62
20	Sector of Employment by Urban-Rural Area.	63
21	Sector of Employment for Agricultural and Rural Functional Groups	65
22	Means of Selected Socioeconomic Characteristics of Heads of Household by Sector of Employment	66

1.0 Introduction and Objectives

This report presents the results of a Functional Classification Study of Panama which has been undertaken under the direction of Dr. Cutberto Parillon, Director of Nutrition, Ministry of Health in the Republic of Panama, with the collaboration of the Institute for Nutrition of Central America and Panama (INCAP), Sigma One Corporation and the United States Agency for International Development.

The study is based on data developed by the 1980 National Nutrition Survey as part of the "Multi-Sectorial Analysis of the Food and Nutrition Situation in Panama" (Parillon, 1980)¹ and available secondary data from Panama.

The objectives of the study are to:

- o provide an analytical and quantitative basis for nutrition planning,
- o provide information which might be useful in improving existing nutrition programs and projects and for incorporating nutritional activities into other developmental initiatives, and
- o provide insight towards improving the existing information systems to better measure the nutritional situation and its evolution.

The approach of the study is to apply the concepts of the "Functional Classification" approach as developed by Joy and

¹See Appendix A for description of the sample.

Payne (Joy, 1971; Joy and Payne, 1975; Joy, 1973; and Payne, 1976) and as implemented by INCAP (Valverde et al, 1978).

The specific steps in the functional classification approach are:

- o Define distinct categories of population groups in poverty conditions according to their connection to the economic and productive process of the society in which they operate. These groups are called functional groups because an important characteristic of their definition is the occupation of the head of household.
- o Locate these groups geographically and by administrative/political subdivisions within a country, or regions in that country.
- o Enumerate or otherwise estimate the size of each group in terms of number of persons affected of each group in each geographic or political/administrative subdivision.
- o Describe the socio and economic characteristics that may be causally related with specific nutritional problems for each functional group.

1.1 The Nutrition Problem in Panama

More than twenty-five percent of the households in Panama have important nutritional problems in that at least thirty percent of the country's preschool aged children are affected by the growth retardation effects of malnutrition. Among the adult population, 22.8 percent of males and 24 percent of females are

classified as malnourished (Bermudez, 1982). These nutritional problems are, in part, associated with levels of food consumption which are below internationally recommended levels of calorie intake. A very large number of families in Panama use the bulk of their total real resources to obtain diets which are for the most part below international standards of adequacy for food energy. These food energy deficits are associated with other indicators of poverty which jointly, with inadequate diets, have been shown to be important determinants of the prevalence and persistence of malnutrition in Panama (Parillon et al, 1982).

Among the indicators of poverty which have been shown to be statistically and causally associated with households with malnutrition in Panama are social and cultural characteristics of the household; variables such as low calorie intake levels, mother's opportunity cost of time, low income and occupational characteristics of the working age adults in the household; health and environmental variables such as poor housing quality, lack of access to potable water, poor sanitary conditions, high levels of childhood morbidity from measles and diarrhea and poor access to the health services. The nutritional problems and the conditions on causal factors which determine malnutrition are disproportionately concentrated in the rural population, although significant problems persist for the urban areas (Franklin et al, 1982).

Malnutrition problems persist in appreciable proportions in Panama, particularly in rural areas even after substantial public investments in the health and sanitation systems, nutri-

tion interventions and agricultural policies which seek to both raise rural incomes and provide low cost food for the urban population. The continuing provision of health and social services to urban and rural populations and the economic growth of the early 1970's has resulted in substantial gains for the population as a whole. Indicators for well being related to health and nutrition have improved in the last 15 years. For example, Bermudez (1982), in her INCAP thesis, shows clear evidence of nutritional improvement among the adult population between 1967 and 1980. The recent evidence, however, is that important "pockets" of malnutrition and poverty remain among certain urban and rural groups and locales. It is also clear that some of the broad coverage programs have either failed to reach their intended beneficiaries or have done so at very high costs. Further improvement of the nutritional situation will require more precise targetting so as to effectively reach the groups in which important nutritional problems persist and to do so at reasonable cost. This study is directed at identifying malnourished groups, their geographic location, and their socioeconomic conditions so that more effective plans and programs may be implemented towards eliminating the remaining nutritional problems in Panama.

1.2 The Functional Classification Approach

The purposes of a nutritional functional classification study are to provide diagnostic information to assist planners and service providers in locating and identifying population

groups with important nutritional problems. The basic approach consists of identifying the geographic and politico-administrative location of population groups whose sociodemographic characteristics are causally or statistically related with the prevalence of important nutritional problems. The methods are a planning rather than an analytical tool because they permit an identification of the characteristics of population groups which allow the targetting of specific remedial activities, and estimate the number of persons in each group and setting to facilitate the estimation of costs and level of effort required to deliver services or other remedial actions and to facilitate the deployment of resources.

The technique differs significantly from conventional nutrition planning approaches in that these latter have been based principally on sociodemographic and physiological or health characteristics of persons at nutritional risk. The targetting of remedial actions has therefore required prior screening through health and other types of measurement. The cost and difficulties involved in medical screening to detect persons with nutritional problems have usually led to the use of very gross targetting devices, such as age-sex distributions, i.e. populations at risk are the pre-school aged children and pregnant mothers.

In contrast, the functional classification approach permits a finer reticulation of the characteristics of the population with nutritional problems, so that remedial actions can be targetted to those with a very high risk, or in fact, truly

malnourished, as opposed to large population groups that may, or may not, have serious nutritional problems. As such, the technique reduces the common problem of leakages of resources from the intended beneficiaries to other members of the population. An important fact, however, in this regard, is that the functional classification technique attempts to relate the prevalence of malnutrition in each identified functional group by characteristics of that functional group that are associated with their connection to the productive process in the economy. In this manner the interventions or remedial actions that can be instituted include those which can be promoted through policy mechanisms. For example, important determinants of functional group categories include the occupation of the head of household and employment, geographic location, and other economic characteristics pertaining to how that person is inserted into the productive process. With this information it becomes possible to design remedial actions or interventions that create incentives for the malnourished to solve their own problems. The functional classification technique can thus serve to enhance the possibility of designing remedial actions which are self-sustaining and not requiring continuous resource transfers from society at large to the populations at risk.

The technique does not, in and of itself, provide the prescription for required remedial action. The technique is principally directed at providing information so that nutrition planners and other experts can establish the basis for an

analysis of the causes of the existing nutritional problems and the likely impact of alternative remedial actions which might be directed at ameliorating the food and nutrition problems which particular functional groups have in their settings. The types of remedial actions that may be undertaken are selected from those remedial actions which have been known to be effective under similar conditions in other settings, and are in accord with the policy framework of the country or region in question. They can include remedial actions such as specific interventions, i.e. a feeding program, and they can also include the incorporation of food and nutrition objectives in general development activities, such as road building, the building of a dam, or the establishment of a potable water system, etc.

A functional classification study identifies, quantifies, and localizes groups of families according to their life pattern, social, economic and cultural problems and the level of resources that are available to them. They are clustered according to these characteristics under the assumption that they will respond in a similar manner to specific policies and programs.

A functional classification study is the beginning of a planning process which is used to identify the important nutritional problems of a country in terms of their size and location, and the relationship of their nutritional problems to social and economic processes that determine their levels of living and the bases for their nutritional problems. There are no precise statistical or methodological criteria for defining functional groups and for associating the functional groups with

the causal factors that may have determined their nutritional problems. The functional classification approach is a pragmatic approach for presenting information which requires the interaction of statistical and data management technicians in support of experienced nutritional planning personnel. It is for that reason that the present project has been organized with the collaboration of the three participating institutions, the Ministry of Health in Panama, INCAP and Sigma One Corporation. This report concentrates on the statistical, data management and policy analysis input of Sigma One Corporation. It is complementary to a master report which is being prepared in Spanish by Parillon, Valverde, Franklin and Harrell.

2.0 Statistical Results

The principal data base for the study is the 1980 National Nutrition Survey. This section presents the results of statistical analysis and tabulations with that data according to the procedures outlined by Joy (1973).

2.1 Definition of Functional Groups

The 1980 National Nutrition Survey was designed with the same sampling frame as the World Fertility Survey for Panama; as such it is representative of the population in each administrative district as a self-weighting sample. Occupational questions in that survey were used to identify each head of household with the occupation codes used by the International Labor Organization. The groups thus formed were further aggregated into larger groups with similar socioeconomic characteristics. A very large group of households was classified into a general category of agricultural occupations. For the agricultural sector, the data from the 1980 survey and analyses of variance techniques were used to form seven distinct functional groups from those households engaged in agricultural production activities. The analyses of variance procedure was used to determine the extent to which the type and number of crops grown by the household served as an indicator of the prevalence of malnutrition. The seven functional groups for agricultural households are defined as follows:

- o Small Horticultural Producers: This group consists of households that farm more than half a hectare of land and produce fruits and vegetables but do not grow any

rice or maize. They are generally located in two distinct types of areas--very remote or close to urban centers. Those located in remote areas consume almost all of their own produce; those close to urban areas sell fruits and some vegetables for urban consumption. Their median land area sown to crops is 2.5 hectares.

o Small Cassava Producers: This group is similar to the horticulture producers but tends to specialize its production to cassava. Their median crop area is 1 hectare.

o Small Diversified Producers: This group is similar to the previous two except that they produce at least three crops, of which two are maize and rice. They tend to produce for subsistence consumption and their median crop area is 5 hectares.

o Small Maize Producers: This group consists of households that live on the farm and are specialized to maize production. It includes maize farms up to 20 hectares in size, although the median farm size is 5 hectares. This group was isolated as a distinct group primarily to assess the impact of the maize price support policy which the country has pursued since 1974.

o Small Rice Producers: This group is similar to the maize producing group except the farm is specialized to rice production. This group also includes farms of up

to 20 hectares, although the median farm size is 2.5 hectares. This group was formed to assess the impact of the rice support policy.

- o Small Rice and Maize Producers: This group is similar in all respects to the previous two, except that the farm produces both maize and rice on farms whose median size is 5 hectares.
- o Farmers with Employees: This group consists of all other households that are engaged in agricultural production in farms 20 hectares or larger. This group has also identified itself as using hired labor on a permanent basis.

The above groups exhaust the households that live on farms; in the bulk they represent small land holders with the following distribution of farm sizes: 25 percent farm less than 0.5 hectares; 50 percent farm less than 2.0 hectares; 75 percent farm less than 10.0 hectares; 90 percent farm less than 30 hectares, and only the top 5 percent farm 50 hectares or more. Even the so-called Farmers with Employees represent relatively small land holdings, with median size of 32.5 hectares. It is important to note that this sample represents households whose residence is on or near the land which they farm. The National Nutrition Survey was a survey of households and not a survey of farms; thus households that farm large farms are not included as farm households because these households typically have their principal residence in urban areas. Furthermore, it is typical in Panama for relatively wealthy entrepreneurs to engage in multiple

economic activities so that the owners or operators of large farms will be classified according to their primary urban occupation. Households dwelling on large farms would typically be the households of hired caretakers.

Those households not classified by the agricultural production activities were classified by the first two digits of the official occupation code as given for the head of household in the survey form. These categories were combined into mutually exclusive groups according to ad-hoc criteria that centered on seeking similarities in income, socioeconomic status, etc.

- o Rural Workers: This group is composed of households which reside principally in rural areas and whose income is derived principally from wage work. This group includes a few dwellers in peripheral urban areas whose economic activity is agricultural wage work. The majority of this group are engaged in agricultural wage work during all or part of the year. They are also engaged as construction laborers, in petty trade, in crafts manufacturing and the service sector. This group probably includes a large number of households whose head migrates seasonally or even continuously seeking employment on large farms, banana or sugar estates or in the urban areas.
- o Salaried Urban Workers: This group consists of households whose head is permanently employed in an urban job. It includes persons engaged in

construction, services, and industry. Fifty percent of this group is concentrated in commercial or industrial occupations.

- o Self-Employed: This group of households represents those that identified themselves as self-employed and do not engage in agricultural production activities. The bulk reside in rural areas and identify themselves as linked to the agricultural sector or engaged in commercial activities. They tend to be engaged in commercial activities such as marketing of agricultural products.
- o Commercial and Transportation Employees: This group represents wage earning households whose occupation code classifies them in either of these sectors. They include clerks and drivers, and are generally permanently employed as opposed to being "occasional" workers in this sector.
- o Professionals, Office and Financial Employees: Households in this group include all professionals, i.e. college trained persons that did not identify themselves in any other group and "white collar" office and financial employees.
- o Skilled Workers: Includes all skilled occupations including barbers, craftsmen, carpenters, etc.
- o Unskilled Workers: Represents households that identified their head of household as such with the official occupation codes, including unskilled

construction workers, loaders working in the transport sector, and other "occasional" employees.

- o Government Employees: Households in this group have heads who identify themselves as working for the government.

Table 1 presents the number of households in each functional group and their location by urban and rural category. Some agricultural groups appear in urban districts for two reasons. First, the Panamanian census bureau classifies segments according to their predominant characteristic, and some segments have both types of households; second, even in highly urbanized areas some households produce significant amounts of agricultural products in tiny plots around the home.

2.2 Distribution of Nutritional Indicator Across Functional Group

For the purpose of this analysis, nutritional status is established at the household level by determining the nutritional status of the children nine years old or younger in each household. If any child in the household is "malnourished", as measured by anthropometric indicators, the household is classified as "malnourished". By focusing on this age range rather than on older children and adults, it is possible to concentrate the analysis on programs and policies of the last decade. Households without young children may also have nutritional problems, but of these, those with nutritional problems will constitute a very small minority of the population.

The malnutrition indicator for each child is a function of

Table 1: Functional Group by Urban/Rural Sector

Functional Group	Urban		Rural	
	n	% ^a	n	%
Small Horticultural Producers	68	3.6	517	14.7
Solely Cassava Producers	18	1.0	59	1.7
Solely Maize Producers	7	0.4	114	3.2
Solely Rice Producers	4	0.2	144	4.1
Maize and Rice Producers	4	0.2	301	8.6
Highly Diversified Crops	47	2.5	670	19.1
Agricultural Workers	49	2.6	669	19.0
Salaried Urban Workers	271	14.3	0	0.0
Self-Employed	60	3.2	201	5.7
Farmers with Employees	5	0.3	165	4.7
Commercial, Transportation Employees	239	12.6	167	4.8
Professionals, Office, Financiers	273	14.4	138	3.9
Skilled Workers	306	16.2	210	6.0
Unskilled Workers	180	9.5	265	7.5
Government Employees	44	2.3	34	1.0

^aColumn percentage.

both the child's height-for-age measurement and weight-for-height measurement. The height-for-age measurement is derived by comparing the child's present height to a standard reference and then classifying it as low (below two standard deviations of the standard reference), normal (between -2SD below the reference standard and +2SD above the reference standard), and high (above +2SD above the reference standard).^{*} In like fashion, the weight-for-height indicator is classified as low, normal or high based on comparing the child's present weight to a reference standard weight for the child's given height. The malnutrition indicator (Figure 1) combines both the weight-for-height indicator (low, normal, high) and the height-for-age indicator (low, normal, high). Children with a low value of weight-for-height, which measures present malnutrition, are "acutely malnourished"; children with a normal or high value of weight-for-height and a low value of height-for-age are "chronically malnourished"; and

Figure 1: Definition of Malnutrition Indicator
Based on Weight-for-Height and Height-for-Age

Weight-for-Height	Low	Height-for-Age Normal	High
Low	Acute	Acute	Acute
Normal	Chronic	Normal	Normal
High	Chronic	Normal	Normal

^{*}These standards are stricter than conventional criteria such as the Gomez standard. See Frazao, Harrell and Parillon (1981) for a discussion and interpretation of anthropometric indicators and nutritional status criteria.

children with normal or high values for both weight-for-height and height-for-age are normal.

Table 2 presents the functional groups ordered in descending order of the combined prevalence of acute and chronic malnutrition among children zero to nine years of age. The table also presents the number of households in which all the children are normal and the number of households without children nine years old or younger. The obvious fact is that agricultural and rural occupations define the functional groups with the highest prevalence of malnutrition. As was seen in Table 1, unskilled workers are also concentrated in the rural area. This strong rural-urban dichotomy on the prevalence of malnutrition among children also reveals itself in the data from the 1980 survey which was used to classify the adult population. The rural provinces have higher prevalence of adult malnutrition (Veraguas, in particular) and the predominantly urban provinces of Panama and Colon have the lowest adult malnutrition (Bermudez, 1982).

All the agricultural or rural functional groups rank above all the urban functional groups in terms of malnutrition. Almost three-fourths of all the malnourished children in Panama live in households whose head is dependent on the agricultural sector for his or her income and employment.

The two groups having the most malnutrition (diversified farmers and horticulturalists) are those whose production is highly diversified. These two groups account for 34 percent of rural households as well as 35 percent of the malnutrition in the

Table 2: Functional Groups Ordered by Prevalence of Acute or Chronic Malnutrition in Children Aged 0-9 Years

Functional Group	Acute or Chronic		Acute		Chronic		Normal		Houses Without Children	
	n	% ^a	n	%	n	%	n	%	n	%
Diversified Small Farms	213	27.3	30	3.8	183	23.5	218	36.0	286	36.7
Small Horticulturalists	157	25.1	18	2.9	139	22.2	234	37.3	236	37.6
Maize & Rice Producers	84	25.0	13	3.9	71	21.9	124	36.9	128	38.1
Solely Rice Producers	38	24.2	10	6.4	28	17.8	57	36.3	62	39.5
Farmers with Employees	40	23.5	8	4.7	32	18.8	58	34.1	72	42.4
Agricultural Workers	154	21.4	21	2.9	133	18.5	305	42.5	259	36.1
Unskilled Workers	92	20.7	21	4.7	71	16.0	212	47.6	141	31.7
Maize Alone	26	19.7	4	3.0	22	16.7	43	32.6	63	47.7
Cassava Producers	16	19.1	3	3.6	13	15.5	46	54.8	22	26.2
Skilled Workers	81	15.7	17	3.3	64	12.4	283	54.8	152	29.5
Salaried Urban	42	15.4	7	2.6	35	12.9	108	39.8	121	44.7
Self-Employed	35	13.4	3	1.2	32	12.3	101	38.7	125	47.9
Government	10	12.8	1	1.3	9	11.5	42	53.8	26	33.3
Commercial, Transport	46	11.3	13	3.2	33	8.1	197	48.5	163	40.2
Professional, Office	45	10.9	12	2.9	33	8.0	221	53.8	135	35.3

^aRow percentages

whole country. Highly diversified, small scale production is usually a sign of very poor market access in product and factor markets. Both acute and chronic prevalence rates are higher among the rural functional groups, but the difference in the prevalence of chronic is more marked between the rural and urban groups. This would suggest that urban children that become malnourished are able to recover more quickly and remain more well nourished than rural children. Rural children live in conditions in which malnutrition persists, or at least recurs.

Table 3 presents the distribution of households by nutritional criteria and the sector of employment of the head of household. As can be seen, households that are economically linked to the agricultural sector contain more than half of the malnourished children in the Panamanian population. These households have 41.8 percent of the acute cases which currently require remedial action and 55 percent of chronic cases which show signs of past episodes of malnutrition.

Table 4 gives further detail on the economic sector of employment of certain functional groups whose occupation code did not locate them in a specific sector. As can be seen, the commercial sector absorbs over a third of the salaried urban workers. The public sector absorbs 46.8 percent of the professionals and "white collar" workers. One fourth of the skilled workers are absorbed by the construction sector. Unskilled workers are concentrated in the agricultural (28.5 percent), the commercial (19.9 percent), the industrial (14.2 percent) and the public (13.6 percent) sectors. The self-

Table 3: Distribution of Malnutrition Indicator by Sector of Employment of Male Head of Household

Sector of Employment	Acute or Chronic		Acute		Chronic		Normal		No Children	
	n	% ^a	n	%	n	%	n	%	n	%
Construction	35	5.6	11	10.0	24	4.7	123	8.2	55	4.4
Transportation	31	5.0	7	6.4	24	4.7	106	7.0	87	7.0
Commercial	71	11.4	17	15.5	54	10.5	246	16.3	207	16.7
Industrial	46	7.4	7	6.4	39	7.6	116	7.7	74	6.0
Agricultural	329	52.6	46	41.8	283	55.0	489	32.4	475	38.2
Public	48	7.7	12	10.9	36	7.0	241	16.0	180	14.5
Services	34	5.4	5	4.6	29	5.6	115	7.6	80	6.4
Communications	2	0.3	0	0.0	2	0.4	9	0.6	9	0.7
Banking/Finance	0	0.0	0	0.0	0	0.0	10	0.7	4	0.3

^aColumn percentages

Table 4: Distribution of Selected Functional Groups
by Sector of Employment of Male Head of Household

Sector of Employment	Salaried Urban		Professionals		Skilled Workers		Unskilled Workers		Self-Employed	
	n	% ^a	n	%	n	%	n	%	n	%
Construction	12	6.4	13	4.4	110	25.6	23	7.3	4	2.8
Transportation	22	11.7	12	4.0	40	9.3	17	5.4	8	5.6
Commercial	65	34.6	53	17.7	78	18.1	63	19.9	44	31.0
Industrial	29	15.4	15	5.0	61	14.2	45	14.2	1	0.7
Agricultural	12	6.4	18	6.0	27	6.3	90	28.5	61	43.0
Public	13	6.9	140	46.8	53	12.3	43	13.6	3	2.1
Services	25	13.3	30	10.0	49	11.4	30	9.5	9	6.3
Communications	2	1.1	6	2.0	6	1.4	0	0.0	0	0.0
Banking/Finance	1	0.5	10	3.3	0	0.0	0	0.0	0	0.0

^aColumn percentages.

employed are concentrated in agriculture and commerce.

2.3 Socioeconomic Characteristics of the Functional Groups

The socioeconomic variables which have been causally related to malnutrition in Panama (Parillon et al, 1982) are presented in Table 5. Table 5 presents the functional groups ranked by the prevalence of malnutrition and associates each group with its average per capita income, average family size, literacy of the head of household, an indicator of whether the household has an employed adult, and for the agricultural households, the percentage of income that is derived from agricultural production by the household and how much of that production is marketed by the household. Table 6 shows the sector of employment for those functional groups which are engaged in agricultural production and in wage work away from their own farms. As can be seen, two-thirds of these households are engaged in wage work in other agricultural enterprises. Table 7 presents variables associated with the health system which have been shown to be causally related to malnutrition. The definition of each variable is as follows:

- o Monthly per capita income is the value of all earnings and an imputation for subsistence consumption divided by the number of persons in the household.
- o Family size is the number of persons living and eating in the household.
- o Literacy of head of household is determined by a set of questions that is based on reading and writing or

Table 5: Means of Income and Selected Socioeconomic Indicators
by Functional Group

Functional Group	Monthly Per Capita Income (B/month)*	Family Size (No. Persons)	Literacy of Head of Household (% Households)	% Households Have Adults Employed	% Income from Agricultural Production	% Marketed Surplus
Diversified Small Farms	127.00	5.4	80	73	37	34
Horticulturalists	87.00	5.2	80	69	50	59
Maize & Rice	56.47	5.0	77	77	54	53
Solely Rice	66.10	4.9	75	74	55	53
Farmers with Employees	112.84	5.0	79	77	60	58
Agricultural Workers	114.45	5.1	83	70	13	49
Unskilled Workers	95.75	5.1	86	77	6	52
Solely Maize Producers	78.00	4.9	82	66	41	63
Cassava Producers	60.00	4.9	82	63	28	35
Skilled Workers	149.65	5.4	94	82	--	--
Salaried Urban Workers	150.48	4.8	95	61	--	--
Self-Employed	80.06	4.7	81	71	--	--
Government	122.00	5.4	96	83	--	--
Commercial, Transport	288.00	4.8	93	77	2	48
Professionals Office Workers	198.00	4.7	97	87	--	--

*1B = 1 U.S.D.

Table 6: Sector of Employment for Agricultural and Rural Functional Groups

	Rural Workers		Horticultural Producers		Cassava Producers		Diversified Small Farmers	
	n	% ^a	n	%	n	%	n	%
Construction	24	4.6	16	4.1	2	4.6	17	3.9
Transportation	7	1.4	8	2.0	4	9.3	3	0.7
Commercial	59	11.4	28	7.1	8	18.6	41	9.5
Industrial	40	7.7	19	4.8	5	11.6	21	4.9
Agricultural	315	61.0	257	65.4	10	23.3	287	66.4
Public	27	5.2	30	7.6	7	16.3	28	6.5
Services	25	4.8	14	3.6	4	9.3	12	2.8
Communications	0	0.0	0	0.0	0	0.0	1	0.2
Banking/Finance	1	0.2	0	0.0	0	0.0	1	0.2
Not Employed, Off-Farm or Unemployed	18	3.5	21	5.3	3	7.0	21	4.9

^aColumn percentages

Table 7: Distribution of Health System Indicators by Functional Group

	High Risk Sanitation (%)	Good Water (%)	Health Access Problems (%)	Health Money Problems (%)	Sick Persons (%)
Diversified Small Farms	33.9	52.02	5.29	11.64	45.50
Small Horticulturalists	31.8	55.73	3.79	7.25	40.69
Maize and Rice Producers	46.0	48.23	3.44	9.38	41.56
Solely Rice Producers	42.8	56.34	4.03	6.71	40.94
Farmers with Employees	42.2	49.69	4.24	4.85	46.06
Agricultural Workers	25.6	63.89	2.54	7.06	41.24
Unskilled Workers	11.8	83.78	1.35	4.72	41.35
Maize Alone	31.5	63.78	2.38	6.35	40.48
Cassava Producers	19.2	62.34	2.53	2.53	40.51
Skilled Workers	5.7	94.25	1.55	2.52	43.02
Salaried Urban	0.8	99.22	0.74	3.33	39.63
Self-Employed	31.5	65.73	3.13	3.91	34.38
Government	2.7	97.22	0.00	1.28	38.46
Commercial, Transport	5.8	94.88	0.74	1.49	37.13
Professional, Office	4.7	96.69	0.24	1.46	35.77
National Average			2.2	5.5	39.9

- having completed two years of schooling.
- o Household has adult employed indicates that some adult in the household was employed at a job within the last week.
 - o Percent household income derived from agricultural production is the value of total production including subsistence consumption divided by total income; total income includes income from wage work, petty trade and transfers.
 - o Percent marketed surplus is the value of agricultural sales divided by the value of total production.
 - o The high risk sanitation variable indicates that Health Ministry personnel judged the excreta disposal facilities available to the household to be of high risk, i.e. generally non existent facilities.
 - o Good water indicator is determined by the availability of potable water from an established water system or a "protected" source.
 - o Health access problems are self-reported by the respondents to the survey.
 - o Health money problems are self-reported by the respondents to the survey.
 - o Sick persons in household specifies that some member of the household had some illness in the last 15 days.

Regarding the socioeconomic data of Table 5, the salient fact is that lower per capita incomes are concentrated in the rural and agricultural functional groups, but between these there

does not seem to be an obvious correlation between income and the prevalence of nutritional problems. It is important to remember that for the country as a whole, income is significantly associated with food consumption levels and with nutritional status. What this result suggests then, is that for some functional groups the proximal cause of malnutrition is not low income per se. For example, the average per capita incomes of diversified small farmers are the highest for all agricultural functional groups, and this group has the highest prevalence of malnutrition when chronic and acute cases are combined. The direct causes of the nutritional problems for this group are undoubtedly related to factors other than incomes and food consumption levels. On the other hand, in the absence of other information it would appear that the nutritional problems of rice and maize producers are associated with comparatively low levels of income. In a similar fashion, the self-employed in the urban area report low incomes, yet exhibit low rates of malnutrition. These results emphasize that while the principal cure for malnutrition is higher real incomes, there would still be need for nutrition-specific health and feeding interventions in certain areas for certain functional groups.

The rural functional groups show a slight tendency for larger families than the urban functional groups, and there is also a slight correlation between larger families and malnutrition. While this may reflect a causal relationship between close child spacing, high fertility and malnutrition, it is unlikely that a major effort in birth control services is

warranted, per se. The larger families among the rural dwellers could be reflecting a demand for labor services from children and not necessarily unwanted births. In a similar fashion the somewhat stronger association between literacy and malnutrition may be reflecting historical conditions rather than current conditions of access to schooling. In Panama a very large percentage of the school-aged population and of the 15 years to 25 years age group is currently enrolled in some form of schooling.

The more important information is revealed by the employment and source of income data. The number of households that report an adult as "formally" employed within the last week is low ranging from 61 percent for households headed by urban workers to 87 percent for white collar workers' households. The source of income information reveals that more than half of rural incomes are derived from sources other than agricultural production on their own farms, such as wage work on other agricultural enterprises (Tables 5 and 6).

These two factors are not independent. Socio-anthropological observation by Sigma One Corporation staff indicates that in Panama, it is common for a rural household to be economically dependent on one or more persons who have (temporarily) migrated out of the household. This phenomenon takes several forms, such as (a) the seasonal outmigration of male adults to work in the sugar harvest or on other agricultural enterprises, (b) the outmigration of young adult males and females to work (semi) permanently in urban areas and (c) the

weekly commuting of males to low skilled employment in urban areas, particularly when the place of residence is served by the bus system. Under these systems, the rural household serves as a place of permanent residence, a caretaker for the young and old, and as a purveyor of agricultural products to the migrant (or migrating) wage earners. One form of this arrangement that is of particular importance to the nutrition problem is the one where, through an extended family network, the children of urban workers are nurtured by relatives in the rural household. These children tend to be at higher nutritional risk than children being nurtured by their natural parents (Franklin et al, 1982; Franklin and Valdes, 1979). These results suggest a strong dependence of the nutritional well being of the Panamanian population on the functioning of the country's labor market. This dependence on the labor markets involves two mechanisms. First, income is a proximal determinant of nutritional status, and even in rural areas over half the income is earned from sources other than agricultural production; therefore labor markets determine most of the income, and income is in turn an important determinant of nutritional status. Second, the temporary out-migration from rural areas of the reproductive aged men and women tends to place children at nutritional risk; if higher incomes could be earned in rural areas lower malnutrition would prevail.

Table 7 presents the health experience and access characteristics for the functional groups. As can be seen, the Diversified Small Farmers have higher rates of access problems to the health system, have a higher than average rate of high risk

sanitation facilities, and have relatively low coverage of adequate water supplies. Given their higher incidence of sick persons in the household, it appears then that malnutrition problems of this functional group are associated more with poor health than with low incomes, per se. It is important to note, however, that income would still be an important factor since among the causes of poor health are those related to costs of using the public health system. For example, 11.6 percent of rural dwellers in Panama reported not using the health system because they did not have money to pay for transportation to the health facilities.

It is precisely in this sense that the functional classification approach provides a diagnostic and targeting tool for nutrition planning. The diversified small farmers are able to obtain adequate though low incomes through off-farm employment, and through this income are generally able to obtain adequate diets. Nevertheless, they have the highest rates of malnutrition because of poor health and inadequate access to the public health system resources. A food or income oriented intervention would do little to ameliorate their nutritional problems; rather, what would be required would be improved access to the health system, including improved coverage or functioning of the water and sanitation systems.

Before such insight can be converted into an effective plan, it is necessary to geographically locate the various

functional groups. The next section presents the mapping of malnutrition and functional groups by geographic/politico-administrative criteria.

2.4 Geographic Distribution of Malnutrition and Functional Groups

Table 8 presents the distribution of malnutrition by district, with the districts ranked in order of the prevalence of both acute and chronic malnutrition. Cañazas district in Veraguas province, La Pintada in Coclé and Chagres in Colón rank as the three districts with the highest percentage of households with malnourished children. Appendix B presents the distribution of the functional groups by district and Table 9 presents the distribution of functional groups by region. The functional groups with the highest prevalence of malnutrition are concentrated in the central provinces of Veraguas, Coclé, Herrera and Los Santos.

The Directorate of Nutrition of the Ministry of Health has reviewed the statistical results of the functional classification study and has designated 20 districts as requiring priority attention from the public sector (Table 10). The criteria for selection included, but was not limited to, malnutrition prevalence rates. For example, San Miguelito and La Chorrera have relatively low prevalence of malnutrition, but being populous have a high absolute number of households with malnourished children. They also have high concentrations of functional groups with nutritional problems and specific socioeconomic conditions.

Among the priority districts are ten from the central provinces, particularly from Veraguas Province. These districts have high concentrations of the highly diversified subsistence

Table 8: Distribution of Malnutrition in Panamanian Children Aged 0-60 Months by District

District	Acute or Chronic		Acute		Chronic		Normal		No Children	
	n	%	n	%	n	%	n	%	n	%
Canazas	27	52.9	1	2.0	26	51.0	15	29.4	9	17.6
La Pintada	32	47.8	3	4.5	29	43.3	19	28.4	16	23.8
Chagres	30	42.3	5	7.0	25	35.2	23	32.4	18	25.3
Santa Fe	12	40.0	0	0.0	12	40.0	8	26.7	10	33.3
San Felix	12	37.5	1	3.1	11	34.4	7	21.9	13	40.6
La Mesa	15	35.7	1	2.4	14	33.3	10	23.8	17	40.4
Comarca De San Blas	33	34.4	3	3.1	30	31.3	34	35.4	29	30.2
Las Palmas	13	34.2	2	5.3	11	28.9	16	42.1	9	23.6
Renacimiento	15	34.1	1	2.3	14	31.8	17	38.6	12	27.2
Boqueron	11	33.3	1	3.0	10	30.3	13	39.4	9	27.2
Tole	17	32.1	1	1.9	16	30.2	19	35.8	17	32.0
Ola	9	31.0	0	0.0	9	31.0	8	27.6	12	41.3
Montijo	19	30.2	2	3.2	17	27.0	25	39.7	19	30.1
Anton	30	29.1	7	6.8	23	22.3	47	45.6	26	25.2
Penonome	32	27.4	2	1.7	30	25.6	47	40.2	38	32.4
Atalaya	6	27.3	3	13.6	3	13.6	10	45.5	6	27.2
Pinocana	26	27.1	3	3.1	23	24.0	38	39.6	32	33.3
Los Pozos	10	26.3	2	5.3	8	21.1	10	26.3	18	47.3
Donoso	17	26.2	2	3.1	15	23.1	26	40.0	22	33.8
Rio De Jesus	9	25.7	0	0.0	9	25.7	14	40.0	12	34.2
Bugaba	34	24.3	6	4.3	28	20.0	51	36.4	55	39.2
Chiriqui Grande	5	23.8	0	0.0	5	23.8	7	33.3	9	42.8

District	Acute or Chronic		Acute		Chronic		Normal		No Children	
	n	%	n	%	n	%	n	%	n	%
Las Minas	6	23.1	0	0.0	6	23.1	9	34.6	11	42.3
San Lorenzo	13	22.8	1	1.8	12	21.1	28	49.1	16	28.0
Sona	21	22.3	2	2.1	19	20.2	37	39.4	36	38.2
Bocas Del Toro	10	22.2	1	2.2	9	20.0	19	42.2	16	35.5
San Francisco	4	22.2	0	0.0	4	22.2	5	27.8	9	50.0
Dolega	10	21.3	0	0.0	10	21.3	16	34.0	21	44.6
San Carlos	11	21.2	1	1.9	10	19.2	30	57.7	11	21.1
Portobelo	13	20.6	2	3.2	11	17.5	27	42.9	23	36.5
Santiago	37	19.6	12	6.3	25	13.2	88	46.6	64	33.8
Santa Isabel	6	18.8	2	6.3	4	12.5	12	37.5	14	43.7
Tonosi	9	18.8	3	6.3	6	12.5	18	37.5	21	43.7
Alanje	12	17.9	0	0.0	12	17.9	26	38.8	29	43.2
Remedios	6	17.1	0	0.0	6	17.1	13	37.1	16	45.7
Balboa	5	16.7	2	6.7	3	10.0	13	43.3	12	40.0
Nata	10	16.4	2	3.3	8	13.1	27	44.3	24	39.3
Gualaca	10	16.4	0	0.0	10	16.4	29	47.5	22	36.0
Changuinola	15	16.3	5	5.4	10	10.9	50	54.3	27	29.3
Chepigana	18	16.2	5	4.5	13	11.7	56	50.5	37	33.3
Las Tablas	9	16.1	4	7.1	5	8.9	27	48.2	20	35.7
Calobre	7	15.9	1	2.3	6	13.6	20	45.5	17	38.6
Ocu	11	15.7	3	4.3	8	11.4	36	51.4	23	32.8
David	28	15.6	2	1.1	26	14.5	82	45.8	69	38.5
Capira	8	15.4	2	3.8	6	11.5	24	46.2	20	38.4
Colon	47	15.1	14	4.5	33	10.6	132	42.4	132	42.4
San Miguelito	55	14.9	10	2.7	45	12.2	188	50.9	126	34.1
Chepo	11	14.7	1	1.3	10	13.3	32	42.7	32	42.6

District	Acute or Chronic		Acute		Chronic		Normal		No Children	
	n	%	n	%	n	%	n	%	n	%
Parita	8	14.5	2	3.6	6	10.9	19	34.5	28	50.9
La Chorrera	30	14.4	4	1.9	26	12.4	90	43.1	89	42.5
Baru	16	13.3	2	1.7	14	11.7	56	46.7	48	40.0
Pese	8	12.9	3	4.8	5	8.1	28	45.2	26	41.9
Arraijan	15	11.3	3	2.3	12	9.0	72	54.1	46	34.5
Aguadulce	13	11.1	6	5.1	7	6.0	55	47.0	49	41.8
Pedasi	5	10.4	2	4.2	3	6.3	16	33.3	27	56.2
Boquete	6	10.3	0	0.0	6	10.3	25	43.1	27	46.5
Macaracas	3	10.0	1	3.3	2	6.7	12	40.0	15	50.0
Panama	56	9.9	14	2.5	42	7.4	225	39.9	283	50.1
Taboga	3	9.7	1	3.2	2	6.5	10	32.3	18	58.0
Los Santos	9	9.4	4	4.2	5	5.2	36	37.5	51	53.1
Chame	3	9.1	2	6.1	1	3.0	16	48.5	14	42.4
Santa Maria	3	7.5	0	0.0	3	7.5	19	47.5	18	45.0
Guarare	5	7.2	3	4.3	2	2.9	23	33.3	41	59.4
Pocri	2	6.3	2	6.3	0	0.0	8	25.0	22	68.7
Chitre	7	5.8	3	2.5	4	3.3	53	43.8	61	50.4
Chiman	1	4.8	0	0.0	1	4.8	9	42.9	11	52.3

Table 9: Regional Distribution of Functional Groups*

Group	Isthmus ^a		Central ^b		Chiriqui		Bocas		Darien	
	n	%	n	%	n	%	n	%	n	%
Diversified Small Farms	119	16.6	453	63.2	95	13.2	11	1.5	39	5.4
Horticulturalists	212	36.2	212	36.4	145	24.8	14	2.4	1	0.2
Maize & Rice	21	6.9	177	58.0	40	13.1	2	0.7	65	21.3
Small Rice Farmers	23	15.5	69	46.6	26	17.6	6	4.0	24	16.2
Farmers with Employees	30	17.6	71	41.8	27	15.9	5	2.9	37	21.8
Rural Workers	207	28.8	291	40.5	178	24.8	21	2.9	21	2.9
Unskilled	189	42.5	98	22.0	109	25.5	42	9.4	7	1.6
Small Maize Farmers	27	22.3	52	43.0	21	17.3	7	5.8	14	11.6
Cassava Producers	20	26.0	40	51.9	12	15.6	5	6.5	0	0.0
Skilled Workers	309	58.1	291	40.5	178	24.8	21	2.9	21	2.9
Salaried Urban Workers	195	73.1	52	19.5	20	7.5	--	--	--	--
Self-Employed	79	30.3	120	46.0	45	17.2	6	2.3	11	4.2
Government Workers	44	56.4	20	25.6	11	14.1	2	2.6	1	1.3
Commerce, Transportation Workers	248	61.1	104	25.6	40	9.8	7	1.7	7	1.7
Professionals, Office and Financial Employees	225	54.7	112	27.2	59	14.4	6	1.4	9	2.2

^aColon and Panama provinces.

^bCocle, Herrera, Los Santos and Veraguas.

*Functional groups ranked in order of the prevalence of malnutrition (from high to low).

Table 10: Socioeconomic Characteristics in Twenty Districts With High Prevalence of Malnutrition

District Code	N	Average Family Size	% Literacy of Head of HH	% Head of HH Employed	Average Per Capita Monthly Income	% Income from Agr.	% Mktd. Surplus	% Adequate Water	
Cañazas	92	51	5.53	61	89	27.17	32	29	25
La Pintada	22	67	5.43	79	87	52.48	53	51	35
Chagres	31	71	5.62	90	91	64.99	62	73	56
Santa Fe	98	30	5.40	90	96	49.61	87	52	20
La Mesa	93	42	4.79	95	97	37.89	26	21	56
San Blas	35	96	5.76	80	92	64.38	31	56	59
Las Palmas	94	38	5.05	80	91	14.34	84	30	26
Renacimiento	4y	53	5.96	77	83	52.87	34	37	31
Boqueron	42	33	5.58	71	72	63.77	28	47	52
Tole	4x	57	5.07	50	77	59.32	12	44	72
Ola	24	29	4.97	85	83	88.77	99	76	43
Montijo	95	63	5.00	87	83	63.53	30	37	89
Anton	21	103	5.72	83	73	44.86	16	28	82
Penonome	25	117	5.17	92	80	92.71	43	53	61
Pinogana	51	96	4.74	74	85	33.27	89	50	3
Donoso	32	65	4.52	82	89	134.60	67	74	56
Sona	9x	94	5.57	86	90	56.07	18	40	73
Santiago	99	189	5.46	92	87	97.93	19	42	77
San Miguelito	8y	369	6.04	96	84	111.39	1	16	100
La Chorrera	86	209	5.11	90	78	230.99	4	49	96

maize and rice producers. For example, the two worst districts, Cañazas in Veraguas and La Pintada in Cocre, are inhabited predominantly by the functional group (highly diversified maize and rice producers) that has the highest prevalence of malnutrition. In Cañazas, per capita incomes are among the lowest in the country, literacy is low, coverage of health system is low, and the households depend on off-farm work for over two-thirds of their income. In La Pintada incomes and other indicators are higher, with a higher proportion (half) of income being derived from agricultural sources. In La Pintada, marketed surplus is also higher. These results suggest that an agricultural production/marketing type intervention would have a higher probability of impact in La Pintada than in Cañazas. In Cañazas the principal means for increasing incomes and improving nutrition would be through improved employment opportunities. In both districts access to public health services is low.

The results illustrated by these two districts highlight the usefulness of the functional classification approach. Both districts are inhabited by a functional group (diversified small farmers) whose national average per capita income is not very low; yet in these districts incomes are very low, a fourth of the national average for Cañazas and less than one-half of the national average for La Pintada. While both districts have health access problems, a near term intervention would focus on income generation and would require substantially different forms in each district. A food for work program during periods of seasonal unemployment could possibly be effective in Cañazas,

whereas one would probably compete with other income generating activities in La Pintada.

The information presented in Tables 5 through 10 can be carefully analyzed to develop group and district-specific diagnoses, and to recommend possible areas for program or policy intervention.

The districts of La Mesa, Santa Fe, Olla, Las Palmas and Anton in Veraguas also reveal the bi-modal nature of the highly diversified maize and rice producers' groups. For some, such as Olla's, agriculturally based interventions would appear to offer some promise; for others, rural employment seems to be the required approach. Also, the focus on income generation would need to be complemented with public health initiatives in some districts (e.g. Las Palmas, Olla) but not in others (Anton). In general, the above districts in the central provinces and the functional groups with nutritional problems that reside there are characterized by their very low incomes derived mostly from wage labor and poor access to the health system. In many cases these low income households have little land, and the land they work is subject to erosion since they are located in the foothills of the central mountain range. The economic relations between these low income rural dwellers and the large farms of the valleys in these provinces are the principal determinants of the economic conditions and an important determinant of the nutritional conditions for these households. To this end, the role of the price support policies for maize and rice may be an important aspect of

the welfare of these low income households. This topic is more fully discussed in the concluding chapter. It is important to note, however, the nature of the linkage between price supports for maize and rice and the income and nutrition of these poor households. First, it is not clear that the high support prices would have a direct beneficial effect on the income and nutrition of these households; if rice and maize prices were lower these households could be purchasers of maize and rice and growers of other crops. While measured income is higher, it is not clear that consumption levels are higher. On the other hand, since they depend on wage work on the larger farms for the bulk of their real income and almost all of their cash income, the high support prices would be expected to increase labor demands on the large farms and thus increase the opportunities for wage work. The mechanism would be indirect, and to the extent that commercial production of maize and rice may be capital intensive, the impact of the high prices on the income of the poor could be somewhat limited. This issue requires further study.

Some of the districts are characterized by their remoteness and the difficulty in delivering public services to them. These districts include Pinogana, Donoso, Chagres and San Blas. In each of these cases the specific interventions may differ, but much emphasis will need to be given towards promoting self-sufficiency and self-reliance through a community self-help approach. The role for direct public program and policy intervention is limited by the difficulty of access.

The districts of Santiago, La Chorrera and San Miguelito contain urban and peri-urban unskilled workers whose nutritional health can best be enhanced by approaches that accelerate their incorporation into stable urban employment through specific skill training and employment promotion policies. In general, the employment effect of economic and agricultural policies must be carefully reviewed.

As indicated earlier, the data presented thus far needs to be carefully analyzed by Panamanian economic, agricultural and health planners to arrive at specific approaches at relieving the poverty conditions that underlie the nutritional problems in these twenty districts.

2.5 Food Consumption Aspects of the Nutritional Problem

Food intake is the proximal cause of nutritional status in an individual. When inadequate levels of food intake persist, the body attempts to adjust by using body tissue for energy. This results in weight loss and, in growing children, growth retardation. Levels of food intake that are marginally lower than that required by the body's level of activity and physiological state may result in decreased levels of human function, but can persist for prolonged periods. As the gap between intake and requirements becomes larger and persists for long periods, biochemical lesion, illness and even death may ensue.

In this study, we have used growth retardation as an indicator of the joint effects of inadequate food intake and

inadequate nutrient utilization (due to morbidity). The foregoing analysis has concentrated on economic, social and public sector variables that determine the food and health conditions of the population in Panama. This section will analyze aspects related directly to food intake. These aspects are important since it is through food interventions and policies that the problems of malnutrition are most commonly addressed.

In the 1980 National Nutrition Survey 10 percent of the survey respondents were administered a twenty-four hour recall food use questionnaire to assess food consumption patterns and nutrient intakes. While it is not possible to make valid inferences about food consumption at the level of disaggregation implied by the functional groups and district reticulation, it is worthwhile to analyze the food consumption situation by an urban/rural breakdown. The following material is taken from a report by Sigma One Corporation to the Research Triangle Institute for their study of The Consumption Effects of Agricultural Policies in Panama.

2.5.1 Distribution of Nutritional Adequacy

The data from the food consumption part of the 1980 Nutrition Study indicate that for more than half of the households in that subsample, calorie intakes adjusted for age and sex composition are below the FAO reference value of 2700 calories per calorie equivalent person (Table 11). As many as 25 percent of the households have daily calorie intakes one-third lower than the reference value. This indicates that more than 25

percent, and as many as 50 percent, of the households in Panama have substandard food intakes. Food availability is a serious problem for at least 25 percent of the population. Unlike the anthropometric data, there do not appear to be appreciable differences between the rural and urban distributions of nutrients among households. This suggests that inadequate food intake interacts with inadequate health conditions to create the more serious rural malnutrition problem.

Diet composition is not a principal problem. Diets deficient in calories are more prevalent than protein deficient diets and protein consumption is not a major problem for most households.

Regional published prices or self-reported prices were used to impute monetary value to the 24 hour recall food consumption data. This imputation was used to analyze the relationship between cost and composition of diets. The extreme values of money value of food (5th and 95th percentiles) in Table 10 are approximately the same between the urban and rural samples, but the central values are substantially higher for the urban sample. Using the median (50th percentile) levels from Table 11, urban diets cost approximately 50 percent more than rural diets at the same calorie levels. From Table 11, it can be computed that one Balboa (= 1 U.S.D.) purchases approximately 45 percent more calories in the rural area than in the urban area. This suggests that the regional differences in money value of food per household are due to differences in food costs.

The 50 percent higher food costs for urban areas could be,

Table 11: Percentile Distribution of Energy Intake and Household Food Costs by Region and Urban Rural Categories

	Urban						Rural					
	n	5th	25th	50th	75th	95th	n	5th	25th	50th	75th	95th
Calorie/CEP^a day												
Isthmus ^b	123	1263	1816	2199	3027	4408	119	1025	1798	2381	3089	4634
Central ^c	46	1138	2055	2594	2911	5847	180	1190	1875	2514	3168	4310
Chiriqui	26	1129	1952	2638	3054	5917	75	737	1640	2068	2791	4393
Bocas del Toro	4	-	-	-	-	-	18	531	2001	2752	3135	6138
Darien	-	-	-	-	-	-	23	943	1609	2221	3662	5628
Household Food Costs (\$/day)												
Isthmus	131	1.4	3.5	5.4	7.6	12.5	127	1.2	2.5	3.8	6.2	11.8
Central	54	2.1	3.3	5.5	7.1	11.0	182	1.1	2.1	3.2	4.6	7.9
Chiriqui	26	1.5	3.7	5.6	7.7	17.0	75	.6	2.1	3.1	4.5	8.4
Bocas del Toro	4	4.6	5.0	6.5	7.1	7.3	18	1.4	4.4	6.9	8.4	21.1
Darien	1	-	-	-	-	-	23	.4	1.4	3.4	4.8	9.6
% of Food Production consumed by family												
Isthmus	110	35	50	50	100	100	549	8	50	50	79	100
Central	171	13	50	54	100	100	1309	30	50	70	100	100
Chiriqui	78	0	50	50	69	100	524	9	50	50	97	100
Bocas del Toro	2	-	-	-	-	-	61	0	50	50	81	100
Darien	-	-	-	-	-	-	172	13	46	59	88	100

^aCalorie-equivalent person.

^bEncompasses the provinces of Panama and Colon.

^cGroups together the provinces of Coclé, Herrera, Los Santos and Veraguas.

in part, marketing margins, but also quality differences. Using protein content of the diet as an index of quality it is possible to compute that urban diets are more protein dense, thus suggesting quality differences as an important factor which could account for regional differences in food costs. The average rural diet contains 29 grams of protein per thousand calories and the urban diet contains 32.7 grams of protein per thousand calories. This could account for about 25 percent of the regional differences in food costs. The balance of the regional price differences could be attributable to marketing margins.

The protein density levels compare favorably with U.S. data; the average protein density ratio from the 1977/78 National Food Consumption Survey in the United States was 34.8 grams per thousand calories for the whole U.S. population (Franklin et al, 1980). Diets with these protein densities will more than satisfy protein RDA's if energy intakes are near adequacy levels. This reaffirms the general assessment that the nutritional problems in Panama are principally associated with a mal-distribution of food energy across households, rather than with composition of the diet. While higher cost urban diets are, in part, the result of quality differences, there appears to be an important difference in urban vs. rural food costs for nutritionally equivalent diets.

2.5.2 Food Consumption Patterns

This section presents the composition of the Panamanian diet. The share each principal food commodity contributes to the household's total calorie intake and food expenditure are presented in Table 12 for all households and in Tables 13 and 14

Table 12: Calorie, Protein, and Expenditure Shares for
Principal Food Commodities

All Households (n=728)			
Commodity	Average percent of daily calories	Average percent of daily protein	Average percent of daily food expenditures
Corn	2.8	2.0	2.1
Cereals	.5	.5	.4
Breads	7.8	8.1	5.2
Beans	5.3	11.2	4.9
Rice	33.4	23.6	16.4
Fish	1.9	8.6	5.2
Milk	4.1	6.9	6.8
Poultry-eggs	4.1	9.9	10.3
Beef	6.3	15.5	13.9
Pork	1.0	1.8	2.1
Oils	12.0	0	6.3
Vegetables-fruits	11.9	6.5	12.8
Sugars	5.4	0	2.2
Others	<u>3.5</u>	<u>5.4</u>	<u>11.4</u>
TOTALS	100.0	100.0	100.0

Source: Household consumption data collected for the Nutrition Evaluation project in 1980: The share each principal food commodity contributes to households total caloric intake, protein intake and expenditures on food.

Table 13: Calorie, Protein, and Expenditure Shares for Principal Food Commodities

Rural Households (n=418)			
Commodity	Average percent of daily calories	Average percent of daily protein	Average percent of daily food expenditures
Corn	3.6	2.7	2.8
Cereals	.3	.4	.4
Breads	5.6	5.9	4.3
Beans	6.1	13.2	5.7
Rice	36.0	26.9	20.0
Fish	2.1	10.5	6.2
Milk	3.0	5.3	5.5
Poultry-eggs	3.2	8.0	9.0
Beef	4.8	12.4	10.6
Pork	1.0	1.8	2.2
Oils	11.3	0	6.7
Vegetables-fruits	14.5	8.0	14.1
Sugars	5.3	0	2.5
Others	<u>3.2</u>	<u>4.9</u>	<u>10.0</u>
TOTALS	100.0	100.0	100.0

Source: Household consumption data collected for the Nutrition Evaluation project in 1980: The share each principal food commodity contributes to households total caloric intake, protein intake and expenditures on food.

Table 14: Calorie, Protein, and Expenditure Shares for
Principal Food Commodities

Urban Households (n=192)			
Commodity	Average percent of daily calories	Average percent of daily protein	Average percent of daily food expenditures
Corn	1.8	1.3	1.0
Cereals	.7	.7	.5
Breads	11.4	11.9	6.9
Beans	3.8	7.7	3.4
Rice	28.3	17.9	9.6
Fish	1.0	4.7	3.2
Milk	6.3	10.1	9.4
Poultry-eggs	5.2	12.2	11.7
Beef	9.6	22.4	21.0
Pork	1.0	1.6	1.8
Oils	13.0	0	5.8
Vegetables-fruits	7.3	3.6	10.1
Sugars	6.2	0	2.0
Others	<u>4.4</u>	<u>5.9</u>	<u>13.6</u>
TOTALS	100.0	100.0	100.0

Source: Household consumption data collected for the Nutrition Evaluation project in 1980: The share each principal food commodity contributes to households total caloric intake, protein intake and expenditures on food.

for rural and urban households, respectively. Rice is the important staple in the Panamanian diet; it accounts for one-third of calories, one-fourth of protein, and one-sixth of food expenditures (Table 12). The importance of rice is greater in the diets of rural households than in urban households. The diets of the rural population are composed of rice, oils and fats, fruits and vegetables, including roots, tubers, plantains and bananas. The urban diets are relatively more intense in beef and poultry as complements to the rice-based diet.

Average shares of total daily calories for rural households for corn and beans are 3.6 percent and 6.1 percent respectively; while among urban households corn represents only 1.8 percent and beans only 3.8 percent of household calorie availability. Roots, tubers, plantains, and bananas on the other hand, represent almost 10 percent of calories for the rural households.

2.5.3 Determinants of Food Consumption Levels and Patterns

The Directorate for Nutrition of the Ministry of Health in Panama publishes, periodically, an estimate of the per person food costs necessary to obtain a nutritionally adequate diet from the typical food use pattern in Panama. This cost is known as the cost of the "basic food basket" and was estimated at \$1.06 per adult per day at the time of the 1980 nutrition survey. This value was used to stratify the data from the survey households according to income and a criterion suggested by the Economic Commission for Latin America (ECLA). This criterion establishes three income cut-off points for defining levels of poverty; incomes below the cost of a basic food basket are said to

Table 15: Averages of Consumption Variables and Other Selected Household Variables for Urban and Rural Households by Income Food Strata^a

Poverty Levels*	n	%	Averages for Urban Households (n=166)			
			Money Value of Daily Food Consumption	CEP ^b Per Household	Daily Calories Per CEP	Daily Protein Per CEP (grams)
Extreme Poverty	38	23	5.28	5.3	2,126	66.2
Poverty	32	19	7.06	5.2	2,671	60.9
Inadequate	23	14	6.64	4.4	2,586	83.6
Non-Poor	73	44	5.76	3.8	2,490	83.4
	166	100				

Poverty Levels*	n	%	Averages for Rural Households (n=381)					Percentage Off-Farm Income
			Money Value of Daily Food Consump.	CEP ^b Per HH	Daily Calories Per CEP	Daily Protein Per CEP (grams)	Marketed Surplus ^c	
Extreme Poverty	204	54	3.96	5.4	2,230	61.8	.26	36
Poverty	81	21	4.29	4.7	2,403	69.4	.27	66
Inadequate	34	9	5.27	3.9	2,667	88.5	.19	72
Non-Poor	62	16	4.54	3.5	2,696	89.1	.31	75
	381	100						

Cost of monthly basic food basket = household CEP x \$1.06/day x 30.4 days/month.

\$1.06 = daily cost of basic food basket from "Determinacion y Costo de la Canasta Basica de Alimentos Para Panama," Ministerio de Salud, Panama.

CEP = Calorie equivalent person; weights each household member by the ratio of the age-sex calorie recommendation relative to the male adult recommendation.

Market connectedness = ratio of value of agricultural sales to value of agricultural production for each household.

Extreme Poverty Gross income < 1 basic basket.
 Poverty 1 basic basket ≤ gross income < 2 basic baskets.
 Inadequate 2 basic baskets ≤ gross income < 3 basic baskets.
 Non-Poor Gross income ≥ 3 basic baskets.

reflect extreme poverty; incomes greater than the cost of one basic basket but lower than twice the monetary value of two basic baskets are said to reflect poverty; incomes at levels between twice and three times the cost of the basic basket are considered low but adequate, and income levels above three times the cost of the basic basket are considered as not poor.

Table 15 presents the stratification of household incomes according to this criterion and the associated average values for food costs, calorie and protein intakes, and number of calorie equivalent persons per household. The table suggests that low incomes are associated with low levels of food expenditure and food consumption. The table also highlights the great disparity between urban and rural incomes; 23 percent of the urban sample households are judged to be in extreme poverty whereas 54 percent of the rural households are judged to be in extreme poverty according to the ECLA criterion.

2.5.4 Econometric Estimates of Food Consumption Parameters

In the Consumption Effects of Agricultural Policies study total expenditures on food, calorie consumption and quantities of each of the following six commodities, rice, corn, beans, milk, poultry and beef, were analyzed for their economic relation to a number of socioeconomic variables. These econometric analyses of food consumption patterns for rural households on the six commodities yielded income as a highly significant determinant of consumption of rice, milk, poultry and beef, but is of lesser importance for beans and is insignificant for corn. Corn and

beans are the less preferred commodities and are of greater relative importance to poorer households. Higher income households consume more rice, the major staple, and more milk, poultry and beef. Table 16 presents the estimated income elasticities for these commodities in rural households. The econometric analysis of urban diets yielded positive income elasticities for beef and poultry. Urban consumers will therefore allocate additional income to purchase beef and poultry, and little, if any, to obtain additional grains or fruits and vegetables, whereas the rural population will allocate additional income to rice as well as beef, milk and poultry.

For the rural households the number of persons in each household, family size, is a significant determinant of bean, corn and rice consumption, reflecting that larger families are poorer and consume more of the less preferred commodities. Education is a highly significant determinant of consumption in that households in which the head of household has less than one year of education consume more corn, beans and rice. This again reflects poverty as an important determinant of food consumption patterns because the lower income households have less education. Percentage of off-farm income as a regressor is significant and negative for beans and rice, which reflects that households earning a greater percentage of income from off-farm will consume less beans and rice. Households with high percentages of income from off-farm have higher total incomes and do not consume as much of the less preferred commodities. It is important to note that these relatively higher income rural households derive most

Table 16: Estimates of Income Elasticities of Selected Commodities for Rural Households

Regression of logarithm of total family grams per commodity on logarithm of total family income and family size, market connectedness, land size, mechanization, percent off-farm income, education of head of household.

	N	Income Elasticity
Corn	151	0.00
Beans	188	0.00
Rice	373	0.26
Milk	255	0.47
Poultry	76	0.82
Beef	170	0.51

of their income from agricultural activities, but not from production of crops on their own farms. Rather, they work as laborers on larger farms, including the sugar estates, or are engaged in petty trade of agricultural products. From a food consumption point of view, rural dwellers that are engaged in wage work are better off than subsistence farmers.

much of the less preferred commodities. Land size, number of hectares, is significant only for corn consumption. For the rural sector, it is worth noting that neither land size, mechanization nor market connectedness are important determinants of the food consumption patterns. For the urban households, neither homeownership nor sector of employment enter as significant determinants of the household consumption patterns.

2.5.5 Summary of Food Consumption Analysis

While nearly half of the population has not yet achieved calorie adequacy, Panamanian consumers will spend more of their additional income on the quality components (higher cost sources of calories) than on calories themselves. Generally, they achieve this by spending relatively more of their income on animal sources of food than on vegetable sources of food. The differences between rural and urban diets are principally those of composition and quality, rather than adequacy. Both the composition and level of intake is principally determined by income for both rural and urban consumers. The rural population being considerably poorer than the urban population adjusts to

its lower incomes by consuming diets prepared with less preferred foods (cereals and starches). The rural population allocates the bulk of their real resources to obtain their food.

Both the urban and rural populations would prefer to consume more beef, milk and poultry products. As incomes rise, even the rural poor would consume less corn (maize) and beans. A nutrition oriented food policy for Panama would seek to expand the supply and reduce the costs of animal products. There would seem to be little nutritional or economic justification for investing public resources in expanding the supply of beans. Public initiatives that facilitated the marketing of fruits and horticultural crops would probably result in benefits to both producers and consumers, although this would not be a priority issue from the nutritional point of view.

The agricultural policy issues regarding maize and rice are more complex. The present policy of supporting maize and rice prices above import parity results in higher incomes to maize and rice producers, may result in higher wages for rural laborers, but results in higher food costs and provides incentives for domestic resource misallocations. The high support prices also result in higher food costs for non-producing households. For maize the higher costs are passed through in the price of poultry and other animal products. Higher rice prices are passed directly to consumers. Regarding efficiency in resource use, Table 17 presents estimates of domestic resource cost coefficients for maize and rice production under two levels of technology in Panama. These numbers suggest that farmers using

Table 17: Domestic Resource Costs^a

Rice	Low Yield Technology	High Yield Technology
100% of land value ^b	1.33	7.77
50% of land value	1.13	4.37
0% of land value	0.94	0.97
<hr/>		
Corn		
100% of land value	1.23	2.44
50% of land value	1.02	1.37
0% of land value	0.81	0.30

^aDomestic resource cost (DRC) is the value of domestic resources (in balboas) committed to the production of output from one hectare divided by the value added in world prices (U.S. dollars). This result is then divided by the real exchange rate; the result is a unitless number. A value less than one indicates a comparative advantage; a value greater than one indicates a comparative disadvantage.

^bLand value is an estimate of land rent as a domestic resource committed to the production of output from one hectare and is calculated in the following manner:

$$(\text{Producer Price} \times \text{Yield}) - \text{Total Cost of Production for one hectare.}$$

low levels of inputs and land with low opportunity costs are the economically efficient producers of maize and rice. To the extent that the high support prices induce the diversion of land and other resources from alternative uses, then the high support prices tend to induce economic losses to the country and become a de facto transfer payment to inefficient (high technology) producers. Furthermore, Table 17 shows that under the current factor mix, Panama does not have international comparative advantage in maize and rice production unless the land used for maize and rice has no alternative use. This result is borne out by the fact that the domestic resource cost coefficients are less than one only when land is costed at zero.

This result does not imply, however, that Panama should not produce either; rather what it implies is that the high support prices induce the use of high cost and economically inefficient technologies. At lower prices, say import parity, farmers would probably reduce their use of imported factors and increase their use of domestic resources such as labor.

The economic efficiency costs and the nutritional costs are an argument for removing the "support" component of the maize and rice price policies. Market stabilization at or near international price trends, on the other hand, could remain an important reason for public intervention in these markets. Removal of the positive protection effect of the price policies would result in lower food prices and lower farm incomes. The incidence of these lower incomes cannot be ascertained with the analyses undertaken thus far. Small rice and maize producers

tend to be more dependent on their production for their income and they tend to sell a greater portion of their production. Thus, they are likely to benefit from the higher product prices; removal of the support element would tend to make them even poorer and perhaps exacerbate their nutritional problems. On the other hand, the impact of the higher prices is higher for the larger farmer because of higher yields and more area under production. Larger farmers are also the employers of rural laborers. Removal of price supports could also affect the incomes of rural wage workers to the extent that it puts downward pressure on wages and the demand for labor. While it is reasonable to believe that the economy and countrywide economic and nutritional benefits of removing the high support price levels for maize and rice will, in the long run, outweigh nutritional and income losses to low income rural dwellers, provision must be made for protecting the incomes of the rural poor from further deterioration. These results also suggest an urgent need for a detailed study of the incidence of the income and wage effects of the high support prices for maize and rice. If it were to develop that these effects are highly regressive, then economic and nutritional arguments for their elimination would prevail.

2.5.6 Income and Employment Issues

Given the importance of income as the determinant of both the pattern and level of food consumption and its association with the nutritional status of certain functional groups, it is important in turn to analyze the sources of incomes, particularly

as these may relate to agricultural policies. Rural incomes seem principally determined by conditions in the rural labor market. The higher income households in the rural area are those that are engaged in wage work rather than in direct agricultural production on their own farm (Table 5). Of these households with the greater part of their income being derived from the labor market rather than the agricultural product market, most work for wages on other agricultural enterprises and nearly a fifth are engaged in petty trade or other services related to agriculture. Estimates of wage equations for the urban and rural sector in a related project (Franklin et al, 1982) indicate that wages (and therefore incomes) in both the rural and urban sector are being determined by human capital variables such as schooling and experience. The principal consequences of agricultural and economic policy changes on food consumption and nutrition in Panama would therefore be determined by the impact of policies on wage income in both rural and urban settings. In the short run, wage income will be determined by labor demands in that labor supply is likely to be highly elastic at the prevailing wage.

The functional groups with the highest prevalence of malnourished children are those linked economically to the agricultural sector as shown in Tables 2, 5 and 6. For these groups, less than half of their income is derived from agricultural production on their own farms and less than half

of their produce is sold in the market. Small farm households, in particular, were seen to have nutritional problems which are principally associated with low incomes. For these households, the income effect of price support policies may have been small, perhaps due to low productivity and low levels of marketed surplus. While there may exist scope for nutritional improvement through agricultural production oriented interventions, the importance of the rural labor market as a vehicle for intervention must also be considered. Furthermore, the urban functional groups with appreciable nutritional problems are identified as "blue" collar workers, salaried employees and the self-employed.

Table 18 presents labor force participation rates for men and women for the urban and rural sectors. The overall labor force participation rate for both men and women in the whole country is 62 percent. Table 19 presents the tabulation of all those persons aged 15 to 55 that were employed at the time of the survey. Given the definition of labor force participation as working or looking for work, then the unemployment rates implied by Table 19 are generally very low. Either this suggests a stigma at answering that no one in the household is gainfully employed, or that in Panama the discouraged worker effect is high. This would account for the relatively low labor force participation throughout the country. Table 20 presents the distribution of reasons for not participating in the labor force given by persons in the 15 to 55 years age range. The most important reason is that close to 90 percent of the able bodied males that are not formally in the labor force are attending some

Table 18: Distribution of Labor Force Participation
by Region, Age Group and Sex

Region	Age Group	Women		Men	
		n	%	n	%
Isthmus	15-25	205	19.6	438	44.8
	25-40	373	37.9	784	87.9
	40-55	213	35.9	504	90.2
	All Ages	791	30.2	1726	71.1
Central	15-25	175	27.0	430	60.6
	25-40	289	38.0	724	91.9
	40-55	172	34.5	520	89.8
	All Ages	636	33.4	1674	80.4
Chiriqui	15-25	53	14.9	179	51.1
	25-40	104	30.4	289	87.3
	40-55	62	28.4	199	84.0
	All Ages	219	23.9	667	72.7
Bocas	15-25	10	11.2	23	41.0
	25-40	27	45.0	36	66.7
	40-55	7	25.0	38	84.4
	All Ages	44	24.9	97	62.6
Darien	15-25	17	26.6	36	58.1
	25-40	29	39.2	59	88.1
	40-55	12	27.3	53	90.0
	All Ages	58	31.9	149	78.8

Table 19: Distribution of Employment by Region,
Age Group and Sex

Region	Age Group	Women n	Employed %	Men n	Employed %
Isthmus	15-25	176	16.9	397	40.6
	25-40	343	34.8	759	85.1
	40-55	205	34.5	495	88.6
	All Ages	724	27.6	1651	68.0
Central	15-25	172	26.6	420	58.7
	25-40	284	37.4	711	90.2
	40-55	172	34.5	513	88.6
	All Ages	628	33.0	1644	78.9
Chiriqui	15-25	50	14.1	170	48.6
	25-40	100	29.2	280	84.6
	40-55	61	28.0	197	83.1
	All Ages	211	23.1	647	70.5
Bocas	15-25	9	10.1	23	41.1
	25-40	26	43.3	36	66.7
	40-55	7	25.0	38	84.4
	All Ages	42	23.7	97	62.6
Darien	15-25	17	26.6	36	58.1
	25-40	29	39.2	58	86.6
	40-55	12	27.3	54	90.0
	All Ages	58	31.9	148	78.3

Table 20: Distribution of Reasons for Not Participating
in the Labor Force by Sex and Urban-Rural

Reason	Rural		Urban	
	Male	Female	Male	Female
Student	86.9	29.1	91.6	12.1
Housewife	-	55.2	-	80.8
Invalid	1.4	0.5	2.0	0.7
Discouraged	2.9	1.0	1.5	0.3
Waiting to Hear	7.2	1.5	0.4	0.0
Works Occasionally	1.4	0.0	2.0	0.5
Other Reason	0.0	12.8	2.0	5.5

form of schooling.

Table 21 presents employment by sector for rural and urban areas. In the urban areas the commercial, public and service sector absorb over two-thirds of all employment. In the rural areas agricultural activities absorb half of the labor force and the commercial and public sectors absorb over 26 percent more. Thus, the bulk of employment is concentrated in the commercial, public, service and agricultural sectors. In traditional nomenclature, the tertiary sectors (commerce, public and service) absorb the bulk of the labor force not absorbed by the primary agricultural sector. It is worth recalling that much of the income (one-half) from the agricultural sector is not earned by agricultural production, but by the sale of labor away from the farm. Rural incomes are being determined in large part by rural labor markets and less so by agricultural product markets. What is not clear is to what extent the sector can continue to absorb wage labor.

As was seen in Table 5, the majority of rural workers, horticultural producers and diversified small farmers are also employed in the agricultural sector as wage workers on other farms. In addition, the monthly income per capita, education of the head of the household, percentage of adults employed and percentage of adequate water are lowest for those households linked economically to the agricultural sector (Table 22).

Given the importance of off-farm labor in the agricultural sector, and the fact that tertiary activities absorb the bulk of urban employment, it becomes clear that job creation and employ-

Table 21: Sector of Employment by Urban-Rural Area

Sector of Employment	Urban		Rural	
	n	% ^a	n	%
Construction	160	6.4	159	4.3
Transportation	200	8.0	126	3.4
Commercial	608	24.4	476	13.0
Industrial	219	8.8	229	6.2
Agriculture	150	6.0	1889	51.4
Public	684	27.4	486	13.2
Services	404	16.2	272	7.4
Communications	38	1.5	22	0.6
Banking or Finance	33	1.3	14	0.4

^aColumn percentages.

Table 22: Means of Selected Socioeconomic Characteristics of Heads of Household by Sector of Employment

	Monthly Income Per Capita	Years Schooling of Head	% Womens Labor Force Part.	Adults Employed %	Good Water %
Construction	176.72	6.4	7.0	83	92
Transportation	124.47	7.3	8.0	80	95
Commercial	145.52	6.8	9.3	81	92
Industrial	156.75	6.3	8.2	83	88
Agriculture	77.18	4.2	7.0	75	53
Public	425.95	7.9	9.5	83	94
Service	105.92	6.9	13.7	73	92
Communications	104.48	9.0	17.6	80	90
Banking & Finance	135.31	9.8	4.7	93	100

ment generation must take place in the rural areas themselves. To expel labor from agriculture to the urban areas will create serious problems with the absorption capacity of the public, service and commercial sectors. These latter two must look for growth in Panama's role as an international trading and financial center and not on the domestic effective demand for trade in goods and service provision. These trading and service sectors will have limited capacity to absorb workers. The industrial base is small as is the effective demand for its products. Accordingly, Panama must look to the agricultural sector for employment generation. The policy dilemma centers on how this might be achieved.

The dilemma is illustrated by maize and rice production on commercial farms. Cost of production data for the RTI/Sigma One CEAP study shows that the cost share for labor in maize and rice production declines (from 33 percent and 25 percent respectively) as the cost shares of mechanization and agro-chemicals increase. As these latter increase the unit costs remain the same since yields also increase. The commercial farmer has incentives to use the non-labor inputs since the higher yields will result in higher total net returns to the enterprise. The employment effect of high support prices for these commodities is likely to be small since labor share will decline in relative and absolute terms. Removal of the support prices would shift labor demands downward as producers responded to lower prices by producing less of each commodity. The net effect on labor incomes is not clear since it is not clear to what extent the lower prices would

result in more labor intensive production. High support prices tend to be absorbed by the producers and non-labor factors, yet lower prices could result in lower employment levels.

What is needed in further analysis is insight into the alternative use for the land being sown to maize and rice by commercial farmers. If the alternative uses are labor intensive, then positive nutritional and income benefits could ensue. The matter of rural incomes and employment warrants a thorough study of rural labor markets and their relation to the structure of incentives facing agriculture.

3.0 Towards a Nutrition Policy for Panama

Panama has not had a nutrition policy; it has applied policy instruments to boost the incomes of maize and rice producers through price supports and institutional services in the agricultural sector and policies to put downward pressure on wage goods through retail price controls, particularly of food stuffs. It is not clear that the farm income policies have been effective in raising the incomes of poor farmers; in fact, it is possible that the price support policies may have induced resource misallocations within the agricultural sector. To wit, high rice and maize prices may have forced small land holders to produce these grains, whereas in the absence of the support prices these grains might have been available at lower prices as consumer goods for farmers, and the farmers could have used resources currently allocated to maize and rice production to grow other more economically appropriate crops or would have released labor for sale in rural labor markets.

A nutrition policy for Panama must be based on three clear facts that arise from this study. First, that malnutrition is overwhelmingly concentrated in functional groups whose principal economic activities are linked to the agricultural sector. Second, that while for some groups and some districts the prevalence of malnutrition is proximally linked to low incomes, rural incomes are being determined in large part by rural labor markets rather than agricultural product markets. Third, for an important number of rural dwellers the nutritional problems are still associated with inadequate provision or access to health

services.

A nutrition policy in Panama would focus primarily on two aspects, income generation through off-farm employment and health service provision. Only secondarily would a nutrition policy focus on increased food output. The focus on agricultural policy would be to remove the distortions impeding optimal resource allocation in the rural sector. An important caveat is that optimal resource allocation may imply accelerated rural to urban migration.

Bibliography

1. Bermudez, O. I. C., "Estado Nutricional de la Poblacion Adulta en la Republica de Panama," 1980.
2. FAO, "Food and Nutrition Planning," Nutrition Consultants Report Series (Rome), No. 35.
3. Franklin, Harrell, Parillon, "Final Report: Nutrition Evaluation Project," Sigma One Corporation, Raleigh, N.C., 1982.
4. Franklin, D. L., Shearer, E. S., and Arcia, G., "Consumption Effects of Agricultural Policies in Panama," Research Triangle Institute, Research Triangle Park, N.C., 1982.
5. Franklin, D. L. and Vial de Valdes, I., "Desnutricion Infantil y su Relacion con el Tiempo y las Habilidades de la Madre," Cuadernos de Economia, Vol. 16, No. 49, 1979.
6. Frazao, Harrell, Parillon, "Suggested Anthropometric Indicators for the Cross-Sectional Classification of Nutritional Status of Preschool Children," Research Triangle Institute and Republica de Panama, 1980.
7. Joy, J. L., "Economic Aspects of Food and Nutrition Planning," First Asian Conference on Nutrition, 1971.
8. Joy, J. L., "Food and Nutrition Planning," Journal of Agricultural Economics, No. 24, 1973.
9. Joy, J. L. and Payne, P. R., "La Nutricion y la Planificacion del Desarrollo Nacional," Alimentary Nutricion (FAO), Vol. 1, No. 4, 1975.
10. Parillon, Franklin, Harrell, Frazao, Vial de Valdes, "Alimentacion y Nutricion en Panama: la Situacion Actual," Ministerio de Salud, Republica de Panama, 1982.
11. Payne, P. R., "Nutrition Planning and Food Policy," Food Policy, Vol. 1, No. 2, 1976.
12. Pines, J. M., "National Nutrition Planning - Lessons of Experience," Food Policy, Vol. 7, No. 4, 1982.
13. USAID/Panama, "Country Development Strategy Statement," AID, Washington, D.C., 1982.
14. Valverde, V., et al, "Clasificacion Funcional de Poblaciones Desnutridas en la Republica de El Salvador".

APPENDIX A

Sampling Design for National Nutrition Survey

A. Introducción.

La existencia de necesidades crecientes de información relativas a las condiciones en que vive la población panameña ha obligado el interés del Ministerio de Salud hacia la investigación de algunas áreas específicas que le permitirán el diseño o rediseño de acciones y programas de salud tendientes a la satisfacción de algunas expectativas. Entre estas áreas, consideradas prioritarias, se encuentra el estado nutricional de la población y las causas que la determinan y condicionan, aspectos no estudiados integralmente y que demandan un esfuerzo multisectorial importante, en razón de los sectores envueltos en el problema.

La Constitución Nacional establece en su Artículo No. 104, Numeral Primero, que es obligación del Estado: "Desarrollar una política nacional de alimentación y nutrición...." y es por tanto para implementar este precepto legal que el Ministerio de Salud, junto con los sectores sociales y económicos de gobierno, llevará a cabo una Encuesta Nacional con el propósito de recabar la información que le permita, con una visión más completa del problema, proponer políticas y programas para beneficio de la población en el área nutricional.

B. Definiciones.

Con la finalidad de que algunos conceptos de carácter técnicos sean interpretados correctamente, se incluyen algunas definiciones de términos usados en este documento, para beneficio del lector:

Segmento Censal: Es el área geográfica determinada para fines censales, demarcada dentro de límites físicos permanentes y de fácil reconocimiento, el cual encierra un número predeterminado de viviendas, factible de ser empadronada en un día o en un período relativamente corto.

Vivienda: Es todo local o recinto estructuralmente separado o independiente, que ha sido construido, hecho o convertido para fines de alojamiento permanente o temporal de personas, así como cualquier clase de albergue, fijo o móvil ocupado como lugar de alojamiento al momento del Censo o de la Encuesta.

Para efecto del estudio, el Segmento Censal será la unidad primaria de muestreo y la vivienda la unidad de observación dentro del segmento.

C. Tamaño y Selección de la Muestra.

1. Marco Muestral Utilizado

Para fines censales el territorio de la República de Panamá fué demarcado en 12,180 segmentos censales por la Dirección de Estadística y Censo para el levantamiento de los Censos Nacionales de 1970. El marco lo conformaron la totalidad de dichos segmentos.

2. Tamaño de la Muestra

Para obtener estimaciones adecuadas del estado nutricional de la población y sus causas, a nivel de distrito, regiones y de país, se consideró necesaria la toma de una muestra representativa para esos niveles. Se consideró conveniente la selección de una muestra de aproximadamente 8,229 hogares o viviendas, las que están incluidas en 317 segmentos censales.

Es importante destacar que el trabajo de selección se realizará sobre la situación observada en 1970 y que en la actualidad, sin duda, tenderá a ser diferente; pero la metodología presupone que cada segmento deberá ser censado y que el volumen de hogares o viviendas y personas que participaran en la investigación puedan aumentar significativamente.

3. Configuración del Marco Muestral

En atención a los propósitos de la investigación y al deseo de obtener indicadores a nivel de distritos, los segmentos censales se agruparon en 66 estratos, circunstancia que facilitaría los asuntos administrativos y proporcionaría estimaciones más seguras que otro tipo de muestras al azar. El marco muestral debidamente estratificado tiene la siguiente configuración:

NUMERO DE SEGMENTOS CENSALES Y TOTAL DE VIVIENDAS EN
LA REPUBLICA, POR PROVINCIA Y DISTRITO:
CENSO DE 1970

PROVINCIA Y DISTRITO	NUMERO DE SEGMENTOS	NUMERO DE VIVIENDAS	MEDIA DE VIVIENDA
REPUBLICA.....	<u>12,180</u>	<u>316,286</u>	<u>26.0</u>
BOCAS DEL TORO.....	<u>390</u>	<u>9,618</u>	<u>24.7</u>
Bocas del Toro.....	94	2,077	22.1
Changuinola.....	233	6,201	26.6
Chiriquí Grande.....	63	1,340	21.3
COCLE.....	<u>973</u>	<u>24,818</u>	<u>25.5</u>
Aguadulce.....	141	4,288	30.4
Antón.....	211	5,409	25.6
La Pintada.....	140	2,994	21.4
Matía.....	102	2,520	24.7
Olá.....	53	1,187	20.5
Penonomé.....	321	8,420	26.2
COLOM.....	<u>1,007</u>	<u>27,159</u>	<u>27.0</u>
Colón.....	828	23,518	28.4
Chagres.....	67	1,442	21.5
Donoso.....	65	1,057	16.3
Portobelo.....	19	511	26.9
Santa Isabel.....	28	631	22.5
CHIRIQUI.....	<u>2,048</u>	<u>49,410</u>	<u>24.1</u>
Alanje.....	119	1,733	14.6
Barú.....	332	8,915	26.9
Boquerón.....	58	1,423	24.5
Boquete.....	83	2,324	28.0

PROVINCIA Y DISTRITO	NUMERO DE SEGMENTOS	NUMERO DE VIVIENDAS	MEDIA DE VIVIENDA
Bugaba.....	335	7,572	22.6
David.....	457	13,460	29.5
Dolega.....	102	2,274	22.3
Gualaca.....	60	1,392	23.2
Remedios.....	49	1,007	20.6
San Félix.....	87	1,640	18.9
San Lorenzo.....	128	2,293	18.0
Tolé.....	175	3,786	21.6
Renacimiento.....	63	1,586	25.2
DAPIEN.....	217	5,461	25.2
Chepigana.....	139	3,200	23.6
Pinogana.....	78	2,181	28.0
HERRERA.....	709	16,660	23.5
Chitré.....	153	4,887	31.9
Las Minas.....	91	1,692	18.6
Los Pozos.....	92	1,909	20.8
Ocú.....	161	3,365	20.9
Parita.....	68	1,689	24.8
Pesé.....	102	1,897	18.6
Santa María.....	42	1,221	29.1
LOS SANTOS.....	873	19,493	22.3
Guararé.....	96	2,219	23.1
Las Tablas.....	230	5,196	22.6
Los Santos.....	202	4,246	21.0
Macaracas.....	102	2,438	23.9
Pedasf.....	64	1,398	21.8
Pocrf.....	69	1,578	22.9
Tonosf.....	110	2,423	22.2
PANAMA.....	4,502	131,194	29.1
Arraíján.....	153	4,616	30.2
Balboa.....	38	803	21.3
Capira.....	166	3,788	22.8
Chame.....	106	2,659	25.1
Chapo.....	145	2,969	20.5
Chimán.....	15	445	29.7
La Chorrera.....	376	9,591	25.5
Panamá.....	2,755	84,922	30.8
San Carlos.....	92	2,218	24.1
Taboqa.....	16	471	29.4
San Miguelito.....	517	15,502	30.0
San Blas.....	123	3,205	26.1

PROVINCIA Y DISTRITO	NUMERO DE SEGMENTOS	NUMERO DE VIVIENDAS	MEDIA DE VIVIENDA
VERAGUAS.....	1,461	32,468	22.2
Atalaya.....	53	1,166	22.0
Calobre.....	124	2,603	21.0
Cañazas.....	130	2,676	20.6
La Mesa.....	102	2,398	23.5
Las Palmas.....	158	3,543	22.4
Montijo.....	120	2,777	23.1
Río de Jesús.....	69	1,430	20.7
San Francisco.....	77	1,648	21.4
Santa Fe.....	83	1,730	20.8
Santiago.....	320	7,553	23.6
Soná.....	225	4,948	22.0

3. Diseño de la Muestra

Definido el marco muestral y el tamaño de la muestra, se procedió a seleccionar los segmentos a nivel de cada estrato. La muestra de 317 segmentos representa el 3% de la totalidad de la segmentación del país y el número de segmentos por cada estrato se obtuvo aplicando a los valores del marco esta proporción, asegurándose con este procedimiento una probabilidad mayor de selección en los estratos con mayor número de segmentos.

La probabilidad de selección de cada segmento dentro del estrato están dadas en la inversa de los factores de expansión que se dan en el Cuadro No. 2 que se incluye más adelante, agregándose la media de la muestra para los fines de comparación con la media de la población.

Como el muestreo no es autoponderado se incluyen también en el mismo cuadro los factores de ponderación para cada uno de los estratos para facilitar el análisis de los datos.

Determinado el número de segmentos por cada estrato, se procedió a la selección de los que participarían finalmente en la muestra, aplicándose

NUMERO DE SEGMENTOS, VIVIENDAS Y MEDIA DE VIVIENDAS SELECCIONADAS
EN LA MUESTRA DE NUTRICION, POR PROVINCIA Y DISTRITO:
CENSO DE 1970

PROVINCIA Y DISTRITO	Número de Segmentos	número de Vivienda	Media de Vivienda	Factor de Expansión	Factor de Ponderación
TOTAL.....	<u>317</u>	<u>8,229</u>	<u>26.0</u>		
1. BOCAS DEL TORO.....	<u>15</u>	<u>346</u>	<u>23.0</u>		0.0337
1.1 Bocas del Toro.....	4	90	22.5	23.500	0.0185
1.2 Changuinola....	8	185	23.5	29.125	0.6201
1.3 Chiriquí Grande	3	70	23.3	21.000	0.1614
2. COCLE.....	<u>30</u>	<u>852</u>	<u>28.4</u>		0.0753
2.1 Aguadulce.....	4	156	39.0	35.250	0.1842
2.2 Antón.....	6	158	26.3	35.170	0.2088
2.3 La Pintada.....	4	103	27.0	35.000	0.1264
2.4 Natá.....	3	86	28.7	34.000	0.1021
2.5 Olá.....	3	78	26.0	19.333	0.0337
2.6 Penonomé.....	10	266	26.6	32.100	0.3448
3. COLON.....	<u>25</u>	<u>662</u>	<u>26.5</u>		0.0934
3.1 Colón.....	<u>15</u>	<u>476</u>	<u>31.7</u>	55.200	0.7194
3.2 Chagres.....	3	59	19.7	22.333	0.0513
3.3 Donoso.....	3	56	18.7	21.670	0.0375
3.4 Portobelo.....	2	20	10.0	9.500	0.0076
3.5 Santa Isabel...	2	51	25.5	14.000	0.0090
4. CHIRIQUI.....	<u>58</u>	<u>1,464</u>	<u>25.2</u>		0.1505
4.1 Alanje.....	3	66	22.0	39.670	0.0502
4.2 Barú.....	8	194	24.5	41.500	0.1772
4.3 Boquerón.....	3	81	27.0	19.330	0.0333
4.4 Boquete.....	3	81	27.0	27.670	0.0308
4.5 Bugaba.....	8	203	26.0	41.830	0.1546
4.6 David.....	10	267	26.7	45.700	0.2958
4.7 Dolega.....	3	85	28.3	34.000	0.0404
4.8 Gualaca.....	3	103	34.3	20.000	0.0225
4.9 Remedios.....	2	44	22.0	24.500	0.0214
4.10 San Félix.....	3	40	13.3	29.000	0.0300
4.11 San Lorenzo....	4	90	22.5	32.000	0.0368
4.12 Tolé.....	5	119	23.8	35.000	0.0770
4.13 Renacimiento...	3	86	28.7	21.000	0.0300
5. DARIEN.....	<u>10</u>	<u>280</u>	<u>28.0</u>		0.0137
5.1 Chepigana.....	6	169	28.2	23.170	0.5538
5.2 Pinogana.....	4	111	27.8	19.500	0.4462
6. HERRERA... ..	<u>22</u>	<u>497</u>	<u>22.6</u>		0.0444
6.1 Chitré.....	4	113	28.3	38.250	0.3246
6.2 Las Minas.....	3	50	16.7	30.330	0.0825
6.3 Los Pozos.....	3	58	19.3	30.670	0.1032

NUMERO DE SEGMENTOS, VIVIENDAS Y MEDIA DE VIVIENDAS SELECCIONADAS
EN LA MUESTRA DE NUMERICOS, POR PROVINCIA Y DISTRITO:
CEISO DE 1970

PROVINCIA Y DISTRITO	Número de Segmentos	Número de Vivienda	Media de Vivienda	Factor de Expansión	Factor de Ponderación
6.4 Ocú.....	4	75	19.8	40.250	0.2031
6.5 Parita.....	3	68	22.7	22.670	0.0867
6.6 Pesé.....	3	79	26.3	34.000	0.1321
6.7 Santa María...	2	54	27.0	21.000	0.0678
7. LOS SANTOS.....	<u>28</u>	<u>640</u>	<u>22.9</u>		0.0379
7.1 Guararé.....	3	63	22.7	32.000	0.1082
7.2 Las Tablas.....	6	140	23.3	38.330	0.2203
7.3 Los Santos.....	6	149	24.8	33.670	0.2666
7.4 Macaracas.....	3	82	27.3	34.000	0.1248
7.5 Pedasí.....	3	56	18.7	21.330	0.0421
7.6 Pocrí.....	3	65	21.7	23.000	0.0530
7.7 Tonosí.....	4	80	20.0	27.500	0.1850
8. PANAMA.....	<u>84</u>	<u>2,537</u>	<u>30.2</u>		0.4600
8.1 Arraiján.....	4	131	32.8	33.250	0.0396
8.2 Balboa.....	2	42	21.0	19.000	0.0027
8.3 Capira.....	4	86	21.5	41.500	0.0271
8.4 Chame.....	3	79	26.3	35.330	0.0137
8.5 Chepo.....	4	105	26.3	36.250	0.0387
8.6 Chimán.....	2	43	21.5	7.500	0.0026
8.7 La Chorrera....	10	269	26.9	37.600	0.0905
8.8 Panamá.....	30	959	32.0	91.830	0.5784
8.9 San Carlos.....	3	72	24.0	30.670	0.0131
8.10 Taboga.....	2	62	31.0	8.000	0.0018
8.11 San Miguelito..	15	545	36.3	34.470	0.1918
San Blas.....	5	144	28.8	24.600	0.1752
9. VERAGUAS.....	<u>45</u>	<u>952</u>	<u>21.2</u>		0.0911
9.1 Atalaya.....	2	47	23.5	26.500	0.0363
9.2 Calobre.....	4	82	20.5	31.000	0.0683
9.3 Cañazas.....	4	79	19.8	32.500	0.0905
9.4 La Mesa.....	3	51	20.3	34.000	0.0642
9.5 Las Palmas.....	4	94	23.5	39.500	0.1022
9.6 Montijo.....	3	63	21.0	40.000	0.0965
9.7 Río de Jesús...	3	51	17.0	23.000	0.0346
9.8 San Francisco..	3	60	20.0	25.670	0.0497
9.9 Santa Fe.....	3	53	19.3	27.670	0.0447
9.10 Santiago.....	10	229	22.9	32.000	0.2641
9.11 Soná.....	6	128	21.3	37.500	0.1489

un muestreo aleatorio simple en cada uno de los estratos o distritos. Los resultados se incluyen en el Cuadro No. 3

D. Selección de una Sub-Muestra.

Como parte de la investigación se determinó la selección de una sub-muestra de familias para la realización de una Encuesta de Consumo de Alimentos, en la que se incluirán preguntas sobre las ingestas que las familias emplearon durante el día o el día anterior y su correspondiente distribución entre sus miembros. La razón de la adopción de esta metodología se justifica por las dificultades y los costos que significaría aplicarla a la totalidad de la muestra.

Se determinó que el 12% de las familias de la Encuesta General participarían en la de Consulta, lo que representaría 3 familias por segmento para un total aproximado de 951 en la Sub-Muestra.

Existe un problema de operación en la selección de las familias que participarían en la entrevista, dada la dificultad que representaría ejecutarla simultáneamente con la Encuesta General. Para clarificar el problema, la Encuesta General será ejecutada a nivel de segmento por un equipo de tres enfermeras que se distribuirán geográficamente dentro del área para realizar las entrevistas en el día a toda la población presente.

La Encuesta de Consumo la realizará una nutricionista mediante visita a tres hogares seleccionados entre los existentes en el segmento. Se conoce que la situación de volumen de familias en el segmento ha variado en los últimos 10 años y ante el desconocimiento del total de familias en el área se dificulta su selección debido a el costo que representaría la realización de la Encuesta de Consumo un día después de terminada la Encuesta General, de

la cual se obtendría la situación del segmento en cuanto al número de familias existentes y la facilidad para la selección de las tres familias, mediante un muestreo aleatorio simple, a nuestro juicio, la mejor alternativa técnica.

Se proponen las siguientes alternativas:

1. Realizar la Encuesta de Consumo un día después de la Encuesta General. Se conocería el total de familias en el segmento, se ordenarían los formularios y se seleccionarían las familias, pero incide significativamente en los costos.
2. Seleccionar las viviendas para la Encuesta de Consumo sobre la información cartográfica existente (1970). Esta alternativa no implicaría costos adicionales, pero el desconocimiento de la realidad en el segmento produciría un sesgo de selección importante.
3. Sectorizar el segmento censal, en un pedazo para cada encuestador y actualizar cada pedazo rápidamente para obtener una mejor aproximación de la situación y seleccionar al azar una vivienda de cada sector. Esto significaría el empleo del guía en el recorrido completo del segmento. No significaría costo adicional.

Panamá, 29 de mayo de 1980
RMBE/sldq.-

SEGMETOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

Provincia	Distrito	Corregimiento	Nº del Segmento	
BOCAS DEL TORO	Bocas del Toro...	Cabecera.....	10-01-011	
		Bahía Azul.....	10-02-004	
		Calovévora o Sta. Catalina.	10-04-006	
		Tobobo.....	10-06-006	
	Changuinola.....	Cabecera.....	11-01-027	
		Cabecera.....	11-01-053	
		Cabecera.....	11-01-082	
		Cabecera.....	11-01-111	
		Almirante.....	11-02-010	
		Almirante.....	11-02-040	
		Guabito.....	11-03-014	
			11-03-039	
	Chiriquí Grande..	Cabecera.....	12-02-007	
		Mununí.....	12-04-001	
		Punta Robalo.....	12-06-007	
	COCLE.....	Aguadulce.....	Cabecera.....	20-01-010
			Cabecera.....	20-01-045
			El Roble.....	20-03-008
			Pecrí.....	20-04-002
	Antón.....	Cabecera.....	El Chirú.....	21-01-029
			El Valle.....	21-03-010
			Río Hato.....	21-05-018
			San Juan de Dios.....	21-07-020
			Santa Rita.....	21-08-007
				21-09-008
La Pintada.....	Cabecera.....	El Harinos.....	22-01-020	
		Llano Grande.....	22-02-034	
		Piedras Gordas.....	22-04-009	
			22-05-003	
Natá.....	Cabecera.....	Capellanía.....	23-01-017	
		Guzmán.....	23-02-025	
			23-04-007	
Ol.....	El Copé.....	El Palmar.....	24-02-004	
		La Pava.....	24-03-013	
Funchaná.....	Cabecera.....	Cabecera.....	24-05-004	
		Cabecera.....	25-01-005	
		Cabecera.....	25-01-040	
		Coclé.....	25-03-004	
		Chiriquí Arriba.....	25-03-019	
		Pajonal.....	25-05-005	
		Pajonal.....	25-06-037	
		Río Grande.....	25-07-006	
		Tocari.....	25-08-025	
		Tocari.....	25-09-027	
Tulú.....	25-10-001			

SECTORES SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

(Continuación)

Provincia	Distrito	Corregimiento	Nº del Segmento		
COLON.....	Colón.....	Cabecera.....	30-01-021		
		Barrio Norte.....	30-01-076		
		Barrio Norte.....	30-01-131		
		Barrio Norte.....	30-01-187		
		Barrio Norte.....	30-01-242		
		Barrio Sur.....	30-02-006		
		Barrio Sur.....	30-02-061		
		Barrio Sur.....	30-02-166		
		Barrio Sur.....	30-02-172		
		Barrio Sur.....	30-02-227		
		Buena Vista.....	30-03-007		
		Cativa.....	30-04-025		
		Limón.....	30-07-012		
		Sabanitas.....	30-10-003		
		San Juan.....	30-12-014		
	Chagres.....	El Guabo.....	El Guabo.....	31-03-007	
			Palmas Bellas.....	31-05-006	
			Salud.....	31-07-009	
	Donoso.....	Cabecera.....	Cabecera.....	32-01-005	
			Coclé del Norte.....	32-02-014	
			Río Indio.....	32-05-004	
	Portobelo.....	Cabecera.....	Cabecera.....	33-01-006	
			Isla Grande.....	33-04-004	
	Santa Isabel.....	Nombre de Dios.....	Nombre de Dios.....	34-04-001	
			Santa Isabel.....	34-07-004	
	San Blas.....	San Blas.....	San Blas.....	35-01-021	
			" ".....	35-01-046	
			" ".....	35-01-070	
			" ".....	35-01-095	
			" ".....	35-01-119	
	CHIRIQUI.....	Alanje.....	Cabecera.....	40-01-011	
			Divalú.....	40-02-039	
			Guarumal.....	40-04-017	
		Barú.....	Cabecera.....	Cabecera.....	41-01-018
				".....	41-01-060
				".....	41-01-101
				".....	41-01-143
				".....	41-01-184
				".....	41-01-226
".....				41-01-267	
Progreso.....		41-05-029			
Boquerón.....		Cabecera.....	Cabecera.....	42-01-006	
			Najala.....	42-02-009	
	Guayabal.....		42-04-013		

92

SEGMENTOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

			(Continuación)
Provincia	Distrito	Corregimiento	Nº del Segmento
CHIRIQUI.....	Boquete.....	Cabecera.....	43-01-011
		Cabecera.....	43-01-040
		Caldera.....	43-02-001
	Bugaba.....	Cabecera.....	44-01-034
		Aserrio de Gariché.....	44-02-013
		Bugaba.....	44-03-003
		La Estrella.....	44-05-002
		San Andrés.....	44-09-011
		Santa Rosa.....	44-12-009
		Sortová.....	44-14-003
		Volcán.....	44-15-013
	David.....	Cabecera.....	45-01-021
		"	45-01-067
		"	45-01-112
		"	45-01-158
		"	45-01-204
		Bijagual.....	45-02-004
		Chiriquí.....	45-04-022
		Las Lomas.....	45-05-024
		Madregala.....	45-07-020
		San Carlos.....	45-08-016
	Dolega.....	Cabecera.....	46-01-023
		Los Anastacios.....	46-03-007
		Rovira.....	46-06-009
	Gualaca.....	Cabecera.....	47-01-010
		Hornito.....	47-02-001
		Rincon.....	47-05-002
	Remedios.....	Cabecera.....	48-01-005
		Cerro Iglesias.....	48-02-011
	San Félix.....	Cabecera.....	49-01-006
		Hato Corotú.....	49-03-003
		Quebrada de Loro.....	49-09-003
	San Lorenzo.....	Cabecera.....	4x-01-007
Boca del Monte.....		4x-04-009	
Cerro Banco.....		4x-06-008	
San Lorenzo.....		4x-10-001	
Tolú.....	Cabecera.....	4y-01-007	
	Alto Caballero.....	4y-02-002	
	Cerro Puerco.....	4y-05-009	
	Chichica.....	4y-07-017	
	Quebrada de Piedra.....	4y-12-002	
Renacimiento.....	Cabecera.....	39-01-003	
	Monte Lirio.....	39-03-012	
	Santa Cruz.....	39-05-003	

SEGMENTOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

(Continuación)

Provincia	Distrito	Corregimiento	Nº del Segmento	
DARIEH	Chepigana	Cabecera	50-01-012	
		Chepigana	50-03-001	
		Garachiné	50-04-014	
		Río Congo	50-07-003	
		Sambu	50-09-006	
		Tucutí	50-12-001	
	Pinogama	Cabecera	51-01-008	
		Yapo	51-06-005	
		Yaviza	51-07-014	
		Yaviza	51-07-033	
	HERRERA	Chitré	Cabecera	60-01-016
			"	60-01-054
			"	60-01-093
			Monagrillo	60-03-005
Las Minas		Cabecera	61-01-013	
		El Toro	61-04-006	
		Quebrada del Rosario	61-06-006	
Los Pozos		Cabecera	62-01-019	
		La Pitalosa	62-06-006	
		Los Cerros de Paja	62-08-012	
Ocu		Cabecera	63-01-024	
		Corro Largo	63-02-011	
		Los Llanos	63-03-017	
		Peñas Chatas	63-05-007	
Parita		Cabecera	64-01-010	
		Cabuza	64-02-009	
		Portobelillo	64-06-003	
Pose		Cabecera	65-03-001	
		Oeste Nº 2	65-06-003	
		Rincón Hondo	65-08-009	
Santa María		Cabecera	66-01-006	
	Chupampa	66-02-014		
LOS SANTOS	Guararé	Cabecera	70-01-002	
		Cabecera	70-01-034	
		La Pasera	70-06-002	
	Las Tablas	Cabecera	71-01-001	
		Bajo Corral	71-03-005	
		El Muñoz	71-07-001	
		La Palma	71-11-016	
		Peña Blanca	71-17-001	
		Santo Domingo	71-21-016	

SEGMETOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

(Continuación)

Provincia	Distrito	Corregimiento	Nº del Segmento
LOS SANTOS.....	Los Santos.....	Cabecera.....	72-01-021
		El Guásimo.....	72-02-001
		Las Cruces.....	72-05-006
		Los Angeles.....	72-07-003
		Sabana Grande.....	72-10-009
		Tres Quebradas.....	72-12-006
	Macaracas.....	Cabecera.....	73-02-002
		Chupá.....	73-05-009
		Llano de Piedra.....	73-09-010
	Pedasí.....	Cabecera.....	74-01-010
		Los Asientos.....	74-02-015
		Mariabe.....	74-03-007
	Pocrí.....	Cabecera.....	75-01-013
		La Jamina.....	75-03-013
		Paritilla.....	75-05-011
	Tonosi.....	Cabecera.....	76-01-008
		El Bebedero.....	76-04-004
		El Cortezo.....	76-06-003
		Guánico.....	76-08-012
	PANAMA.....	Arraijan.....	Cabecera.....
Cabecera.....			80-01-047
Juan D. Arosemena.....			80-02-026
Vista Alegre.....			80-06-009
Balboa.....		Cabecera.....	81-01-007
		La Esmeralda.....	81-03-003
Capira.....		Cabecera.....	82-03-011
		Ciri Grande.....	82-06-017
		La Trinidad.....	82-08-016
		Villa Rosario.....	82-12-006
Chama.....		Cabecera.....	83-01-011
		Buenos Aires.....	83-03-004
		Las Lajas.....	83-07-010
Chepo.....		Cabecera.....	84-01-001
		".....	84-01-039
		".....	84-01-075
		El Llano.....	84-04-016
Chiman.....		Cabecera.....	85-01-003
		Brujas.....	85-02-001
La Chorrera.....		Cabecera.....	86-01-027
		Barrio Balboa.....	86-01-064
		Barrio Balboa.....	86-01-102
		Barrio Colón.....	86-02-033
		Barrio Colón.....	86-02-071

SECTORES SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

(Continuación)				
Provincia	Distrito	Corregimiento	Nº del Segmento	
PANAMA.....	La Chorrera.....	Arosemena.....	86-04-006	
		Guadalupo.....	86-08-002	
		Hurtado.....	86-10-001	
		Los Diaz.....	86-13-010	
		Puerto Caimito.....	86-17-007	
	Panamá.....	Ciudad de Panamá.....	San Felipe.....	87-01-056
			El Chorrillo.....	87-02-053
			" "	87-02-145
			Santa Ana.....	87-03-034
			" "	87-03-126
			" "	87-03-118
			La Exposición o Calidonia.....	87-04-046
			" " "	87-04-139
			" " "	87-04-231
			" " "	87-04-386
			" " "	Curundu Sector H
			Betania.....	87-05-125
			"	Altos del Chane Nº3
			Bella Vista.....	87-06-077
			" "	87-06-170
			Pueblo Nuevo.....	87-07-032
			" "	87-07-129
			San Francisco.....	87-08-076
			" "	87-08-194
			Parque Lefevre.....	87-09-042
			" "	87-09-184
			Rio Abajo.....	87-10-023
			" "	87-10-123
	Juan Diaz.....	87-12-018		
	" "	87-12-117		
	" "	87-12-002		
	Pedregal.....	87-13-012		
	Resto del Dis- trito.		Chilibre.....	87-14-068
Las Cuambres.....			87-15-073	
Pacora.....			87-16-021	
San Carlos.....	Cabequera.....		88-01-009	
		La Ermita.....	88-05-003	
		Los Llanitos.....	88-08-008	
Taboga.....	Cabequera.....		89-01-003	
		Otoque Occidente.....	89-02-002	

SEGMENTOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

			(Continuación)
Provincia	Distrito	Corregimiento	Nº del Segmento
PANAMA.....	San Miguelito		87-11-075
			87-11-166
			87-11-192
			87-11-219
			87-11-245
			87-11-272
			87-11-298
			87-11-325
			87-11-384
			87-11-410
			Samaria Sector R1-K2
			87-11-343 Sector C
			Pan de Azúcar Sect. E
	San Antonio Sect. 8		
	Altos de Cerro Viento		
	Sect. 13.		
VERAGUAS.....	Atalaya.....	Cabecera.....	90-01-013
		"	90-01-040
	Calobre.....	Cabecera.....	91-01-009
		Chitrú.....	91-03-010
		La Laguna.....	91-06-007
		Las Guías.....	91-10-007
	Cañazas.....	Cabecera.....	92-01-026
		Agua de Salud.....	92-02-006
		Los Valles.....	92-04-002
		San Marcelo.....	92-05-023
	La Mesa.....	Cabecera.....	93-01-016
		Boró.....	93-03-002
		Llano Grande.....	93-04-019
	Las Palmas.....	Cabecera.....	94-01-025
		El María.....	94-04-010
		El Prado.....	94-06-028
		Puerto Vidal.....	94-10-011
	Montijo.....	Cabecera.....	95-01-017
		Gobernadora.....	95-03-006
		Pilón.....	95-07-004
	Rio de Jesús....	Cabecera.....	96-01-017
		"	96-01-040
		Los Castillos.....	96-03-009
	San Francisco...	Cabecera.....	97-02-001
		Romance.....	97-04-005
		San Juan.....	97-05-015

SEGMENTOS SELECCIONADOS PARA LA ENCUESTA SOBRE EL ESTADO
NUTRICIONAL DE LA POBLACION, EN LA REPUBLICA DE PANAMA

			(Conclusión)	
Provincia	Distrito	Corregimiento	Nº del Segmento	
VERAGUAS.....	Santa Fé.....	Cabecera.....	98-01-015	
		El Alto.....	98-03-012	
		El Pantano.....	98-05-008	
	Santiago.....	Cabecera.....	".....	99-01-003
			".....	99-01-035
			".....	99-01-066
			".....	99-01-098
			".....	99-01-130
		La Colorada.....	99-02-002	
		La Peña.....	99-03-016	
		La Peña.....	99-03-018	
		Ponuga.....	99-05-005	
		".....	99-05-037	
	Sona.....	Cabecera.....	".....	9x-01-014
			Bahía Honda.....	9x-02-005
			Cative.....	9x-04-001
			Guarumal.....	9x-06-004
			La Soledad.....	9x-07-008
			Rodeo Viejo.....	9x-10-001

Panamá, 26 de mayo de 1980.

APPENDIX B

Table 1B: Distribution of Functional Groups by District

	Functional Group ^a													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BOCAS DEL TORO	4.4	0.0	6.7	2.2	13.3	4.4	15.6	2.2	8.9	6.0	11.1	2.2	2.2	6.7
CHANGUINOLA	1.1	5.5	2.2	0.0	3.3	7.6	10.9	3.3	2.2	15.2	39.1	2.2	1.1	1.1
CHIRIQUI GRANDE	14.3	4.8	0.0	4.8	9.5	23.8	19.0	0.0	0.0	0.0	4.8	9.5	0.0	9.5
AGUADULCE	0.9	3.4	4.3	0.0	17.1	4.3	5.1	11.1	7.7	20.5	9.4	0.0	2.6	2.6
ANTON	1.9	1.0	4.9	2.9	22.3	9.7	24.3	3.9	1.0	7.8	7.8	0.0	1.9	7.8
LA PINTADA	1.5	1.5	1.5	7.5	67.2	9.0	11.9	0.0	1.5	0.0	0.0	4.5	0.0	4.5
NATA	0.0	0.0	4.9	4.9	39.3	4.9	6.6	8.2	6.6	11.5	21.3	0.0	0.0	1.6
OLA	0.0	3.4	0.0	3.4	58.6	10.3	17.2	0.0	3.4	0.0	6.9	0.0	0.0	0.0
PENONOME	10.3	2.6	3.4	8.5	28.2	13.7	14.5	1.7	5.1	1.7	1.7	4.3	0.9	8.5
COLON	0.0	0.6	0.3	0.3	3.5	1.9	6.8	11.6	15.1	10.3	14.1	0.6	1.0	1.3
CHAGRES	5.6	1.4	0.0	2.8	18.3	16.9	16.9	0.0	0.0	7.0	6.5	8.5	0.0	2.8
DONOSO	7.7	3.1	1.5	1.5	10.8	47.7	13.8	0.0	3.1	4.6	4.6	10.8	3.1	7.7
PORTOBELLO	0.0	3.2	0.0	6.3	4.8	12.7	15.9	0.0	7.9	3.2	11.1	4.8	1.6	3.2
SANTA ISABEL	12.5	3.1	0.0	6.3	3.1	3.1	6.3	7.0	6.3	9.4	6.3	3.1	3.1	3.1
COMARCA DE SAN BLAS	1.0	8.3	1.0	2.1	12.5	19.8	19.8	0.0	13.5	5.2	4.2	4.2	2.1	6.3
RENACIMIENTO	0.0	6.8	2.3	4.5	15.9	29.5	15.9	0.0	4.5	0.0	6.8	11.4	0.0	2.3
SAN LORENZO	1.8	0.0	0.0	14.0	5.3	8.0	33.3	0.0	3.5	5.3	12.3	3.5	0.0	5.3
TOLE	1.9	1.9	0.0	5.7	15.1	9.4	28.3	0.0	7.5	3.8	1.9	3.8	1.9	9.4
ALANJE	9.0	4.5	0.0	1.5	23.9	13.4	25.4	0.0	1.5	6.0	19.4	4.5	0.0	4.5
BARU	0.8	0.8	0.8	0.0	4.2	7.5	17.5	9.2	8.3	10.8	14.2	0.0	4.2	5.8
BOQUEYON	3.0	0.0	9.1	6.1	15.2	27.3	33.3	0.0	6.1	6.1	12.1	3.0	0.0	0.0
BOQUETE	0.0	1.7	0.0	3.4	3.4	25.9	10.3	1.7	5.2	5.2	17.2	0.0	0.0	1.7
BUBABA	4.3	5.7	3.6	9.3	13.6	17.9	21.4	1.4	3.6	7.1	10.0	4.3	0.0	5.7
DAVID	3.9	0.0	1.1	3.4	2.2	8.9	8.9	2.8	11.7	12.8	14.0	1.7	2.2	3.9

Table 1B Continued

	Functional Group ^a													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
BUALACA	1.6	4.9	0.0	3.3	6.6	23.0	14.8	1.6	8.2	18.0	11.5	0.0	0.0	4.9
REMEDIOS	2.9	0.0	0.0	0.0	2.9	11.3	20.0	0.0	5.7	14.3	2.9	2.9	0.0	2.9
SAN FELIX	3.1	0.0	0.0	3.1	15.6	40.6	28.1	0.0	0.0	0.0	6.3	12.5	0.0	6.3
CHEPIBANA	9.0	1.8	0.0	30.6	16.2	0.0	12.6	0.0	7.2	8.1	3.6	12.6	0.9	4.5
PINDGANA	14.6	12.5	0.0	32.3	21.9	1.0	7.3	0.0	1.0	0.0	3.1	24.0	0.0	6.3
CHITRE	0.0	1.7	0.0	0.0	0.8	9.1	3.3	18.2	14.0	9.1	3.3	1.7	2.5	2.5
LAS MINAS	3.8	0.0	7.7	7.7	26.9	26.9	23.1	0.0	0.0	0.0	0.0	0.0	0.0	7.7
LOS POZOS	0.0	2.6	5.3	7.9	26.3	42.1	0.0	0.0	0.0	5.3	0.0	2.6	0.0	18.4
OCU	0.0	2.9	5.7	4.3	28.6	18.6	20.0	0.0	0.0	1.4	0.0	2.9	0.0	25.7
PARITA	0.0	1.8	1.8	7.3	12.7	21.8	29.1	0.0	0.0	1.8	5.5	1.8	0.0	3.6
PESE	3.2	1.6	1.6	4.8	22.6	41.9	19.4	0.0	6.5	0.0	6.5	3.2	0.0	9.7
SANTA MARIA	10.0	2.5	5.0	0.0	7.5	25.0	17.5	0.0	7.5	2.5	2.5	2.5	2.5	5.0
GUARARE	4.3	7.2	0.0	10.1	5.8	0.0	20.3	0.0	13.0	5.8	7.2	5.8	4.3	7.2
LAS TABLAS	0.0	5.4	0.0	7.1	8.9	3.6	8.9	1.8	15.1	12.5	1.8	1.8	3.6	3.6
LOS SANTOS	6.3	6.3	0.0	21.9	6.3	3.1	20.8	0.0	2.1	4.2	5.2	10.4	0.0	5.2
MACARACAS	0.0	0.0	3.3	13.3	33.3	13.3	16.7	0.0	3.3	3.3	0.0	26.7	3.3	0.0
PEDASI	8.3	2.1	4.2	14.6	16.7	6.3	29.2	0.0	6.3	8.3	2.1	6.3	0.0	2.1
POCRI	3.1	21.9	0.0	6.3	15.6	3.1	31.3	0.0	3.1	3.1	3.1	6.3	0.0	6.3
TONOSI	4.2	4.2	8.3	10.4	20.8	4.2	18.8	0.0	6.3	8.3	2.1	10.4	0.0	2.1
SAN MIGUELITO	0.0	0.3	0.8	0.0	0.8	0.3	2.7	15.4	10.6	22.0	9.5	0.0	3.3	2.7
ARRAIJAN	0.0	0.0	0.0	0.0	0.8	0.8	16.5	4.5	1.5	19.5	3.8	0.0	3.0	6.8
BALBOA	3.3	0.0	0.0	0.0	33.3	26.7	16.7	0.0	3.3	3.3	0.0	0.0	0.0	13.3
CAPIRA	1.9	3.8	0.0	1.9	3.8	23.1	19.2	1.9	3.8	5.8	3.8	1.9	0.0	7.7

Table 1B Continued

	Functional Group ^a													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CHAME	0.0	6.1	3.0	0.0	27.3	33.3	12.1	0.0	3.0	12.1	9.1	3.0	0.0	3.0
CHEPO	1.3	1.3	1.3	0.0	16.0	6.7	32.0	0.0	2.7	6.7	6.7	4.0	1.3	8.0
CHIMAN	9.5	0.0	0.0	19.0	14.3	33.3	9.5	0.0	4.8	0.0	0.0	0.0	0.0	9.5
LA CHORRERA	1.0	1.4	3.3	0.5	6.7	30.1	12.4	1.9	11.5	15.3	12.9	0.5	1.4	2.9
PANAMA	0.2	0.0	0.0	0.4	0.7	1.1	3.7	15.1	14.0	15.4	6.4	0.0	2.7	2.7
SAN CARLOS	1.9	1.9	5.8	1.9	19.2	40.4	11.5	0.0	5.8	13.5	7.7	1.9	0.0	1.9
TABOGA	0.0	3.2	6.5	0.0	12.9	0.0	12.9	19.4	6.5	12.9	16.1	0.0	0.0	3.2
SONA	2.1	1.1	1.1	13.8	24.5	6.4	21.3	1.1	1.1	5.3	7.4	7.4	2.1	8.5
ATALAYA	0.0	4.5	4.5	18.2	31.8	27.3	13.6	0.0	4.5	0.0	4.5	4.5	0.0	0.0
CALOBRE	2.3	0.0	0.0	13.6	63.6	4.5	11.4	0.0	2.3	0.0	2.3	11.4	0.0	11.4
CANAZAS	5.9	2.0	0.0	7.8	51.0	11.8	19.6	0.0	0.0	0.0	2.0	0.0	0.0	5.9
LA MESA	7.1	0.0	0.0	35.7	35.7	0.0	16.7	0.0	2.4	0.0	0.0	0.0	0.0	7.1
LAS PALMAS	10.5	2.6	0.0	5.3	52.6	15.8	13.2	0.0	0.0	0.0	2.6	5.3	0.0	2.6
MONTIJO	12.7	1.6	0.0	25.4	19.0	4.8	22.2	0.0	4.8	0.0	0.0	4.8	0.0	4.8
RIO DE JESUS	0.0	0.0	0.0	22.9	22.9	42.9	2.9	0.0	0.0	0.0	0.0	0.0	0.0	11.4
SAN FRANCISCO	0.9	0.0	0.0	11.1	16.7	38.9	11.1	0.0	0.0	0.0	5.6	0.0	0.0	11.1
SANTA FE	3.3	3.3	0.0	23.3	46.7	10.0	16.7	0.0	0.0	0.0	3.3	10.0	0.0	0.0
SANTIAGO	3.7	2.1	0.5	6.9	13.2	3.2	9.5	2.1	16.4	12.2	12.2	0.0	1.1	5.3

91

Table 1B Continued

^aFunctional Groups:

1	Small Horticultural Producers
2	Solely Cassava Producers
3	Solely Maize Producers
4	Solely Rice Producers
5	Maize and Rice Producers
6	Highly Diversified Crops
7	Agricultural Workers
8	Salaried Urban Workers
9	Professionals, Office, Financiers
10	Skilled Workers
11	Unskilled Workers
12	Farmers with Employees
13	Government Employees
14	Self-Employed