

PN-ABE460  
ISN=68923

**INTSORMIL**

**Household Food Use in  
Three Rural Communities**

**Farming Systems Research in Southern Honduras**

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**Report No. 2**

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# Intsormil

Project Title: Sociocultural Constraints in the Production and Consumption  
of Grain Sorghum and Pearl Millet in Less Developed Countries

Leader: C. Milton Coughenour

Institution: University of Kentucky

Contract No. AID/DSAN-G-0149

- ☆ International Sorghum/Millet
- ☆ Collaborative Research Support Program (CRSP)

A Research Development Program of the Agency for International Development, Participating Land-Grant Universities, Host County Research Agencies and Private Donors.



Institute of Agriculture and Natural Resources  
University of Nebraska-Lincoln



SOCIOECONOMIC CONSTRAINTS TO THE PRODUCTION,  
DISTRIBUTION AND CONSUMPTION OF  
SORGHUM IN SOUTHERN HONDURAS

A Farming Systems Approach

Report No. 2

HOUSEHOLD FOOD USE IN THREE RURAL COMMUNITIES  
IN SOUTHERN HONDURAS

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INTSORMIL  
Contract No. AID/DSAN-G-0149

1985

## TABLE OF CONTENTS

List of Tables . . . . .	iii
List of Figures. . . . .	iv
Executive Summary. . . . .	v
Chapter I: Introduction . . . . .	1
Chapter II: The Ethnographic Context . . . . .	13
Chapter III: Beliefs About Food . . . . .	32
Chapter IV: Food Consumption . . . . .	60
Chapter V: Conclusions . . . . .	103
Appendix: Food Preparation. . . . .	113
Glossary of Spanish Terms and Units of Measure . .	116
Bibliography . . . . .	120

## LIST OF TABLES

	Page
Table 1 Household Composition. . . . .	19
Table 2 Foods Used Listed by Source. . . . .	25
Table 3 Crop Frequencies Reported by . . . . . Males and Females.	28
Table 4 Common Fruit Trees Grown . . . . .	29
Table 5 Food Preferences (Large Sample). . . . .	40
Table 6 Food Preferences (Small Sample). . . . .	41
Table 7 Nutritive Value as a Food. . . . . Classification.	44
Table 8 Hot/Cold Classification of . . . . . Foods (Small Sample).	46
Table 9 Foods Appropriate for Different. . . . . Age Groups (Large Sample).	49
Table 10 Appropriateness of Foods for . . . . . Other Groups (Large Samples).	52
Table 11a National Survey of Rural Honduran . . . . . Women About the Nutritive Value of Food Groups for Particular Groups of People.	56
Table 11b Beliefs of Women in the Municipio . . . . . of Pespire About Food Groups That Are "Good" for Certain Groups of People.	56
Table 12 Average Number of Months in Which. . . . . Grains Are Used.	61
Table 13 Foods Most Often Used During June. . . . . and July	62
Table 14 Foods Used Less Often During June. . . . . and July	63
Table 15 Dietary Diversity. . . . .	66

## LIST OF TABLES (continued)

Table 16	General Dietary Pattern. . . . .	67
	(24-hour recall).	
Table 17	Percentage Contribution of Food. . . . .	69
	Groups to Diet in Honduras.	
Table 18	Zero Order Correlations Between. . . . .	70
	Degree to Which Protein and Energy Need are Met and Food Use.	
Table 19	Percentage of Energy Needs Met by. . . . .	72
	Households.	
Table 20	Percentage of Protein Needs Met. . . . .	73
	Households.	
Table 21	Zero Order Correlations Between. . . . .	75
	Certain Economic and Household Variables and Dietary Variables.	
Table 22	Zero Order Correlations Between. . . . .	76
	Dietary Variables and Family Structure.	
Table 23	Access to Land in the Research . . . . .	79
	Communities.	
Table 24	Zero Order Correlations Between . . . . .	80
	Access to Land and Certain Dietary Variables.	
Table 25	Comparisons of the Villages Studied. . . . .	83
Table 26	The Case Studies . . . . .	99

## LIST OF FIGURES

Figure 1	Map of Honduras with Research Sites . . . . .	3
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## EXECUTIVE SUMMARY

This report presents the results of our preliminary studies of diet and nutritional status in sorghum growing communities of Southern Honduras. It is part of the farming systems research carried out as part of the University of Kentucky/INTSORMIL research program.

In 1981 three communities in the municipality of Pespire in the highland region of the Department of Choluteca were surveyed. The objectives of the research were to:

- (1) describe the basic diet of sorghum growing communities and the acceptability of sorghum as a human food;
- (2) assess the nutritional problems of these communities in order to determine the potential impact of increasing sorghum production on nutritional status;
- (3) and describe the processing techniques and grain quality characteristics preferred by people in the communities.

The diets of families in the research communities were found to be quite varied. Families used foods they produced themselves, as well as some purchased foods and a number of wild fruits and some fish and game. At the same time, however, there was a great deal of variation among families and among the communities. Some families had a more varied diet than others. Some were able to meet their needs for energy and protein, others were not. Economic factors were found to predict dietary variability but not necessarily dietary adequacy with respect to energy and protein. The size of a family and the number of children relative to adults were more important predictors of adequacy with larger, younger families at a disadvantage. Those families with access to their own land were better able to meet nutrient requirements. Participation in the food for work program in one of the communities also contributed to dietary adequacy. On the whole, however, our comparisons of the diets of these communities with national surveys show that these villages are worse off nutritionally than the national average. The major nutritional deficiency appears to be energy rather than protein.

Although sorghum use as a tortilla grain had not frequently been reported for Honduras, our data demonstrate that many families in these communities use

sorghum for most of the year. At the same time, maize continues to be the preferred grain. Sorghum is

perceived to be less filling than maize and is classified as "cooler" in the humoral classification system. This latter quality occasionally affects people's behavior because they consider the grain less appropriate for individuals in special conditions, such as lactating women.

Sorghum is used most by the poorest families, because of its lower cost. In fact, it is more frequently purchased than maize. Families use their maize first and then purchase the less expensive sorghum. As a result, we believe that improving sorghum production would result in nutritional benefits to the poor.

Although maize is the preferred tortilla grain, sorghum is an acceptable alternative. With energy as the first limiting nutrient, and because of the diversity of foods in the diet, it seems more important to provide more staple grains than to attempt to improve the nutritional quality of the grain for this region of the world.

Questions concerning the digestibility of the proteins in sorghum has occasioned some controversy over its promotion in areas of the world in which traditional methods of processing do not exist. In this region sorghum is nixtamalized before use. Continuing work is needed on the effects of nixtamalization on protein digestibility in sorghum.

## CHAPTER I

### INTRODUCTION

In June through August 1981 researchers from the University of Kentucky conducted a preliminary study of agricultural production and food consumption in three communities in Southern Honduras as a part of research carried out under the auspices of the International Sorghum/Millet Collaborative Research Support Project (INTSORMIL). This report contains information concerning food consumption and nutritional status for the three communities studied in the preliminary survey.

The study had several objectives. The first was to provide information on the uses and methods of preparation of basic food stuffs, with an emphasis on sorghum, in order to provide information on the characteristics of sorghum that make it an acceptable food in that area. This is crucial because the overall goal of INTSORMIL is to improve the production of sorghum and millet suitable for human food. The second was to provide information on the diet and nutritional status of farm families in Southern Honduras in order to assess the nutritional needs that could be addressed by increasing sorghum production. The third was to assess the impact of alternative existing farming strategies on the diets and nutritional status of farm families. This information is useful for predicting the probable impact of agricultural innovation on diet and nutritional status. The final objective of this research was to provide baseline data on both diet and nutritional status in order to allow a basis for evaluation of the effects of agricultural innovation on the nutritional status of small farm families in the future. Data necessary for the evaluation of such projects have been notably lacking in the past, leaving no basis for comparison of the quality of life after innovations have been introduced.

These objectives were carried out through a research strategy that focused on an analysis of household food use in a sample of families in Southern Honduras.

## Food and Nutritional Status in Southern Honduras

Honduras was chosen as a site for the present research, and for INTSORMIL involvement in general, in part because it represents an area of extreme poverty and important food needs. INCAP (Teller et al. 1979) reports that there was a deterioration in the nutritional status of all Central American countries, except for Costa Rica from 1965 to 1975. This took place in spite of improvement in other national level socio-economic indicators during that time period. In Honduras, specifically, the situation is similar. Although national surveys of food availability indicate that minimum daily caloric requirements can be met, food consumption surveys show a more negative picture (Inter-American Development Bank (IDB) 1979). Available energy in kilocalories per capita decreased by 2.4% from 1970 to 1974. In 1975 the prevalence of second and third degree malnutrition in Honduras was 38% of the population (Teller et al. 1979). For certain groups in the population the problem is even more severe: data from the 1960s and 1970s show that over 70% of children under the age of 5 suffered from some form of protein calorie malnutrition (IDB 1979, INCAP 1969, SAPLAN 1981). More recent studies carried out by INCAP and the planning council of Honduras report the continuation of this trend. A comparison of the surveys carried out by INCAP in 1965-67 and SAPLAN studies carried out in 1979 (SAPLAN 1981) show that the overall availability of energy, iron, and vitamins A and C in the Honduran diet had declined slightly during this time.

At the same time, food balance data from the nation as a whole demonstrate trends seen in other third world countries experiencing declines in nutritional well-being. Production of beef between 1960 and 1979 rose 89% and exports of beef rose 126%. At the same time, per capita consumption of meats rose by only 32%. Imports of basic grains rose by almost 2,000% for maize, 330% for rice and 200% for beans, while consumption of maize and beans fell by 14% and 5%, respectively. National level data document an increase in sorghum production in Southern Honduras in recent years but, interestingly, no national level data on sorghum consumption were available.

The situation described above resulted in the designation of Honduras as a food priority country by the United Nations. Both the country and the international aid organizations have established increased domestic production of food crops as a priority.

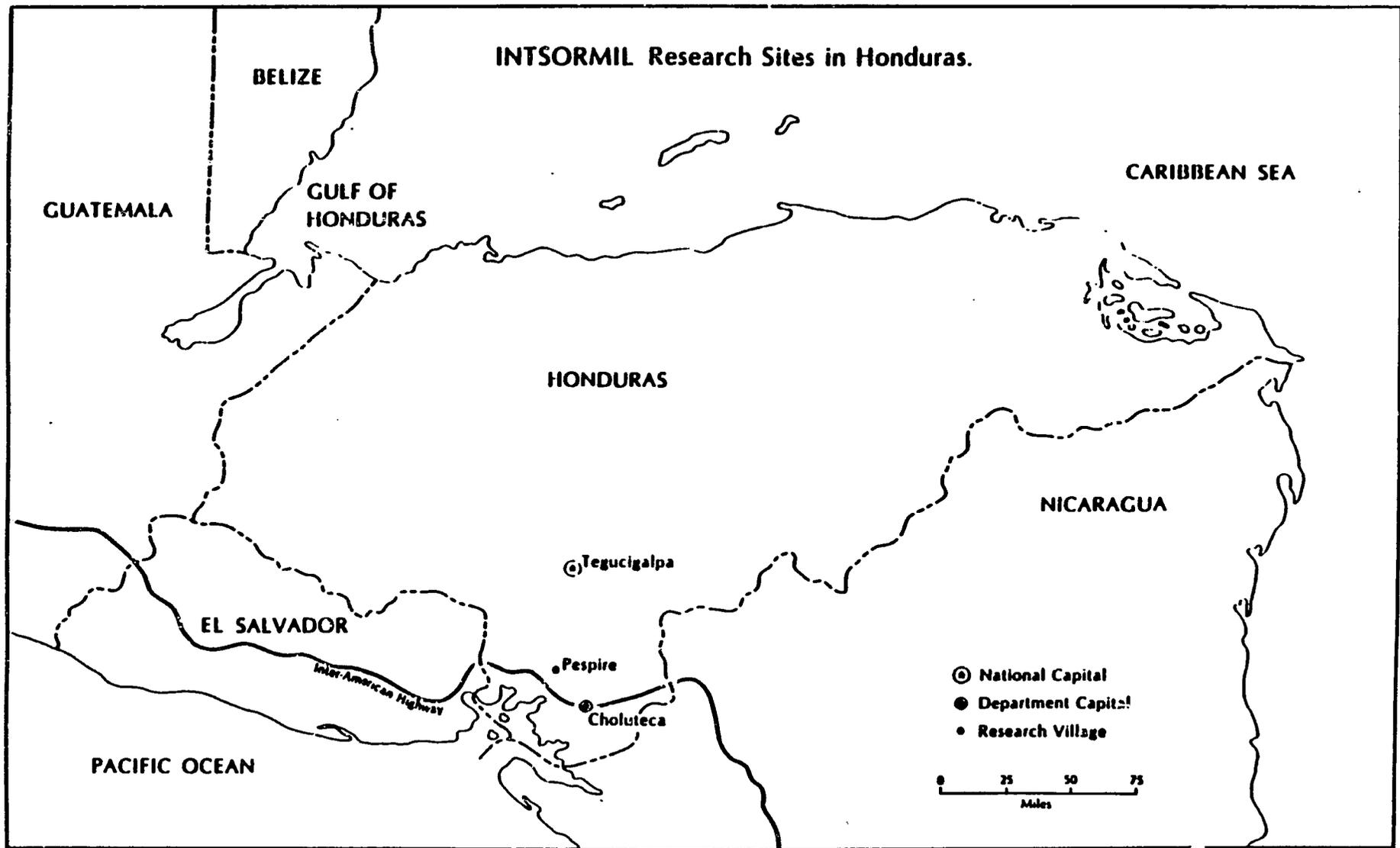


Figure 1. Map of Honduras with Research Sites.

## Issues In Nutrition and Agricultural Change

There has been growing realization in recent years that agricultural change is not nutritionally neutral (e.g., Latham 1984). Changes in crops, cropping patterns, and agricultural technology have varying effects on diet and nutritional status. Fleuret and Fleuret (1980), in an influential article, have pointed out that few programs to improve the productivity of small farmers have had a positive effect on the nutritional status of farm families. Some may even have contributed to a decline. In addition, food and agricultural policy is frequently formulated and implemented without paying careful attention to the nutritional impact of methods of food production and processing (Hulse 1982, Valdes 1983).

Changing agricultural production can negatively affect nutritional status of farm families in a number of ways. Currently under debate is the effect of shifting from subsistence or semi-subsistence production of food crops, to the production of commercial crops for sale. Data currently available suggest that in a few instances the cash generated through the sale of agricultural products allows for the purchase of a more adequate diet than previously. In many other instances cash income is less than, or not significantly more than, real income under a semi-subsistence system (IFPRI 1984). In addition, changes in work patterns such as higher labor demands on family members may offset improvement in food availability (Gross and Underwood 1971). Some researchers have demonstrated that agricultural development has benefitted most those groups that are at least risk and made little or no impact on the populations most vulnerable to nutritional risk (Dewey 1980, Chafkin and Berg 1975, Hernandez et al. 1974).

As a result of these studies research in factors affecting nutritional status in rural communities of developing countries has begun to emphasize several points. There is an increased interest in variability within communities both in terms of food use and nutritional status and the socioeconomic factors that affect them (Valverde et al. 1977, 1980, 1981; Valverde and Rawson 1976; Omawale 1980; Pelto and Jerome 1978; K.M. DeWalt, Kelly and Pelto 1980). The variable position of families within communities with respect to their ability to benefit from development projects and the ways in which economic change affect diet and food

use has moved several nutritionists to advocate what they call "functional classification" of populations at nutritional risk (Valverde et al. 1980; Omawale 1980). The goal of this approach is to provide a systematic socio-economic analysis of nutritional problems in order to discover the factors directly affecting nutritional status for each group identified. Using this approach the researcher is not satisfied to identify a group at high risk, such as young children or pregnant woman. The goal is to pinpoint particular types of households for whom these family members are at risk. Classification of risk may rest on any number of situations found to be associated with nutritional problems for which the underlying factors affecting the ability of households to meet nutritional needs is different. For example, the families of both landless workers and small landholders may be at nutritional risk, but the potential interventions advocated for each may be different.

Omawale (1980), in research in the Philippines, classified households according to occupation and broke those groups down even further into categories such as small farmers, larger farmers, small farmers using irrigation, those without irrigation, etc. He was then able to identify specific problems affecting each group. This type of approach is quite similar to the farming systems approach used in the present research in which the detailed description of agricultural systems and the identification of recommendation domains for specific groups are emphasized.

The focus on variability and functional classification has emerged within the context of community focused research strategies. Anthropologists and other social scientists have long argued for the community as a unit of analysis. The need to work at the level of the community rather than larger social units is important because of ecological variation from region to region, variation in access to infrastructure, ethnic and regional variations in culture, differences in land tenure arrangements, etc. At the same time it is important to recognize the effect of events taking place on the national and international levels on communities as a whole and households and individuals within communities. There is a real need for understanding the linkages between microlevel and macrolevel data and theory (B. DeWalt and Pelto 1985).

## Household Food Resources: The Nutritional Strategies Approach

In recent years we have been developing an approach to understanding diet and nutritional status in agricultural communities that highlights the relationships between agricultural production, income generation and diet and nutritional status with an emphasis on analyzing variation in dietary and economic strategies within and between communities (K. M. DeWalt 1981, 1983a, 1983b). In the nutritional strategies approach, alternative food sources for communities and the resources needed to exploit them are identified. In general, food resources in agrarian communities include home production, purchase, collection of wild foods and gifts of food. Households differ in the extent to which they use different food resources; that is, they follow alternative nutritional strategies. Different household characteristics affect the use of each of the alternative food resources. Analysis of the food resources available and the factors that affect their exploitation to meet family nutritional needs allows for an evaluation of potential interventions by examining their probable effect on families' nutritional strategies.

The research carried out in Southern Honduras incorporated an examination of nutritional strategies within a farming systems research framework. Our focus on sorghum in the farming systems and in nutritional strategies was placed within the context of the overall farming and nutritional systems.

### METHODS OF DATA COLLECTION

Although an understanding of food consumption in Southern Honduras was a major research goal, the data collection was directed at a wide variety of issues only some of which dealt directly with food use. Food consumption and nutritional status are part of a larger social context. To understand food consumption it is necessary to look at factors influencing food availability and beliefs about food. In order to investigate these we have used several methods of data collection, including participant observation, dietary survey methods, open-ended questions, and sorting tasks. Interpretation of the data also involved nutritional analyses that will be discussed later.

## Selecting Study Communities

Sorghum cultivation for human consumption is restricted to several areas of Honduras. Sorghum as a human food is restricted almost exclusively to Southern Honduras principally in the Departments of Valle and Choluteca. For this research project we wished to select a fairly representative community in the Department of Choluteca. The municipality of Pespire was chosen because it represented an area in which the agricultural census showed a large amount of sorghum was cultivated and in which land holdings varied considerably, from large holdings of several hundred hectares to small holdings of only a few hectares. In addition, many landless families rented or sharecropped land.

Three communities from the municipality of Pespire were selected for survey. These included the village of Cacuatere and two of its outlying hamlets, El Corinto and El Naranjito. Cacuatere and El Corinto are accessible by dirt road during much of the year. El Naranjito was accessible from Cacuatere only by foot path in 1981, although a road now exists nearly all the way to the village. The three communities are described in more detail in Chapter II.

## Phase 1: Outlining Food Resources

In order to provide background information for the study of food consumption we used various ethnographic methods, including mapping, conducting market surveys of foods and prices, key informant interviewing, and general participant observation. During our preliminary search for a field site, we began noting available foods and their prices in the markets and shops in Tegucigalpa, Choluteca, Pespire, and other communities. After choosing the communities for study, we mapped the town of Pespire and the three villages and began observing daily life. We surveyed local shops and obtained the names of individuals in the villages who sold dairy products, eggs, or breads in their homes. In shops in Pespire we asked which products were most frequently purchased by shoppers from the research communities. We observed and shared in food preparation and meals in a variety of situations. At special occasions such as a Saint's Day Festival and a town dance, we noted foods being sold. Food preparation was observed and photographed. All of these activities

provided basic descriptive ethnographic information about available foods and their preparation. In addition, we attended several meetings of homemakers' clubs and conducted group interviews. Interviews with key informants were used to construct tables of seasonal availability of foods.

## Phase 2: Survey of Food Use in Three Villages

As a second stage of our research we constructed and administered a formal interview schedule. The interview for female household heads was designed to look at a variety of topics related both directly and indirectly to dietary behavior. Those topics included an inventory of household goods, household composition, a childbirth history, economic activities and resources, group membership within the community, activities outside the community, beliefs about health, and use of health care services. We also gathered data concerned more directly with food use, focusing on diet, food preparation, and beliefs about foods.

### The Sample

The sample for the research was an approximate one-half random sample of households in the villages of Cacautare, El Corinto and El Naranjito. As there was no pre-existing centralized list of all households, we constructed one using information obtained from the Club Amas de Casa, a homemakers' group, and the Health Center. These groups provided names of household heads. As the overall objective of the farming systems research project was to obtain information on cultivation practices as well as consumption, we focused primarily on households that were cultivating land in 1981. Later an effort was made to include some households not currently cultivating. Our final sample included 52 female household heads for whom matched interviews with males were conducted, and 16 females who were single household heads or whose husbands were not engaged in agriculture or were not available for interviewing, for a total of 68 interviews. These represent 41% of the 139 households in the three villages.

Before constructing the interview schedules for both male and female household heads, a number of people were consulted including members of the Club

Amas de Casa and the Club Amas de Hogar (another home-makers' group), Save the Children Federation workers, the local priest and a local woman from Pespire who acted as a key informant. They provided relevant information and vocabulary. The interview schedule was constructed using a combination of sources, including schedules used in previous studies in Mexico, and questionnaires used by several other projects that were carried out in Honduras.

Interviews with female household heads took place in their homes. Entry into the community was begun by attending a meeting of the Amas de Casa Club and introducing ourselves and the project. Most of our informants were quite cooperative in spite of the fact that the interview took from 1-1/2 to 2 hours to complete.

### Dietary Information

The survey of food use involved several levels of analysis: foods available throughout the year in the three communities studied, foods consumed in specific households during a particular time period, and foods eaten by (and energy available to) individuals within each household.

In the interview schedule, questions concerned with food availability were included to identify the following resources: vegetables, grains, and herbs being produced in backyard gardens and fields; trees producing fruit for sale and/or consumption; and ownership of animals and poultry. Other questions were directed at identifying foods obtained through gathering, hunting, and fishing because foods of that type are less likely to be reported in a list-recall type question.

The interview schedule also focused on consumption of foods, whether procured through purchase, COHAAT (The Cooperative Honduran and German Program of Food for Work), gifts, gathering, or home production. We used a combination of dietary survey methods to collect the consumption data. Those methods included: (1) specific questions focusing on use of grains for tortillas; (2) a market-basket recall for the week preceding the interview, and (3) a 24-hour recall of family meals for the day preceding the interview.

In the market-basket survey, using a list-recall format, the interviewer asked about foods that were eaten during the preceding week. Using an exhaustive list of available foods we asked the amount, the price and the source for each food reported used. The objective was to get an idea of the relative proportions of foods used from different resources, as well as to determine a dietary outline for which available energy and protein content could be analyzed.

Each interview also included a 24-hour recall of family meals, asking, "What did your family eat yesterday?" for each meal and snack available to the members of the family. It is possible from these data to calculate the amount of nutrients available to the household and their source. Furthermore, collecting similar information several different ways by asking about the quantities of foods reported used in one day, amounts of grains reported used daily for tortillas, and amounts of foods used weekly acted as a check on the consistency of answers. Additional questions were asked about foods eaten as snacks during the day, such as foods provided for school children by the Amas de Casa.

Finally, we conducted a 24-hour recall for all children under 60 months of age. Because pre-school age children are especially vulnerable to undernutrition, we were interested in obtaining data regarding their nutritional status, especially related to the impact of using sorghum in the diet.

#### Evaluation of Dietary Survey Methods

As Burk and Pao (1976) have pointed out, no one method of data collection on food intake has been found to be consistently advantageous. Researchers must decide "which trade-offs are most relevant to their objectives" (Burk and Pao 1976:70). Ideally, the most accurate method of studying food consumption is the weighing of all foods eaten, but this method often results in low response rates and may disrupt normal food use. To apply this method, either respondents must be trained to measure and record amounts of foods used or interviewers must make repeated visits to weigh the foods. Both alternatives involve a great deal of time and cooperation.

When compared with other data collection methods (weighed or estimated record and dietary history), the 24-hour recall method has been evaluated as providing greater validity because of its better response rates. It depends on memory and may carry with it a "downward bias" but it can be achieved in only one interview and does not change the dietary behavior being studied (Ibid). Our interview schedule was based on a combination of several kinds of list-recall methods, which appeared to be the most practical approach because of our limited time in the communities. For future use of the interview schedule, however, careful documentation of household units of measurement would be necessary for a more precise interpretation of the responses given.

### Food Beliefs

During the research period, data were also collected regarding beliefs about foods. Although the role of beliefs and attitudes about foods in shaping consumption patterns is unclear (Pelto and Jerome 1978), food ideology does "have some effect on the use of particular foods and nutritional strategies" (K.M. DeWalt 1981). We were especially interested in learning about attitudes toward the use of sorghum in the diet, but our questions did not focus exclusively on it. Rather, we noted whether sorghum was listed as a preferred or a harmful food, and it was included as one of the foods to be classified in a sorting task.

Methods of data collection included questions in the interview schedule and a modified Q-sort. First, during the interviews the following questions were asked: "What are your favorite foods?" "What (foods) would you buy if you had more money?" In another part of the interview, we asked which foods were best for particular groups of people such as old people, infants, nursing women, etc. We also asked a question concerning harmful foods.

The second method used for gathering data was a sorting task. We interviewed 13 women with whom we had previously conducted the household interview, and we preferred women who were natives of the research communities. This task involved sorting index cards on which were written the names of 95 foods and other substances. We asked the informants to separate the foods according to some quality that differentiated

them. Although we preferred allowing each person to come up with original categories, if the respondent asked for further instructions, we gave the example of separating "foods you eat from foods you do not eat." We went through the sorting two times (reading aloud the names of the foods as each card was picked up) with each informant. If they had not included the category of hot/cold, we suggested it so that we could compare choices in that category for all the interviews. These interviews were conducted at the end of the research period when we had already learned the names of locally used herbs, fruits, vegetables, game, beverages, and medicines to include as choices.

### Nutritional Analysis

The last issue to be discussed is that of analysis of dietary data collected. The analysis of dietary adequacy includes an examination of the the percentage of energy and protein needs met by each household, the proportional contribution of different food groups to the total energy and protein intake for each household, a comparison of these indicators with national statistics for Honduras, and a study of patterned use of foods in the diet. In order to measure protein and energy intake from the foods recorded in the 24-hour recall and the weekly survey, food composition tables for Latin American foods (INCAP 1960) were used. The protein and energy requirement standards developed by WHO (1973) were used in combination with INCAP's (1969) estimates of height and weight for particular age/sex categories of Hondurans in order to estimate each household's protein and energy needs (based on the age/sex categories represented in each household). Reports of INCAP and USAID were used for comparing the dietary patterns of the research communities with Honduras in general.

The following chapters of this report will describe the communities chosen for study with special emphasis on the food resources available in them; discuss patterns of food use in the communities with special reference to alternative staple grains and their use; identify nutritional problems and the factors that cause them; present information on food and health beliefs and food preferences; and drawing on these data, suggest directions for the role of INTSORMIL.

## CHAPTER II

### THE ETHNOGRAPHIC CONTEXT

Honduras is located in Central America, bordered by Guatemala and the Caribbean Sea on the north and by El Salvador, Nicaragua and the Pacific Ocean on the south (see Figure 1 in Chapter I). Honduras has a surface area of about 43,277 square miles and a population of 3.4 million. The economy is mainly agricultural with major export products of bananas, coffee, livestock, and forest products. Most of the land (83%) has been evaluated as best suited for forest or grazing. The major food crops are produced by the small farmers and include corn, beans, rice, and sorghum (Butland 1960; U.S. Agency for International Development 1978).

### HISTORY

The use of slash-and-burn agriculture and a diet based on staple crops of maize, beans, and squash in Southern Honduras also existed in pre-conquest times when the area was inhabited by populations that were influenced by Mesoamerican and South American cultures. These groups were decimated by Spanish conquest, epidemics, and slave trade. Spanish settlements were established in the Choluteca area during the 1520s and the discovery of gold and silver in the highlands as well as indigo production stimulated colonial interest in the area. The lowlands provided grasslands for livestock grazing. In the 1700s, however, that interest declined when mining failed as a result of poor techniques and because of lack of a sufficient labor force (Boyer 1982).

Post-conquest land tenure included private lands, large haciendas, smaller ranches, debt peonage, and tenant farming, as well as communal ejido lands. Because of small population, rugged terrain, and lack of transportation, trade was not well developed within Honduras, and Boyer notes that it is not surprising that Honduran elites did not throw themselves into private entrepreneurial and public infrastructural projects but instead concentrated on local retail business and cattle raising, leaving development of mining and banana plantations to foreign investors (Boyer 1982).

With the arrival of the fruit companies and increased mining in the late nineteenth century, changes took place that shaped the trends at work in Southern Honduras today. Political instability increased with the acceleration of foreign intervention and because there was more to be gained from investments. The mining operations attracted Honduran and European labor, and road building also increased. During the latter part of the nineteenth century indigo production declined after the development of synthetic dyes began. Sorghum was introduced as an animal feed, but gradually began to be used in tortillas during dry years when maize production dropped. During the late nineteenth and early twentieth centuries, families from Nicaragua, El Salvador, and northern Honduras established rural communities in Southern Honduras (Boyer 1982).

After World War II, small farmers in Honduras began to experience increasing land scarcity. This scarcity was a result of: (1) expanding commercial agriculture involving large farmers (coffee and cotton production as well as cattle raising), (2) "filling up" of existing communities in rural areas over the years, and (3) increased migration from El Salvador (Durham 1979:126-170). The scarcity of land for small farmers continues to intensify as pasture land replaces forest land, since beef exports are rising in importance (B. DeWalt 1982). The results of such trends are increasing dependence on food importation, reduction of subsistence farming, and fewer wage-labor opportunities for small farmers and non-owners of land. Such trends will also affect dietary patterns and nutritional status.

### Southern Honduras

The three communities studied here are located in Southern Honduras, an area that includes the states of Valle and Choluteca. This area comprises 5% of the total land area of Honduras, but almost 11% of the country's population is concentrated in the area. Ecological features in Southern Honduras include the coastal area with mangrove swamps and marshlands, lowlands of open savanna, foothills, and mountains. Elevations range from 0 to 800 meters above sea level with the steep rise of mountains. Four rivers and many streams flow through the area (the largest rivers are the Nacaome and the Choluteca).

The hot climate is divided into two seasons: dry verano and wet invierno with temperatures reaching their maximum of 40 degree C (104 degree F) during March and April (the peak of the dry season). The rainfall is extremely variable from year to year, and in Southern Honduras it can range from 500 mm annually to 2,500 mm. Rainfall is concentrated almost entirely in the wet season, from May through November. There is almost no rain during the verano, December through April. The farming systems and related dietary patterns operate within climatic and topographic limitations (DeWalt and DeWalt 1982).

### The Research Communities

The municipio (similar to an American "county") of Pespire is located in Southern Honduras on the paved road that links Tegucigalpa with the Pan American Highway. The municipio is made up of nine villages or aldeas. The aldea of Cacautare is the subject of our study. Three communities, including the village center of Cacautare with two of its outlying hamlets, El Corinto and El Naranjito (see Figure 2), were surveyed. These settlements are located about six kilometers from the central town of Pespire and are accessible by means of dirt roads and paths. At the time of this research, Naranjito could not be reached by jeep as the path into the village was too steep and rugged for driving. (In 1982 a passable road to the village was completed.) Town residents climbed the path up into the village from the aldea of Cacautare, a trip that took about ten minutes. The central aldea of Cacautare and the hamlet of El Corinto can be reached by jeep or bicycle, and daily busses stop at Pespire on the way to San Lorenzo, Nacaome, Choluteca, and Tegucigalpa. In 1981, The town of Cacautare had 82 houses, while El Corinto had 15 and El Naranjito 42.

The communities of Cacautare and Corinto are contiguous and share various services, such as a school and a housewives' club. A dirt road runs through these two communities, located on the fairly flat terrain of a small valley. Passing along the road, one might see young girls sweeping their houses out with brooms or men carrying loads of sticks to their houses for fuel. Houses face the road or paths, and many houses have shaded porches. Homes are surrounded by at least a small yard with various trees and sometimes a few flowers. The houses are made of wooden stakes or

boards, wattle-and-daub, or brick. They are topped with curved red clay tiles.

El Naranjito looks very different from the other two communities. The houses are built on the sides of the steep and rugged hills. Many have thatched roofs, rather than the red clay tiles used in Cacautare. From the houses in Naranjito, one can look down and view Cacautare in the valley below. Residents of Naranjito speak of going "down to the valley" to reach Cacautare.

Cacautare and Corinto are more conveniently located for getting to the Health Center (Centro de Salud), as several informants commented, and for catching busses. They also have more extended school services: in the former communities, children begin school earlier -at age six, rather than at seven as in El Naranjito. Families in Cacautare and Corinto, furthermore, participate in a food supplementation program for pre-school children. This program is administered by members of the Amas de Casa, a homemakers' club. It distributes milk and fritas de harina (fried pastry made from wheat flour, eggs, and sugar) to the children, using supplies provided by the CARE program. El Naranjito does not have such a food distribution program, nor does it have a housewives' club.

The communities of Cacautare, Corinto, and Naranjito differ in other ways as well. Analysis of information on land tenure shows a different pattern for Cacautare and Corinto as compared with Naranjito. Average size of land holding in Cacautare and Corinto is 16 manzanas (see Glossary for conversions). In Naranjito average size of land holding is only 5 manzanas. However, 29% of families in Cacautare and Corinto do not own land while only 4% of families in Naranjito are landless. Although there is more land available in Cacautare and Corinto, it is concentrated in the hands of a relatively few large landholders, while land is more equitably distributed in Naranjito. Many of landless in Cacautare and Corinto must rent or sharecrop land or work as laborers.

### Material Goods

None of these communities has access to public electricity, but several individuals surveyed own gas-powered refrigerators and two have kerosene stoves.

About half of the families use wells as a source of water, 30% have water piped to their houses and a few use a public faucet or the river to obtain water. Concerning other material belongings, more than half of the families surveyed own radios, 20% have sewing machines, four own bicycles, two own vehicles, and one owns a television.

Almost all of the houses have earth or cement floors or a combination of both (91%), and walls are usually estacon (stakes or sticks, 53%), wood planks (30%), or wattle and daub (21%). A few have brick walls. About 70% of the households have at least two rooms. In a two-room house there will be a separate bedroom and a living room in which the fogon (a raised, adobe wood-burning stove) will be found. Furniture includes beds, hammocks, folding wooden chairs, a long narrow table called a tablon, wooden benches, and storage bins of wooden planks or barrels. A few people have separate storage rooms for the last items, others have storage bins outside. Walls are often decorated with commercial calendars and many people have photographs of relatives or of themselves hanging on the walls. Room dividers are often made of stick frames covered with newspaper, fertilizer sacks, or grass mats. Beds are frames with rope springs covered with grass mats. Hammocks are common and are used for sitting as well as for sleeping. In one house, in which the female household head is an invalid, a coffin is kept in one corner of the house. Several houses have shelves stocked with canned juices, bottled drinks, spices, breads, canned tomato paste, noodles, sweets, aspirin and other non-prescription drugs, sardines, salt -- these items make up the inventory of a trucha (small store) or a pulperia (a slightly larger shop with a more varied selection). Often it would not be immediately obvious that the family was operating a shop until a customer would come in during our interview to buy something. Some houses have big Coca-Cola signs outside or inside to advertise the sale of carbonated beverages.

Houses are surprisingly cool. Houses of stakes allow the air to blow through. Doors are generally left open, and cats, dogs, and chickens wander in and out throughout the day.

## Occupations

Ninety percent of the families surveyed list farming as their primary occupation. Other primary occupations listed are carpenter, storekeeper, wage-laborer, gas-pump operator (in Tegucigalpa), and justice-of-the-peace. Secondary occupations are listed by 29% of the men and include fence building and live-stock raising. Road work, farming, carpentry, and other jobs are also listed.

Forty-six percent of the farmers are landowners, and in 1981, 39% of the farmers were renting land, while 15% were borrowing land. Land tenure will be discussed in Chapter V in terms of its relationship to dietary patterns, but in general, these are small-scale farmers, planting their crops on the steep sides of hills.

In 1981, fourteen (51%) of the men surveyed in Naranjito were working to build a road. The workers were paid by COHAAT (the Cooperative Honduran and German Program of Food for Work), a food-for-work development program that supports local improvements by reimbursing workers with food. Wages are paid in supplies of rice, beans, corn, sardines, and cooking oil for their households. Only one man from Cacutare was working at this project. The program had previously built the road in Cacutare and had been operating for several weeks to extend the road into El Naranjito when research began. The food available through this program, then, was temporary. The program terminated with the completion of the road late in 1981 when the Naranjito road was completed.

At least 40% of the women interviewed are involved in work at home that brings in money, such as selling produce, breads, tortillas, cheese, milk, eggs, snacks, dressmaking and giving injections (see Fordham et al 1985 for a more complete description of women's economic activities). The truchas and pulperias mentioned above are primarily run by women. One informant is a school teacher; another is the principal of the grade school. A few women have beehive-shaped ovens next to houses in which they bake rosquillas and rosquetas (hard cookie-like confections made of corn or sorghum and other ingredients) and other breads for sale as well as for home consumption. They lend or rent their ovens as well. Four women with sewing machines said that they make extra money as seamstresses. The

extension agent in Pespire teaches sewing classes with machines in Pespire, but thirteen women in the surveyed communities have sewing machines of their own.

### Household Composition

Household composition (see Table 1) varies, but a majority of households (63%) are nuclear families. Sixteen percent of the households are nuclear families plus grandchildren: in some of these families, an unmarried daughter lives at home with her children and her parents' family, while in others only the grandchildren lived in the home of their grandparents. It seems very common for grandparents to raise their grandchildren, and it is said to be desirable to have children in a home rather than to live alone. Two families report that they have adopted children, and several mention that they have children who are living away from home -- with a grandparent or another relative. The rest of the families (21%) reflect a variety of household types. Some are joint families (in which two nuclear families live together). Others are stem families, that is, nuclear families plus a single grandparent living with married children or with single adult children. There is only one single-member household, composed of a widowed woman whose married son lives nearby in the community. There are five households headed by single females, but there are no households headed by men without a mother, daughter, wife, or compañera (common-law wife).

Table 1. Household Composition

<u>Type Family*</u>	<u>% of Households</u>
Nuclear family	63% of households
Nuclear families + grandchildren	16%
Other forms:	21%
joint families	
nuclear family + grandparent	
single member	
single female + children	

\*Average family size: 6.5 persons

A majority of the households have from six to ten people living together (67%). The average family size is 6.5 persons. Forty-four percent of the households include at least one person 50 years or older. Seventy-five percent have teenagers from ages 10 to 19 years. Eighty-seven percent include children under 10 years of age. In our total sample, the age range is:

154 adults (over 18 years old) - 35% of population  
122 teenagers (10 to 18 years) - 28% of population  
166 children (under 10 years old) - 37% of population

For female household heads, the ages range from 17 years into the 70s, with the following distribution:

under 30 years old	28% of female household heads
30 - 39 years	31% of female household heads
40 - 49 years	22% of female household heads
50 years old or more	19% of female household heads

For female household heads, the mean years of education is 2.6 years. Twenty-one percent have no formal education, while two of the women have more than a 6th grade education. The number of years of formal education appears to be increasing, however. For women 17 to 29, the average is 4.3 years, while for women 40 and older, the average is less than 2 years.

About one-fifth of the women have worked outside of the community in which they are currently living, with domestic work listed as the most common type of employment. For many of the women, shopping and medical consultation for themselves or for another family member are the most common reasons listed for traveling to another community.

#### Use of Health Care Systems

Health care alternatives for villagers include treatment by local injectionists, physicians at the Health Center in Pespire, or physicians in Nacaome or San Lorenzo (both located in the nearby Department of Valle), as well as physicians and hospitals in Tegucigalpa and Choluteca.

The health center, located in Pespire, provides doctor's treatment for infectious disease, a well baby clinic, prenatal care for mothers, and vaccinations for children. The doctor there prescribes and distributes

medicine at a small charge and dispenses injections at a cost to the patient of 1 to 2 lempiras (one lempira = \$.50 U.S.) per visit plus 30 centavos (\$.15 U.S.) for medication, with most of the cost subsidized by the government.

A visit to the health center on a typical day revealed long waiting lines. Twenty-seven adults (of those, seven were males), 11 infants, and a few small children were waiting. The day's schedule, posted on a sign in the clinic, included consultations for sickness, prenatal care, and immunization during the morning. Afternoon activities included injections, home visits, and administrative duties.

Nine (13%) of the families interviewed in the research communities said that someone in the family had been treated by doctors other than those at the Health Center, usually in San Lorenzo and San Felipe. People sought treatment from other doctors for rheumatism, hemorrhaging, convulsions, and for sick children. Forty-seven (70%) of the households report that someone in the family has been treated by a dentist to have teeth pulled, filled, or gold inlays applied.

Eighteen (26%) of the families said that someone in the household had been to a hospital for reasons other than childbirth. When childbirth is included, 54% of the households have taken a family member to a hospital for treatment. Of the non-childbirth hospitalizations, most involve taking children to the Materno de Infantil in Tegucigalpa for urinary tract infections, gripe (the flu), diarrhea, and headache; others involve adults (for tumors, heart trouble, tapeworm, a fractured hand, hemorrhaging, eye surgery, and sterilization). Public transportation is available at a low cost on daily busses to Tegucigalpa, Choluteca, and San Lorenzo, so owning a vehicle is not necessary in order to reach medical care. However, one man cut his hand while working and was quickly taken to a clinic in another aldea by members of our research team because rapid means of transportation in case of an emergency are not otherwise available. As mentioned earlier, the people in El Naranjito had more difficulty in getting to Pespire when ill because of the rugged terrain.

For childbirth, patterns of use of health care services are as follows for the women interviewed:

- 19 (28%) have had at least one child in a hospital
- 51 (76%) have been attended at home by a partero (traditional childbirth attendant) at least once
- 14 (20%) have delivered a baby alone at home at least once
- 17 (25%) have had a relative (not a partero) present
- 2 have had their husbands present.

Only one of the women interviewed has not had children. She is the youngest female household head (17 years old). Twenty-two percent of the women who have given birth have had at least one miscarriage; forty-five percent have given birth to children who died in infancy. It is evident that hospitalizations are increasing for childbirth, because women under 30 make up almost half of the group to have been hospitalized while they represent only 29% of the total population.

When asked "What are the common illnesses here?" the illnesses listed most often are the following (in order of most-often mentioned to least-often mentioned): flu, diarrhea, fever, measles, nausea, malaria, headache, and chicken pox. Others mentioned include coughs, bronchitis, dengue fever, arthritis, rheumatism, skin rashes, polio, malnutrition, "nerves," pneumonia, and eye infections.

Pastillas (pills) are the most commonly mentioned remedy for treating illness. They can be obtained at shops and general stores, pharmacies, and at the health center. People report using herbal teas and pills to treat many of the same illnesses and say that they go to the center only if the illness is more serious. People take their children to the health center for treatment of diarrhea more often than they do for the flu (gripe). The flu is more often treated at home.

In general, the use of "pills" is a very common form of treatment; our informants distinguish between "pills" and medicine distributed at the health center or other hospitals or clinics. The most commonly used pills are aspirin, dristan, Conmel (a brand of aspirin), Mejorales (a brand of aspirin for children), and Desenfriol, a cold preparation. These are used for treating the flu, fever, nausea, and headaches, in an almost interchangeable way. Alka Seltzer is used for nausea and magnesia (a purgative) for fever, nausea, and headache-with-fever. For malaria, Aralen is used by most households, but one herb-user also reported using the bark of the quina tree for treating it. Sulfa de

asinas is used for the flu and for headaches. Terromicina (an antibiotic) is often mentioned as a treatment for diarrhea and sometimes for the flu. Purgatives are also recommended for treating diarrhea in children. Penicillin injections are mentioned for treating flu and fever.

No one interviewed said that they simply wait to get well or that they do nothing. Comments about health and treatments included some mention of foods that are harmful: one woman mentioned having high blood pressure and said that her doctor recommends that she eliminate salt from her diet. As a result, when she made cuajada (soft cheese), she separated a portion of the cheese that she did not salt. She kept it for household consumption, then salted the rest of the cheese that she intended to sell. Some informants mentioned that fat or grease is bad for health, and that pork is not good for you because it has so much fat.

When asked about illnesses during the previous 15 days, 17 households said that they had taken a family member to the health center during that time for treatment. Five had taken someone to Tegucigalpa. In total, 30 families had someone with the flu within the 15-day period, and nine reported that a family member had had diarrhea.

About one-third of the families mentioned using herbs to treat common illnesses (23 individuals). Illnesses for which herbal treatments are used include the flu, diarrhea, measles, fever, bronchitis, coughs, and polio. Female household heads who reported using herbs to treat illnesses also said that they seek other kinds of medical treatment, including that of physicians, when the condition is serious.

#### FOOD AVAILABILITY

As stated earlier, these farmers are small landholders: 60% of them used fewer than five manzanas of land during 1980. The farmers practice "shifting cultivation" on steep hills under conditions of extremely variable rainfall (see DeWalt and DeWalt 1982 for a more complete description of cultivation practices). The production of both primary and secondary crops is dependent on fluctuations of the wet and dry seasons. Diet is largely shaped by seasonal

sorghum, and 13% were growing neither crop in 1981. Maize is variations of locally produced crops, with the exception of a few staple foods available in the Pespire market, in shops and general stores in Pespire and the three villages studied, and distributed by COHAAT in payment for work. Table 2 lists the sources and names of available foods.

The preliminary surveys reported here were conducted during June, July, and August (part of the wet season). Locally produced foods that were in season during the time of the research included bell peppers, guavas, watermelons, muskmelons, nances (acerola), avocados, and chayote and ayote (squashes). Foods produced locally and almost always available included green beans, manioc, bananas, coconut, and lemons. Foods that can be purchased in Pespire all year included maize, sorghum, beans, rice, potatoes, tomatoes, cabbage, onion, carrots, radishes, and squash.

There are a number of foods reported to be frequently used that were not in season during our research. In particular, mangoes are in season during March and April (and sometimes again in August). There are thousands of mango trees in the municipio; therefore, when mangoes are in season, they form a very important part of the diet. In addition, the period of research included a transitional time for the use of grains. The current year's maize crop was almost ready for harvest. Many families were using either a mixture of maize and sorghum, or sorghum alone, for making tortillas. During other seasons, fewer families use sorghum.

On the other hand, dairy products were more readily available during this time period and are not usually as available during other seasons. We were informed that only during the wet season is there sufficient pasture for cows to produce enough milk for making cuajada (and foods made with cuajada, such as rosquillas and quesadillas). What is clear, however, is that there is a wide variety of foods available throughout the year (see Table 2).

### Food Production

The primary crops produced in the region are maize and sorghum. According to the female household heads

Names in English (and Spanish)

I. HOME-PRODUCED FOODS

Foods grown in gardens or fields (milpas)

Corn (maiz)	Bananas (guineo, mínimo)
Sorghum (maicillo)	Guava
Squash (ayote, petaste, chayote, pipian)	Acerola (nance)
Sweet Manioc (yuca)	Custard Apple (anonas)
Green Beans (frijol verde)	Coconut (coco)
Hot Peppers (chile picante)	Lemon (limón)
Sweet Peppers (chile dulce)	Avocado (aguacate)
Sweet Potatoes (camote)	Watermelon (sandía)
Annato (achiote)	

Other fruits available  
although not in season  
during winter (invierno)

Mango
Papaya
Plantains (plátanos)
Plums (ciruelas or jocotes)
Pineapple (piña)
Cashew (marañón)

Poultry and dairy products

Chicken (pollo/gallina)	Cuajada (a locally produced
Milk (leche)	cheese for which there is
Cheese (queso)	no English equivalent)
Eggs (huevos)	

II. PURCHASED FOODS

Frequently used foods

Corn	Milk
Sorghum	Cheese
Beans (frijoles)	Cuajada
Rice (arroz)	Soured Cream (mantequilla)
Tomatoes (tomatoes)	Vegetable Oil (aciete)
Avocadoes	Lard (manteca)
Cabbage (repollo)	Soft Wheat Rolls (panes)
Onions (cebolla)	Rosquillas (a hard biscuit, made
Potatoes (papas)	with cuajada, for which there
Coffee (café)	is no English equivalent)
Sugar (azúcar)	Spices (especias)
Salt (sal)	Bouillon Cubes (cubitos maggi)
Lime (cal)	Noodles (fideos)
Eggs	

Less frequently used foods

Beef (res)	Game (carne de caza)
Chicken	Canned Sardines
Fish (pescado)	(sardinas enlatadas)
Canned Tomato Paste	Canned Fruit Juices
(salsa de tomate)	(jugos)
Instant Oatmeal (osmil)	Garlic (ajo)
Wheat Flour (harina)	Sodas (refrescos)
Sweets (confites)	Mínimo
Pork (cerdo)	Prepared Baby Formula
Rosquetas (hard biscuit,	
similar to rosquillas)	

III. FOODS AVAILABLE FROM OTHER SOURCES

Foods available from COHAAT

Corn
Rice
Oil
Beans
Canned Sardines

Foods gathered

Fruits (nances, custard apples, lemons)
Game (rabbit, armadillo, iguana, venison, doves)
Fish (fresh water shell fish, chacalines,
camarones, sardines, robales, pescado blanco,
miracielo, mojaras, llegua)

interviewed, 84% of the farmers were growing both crops, 3% were growing only sorghum, and 13% were growing neither crop in 1981. Maize is harvested twice a year and is usually consumed within a few months before insects or moisture ruin the stored grain; the wet season harvest is especially vulnerable to such damage (DeWalt and DeWalt 1982). The maize is eaten in three stages: (1) jilotes, small immature ears of maize that are used in soups; (2) elotes, young ears of green maize harvested in late July and early August that are used to make tamales, boiled (elotes cocidos) or roasted (elotes asados) and eaten from the cob; and (3) mazorcas, mature ears of maize that are used for making tortillas.

For tortillas, the maize is taken off the cob and treated with an alkaline substance (lime or ashes). The pericarp is removed and the resulting nixtamal is ground into masa (dough) and formed into tortillas. Most of the maize is produced for household consumption. One farmer noted, however, that his family eats sorghum and sells their maize because they can get a better price for it. Of the 52 cultivators with whom we spoke, 38% sold maize, and 85% sold sorghum in 1980.

Sorghum is both a cash crop and a staple food (about 37% of sorghum produced in this area is used for human food). The sorghum used for tortillas is harvested in December or January. The two kinds of sorghum most popular in this area are: (1) coludo - "bien floja" (loose panicle), which is larger than the other type, and yields well in times of drought, and (2) piña (because of its pineapple shape), which is whiter and better for tortillas and popped sorghum (alboroto). It does not, however, yield as well as coludo in case of drought.

Although maize is the preferred grain for use in tortillas, fully 80% of the households in our sample reported that they used sorghum in tortillas at some time during the year, either by itself or mixed with maize. Sorghum is an important "back up" food, especially during dry years when maize yields are low.

Important secondary food crops include several varieties of squash (ayote, pipian, chayote), sweet manioc (yucca), yams or sweet potatoes (camote), beans, muskmelons, watermelons, rice, and sesame. These crops are grown in the fields, intercropped with maize and sorghum, or in "backyard gardens." The increasing use

of herbicides (see DeWalt and DeWalt 1982) may have detrimental effects on the availability of these important supplemental crops. The secondary vegetable crops (broadleaf plants) are susceptible to herbicides. Farmers noted that when using herbicides, they must separate these crops or weed the intercropped portions of their major crops by hand in order to protect the vegetables.

After only 10 years of use in Southern Honduras, herbicides are being used by 66% of the farmers in our sample. It is expected that as this number increases, the cultivation of secondary crops will decrease because growing a variety of crops requires the farmers to expend extra time, effort, and perhaps money to hire labor (DeWalt and DeWalt 1982).

Other secondary crops of lesser importance include sweet peppers, hot peppers, radishes, and tomatoes. Such crops are grown almost exclusively for household consumption. The yield for these crops is extremely variable and unpredictable because of rainfall variance and insect damage. Male farmers discounted the importance of these vegetable crops, perhaps because they are harvested as they ripen in very small quantities at any one time (DeWalt and DeWalt 1982). In contrast, when asked whether their household had planted particular crops, females reported much higher frequencies for the secondary crops than did the males. According to the women, 84% of the households surveyed plant at least one secondary crop, with about half of the families using both fields and household gardens, while many plant them only in their fields. In only seven cases was the household garden reported as the only land cultivated for secondary crops. However, many women were also found to discount the plants growing in their gardens. They apparently do not consider them "formal" gardens and seem to think they are insignificant, although ayote, beans, tomatoes, sweet manioc, radishes, and peppers (both varieties) are grown in their yards. Watermelons, muskmelons, camote, and chayote (a green, "spiny" squash) are always grown in fields, rather than near the houses. Many families plant ayote, beans, and manioc in both locations.

Some indication of the way in which these secondary crops are discounted by people in the community is given in Table 3. This table contrasts the frequencies of each secondary crop reported by male and female household heads. There we see the

systematic under-reporting by male household heads of crops that undoubtedly contribute a great deal to the variety and nutritional value of meals. Men tend only to report field crops and exclude garden crops.

It is difficult to obtain data on the yields for these crops. One problem in gathering this type of data is that secondary crops may not yield even when planted because they are so vulnerable to insects, drought, and animals. Another problem is that these crops tend to be harvested as needed rather than all at once as is usually the case with field crops. From the data reported by women in Table 3, however, it appears that these crops represent a potentially important contribution to a varied diet, and unless they are replaced with purchased foods of equal nutritional quality, decreasing cultivation of secondary crops could have a negative effect on dietary patterns for rural people in this area.

Table 3. Crop Frequencies Reported by Males and Females

Crop	Male Reported (N = 52)		Females Reported (N = 52)	
	#	%	#	%
Sesame	2	4	5	7
Beans	13	25	32	47
Watermelon	7	14	30	44
Muskmelon	3	6	27	40
Sweet potatoes	-	-	13	19
Sweet manioc	15	29	45	66
Chayote	-	-	2	3
Tomato	-	-	5	7
Ayote	21	40	51	75
Sweet peppers	-	-	13	19
Hot peppers	-	-	20	29
Rice	2	4	1	1.4
Radish	-	-	1	1.4
Green beans	-	-	7	10

Fruit and nut-bearing trees provide another source of foods for the people in our sample. The trees most commonly owned are listed in Table 4.

Table 4. Common Fruit Trees Grown

Tree	% of households owning	Tree	% of households owning
Mango	47%	Lemon	34%
Cashew	20%	Orange	28%
Papaya	28%	Plum	16%
Coconut	16%	Custard Apple	12%

Other fruits grown in the area include guava, guineo and minimo (two varieties of banana), nance (acerola), pineapple, and plantain. Many people who owned fruit trees reported that their trees were presently too young to produce. Informants often stated that they did not have any fruit trees at all until we would ask them about specific species ("What about lemons?"). On several occasions, informants would state that they had no fruit trees, yet when the interview was over we would walk with them through their yards where they would point out various trees to us. As in the case of garden crops, there is a tendency to take such plants for granted. Again, while yield is somewhat unpredictable, seasonal, and difficult to estimate, such foods can play an important role in the diet. Sixty-nine percent of the households surveyed owned fruit trees that were producing fruit used for household consumption.

Thirty-eight percent of the households reported selling fruit (this group represents over half of the households that owned productive trees). The fruit most commonly sold is mango (73% of those selling fruit sell mangos); but lemons, oranges, plums, and custard apples are also listed. Other trees that produce fruit but are not often sold are papaya, pineapple, coconut and cashew. A review of the wild and domesticated fruit trees available in these communities suggests that there are few times of the year when fruit is not available. In season, many of these fruits are consumed

in large quantities. We observed buckets full of nances being brought back to the villages by children. Some families reported using several hundred plums a week during their season (April-May). Mangos are consumed in quantity in the green as well as ripe stages during the two yearly seasons (May and August). The fruit of the second season of mangos is usually poor and not fit for sale and the harvest of these mangos is often completely consumed in the household.

### Animal and Poultry Products

Dairy and poultry products are another important source of food for people in these communities. For the 24% of the households that own cows producing milk, dairy products such as cuajada, soured cream, and milk can be produced at home rather than purchased. Some of these families sell extra milk to people in the community, and a few make cuajada and breads made with cuajada such as rosquillas to sell in the community. Over half of the households (57%) own at least one hen producing eggs; but many chickens died of a disease called murina (Newcastle's disease) in the year prior to the survey. In general, the number of eggs produced per hen was very low.

Many of the households (44%) own pigs, but these are sold rather than consumed at home. It is illegal to slaughter animals except in government-approved slaughter houses, and the nearest one is in Pespire. To have an animal slaughtered requires payment for the slaughter, and preservation of the food is difficult because there is no electricity in the villages. Consequently, most farmers sell their pigs. Some minor animals are kept. One family raises rabbits in the kitchen for example. Two families kept palomas (doves) in their houses but said they only eat wild ones that they shoot.

### Wild Game and Gathered Foods

Nineteen percent of the households reported hunting for food at least one time during the previous year. Available game includes rabbits, garrobo (lizard), iguana, armadillo, and birds.

More households take advantage of fishing as a source of food, particularly in El Naranjito. Forty-

eight percent of the female household heads reported that someone in the family fishes on a regular basis. River fish used include sardines (all year), chacalines or crayfish (July-August), and camarones or shrimp (February and March).

About 22% of the females reported that they gather wild plants for food or medicine. Foods gathered are nances, guavas, lemons, wild green beans, custard apples, mangos, oranges, and plums.

### Food Preparation

Food preparation takes place in the kitchen, using a mesa (a small table) or a tablon (long narrow work table) to which a corn mill is attached. Major cooking utensils include sartenas de barro (frying pans made of clay), ollas (two to four-quart round pots with handles), and comales (clay griddles). Some households own enamel-ware pans as well. Cooking is done on the fogon (an adobe stove) that is fueled with wood, and has openings on top over which pans are set when in use. Another piece of kitchen equipment is a batea (wooden trough-like dish used for making cuajada).

The most common spices used for seasoning food included black pepper, cumin, annato, hot peppers (yellow), and salt. Other herbs such as oregano and cilantro are used for curing, as well as cooking. Some commonly prepared foods included tortillas, atole de maiz (maize gruel), cuajada, rosquillas and rosquetas, tamales (also called nacatamales), and tamalitos. Other foods prepared included pan de harina (wheat bread), quesadillas (similar to rosquillas but seasoned with sugar and cinnamon), tamales pisques, and a variety of soups. For a more detailed description of the preparation of these foods, the reader can refer to the Appendix.

In this chapter, we have briefly described the historical and ethnographic background of the research communities in order to provide a context for a discussion of food use. In the chapters that follow, we will present a more detailed description and analysis of the methodologies utilized in this research and findings regarding food beliefs and household consumption of food in the research communities.

## CHAPTER III: BELIEFS ABOUT FOOD

### Introduction

It has often been stated that food has complex cultural meanings as well as the potential for providing energy and nourishment. MacKensie has described some of the meanings of food;

It defines the human and the non-human, the insider and the outsider, it marks the units within a society by including members or excluding others from obligations to contribute food or to receive food gifts. Food is a source of prestige or humiliation, a sign of wealth and power, an instrument of cause and cure, a creator and maintainer of social relations and alliances (MacKensie 1976:22).

Although food beliefs may have less influence on general food intake and nutritional status than do such variables as food availability and a family's socio-economic status (K.M DeWalt and Pelto 1977), these beliefs may influence food intake for certain groups of people under particular circumstances (Harwood 1971; Wilsor 1971; Logan 1972; Gonzalez 1964; Jelliffe 1967); and such beliefs may tell us how people perceive themselves and others (Douglas 1972). In order to understand the nutritional systems of families in a community, it is important to have some idea of what people think about food - how they categorize specific foods, which foods are considered health-promoting or harmful or prestigious, etc.

In this research we wish specifically to address the question of the place of sorghum as a human food in the food beliefs of people in Southern Honduras. In the survey instrument we included a number of questions designed to elicit information concerning the values people attached to individual foods and beliefs about foods seen to be appropriate for people in special circumstances, such as children, pregnant and lactating women and the sick. We also included tasks designed to elicit local categories of food that might be important. The categories of special interest revolve around the system of food classification found in much of Latin America in which foods as well as illnesses, medicines, and situations are classified as hot or cold or somewhere in-between. Because of its significance,

the classification system will be discussed below in detail.

### Hot/Cold Classification System

There is an extensive body of literature concerning the hot/cold food classification system as it relates to ideas about how the body works, which is especially pertinent to Latin America. The hot/cold system, as it exists in much of Latin America, as well as a number of other parts of the world, refers to a system of classification in which the qualities of "hot," "cold," and in some instances "cool" and "neutral" are attributed to foods as well as illnesses, medicines and situations. The system is closely related historically to the humoral theory of medicine characteristic of classical Greek medicine; it is, therefore, often referred to as humoral medicine.

Michael Logan (1972), drawing on the work of Redfield, Foster, Lewis and others, has analyzed adherence to humoral medicine in rural Mexico. Logan suggests that humoral folk medicine may provide an adaptive cultural mechanism that can help control disease (specifically pellagra). He focuses on the use of foods seen to have health significance and concludes that the way in which people combine foods from such categories may significantly affect their nutritional status. According to humoral folk medicine as described by Logan, the body is a self-corrective system, maintaining an equilibrium for optimal health. That balance can be upset by intense heat (resulting from hard work, excitement, certain "hot" foods, or "hot" illnesses) and intense cold (resulting from exposure to "evil winds" or "cold" foods or "cold" illnesses). Here, "hot" and "cold" are abstract qualities rather than temperatures, but they can result in changes in the body's temperature and the development of illness. Illnesses can be treated by consuming foods with the opposite quality so that illnesses with cold symptoms (such as pellagra's symptoms of diarrhea, loss of appetite and lethargy) can be cured by eating hot foods to restore balance in the body.

Because maize is a poor source of niacin and tryptophan, chronic deficiencies in those nutrients (and the development of pellagra) would be expected to exist in rural Mexican peasant communities where the people depend so heavily on maize as a dietary staple.

Logan points out that certain hot foods, which are logically considered to be medicinal for pellagra's cold symptoms, are foods that provide additional niacin and/or tryptophan and would thus help control pellagra. Although there is some variation in the categories used, Logan lists the following foods as generally classified throughout Mexico as hot: beef, goat, chicken, wheat, beans, peanuts, peppers, honey, coffee, distilled drinks (Logan 1972: 399). Beans and peppers, regularly included in the daily diet, may help prevent pellagra; the use of the more expensive proteins (beef, pork, wheat, chicken) when symptoms occur, may help control the disease. Logan does not explore the consequences of the avoidance of cold foods in response to symptoms of pellagra (rabbit, pork, lard, pigeon, duck, milk, eggs, maize, rice, tomato, oranges, beer, and soft drinks). Such avoidance would be logically correct according to the hot/cold system, but it might negatively affect nutritional status. Logan does, however, make the important point that folk medicine may offer potentially helpful frameworks and adaptive measures for health.

Madsen (1955) and Foster (1953, 1979a) have discussed the historical development of the hot/cold system and provide a context for understanding it as a food classification system. The system of humoral medicine developed in classical Greece. It then spread to Rome and Northern Africa. Islamic physicians further developed the system that was then introduced into Spain during the Moorish occupation. The Spaniards carried humoral medicine to the New World at the time of the Conquest. Madsen and Foster also discuss one of the key questions concerning humoral medicine in the New World. Humoral medicine was a complex system in which foods, etc., were categorized as either wet or dry, as well as hot or cold. In the New World the wet/dry dimension has disappeared and only the hot/cold dimension remains. Madsen suggests that the humoral system was compatible with the existing Aztec concept of balanced opposites in the universe. Through time, most of the elements of the humoral system were dropped except for the distinction of hot and cold qualities. Madsen discusses the system's use by a specific population in Mexico, the Indians of Tecospa. The hot/cold system has continually expanded in the culture of the Tecospa Indians to include new items borrowed from Mestizo culture (such as movies and Alka-seltzer). The system is most important in terms of determining the treatment of illnesses and injuries. In considering why

the Indians have borrowed new medical practices but not theories of etiology that go with them, Madsen notes that "first, it is much easier to prove the effectiveness of an aspirin tablet than to prove the advantages of a medical theory such as the theory that disease is caused by germs. In the second place, acceptance of aspirin does not require any revision of Indian medicinal theory," while acceptance of the germ theory would (Madsen 1955: 139). Madsen also makes the point that the hot/cold system often conditions acceptance or rejection of new medical procedures (ibid.). He describes, for example, why (within this system) the practices of daily bathing and seeking fresh night air are rejected, while hospital appendectomies have been accepted by the Indians. Madsen does not focus solely on how foods are classified, but he shows why certain foods are considered beneficial or harmful when an individual has a particular illness.

Similarly, Foster (1979a) describes the history of the hot/cold system and discusses it as it relates to food and to health. He emphasizes that the humoral system was always a naturalistic medical system whereby health can be explained in terms of the natural environment rather than in terms of witches and spirits. According to this system, evenly distributed body warmth is essential for health. The body can become vulnerable to imbalance, and eating inappropriate foods can aggravate the imbalance. Most often, prevention involves preventing exposure to cold and treatment involves the removal of excess heat. Finally, Foster notes that there are still traces of humoral beliefs and practices in the United States. However, in the U.S., the humoral rationale for treatment is usually missing, while in Latin America such rationales still exist. As will be discussed later, in Honduras the importance of the hot/cold system for ideas about health continues to be apparent.

Other writers have concentrated on the implications of the hot/cold classification of foods for medical treatment (Harwood 1971; Wilson 1971). Harwood, for example, has examined the consequences of food beliefs for medical regimens suggested for Puerto Ricans in New York City. He looks at how the belief system influences patient behavior and how physicians can work with patients for whom such beliefs are important. He provides examples of the interaction of foods and treatment for illnesses: because colds, for example, are cold in nature, a patient who uses the

hot/cold system will not drink fruit juices (which are also cold). Instead, they will prefer a drink that is hot so that it will balance out their cold condition. Harwood states that ginger tea, a hot drink, is preferred and will not impair the recommended treatment for a cold. On the other hand, he notes that some pregnant women, in order to prevent their babies from being born with rashes (which are hot), will avoid eating hot foods. Thus, they may refuse to take iron supplements or vitamins, which are also hot. The author suggests that a valuable approach is for the physician to help the patient "neutralize" certain foods or medicines to make treatment possible. For instance, the pregnant women could be advised to take the vitamins or iron with fruit juice or an herbal tea, which could balance out the hot quality of the vitamins. Harwood states that there are many examples of treatments recommended by physicians that just happen to be compatible with the hot/cold system. Such treatments are more likely to be followed. Penicillin, which is hot, is appreciated as an appropriate treatment for former rheumatic fever patients because that illness is seen as a cold illness (because it affects the joints). Harwood, therefore, suggests that the hot/cold system of beliefs can reinforce treatments recommended by physicians if used creatively in working with the patient. Harwood emphasizes that the most serious implications of the belief system are in infant feeding.

Wilson (1971) makes a similar point in regard to the implications of food beliefs for women and infants in a village of Malay fisherfolk. According to the village beliefs, because many foods can become bisa (poisonous) when you are sick, it is important to restrict one's diet when ill. The illness is often self-diagnosed, and the food restrictions are self-prescribed. As a result, the variety of foods that can be eaten when someone is ill is quite limited. Dietary restrictions also apply to women immediately after they have given birth. For 40 days, the new mother severely restricts her diet, eating only hot foods (boiled rice, hot peppers, coffee, dry or roasted fish), with no fruits or vegetables allowed. As a result, anemia and folic-acid deficiency and low carotene levels may develop.

More recently, Logan (1977) and Foster (1979b) have criticized much of the earlier research on the hot/cold belief system, identifying methodological

problems and theoretical biases. Both of these writers state that previous research has tended to assume cultural homogeneity (in terms of how large groups of people classify specific foods) and that methods used have further contributed to the assumption that food beliefs are unvarying. For one thing, it has been assumed that the answers of one or two key informants are sufficient to illustrate an entire community's classification system. In actuality, however, different individuals will have varying degrees of interest in, and knowledge of such classification systems. Foster also emphasizes the fact that because an informant will sometimes give different answers to the same question, it will be better to question them on several occasions or to double check their answers by repeating a question later in the interview. Logan stresses that more studies are needed that look at behavior as well as the verbal statements (such as observing daily diet when an individual is healthy and ill). These articles seem to reflect the growing sensitivity of anthropologists to intracultural diversity (see Pelto and Pelto 1975). Foster concludes that "it is one thing, however, to recognize intracultural variation and another thing to measure it precisely and analyze its implications" (Foster 1979b:179).

Two other researchers have discussed the relationship of health to food classification systems other than the hot/cold system, in Latin America. Gonzalez (1964), in a study of lower class Ladino migrants to Guatemala City, discusses two major concepts relating to nutrition. Those concepts are a negative value emphasis (foods to avoid) and a positive value emphasis (helpful foods). The first category, foods to avoid, included extremes of hot/cold qualities, "strong" foods (such as meat, lard, and hot peppers), and "indigestible" foods (or heavy foods, such as potatoes and rice). According to the population studied, these foods are harmful for children, infants, sick persons, and pregnant and lactating women. Such persons are considered to be in a "delicate state," with special needs. The second category of foods includes foods that promote growth for children and foods that can be digested by sick people and infants. According to Gonzalez, the concept of growth-promoting foods seems to be the only area in which food is directly and positively related to good health. Guatemalans she studied constantly referred to the healthy child as being big and fat. Foods considered most nourishing included milk, bread, tortillas, noodles, oatmeal and

other gruels, vegetables, black beans, eggs, and sometimes beef. The author noted that she found "tremendous variation" in certain beliefs, but she still felt that there was enough agreement to allow her to generalize about the attitudes of the people interviewed. She also points out that the people interviewed "are rarely able to eat as they would really like" (Gonzalez 1964:1727), so that foods considered nourishing may not be eaten as often as desired.

MacKensie (1976) has also discussed beliefs about foods in terms of impact on health. She cautions that although food beliefs regarding appropriate foods for infants and children may influence health, they are only one element of the total picture in which external conditions such as poverty and poor health services are equally important. She provides examples of beliefs that promote health in one community she studied, such as the importance given to diversity in defining a proper meal. On the other hand, she suggests that the belief in one village that weight loss or the very slow weight gain after weaning is healthy may contribute to high rates of undernutrition in children there, because the expectations of the normal weight is accepted as the healthy weight. Food beliefs, then, to the extent that they may shape expectations and influence behavior, may have a variety of effects on health and nutritional status.

#### FOOD BELIEFS IN THE RESEARCH COMMUNITIES

How do beliefs about foods and systems of food classification relate to our research in Southern Honduras? In the survey instrument, we included questions concerning beliefs about foods in terms of foods that are preferred for various occasions or for use by certain groups of people and about foods in relation to health. We also asked a smaller sample of 13 women to categorize a list of local foods in any way they considered important. In this section, we will describe how women answered these questions.

#### Preferred Foods

Table 5 provides details concerning food preferences of the sample of 68 female household heads who discussed favorite foods, foods that would be

purchased more often if money were available, and foods served on special occasions. When asked "What are your favorite foods?" most women answered beans, rice, meats, eggs, soured cream, and cuajada. A small number of people also listed vegetables (tomatoes, potatoes, squashes), fruits (mangoes, oranges, guavas), soups, and spaghetti. A slightly different group of foods was listed when we asked what people would buy if they had more money. Meat and dairy products were especially high on the list of would-be purchases. Very few people said that they would buy more staple foods -- beans, rice, maize -- none of the informants mentioned sorghum. Fruits mentioned were not locally available fruits but could be purchased in Tegucigalpa (for example, pears, apples, grapes). The vegetables listed could be purchased in Pespire: carrots, radishes, cucumbers. A few people said that they would buy more of everything.

When asked about special foods served to guests, chicken was the food mentioned most often. In fact, 39 women mentioned chicken in some form - either in tamales, soups, or baked or roasted. A common answer was "mata una gallina" (kill a hen). One family asked us to come visit them and did indeed kill a chicken to share with us. Several women answered that they were too poor to serve special foods; but in spite of limited food budgets, most families said that they would serve something different from their normal daily menus. In addition to chicken, other special foods listed that are not served daily in most households were tamales, baked goods (bread or rosquillas), meat, pork, and pasta.

#### Food Preferences of Smaller Sample

In more intensive interviews with 13 of the female household heads, women were asked to classify 95 foods (and other substances such as medicines and herbs) according to some quality that differentiated them. Many of the women used the classification of foods they either liked or disliked. Of these items, 76 were liked by all of the women who rated foods by this classification (9 of the 13 women used this classification). No food was disliked by everyone. The foods that at least one person disliked are listed in Table 6. These foods are used in spite of the fact that some people do not like them, however.

Table 5. Food Preferences (Large Sample\*).

<u>Favorite Foods</u>	<u># of people who listed this food</u>
Beans	44
Rice	42
Meats	31
Eggs	20
Soured Cream	13
Vegetables	12
Cuajada	10
Soups	7
Spaghetti	5
Fruits	4

Foods people would buy if they had more money:

<u>Food</u>	<u># of people who listed this food</u>
Meat	41
Dairy Products	23
Fruits	18
Vegetables	18
Beans	6
Rice	2
Maize	1

Foods listed for special occasions included:  
chicken, tamales, rosquillas, rosquetas,  
pork, noodles, and spaghetti.

\*The large sample consisted of 68 female household heads.

Table 6. Food Preferences (Small Sample\*).

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Foods disliked by at least one woman using this classification:

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<u>Food</u>	<u># of people who listed this food:</u>
Iguana	6
Corn liquor	6
Sorghum tortillas	5
Sorghum porridge	5
Beer	5
Ash (used for cooking grains)	4
Lizard	4
Armadillo	3
Sorghum, in general	2
Black beans	2
Rabbit	2
Sorghum soft drink	1
Boiled water	1
Lime (used for cooking grains)	1
Hot peppers	1
Cinnamon tea	1
Valerian tea	1

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\*Of the 13 women interviewed in the small sample, 9 used the classification of foods liked/disliked.

Penicillin, the teas, and the various sorghum products are disliked because of their flavor, but they are used. Boiled water is considered by some people to be inferior to fresh water in flavor and nutrition because boiling "kills the vitamins." For sanitation, filters are considered preferable to boiling, but it was stated that such filters are hard to obtain. None of the women said that they like liquor or beer, and many made moral judgements about drinking. There is a chapter of Alcoholics Anonymous in Cacautare, and several women said that alcoholism is a problem among men in the community. One informant said that alcoholism is "the worst problem of the poor." Consumption of alcohol seems to be more acceptable for males,

but we did not formally question women about its usage. The wild game (lizards and armadillo) were listed by most of the women as being nutritious in spite of the fact that some expressed a dislike for them. Sorghum tortillas, sorghum drink, and sorghum in general were mentioned among disliked foods in contrast to maize tortillas and maize in general, which were not listed as disliked foods. In talking informally with both males and females in the communities, people often stated that they did not like the taste or appearance of sorghum tortillas; sorghum foods were never listed as favorite foods.

#### Nutritious/Non-nutritious Foods

When we asked women in the survey sample why certain foods were considered good, many answered that those foods were nutritious or nourishing. Nutritious seemed to mean a variety of things, including "strength-giving," "invigorating," and "containing vitamins." During the interviews, informants mentioned a few specific nutrients such as vitamins, protein, calcium, phosphorus, and fat. But these nutrients were not described consistently by different women, and no one said that certain foods contain particular vitamins (merely, that certain foods contained many vitamins and others did not). Fat was never described in a positive way, and foods with a great deal of fat in them were often considered unhealthy. As was mentioned previously, one woman mentioned that she could not eat salt because she has high blood pressure. Several women said that pork is not good for you, and one person said that their religion (Seventh Day Adventists) prohibits eating pork. Another woman commented that foods that are fresh have more vitamins than other foods, and her husband added that maiz nuevo (new maize) loses its vitamins after four days. He said the new maize should be eaten immediately.

#### Nutritional Evaluation of the Smaller Sample

Eleven of the 13 women interviewed used the category of "nutrition" spontaneously as a relevant food classification. Table 7 summarizes the details of the women's evaluation of the nutritional value of particular foods. There was no food for which everyone agreed that the food is "bad for you," but several foods were considered to be lacking in nutritious

value. Sorghum products (tortillas, "popped" sorghum, and sorghum in general) were the foods mentioned most often in this category. Sorghum drink, however, was rated more often as a nutritious food (7 of 11 women using this classification rated it as nutritious). Although maize tortillas were not rated as particularly nutritious, only 2 of the 11 women using this classification rated them as definitely not nutritious. However, gruel made with maize was rated by many of the women (8 out of 11) as nutritious, while sorghum gruel was not valued as a nutritious food. In general, it appears that maize products are viewed more positively in terms of nutritive value than are sorghum products, in addition to being preferred in terms of flavor and appearance. Watermelon, rosquetas, ash, and hot peppers were often listed as not especially nutritious, as well. On the other hand, there were several foods that everyone agreed were nutritious (see Table 7 for more details).

It is apparent that while most women we interviewed do not know which foods provide the best sources of specific nutrients in a scientific sense, they nevertheless have opinions regarding nutritional values of foods. Interestingly, they do not seem to value squashes as nutritious foods. However, they do value red beans and rice. They also value meat, eggs, and milk although those foods may not be as affordable as other foods (see Table 7).

### Hot/Cold Foods

As mentioned above, qualities such as providing nourishment, vigor, and strength are considered important for foods in these communities; on the other hand, green foods were said to be harmful for certain people. The hot/cold classification of foods was often mentioned by women in the survey sample. These categories were never mentioned in terms of cooking or combining foods on an every day basis or in terms of foods that are generally good for you. It was only mentioned in terms of foods that must be avoided or used in certain ways. When talking about preferred foods or foods appropriate for adults and older people, no one mentioned this quality. When discussing foods that should not be eaten by infants or by people who are sick, however, the classification became important and was mentioned often.

Table 7. Nutritive Value as a Food Classification  
(Small Sample)

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Foods Rated as Very Nutritious by All Women\*:

Red Beans	Milk	Oranges
Beef	Honey	Shrimp
Crayfish	Eggs	Papaya
Mother's milk		

Foods Rated as Very or Fairly Nutritious by Many of the Women: (at least 8 of the 11 women)

Rice	Vegetable soup	Canned tomato sauce
Avocado	Wheat flour	Chicken
Mangos	Tomatoes	Lizard
Oatmeal	Pineapple	Carrots
Custard apples	Potatoes	Bouillon cubes

Foods rated as Very or Fairly Nutritious by Some of the Women: (at least 6 of the 11 women)

Black beans	Sesame products	Armadillo
Sorghum	Sweet potatoes	
soft drink		

Foods Rated with Mixed Reaction:

Bread	Fresh corn
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Foods Considered Not Nutritious By At Least Half of the Sample:

Sorghum tortillas	Watermelon	Hot pepper
Sorghum, in general	Rosquillas	Ash
Popped sorghum	Rosquetas	Coca-cola
Sorghum porridge	Sugar	Tamales
Vegetable shortening	Squashes	

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\*Eleven women used this classification.

For infants, the hot/cold qualities of foods seem relevant because the digestive systems of infants are considered relatively delicate or unstable. Apparently it is also important for people who are sick to avoid certain foods (and activities) that may prevent them from reaching a healthy, balanced physical condition.

Answers to direct questions concerning the hot/cold classification system were contradictory to some extent and exhibit the variability in classification reported by other researchers in other regions of Latin America. However, at the same time the distinction seems to be an important one for many of the women even though they may classify particular foods differently. For example, it was said that both cold foods and hot foods cause diarrhea in infants. Cold foods, such as fish and green beans, were said to cause pain and diarrhea; hot foods, such as red beans, hurt the stomach because they cannot be digested, and they cause diarrhea as well. They may also cause fever. The pragmatic way in which belief systems influence behavior is exemplified by the response of a woman who noted that "it is better for infants to eat these foods than to go hungry." When asked about foods appropriate for sick people, one informant said that vitamins and iron are hot, and thus are harmful when a person is sick. Beans and meat are often described in similar ways - they are both hot, they can cause diarrhea, and they are harmful when one is sick. Several women said that when one has the flu, cold foods are harmful because the flu is cold. This statement implies that the quality of the illness needs to be balanced by the opposite, rather than the same, quality in foods. Others said that when you have fever, bathing is harmful for you because fever is a hot condition and bathing is cold. Similarly, chicken and chicken soup (which are cold) are harmful if you have fever. These answers suggest that extreme opposites should also be avoided. Other women stated that if you have fever, meat (which is hot) may be harmful because it can make a fever worse. These answers seem to suggest that extremes of either type are harmful when one is sick, and, at the same time, that because illnesses themselves are hot or cold, they may require different responses in terms of eating cold or hot or neutral foods.

Evaluation of Hot/Cold Qualities by the Smaller Sample

In the food classification interviews, 12 of the 13 women interviewed rated the list of foods in terms of the hot/cold dichotomy. (One woman stated that she didn't believe in such a classification - that all foods are neutral.)

Table 8. Hot/Cold Classification of Foods (Small Sample).

<u>Foods Listed as Hot by</u> <u>All Women*</u>	<u>Foods Listed as Cold by</u> <u>All Women</u>
Lizard	Pineapple      Sesame
Penicillin	Lemonade      Banana (minimo)
Hot peppers	Watermelon    Sugar cane
	Oranges        Papaya
	Oatmeal
	Sorghum soft drink

Foods Usually Rated as Hot (by at least 8 women):

Coffee with sugar	Cinnamon tea
Armadillo	Lemon grass
Valerian tea	Aspirin
Pork	Iguana
Beef	Ash
Manzanilla	

Foods Usually Rated as Cold (by at least 8 women):

Coconut	Guanabana	Cashew nut
Tomato sauce	Mango	Plums
Carrots	Manioc	Lettuce
Sorghum, in general	Sorghum porridge	Avocado
Tomato	Cuajada	Maize porridge
Salt	Sweet peppers	Banana (guineo)
Soured cream	Crayfish	Sugar
Honey	Sorghum tortillas	Green beans
Guava	Custard apple	Water
Boiled water	Coca-cola	

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\*Twelve of the 13 women in the small sample used the hot/cold system to classify foods.

As expected, there was a great deal of variation in answers. There was complete agreement by all 12 informants for only 13 of 95 items. Table 8 presents the details of how these women rated foods in terms of the hot/cold classification. There were 29 foods usually agreed on as cold (by at least 8 out of the 12 women using this category), including most fruits, some vegetables, sorghum, crayfish, gruels, boiled and unboiled water, sugar, salt, and soured cream. There were 11 foods usually classified as hot (at least 8 out of 12 women using this category agreed), especially meats, medicines, and wild game. For 53 out of 95 items listed, then, at least 8 out of 12 women agreed on the classification (see Table 8).

Foods about which women most often disagreed included maize tortillas, milk, vegetable soup, onions, rosquetas, wheat flour, liquor (made from maize), and maize in general. For maize, for example, the classifications were as follows: five women reported it as hot; four as cold; two as neutral; and one said that she didn't know. Because we did not indicate on the cards used for putting the foods in different categories whether the foods listed were raw, cooked, fresh, or otherwise, the lack of context may have influenced the answers. Different informants may have been thinking of foods in different states. Or it may be that staple foods are used in a greater variety of ways and may seem more ambiguous in terms of such a classification system than are rarely used foods. From our interviews with the larger sample, it seems clear that women think of the hot/cold dichotomy more in terms of how it relates to illness rather than perceiving it as an unchanging classification of particular foods. As a result, it appears that the way an individual classifies a particular food may not affect their usual consumption of that food, but when someone in the family is ill, such a classification may become more relevant for food consumption.

Many of the women commented, for example, that since infections are hot in nature, and so is penicillin, one must drink a certain amount of milk (which these women consider cold) while taking the medicine in order to balance out the effects of treating a hot condition with a hot substance. The milk will prevent the penicillin from "killing the red corpuscles in the blood." One informant stated that sorghum drink, which is cold, is good for people who have measles (a hot condition). Although the women

interviewed classify many of the foods in different ways, the hot/cold classification seems to have some influence on food choices for infants and for sick persons. Although we did not note it in this community several informants in another nearby community noted that because sorghum is colder than maize, nursing women should avoid sorghum tortillas. The belief was expressed that the colder sorghum tortillas would cause the nursing child to have diarrhea. We noted in that community that two lactating women were preparing sorghum tortillas for their families and a small amount of maize tortillas for themselves because of this belief.

### Appropriateness of Foods

Women in the survey sample were also asked about foods seen as best (or potentially harmful) for particular groups of people such as adults, old people, sick people, infants, and young children. The biggest differences in foods considered appropriate were in foods good for adults in contrast to those good for non-adults. Table 9 summarizes the details of how the women evaluated foods in terms of appropriateness for different age groups.

### Foods Appropriate for Adults

The list of foods good for adults is quite extensive and many people answered that "all foods" are good for adults. Most often listed were meats (especially beef, but also pork, chicken, fish, game - meats were listed by 32 women), soup, vegetables, and milk. Beans and rice were mentioned by fewer than 20% of the respondents. Fruits, eggs, and tortillas were rarely mentioned; maize, sorghum and gruels made from them were never mentioned (see Table 9). The most common reasons for eating the foods listed were that they strengthen the blood (especially soup, vegetables, meat), and provide energy and vigor for the body to work: "fortalecen mejor" (they fortify better) and "sostenen" (they sustain). Milk, meat, and vegetables are the foods for which these explanations were given. One person said that meat, cheese, and cuajada are healthy because they do not contain fat. Others indicated that the best foods are those that are "filling and cheap."

Table 9. Foods Appropriate for Different Age Groups (Large Sample\*).

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Foods Appropriate for Adults:

Food:	# of people listing it:
Soup	33
Meats	32
Vegetables	32
Milk	25
Rice	14
Beans	11
Eggs	6
Fruits	4
Tortillas	2

Foods Appropriate for Infants:

Food:	# of people listing it:
Milk	47
Eggs	37
Vegetables	21
Soups	13
Rice	13
Fruits	13
Meats	4

Foods Appropriate for Children:

Food:	# of people listing it:
Milk	41
Eggs	32
Soups	31
Vegetables	27
Fruit & Juices	17
Meats	15
Rice	13
Beans	5
Tortillas	1

Foods Appropriate for Older People:

Food:	# of people listing it:
Soups	42
Milk	31
Vegetables	19
Gruels	15
Eggs	18
Beans	6
Rice	4
Wild Game	3

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\*The large sample consisted of 68 female household heads.

### Foods Appropriate for Infants

For infants, most people said that milk (breast milk; cows milk; boiled, canned or unspecified milk) is the best food. Eggs were mentioned often, as well as vegetables - especially potatoes and tomatoes - soups, rice, and fruits. Green vegetables and fruits were not included. Meats were rarely listed (see Table 9). The most common reasons for using these foods are that they are nourishing and that they have vitamins. Other reasons are that they help growth, are easy to digest, and will fatten up the baby.

### Foods Appropriate for Children

These foods were, again, milk, eggs, soups, and vegetables. Less often mentioned were fruit and fruit juices, meats and rice. Beans were rarely mentioned and only one person listed tortillas (see Table 9). Reasons were the same as those given for foods appropriate for infants, with the addition of "not causing diarrhea" as an important quality.

### Foods Appropriate for Older People

For elderly people, soups and milk were most often listed, but vegetables, gruels, and eggs were also listed. Four persons listed rice, six listed beans, and none said tortillas (see Table 9). One person specified that old people should only eat meat at the midday meal. Meats were usually listed in the form of soups (18 out of the 42 people who listed soups indicated that those with meat were best). Older people were the only group for which wild game was specifically recommended: rabbit, lizard, and armadillo were recommended because they provide vigor and strength needed by elderly persons. Most of the reasons for recommending foods involved ease of digestion (suave or bland foods, for example, were recommended by 30% of the informants) and for their nourishing quality (30% of the informants listed this as a reason). A few people said that ease of chewing was also an important factor.

### Foods Appropriate for Sick People

The women interviewed also indicated beliefs regarding the appropriateness of foods for other groups of people such as sick people and nursing mothers, as well as foods considered harmful for certain people. Table 10 presents the details of these beliefs. The foods considered especially appropriate for sick people include soups, vegetables - especially cabbage and potatoes - fruit and fruit juices, and milk. Less often mentioned were eggs, beef, and gruels made with sorghum or maize. Again, rice and beans were rarely mentioned, and no one listed tortillas as particularly good for sick people (see Table 10). The most frequently given reasons for eating these foods were to provide general strength and nourishment and to provide vitamins. Other reasons were to help recovery, to avoid harm (especially to avoid hurting the stomach), and to strengthen the blood.

### Foods Considered Harmful

As indicated above, we also asked which foods are harmful for certain groups of people or under certain conditions (see Table 10 for details). Many people said that for infants, green foods are bad because after eating them the infants defecate green feces and have diarrhea, and also because such foods are said to produce mucle (mucous). The offending foods include avocados, cabbage, green fruits, immature squash, and green beans. Many people referred to the hot/cold qualities of foods in this context. Some said that cold foods cause pain and diarrhea; others said that hot foods (15 women listed red beans in this context) hurt the stomach and cannot be digested. A few people mentioned that meat is fuerte (too strong) and cannot be digested by infants. Similarly, a few said that cow's milk is fuerte and gives diarrhea, particularly if the infant is already sick. Other harmful foods are beans, onions, elotes (maize in the green stage), coconut, watermelon, cuajada, soured cream and bananas. About 20% of the women said that no foods are harmful for infants, although, as several informants added, "people used to say so," or "old people say so." These individuals seemed to agree with other informants regarding which foods were supposed to be harmful for infants, but they did not accept these restrictions.

Table 10. Appropriateness of Foods for Other Groups (Large Sample\*).

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Foods Appropriate for Sick People:

Food:	# of people listing it:
Soups	48
Vegetables	39
Fruit	30
Fruit juices	25
Milk	26
Eggs	13
Beef	12
Gruels	11
Rice	6
Beans	2

Foods Appropriate for Nursing Mothers:

Food:	# of people listing it:
Soups	40
Milk	40
Natural drinks	24
Vegetables	16
Eggs	11

Foods Considered Harmful for Infants:

Food:	# of people listing it:
Green foods	32
avocado	12
cabbage	7
green fruits	2
immature squash	5
green beans	6
Red beans	15
Meat	7
Cow's milk	5

Foods Considered Harmful for Sick People:

Food:	# of people listing it:
Beans	26
Meat	23
Grease	7
Hot peppers	5
Spices	5
Pork	4

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\*The large sample consisted of 68 female household heads.

Another topic discussed was foods considered harmful for sick people. Beans and meat were listed most often, with grease, hot peppers and spices, and pork also mentioned. Thirteen percent of the women interviewed said that no foods were harmful for sick people, and four others said that it depends on the illness. The most common reasons people gave for avoiding certain foods involved ideas about the hot/cold ideology and the statement that "the doctor says so." Beans and meat were often listed together as harmful for sick people; it is said that they can cause diarrhea, nausea, or congestion in the stomach. Another reason given for avoiding these foods is that they could be greasy.

#### Beliefs About Medicinal Foods

About one third of the families interviewed mentioned using herbs to treat common illnesses (23 individuals). The illnesses most often mentioned in association with herbal treatments are gripe (flu), diarrhea, measles, and fever. Other illnesses mentioned less often are bronchitis, coughs, and polio. One person discussed using food remedies other than herbs (potato plaster for mumps, and Coca Cola for nausea). The most commonly used herbs during the period of our interviewing were anise and teas made from lemon and orange leaves for gripe (flu) and flor de recera for coughs.

For treating many conditions, for example, an individual might use pills as well as herbs, finally going to the health center or prescription medicine if the case becomes more serious. Although there are probably variations in levels of knowledge about herbs and their uses, it is likely that the number of women reporting that they use herbal treatments is an under-estimation. The fact that we asked about herbs in the context of food-gathering rather than in the context of treating illnesses may have been partly responsible for most of the women saying that they do not gather herbs. Or the fact that they do not themselves gather herbs may not mean that they do not use herbs - they may obtain herbs from other women in the village. Except for lemons, which were mixed with water as a drink and taken with meals as well as used in hot tea for illness, the other plants and herbs were often classified by women as medicines rather than as foods. Finally, we learned the names of the herbs used locally

fairly late in the research process and did not use the names as probes during the earlier interviews. Nevertheless, several women brought up the use of herbs and most seemed to recognize their names when we asked about specific herbs.

### Infant Feeding: Beliefs and Practices

The following information concerns beliefs and practices of infant feeding in the villages studied. When asked, "What is the best age at which to introduce solid foods?" our informants' answers varied. The range was from 2 months of age to 18 months old. Almost 60% of the women in the larger sample said 3 to 6 months, while about 35% said 7 to 12 months. Eggs, rice, soup, tortillas, potatoes, and certain fruits were considered the best foods for this purpose because they are bland and smooth and therefore are easy to chew and digest.

Of the 19 women with infants under the age of one year, 89% were nursing, and 42% were using bottle feeding. Only two women were using bottle feeding exclusively. Some of the nursing infants, then, were also receiving bottle supplements, and many were eating some solid food as well. Of the eight one-year-old babies in our sample, two were nursing and receiving bottle supplements. Most of the babies who were not nursing had been weaned because the mother became pregnant or sick. Of the 14 two-year-olds, none were nursing. The primary reason for weaning was that the children themselves were ready to stop nursing. Two had been weaned because the mother had become pregnant, and one was weaned because the doctor told the mother that the child would get nose bleeds if it continued to nurse. Of these two-year-olds, two were receiving bottle supplements. A few women said that they would use bottle feeding for infants if they could afford to do so.

Foods considered best for nursing mothers were soups and milk. Natural drinks (frescos) made of maize, sesame, rice, oatmeal, sorghum, or moro were often listed, as well as vegetables and eggs (see Table 10 for details). These foods were said to increase the quantity and quality of the mother's milk and provide nourishment for both mother and infant.

## Conclusions

Although maize provides the greatest proportion of energy in most families' diets (see Chapter V), it is not described as a highly nutritious food. The women in the small sample do not include tortillas in the category of nutritious foods, and they describe gruels as not particularly nutritious (although in our larger sample women state that gruels are good for particular groups of people -i.e., nursing women and sick people). Beans and rice are considered more nutritious than other grains in our small sample, but in the large sample they are rarely mentioned as being especially good for people. These beliefs seem to be less important than food availability (in terms of influencing food consumption), yet they may affect how people perceive themselves and how they may perceive efforts to encourage them to change their dietary patterns. Although people in the area seem to be proud of their Mayan heritage, for example, they do not seem to value the dietary combination of maize, beans, and squash as a part of that heritage. Nor do they seem to interpret maize as a "superfood," although it is eaten by all families and is the mainstay of the diet for many families.

On the other hand, we did not find evidence of severely restrictive "cultural blocks" (Jelliffe 1967) that limit the general diet. These findings differ somewhat from the results of an INCAP study conducted during 1965-67, which outlined the food groups considered nutritious for particular groups of people by Honduran women (U.S. Agency for International Development 1979:89). Table 11-a describes percentages of Honduran women interviewed who believed that the foods indicated are nutritious for specific groups of people.

Basing their conclusion on this data, AID has stated that "Nutrition education knowledge appears to be minimal in rural Honduran families. Few women expressed any knowledge of the appropriate foods for population groups vulnerable to malnutrition as a result of poor nutrition practices" (U.S. Agency for International Development 1979:91). According to their evaluation, programs of nutritional education for rural Honduran women would be a recommended strategy for improvement in family nutrition.

Table 11a. National Survey of Beliefs of Rural Honduran Women About the Nutritive Value of Food Groups for Particular Groups of People.

Groups of People For Whom Foods Are Rated	The Percentage of Women Who Rated Food Groups as Having Nutritive Value						
	% Milk Products	% Eggs, Meat	% Vege- tables	% Fruit	% Cereals	% Other Foods	% No Belief
Children under 2 years	29	4	6	5	6	-	30
Children 2-5 years	23	6	6	5	3	-	57
Pregnant women	15	8	3	4	2	-	68
Lactating women	13	11	4	1	5	-	66

Table 11b. Beliefs of Women in the Municipio of Pespire About Food Groups That Are "Good for" Certain Groups of People.

Groups of People For Whom Foods Are Rated	The Percentage of Women Who Rated Food Groups as Being Good for Different People									
	% Milk	% Eggs	% Meat	% Veg.	% Fruit	% Rice	% Tortillas	% Gruels	% Beans	% Soup
Infants	69	54	6	31	19	19	1	13	0	19
Children	60	47	22	40	25	19	0	0	7	46
Lactating women	59	16	0	24	0	0	0	35	0	59
Sick people	38	19	18	57	81	9	0	16	3	71
Old people	46	26	26	28	0	6	0	22	9	62

Table 11b presents percentages of women in our sample of 68 households who believed that certain food groups are good for the groups indicated. Although some of the opinions indicated may be problematic (such as the lack of confidence expressed in the value of gruels for children and the low percentages of answers regarding beans as a particularly good food), it seems that women in our sample are more aware of the potential benefits of various food groups than were those in the earlier sample. In addition, the percentages in our study may be an underrepresentation, because we asked open-ended questions rather than multiple-choice questions. The number of women who appreciate the value of eggs and milk is notably higher than in the earlier study. The earlier study did not provide data on opinions about soups, but our sample rated soups as very good for people, especially for sick people.

A sizeable number of female household heads indicate that they do not restrict the diets of infants or sick people because of beliefs about harmful foods. Of the rest of the women (the majority), who say that there are foods that should be avoided, their greatest concerns are with foods that cause or aggravate diarrhea (such as green foods, for example) in children, especially when the child is already sick. Such concern seems very realistic and practical in light of current understandings of the interaction of nutrition and infection (Latham 1975).

As noted above, the qualities of "hot" and "cold" seem most relevant for food consumption when someone in the family is ill or for choosing foods for infants and children. As Logan (1972), Wilson (1971), Harwood (1971), and Gonzalez (1964) have suggested, it seems possible that this belief system may restrict the foods eaten, however, the humoral system also provides a precedent for thinking of foods as directly related to health and recovery from illness. Dietary recommendations that are not incompatible with this system may be more readily accepted, assuming the recommended foods are available and affordable. The women in our sample have definite opinions about combining certain foods with medications and about the relationship of foods to particular illnesses (such as diarrhea). These opinions seem to be especially relevant for making choices about diet that may influence health. Although the women interviewed disagreed with each other about the way many foods are classified, the hot/cold dichotomy is

still meaningful for many of them, and they continue to incorporate newly introduced foods and substances (Coca-Cola and penicillin, for example) into the system. The concerns of these women seem to support the idea that beliefs about foods may affect infant feeding in particular, but such beliefs are not universally accepted in the community.

The concept of "variety" was never mentioned as a reason for using certain foods, in contrast to MacKensie's (1976) findings for the villages she studied. Some people in our sample said that they do not know why particular foods are good for people, but many seemed to have expectations concerning our beliefs and values. For example, one man who listened to the interview with his wife said "We don't know the scientific reason why these foods are good, but we have observed that they help." Another informant hesitated when we asked her why certain foods are good, and she said in apparent surprise, "You know why."

The women in our research communities systematically evaluated food in terms of a number of categories: nutrition, ease of digestion, heaviness, harmfulness, hot/cold qualities, and flavor. The foods considered most health-promoting by the women we interviewed are not inconsistent with evaluations of nutritionists, with the exception of their lack of appreciation of the value of staple foods already in their diet. Their high regard for vitamins may be related to the influence of the "radio schools" in the past. [The radio schools consisted of taped classes, prepared by teachers and campesino leaders, and supported by the Catholic Church (White 1972). They were broadcast from the early 1960s through much of the 1970s.] Several women mentioned that their beliefs differ from what people "used to say" and from what "old people say." For women in the community, the average education is about three years of grade school, but other sources of information about diet have included extension classes through the housewives' clubs and the radio schools. White (1972) has suggested that housewives' clubs provided the necessary social context and structure for encouraging women to put newly acquired knowledge into effect. When radio school participants in agricultural classes (male) and health classes (female) were compared, the women were found to use recommended practices more often than did the men, although both groups had mastered new information. White concludes that one of the major reasons for

the difference was the presence of the clubs to which many of the women participating in the radio classes belonged (White 1972). The current influence of these clubs may have contributed to the greater number of women in our sample who appreciated the nutritional values of various food groups (when compared to the 1965-67 INCAP study results).

The women at one of the Amas de Hogar meetings we attended in Pespire expressed interest in learning more about nutrition. Thus, women in Southern Honduras may be fairly receptive to nutrition education, and women in rural areas seem to have acquired some general notions of the nutritious values of foods. But the changing emphasis within applied anthropology on nutrition education and changing local beliefs about health raises ethical questions - these questions have been discussed by K.M. DeWalt and Pelto (1977), MacKensie (1976), and Bonfil Batalla (1966). DeWalt and Pelto describe the changing perspectives in applied anthropological theory regarding causes of malnutrition. They point out a shift from the post-war emphasis on the role of local beliefs about health and nutrition to an increasing emphasis on economic, political, and social conditions underlying the existence of malnutrition. Their findings in the community in Mexico suggested that nutrition education would not be sufficient to change eating habits because, in general, the people were not eating more of the foods they considered nutritious. General economic well-being, household composition, and exposure to urban ideas were the most influential variables on food consumption (K.M. DeWalt and Pelto 1977).

MacKensie warned that analysis of health beliefs of villagers in developing countries, by focusing on the individual's responsibility for health, may "indirectly take the pressure of criticism off poor health services by putting the blame on the customs of the people instead" (Mackensie 1976:19). Bonfil Batalla stated that while studies of health beliefs (including ideas about nutrition) may be valuable, such studies focus on "the psychological manifestations of a problem" rather than the causes. He concluded that "the solutions that might be proposed with the above-mentioned study emphasis will not produce the improvement of life conditions, because they do not suggest any alterations in the structures that have determined their existence" (Bonfil Batalla 1966:90).

## CHAPTER IV: FOOD CONSUMPTION

In this chapter we will discuss food consumption in the communities studied, looking at the foods used, their contribution to the diet, and nutritional adequacy of dietary patterns. To begin we will describe diet in terms of which of the available foods are most commonly eaten and how they are prepared and then discuss the extent of dietary diversity in the communities. The contribution of particular food groups to the diet will be analyzed and dietary adequacy in meeting the families' energy and protein requirements will be presented. Finally we will discuss variables that interact with food use and the dietary patterns that result.

The data presented here are based on the market basket survey of foods used by each household during a one-week period, the 24-hour recall of foods eaten by each family during one day, and participant observation as described in Chapter I. In order to measure quantity of energy in kcal. and grams of protein, a program for computer analysis was prepared that, based on nutritional composition tables (INCAP 1961; Pennington 1976; Bowes and Church 1970; USDA 1975), analyzed amounts of foods eaten for energy and protein. Intake was then compared with energy/protein need. Need was determined by using standards for protein/energy requirements (WHO) adjusted for protein quality and for activity level, in combination with INCAP's estimates (1969) of body weight for the age/sex categories of the members of each household. Quantities of foods in certain food groups were also compared with total intake and need. Dietary diversity was measured by counting the total number of different foods eaten by a family during the week.

Error in calculating energy/protein intake will tend to be an underestimation (1) because consumption of some foods was probably underreported (fruits and snacks in particular), and (2) because reporting of certain foods was inconsistent, making it impossible to convert them into kcal. and grams in order to include in the intake calculations. However, these errors apply to all households so the relative level of intakes is accurate and useful for analysis.

## General Dietary Patterns

All of the families surveyed reported eating three meals a day, and some households have snacks before breakfast or before bedtime (for example, coffee with milk and sugar and soft wheat rolls are frequently consumed before a more substantial morning meal).

Maize or sorghum tortillas are served with every meal, except for one or two households in which flour tortillas are occasionally served. Maize tortillas were used exclusively in 48% of households and sorghum tortillas in 34% of the households; mixed-grain tortillas were used in 18% of the families. Thus, in a survey of tortilla consumption during a week in July or early August, maize was used in 66% of households, and sorghum was eaten in 51% of the households. Most women say that they prefer the taste of maize and that eating maize gives them a more satisfactory sensation of having a full stomach. A common formula cited is that it takes four sorghum tortillas to feel as full as three maize tortillas.

Sorghum, in addition to being less acceptable in terms of taste, also has the disadvantage of yielding "ugly, dark-colored tortillas." However, most persons interviewed stated that they eat sorghum when they do not have maize. It takes longer to remove the pericarp from maize than from sorghum, but the other preparations take about equal amounts of time in using the two grains.

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Table 12. Average Number of Months in Which Grains Are Used

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	<u>Owners</u>	<u>Renters</u>	<u>Others</u>
Maize	9.1	6.9	6.8
Sorghum	3.3	4.8	6.8
Mixed	1.8	2.2	3.6

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Only 20% of the families use maize exclusively throughout the entire year. Late July, in particular, is a transitional time when many families use sorghum because they are just running out of maize, but they do not purchase more because their new crop is about to mature for harvest. Table 12 indicates that of those households using sorghum, families of non-cultivators use it during more months of the year than do renters or land owners. Apparently those who own enough land to raise maize for home consumption keep their maize harvest and sell the sorghum harvest. One farmer in Cacautare stated that the poorer farmers sell their maize because they can get a better price for it, and then they eat the sorghum they grow. Households headed by single women are more likely to use sorghum exclusively than to use maize (75% reflected this pattern).

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Table 13. Foods Most Often Used During June and July 1981.

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<u>Food</u>	<u>% of families using</u>	<u>Food</u>	<u>% of families using</u>
Maize	66%	Eggs	65%
Sorghum	51	Spices	65
Coffee	95	Cuajada	62
Sugar	97	Annato	60
Beans	95	Potatoes	59
Rice	91	Cabbage	56
Vegetable shortening	87	Milk	56
Salt	84	Lime	56
Tomatoes	76	Wheat rolls	55
Onions	69	Ayote	55
Green corn	68	Noodles	50

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Table 14. Foods Used Less Often During June and July 1981.

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<u>Food</u>	<u>% of families using</u>	<u>Food</u>	<u>% of families using</u>
Nance	37%	Flour	22%
Tamales	41	Rosquillas	22
Bouillion	30	Bananas	19
		(minimos)	
Beef	31	Bananas	16
		(others)	
Fish	25	Avocado	15
Sour cream	24	Plantain	12
Pork	11	Manioc	12
Vegetable oil	9	Chayote	7
Rosquetas	1	Coconut	6

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Table 13 lists the most commonly used foods during June and July. Either maize or sorghum (or both) are used in every household. The next most commonly used food is sugar (97%). It is used for cooking, for baking pastries and confections, in making beverages such as lemonade, and especially for sweetening coffee. Coffee is another food served regularly (95%). It is always served with sugar and preferably served with milk as well. Rice and beans are also used by almost every household. Vegetable shortening is the most common fat used for cooking vegetables or frying meat or beans and is used by 87% of the families. Other foods used by many families include salt, tomatoes, onions, elotes, eggs, cuajada, milk, cabbage, potatoes, bread (soft wheat rolls), ayote, and noodles (see Table 13).

Table 14 lists foods used less often (fewer than 50% of the families reported using them). These foods included: beef, fish, chicken, and pork; vegetables and soured cream; rosquillas and rosquetas and wheat flour. Rarely used foods include fruits such as pineapple, miniature bananas, bananas, plantain, and vegetables such as chayote and sweet manioc (see Table 14). It is quite likely, however, that use of fruits is under-reported. Often people would say that their family didn't eat a particular fruit -- then during the interview we might notice a child enter the house

munching away on that very fruit. As noted earlier, though, because many of the fruits and vegetables grown locally are vulnerable to variation in rainfall, the small numbers for their use may reflect the failure of the crop in 1981.

As indicated in Table 14, tamales were eaten by 41% of the families interviewed during a week in June or July and 22% ate rosquillas. Other foods, such as rosquetas, pan de harina (wheat bread), quesadillas, tamales pisques, sopa de capirotades de masa, and bean soup, were eaten less often and may be served only on special occasions, with the exception of bean soup that is eaten fairly often. The interested reader may refer to Appendix I for descriptions of the ingredients and preparation of these foods.

### Dietary Diversity

The number of different foods eaten during one week per family ranged from 6 to 34 of the foods listed in the market basket survey, with a mean of 20. The number of different foods eaten during one day per family ranged from 3 to 18 foods, with a mean of 8. Because dietary diversity has been linked to dietary adequacy (Sanjur, Cravioto and van Veen 1970; Chassy, van Veen and Young 1967), it is one of the variables considered in relation to the degree to which families meet their energy and protein needs. It was also analyzed for correlation with socioeconomic status. Results of analysis of the interaction of dietary diversity with other variables will be discussed later in this chapter. However, it is important to note that in general the diet of families in Southern Honduras is quite complex; foods such as rice, beans, tortillas, and coffee are served in almost all households two to three times a day, but in most cases they only form part of the meal (see Table 15 for range of scores for dietary diversity). A wide variety of other foods are also eaten.

### Daily Food Consumption

In a 24-hour recall of foods eaten, 84% of the households ate eggs, dairy products, or meat/fish. Only 11 households reported that they did not consume any of these foods. Most of these families (8 out of the 11) used bread, squash, green beans and/or tomatoes along

with the dietary core of rice, beans, tortillas, and coffee. These families are quite heterogenous: of the 11 households, six used sorghum tortillas exclusively, three ate maize tortillas exclusively, and two ate mixed tortillas. Over half are exceeding their family's energy needs (see case study #3 for an example); and all except one (see case study #7) are meeting their protein needs. In four of these households, the children under five years of age receive milk (usually from the Amas de Casa food distribution program for children) even though dairy products were not served at home. In two of the households, the children do not drink milk.

Twenty-four households reported that they send their children to the Amas de Casa feeding center for a daily meal of one glass of milk; one frita de harina (a pastry made with wheat flour, eggs, sugar); and one bowl of rice with milk and cinnamon. According to the 24-hour recall, the vegetables most frequently eaten were potatoes, ayote-squash, and tomatoes. Vegetables were used with rice, or in soups or fried and served with tortillas. Several households reported eating ensalada: salad made of chopped cabbage and tomato with lemon juice. Rice was served with vegetables such as tomato, potato and cabbage and seasoned with cumin, black pepper and vinegar. Soups included sweet pepper, banana, chicken bouillon cubes and spices (with variations of ayote or cabbage instead of bananas). Other vegetables eaten were hot peppers, onion, plantains, and frijoles tiernos (green beans). Of the families that included either meat/fish, eggs, or dairy products in their diet, 16 ate meat and/or fish, 37 ate eggs, and 29 ate dairy products (see Table 16). Only six families (9%) used eggs, dairy products, and meat/fish all in one day.

Fruits were used relatively rarely: lemons were most common (5 families drank fresh-squeezed lemonade), but miniature bananas, canned fruit juices, custard apples and nances were also mentioned. Fruits seem to be eaten most often as snacks rather than as part of the meal.

#### Dietary Patterns and Dietary Adequacy

No one dietary pattern was associated in a simple way with whether or not families met their energy needs. In other words, families that used meat and eggs

were not necessarily closer to satisfying energy needs than families relying exclusively on grain foods for energy, although protein levels differ with different foods eaten. Families satisfy their energy needs in different ways. These different ways of meeting dietary needs will be discussed in detail in the section in this chapter called "Case Studies." First, however, we will discuss broad dietary patterns in terms of: (1) food groups and their contribution to the diet, (2) the range of overall energy/protein adequacy, and (3) variables influencing these dietary patterns. Then, we will present specific case studies and describe how they illustrate the dietary patterns of the sample as a whole.

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Table 15. Dietary Diversity.

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<u>Weekly Score</u>	<u>Cumulative Freq.</u>	<u>%</u>	<u>Daily Scores</u>	<u>Cumulative Freq.</u>	<u>% households</u>
6-14	15	22%	3-5	14	21%
13-15	32	47%	6-7	35	53%
19-23	50	74%	8-9	50	76%
24-34	68	100%	10-12	66*	100%

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\* Missing data for two cases.

Table 16. General Dietary Pattern (24-hour Recall).

<u>Food Group Used</u>	<u>% of Households</u>	<u>Meat/Fish: % households</u>
		Beef 4 Pork 0
		Chicken 4 Chacalines 5
		Sardines 5 Camarones 1
Beans	84%	
Tortillas	100%	
Vegetables	43%	
Fruits	12%	
Meat/Fish	26%	
Eggs	54%	
Dairy Products	43%	
		<u>Dairy Products: # households</u>
		cuajada 22
		cheese 3

Relative Contribution of Food Groups to Dietary Intake

In 1969, INCAP described the national dietary patterns in rural areas of Honduras (although Southern Honduras was not well represented in this survey's coverage). Table 17 presents the proportion of total energy and protein intake represented by various food groups. It is noteworthy that grains contributed 50% of energy and 39% of protein intake. Foods of animal origin (dairy products, eggs, and meat) provided 13% of energy and 32% of protein intake. Other foods, such as vegetables, fruits, and sugar, contributed smaller proportions of energy and protein in the diet.

In the sample described here, an even greater proportion of energy and protein intake was provided by grains: 75% of energy and 64% of protein intake. Animal products (dairy products, eggs, and meat) represent a smaller dietary contribution in this study, providing only 5% of energy and 14% of protein intake. The dietary contribution of vegetables, fruits, and sugar in this sample was very similar to the results of the national survey, but beans made a smaller contribution. Here, beans provided only 1% of energy and 17% of protein to the diet (see Table 17).

Comparison of Dietary Patterns in the Three Communities

In comparing diet in the different communities, the patterns of consumption were basically similar with

the exception of use of vegetables and dairy products. In Cacautare and Corinto, dairy products contributed 10% of protein intake in contrast to 6% in Naranjito. In Naranjito vegetables contributed 5% of energy but only 2% of energy in Cacautare and Corinto. Otherwise, patterns were quite similar for the villages in terms of the food groups.

In the use of specific foods, the main differences between the diets of households in the different villages were in the use of grains and fish. In Naranjito there is a higher frequency of families who report using fish regularly than in Cacautare or Corinto. In Naranjito, 24% more of the households use maize and 21% fewer use sorghum than in Cacautare and Corinto. Although the chickens in Naranjito survived the disease that killed most of the poultry in Cacautare and Corinto, households in all the villages used only small amounts of eggs and chicken in their diet. Similarly, dairy products and beans represented a small part of the diet in all the villages (see Table 17).

Analysis of the relationship between the use of particular foods and the degree to which energy and protein needs are met or exceeded by each household (see Table 18) shows that the use of grains and the use of dairy products are highly correlated with meeting energy needs in all three villages. In Cacautare and Corinto, use of maize, beans, and rice is related to meeting nutrient needs, but for Naranjito the relationship is not as strong (with the exception of beans). Unlike maize, sorghum use is not significantly related to the degree of nutrient needs met in any of the villages. Only in Naranjito is dietary diversity related to meeting nutrient needs - protein needs in particular. As will be discussed in the next section of this chapter, a larger number of households in Naranjito are greatly exceeding their protein needs than in the other villages. This, and the relationship with dietary diversity, may be due to the influence of the COHAAT food-for-work program. This program provides staple foods in payment for labor. More cash is therefore available for buying non-staple foods (such as meat and dairy products) than for households in Cacautare and Corinto. Although the same number of different foods may be eaten by households in all the villages, it appears that the households in Naranjito are consuming more non-staple, protein-rich foods than in the other villages.

Table 17. Percentage Contribution of Food Groups to Diet in Honduras.

<u>RURAL AREA *</u>	<u>Energy</u>	<u>Protein</u>	<u>OUR SAMPLE</u>	<u>Energy</u>	<u>Protein</u>
Dairy Products	7%	13%	Dairy Products	3%	9%
Eggs	1	3	Eggs	1	2
Meat	5	16	Meat	1	3
Beans	11	23	Beans	1	17
Vegetables	3	2	Vegetables	3	4
Fruits	2	1	Fruits	1	1
Grains	50	39	Grains	75	64
Sugar	8	0.1	Sugar	7	0.5
<u>Cacautare and El Corinto</u>	<u>Energy</u>	<u>Protein</u>	<u>El Naranjito</u>	<u>Energy</u>	<u>Protein</u>
Dairy Products	3%	10%	Dairy Products	2%	6%
Eggs	.5	1	Eggs	1	2
Meat	1	3	Meat	2	4
Beans	1	17	Beans	1	13
Vegetables	2	4	Vegetables	5	6
Fruits	1	1	Fruits	.5	.2
Grains	74	64	Grains	77	66
Sugar	8	.5	Sugar	6	.6

\* INCAP, 1969.

Table 18. Zero Order Correlation Between Degree to Which Protein and Energy Needs are Met and Food Use.

<u>FOOD USE</u>	<u>ENERGY</u>	<u>PROTEIN</u>
Corn	.47*** <sup>1,2</sup>	.36** <sup>1,2</sup>
Sorghum	.01	-.11
Grains	.91*** <sup>1,2,3</sup>	.55*** <sup>1,2,3</sup>
Beans	.25* <sup>1,2</sup>	.49*** <sup>1,2,3</sup>
Rice	.42*** <sup>1,2</sup>	.40*** <sup>1,2</sup>
Eggs	.21	.35** <sup>1,2</sup>
Dairy Products	.44** <sup>1,2,3</sup>	.74*** <sup>1,2,3</sup>
Meat & Poultry	.36** <sup>3</sup>	.39** <sup>3</sup>
Animal Protein (meat, eggs, dairy)	.53*** <sup>1,2,3</sup>	.85*** <sup>1,2,3</sup>
Dietary Diversity	.20	.19 (.56)** <sup>3</sup>

\*p < .05.

\*\*p < .01.

\*\*\*p < .001

1 = Relationship holds in village 1, Cacautare.

2 = Relationship holds in village 2, El Corinto.

3 = Relationship holds in village 3, El Naranjito.

COHAAT paid for labor in maize, which may account for the somewhat greater frequency of maize consumption in Naranjito. This idea is further supported by the fact that only in Cacautare and Corinto is the amount of money spent on food related to whether or not maize is eaten. The frequency of consumption of beans and rice (also used for payment by COHAAT), however, does not increase in Naranjito.

### Dietary Adequacy

According to the 1969 INCAP survey, in rural Honduras the average daily energy intake per person represents only 89% of adequacy. Forty-six percent of families consumed less than or equal to 90% of their energy requirements, 26% less than 70% of their requirements, and 14% less than 50%. Average protein intake met or exceeded 100% of requirements; and 32% of the protein intake was from animal foods, which was considered adequate. In spite of this average pattern, thirteen percent of the rural families consumed less than 70% of the recommended amounts, and 8% did not consume any animal protein. The results showed that 39% of the protein intake was provided by cereals and 23% by legumes. INCAP interpreted this data to mean that the daily protein intake is quite variable in the population.

### Range of Dietary Adequacy

In our sample of families, the range of dietary adequacy in terms of energy and protein was quite large. Tables 19 and 20 indicate the range of how well household energy and protein needs were satisfied during a period of one week. The average intake for the entire sample is 110% of energy needs and 200% of protein needs. These average figures mask the diversity that exists between and in the communities studied, however.

In Cacautare and Corinto the average percent of energy needs met is 102%, while in Naranjito the average is 125% (see Table 19). In Cacautare and Corinto this means that 57% of the households interviewed do not meet their energy needs, in contrast to Naranjito where only one-third of the households fail to meet 100% of their energy requirements. In terms of protein needs met, for Cacautare and Corinto the

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Table 19. Percentage of Energy Needs Met by Households

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<u>Range of the % of Energy Needs Met</u>	<u># of Households</u>	<u>% of Households</u>
Total Sample		
< 100%	33	49%
> 100%	35	51%
	<u>68</u>	<u>100%</u>
Cacautare and Corinto		
< 100%	25	57%
> 100%	19	43%
	<u>44</u>	<u>100%</u>
El Naranjito		
< 100%	8	33%
> 100%	16	67%
	<u>24</u>	<u>100%</u>
Mean % of Energy Needs Met:		
Total Sample	110%	
Cacautare and Corinto	102%	
El Naranjito	125%	

---

average percent is 181%, and for Naranjito the average is 236% (see Table 20). All the households except two (both in Cacautare) meet their protein needs; but in Naranjito the proportion of households meeting more than 180% of protein needs represents three quarters of the households while in Cacautare and Corinto only about one half of the households do that well.

#### Variables Influencing Dietary Patterns

In this study a number of factors that may have potential impact on diet and dietary adequacy have been addressed. There are a number of variables that other

researchers have found to influence the quality of diet in terms of foods used as well as adequacy. These include income, land tenure, family structure, and commitment to subsistence agriculture (Valverde et al. 1977, 1980, 1981; K.M. DeWalt, Kelly and Pelto 1980; Valverde and Rawson 1976). We have included these and others in this analysis of factors affecting food use.

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Table 20. Percentage of Protein Needs Met by Households

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<u>Range of the % of Protein Needs Met</u>	<u># of Households</u>	<u>% of Households</u>
Total Sample		
< 100%	2	3%
> 100%	66	97%
	<u>68</u>	<u>100%</u>
Cacautare and Corinto		
< 100%	2	05%
> 100%	42	95%
	<u>44</u>	<u>100%</u>
El Naranjito		
< 100%	0	0%
> 100%	24	100%
	<u>24</u>	<u>100%</u>
Mean % of Protein Needs Met:		
Total Sample	200%	
Cacautare and Corinto	181%	
El Naranjito	236%	

---

Economic Well-being. Here, economic well-being is measured in terms of several indicators rather than using cash income to assess economic standing. These indicators include a Guttman scale of household goods called the Material Style of Life scale (MSL), the number of large animals owned, and land ownership.

K.M. DeWalt, Kelly and Pelto (1980) found the Guttman scale of material goods to be a useful way of measuring micro-differentiation in economic well-being among peasant farmers in Mexico. In Southern Honduras, however, there appears to be less variation in the material style of life. As Table 21, shows however, the MSL is related to dietary diversity for households in Cacautare and Corinto but not in Naranjito. Although we found no relationship between MSL and the degree to which families meet energy/protein requirements, MSL is related to the contribution of certain food groups to the diet. It is negatively related to energy intake from grains and positively related to protein intake coming from meats. In other words, families who are higher on the MSL scale get less of their energy from grains and more of their energy from meats than do families who score lower on the scale. In contrast, ownership of large animals is related to the use of particular foods as well as to households' ability to meet nutrient needs. In Cacautare and Corinto, owning large animals is positively correlated with meeting energy needs, meeting protein needs, and with dietary diversity. The foods that correlate positively with owning livestock are maize, beans, and rice but these relationships are present only in Cacautare and Corinto. In Naranjito, neither MSL nor owning livestock is related to meeting nutrient needs or to foods used (see Table 21). In all three villages the estimated average amount of money spent on food each week is similar: 27 lempiras in Cacautare and Corinto and 23 lempiras in Naranjito. Like dietary diversity, the amount of money spent on food is related to meeting nutrient needs (i.e., protein needs) only in Naranjito. In all three villages, however, the amount of money spent weekly on food is related to increased consumption of animal foods as well as to dietary diversity (see Table 21).

Family Structure. Family structure is another variable often found to be related to dietary patterns (Valverde and Rawson 1976). The ways in which this variable relates to diet are summarized in Tables 21 and 22. We analyzed family structure in terms of the number of people in the family as well as in terms of a variable called the "dependency ratio" in which the number of children in the household is divided by the number of adults.

Table 21. Zero Order Correlation Between Certain Economic and Household Variables and Dietary Variables.

	# of People	MSL
% OF ENERGY INTAKE COMING FROM FOOD GROUPS		
GRAINS	.34*	-.29
ANIMAL PRODUCTS	-.26*	.25
VEGETABLES	.20	-.16
SWEETS	-.38**	.02
FRUITS	-.19	.10
OTHER FOODS	.01	.16
% OF PROTEIN INTAKE COMING FROM FOOD GROUPS		
DAIRY FOODS	-.30	.20
MEATS	-.07	.33*
Dietary Diversity	.10	.50*** <sup>1,2</sup>
Energy Adequacy	-.42***	-.03
Protein Adequacy	-.29**	.06
Weekly Food Budget		
Consumption of Animal Foods	.41** <sup>1,2</sup>	.46* <sup>3</sup>
Dietary Diversity	.73** <sup>1,2</sup>	.74*** <sup>3</sup>

\*p < .05.

\*\*p < .01.

\*\*\*p < .001.

<sup>1,2</sup> Relationship holds for Cacautare and Corinto.

<sup>3</sup> Relationship holds for Naranjito.

Table 22. Zero Order Correlations Between Dietary Variables and Family Structure.

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<u>Cacautare and El Corinto</u>		
	# of People (average 6.3)	Dependency Ratio (average 1.18)
Energy Adequacy	-.45**	-.33*
Protein Adequacy	-.50***	-.33*
Dietary Diversity	---	-.32*
 <u>El Naranjito</u>		
	# of People (average 6.8)	Dependency Ratio (average 1.16)
Energy Adequacy	-.50*	---
Protein Adequacy	---	---
Dietary Adequacy	---	---

---

\*p < .05.

\*\*p < .01.

\*\*\*p < .001.

--- No Significant Correlation.

Dependency Ratio = # of children in household/# of adults.

For the total sample, the average number of people in a household is 6.5 persons (see Chapter II for details of household composition). Table 21 presents the relationships of the total number of people in a household to meeting energy and protein needs. The number of people is negatively related to both to meeting energy needs and protein needs. The number of people is also related to food use in terms of the contribution of certain food groups to the diet (see Table 21). This variable is negatively related to energy intake coming from sweets and from animal products. It is positively correlated with the proportion of energy intake from grains. In larger families, then, a greater proportion of energy intake is coming from the less expensive grains than from animal products.

In addition to analyzing the possible relationship of family structure and diet in the total sample, the three research communities can be compared. In Cacautare and Corinto, the average number of people in a household is 6.3, and in Naranjito it is 6.8. The average dependency ratios for the villages are also very similar; in Cacautare and Corinto it is 1.18, and in Naranjito it is 1.16. The relationships between these variables and diet are quite different in the three villages, however, as shown in Table 22. In Naranjito, the only relationship between family structure and overall diet is a negative correlation of the number of people in the household and meeting energy needs. In Naranjito, the dependency ratio does not relate to the diet variables. In Cacautare and Corinto the picture is different. Both the number of people and the dependency ratio for each household are negatively related to meeting energy/protein needs. There is a negative correlation of the total number of people in the household and meeting energy needs and a fairly high negative correlation of number of people and meeting protein needs. The dependency ratio also has a negative correlation both with meeting energy needs and meeting protein needs. It also relates negatively to dietary diversity (see Table 22).

It appears that the more people (and especially a greater proportion of children to adults) in the family, the lower the ability of the household to meet its nutrient needs. This is not to say that large families cannot meet their energy/protein needs, but the patterns are very different in the villages. In Cacautare and Corinto, 71% (15/21) of the families with

greater than the average number of people failed to meet 100% of their energy needs. In Naranjito, however, over half of the larger-than-average families were able to meet their energy needs (53% or 8/15). The dependency ratio is also negatively correlated with MSL in Cacautare and Corinto, suggesting that larger families are poorer, although no correlation exists between these variables for Naranjito.

These patterns suggest that the temporary presence of COHAAT significantly influenced the diet of households in Naranjito. It is noteworthy that of the larger-than-average families, most of those that met their energy needs had at least one individual working for COHAAT (75%), while most of those who did not meet their needs did not work for COHAAT (71%).

The families that are experiencing the worst deprivation in terms of energy needs are those headed by single women. None of these families (all 4 are in Cacautare) met more than 75% of their energy needs. Typically, there are six to eight people in these households and they have the highest dependency ratios (from 1.66 to 5.0). The only source of income for the women and children in these families is often from selling vegetables and snacks.

Land Availability. Another variable that has been found to have an impact on dietary patterns is availability of land to households (Valverde et al. 1977). The amount of land available to each household, the type of land tenure, and the amount of land planted during the previous season were found to influence dietary patterns in a number of ways in Southern Honduras. In an earlier report (DeWalt and DeWalt 1982:15), we have described land tenure in the municipio of Pespire: "Those individuals with fewer than ten hectares make up over 79% of all those controlling some land yet they hold only 20% of the total land. Sixty-one landowners (only 3.5% of the total landowners) control close to half the land in the municipio. This land concentration would appear even more skewed if the landless agricultural laborers were also included in these data." Control over land in the research communities is similar to that of the municipio as a whole in that most of the landholdings are extremely small. Only two persons own more than 40 hectares of land. The average amounts of land available per household are fairly similar in the villages: 5 manzanas in Naranjito and 7.4 manzanas in Cacautare and

Corinto. Yet actual access to land is quite different. In Naranjito, only one person lacked access to land, while in Cacautare and Corinto a total of 15 people were landless. Sixty-seven percent of the cultivators (using either rented, owned, or borrowed land) in Naranjito had access to one to five manzanas while in Cacautare and Corinto, 29% of the landholders were in that category.

Table 23 contains details of access to land in the different villages. In Cacautare and Corinto there were more families in the two extreme categories of either having no land or having access to more than 10 manzanas (these categories together represent 57% of the families). This pattern is in contrast to Naranjito where only 12% of the families are in those categories. In all three villages, availability of land is strongly related to the use of animal products and to dietary diversity. Table 24 illustrates these relationships.

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Table 23. Access to Land in the Research Communities.

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Cacautare and Corinto		
Amount of Land		% of Households
0	manzanas	34
1-5	manzanas	29
6-10	manzanas	14
>10	manzanas	23
Naranjito		
0	manzanas	4
1-5	manzanas	67
6-10	manzanas	21
>10	manzanas	8

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Land availability is negatively correlated with the use of grains. It is not related to the degree to which energy needs are met. These patterns suggest that land availability is an index of the overall economic

Table 24. Zero Order Correlations Between Access to Land and Certain Dietary Variables.

	Owns Land	Land Available	Land Planted
% of Energy Intake Coming from Food Groups			
Grains	-.43**	-.39**	-.14
Animal Products	.36**	.43**	.15
Vegetables	.23	.21	.39*
Sweets	.12	.11	-.21
Fruits	.27*	.23*	-.001
Other Foods	.18	.23	.09
% of Protein Intake Coming From Food Groups			
Dairy Foods	.35**	.30*	.05
Meats	.22	.49***	.16
Dietary Diversity	.38***	.48***	.24*
Energy Adequacy	.03	.12	.17
Protein Adequacy	.06	.15	.25*

\*p  $\leq$  .05.  
 \*\*p  $\leq$  .01.  
 \*\*\*p  $\leq$  .001.

well-being of the household, but it does not explain the range of variation in the ability of a family to meet nutrient needs. It does, though, represent a pattern of food use in that people with greater access to land tend to be able to use more different kinds of food and, in particular, more foods of animal origin.

Although we found no correlation of the total amount of land available with meeting energy or protein needs, there does seem to be a relationship between being landless and meeting these needs. Of families totally without land (15 out of 16 were in Cacautare and Corinto), only 38% met their energy needs, while 57% of all of the families with land met their energy needs. As mentioned earlier, we found that the amount of land available is negatively correlated with use of grains and positively with use of animal products and with dietary diversity in all three villages. Thus, amount of land available seems to be an indicator of economic well-being and related to dietary patterns.

Land Tenure. In an earlier analysis (K.M DeWalt, Fordham and Thompson 1982), it was found that there were differences in the dietary patterns of land owners and renters in terms of their use of alternate grains. Sixty-eight percent of households owning land used maize exclusively (rather than using sorghum), while only 44% of households renting land used maize exclusively throughout the year. We suggested that this pattern of grain usage reflects the more limited resource base for non-owners of land. In general, owning land is positively correlated with MSL, dietary diversity, eating animal foods, and owning livestock. In contrast, for land renters, these relationships do not exist. This is not surprising, because the amount of land available is largely dependent on ownership.

Amount of Land Planted. In looking at the amount of land actually planted in the year preceding the research, it is clear that the amount of land planted is related to household dietary patterns in the research communities. Table 24 shows that there is a positive relation with the consumption of homegrown vegetables, with dietary diversity, and with satisfying protein needs.

The average amount of land planted-per-person in the household provides another way of examining the relationship of dietary patterns and land planted. The average amount of land planted-per-person is different

for the various villages studied: in Naranjito it is .54 manzanas and in Cacautare and Corinto it is .34. In Cacautare and Corinto the average land available per household is slightly higher than in Naranjito. In Naranjito this variable is positively related to meeting energy needs, while in Cacautare and Corinto it is related to meeting protein needs.

Apparently the amount of land planted reflects the family's commitment to subsistence agriculture. This appears to be somewhat stronger in Naranjito than in the other villages.

### Comparison of the Villages

Table 25, which presents a comparison of various characteristics of the villages studied, shows that the material style of life, dependency ratio, and weekly food budget are very similar in the villages. Access to land and the proportion of families meeting their energy needs, however, are quite different. In general, economic indicators seem to be related to the use of more expensive, purchased foods and greater dietary diversity, while the number of people in the household and the amount of land planted per person are related to whether families meet their nutrient needs (COHAAT's influence seems to have temporarily obscured that relationship in Naranjito).

Table 25. Comparison of the Villages Studied

	Cacautare/Corinto N=44	El Naranjito N=24
<100% Energy needs met	57%	34%
Mean energy needs met	102%	125%
Mean % protein needs met	181%	236%
Mean weekly budget for food	27 L	23 L
Mean material style of life	3.7	3.1
Mean dependency ratio	1.18	1.16
Mean amount of land available per household	7.4 manzanas	5.0 manzanas
Mean amount of land planted per household	2.2 manzanas	3.3 manzanas
Mean amount of land planted	.34 manzanas	.54 manzanas

#### CASE STUDIES

In order to illustrate in a more graphic way some of the relationships we have discussed, we will present in more detail a series of case studies drawn from the survey sample. We will relate these individual families' dietary patterns to those of the sample as a whole. Table 26 compares the information for all of the cases presented. The first four families in Cacautare and Corinto that will be discussed are meeting their daily energy needs as calculated from foods listed in a week's market basket survey.

##### Case 1: Christina and Julian

This household consists of Julian (60 years old), Christina (50), and one of their daughters (15). Three adult children have moved away from home in order to

get a job or marry (two are living in Progreso, on the North Coast of Honduras, and the third is in Tegucigalpa). The family has lived in this wood house for 30 years. The house has three rooms, and the family ranks relatively high on the material life style scale as evident in the presence of a radio and sewing machine among other belongings. Christina is not a member of the Amas de Casa club, but her daughter works for the group's food supplementation program at the school.

The family owns 22 manzanas of land and planted six during the previous year. They grow maize, sorghum, watermelon, muskmelon, gourds, ayote, and manioc. Last year Julian sold four cargas (about 800 lbs) of maize (27% of the harvest) and 20 cargas of sorghum (50% of the harvest). The family has not bought grain this year, and they still have some left from last year's harvest. In the garden they raise ayote and peppers (both sweet and hot peppers). Their papaya trees produce enough fruit for home consumption, and their mango trees provide fruit for sale as well as for the family. Animals owned include 5 cows that produce sufficient milk for making cuajada and soured cream. The family's 10 hens, which survived the epidemic that killed many of the poultry in the village, provide 5 eggs a day. Christina sells extra eggs and milk. Julian fishes for the family occasionally.

The dietary diversity score for the family for the week considered was fairly low. The family regularly consumes one medida (about 5 lbs.) of maize each day, which yields about 762.7 grams/person/day (2745.6 kcal/person). Thus, maize alone provided 59% of the family's daily energy intake and met 111% of their energy needs per day. The foods eaten during one day's meals are listed below along with the sources of the foods:

#### BREAKFAST

beans-purchased  
maize tortillas-homegrown  
coffee-purchased

#### LUNCH

rice-purchased  
beans-purchased  
cuajada-home produced  
maize tortillas-homegrown

#### DINNER

beans-purchased  
cuajada-home produced  
maize tortillas-homegrown  
coffee-purchased

During visits on other days, Christina served us watermelon and mixed vegetables, which indicates that their diet varies from day to day. According to the market basket survey for the week, they also ate fresh maize and squash, both from their own harvest. But even for the day described above, the family greatly exceeded their nutrient needs (187% of their energy needs and 655% of their protein needs).

This family is small in relation to available resources and there are no dependent children. With two manzanas of land planted per person, they have sufficient resources for direct production of food and to purchase other foods, such as beans, rice, sugar, lard, coffee, and tomatoes. The usual weekly expenditure for foods is 12 lempiras (\$6.00) for this household.

#### Case 2: Dalila and Adolfo

Like the previous household, this family has a high material life style score (5). They live in an adobe and wood house with four large rooms. The family structure is quite different, however: the household includes Adolfo (48), Dalila (35), four sons (17, 15, 7 and 5 years old), and three daughters (11 and 3 years old and 9 months old). Two adult children live in Tegucigalpa, one of whom sends money to the family. Dalila, a member of the Amas de Casa, is a costurera (seamstress) and earns money by making clothes in her home for women in the community.

The family rents two manzanas of land, and last year Adolfo sold two cargas of maize (25% of the harvest) and three cargas of sorghum (30% of harvest). The previous year's crops included maize, sorghum, beans, ayote, gourds, manioc, and sweet potatoes. The family has had to buy grain during the year. Their garden produced squash, bell peppers, and beans (frijoles alazines). Adolfo fishes, and occasionally the family uses wild foods, such as lemons gathered for making lemonade. They own livestock, including 6 cows

that provide only enough milk for home consumption. Their hens produce about 10 eggs/week. This family's diet includes a relatively wide variety (dietary diversity was 22 items), and their weekly purchases include beef, flour, wheat rolls, noodles, and cuajada, in addition to the core of foods purchased by almost every family. This family usually spends 25 lempiras on food per week. Fresh maize from their harvest was also eaten during the week. The previous day's menu is shown below:

BREAKFAST

bread-purchased  
coffee-purchased  
flour tortillas-purchased flour  
beans-purchased  
cuajada-purchased

LUNCH

chicken soup: made from purchased bouillon, lard, onions, and annato, and homegrown ayote  
sorghum tortillas-homegrown  
lemonade-gathered lemons

DINNER

beans-purchased  
sorghum  
tortillas-homegrown  
cuajada-purchased  
coffee-purchased

The younger children usually receive milk at their school, but did not do so on the day of the interview. The 9-month old daughter is breast-fed and is also given cow's milk twice a day in addition to sharing the family's meals. The family generally uses two medidas of grain a day (this week they used sorghum), so that the contribution of sorghum to the daily diet was 508.4 grams/person/day (1728.7 kcal/person), representing 67% of the energy intake and meeting 79% of the energy needs for the household.

Their overall diet met 118% of estimated energy needs and 198% of their estimated protein needs. Although this family eats a wider variety of foods than did family 1, the proportion of grain eaten was apparently increased more than the amounts of other foods representing that variety.

The next two families to be discussed both meet their energy needs to the same degree (111%), but their dietary patterns are quite different, as are their economic situations.

### Case 3: Nicolasa and Marco

There are four persons living in this household: the husband (46) who is a day laborer; the wife (25) who is pregnant, a daughter (3), and a son (1 year). Another daughter, 6 years old, lives with Nicolasa's mother in Pespire. The family visits her twice a month. With a material life style score of 4, this family has lived in their three-room house made of wood and wattle-and-daub for three years.

They rent one manzana of land on which they plant maize and sorghum. Last year Marco did not sell any portion of his grain harvest. In the garden, they grow ayote. The family owns no animals or fruit trees, but they do own hens that produce eggs for home consumption. The family eats maize during only one month of the year, and eats sorghum during the rest of the year, using one medida per day. This year they had to purchase sorghum. The previous day's menu included:

#### BREAKFAST

coffee-purchased  
sorghum tortillas-purchased

#### LUNCH

ayote-homegrown  
sorghum tortillas-purchased

#### DINNER

ayote-homegrown  
sorghum tortillas-purchased

The daughter received milk at school. The one-year old son was given atole de arroz (a gruel made with rice flour and water sweetened with sugar) five times a day; the mother stopped nursing him when he was nine months old, when she learned that she was again pregnant. This family usually spends 10 lempiras per week on food and their weekly dietary diversity score is eight. For the day studied, their diet was strikingly monotonous, and the contribution of sorghum

to their diet represented 91% of their energy intake (and meets 101% of their energy needs). Available grams of sorghum per person are 572 grams/person (1944.8 kcal./person). The lack of alternative sources of food is apparent in this family's dietary pattern, but even with such limitations they satisfied 111% of their energy needs and 169% of their protein needs. The dependency ratio is 1.0, and they planted .25 manzanas per person.

#### Case 4: Uvaldina and Miguel

This family is one of the most prosperous in the community, owning 46 manzanas of land and with a material life style of 6. Their four-room wood house, in which they have lived for 18 years, is furnished with a sofa and upholstered chairs. They have a kerosene stove in addition to a fogon. The family includes the husband (51), a carpenter; the wife (59), a member of the Amas de Casa and director of the local elementary school; and their 21 year-old son. Another child (18), a student, lives in Choluteca while going to school. The family owns numerous fruit trees including cashew, lemon, guava, custard apple, plum, and mango - all of which produce enough fruit to sell, as well as meet home consumption needs. Animals owned include horses, mules, a burro, oxen, 6 pigs, and 7 cows (4 give milk). The 13 hens produce enough eggs for the family to eat and sell. Miguel hunts and fishes. The family ate garrobo (lizard) during the week surveyed. The family also raises rabbits.

Crops planted on two manzanas (out of a total of 46) are maize, sorghum, ayote, gourds and sweet manioc. The family has grain from the previous year's harvest; they have not bought maize this year, but they have purchased sorghum to feed the animals. Miguel does not sell his grain harvest. During the previous week, for which the dietary diversity score was 29, the family purchased flour, tomatoes, onion, garlic, cabbage, potatoes, chayote, ayote, miniature bananas, plantains, watermelon, wheat rolls, chicken bouillon, lard, beef and pork, in addition to the "core" purchases. Their 24-hour recall indicates the following menu:

#### BREAKFAST

coffee-purchased  
eggs-home produced  
cuajada-home produced  
maize tortillas-homegrown  
wheat rolls-purchased

#### LUNCH

vegetable soup chicken-home produced

#### DINNER

beef-purchased  
frita-ingredients purchased  
cuajada-home produced  
maize tortillas-homegrown  
coffee-purchased

#### EVENING SNACK

wheat rolls  
milk

The weekly food expenditures usually total 35 to 40 lempiras. Their dietary diversity score was quite high: 29.

This family uses 1/2 medida/day of maize, which provides 381.3 grams/person/day (1372.8 kcal/person), representing 46% of their energy intake and meeting 52% of their energy needs. They met 111% of their energy needs and 180% of their protein needs for the day. It is evident that although their diet represents fewer calories per person than family 1, this family still consumes sufficient amounts of energy-giving foods, with non-grain foods representing over half of their energy intake. Their three-member family ate 1/2 medida of grain in contrast to family 1 (also three members), which used 1 medida of grain per day. Family 4 has numerous resources for food production; in addition, they spend more money on food than do the other three families described above. The dependency ratio is 0 and .67 manzanas are planted per person.

We will now describe dietary patterns of three families in Cacautare and Corinto that do not satisfy 100% of their energy needs.

Case 5: Bernarda and Florentino

This family includes the man (45), the woman (35), two sons (13 and 9), and six daughters (12, 10, 7, 5, 3, 2). They have lived in their three-room wood house for ten years, and their material life style score is 3. They own 8 manzanas of land and borrow 5, which they have planted with maize, sorghum, sesame, watermelon, muskmelon, beans, ayote, manioc, and sweet potatoes. Florentino sells 5 cargas of sorghum (50% of the harvest) but does not sell maize. The family's papaya, lemon, and custard apple trees produce enough fruit for home consumption; their orange tree does not produce fruit. Eight hens produce eggs for the household. Florentino fishes occasionally. Below is the menu for the day described in a 24-hour recall:

**BREAKFAST**

eggs-home produced  
beans-purchased  
coffee-purchased  
wheat rolls-purchased  
tortillas-(mixed grains, homegrown)

**LUNCH**

chicken-home produced  
rice-purchased  
tortillas-(mixed grains, homegrown)

**DINNER**

beans-purchased  
tortillas-(mixed grains, homegrown)

**SNACKS**

confites (sweets)  
lemonade

The two youngest children were given milk and atole prepared especially for them, in addition to eating what the family eats. Food purchases for the week (usually 30 lempiras) included milk, bread, tomatoes, beef, chicken bouillon, and lard, plus their harvest was also eaten during the week. The weekly dietary diversity was 21. The family eats sorghum as well as maize tortillas, and during the week studied, they ate tortillas made with mixed grains. They use 1 1/2 medidas of grain/day for tortillas (343.2 grams/person/day, or 1590.2 kcal/person). Maize and

sorghum eaten contributed 70% of their intake and represented 56% of the family's energy needs. Although this family ate chicken and purchased beef to eat, apparently such nongrain foods were not eaten in sufficient quantities (nor were they supplemented with sufficient quantities of grains) to satisfy the family's energy needs. Their diet provided only 80% of their energy needs but 145% of their protein needs.

#### Case 6: Maria Jesus

Maria is one of the few single, female household heads in the study communities. She has lived in her house (three-room, made of sticks) for two years, and her material life style score is quite low (2). We were told that her husband had only recently left her alone with their six children. The household includes herself (28), five sons (13, 10, 4, and 3 years; and 11 months), and one daughter (7). She has no land, but apparently her husband planted maize, sorghum, watermelon, muskmelon, beans, ayote, and manioc. She said that none of the grain was left from the past year's harvest ("se vendio" - it was sold). Maria Jesus earns money by selling fruits and vegetables (in Tegucigalpa, for example), and by making and selling tortillas, rosquillas, rosquetas, and sweets (which her children also sell for her). The family owns plum trees that provide fruit to eat and sell. The hens produce eggs for the household. Maria Jesus's sons fish once a week for guavinas, crayfish, and sontes. This week the family ate guavinas they caught. This Maria Jesus is a member of Amas de Casa, and her young children receive milk and fritas at their school. The previous day's menu includes:

##### BREAKFAST

coffee-purchased  
sorghum tortillas-purchased

##### LUNCH

sorghum tortillas-purchased  
beans-purchased

##### DINNER

sorghum tortillas-purchased  
eggs-home produced

Maria Jesus usually spends 8 lempiras on food per week. Purchases include cuajada, tomatoes (to sell and eat), onion, pineapple, miniature bananas, lard, and noodles. The family uses one medida of sorghum a day (they eat maize during August and sorghum the rest of the year). This medida provides 327 grams of sorghum/person/day (1111.3 kcal/person/day), which is 75% of their energy intake but only satisfies 56% of their energy needs. The family's diet only provided 75% of their energy needs, but 143% of their protein needs. The dependency ratio is 2.5 and no land is planted this year. Their dietary diversity score was 17.

#### Case 7: Lilian

This household's diet was the most deficient of all 68 families interviewed. The reported intake satisfied only 43% of their energy needs and 92% of their protein needs. This family also had the highest dependency ratio (5).

Lilian is 33 and lives with her children: three sons (8, 6, and 3) and two daughters (10 years old, 15 months old). They live in a one-room wood house and their material life style score is 1.0. They own no land and do not have a backyard garden. Lilian injured her hand and said that she cannot use it. To raise money she sells "rifas" (raffle tickets), offering as a prize items such as clothing. She reported that she usually spends 15 lempiras per week on food, and the dietary diversity score for the week's diet is extremely low: 6. The week of the interview she purchased only sorghum, maize, beans, coffee, sugar and salt. The 24-hour recall reflected the following menu:

#### BREAKFAST

rice-purchased  
tortillas of mixed grain-purchased  
coffee-purchased

#### LUNCH

bean soup-purchased ingredients  
tortillas of mixed grains-purchased

#### DINNER

tortillas of mixed grains-purchased  
fried beans

At school her children receive milk, fritas de harina and rice with milk. Lilian uses sorghum all year for tortillas but mixes it with maize when she can (she usually only uses maize during one month). She uses 1/2 medida of sorghum and about 6 ounces of maize each day (1/2 medida of maize per week). This amount of grain provides 219.3 grams of grain/person/day (751.3 kcal), which is 94% of their energy intake for the day studied and 41% of the family's needs. As mentioned above, the family meets neither energy nor protein requirements for the day.

The final set of cases to be presented describe the dietary patterns of four households in Naranjito, including two families that have adequate energy intake and two that do not.

#### Case 8: Santa Casamira and Secundino

This couple lives in a one-room house made of estacon (wooden stakes or sticks) and their material lifestyle score is very low (1). They have lived there for six years and their family includes: the man (24), a farmer who also works for COHAAT; the woman (23); and two sons (4 and 2 years).

Secundino rents two manzanas of land on which he grows maize, sorghum, beans, ayote, and sweet manioc; last year he sold one carga of maize (17% of harvest) and two cargas of sorghum (17% of harvest). The household belongs to the grain co-op in Naranjito. There is no grain left from the previous year's harvest. Secundino therefore purchases sorghum, and obtains maize from COHAAT in payment for his labor on the road being built. Garden crops include ayote, manioc, camote, tomato, and sweet peppers. Secundino fishes for the family. Ten hens produce eggs for home consumption.

Santa Casamira uses a variety of purchased foods for her family's meals: noodles, milk, cheese, cuajada, tomatoes, onion, potatoes, beef, chicken, lard, and core purchases. She usually spends 10 to 15 lempiras on food, and the dietary diversity score for the previous week's meals was 24. Santa Casimira makes tortillas with maize or sorghum, and during the week surveyed she mixed both grains. The family eats one medida /day of grain (1/2 medida each of sorghum and maize), which provides 572 grams/person/day (or 2002 kcal/person). These grains contribute 45% of the family's energy

intake and satisfy 98% of their energy needs. Thus, it is evident that the family exceeds the energy requirements and that non-grain foods are a significant part of the diet. In spite of their low score for material life style and the small amount of land used, the family meets 219% of its energy and 527% of its protein needs. With staples provided by COHAAT, cash can be used for buying foods that would be prohibitively expensive otherwise. The family's menu for one day is described below:

**BREAKFAST**

eggs-home produced  
coffee-purchased  
tortillas: maize-COHAAT; sorghum-purchased  
beans-COHAAT

**LUNCH**

beans-COHAAT  
tortillas: maize-COHAAT; sorghum-purchased  
soup: chicken purchased  
greens beans-homegrown  
ayote-homegrown

**DINNER**

cuajada-purchased  
tortillas: maize-COHAAT; sorghum-purchased  
tomatoes beans-COHAAT

**SNACKS**

colas-purchased

The two children ate what the adults ate, with the exception of cuajada, which they were not given. The dependency ratio for this family is 1, and they planted .5 manzanas/person.

**Case 9: Angelina and Pedro**

This household also meets its energy needs, but it is quite different from family 8. The family consists of the man (73), the woman (71), a son (19), and a daughter (23), and grandchildren (13, 4, 13, 9 months). Two of the daughter's children live with their father's mother in Nacaome, Department of Valle. Five adult children have left home. This family belongs to the grain co-op, and both the man and his son are farmers

as well as laborers for COHAAT. Angelina makes bread, rosquetas, and rosquillas to eat and sell; her daughter cooks for the family and takes care of the house work. The family has lived in their house for 40 years. It is made of estacon and has three large rooms. The material life style score for the household is 4. The family owns one of the few ovens in the community.

Pedro owns five manzanas of land, and he and his son planted three manzanas in maize, sorghum, watermelon, muskmelon, beans, ayote, rice and manioc. They sold 75% of their sorghum harvest (3 cargas), and Angelina said that there is no grain left from last year's harvests. Garden crops planted include beans and tomatoes, but insects ruined the tomatoes. The family eats tortillas made of maize or sorghum or a mixture of the grains. During the week surveyed, however, only maize was used for tortillas. Below is a menu from the 24-hour recall:

BREAKFAST

eggs-home produced  
maize tortillas-COHAAT  
beans-COHAAT  
coffee-purchased

LUNCH

rice-COHAAT  
beans-COHAAT  
maize tortillas-COHAAT  
coffee-purchased  
tomatoes-purchased  
fried potatoes-purchased potatoes  
lard-purchased

DINNER

beans-COHAAT  
rice-COHAAT  
maize tortillas-COHAAT  
coffee-purchased  
green beans-homegrown

Angelina's daughter nurses her own nine-month-old infant and feeds it from the family's meals as well (with the exception of potatoes and green beans). Food purchases usually total about 20 lempiras, and items purchased include noodles, cheese, cuajada, tomatoes, onion, potatoes, sugar, coffee, and salt. Chayote and

manioc are produced at home. The dietary diversity score is 18. The family consumes almost two medidas/day of maize, providing 572 grams/person/day (2059.2 kcal/person). This represents about 75% of the family's energy intake and satisfies 92% of the family's energy needs. The family meets 114% of its energy needs and 199% of the protein needs with the overall diet. It appears that, like family 2, although this family eats a wide variety of foods, grains still represent the major proportion of calories yielded from the diet. The dependency ratio in this family is .6 and the land planted per person is .37 manzanas.

#### Case 10: Juana

The seven people in this household include the woman (43), her three sons (18, 20, 5), and three daughters (13, 11, and 10). Juana has lived in this house for 12 years; it is made of wattle-and-daub and has one room. The material life style score is 3. The family belongs to the grain co-op. Juana's two oldest sons are renting two manzanas of land to farm. Because it is their first year cultivating, they have no grain reserve from the previous year, but they are now growing maize and sorghum. The family does not have a garden. They own two pigs and two hens, which provide eggs for the household. The sons go fishing, providing another source of food. In order to raise money, Juana makes and sells wheat rolls and various kinds of sweets. The 24-hour recall reports the following diet:

#### BREAKFAST

- beans-purchased
- eggs-home produced
- sorghum tortillas-purchased
- coffee-purchased

#### LUNCH

- egg soup (sopa de huevo) -home produced
- sorghum tortillas-purchased

#### DINNER

- coffee-purchased
- beans-purchased
- sorghum tortillas-purchased.

The children receive milk at school. Juana's food purchases are limited to sorghum, beans, rice, lard, sugar, salt, annato, spices, and lime. The dietary diversity score for the week's meals was 10. The weekly food expenses usually run about 20 lempiras. The family eats about 100 ounces of sorghum per day, or 408.6 grams/person/day (1389 kcal/person). Sorghum provides 69% of the family's energy intake and 57% of their energy requirements. Overall, the family's diet satisfies 85% of their energy needs and 125% of the protein needs. Because the family's diet was only 15% energy-deficient during the sons' first year to cultivate, it is possible that the dietary patterns may improve over the next few years along with improved crop production. The dependency ratio is 0, and land planted per person is .28 manzanas.

Case 11: Juana Bautista and Antonio

Like the other families in Maranjito, this household belongs to the grain co-op, and the male household head works for COHAAT, from which the family obtains maize, beans, and rice. The family has lived here for 26 years in a one-room house of estacon. The material style of life score is 3. The family does not have a garden, but Antonio rents two manzanas of land on which he has planted maize, sorghum, watermelon, muskmelon, ayote, and manioc. Last year he sold four cargas of sorghum (50% of harvest). The family owns chickens that produce several eggs a day for family consumption. The family also eats fresh fish (for example, last week a family member caught one pound of crayfish). The family also hunts game. Members of the family include the husband (49), the wife (46), four sons (16, 9, 9, and 11 months), and three daughters (11, 7, 3). Three children have moved away.

The family uses maize during eight months and sorghum during the other four months. During the week studied, they were eating maize tortillas, for which they use one medida of maize/day (254 grams/person/day or 915.2 kcal/person). Eating a medida of maize supplies 42% of the family's energy needs and represents 83% of the family's energy intake. Purchased foods included cheese, tomatoes, potatoes, green beans, chicken, sardines, lard, and core foods. This week the family spent 5 lempiras on food. Fresh maize from the harvest was eaten that week, and nances were gathered

and eaten as well. Dietary diversity is 19. Below is listed the family's menu from the 24-hour recall:

**BREAKFAST**

beans-purchased  
coffee-purchased  
maize tortilla-COHAAT

**LUNCH**

crayfish (chacalines) - caught  
eggs-home produced  
maize tortillas-COHAAT

**DINNER**

tomatoes with sardines (canned) - purchased  
beans-purchased  
maize tortillas-COHAAT

**SNACK**

nance

The 11-month old infant is breast fed but also eats small portions of foods such as rice, beans, fish, and coffee from the family's regular meals. The family's overall diet satisfies only 51% of their energy requirements and 114% of their protein needs. The dependency ratio is 2.0 and land planted per person is .22 manzanas.

Dietary Patterns in the Case Studies

Table 26 shows the proportion of energy intake contributed by various food groups for each case study. The four cases in Cacautare and Corinto that met their nutritional needs all had certain aspects in common; the differences are also instructive.

Three of the families (#1, #3, #4) are smaller than average (they have only three or four people in contrast to the average of 6.5 persons), and they also have relatively low dependency ratios (0, 1.0, 0). Two of these families own more than ten manzanas of land. Thus, while they have higher socio-economic status than other families, they also have fewer people to feed and fewer dependent family members in general. Furthermore, in one family, all three family members are earning money: the female household head is principal of the

Table 26. The Case Studies

Food Groups	% of Energy Intake Contributed by Food Groups											
	Our Sample Mean	Case #1	Case #2	Case #3	Case #4	Case #5	Case #6	Case #7	Case #8	Case #9	Case #10	Case #11
Dairy Products	3%	31%	1%		6%	1%	1%			3%		1%
Eggs	1	1	1		2				1	2		
Meat	1						1		4	2		2
Beans	1	1	1	1	1	1	1	1	1	1	1	1
Vegetables	3			3			1		9	4		
Fruit	1											
Grains	75	42	86	90	48	79	84	81	45	75	79	83
Sugar	7		4	6	1	8	5	18	7	6	9	5

Tortillas used that week:

Grain used (corn, sorg, mixed)	corn	corn	sorg	corn	mixed	sorg	mixed	mixed	corn	sorg	corn
Source G = Grown C = Cchat P = Purchased	G	G	P	G	G	P	P (C corn) (P sorg)		C	P	C
% Energy Needs Met (M = 110%)	187%	118%	111%	111%	80%	75%	43%	219%	114%	85%	51%
\$ Protein Needs Met (Mean = 200%)	655%	198%	169%	180%	145%	143%	92%	527%	199%	125%	114%

99

grade school; the male household head is a carpenter; the son is a farmer. Two of these families sell fruit; one sells eggs as well; and another one sold grain, also. It seems clear that these families can take put advantage of a number of sources of income. In these two families (case #1 and #4), the proportion of energy intake from grain foods is about the lowest for all the cases presented. Case #3, which has the smallest amount of land planted per person of families in this category (.25 manzanas), rents only one manzana of land; but other variables seem to intervene in their ability to obtain an adequate diet. The male household head is a day-laborer and earns a cash income; the amount of money spent on food is kept low as is the dietary diversity; and the family is small. Also, 90% of the family's energy intake comes from grains rather than from more expensive foods.

Case #3 provides an example of why we should not expect low dietary diversity scores and small amounts of money spent on food to correlate with ability to meet protein and energy needs - some families adjust for lack of financial resources (or lack of land) by eating differently. This family obtains most of their energy from grains and sweetened coffee. They are still able to meet their energy and protein requirements because of quantity of food consumed. The reported food intake, however, makes it likely that this family may not be satisfying other specific nutritional needs, such as vitamin and mineral requirements.

On the other hand, cases #5, #6, and #7 represent families in Cacautare and Corinto that did not meet their nutritional during the week for which data were obtained. All three of these families are of average size or larger (7, 10, and 6 persons), and all three have higher than average dependency ratios (2.33, 2.5, and 5.0; the average for these communities is 1.17). Two of these families are headed by a single female, supporting numerous young children. Neither of these families sells grains. Instead, the women make breads and sweets to sell in addition to selling vegetables. One woman sells raffle tickets. Both of these families have to purchase the grain they eat. One of these families has a relatively low dietary diversity score (6), and both families spend less than average for food (8 lempiras and 15 lempiras; the average is 27 lempiras). The third family that exemplifies those families in Cacautare and Corinto that did not meet their energy needs (case #5), sells grain and owns

land, but the family is large (10 people), spends more money than the other families, and maintains a higher dietary diversity score (21). They purchased milk, bread, tomatoes, and beef in addition to staple foods of beans, rice, and coffee. At the same time, however, this family uses only 1- 1/2 medidas of grain daily (they grow their own grains). Even with the purchased foods, this family (like the other two in this category) derives most of its energy from grains eaten (79% of energy intake).

Representing families in Naranjito that succeeded in meeting their energy needs, both case #8 and #9 have lower than average dependency ratios (1.0, 0.6), sell grain, and in both, the male household heads work for COHAAT in addition to farming. One family is smaller than average. For this family, only 45% of their energy comes from grains; they also eat meat/fish and eggs. The other family is larger than average (8 people), and it meets its energy needs in spite of the fact that it plants less than the average amount of land-per-person (.37 manzanas). It seems likely that the size of the family and the lack of access to land are offset by the fact that the female household head sells breads, and the male household head and his two sons farm and work for COHAAT as well. Also, a large proportion of their energy intake comes from grains (75%), supplemented with some dairy products, eggs, and meat.

The last cases to be discussed, cases #10 and #11, are both families in Naranjito that fail to meet energy requirements. Both families are larger than average (7, 9 persons) with smaller than average amounts of land planted-per-person (.28, .22). In one family, the female household head sells bread, and her two grown sons are cultivating land for the first time. This family eats a very limited diet (including sorghum, which is purchased). The sons do not work for COHAAT. In the other family, the male household head both farms and works for COHAAT. The family sells grain and spent only 5 lempiras on food during one week, but with 9 people, most of them very young, their resources are stretched (this family does not own land; they rent two manzanas of land). These case studies illustrate the complex interaction of the variables that we correlated with one another.

## Conclusions

In looking at the dietary patterns in these three communities, it is clear that although the overall averages suggest that nutritional needs are being adequately met (110% energy needs; 200% protein needs), energy and protein are not equally distributed among the families in the different villages. For example, slightly fewer than half of the families interviewed in Cacautare and El Corinto met their energy needs, while in Naranjito, two-thirds of the families did so. Protein needs are met by almost every family, but in Naranjito, three-quarters of the households are greatly exceeding their protein needs, in contrast to Cacautare and Corinto, where only one-third of the household do so.

The families in these communities get an even greater proportion of energy from grains than do those represented by the national survey for rural population from 1965-67. They derive less energy from meat and beans, while they derive about the same proportions of energy from vegetables, fruit, eggs, and dairy products as were described in the national survey mentioned above.

In general, economic indicators (such as MSL, amount of land available, ownership of large animals) are related to which foods make up the diet for a family and how many different foods are included in the diet. The amount of land planted per person in the family, the number of people in the family, and family composition (sex, age, marital status) are related to whether families meet their energy and protein needs.

In Naranjito, where the people have been participating in a food-for-work program, families seem to be able to meet nutritional needs better and to enjoy a more diverse diet in spite of small size of land holdings and in spite of having large families. However, even in this village, there are a number of families not meeting their basic energy needs.

## CHAPTER V: CONCLUSIONS

In this chapter, we will comment on a series of questions having to do with the specific conditions observed in the research communities in Southern Honduras as well as with more general issues concerning the impact of development on nutrition. These questions include the following: What are the dietary patterns in these communities and how do they relate to various socioeconomic variables? What are trends in development that seem to be taking place in Southern Honduras? What is the significance of the dietary patterns and nutritional status in these communities in relation to Honduras in general and to the rest of Latin America? And what nutritionally relevant recommendations are appropriate for the findings in these research communities?

As stated earlier, Honduras has been designated a "food priority" country because of its relatively high levels of undernutrition, declining yields in basic grain production, an increasing demand for grains, and low ratings on certain economic indicators (such as per capita income). This study was conducted as part of an INTSORMIL program with the long range goal of increasing sorghum production in Honduras (where it is already being consumed as human food as well as being used for animal feed) to help ease the food needs of the country.

### The Diet

The characteristic diet of families in our sample is varied, and it is based on a core of foods including maize and/or sorghum tortillas, sweetened coffee, beans, rice, squashes, tomatoes, cabbage, potatoes, cuajada, eggs, and fruits such as melons, bananas, plantains, acerola, cashew, plums, lemons, and mangoes (when in season). Certain bread products, beef, pork, and chicken are eaten less frequently. Grains provide a greater proportion of the energy and protein intake for families in the sample than was characteristic for the national average of diets of rural populations. Beans, on the other hand, make a smaller contribution to the diet. In Naranjito, Families working for COHAAT seemed more able to include a variety of purchased foods and the more expensive foods in addition to grains in the diet. In all three villages, the average dietary

diversity score (the number of different foods eaten by a family during one week) is 20. Thus, there is a fair amount of dietary diversity among households in the villages.

#### Alternative Grains in The Diets of Families in Southern Honduras

Southern Honduras is an area in which maize and sorghum have existed as alternative tortilla grains for a number of years. Sorghum was introduced into Central America at least two hundred years ago and was cultivated in Honduras at least one hundred years ago. Maize tortillas have probably been a mainstay of the diet in this region for a thousand years. Sorghum, introduced much later, has been thoroughly incorporated into diets in the research communities. Local landraces (maicillos criollos) have been selected, over the last two hundred years, for their acceptability as tortilla grains, as well as for their agronomic characteristics. However, it is clear from the responses of the people in the three research communities that maize continues to be the preferred and more highly valued grain. Sorghum is considered less nutritious and "cooler" in the humoral system of medicine. This latter classification means that sorghum consumption is occasionally considered inappropriate for people in certain situations, such as lactating mothers.

The low value placed on sorghum has, we feel, resulted in a significant underreporting of sorghum consumption. The survey conducted by INCAP in the mid-1960s did not report sorghum as a food used in Honduras (INCAP 1969). When questioned about sorghum consumption, SAPLAN staff in the capital city of Tegucigalpa also maintained that sorghum was not a significant human food in Honduras. Scrimshaw (personal communication) notes that INCAP staff also failed to report sorghum consumption in neighboring Northern Nicaragua because they assumed that all tortillas were made from maize, and their informants were unwilling to offer the information that sorghum was being used.

Although undervalued, sorghum is acceptable as a maize substitute in the communities surveyed here. Many families use sorghum as a tortilla grain for a significant portion of the year. Poorer members of the communities, such as landless families and families renting land, were found to be more likely to consume

sorghum than were families that own land. Sorghum is even more important than maize for poorer families. In Naranjito, more households are using maize, and fewer are using sorghum than in Cacautare and Corinto; it seems clear that this difference is largely due to the presence of the COHAAT project, which provides maize in payment for work.

### Dietary Adequacy

In looking at dietary adequacy, we find that there is a wide range in the degree to which families meet their energy and protein needs (from 43% to 273% of energy needs; from 92% to 655% of protein needs). There are a number of families at risk, especially with respect to energy. In Cacautare and Corinto, slightly more than half of the families interviewed do not meet their energy needs, while in Naranjito, about one-third of the families fail to meet their energy needs. All families except two meet their protein needs. It appears from these data that the families in our research communities are having an even harder time securing an adequate diet than the "average" rural Honduran family (46% of whom meet less than or equal to 90% of their energy needs and 100% of whom meet or exceed their protein needs).

At the same time, the chief nutritional problem appears to be inadequate energy availability rather than inadequate protein intake. This is not an unusual finding. Most investigators concerned with undernutrition note that energy is more likely to be the first limiting nutrient when total diets are examined.

According to national surveys of the Honduran diet, deficiencies of vitamin A and riboflavin are also significant health concerns. Although we did not analyze dietary data for vitamin A content, it is likely that deficiencies existed in some families in the sample during the time period of the study, as many families depend heavily on grain foods to provide a large proportion of energy.

### Ascorbic Acid and Sorghum Consumption

In recent years there has been some question concerning the effect of sorghum-based diets on ascorbic acid requirements. Some researchers have

suggested that sorghum-based diets increase the requirement for ascorbic acid. We cannot, of course, address that question directly with survey data. However, it should be noted that families in these communities appear to have access to a wide variety of vitamin C rich foods, including a number of fruits and vegetables noted above.

### Variables Influencing Dietary Patterns

There are a number of variables that are related to which foods are included in the diet and to whether a family is able to satisfy their energy and protein needs. In general, economic indicators (material life style scale, land availability, and the number of large animals owned) are related to consumption of more expensive foods, use of more purchased foods, and a greater diversity of diet. These variables, however, do not explain the range of variation in dietary adequacy. Family structure and land use seem to have a stronger influence on the families' ability to meet nutrient requirements. The number of persons in the household and the ratio of children to adults seem particularly important for whether a family is able to meet energy requirements. In Cacautare and Corinto, large families have an especially difficult time meeting energy needs. Again, the fact that many families in Naranjito work for COHAAT seems to have offset (to a certain extent) the problems of large families in maintaining an adequate diet. The number of people in the household is also related to which foods are used: it is negatively related to energy intake from sweets and from meat. Larger families get more of their calories from grains.

Land use is another important variable in relation to dietary adequacy. In the municipio of Pespire, 3.5% of the total landowners control close to half the land. Most farmers have access to and use only small amounts of land. In the survey sample of households, almost half of the families interviewed control their own land, and about half either rent or borrow land. Sixty percent planted 5 or fewer manzanas of land.

As we have shown, landless households are less likely to meet energy needs. Land ownership strongly influences dietary patterns as well. In general, owning land is positively correlated with dietary diversity and with consumption of foods from animal sources. Renting land is positively correlated with eating

sorghum (instead of maize) for more months during the year. The amount of land planted per person is related to meeting energy needs in Naranjito and to meeting both energy and protein needs in Cacautare and Corinto. The case studies presented in Chapter IV suggest that these variables interact in complex ways in shaping dietary patterns.

### Changing Trends in Land Use in Honduras

B. DeWalt (1982) has described changes currently taking place in land use and in food production and consumption in Honduras. With an increasing market for cattle and greater exportation of beef from Honduras, forest lands are being converted to pasture lands in order to make increased beef production possible. Beef production has expanded rapidly since 1959, but consumption of beef has decreased because most of the beef is exported, primarily to Puerto Rico and the United States. Since 1976, Honduras has been a net importer of maize, rice, sorghum, and beans. Presumably, this trend will increase as more land is used for pasture instead of for subsistence farming. DeWalt also notes that the amount of land planted in annual crops seems to have held steady in the municipio of Pespire but that an increasing proportion of those crops may be destined for consumption by animals instead of by humans. DeWalt describes the process by which pasture lands are being created: landless peasants in these communities are able to rent land at reasonable prices and, by doing so, they clear the land for the owner, plant pasture grasses between the rows of grain crops, and leave the grasses for fodder after the grain crops have matured and have been harvested. It is important to consider how this trend will affect the local diets in communities in the research sample.

Those who rent land will be most affected as access to land becomes more difficult. Land owners have much to gain by using their land for livestock after it has been cleared. It is likely that the effects will differ somewhat for Naranjito in contrast to Cacautare and Corinto. More cultivators are renting land in Cacautare and Corinto than in Naranjito. Because livestock raising does not create new jobs, landless peasants will also lose ready access to labor that could provide cash income to purchase food. Migration may be the only option for some families.

In Naranjito, problems associated with farming small plots seem to be blunted at least temporarily by the food distributed by COHAAT. We are not sure to what extent diet will be affected by the departure of COHAAT. The communities studied seem to be undergoing a shift from a semi-subsistence to a more cash-based economy. Thus far, this transition has not caused major socioeconomic or nutritional problems for most people. With increased cattle production, however, socioeconomic conditions (and dietary patterns) may change more drastically, resulting in reduced options for landless peasant families.

### Significance of Dietary Patterns and Nutritional Status in Southern Honduras in Relation to Latin America

Escudero (1978) has suggested that the magnitude of malnutrition in Latin America is actually worse than the levels indicated by official statistics because of inaccurate and biased recording of mortality and morbidity. In 1973, for example, 38,687 deaths from malnutrition in Latin America were recorded. Escudero estimates that a more accurate count would be about 400,000 per year (which would represent 17% of deaths from all causes). He gives two reasons for the differences in these statistics. First, there may be an underregistration of deaths in rural areas, where many of the registered deaths are not certified by physicians. As a result, cause of death may be inaccurate or missing altogether. Second, even deaths certified by physicians are unlikely to be attributed to malnutrition because of the model of causality of professional medicine, which "presents each and every disease as the result of a specific pathogenic agent" (Escudero 1978: 472-73). Furthermore, the "International Classification of Disease," which is used for comparative purposes in order to standardize mortality reporting, lists infectious disease as the cause of death even if both disease and malnutrition are mentioned in the death certificate, in spite of the fact that it is well known that fatality from a number of diseases (such as measles) is a function of nutritional status. Escudero also states that current morbidity statistics are actually descriptive of "medical services rendered" rather than an accurate way of recording prevalence and incidence of disease. He includes Honduras as a country where these patterns can be observed. Escudero recommends the use of surveys conducted in various geographical areas studying food

consumption, dietary habits, and height/weight patterns in order to draw conclusions about malnutrition in rural areas of Latin America.

Escudero, then, suggests that hospital records and death certificates are not helpful (or particularly accurate) for determining the magnitude of malnutrition in rural Latin America. Other researchers have also discussed the issue of health problems in communities, even when clinical evidence of frequent malnutrition is not found. It has been suggested that "lack of fully nutritionally balanced meals" (K.M. DeWalt and Pelto 1977) and "chronic borderline nutrition" (MacKensie 1976) have subtle effects on resistance to disease and the maintenance of energy levels.

In this study, it is shown that a number of families fail to meet their energy needs. Although in this preliminary study we did not conduct height/weight surveys, the data presented indicate that certain families seem particularly vulnerable to problems of infection (and possibly growth retardation for young children), given the low levels of reported energy intake and the high proportion of energy coming from grains in exclusion of other foods. Other families seem to be doing well in satisfying nutrient needs and may not be subject to the same risks. Heavy reliance on grains may have several effects on health, especially for children. First, vitamin A intake may be deficient. Secondly, protein availability may be adversely affected by a low consumption of beans (which can potentially balance out the amino acids in maize and sorghum products). For example, Table 26 suggests that all of the families presented as case studies consume about the same proportion of energy from beans, whereas it would be important for families consuming large proportions of grain foods to balance those foods with nongrain sources of protein (either beans or other foods). It would be useful to find out why families are receiving such a small proportion of their energy intake from beans. Our data collection may have involved some error, but because beans are purchased or earned in measurable units (unlike garden vegetables), one would expect reports of their consumption to be fairly reliable. Beans may be considered relatively expensive by people, and they must be purchased or earned because they do not grow well in this region of Honduras. Beliefs about beans vary, with a sample of women agreeing that red beans are generally nutritious, although they are often considered an inappropriate

food for sick people and for young children. The major point to stress is that dietary patterns have implications for general health status. Our data suggest that these patterns vary among different types of families in these communities. The poor families without access to land are those who have the poorest diets and would thus be expected to be in much poorer health.

### Conclusions

Escudero has concluded that in terms of maintaining health, "it is much cheaper, as well as more useful and simpler, to supply a population with food than to supply it with medical care when it becomes ill with parasitosis, diarrhea, bronchopneumonia, or measles" (Escudero 1978: 487). The question is, however, how to provide more food for the people at risk.

Because our data suggest that land planted and land-planted-per-person and the number of people in the family are the variables most closely related to whether families meet their nutritional needs, the most effective ways of improving nutritional status may not be directly related to particular foods. Instead, improving nutrition may have to involve long-range efforts to make more land available to subsistence farmers in combination with making available family planning services, and perhaps most importantly, creating jobs in other sectors of the economy. The first change, changes in land ownership and usage, would require structural changes in the communities studied. Honduras has had a relatively modest agrarian reform, but larger efforts would be required to benefit the large number of individuals without access to land. However, there are other approaches that can be beneficial on a short-term basis. They include providing better varieties of crops already grown (to increase productive yield), continuing food supplementation for children's diets, and distribution of vitamin A capsules for children. In the communities studied, aid for families headed by single females supporting children is particularly necessary. Food-for-work programs seem especially popular with the peasants and may be successful if they are tied to attempts to improve the long-term capacities of villages and farmers. Another program would be improved prevention and treatment of diseases in poultry and pigs; many informants stated that they lose a large number of hens and swine every year to preventable

epidemic diseases. Many families own hens, but egg production is low, and as Table 16 indicates, eggs provide only a small proportion of energy and protein in the diet in these communities.

Regarding food beliefs and nutritional education programs, there are several points to make. In focusing on food beliefs, the researcher risks producing data that can be interpreted by others in ways that stereotype rural populations or "blame the victim" for nutritional problems experienced. These data and other researchers' findings show that the main nutritional problem is insufficient food intake resulting from limited resources (particularly, access to land). At the same time, these data suggest that this sample population has greater awareness of the positive value of foods than was found to be the case in earlier studies of the rural population in Honduras. We also find that ideas such as hot/cold distinctions and beliefs about strong foods or foods causing diarrhea have a potential for influencing food choices for infants and persons who are sick. But the concept of "neutralizing" foods and substances for treatment of illness (see Harwood 1971) is also present and may be useful for offsetting potential dietary restrictions or for making beneficial restrictions. The precedent for conceptualizing foods in a beneficial way (as well as having a harmful relationship to health) already exists in these communities.

An idea that we did not encounter was an emphasis on a "balanced diet." If nutritional education can be of help in these communities, the issue of balancing available foods might be of value to emphasize. Maintaining a balanced diet through the inclusion of a variety of home-grown foods is becoming more difficult to do, however, because of the increasing use of herbicides. As stated in Chapter II, growing vegetables in the milpa, where herbicides are used, requires extra time and effort. This trend will become a problem if nutrients previously received from home-produced foods are not obtained from other sources. At any rate, families seem to be utilizing a large number of the available foods; nutritional problems are more the result of socioeconomic conditions than lack of information about foods.

On the other hand, education about foods may influence receptivity to increased use of certain foods, such as sorghum, because people are definite

about their food preferences. Researchers have raised the question of the ethics involved in encouraging people to eat foods that the local populations do not prefer and which Americans would not eat (Taussig 1978a, 1978b). At the same time, such efforts may at least increase the number of options open to farmers with access to only small amounts of land and vulnerable to ecological constraints. At present, more information is needed concerning the nutritional qualities of sorghum and of its interaction with other foods in the diet and its digestibility in the body before increased reliance on it as a dietary staple can be recommended. However, the people in our sample communities are already making the decision about its use, saying that when they don't have maize, they will continue to eat sorghum.

## APPENDIX

### PREPARATION OF SOME BASIC FOODS

#### Tortilla Making

Below is a description of a woman making tortillas for the noon meal as observed by Karen Thompson:

Before I arrived, Maria had cooked the maize with ceniza and water; then she had rinsed off the kernel skins. While I watched, she ground the cooked maize in her hand mill. Then she put the masa on the stone piedra and began to knead it with her hands, sprinkling it with water from a calabash bowl occasionally. She began regrinding it bit by bit with the grind stone (mano). She scraped the reground masa and formed a ball with it in her fingertips. In seconds she shaped the mass into a disk, circular with smooth edges of uniform thickness. She began patting it in the palm of her hands, pressing it in one palm with the palm of the other hand. She continued to flatten the disk, then she turned it upside down into the other hand and patted it back-and-forth between her hands until it became round and flat. She dropped it lightly into an ungreased comal on top of the fogón and heated the tortilla for about 8 minutes. While it was heating, she said that she learned to make tortillas when she was 11 years old. Maria put a pot of cooked rice floating in lard on the fogón to reheat. Under the fogón was a hollowed-out guanacaste tree trunk in which she kept water for drinking and for cleaning.

Above her fogón, mazorcas (cobs of mature maize) still in the husks were stacked on top of sticks that were lying across a log rafter. Maria said that she can store them four months this way.

During a visit with another family, I watched a young girl making maicillo tortillas by pressing them flat between pieces of plastic wrap that were spread on the table. Her mother said that the girl cannot make them well using the method of patting them between her hands, and they called their method the "Costa Rican style". This family cooked their sorghum using ash and lime (half and half), for one-half hour. They said that the sorghum was softer ("mas blandito") and therefore did not require as much cooking time as did maize.

Maize however, they said, was more nutritious. They

Maize however, they said, was more nutritious. They told me that they make tortillas out of green or dry maize, but for sorghum tortillas they use only dry sorghum.

Atole de Maiz. Maize porridge is another food made with masa from elotes (maiz verde, or green corn in the dough stage). It is made by stirring the ingredients (masa, sugar, milk, cinnamon) constantly for an hour until it has the consistency of smooth pudding with a very sweet, filling quality.

Cuajada. One of the most frequently eaten dairy products is called cuajada (literally, curds). It is made in the following way: After the cream is removed from milk that has been sitting in a covered bowl overnight, cuajo (rennet) and suero (whey from making a previous batch of cheese) are added to the milk to begin the coagulation process. Clabbering tablets are available for this purpose, but they were said to result in a less flavorful cheese.

After waiting for the curds to separate from the liquid, some of the whey is squeezed out and saved (to be fed to the pigs). The remaining mass of curds is placed in the batea so that additional liquid can be drained off as it gathers in the ridge in the dish. Some of the whey is poured over the cheese and drained off again. After this process is repeated salt is added and the curds cut into pieces. It can also be shaped into balls or loaves. The cheese dries and the flavor becomes stronger overnight.

#### Other Foods.

Rosquillas are hard biscuits with a hole in the center made of maize masa, cuajada, mantequilla (soured cream), and ceniza (ash). They are baked in an oven. They can usually only be made during the wet season when there is sufficient fodder for cows to insure good milk production (and thus, providing enough milk for making cuajada).

Rosquetas are very similar to rosquillas. They are made with maize that is uncooked ("mas crudo"), and ground dry. The maize flour is combined with sugar, and the dough is baked.

Pan de harina -- this is made with ground manioc, maize masa, and honey. It is fried.

Quesadilla -- similar to the rosquilla made with maize that is seasoned with sugar, cinnamon, cuajada, and soured cream, and then baked.

Tamales pisques -- These are made by cooking maize as if for tortillas but using more ceniza. The maize is then ground and wrapped around a spoonful of refried beans, doubled over and wrapped in a plantain leaf. The tamales are then boiled in water.

Tamales or nacatamales. Tamales are made year round, using dry maize, and meat (pork or chicken). The half-cooked maize is ground and cooked with onion, sweet pepper, and spices. The meat is fried in oil with tomato, sweet pepper, onion, spices, and canned tomato sauce. The seasoned masa is then wrapped around a spoonful of meat and the tamale is wrapped in a plantain leaf. Sweet tamales are made in the same way except that ground pineapple and sugar are used for the filling instead of meat.

Tamalitos are made with fresh elotes, instead of dry maize, and milk, salt and sugar. They are made during the wet season winter when elotes are harvested (especially July and August).

Fresco de maicillo. A soft drink can be made with sorghum: Water and sugar are cooked with the grain, and the ingredients are then strained and served as a drink.

The preparation of two soups were described to me. The first one was called Sopa de capirotades de masa (masa-ball soup). For this soup, maize, cuajada, eggs, and spices are rolled into balls and fried in lard. The balls are then cooked in a little water with fried vegetables (onion, tomato and black pepper). Annato is added for color when the soup is served. The other soup described was bean soup, made with red beans, beaten egg, onion, and sweet pepper.

GLOSSARY OF SPANISH TERMS AND UNITS OF MEASURE

- Achiote - annato, a red spice used for seasoning.
- Aldea - village
- Amas de Casa; Amas de Hogar - Homemakers' clubs supported by the Ministry of Natural Resources and the Catholic Church, respectively.
- Anona - custard apple.
- Atole - porridge made from various grains: maize, sorghum, rice.
- Ayote - squash, variety of Cucurbita mixta.
- Batea - wooden bowl used for making cuajada.
- Camarones - shrimp, either sea shrimp usually purchased at market, or a species of small fresh-water crustacean.
- Campesino/a - one who makes his/her living cultivating the soil; peasant.
- Camote - tuber: sweet potato.
- Carga - unit of measure. 1 carga = 200 lbs.
- Caserio - hamlet.
- Ceniza - ash.
- Centavo - 1/100 th of a lempira, about 1/2 U.S. cent.
- Centro de Salud - health center.
- Chacalines - crayfish, purchased or caught locally.
- Chayote - variety of squash (Sechium edule) also called patate.
- Ciruelas - plums.
- Coludo, (maicillo coludo) - variety of criollo sorghum with loose panicles.

Comal - a griddle used for baking tortillas, made of clay or metal.

Comedor - literally, dining room; usually refers to a cafe.

Comino - cumin.

Companero/a - common-law spouse.

Confites - sweets, candy.

Costurera - seamstress.

Cuajada - a soft fresh cheese, made locally (literally means "curds").

Ejido - communally owned land

Elotes - green maize, used as a vegetable.

Ensalada - salad, often prepared with cabbage as the green, seasoned with locally made pineapple vinegar.

Estacón - a style of house construction in which the outer walls are made of wooden sticks or stakes.

Fogón - a raised hearth, usually made of adobe.

Frescos - soft drinks made from grains, seeds, and/or fruits, and sugar; it can also mean sodas (refrescos).

Frijoles tiernos - green beans.

Fritas de harina - fried pastry made from wheat flour, eggs, and sugar.

Garrobo - several species of wild lizard.

Gripe - flu.

Guineo - variety of banana, grown locally.

Invierno - literally winter, refers to the wet season and includes the months of May through November.

Jilotes - very immature cobs of maize.

Lempira - basic unit of Honduran currency;  
1 lempira = \$0.50 U.S.

Maicillo - sorghum, usually used to refer to criollo varieties or local landraces.

Mano - grind stone for grinding masa, used with a piedra (see below).

Mantequilla - cream allowed to separate from milk and then slightly soured.

Manzana - unit of land measurement equivalent to 1.7 acres.

Masa - dough made by treating maize or sorghum with an alkaline solution to remove the pericarp followed by wet milling.

Mazorca - mature ear of maize.

Medida - unit of dry measure equivalent to about 5 lbs.

Mesa - table.

Milpa - field.

Minimo - variety of banana.

Municipio - unit of government similar to an American county.

Olla - a round cooking pot with handles; made of clay.

Palomas - doves.

Pan de harina - wheat bread.

Panes - soft, wheat rolls.

Partero/a - traditional childbirth attendant.

Patillas - pills.

Piedra - stone quern used for grinding maize into masa, and other grinding tasks.

Piñ- pineapple.

Piña, (maicillo pina) - a white variety of criollo sorghum.

Pulperia - a general store with a larger selection than a trucha (see below).

Quesadilla - a pastry made with maize or sorghum dough, similar to a rosqueta or rosquilla (see below), but containing a sweetened cheese filling.

Rifas - raffles.

Rosquillas and Rosquetas - hard cookie-like pastries made of maize or sorghum and other ingredients. Rosquillas are made with cuajada, while rosquetas are not.

Sandía - watermelon.

Sarten de barro - flat bottomed pottery pan.

Suero - in cheese-making, whey.

Tablón - a long, narrow work table.

Tamal - a food in which ground maize is wrapped around a spoonful of beans or other filling, wrapped in a plantain leaf, and steamed.

Trucha - a very small store stocking basic necessities and soft drinks.

Verano - literally summer, refers to the dry season and includes the months of December through April.

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