# ECOLOGICAL FORCES AFFECTING THE NUTRITIONAL ADEQUACY OF FOODS PURCHASED BY FAMILIES IN CALI, COLOMBIA

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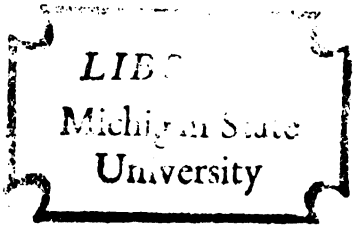


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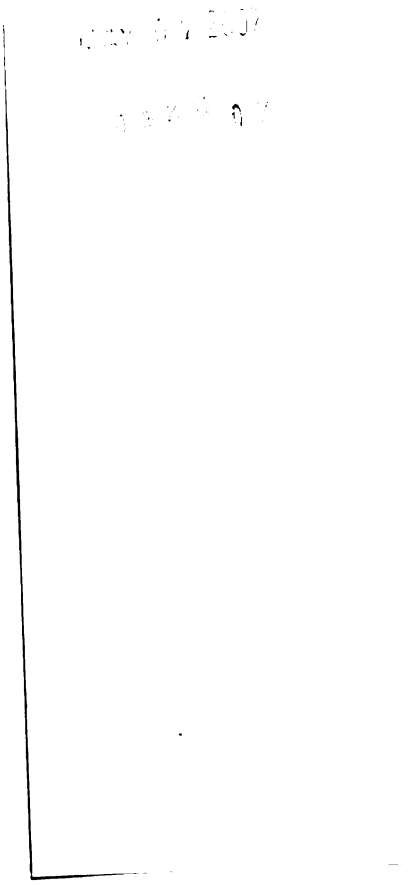

ABSTRACT

ECOLOGICAL FORCES AFFECTING THE NUTRITIONAL ADEQUACY OF FOODS PURCHASED BY FAMILIES IN CALI, COLOMBIA

By

Wilma Jean Jackson

The purpose of this descriptive study was (1) to evaluate the protein-calorie content of primary foods obtained during a specific week by 236 Colombian families included in a Market Basket Survey; (2) to determine the adequacy of these food choices for meeting the protein-calorie requirements of each individual family; and, (3) to analyze the data within a framework of selected ecological forces which could contribute to a more holistic view of the family's nutritional needs.

The sample was selected from a sub-sample of a 1969 Colombian Consumer Survey co-directed by the Latin American Planning Center of Michigan State University and various institutions in Cali, Colombia.

The families were classsified into income per capita levels according to the monthly pesos available per person in each family. The four levels were: I (less than $125 pesos); II ($126-240 pesos); III ($241-500 pesos); IV ($500 pesos and above); and Unknown (mixed level, income unknown).

The families were then described on the basis of such socio-economic characteristics as residential area, monthly income and estimated per cent of income spent for food, employment status, education, newspapers read, dwellings and possessions, child-feeding practices, the participation of family members in decision-making, the reaction of the ama de casa (female responsible for the family purchases) to new food products or different markets, market forces affecting food purchases among the socio-economic levels, and modes of transportation used by the families.

The Market Basket analysis was concerned with the percentages of families purchasing meat, animal products, grains, vegetables, fruit, and processed foods; expenditures for each food category; animal products purchased by families with preschoolers; determination of protein-calorie content of the foods, and the comparison of this indicator with requirements estimated for each family.

The findings presented the differences between the proteins and calories of the selected purchases and the estimated daily protein-calorie requirements calculated for each family (100 per cent was used as the standard for comparison).

In general, the lower IPC families selected a smaller variety and quantity of food products but spent the greater proportion of their income for food. The demand for animal proteins and fruit increased as the IPC level

increased. A different preference pattern for certain grains and vegetables was exhibited by lower compared with upper IPC levels.

The percentage of families meeting 100 per cent of their estimated protein-calorie needs was very low, even though many households exceeded their animal protein requirements. The percentage of all families meeting 80-100 per cent of their needs increased throughout the ascending IPC levels. The per cent of the total sample meeting 100 per cent of their estimated requirements was: calories, 7 per cent; total proteins, 27 per cent; and animal proteins, 60 per cent.

None of the low IPC families, both with or without preschoolers met their estimated calorie needs. The percentages of families at all levels in each of these sub-groups that met 100 per cent of their protein requirements increased throughout the ascending IPC levels. In general, families with preschoolers did not meet their nutritional needs as adequately as did those without young children; however, there was variation within the IPC levels.

The research recommends future studies based on the interrelationships and strengths of ecological forces influencing the nutrition situation, in order to provide guidelines for remedial programs and nutrition education.

# ECOLOGICAL FORCES AFFECTING THE NUTRITIONAL ADEQUACY OF FOODS PURCHASED BY FAMILIES IN CALI, COLOMBIA

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# CHAPTER I

## INTRODUCTION

### The Problem

An assessment of the nutritional needs of a people is both a time-consuming and expensive operation. In developing countries, where resources are scarce, detailed or extensive nutrition surveys may not be feasible. The required information may need to be assembled by careful observation, conversation, and simple inquiries regarding some specific problem (1:91). At times, costly research is not used in an advantageous manner due to lack of personnel, knowledge, funds, or equipment. Often research which is broad in scope has data which, when analyzed from a different perspective, can contribute information relevant to allied professions.

Such a study was the PIMUR project (Proyecto Integrado de Mercadeo Urbano Rural), which was directed in 1969 by the Latin American Planning Center of Michigan State University in cooperation with various institutions in Cali, Colombia. The General Consumer Survey (Encuesta General de Consumidores), one of the technical studies of the PIMUR project, sought to describe and analyze the conduct of the Cali consumer in order to relate the findings to the distribution system, and to provide information which could

be used as a basis for further socio-economic studies in Cali.

The Market Basket Survey (Encuesta de Canasta de Consumo) was a sub-sample of the General Consumer Survey. Its primary purpose was to measure food consumption as a means for partially judging the overall performance of the economic system, especially the food sub-system (2:36).

A suggestion originating from the Market Basket Study was that further analysis of the data should be undertaken in order to more clearly identify the nutritional conditions in the city of Cali (2:36). This further analysis was especially requested by Pradilla of the Universidad del Valle where he and his staff were involved in clinical studies in which patients were returned to nutritional balance using 100 per cent protein from plant sources, with high-lysine corn as the principal source.

## Purpose of the Study

It was the purpose of this present descriptive study (1) to evaluate the protein-calorie content of primary foods obtained during a specific week by the 236 families included in the Colombian Market Basket Survey; (2) to determine the adequacy of these food choices for meeting the protein-calorie requirements of each individual family; and (3) to analyze the data within a framework which could contribute to a more holistic view of the ecological forces influencing the nutritional adequacy of the Market Basket foods to meet the estimated needs of the families.

Importance of the Study

Protein-calorie deficiency, which affects chiefly infants and young children, is a major problem in the economically underdeveloped countries of the world. This deficiency is evidenced in the high infant mortality rates and poor growth rates of children (3). In Colombia, infantile malnutrition due to protein-calorie insufficiency is the cause of an elevated rate of mortality and morbidity in children under five years of age. According to INN, the Colombian National Institute of Nutrition, the mortality in the age group of one to four years was 13.3 per thousand in 1964 (4). It is estimated that in Colombia 82 children out of every 1,000 die before the age of one (5:18).

INN also reported that the deaths of children less than five years of age represented 50 per cent of the general mortality. Each year more than 90,000 children die before reaching five years of age. More than one-third of these die directly or indirectly from causes attributable to malnutrition. Investigations undertaken in pediatric hospitals in Colombia reveal that one-fourth of the children die in an advanced stage of malnutrition, and that more than 90 per cent of the children hospitalized present signs of malnutrition regardless of the precipitating cause of their hospitalization (4).

Scrimshaw related research in the area of malnutrition and infection which reveals that the combination of the two often results in a severity greater than the sum of

the two individual processes. An infection can precipitate an acute deficiency disease in a person with a borderline nutritional status, or if the malnutrition is sufficiently severe, it reduces the individual's resistance to most infections. This phenomenon, known as synergism, is considered a major cause of high morbidity and mortality in the underdeveloped countries where nutrition is poor and infections are common (6).

Coursin cites extensively the increasing body of evidence relative to the effects of undernutrition on central nervous system activity--neuromuscular function, behavior, and intelligence--in the preschool child. Children with a poor post-natal dietary intake

> . . . may begin to show a decline in their neurological competence by four to six months of age. Breast milk is the only source of nutrition of these babies and serves them well until their needs begin to exceed supply. This may occur within a matter of months, even though nursing may continue for several years. The inadequate milk supply is then supplemented with substances of local origin . . . that supplies primarily carbohydrates for calories. Hence, the infant's ongoing growth and development evolves on a restricted nutritional intake that contains progressively smaller amounts of necessary nutrients for normal cellular metabolism (7:6).

In 1960, the Interdepartmental Committee of Nutrition for National Defense (ICNND) conducted a nutrition study in Colombia which revealed, along with the high level of infantile malnutrition, noticeable retardation in the growth of Colombian children. These children follow the growth pattern of North American children up to the ages of six or eight months; then, due to deficiencies in their alimentation after weaning, they present curves of growth

that decline and continue below normal throughout the following years (8).

Although the effects of protein-calorie deficiency may be more marked in children, Berg reported that the effects upon the adult population can result in a limited life expectancy which in turn limits the number of productive years. Malnutrition can also decrease a worker's productivity, lower his resistance to diseases and increase his proneness to accidents. These and other such factors result in a monetary loss to economic development (9:2-3). Studies with adults in Central America showed that the benefits of a diet adequate in protein were equal to those for children. The adults gained "energy, ehthusiasm and ability to stay at strenuous tasks" (10:37).

Due to the serious and often irreparable effects of malnutrition upon both children and adults, which have far-reaching implications for the nation, knowledge of the foods urban families purchase may serve as a partial indicator of the kind of diet the families actually consume. Although the prevention of protein-calorie deficiency in families appears to be dependent upon a combination of ecological variables, at the most obvious level it is dependent upon making available enough food of adequate protein value at a price the family can afford. It is also dependent upon the preparation and distribution of the food in a suitable, equitable, and uncontaminated manner (1:10). According to FAO, the primary indicators of the nutritional quality of a

diet are its protein-calorie content (11:33). Therefore, in this study, an attempt was made to assess the protein-calorie content of the food in the Market Basket and relate the findings to the estimated requirements of the families.

## Definitions of Terms Used

Definitions of some of the terms used in this study are presented in alphabetical order. Only those terms which would appear to require a more narrow or specific definition are included.

Ama de casa.--This person is the adult female generally responsible for the management of the household. Her relationship to the jefe de familia is not known. In the study she is the chief decision-maker relative to food purchase.

Barrio.--The Spanish word for suburb, precinct, or district seems to be more descriptive and so is used instead of the English term.

Family and household.--These terms are used synonomously. Since relationships within the homes are not known, family refers to the nucleus of persons living and eating together regardless of sanquine ties. The basic element is the act of eating together, although there may also be combining of incomes.

Food pesos.--That part of the money income which the ama de casa estimated as the approximate amount used to buy

foods. It also refers to the amount actually spent in the purchase of the Market Basket foods.

Income.--This refers to the total money available monthly to the family. According to the PIMUR definition, this money was almost always the total salary of the persons working in each family and generally it excluded other extra incomes such as interest or dividends (12:12). Income is expressed using the dollar sign as in the United States, but followed by pesos to avoid confusion. Thus $ refers to Colombian pesos, unless otherwise indicated.

Income per capita.--This term, symbolized by IPC, is used primarily as the criteria for the four levels used throughout the study for descriptive purposes. It refers to that part of the income obtained per person when the total family income is divided by the number of persons, both adult and children, in the family.

Jefe de familia.--In 204 cases out of 236, this term refers to the male designated as head of the household by the person interviewed, that is, the ama de casa. Unless otherwise indicated, the term means the male head (jefe). His relationship to the ama de casa is unknown.

Levels of income per capita.--The division of income per capita into four levels, symbolized by IPCL, provided a basis of comparison. The ranges within each level were established by the PIMUR Consumer Survey when it was found that a sufficient number of observations fell within each category to permit more reliable estimates in each range

(12:15). The IPC Levels include the following income ranges:

I - less than $125 pesos monthly
II - from $126 to $240 pesos monthly
III - from $241 to $500 pesos monthly
IV - more than $500 pesos monthly
Unknown - mixed level, income unknown

Malnutrition.--In this study, the term refers to a pathological state caused by the consumption of an inadequate quantity of food over an extended period of time. There is a deficiency of dietary nutrients, principally protein-calorie deficiency which results in undernutrition. The term is also used to refer to an imbalance among essential nutrients in the diet (13:8).

Market Basket.--This term, symbolized by MB, is generally used to indicate the foods obtained by the families during the survey week. However, it is also used to indicate the sample, such as the MB families, or the total survey.

Socio-economic level.--Nine classifications of the barrios were made by the Municipal Planning Office of Cali. These were based on such factors as income, transportation, educational services, community action, sewage facilities, trash collection, water, lights, and types of streets. These nine classifications were reduced to six socio-economic levels (SEL) by the Consumer Survey (12:16).

## Plan of the Report

This chapter has presented an introduction to the problem, the purpose of the study, its importance, and definitions of terms used. Chapter II reviews literature pertinent to nutrition studies from the stance of the malnutrition problem, research emphases, assessment of nutritional problems, a field approach to the problem, nutrition education, protein-calorie requirements, and the evaluation of essential nutrients in a diet.

Chapter III is concerned with data collection and method of analysis with the discussion centering around the selection and description of the sample, the determination of the calorie and protein allowances for the sample and the analysis procedure.

Chapter IV presents a description of the MB families while Chapter V analyzes the contents of the Market Baskets according to types of foods, expenditures, and the percentage of the families estimated protein-calorie requirements supplied by the MB foods.

The final chapter discusses the basic findings, and the ecological forces which influenced the nutritional quality of the Market Basket. It concludes with recommendations for research and implications for nutrition education in Cali.

# CHAPTER II

## REVIEW OF LITERATURE PERTINENT TO NUTRITION STUDIES

Much has been written regarding the nature and prevalence of malnutrition, its etiology, treatment and prevention. This chapter discusses the nutrition problem, the emphases of research in problems of malnutrition, the assessment of nutritional problems, a field approach to the problem, nutrition education, protein-calorie requirements, and the evaluation of essential nutrients in a diet.

### The Malnutrition Problem

Bengoa, in 1940, referred to human malnutrition as an ecological problem resulting from a multiplicity of overlapping and interacting factors in the physical, biological and cultural environments of the community (14:106). At the Colombian Universidad del Valle, researchers found that family instability, unemployment, and poverty were ecological factors correlated with malnutrition.

> . . . more than half of the children suffering from serious malnutrition come from homes where the father is absent and does not contribute to their support. Sibling rank was also found to be an important factor when rations are limited; where there are three or four older brothers or sisters, the younger children are more likely to be undernourished (5:18).

This was because the younger children were not quick enough nor large enough to fight for their share of the meager food.

Jelliffe wrote that cultural influences, such as cooking practices and food classifications, affect the distribution or restriction of foods for vulnerable age groups. Also of increasing importance in the protein-calorie malnutrition of children are the non-nutritional conditioning diseases (13:106).

Two diseases resulting from malnutrition are marasmus and kwashiorkor. Nutritional marasmus is produced by a diet low in both protein and calories and is often termed "balanced starvation." It occurs primarily during the infant's first year of life and usually results from attempts to artifically feed the infant with very dilute milk or substitutes (13:186). Kwashiorkor, the clinical end-result of protein malnutrition, occurs mainly in the age-group 1-3. Growth failure, edema, hepatomegaly and anemia are the clinical evidences of restricted protein intake. Lesions of the skin and mucous membranes resembling pellagra may also be present. Vitamins A, thiamine and pyridoxine are also deficient. Changes in hair pigmentation are due to sulfur-containing amino acid deficiences and from defects in the conversion of phenylalanine to tyrosine. If there is severe calorie deprivation along with protein deficiency, the symptoms of extreme wasting or marasmus appear (15:2039). Children with kwashiorkor and marasmus also show alterations in the pattern of enzymes which is responsible for the oxidation of amino acids and for other body functions (10:37).

Jelliffe specified that kwashiorkor is never exclusively dietary in origin--infections, psycho-cultural, and other such factors are operative (13:106). Observations have shown that the disease is produced by stoppage of maternal milk and a post-weaning diet which has a low protein content. The protein is deficient in quantity as well as quality. However, diarrheas, infections, a child's refusal to eat following the traumatic experience of weaning, habit, taboo and simple ignorance which often exclude available protein-rich foods from the diet of young children are also precipitating causes of malnutrition (1:7-8).

Riley found that the diets of 120 Colombian children under five years of age were deficient in proteins but high in carbohydrates. Their menu consisted primarily of rice, beans, and potatoes (16:97). Surveys by FAO revealed that the weaning foods normally given in the developing countries are chiefly roots, tubers, and cereals, with negligible amounts of milk, eggs, and other animal foods (11).

The approximate mean daily intakes of calories and proteins in the less-developed and developed countries are given by Swaminathan.

> Calories: The mean daily per capita intake of calories in the less-developed countries is about 2,150 as compared with 3,060 in the developed countries.
>
> Proteins: The mean daily per capita protein intake in the less-developed countries is only 58 grams as compared with 90 grams in the developed countries. The intake of animal proteins is very low, i.e., only 9 grams in the less-developed countries as compared with 44 grams in the developed countries (17:6).

In 1965 FAO gave the estimated per capita daily calorie and protein contents of net foodstuff supplies in some developing countries as compared to the United States. It was estimated that there were 3,100 calories per person in the United States as compared to 2,170 in Colombia. The total protein was 49.3 grams, with 22.8 grams animal protein in Colombia, as compared to 91.2 grams in the United States, with 64.2 of these in animal protein. Cereals consumed in Colombia were 181.4 grams with 188.6 grams consumed in the United States. In Colombia, per capita supplies of pulses were 14.8 grams; meat, 100.5 grams; eggs, 9.5 grams; fish, 3.4 grams; milk, 176.1 grams; and oils and fats, 10.4 grams, as compared with the United States' supplies of pulses, 22.1; meat, 267.4; eggs, 51.5; fish, 13.4; milk, 688.7, with oils and fats at 57.9 grams per capita daily (18).

Elaborating on the food consumption of seven food categories, Swaminathan gave comparisons between developed and less-developed areas as follows:

> Cereals: The mean daily per capita consumption of cereals (including millets) in the less-developed countries is about 389 grams as compared to 328 grams in the developed countries. Cereals are the main sources of calories, proteins and B vitamins in the diets of the people in the less-developed countries.
>
> Starch roots: These include potato, sweet potato and cassava. The daily per capita consumption of starch roots is 189 grams in less-developed countries as compared with 316 grams in developed countries.
>
> Sugar and fats: The daily per capita consumption levels of sugar and fats in less-developed countries (29 grams and 12 grams, respectively) are very much less than those (88 grams with 47 grams, respectively) in the developed countries.

Pulses and nuts: These foodstuffs are good sources of protein. The consumption of pulses and nuts in the less-developed countries (53 grams) is greater than that (16 grams) consumed in the developed countries. These foods supply appreciable amounts of proteins in the diets of people in the less-developed countries.

Milk and milk products: The daily per capita consumption of milk in less-developed countries is only 79 grams as compared with 573 grams in developed countries. Milk is an essential food for feeding infants and is a most valuable supplementary food to the diets of weaned infants and pre-school children, school children, and expectant and nursing mothers. The diets of these segments of many populations in less-developed countries are highly deficient in various dietary essentials due to the shortage of the milk supply.

Meat and fish: The mean daily per capita intakes of meat and fish in the less-developed countries are 30 grams and 24 grams, respectively, as compared with 152 and 34 grams, respectively, in the developed countries.

Eggs: The mean daily per capita intake of eggs is only 4 grams in the less-developed countries as compared with 33 grams in the developed countries (17:5).

The FAO target requirements for some of the Latin American countries are to decrease the amount of starch roots and sugar consumed, with levels for pulses and nuts, vegetables and fruits remaining essentially the same. The remaining food items must be considerably increased to supply the calorie and protein levels needed per capita (11).

The World Health Organization stated that the amount of foods and nutrients available to the age-groups of a population is dependent upon those environmental factors which produce an acute shortage of animal protein coupled with inadequate quantities of total protein and protective vegetable foods. Some of the environmental factors are a large increase in population, a low national income resulting in low purchasing power, illiteracy, low per

capita availability to cultivable land, low productivity of soil, and of milk cattle due to primitive methods of agriculture, and animal husbandry, and low levels of industrialization (3).

## Emphases of Research in Problems of Malnutrition

Modern nutrition, according to Rusoff, is more concerned with the specific essential nutrients and their molecular configuration than with food constituents. For example, the concern is with amino acids rather than proteins, specific fatty acids and phospholipids rather than fats, and calcium, phosphorus, iron, and others, rather than minerals (19:17-18). The emphasis is upon the complexity of interrelated factors. This is of extreme importance in the field of amino acid metabolism where very delicate balances exist between individual amino acids and between amino acids and other essential nutrients. Howe reviewed many of these complex interrelationships in his article on amino acid supplementation (20).

Siedler emphasized that foods dropped from a diet must be replaced by foods containing the same nutrients, or additional foods must be added to compensate for the loss of nutrients in order that adequate nourishment may be achieved. For example, foods of the meat group furnish adequate amounts of high quality protein to the diet. Dried beans, peas, and nuts, when used as alternatives, should be

selected carefully to prevent amino acid imbalance problems if they are used extensively as substitutes for meat, eggs, and fish in the diet (21:40).

Byrnes wrote that the value of a protein in the diet is determined by the essential amino acid--usually lysine and tryptophane--and the value of the protein is only as great as the amino acid in shortest supply in the food (5:10). Berg envisioned this phenomenon as a bar chart in which the value of the total protein is only as great as the shortest bar with the remainder of the input lost through the urine since the body cannot store the essential amino acids. In corn and most other cereal grains, lysine is the limiting amino acid--the shortest bar. This then becomes a fatal food chain which steadily accentuates malnutrition among people in developing areas. By depending on starchy foods low in lysine, they suffer a consistent loss of other proteins in their diet (9:4).

In 1964, nutritionists and agriculturists began to weigh the implications of the discovery that high quality protein can be bred into corn. They immediately formulated plans for applying this knowledge to the world food crisis. In 1965, the Rockefeller Foundation programs began to focus on two areas: research with opaque-2 corn, and bio-chemical research on other basic food crops, with the aim of improving their protein content. It granted the Universidad del Valle funds for analysis of the amino acid content of Colombian plant foods in conjunction with studies in infant and child

malnutrition. Hopes are high that improvement in the nutritional status of the infant population can be accomplished through radical improvement of the very food grains that have comprised the diets of peoples in South America since ancient times (22:16).

In the Universidad del Valle, medical history was made when seven children, critically malnourished, quickly achieved a normal nutritional balance on a diet using the newly developed high-protein corn (5:7). Without genetic manipulation, corn is a poor protein source because it almost lacks the two essential amino acids, lysine and tryptophane. Opaque-2 corn contains increased amounts of these two essential amino acids and thus is more correctly described by the term "high-lysine" rather than "high-protein" (5:10).

Krehl and Hodges indicated that the ideal objective in the development of new products to treat or prevent malnutrition is to provide enough protein containing the proper ratio of essential and non-essential amino acids so that they can be used optimally for growth and maintenance of tissues. Sufficient carbohydrate and fat foods are also necessary so that the protein will be used minimally as a source of calories. In this way the physiological wasting of valuable protein is reduced (23:47).

Jelliffe recommended that the diet of a family consist of as full a range of essential amino acids at each individual meal as possible. In this way, there is a mix-

ture of ingredients which can complement and mutually reinforce one another. He suggested a double mix, a triple mix or a quadrimix of foods (24:264-265). The double mix would be the staple which the family regularly used plus an available legume, or animal protein, or a dark, green, leafy vegetable (DGLV). The legume, which lacks the methionine available from the staple, supplies the essential amino acid lysine, which is deficient in the staple (24:265). The triple mix begins with the family staple plus two foods which could be a legume plus either animal protein, or a DGLV, and animal protein. Jelliffe stressed that only a small amount of animal protein is necessary to change a double mix to a triple mix and that even an occasional consumption of such a combination is preferable to none at all. The small amount of animal protein in combination with other foods, supplies more calories and also makes available more essential amino acids to reinforce those of vegetable origin. The quadrimix is the third type of combination. It consists of the preferred staple plus a legume, DGLV, and some animal protein (24:264-265).

Research on high-protein food mixes has resulted in a number of such products. The Maizena Company of South America claimed its product "Duryea" to be the first product in Colombia and in the world to be made with high-lysine corn. Duryea, composed of high-lysine corn, soya flour, powdered milk, vitamins A, C, and B complex, and minerals, is an infant food mix used as a cereal or in the bottle as a

milk substitute (25). Incaparina, a product of the Quaker Oats Company, is an exclusively plant protein mixture composed of the flours of maize, cottonseed and sorghum, with yeast, calcium carbonate and vitamin A (24:205). Berg elaborated on other technological possibilities such as treating grains with lysine during milling or commercially adding it to cereals, drinks, breads and soups (9:4-5).

The advancements of technology in amino acid research are furnishing products which may do much to alleviate the problem of protein malnutrition. Nevertheless, the interrelationship with other elements must be considered. Berg remarked that besides being palatable, the product must be inexpensive, similar to known products, and utilize ingredients which are available within the country (9:5). Jelliffe suggested that the promotion of the high protein foods elaborated on above, should be aimed at all economic levels of the community and be promoted so as to give the image of a high protein food for the entire family, with added benefits for the preschool child (24:207).

The 1969-1970 Foundation Report cited research by Cravioto, Sanjur, Mockeberg, and Zamenhof. In Mexico, Cravioto focused on the family within the home. Observation of variables in the families which would influence the nutrition of the children included sanitary facilities, the size and type of home, family size, the mother's reading ability, and the presence of a newspaper or radio, the mother's attitude toward the food she prepared, method of

preparation, and amount of a newly introduced food eaten by the child. Cravioto felt that the mother and the home are the two major factors in the nutrition of the child. He remarked:

> The mother is the primary educator of the child, and her attitudes toward her family and the food she prepares are critical influences. They are much more important, ultimately, than some vague thing called nutrition (26:16-17).

In New York, Sanjur studied preschool children using a questionnaire designed to measure the social correlates between such factors as:

> . . . the mother's place of birth, her educational level, her awareness of current news events, her shopping, cooking, and eating habits and her knowledge of nutrition and the diet her preschool child receives. (26:49).

Sanjur felt that the regional origin and education of the mother are important since they determine her food ideology. His study sought to measure "all the possible channels of communication that the mother receives and uses to decide what foods she will serve." Also considered were the foods the mother thought best for pregnant women, nursing mothers, sick children, the prevention of "tired blood" and those foods which should be avoided. Foods the mother and the child like, dislike, or had never tasted were recorded from a list of fifty foods (26:48-50).

Monckeberg of the University of Chile reinforced the theory that nutrition is a "vague thing"--a combination of countless inesparable influences. He stated:

> Unfortunately, the social groups that suffer from malnutrition are precisely those with very low edu-

> cational, cultural and sanitary levels. It is obvious that the high frequency of mental retardation in this segment of the population is not a consequence of only malnutrition (26:18-19).

Nonetheless, Monckeberg and colleagues have endeavored to separate malnutrition from such factors as growth and development to determine the amount of mental and motor retardation malnutrition actually causes (26:19).

Studies on the intelligence of the mothers of malnourished children showed that "in the slum area studied, only six per cent of the mothers had an I.Q. over 90, and 77 per cent had an I.Q. less than 75. Monckeberg reported:

> It is quite probable that the scales used to determine intelligence might not be entirely adequate for this group, but it cannot be denied that this low I.Q. is a conditioning factor of malnutrition, since a very close relationship was found between the mother's I.Q. and the nutritional status of their children: the lower the mother's I.Q., the worse the nutritional status of the child. This means that malnutrition produces not only low intellectual performance, but at the same time actually aggravates malnutrition. This vicious circle explains why malnutrition persists from one generation to another with very few possibilities for the individual to improve his condition (26:20-21).

Another study which could have important implications for humans has been conducted by Zamenhof at the University of California. He found that one of the results of long term, chronic protein malnutrition seems to be a baby monkey that cannot cope effectively with his environment. The conclusion was that the monkey "is frightened of change and novelty and responds by clutching himself and withdrawing. He is deficient in his ability to socialize and interact with the world around him" (26:31).

Another area under investigation is that of taste. The researchers involved in these studies feel that interest in regulating and measuring taste and smell is important for one major reason: "Taste influences food selection and intake" (26 ).

## Assessment of Nutrition Status

To achieve the potential benefits from food and nutrition research, it is necessary to determine what foods people eat and to identify those segments of the population where diets need improvement. The Department of Agriculture suggested that current food consumption patterns can be determined by studying food choices, habits, and consumption (27). In planning locally appropriate preventive programs, Jelliffe indicated it is essential to make an ecological diagnosis of the various causative or coexisting factors present within the environment of the individual or family which are responsible for malnutrition (13:106).

Jelliffe also recommended direct assessment of human groups by clinical examination for physical signs (both internal and external) of malnutrition and associating these signs with biochemical and other tests to identify the nutrient(s) responsible for the manifestation (13:10-11). He remarked that the interpretation of clinical signs should be made by using a "grouping of signs" which are commonly seen forming a pattern with respect to the deficiency of the

particular nutrient (13:42). Nutritional anthropometry has as its concern "the measurement of variations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition" (13:50). In developing countries, nutritional anthropometry would appear to have its greatest value in assessing the growth failure and undernutrition resulting from protein-calorie deficiencies. In young children, early protein-calorie malnutrition is probably best detected by deviations from the usual rapid growth rates of this age group. These signs are detected by "a low body weight and by depletion of protein stores, as indicated by a subnormal muscle mass" (13:52). Jelliffe stated that "valuable nutritional surveys of limited scope can be undertaken with a small team by means of clinical assessment, anthropometry, dietary inquiry, and with no laboratory investigation other than haemoglobin estimation" (13:79).

Rajalakshmi cited various means to gain information of dietary intake which can be correlated with other data in the assessment of the nutritional status of an individual or community. These were: the oral survey; measurement of quantities of food consumed; measurement of raw ingredients and cooked product; survey of availability of food to different members of the family; food intake of a particular group such as adolescents; and institutional diets (28:274-282).

Swaminathan enlarged upon the above. He included

agricultural data, socio-economic data, information on marketing, distribution and storage, food consumption patterns and cultural-anthropological data, diet surveys, special food studies, vital and health statistics, physical development studies, clinical nutritional surveys, biochemical studies and prevelent disease patterns (29:123).

Ritchie counseled that "time and effort should not be wasted in assembling large amounts of miscellaneous and irrelevant data" (1:87). She emphasized that base-line information should be systematically obtained from existing sources. Additional surveys and studies should be initiated only in those areas where they are essential. Some of these would include information on demography, information on services and leadership patterns, the role of women, and work habits (1:88).

Burk suggested such additional socio-economic factors as income, urbanization, home facilities, historical influence of early settlers and migrants, and the adjustments to imported food habits (30:65). She wrote that other economic and social factors may be viewed as intermediate and primary. Among the intermediate factors she placed the "influences of past levels, patterns, and standards of living from the macroeconomic point of view." Also included was the "influence of family food preferences from the microeconomic point of view." Other intermediate factors were the family's knowledge of food and nutrition, and their way of life. Burk stated:

> These intermediate factors are influenced by a wide range of more primary factors with their interactions. In this category, one may place family composition and size; occupation; the homemaker's age, employment, and education; home food production; ethnic background; technological changes; extent of eating out; education, merchandising, and promotion; and psychological factors (30:90).

Mead emphasized that nutrition research needs a multi-dimensional code so that a formal description of a people's dietary pattern can be obtained. This code should be so constructed "that comparable units can be used both to provide stimuli and to record responses, and it should be so organized that the responses can be suitably referred to individual differences, specific kinds of experience, emotional disturbance, disease, etc" (31:22). She further insisted that if this is not accomplished "the science of food habits will remain essentially what it is today--a fragmented set of associations casually related to the relevant disciplines" (31:22).

Gottlieb and Rossi wrote that attention has focused on the physical components and psycho-physical attributes of food, yet more attention should be given to the social-psychological aspects. They suggest that the "centrality" of foods may be of considerable importance. This concept refers to the degree to which foods are considered important to the diet; "in their perceived nutritional value; and in their prestige" (32:40).

The code which Mead proposed above would allow for the description of food in its varied aspects:

1. in physiological sensory terms, including such factors as taste, smell, texture, temperature control, resistance to chewing, etc.
2. in terms of its chemistry
3. in nutritional terms, including methods for calculating the significant ratios of nutrients to one another in a diet (FAO, 1955)
4. in cultural terms
   a. agricultural, including the nutritionally relevant details of soil conditions, planting, growing, and harvesting, the use of fertilizers, and methods of storing, processing, and preparing foods for use.
   b. economic, including the economic arrangements surrounding food distribution and provision, its relation to the transportation system (particularly important in countries where a basic item in the diet is produced only in one region; also in countries with poor interregional communication, where abundance of food in one region may be no indicator of the presence or absence of supplies in another), etc.
   c. socio-cultural, including those aspects of social organization which significantly affect nutrition, wuch as differential access to food by sex, age, special state (e.g., puberty, pregnancy, lactation, mourning, illness), caste or class, region, occupation, etc.
   d. educational, including methods of teaching and learning the dietary pattern, the extent to which weight, growth, and aging are involved with prestige patterns, social approval and disapproval, etc.
   e. related to food handling, including styles of serving (all the cultural factors that enter into meal style), use of color, types of fixed combinations, eating utensils, disposal of leftovers, garbage disposal, and the disposal of human feces.
   f. related to dietary patterning, including the geographic and other origins of specific patterns and the seasonal character of each version (31:22).

Mead suggested that the problem today is "a model which will ensure the building of an open system--one which will remain responsive to new knowledge in every relevant field" (31:23).

Burk stated that the "whys" in nutrition research can only be answered by using a series of coordinated studies of cultural factors.

> The planning, the making, and the analysis of such studies will require extensive assistance from other social science disciplines. The relationships of food consumption to social factors are extremely difficult to identify and evaluate (30:110).

Among several approaches to this problem, Burk suggested:

> Still another approach might be duplication and amplification of Kurt Lewin's research which used methods of cultural anthropology and psychology (a) to measure the homogeneity of food habits of households grouped according to economic and social characteristics; (b) to develop frames of reference for evaluating particular foods, such as expense, health, taste, and status; (c) to determine how groups of households put foods into these frames of reference; (d) to study conflicts in motivations of consumer buying (30:111).

Lewin suggested that a "field-theoretical approach" be taken to clarify

> . . . exactly where and how psychological and non-psychological problems overlap. Any type of group life occurs in a setting of certain limitations to what is and what is not possible, what might or might not happen (33:170).

He stated that "nonpsychological" data must be studied to determine the boundary conditions of the life of an individual or group. When this has been accomplished then the factors "which determine the actions of the group or individual in those situations which have been shown to be significant" can be determined (33:170).

## A Field Approach

From the preceding discussions concerning the problem of malnutrition, emphases in research, and data needed for the assessment of the nutritional status of a people, it has become very apparent that a multiplicity of forces are involved and that in order to conceptualize these relationships a frame of reference is needed. The problem of malnutrition involves both psychological and non-psychological factors. Lewin's "channel theory" attempted to show the intersection of these psychological and non-psychological forces.

He stated that "non-psychological" data must be studied first to determine "the boundary conditions of the life of the individual or group." When this has been accomplished then the factors "which determine the actions of the group or individual in those situations which have been shown to be significant" can be determined (33:170).

Lewin defined "field" as the "life-space" of an individual or group. In determining this field or life-space at any given time, a frame of reference must be established so that the "field" as a "whole" or as a "part" of a broader field is clearly delineated. The interdependence of the parts in the field, as well as the location of the event with respect to its depth in time--that is, all those things which are to be included in the representation of any given life-space at any particular time must be specifically determined (33:xi).

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Concerning Lewin's theory of "life-space," Chaplin and Krawiec wrote:

> The person's life space is the totality of all possible events that influence the individual. Thus, the individual's life space contains a past, present, and future; for psychologically, each of these three aspects of life determines behavior in a given situation. The goal-directed individual looks to the future and is influenced in his present behavior by future life space toward which he is striving. The past, of course, influences the individual in terms of his experiences of success and failure, attitudes, etc., which are important in determining present goals, methods of approach to goals, and reactions to failure (34:334).

In considering the problem of what should be included within the life-space of an individual or group, Cartwright said of Lewin:

> He indicates that it is reasonably easy to decide to include many things, such as needs, goals, cognitive structure, and the like, and to exclude many others, such as physical and social events occurring at a remote distance having no direct effect on the individual. There is, however, a boundary zone of events and processes which are ordinarily thought of as physical, economic, political, legal, etc., which, nonetheless, do have direct effect on the individual. Such events and processes must be included within the life space of the individual. Many of Lewin's contributions to the understanding of human behavior consisted of showing that a wider and wider realm of determinants must be treated as part of a single, interdependent field and that phenomena traditionally parceled out to separate "disciplines" must be treated in a single coherent system of constructs (33:xii).

Lewin called the task of "discovering what part of the physical or social world will determine during a given period the 'boundary zone' of the life space, 'psychological ecology'" (33:59). Actually, the boundary conditions of the field during any given period of time is determined in part by the action of the individual(s). Consideration of those

areas of the physical and social world which may not form a part of the life-space of the family in a present situation or which do not at the time affect its boundary zone must be taken into consideration, for it is the only way to predict the situation(s) in which a family may find itself in the future as a result of its decisions (33:58-59).

The behavior of a family or of its individual members is always dependent upon its present field. This present field is characterized by its time depth for every present situation has both its past and future aspects. Lewin spoke of these as the "psychological past," the psychological present," and the "psychological future" (33:27). The behavior of individuals in any present field is a function of the person and the environment (33:25).

For Murphy, the continuity in time is a field continuity as well. He stated:

> As soon as emphasis is placed upon the time dimension and the organism is seen to be in ebb and flow with its environment, both locally and generally, and to be pursuing cycles of interaction . . . attention swings to the life span as a whole (35:70).

The field in which the family is studied is composed of the family and its environment with these considered as one constellation of mutually interdependent factors. The totality of these coexisting factors becomes the life space (LSp) of the family (33:240). In terms of family behavior, any form of behavior becomes a function of the family in transaction with its physical, social and psychological environments. These in turn equal the life-space of the

family and can be expressed in the equation $B = F(Fam,E) = F(LSp)$. The behavior (B) of the family in any present field is a function (F) of the family (Fam) and the environment (E), and the totality of these coexisting factors becomes the life space (LSp) of the family.

In terms of management, only those factors which are part of the family's present field at a given time can affect its managerial behavior. The actual behavior is related to the forces--"directed entities"--acting on the family at any given time (33:83). These forces may be physical, physiological, social or psychological, and the meaning of any single fact is dependent upon its position in the field, that is, upon its mutual interdependence (33:150). Nor is this behavior dependent entirely upon whatever the present situation may be, but also upon the family's needs, motivations, values, and goals as these relate to both the past and the future. In describing a situation at a given time period, also designated "period of events," the relative position of the parts of the field at that time, along with the direction and velocity of the changes occurring must be included (33:50).

Lewin discussed food habits as an example of how to analyze a field for the purpose of changing cultural habits (33:170-187). In summarizing his discussion he stated:

> Food behavior is determined by the dynamics of the food situation which includes the channels through which food comes to the table, the gatekeeper governing the channels at various points, and the food ideology of the gatekeeper. A system of values is the basis of some of

> the forces which determine decisions about food and bring about conflicts of varying intensities (33:185).

Lewin considered that his theory had general application. By identifying social and economic channels and gatekeepers, social changes in large measure could be produced "by changing the constellation of forces within these particular segments of the channel" (33:186).

> The relation between social channels, social perception, and decision is methodologically and practically of considerable significance. The theory of channels and gatekeepers helps to define more precisely how certain "objective" sociological problems of locomotion of goods and persons intersect with "subjective" psychological and cultural problems. It points to sociologically characterized places, like gates and social processes and where individual or group decisions have a particularly great social effect (33:187).

## Nutrition Education

Education in nutrition is characterized as a learning-teaching process, in which nutrition information is disseminated, and efforts are made to induce changes in attitudes, values and habitual practices. These and other efforts are then evaluated to determine their effectiveness (24:220).

Besides the physical availability of foods to a family, education in nutrition must also consider the "cultural availability" of foods (33:178). Included in this factor are many of the conditions which Jelliffe cited as necessary for acceptable education:

1. The proposed action must appear logical to the people concerned.

2. The proposed action must not clash with other beliefs and values.
3. The proposed action must be in accord with local standards of behavior.
4. The action proposed must fit in with the organization of other aspects of the life of the community.
5. The proposed action must be advocated and practiced by someone with prestige in the eyes of the people concerned.
6. The proposed action must have a clear connection with the desired result--in this case, improvement in the child's health.
7. The proposed action must be within the resources of the time, money and effort of the people concerned (24:220-223).

Consistent with Jelliffe's fifth condition is the identification of an influential group to disseminate the new ideas and practices. Rogers developed a classification of people according to their willingness and rapidity in the adoption of new ideas and ways of doing things. These were called:

Innovators: "venturesome;" willing to accept risks;
Early adopters: "respect;' regarded by many others in the social system as a role-model;
Early majority: "deliberate;" willing to consider innovations only after peers have adopted;
Late majority: "skeptical;" overwhelming pressure from peers needed before adoption occurs;
Laggards: "tradition;" oriented to the past (36:185).

Rogers also suggested many generalizations which influence the speed of adoption of an innovation. Among these were: its relative advantage, as seen by the members of the society, over their present practice; its compatibility with their way of life; its complexity, discouraging if too difficult; its divisibility, whether it could be adopted in stages; its communicability, whether it can be shown to people or explained simply to them (36:312).

Lewin felt that the strength of the forces which resist changes in food habits in a stated direction required the investigation of actual attempts to change food habits, although the use of questionnaires is helpful in planning the experimental approach (33:184).

According to the Nutrition Foundation, current emphases in the area of nutrition education focuses upon the preparation of teachers for presenting nutrition in classroom teaching with special emphasis concentrated on the youngest grades since this is where attitudes are developed (26:58-59). Pye of Columbia University concentrated upon black and Puerto Rican children in Harlem and sought to identify their nutrition problems in order to develop educational materials best suited to their specific nutritional situation (26:58).

Berg reported on a study of changes in Israeli food habits, which concluded that the most important influence in the introduction of new foods was the exposure of the children to nutrition education in the school. This was greater than the influence of such forces as neighbors, newspapers and radios. Second to formal nutrition instruction was the provision of a school lunch, even though no formal nutrition instruction was included (9:7).

## Protein-Calorie Requirements

Although the prevention of protein-calorie deficiency in families appears to be dependent upon a combination of

ecological forces within the family field, as stated earlier, at the most obvious level it is dependent upon making available enough food of adequate protein value at a price the family can afford. And, according to Ritchie, it is also dependent upon the preparation and distribution of the food in a suitable, equitable, and uncontaminated manner (1:10).

The nutritive value of a diet has two broad aspects: quantitative and qualitative. According to FAO, the quantitative aspect is measured by the calorie content of the diet; however, there is no single and simple measure available for the qualitative aspect of the diet because the latter consists of a balance between many nutrients and other factors. The two indicators of the nutritional quality of the diet which researchers widely accept are its protein content, with special reference to animal protein, and the percentage of total calories derived from cereals, starch roots, and sugar (11:33).

Rajalakshmi of India wrote that a diet containing insufficient protein or protein of poor quality generally decreases the absorption of calcium (28:24). It also affects the absorption of iron (28:31), the conversion of carotene to vitamin A, the utilization of the body's store of vitamin A (28:44), and the amount of riboflavin required. Riboflavin is a vital factor in the metabolism of protein and carbohydrates (28:53-54).

Nutrient requirements are usually based on a reference standard formulated to include such factors as

physical activity, body size and composition, age, climate, and environment. Pregnancy and lactation needs are also considered (37:28).

The term "reference man" is the basic concept of the calorie-requirement scale established by FAO. The reference man requires 3,200 calories daily, is twenty-five years of age with a weight of sixty-five kilograms and lives in a temperate zone where the mean annual temperature is 10° centigrade. He receives about eight hours of sleep per day, is sedentary four hours and spends about one and one-half hours in recreation or household chores. The term "reference woman" may also be used to describe a woman twenty-five years of age, with a weight of fifty-five kilograms and a home to manage. She is assumed to need 2,300 calories daily plus additional calories to care for the stress of pregnancy and lactation (38:11-12).

The amounts of different nutrients recommended in dietary standards usually exceed those found to be needed for metabolic requirements. Rajalaksmi reported that thirty grams is the minimum amount of protein required for an adult man weighing sixty kilograms, but the amount recommended is often more than double this figure. These extra amounts represent margins of safety to account for human variations in the absorption and utilization of the nutrients. By adding liberal amounts, the requirements become adequate for more than 95 per cent of the relevant population (28:94-95).

Rajalaksmi also noted that the estimates of require-

ments vary according to the criteria used to establish them; and, even though estimates may be agreed upon, different figures result for the recommended amounts because of the safety margin. It is for these reasons that standards are considered as rough approximations and guides toward better nutrition rather than final and accurate guides. She also pointed out that no extensive studies have been conducted for several groups, such as infants, expectant and nursing mothers, and the aged. Thus, the amounts recommended for them are based on even more approximate estimates (28:94-95).

Hegsted remarked that even though standards of recommended allowances may be based upon inadequate information that is later discovered to be erroneous, experience has demonstrated that they are necessary and useful. Standards are revised from time to time as new data become available. Hegsted warned that the danger in using standards lies in their universal acceptance without taking into account their limitations (39:14).

In her study of Columbian families, Florencio developed a "minimum standard." She used the term "minimum" to indicate a point below which the normal physiological needs of an average person cannot be sufficiently met. Florencio stated that her standard was designed for the <u>average</u> person in the population, while the <u>majority</u> of the population would be covered by the allowances established by the Colombian Institute of Nutrition (40:25). This latter standard was formulated from data obtained from the

established standards of various countries (41). As shown in Tables 1 and 2, the Colombian allowances are consistently higher than those of Florencio's "minimum standard."

## The Evaluation of Essential Nutrients

The translation of foods to their nutrient content is made possible by tables of food composition which have been compiled from laboratory analyses of the chemical composition of various foods. Howe stated that the value of tables of food composition lies in the fact that food habits and patterns are relatively constant. The variations which occur are in the quantities of individual foods consumed by a group within a particular season or geographic area (42:514).

The limitations of food tables are given by Rajalakshmi. She noted that it must be recognized that the figures are based on casual samples and the nutrient content of the same foods may vary from sample to sample due to such factors as the genetic strain of the seed or animal, the method of farm management, and the processing and quality of the soil or feed. Rajalakshmi asserted that the primary purpose of the tables is to present approximations of nutrients which facilitate the assessment of the nutritional adequacy of a given diet. She also indicated that other variables which must be taken into consideration are losses which may occur during processing or cooking, or gains which may occur by using iron utensils, as well as the different

rates of absorption of nutrients by the body, and also, the amounts of a particular food actually consumed (28:103-109).

Various food composition tables are presented in the literature and many countries have their own tables of food composition compiled from data from their own laboratories or from nutrition research in various parts of the world. For example, the Colombian Food Composition Tables present figures obtained from a statistical study of more than 50,000 analyses of Colombian foods made since 1944 by the laboratories of the National Institute of Nutrition. A small part of the data came from the tables of the United States Department of Agriculture (43).

TABLE 1. DAILY MINIMUM NUTRIENT ALLOWANCES FOR CALORIES AND PROTEINS (20°C AREA)*

| Groups | Age (years) | Weight (kg) | Calories | Protein Total (gm) | Protein (BV = 80) Animal[a] | Protein Total[a] (gm) | Protein (BV = 60) Animal[a] |
|---|---|---|---|---|---|---|---|
| Infants | 0- 1 | | 800 | 20[a] | 20 | 20[a] | 20 |
| Children | | | | | | | |
| Both Sexes | 1- 3 | 13 | 1100 | 25 | 8 | 35 | -- |
| Both Sexes | 4- 6 | 18 | 1260 | 30 | 10 | 39 | -- |
| Both Sexes | 7- 9 | 24 | 1440 | 40 | 13 | 48 | -- |
| Male | 10-12 | 33 | 1650 | 50 | 17 | 60 | -- |
| Female | 10-12 | 33 | 1550 | 50 | 17 | 60 | -- |
| Adolescents | | | | | | | |
| Male | 13-15 | 45 | 1960 | 65 | 22 | 82 | -- |
| Male | 16-19 | 60 | 2420 | 60 | 20 | 75 | -- |
| Female | 13-15 | 47 | 1860 | 60 | 20 | 79 | -- |
| Female | 16-19 | 53 | 1760 | 55 | 18 | 70 | -- |
| Adults | | | | | | | |
| Male | 20-29 | 65 | 2600 | 50 | 17 | 68 | -- |
| | 30-39 | 65 | 2550 | 50 | 17 | 68 | -- |
| | 40-49 | 65 | 2350 | 50 | 17 | 68 | -- |
| | 50-59 | 65 | 2250 | 50 | 17 | 68 | -- |
| | 60-69 | 65 | 2000 | 50 | 17 | 68 | -- |
| Female | 20-29 | 55 | 1750 | 40 | 13 | 60 | -- |
| | 30-39 | 55 | 1650 | 40 | 13 | 60 | -- |
| | 40-49 | 55 | 1600 | 40 | 13 | 60 | -- |
| | 50-59 | 55 | 1500 | 40 | 13 | 60 | -- |
| | 60-69 | 55 | 1400 | 40 | 13 | 60 | -- |

*Represents a portion of the standard formulated by Florencio (40). The letter "a" refers to the following footnote: "The biological value is actually greater than 80 (or 60) because the total protein allowance for infants is to be derived solely from animal protein."

TABLE 2: COLOMBIAN DAILY RECOMMENDED ALLOWANCES FOR CALORIES AND PROTEINS (20° C AREA)*

| Groups | Age (years) | Weight (kg) | Calories | Protein Total (gm) | Protein (BV = 80) Animal[a] | Protein Total[a] (gm) | Protein (BV = 60) Animal[a] |
|---|---|---|---|---|---|---|---|
| Infants | 0- 1 | | 900 | 27[b] | 27 | 27[b] | 27 |
| Children | | | | | | | |
| Both Sexes | 1- 3 | 13 | 1300 | 31 | 10 | 39 | -- |
| Both Sexes | 4- 6 | 18 | 1600 | 36 | 12 | 50 | -- |
| Both Sexes | 7- 9 | 24 | 2100 | 43 | 14 | 59 | -- |
| Male | 10-12 | 33 | 2400 | 61 | 20 | 72 | -- |
| Female | 10-12 | 33 | 2300 | 60 | 20 | 72 | -- |
| Adolescents | | | | | | | |
| Male | 13-15 | 45 | 3100 | 78 | 26 | 94 | -- |
| Male | 16-19 | 60 | 3300 | 78 | 26 | 90 | -- |
| Female | 13-15 | 47 | 2700 | 73 | 24 | 90 | -- |
| Female | 16-19 | 53 | 2400 | 65 | 22 | 80 | -- |
| Adults | | | | | | | |
| Male | 20-29 | 65 | 2850 | 68 | 23 | 86 | -- |
| | 30-39 | 65 | 2800 | 68 | 23 | 86 | -- |
| | 40-49 | 65 | 2600 | 68 | 23 | 86 | -- |
| | 50-59 | 65 | 2500 | 68 | 23 | 86 | -- |
| | 60-69 | 65 | 2250 | 68 | 23 | 86 | -- |
| Female | 20-29 | 55 | 1900 | 60 | 20 | 78 | -- |
| | 30-39 | 55 | 1800 | 60 | 20 | 78 | -- |
| | 40-49 | 55 | 1750 | 60 | 20 | 78 | -- |
| | 50-59 | 55 | 1650 | 60 | 20 | 78 | -- |
| | 60-69 | 55 | 1500 | 60 | 20 | 78 | -- |

*Represents a portion of the standard as given by Florencio (40). The allowances for animal protein (a) were not in the original standard established by the Colombian Institute of Nutrition but were added by Florencio. As in Table 1, the total protein allowance for infants (b) is to be derived solely from animal protein.

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# CHAPTER III

## DATA COLLECTION AND METHOD OF ANALYSIS

The discussion of the data and method of analysis is divided into four parts: selection of the sample, description of the sample; determination of calorie and protein allowances for the sample; and the procedure used to analyze the calories and proteins in the Market Basket foods.

### Selection of the Sample

As stated earlier, the sample used in this study consisted of 236 familes selected from the Market Basket Survey--a sub-sample of families in the Colombian Consumer Survey known as the PIMUR Project. Although the inclusion of families in the MB Survey was dependent upon their voluntary participation, their selection for this present research was based upon the following criteria: (1) the family was comprised of two or more persons; (2) the family furnished information on the amount of money spent on food purchases; and, (3) the family furnished a record of its food purchases during the survey week.

Because of their voluntary participation in the MB Survey, these families do not represent a random sample, even though they were originally selected for the broader

Consumer Survey by the method of Monte Carlo, which involved the selection of a home every 170.

The data on the 236 families were selected by first obtaining from the MB computer tape, the code numbers of each family. In this way a print-out of the data pertaining to these families could be obtained from the General Consumer Survey tape. The original Consumer Survey described the families on the basis of the total sample of 629 families, whereas this present research was a pooling of all the information deemed relevant to a description of the 236 MB families.

To simplify the MB analysis, the raw data was printed out by computer so that each family could be analyzed individually by studying the total list of its purchases. The original programming detailed each item separately for each of the 236 families. The services of GTE Data Services, Inc., in the City of Owosso were contracted because they provided easy access to the researcher and the cost was minimal.

General Consumer data were analyzed first in order to obtain descriptive data (see Chapter IV). Each household unit was placed within an age group according to the age of the housewife and also within one of the four income per capita levels (IPCL). When the IPC was unknown, the family unit was placed in a fifth group and labeled Unknown.

## Brief Description of the Sample

All of the MB families were residing in the City of Cali. Cali is the capital of the State of Valle and is one of the country's fasting growing cities in terms of population increase. Located in the Cauca Valle, it is the dominant commercial center in the southwestern area of Colombia, and the Cauca Valle is its major source of food.

In February of 1969, the PIMUR researchers estimated the population of the city to be around 865,000 (12:23), with around 41 per cent of the population under fifteen years of age (12:29). It is from this universe that the 236 MB families were chosen.

In the 236 families there were 1,533 family members representing 6 SE levels ranging from upper class to lower-lower class. The sample consisted of 236 amas de casa, and 204 male jefes de familia. Thirty-two of the amas de casa were also designated as the jefe de familia. The ages of the amas de casa ranged from 17-70 with an average age of 37.4; the average age for the male jefes de familia was 40.8. Nearly two-thirds (61 per cent) of the amas de casa were under 40 years of age. There were only 3 who were teenagers and only 1 ama de casa who was 70 years of age.

All family members were divided into one of three age ranges: 15 and above (818 persons); 5 up to 15 (485 persons); and under 5 years of age (230 persons). The number of male and female members in the households was not

determined by the General Consumer Survey. Over half of the total members were in families where the ama de casa was under 40 years of age. The highest percentages of family members in the total sample and in each age range were located in families where the ama de casa was 30-39 years old. Table 3 shows the distribution of the family members according to the age of the ama de casa.

Table 4 summarizes the distribution of family members according to the IPCL and household size. The MB sample consisted of an average of 6.6 persons per family. However, the two lover IPC Levels had a higher number of persons per family, while the two upper IPC households had fewer than the sample mean. The average family size decreased through the ascending IPC levels from 8.5 to 5.5 members. The Unknown IPCL, with a mean of 6.0 family members, was more representative of the total sample mean.

The sample consisted of more lower than upper IPC family members, with the highest number of persons (386) located in Level II. Levels I and III were very similar in size (315 and 319), although there were fewer families in Level I. Level IV had the fewest family members (224). It is assumed that many of the families in the Unknown IPCL, which had 289 members were also low income households.

The jefes de familia, both male and female, were born in various areas of Colombia. The percentage distributions for these areas were small except for one notable exception: 42 per cent of the MB jefes listed Valle as

TABLE 3. DISTRIBUTION OF ALL MEMBERS OF THE MB HOUSEHOLDS ACCORDING TO AGE GROUP OF THE AMA DE CASA

| Age of ama de casa | Household Members | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Persons 15 and over | | Persons 5 to 15 | | Persons under 5 | | Total Persons | |
| | No. | % | No. | % | No. | % | No. | % |
| 16-19 | 7 | 1 | -- | -- | 3 | 1 | 10 | 1 |
| 20-29 | 164 | 20 | 76 | 16 | 70 | 31 | 310 | 20 |
| 30-39 | 248 | 30 | 236 | 49 | 97 | 42 | 581 | 38 |
| 40-49 | 226 | 28 | 126 | 25 | 35 | 15 | 387 | 25 |
| 50-59 | 126 | 15 | 32 | 7 | 21 | 9 | 179 | 12 |
| 60-70 | 47 | 6 | 15 | 3 | 4 | 2 | 66 | 4 |
| Total | 818 | 100 | 485 | 100 | 230 | 100 | 1533 | 100 |
| Percent | 53 | 100 | 32 | 100 | 15 | 100 | 100 | 100 |

TABLE 4. DISTRIBUTION OF MB FAMILY MEMBERS ACCORDING TO IPCL AND HOUSEHOLD SIZE

| IPCL | Number of Families | Percent of Sample | Total Members | Percent of Sample | Average Size of Family | Range |
|---|---|---|---|---|---|---|
| I | 37 | 16 | 315 | 21 | 8.5 | 4-13 |
| II | 54 | 23 | 386 | 25 | 7.1 | 2-15 |
| III | 56 | 24 | 319 | 21 | 5.7 | 2-11 |
| IV | 41 | 17 | 224 | 15 | 5.5 | 2-12 |
| Unknown | 48 | 20 | 289 | 18 | 6.0 | 2-14 |
| Total | 236 | 100 | 1533 | 100 | 6.6 | 2-15 |

their place of origin. The majority (78 per cent) of the jefes were born in urban areas while 17 per cent were originally from rural areas. The rural or urban origin of the remaining 5 per cent was not known.

The length of time the families had resided in the same barrio was known for only 153 households. Most of these had lived in the same barrio an average of 7 years and many had lived there an average of 17 years. Only 36 per cent of the jefes de familia had always resided in Cali.

## Determination of Calorie and Protein Allowances

A handicap in the determination of the protein-calorie allowances for the families was the lack of data on specific ages, sex, height, weight, and position in the family life cycle. According to Wold it is well-known that consumption habits are influenced by the age and number of children in the family. Thus in comparing the consumption habits in family groups that differ by income level, one of the difficulties encountered is to make allowance for the size and age structure of the family (44:221). Manuals on food surveys have suggested that nutrition units for estimating the dietary allowances for a population sample of mixed sex and ages can be expressed as the fractional percentage of the allowance for the reference man. These fractional percentages then become the basis for determining the total number of nutrition units in a family or population.

In Florencio's Colombian study, "the daily nutritional allowances of a family was computed as the sum of the individual allowances of the average number of persons eating per day" (40:24).

In this MB study, instead of using fractional percentages of the reference man, a mean was established for protein and calories for each of the three age groups included in the PIMUR Project. This method of adjusting for sex and age was assumed to be more representative of family needs. The following procedure was used:

1. The allowances were calculated from the Colombian Daily Recommended Allowance for a 20° centigrade area, as given by Florencio (Table 2, page 41).

2. The sum of the allowances for each age group, including male and female as separate factors, was computed for each of the three age ranges. The sum was divided by the total number of factors to obtain the mean for the ages under 5, 5 to 15, 15 and above. Lactating and pregnant women were not included in the calculation. The separate units for male and female, which begin at ages 9-12, were averaged to arrive at one standard for both sexes.

3. The calorie and protein requirements for a family were calculated by adding the total number of allowances for all family members according to their age group and dividing the sum by the total number of factors to obtain the mean.

4. The daily estimated protein and calorie requirements of a family were then compared with the total value of

these nutrients as calculated from the MB analysis.

In Table 5, the Colombian reference man of 25 years of age in a 20° C area is shown requiring 68 grams of total protein, 23 grams of animal protein, and 2,850 calories. Due to the above method used to arrive at a standard for each group of varied age and sex, the calories for the 15-70 age range are considerably less than those for the reference man. The computed requirement of 2,510 calories represents 88 per cent of the reference man's requirements as given by the Colombian Standard, but this quantity is only 90 calories less than the amount given in Florencio's minimum standard as shown in Table 1 (page 40). The proteins needed by the reference man and the 15-70 age group are essentially the same due to the higher protein requirements of the teen-agers included in the adult calculation.

## Procedure Used to Analyze the Proteins and Calories in the MB Foods

Both long and short methods of calculating the nutrients in diets have been used by various researchers. Harper, in a 1956 study of dietary practices of women used the Food Composition Table for Short Method of Dietary Analysis developed by Leichsenring and Wilson which was supplemented by the United States Department of Agriculture Handbook No. 8 (45:55).

Florencio used both her "minimum" standard and the Colombian standard to analyze the diets of her sample.

TABLE 5. DAILY CALORIE AND PROTEIN ALLOWANCES FOR MB POPULATION OF MIXED AGE AND SEX*

| Age Range | Calories | Total Protein Grams | Animal Protein Grams |
|---|---|---|---|
| 0- 5 | 1,280 | 31.20 | 13.80 |
| 5-15 | 2,347 | 57.73 | 19.06 |
| 15-69 | 2,510 | 68.15 | 22.85 |
| Reference Man | 2,850 | 68.00 | 23.00 |

*Calculated from the Colombian Standard as given by Florencio (See Table 2, page 41).

Since the "minimum" standard was considered already set at a limit below which the normal physiological needs of an average person could not be adequately met, the recommended amount of proteins and calories to be consumed was set at 100 per cent. She expressed the average daily intake as a percentage of the "minimum" standard (40:25-26).

Sims, in her analysis of the nutritional status of preschool children, converted the estimated quantities of food consumed to their corresponding nutrient values by means of a coding system and conversion factors for the computer. Developed by the Consumer and Food Economics Research Division of the United States Department of Agriculture, this method uses the quantities of foods consumed and the nutritive values for each food unit. It obtains the products of quantity times nutritive value then sums these to obtain the nutritive value of the diet (46:96-97).

In this present research, analysis of the proteins (P) and calories (C) in the MB foods was made according to the following equation:

$$P \text{ or } C = \frac{453.6 \text{ G}}{1 \text{ lb.}} \div 100 \text{ G} \times \frac{\text{N}}{\text{lb.}} \times \frac{\text{NP or NC}}{100 \text{ G wt.}}$$

$$= \frac{\text{NP or NC}}{\text{N lb}}$$

In this equation, the proteins and calories were calculated by first finding the number of 100 Gram (G) units in a pound. This amount (4.536 100 G units) was then multiplied by the various weights (edible portion) given for

each of the MB foods. The factor thus obtained was then multiplied by the number of grams of protein or number of calories represented in 100 G of each food analyzed.

The amount of protein and calorie in a food item was established by using the purchase weight where stated, by estimating an average size for the vegetable or fruit, or by converting liquids to grams. These were then converted to 100 Gram units and the above equation was followed.

Since the sizes of items purchased by the unit were not given, the estimation of the size was made by consulting with one of the PIMUR researchers, and by comparing sizes in various composition tables. Various items in the composition tables, such as bananas and potatoes, consisted of several varieties, each bearing its own nutritional value. These values were reduced to one common value by obtaining the mean number of proteins and calories for the items.

In presenting the results of the MB survey, the admonition given by Reh was followed. The findings are not presented in terms of "undernourished" or "malnourished," but on the difference between the proteins and calories found in the selected purchases and the calculated protein-calorie requirements for each family. The basis for comparison is the percentage of families found to fall below 100 per cent of their estimated protein-calorie requirements (47:83-84). Florencio indicated that 100 per cent represented a minimum adequacy of nutrients (40:25). Although her study used a minimum standard and this present

research is based on the more generous Colombian standard, the difference between the allowances was not great. Thus in this study 100 per cent is assumed to be the adequate amount the MB families required. This information is, according to Jelliffe, "at best only qualitative, giving an extremely approximate outline of the general dietary pattern." He felt that methods used to assess the nutritional status of a sample are "individually imperfect, inaccurate and subject to their own technical errors." He recommended the avoidance of sweeping conclusions based on limited evidence (13:169-170).

# CHAPTER IV

## THE MARKET BASKET FAMILIES

In this chapter the MB families are described on the basis of their socio-economic characteristics. This includes: SE levels, employment status, educational level, the newspapers they read, their dwellings and possessions, their child-feeding practices, the participation of family members in decision-making, the reaction of the ama de casa to new food products or different markets, market factors affecting food purchases among the SE levels, and modes of transportation utilized by the ama de casa for her last principal food purchases.

### Socio-Economic Characteristics

The SE data were selected from the Colombian Consumer Survey.

#### SE Levels

The MB households represented the six SE levels established by the PIMUR Survey. These levels, ranging from upper to lower-lower class were:

| | |
|---|---|
| Level 1 Upper Class | $10,000 pesos or more |
| Level 2 Upper-Middle | 6,000 - 10,000 pesos |
| Level 3 Middle Class | 2,000 - 6,000 pesos |
| Level 4 Lower-Middle | 800 - 2,000 pesos |
| Level 5 Upper-Lower | 500 - 800 pesos |
| Level 6 Lower-Lower | Less than $500 pesos (12:53) |

SE level of residence.--As shown in Table 6, over half (58 per cent) of the households resided in upper-lower class barrios, while the second highest number of families (20 per cent) lived in the lower-lower class areas. Ten and 7 per cent of the families were living in lower-middle or middle class sectors of Cali, while only 2 and 3 per cent resided in the upper or upper-middle class barrios. IPCL IV was the only level in which the households were distributed throughout all the SE levels of residence with the greatest number of these families living in the middle-class barrios.

SE level of income.--With respect to the SE level of income, Table 7 shows that 50 per cent of the MB families received monthly incomes ranging from $800-2,000 pesos. With 27 per cent of the families receiving $2,000-6,000 pesos monthly, it was apparent that over 75 per cent of the sample could be classified according to income as middle or lower-middle class. Only 11 and 3 per cent were upper-lower or lower-lower class households with incomes of $500-800 pesos or less than $500 pesos. Only 4 per cent of the families were upper class with incomes of $10,000 pesos or more and 5 per cent were upper-middle class since their income was $6,000-10,000 pesos per month.

Comparison of SEL of residence and income.--When the SEL of the residence was compared with the SEL of income (as shown in Table 7), only twenty-eight (15 per cent) of the 188 families giving income information had the same SEL for both residence and income. In general, for each IPCL, the

TABLE 6. DISTRIBUTION OF THE MB FAMILIES ACCORDING TO SOCIO-ECONOMIC LEVEL OF RESIDENCE AND MONTHLY IPCL

| IPCL | Number of Households | Socio-economic level of residence 1 Upper | 2 Upper-Middle | 3 Middle | 4 Lower-Middle | 5 Upper-Lower | 6 Lower-Lower |
|---|---|---|---|---|---|---|---|
| I - less than $125 pesos | 37 | -- | -- | -- | -- | 22 | 15 |
| II - $126 to $240 pesos | 54 | -- | -- | -- | 4 | 36 | 14 |
| III - $241 to $500 pesos | 56 | -- | 1 | 3 | 8 | 38 | 6 |
| IV - More than $500 pesos | 41 | 5 | 6 | 11 | 7 | 9 | 3 |
| Unknown | 48 | -- | -- | 3 | 4 | 33 | 8 |
| Total | 236 | 5 | 7 | 17 | 23 | 138 | 46 |
| Per cent | 100 | 2 | 3 | 7 | 10 | 58 | 20 |

TABLE 7. DISTRIBUTION OF THE MB HOUSEHOLDS ACCORDING TO IPC, RESIDENCE, AND SOCIO-ECONOMIC LEVEL OF MONTHLY INCOME (N=188)

| Monthly IPCL | Economic Level of Actual Residence | Socio-economic levels according to income | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 Upper | 2 Upper-Middle | 3 Middle | 4 Lower-Middle | 5 Upper-Lower | 6 Lower Lower |
| | | $10,000 or More | $6,000 to 10,000 | $2,000 to 6,000 | $800 to 2,000 | $500 to 800 | Less than $500 |
| I - less than $125 pesos | 5 | -- | -- | -- | 11 | 7* | 4 |
| | 6 | -- | -- | -- | 10 | 5 | -- |
| Total | | -- | -- | -- | 21 | 12 | 4 |
| Percent | | -- | -- | -- | 57 | 32 | 11 |
| II - $126 to 240 pesos | 4 | -- | -- | 2 | 2* | -- | -- |
| | 5 | -- | -- | 4 | 29 | 3* | -- |
| | 6 | -- | -- | -- | 10 | 3 | 1* |
| Total | | -- | -- | 6 | 41 | 6 | 1 |
| Percent | | -- | -- | 11 | 76 | 11 | 2 |
| III - $241 to 500 pesos | 2 | -- | -- | 1 | -- | -- | -- |
| | 3 | -- | -- | 2* | 1 | -- | -- |
| | 4 | -- | -- | 5 | 3* | -- | -- |
| | 5 | -- | -- | 14 | 23 | 2* | -- |
| | 6 | -- | -- | 2 | 2 | 1 | -- |
| Total | | -- | -- | 24 | 29 | 3 | -- |
| Percent | | -- | -- | 43 | 52 | 5 | -- |
| IV - More than $500 pesos | 1 | 2* | 3 | -- | -- | -- | -- |
| | 2 | 2 | 1* | 3 | -- | -- | -- |
| | 3 | 2 | 5 | 4* | -- | -- | -- |
| | 4 | 1 | -- | 5 | 1* | -- | -- |
| | 5 | -- | 1 | 7 | 1 | -- | -- |
| | 6 | -- | -- | 1 | 2 | -- | -- |
| Total | | 7 | 10 | 20 | 4 | -- | -- |
| Percent | | 17 | 24 | 49 | 10 | -- | -- |
| Grand Total | | 7 | 10 | 50 | 95 | 21 | 5 |
| Percent | | 4 | 5 | 27 | 50 | 11 | 3 |

*Indicates same SEL for both area of residence and income.

SEL according to income tended to be higher than the economic level of the actual residence. The two lowest IPC levels were concentrated primarly in lower-class barrios, but more than half (57 per cent) of IPCL I, and about three-fourths (76 per cent) of IPCL II had lower-middle class incomes. IPCL III families were scattered throughout all the SEL neighborhoods except the upper-class ones. However, the majority of the IPCL III families resided in upper-lower class barrios, and more than half (52 per cent) were lower-middle class according to income, while 43 per cent were middle class according to income. IPCL IV households had the fewest families residing in both lower-lower and upper class barrios. However, none of the IPCL IV families received incomes of less than $800 pesos per month. Almost half of this level (49 per cent) had middle class incomes.

Monthly income.--The mean monthly income for the 188 households giving this data was $1,941.35 pesos per household or an average of $427 pesos per family member. However, when the mean monthly income was reduced to the mean monthly IPC, it became apparent that the average IPC increased by $79 pesos between IPCL I and II, $144 pesos between IPCL II and III, and by $792 pesos between levels III and IV. As shown in Table 8, the monthly IPC averages ranged from $98 pesos to $1,113 pesos through the ascending levels. The average monthly IPC in United States currency, and the daily averages per person for both pesos and dollars are also shown in Table 8.

Estimated per cent of income spent for food.--The amount of money which the MB families estimated they spent for food was known for all of the 236 households. However, these data were collected by the General Consumer Survey as the amount the family thought it spent every two weeks, rather than on a monthly basis. The distribution of the estimated food pesos per capita is shown in Table 9. Although the average food pesos for the sample was $80.5 pesos, the means within each level, except III and IV, were less than that for the total sample. It is apparent from the ranges of $5-325 pesos bi-monthly, that many family members in all IPC levels either fell far below or above the mean. There was a significant increase in the estimated food expenditure per capita in each of the ascending IPC levels. This range was most marked between IPC levels III and IV. The mean for the mixed IPCL, labeled Unknown, placed it between Levels II and III. Although the Unknown IPCL had the lowest amount of pesos available per capita in the sample, the upper limit of its range was greater than Level II.

A distribution of the MB families according to the per cent of income they estimated spending for food is shown in Table 10. It is apparent that the lowest IPC levels estimated they were spending most of their income for food. The estimated proportions are also smaller throughout the ascending IPC levels. In IPC levels I and II, all families reported spending 40 per cent or more of the monthly income

TABLE 8. DISTRIBUTION OF THE MONTHLY IPC FOR THE 188 MB FAMILIES REPORTING INCOME

| IPCL | IPC Range | Av. pesos per member monthly | Av. dollars per member monthly | Av. pesos per member daily | Av. dollars per member daily |
|---|---|---|---|---|---|
| I | $ 35-125 | $ 98 | $ 5.76 | $ 3.27 | $0.19 |
| II | 128-240 | 177 | 10.41 | 5.90 | .35 |
| III | 249-475 | 321 | 18.88 | 10.70 | .63 |
| IV | 444-3,667 | 1,113 | 65.47 | 37.10 | 2.18 |
| Sample Mean | | $ 427 | $ 25.13 | $ 14.24 | $0.84 |

TABLE 9. DISTRIBUTION OF ESTIMATED BI-MONTHLY FOOD EXPENDITURES PER CAPITA FOR THE 236 MB FAMILIES

| IPCL | Food pesos per capita bi-monthly range | Food pesos per capita bi-monthly average | Food pesos per capita bi-monthly average in U.S. dollars | Av. daily food pesos per capita |
|---|---|---|---|---|
| I | $ 17- 56 | $ 39 | $ 2.29 | $ 2.60 |
| II | 33-103 | 62 | 3.64 | 4.13 |
| III | 33-187 | 85 | 5.00 | 5.66 |
| IV | 52-325 | 145 | 8.53 | 9.66 |
| Unknown | 5-175 | 72 | 4.23 | 4.80 |
| Sample Mean | -- | $ 80.5 | $ 4.74 | $ 5.36 |

for food; actually more than two-thirds of IPCL I and one-half of IPCL II reported expenditures of 70 per cent or more of the monthly income for food. Only about one-fifth of IPCL III reported expenditures above 70 per cent of the monthly income. All except two families in IPCL IV reported less than 60 per cent of the income expended for food, with over half of this group reporting expenditures of less than 40 per cent. For the total sample, 50 per cent of the families reported estimated food expenditures of 60 per cent or more of their monthly income. This percentage was primarily due to the lower IPC households.

Employment.--At the time of the Consumer Survey, as seen in Table 11, only 20 per cent of all the MB *jefes de familia* were unemployed. However, when the percentages of *jefes* unemployed within each IPCl were compared, the percentages decreased through the ascending IPC levels from 30 to 7 per cent, with the Unknown level having a 31 per cent rate of unemployment, the highest rate for the sample.

Twenty-eight per cent (66) of the MB *jefes de familia* were self-employed, while 57 per cent (135) were employees. Only 1 per cent (3) of the *jefes* used both methods to obtain their livelihood. It was not known whether 14 per cent (32) of the *jefes de familia* were employees or self-employed.

Sixty-two per cent (145) of all *jefes de familia* had been working in the same place for an average of ten years, with only 10 per cent (24) of the *jefes* employed in

TABLE 10. PER CENT OF INCOME THE 188 MB FAMILIES ESTIMATED SPENDING EACH MONTH FOR FOOD*

| Estimated per cent of income | Number and cumulative total of families by IPC | | | | | | | | Total | | Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | | | |
| | N | CT | N | CT | N | CT | N | CT | N | % | Cum. % |
| 90-100 | 11 | 11 | 7 | 7 | 2 | 2 | | | 20 | 11 | 11 |
| 89- 89 | 8 | 19 | 10 | 17 | 4 | 6 | | | 22 | 12 | 23 |
| 70- 79 | 8 | 27 | 10 | 27 | 6 | 12 | 1 | 1 | 25 | 13 | 36 |
| 60- 69 | 3 | 30 | 12 | 39 | 11 | 23 | 1 | 2 | 27 | 14 | 50 |
| 50- 59 | 4 | 34 | 13 | 52 | 12 | 35 | 4 | 6 | 33 | 17 | 67 |
| 40- 49 | 3 | 37 | 2 | 54 | 7 | 42 | 8 | 14 | 20 | 11 | 78 |
| 30- 39 | | | | | 11 | 53 | 10 | 24 | 21 | 11 | 89 |
| 20- 29 | | | | | 3 | 56 | 12 | 36 | 15 | 8 | 97 |
| 10- 19 | | | | | | | 5 | 41 | 5 | 3 | 100 |

*The amount the families estimated spending bi-monthly was doubled to arrive at these percentages.

TABLE 11. WORK STATUS OF BOTH MALE AND FEMALE MB JEFES DE FAMILIA WITHIN EACH IPCL

| Work status | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| Jefes working | 26 | 70 | 44 | 81 | 50 | 89 | 38 | 93 | 33 | 69 | 191 | 80 |
| Jefes not working | 11 | 30 | 10 | 19 | 6 | 11 | 3 | 7 | 15 | 31 | 45 | 20 |
| Total | 37 | 100 | 54 | 100 | 56 | 100 | 41 | 100 | 48 | 100 | 236 | 100 |

the same place for less than one year. The work stability of 28 per cent (67) of the jefes was unknown.

With respect to the work status of the 1,533 persons in the total sample, it was found that 22 per cent (333) were working at the time of the survey. Thus, besides the jefes de familia, there were 97 other employed persons. The percentages of persons working within each IPCl were as follows: IPCL I, 16 per cent; IPCL II, 20 per cent; IPCL III, 27 per cent; IPCL IV, 25 per cent; and IPCL Unknown, 22 percent.

Education

The person with the most education in the MB households was a son or daughter in 35 per cent of the families. Throughout the various levels, the son or daughter was also the most educated person except in IPCL IV where the jefes de familia had achieved a higher educational level. In IPCL II, the average educational level of the jefe de familia and son or daughter was equal. These percentages are given in Table 12.

It was also seen in Table 12 that the jefes de familia were more educated than the amas de casa-- 33 per cent for the jefes as compared to 19 per cent for the amas de casa. In 7 per cent of the households, the jefe and ama de casa had received the same level of education. In the total sample, there were also three nieces or nephews and thirteen other persons said to be the most educated persons in the household.

TABLE 12. PERSON WITH MOST EDUCATION IN THE MB FAMILIES BY IPCL

| IPCL | Ama de casa | Jefe de familia | Same education | Son or daughter | Niece or nephew | Other |
|---|---|---|---|---|---|---|
| I N=37 | 9 | 8 | 4 | 13 | 1 | 2 |
| II N=54 | 7 | 21 | 3 | 21 | -- | 2 |
| III N=56 | 12 | 17 | 4 | 22 | 1 | -- |
| IV N=41 | 6 | 20 | 1 | 11 | 1 | 2 |
| Unknown N=48 | 10 | 11 | 4 | 16 | -- | 7 |
| Total N=236 | 44 | 77 | 16 | 83 | 3 | 13 |
| Percent | 19 | 33 | 7 | 35 | 1 | 5 |

With respect to the various levels of education, as noted in Table 13, the majority of both the jefes de familia and amas de casa had only a primary education, whereas higher percentages of a son or daughter or other family member had received some secondary or university education.

Newspapers

In the MB survey, 8 per cent of the households did not read a newspaper, 45 per cent read one paper daily, 22 per cent read only on weekends, with 8 per cent reading on both weekends and holidays and 17 per cent only occasionally reading a newspaper.

The three newspapers read most frequently by the households were Espectador (20 per cent), Occidente

TABLE 13. EDUCATIONAL LEVEL OF JEFES DE FAMILIA, AMAS DE CASA, SON OR DAUGHTER, AND OTHER FAMILY MEMBER WITH THE MOST EDUCATION

| Level of education | Jefes de familia | | Amas de casa | | Son or daughter | | Other | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| No education | 8 | 4 | -- | -- | -- | -- | -- | -- |
| Education unknown | 5 | 2 | 8 | 3 | -- | -- | 2 | 12 |
| Primary unfinished | 66 | 32 | 93 | 39 | 3 | 4 | 3 | 19 |
| Primary completed | 54 | 27 | 87 | 37 | 13 | 15 | 2 | 12 |
| Secondary unfinished | 48 | 24 | 43 | 18 | 47 | 57 | 6 | 38 |
| Secondary completed | 13 | 6 | 4 | 2 | 11 | 13 | -- | -- |
| University | 10 | 6 | 1 | 1 | 9 | 11 | 3 | 19 |
| Total | 204 | 100 | 236 | 100 | 83 | 100 | 16 | 100 |

(30 per cent), and País (42 per cent), with only 2 per cent reading Espacio and Siglo, and 4 per cent reading Tiempo. Only one family purchased a newspaper not included on the list. The newspapers Colombiano and Crisol were not among the papers read by the families. Thirty per cent of the households read more than one newspaper daily; some read three to four papers.

## Dwellings and Possessions

The PIMUR Survey did not furnish data regarding the types of dwellings inhabited by the MB families. However, Riley gave a description of the homes of fourteen of the low income families used in her sample of MB families with

preschool children. She found that the size of the dwellings was not closely related to the number of persons in the family, with much over-crowding resulting. She wrote:

> In some of the newer barrios many of the patios contained an outhouse in the corner as well as a laundry area which generally consisted of a tub or sink, usually homemade, that was mounted on a wooden stand. Here the clothes were washed, people bathed, and kitchen utensils and dishes washed. The water was obtained by either dipping from a barrel or (if a water main was near) from a rubber hose attached to a water outlet at the front of the house near the road. Very few houses were observed to have plumbing.
>
> In one barrio the drinking water was brought in by barrel on horse-drawn carts from which households would have to purchase their water for cooking and drinking. Sometimes a well was dug in the front yard near the laundry area and water from the well was used for laundry and other household chores. At this location waste water could easily be drained into open sewers that ran on both sides of a narrow dirt street. Many of the dwellings appeared to be shared with domestic animals such as dogs, cats, pigs, chickens and ducks. Rodent and insect infestation appeared to be very common.
>
> Most of the observed houses had a minimum of furnishings. Most frequently there was a wooden table, several chairs and benches, beds, and clothes closet (either open or a portable clothes closet). In the kitchens, cooking facilities and utensils were limited and there were storage shelves on the walls on which to place articles. There were no ovens observed and little evidence of storage areas for food but nearly 30 per cent of the households had refrigerators. Thus, the other 70 per cent of the households had to purchase perishables on a day to day basis (44:47-48).

In the General Consumer Survey, an inventory was made of sixteen household items which the families might possess. When these were examined, it was found that the MB families' most common possessions were: an iron (91 per cent), an electric radio (80 per cent), an oil stove

(73 per cent), living room furniture (63 per cent), an electric or gas stove (52 per cent), a sewing machine (51 per cent), and a battery radio (43 per cent). Next in order were: refrigerators (38 per cent), blenders (36 per cent), some type of record player (31 per cent) and bicycles (19 per cent). The items possessed by the fewest number of households were: a vacuum cleaner (3 per cent), a washing machine (8 per cent), a car (12 per cent), and a television set (18 per cent). In twenty-six cases, the household had one or more of the above items, but these were not in operating condition.

Child-Feeding Practices

Information on child-feeding practices is furnished by Riley. In the seventy low-income families taken from the PIMUR sample, there were 120 children consisting of sixty-six boys and fifty-four girls. Eighty-four per cent of these were started on breast feedings from birth; yet at three months, 40 per cent had been taken from the breast with over one-half of the infants weaned before six months of age. By the end of one year, 80 per cent had been gradually weaned from the breast (16:94).

The mothers of these children (about 80 per cent) thought that it was becoming more customary to bottle-feed, and that early weaning was mainly due to an inadequate supply of breast milk or to ideas that the mother's breasts would be damaged by feeding her child. Most children received a bottle supplement and/or food from the family

table (16:95).

Riley's findings seemed to indicate that the mothers with more education and income tended to wean their children from the breast while those of the low-income per capita group would continue nursing as long as possible due to the cost of supplementary foods (16:95).

Dried milk was the form most utilized for supplementary feedings even though it was more costly than an equivalent amount of fluid milk. Dried milk is more convenient, cleaner, and more dependable as to quality, since many venders tend to "water" their raw product. Other supplementary bottle feedings were "cereals, and flour for thickening, sugar for sweetening and cinnamon for flavoring." Brown sugar was a favorite for both infants and adults (16:96).

Although 90 per cent of the mothers in the sample knew about one or more of the high protein supplements, only 30 per cent were actually using a product such as Colombiharina, Incaparina or Duryea at the time of the survey (16:97).

Riley did not find much difference in the educational levels of the mothers with respect to the desirability of meat, butter, eggs and cheese as post-weaning foods, although the younger mother seemd to value the use of green vegetables more than her older counterpart. The mothers (80 per cent) were not opposed to using a different high protein food for their children provided it would be as

nutritious as milk and available at a similar cost. If money were more plentiful, the mothers indicated they would purchase more meat, milk and eggs, and add chicken, fish, butter, and cheese to their menu (16:98-99).

Participation in Decision-Making

More than half (63 per cent of the amas de casa stated they did not have the participation of their family members relevant to the food purchases. Family members sometimes participated in 4 per cent of the households and in 33 per cent the other family members did not assist the ama de casa in what to purchase or where to purchase it.

IPC Levels I, II and Unknown had the highest percentages for the participation of other family members in decision making (38 and 37 per cent). However, in all IPC

TABLE 14. PARTICIPATION OF OTHER MB FAMILY MEMBERS IN ASSISTING THE AMAS DE CASA AS TO WHAT FOODS TO PURCHASE AND WHERE TO PURCHASE THEM

| IPCL | Number | Households where members assist the ama de casa | | Households where members do not assist ama de casa | | Households where members sometimes assist ama de casa | |
|---|---|---|---|---|---|---|---|
| | | No. | % | No. | % | No. | % |
| I | 37 | 14 | 38 | 21 | 57 | 2 | 5 |
| II | 54 | 20 | 37 | 32 | 59 | 2 | 4 |
| III | 56 | 15 | 27 | 40 | 71 | 1 | 2 |
| IV | 41 | 10 | 25 | 28 | 68 | 3 | 7 |
| Unknown | 48 | 18 | 38 | 29 | 60 | 1 | 2 |
| Total | 236 | 77 | 33 | 150 | 63 | 9 | 4 |

levels, the majority of the amas de casa made their purchase decisions without the assistance of their families.

Reaction of Amas de Casa to New Food Product or Different Markets

When a new food product appeared, a large proportion of the 236 amas de casa (49 per cent) reported they tried to test the product as soon as possible. This was also true for each of the IPC levels. About one-fourth of the sampled families (24 per cent) were usually not much interested in new food products and about one-fifth (21 per cent) of the amas de casa tried to test a new product after hearing good comments about it from reliable sources. The reaction of 6 per cent of the sample was unknown.

When questioned as to how many had at some time fed their children one of the new high protein foods, such as Incaparina and Colombiharina, 65 and 54 per cent, respectively, of the IPC Levels I and II amas de casa had tried these products. About half (48 per cent) of IPC III families, about one-third (34 per cent) of IPCL IV households, and 37 per cent of the Unknown IPCL had not used these products.

The majority of the amas de casa (67 per cent) were not accustomed to trying different markets in which to purchase their foods. Twenty-seven per cent were used to trying out different markets while 14 per cent sometimes tried them and 1 per cent gave no answer. Within the IPC levels, the highest percentage of amas de casa who said they

tried different markets was found in Level II (38 per cent). About one-fourth of IPC Levels I and III, 27 per cent of the Unknown IPCL, and only 20 per cent of IPCL IV were accustomed to purchasing at different markets.

Seventy-six per cent of the MB familiies reported that during the thirty days preceding the MB Survey, they had not purchased at different markets with the express purpose of taking advantage of food specials. The lowest IPC amas de casa (35 per cent), had availed themselves of these food savings as compared to the higher IPC levels (15-26 per cent).

Market Forces Affecting Food Purchases Among the SE Levels

Information relative to market forces affecting the MB purchases must be gleaned from the PIMUR report. These state that numerous factors in the food distribution system of Cali affected the availability, quantity, quality and cost of the food products. Some of these forces were: delays in getting the products to market due to transportation problems; excess handling of food causing deterioration of the product; lack of proper storage, sanitary conditions and controls; lack of physical space in stores and markets; pilferage, and ineffective wholesale channels; atomistic nature of the system in which small retailers and small wholesalers are limited in their ability to make major changes in their operations; and lack of knowledge as well as a reluctance and inability on the

part of farmers to fully exploit available farm production technologies (2).

Accessibility was a primary determinant in the selection of where the foods were purchased. If the *ama de casa* had to shop outside her immediate neighborhood, some of the food pesos had to be spent in transportation or for the services of a person to carry the purchases. The upper class *barrios* had greater accessibility to self-service outlets, especially supermarkets, since most of the supermarkets were located in the upper class areas. However, many members of the upper income group had their own cars or could afford taxis and thus had considerable freedom in choosing their shopping centers. The upper class households tended to exhibit the once-per-week major shopping trip pattern found in developed countries, while the lower income and slum residents shopped in non-neighborhood centers approximately once every three to four days. Other purchases were made in neighborhood *tiendas*, small stores with less choice and higher prices. Thus the lower income families, who could least afford to do so, had to spend a substantial percentage of their limited pesos on consumer transport because of the lack of adequate food retailing facilities in their immediate neighborhoods. The purchasing patterns of the middle class groups appeared to be consistent with the premise that accessibility and locational convenience are important determinants of where foods will be purchased (2; 12).

# CHAPTER V

## ANALYSIS OF THE MARKET BASKET

The analysis of the Market Basket is concerned with the percentages of families purchasing items from six major food categories, and the expenditures for each category; the animal products purchased by families with preschoolers; a discussion of the food pesos; the determination of the calorie and protein content of the MB foods; and, the comparison of the protein-calorie content of the Market Basket with the requirements estimated for each family.

### Food Purchased by MB Families

The six major food categories are discussed in the following order: meat, animal products, grains, vegetables, fruits, and processed foods. The sub-items within each of these groups are presented in descending order according to the percentage of families purchasing them. The expenditures for each food category shown in Table 15 are presented in the discussion of each category. It should be noted that the percentages for meat, animal products, and fruits showed an increase from the lowest to the highest IPCL. The reverse was true for grains, vegetables, and processed foods with the highest percentages spent by IPCL I and the lowest by IPCL IV.

TABLE 15. DISTRIBUTION OF FOOD PESOS AMONG THE CATEGORIES OF FOOD PRODUCTS

| IPCL | Total amount spent | Meat | Animal Products | Grains | Vegetables | Fruits | Processed |
|---|---|---|---|---|---|---|---|
| I (N=37) | $ 5,915.15 100% | $ 1,546.93 26% | $ 539.31 9% | $ 1,119.40 19% | $ 701.78 12% | $ 357.43 6% | $ 1,650.30 28% |
| II (N=54) | 10,729.29 100% | 2,988.56 28% | 1,287.87 12% | 1,894.47 17% | 1,058.67 10% | 748.05 7% | 2,751.67 26% |
| III (N=56) | 12,669.28 100% | 3,750.96 30% | 2,070.43 16% | 1,905.89 15% | 852.56 7% | 789.68 6% | 3,290.76 26% |
| IV (N=41) | 14,597.97 100% | 4,448.51 30% | 2,477.14 17% | 1,580.93 11% | 1,198.87 8% | 1,539.02 11% | 3,353.50 23% |
| Unknown (N=48) | 8,506.40 100% | 2,358.73 28% | 1,179.87 14% | 1,333.07 15% | 935.96 11% | 476.60 6% | 2,222.17 26% |
| Total (N=236) | $52,418.09 100% | $15,093.69 29% | $ 7,554.62 14% | $ 7,833.76 15% | $ 4,747.84 9% | $ 3,910.78 8% | $13,268.40 25% |

Meat Products

Meat was the most important product group represented in the Colombian housewife's Market Basket. For the four known IPC Levels, the expenditures for meat increased from the lowest to the highest IPCL. The Unknown IPCL was similar to IPCL II, with both groups spending 20 per cent of their food pesos for meat (Table 15). The selected meat items, percentage of families purchasing them, and the average amounts purchased are detailed in Table 16.

Beef.--Ninety-eight per cent of the MB families purchased beef at an average of 6.91 pounds per family. Beef was the most purchased meat within each IPCL. The average number of pounds per family was lowest in the Unknown IPCL (4.89 pounds) but in IPCL I through IV, the average number of pounds of beef per family increased as the IPC level increased. In IPCL II and IV, 100 per cent of the households purchased beef.

Pork.--Pork ranked second to beef in meat purchases. Forty-four per cent of the families bought an average of 2.05 pounds of pork. The percentage of families that selected this product increased from IPCL I through IPCL IV. Except for IPCL III, the average pounds purchased also increased with the ascending IPC levels, with the Unknown IPCL falling between Levels I and II.

Fish.--Fish purchases were made by 35 per cent of the families at an average of two pounds per family. The lowest number of families purchasing this item was found in

TABLE 16. CATEGORIES OF MEAT: PER CENT OF FAMILIES BUYING AND AVERAGE AMOUNT PURCHASED ON THE DATE INTERVIEWED

| Category | IPCL I % buying | IPCL I Mean lbs. | IPCL II % buying | IPCL II Mean lbs. | IPCL III % buying | IPCL III Mean lbs. | IPCL IV % buying | IPCL IV Mean lbs. | IPCL Unknown % buying | IPCL Unknown Mean lbs. | Total Sample % buying | Total Sample Mean lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pork | 32 | 1.04 | 41 | 1.64 | 55 | 1.46 | 61 | 3.54 | 31 | 1.36 | 44 | 2.05 |
| Beef | 97 | 5.00 | 100 | 5.31 | 96 | 6.88 | 100 | 9.30 | 98 | 4.89 | 98 | 6.91 |
| Fish | 35 | 1.88 | 30 | 2.43 | 45 | 1.80 | 41 | 1.92 | 25 | 2.06 | 35 | 2.00 |
| Chicken | 3 | 2.50 | 4 | 6.00 | 18 | 3.20 | 41 | 3.29 | 4 | 2.50 | 14 | 3.36 |
| Viscera | 14 | 2.50 | 7 | 1.38 | 16 | 1.44 | 15 | 1.67 | 6 | 2.00 | 11 | 1.74 |
| Bone | 22 | 4.19 | 33 | 1.61 | 27 | 1.66 | 27 | 3.55 | 27 | 2.00 | 28 | 2.35 |
| Ham | -- | -- | -- | -- | 4 | .50 | 12 | 1.20 | 2 | .25 | 3 | .97 |
| Lunch Meat | -- | -- | -- | -- | -- | -- | 7 | 1.17 | -- | -- | 1 | 1.17 |
| Sausages | 5 | 2.00* | -- | -- | 5 | 5.70 | 7 | 7.60 | 2 | 3.00 | 4 | 9.00 |
| Other | 8 | -- | 20 | -- | 2 | -- | 12 | -- | 2 | -- | 9 | -- |

*Sausages were purchased by the unit. The mean unit is given here.

the Unknown IPCL (25 per cent), although the mean number of pounds purchased (2.06 pounds) was greater than those for all groups except IPCL II (2.43 pounds). The highest percentages of families that bought fish were seen in IPCL III (45 per cent) and IV (41 per cent). Only about one-third of the two lowest IPC families included fish in their MB purchases.

Bone.--Twenty-eight per cent of the sample purchased an average of 2.35 pounds of bone per family. The highest mean number of pounds (4.19) was obtained by IPCL I, although less than one-fourth of these low income families purchased bone. One-third of IPCL II families and slightly over one-fourth of III, IV, and Unknown obtained average amounts of 1.61-3.55 pounds of bone during the survey week.

Chicken.--Fourteen per cent of the families purchased an average of 3.36 pounds of chicken. This was primarily an upper class meat since 41 per cent of IPCL IV and 18 per cent of IPCL III households bought chicken as compared to 3 and 4 per cent for the remaining levels. Although only a small percentage of IPCL II purchased chicken, the amount purchased was greater than that for the sample as a whole.

Viscera.--Eleven per cent of the households obtained an average of 1.74 pounds of viscera. The percentage distribution was only slightly more for the two highest IPC Levels (16 and 15 per cent) than for the lowest IPCL (14 per cent), with the latter purchasing 2.50 pounds per family as compared to 1.38-2.00 pounds for the other Levels. IPCL

II and Unknown made the least number of purchases (7 and 6 per cent, respectively).

Ham and lunch meat.--Ham was purchased by the upper IPC families (4 and 12 per cent) and the Unknown IPCL (2 per cent). Lunch meat was represented in 1 per cent of the MB households with IPCL IV responsible for this purchase.

Sausages and other items.--A very small number (4 per cent) of all IPC families, excluding IPCL II, obtained some sausage. Nine per cent of the sample (primarily Levels II, IV and I) selected items not detailed in the meat categories.

The percentage of consumers preferring meat products generally showed an increase from the lower to the higher IPC levels, leading one to assume that with an increase in income there was greater demand for meat products. Higher percentages of the upper IPC families also selected a greater variety of meat products, while the lower IPC levels selected only one or two varieties. For the total MB sample, 51 per cent purchased two meat items; 41 per cent selected three to four items. Only 8 per cent of the households purchased five or more meat products. Further details are shown in Table 17.

TABLE 17. PER CENT OF FAMILIES PURCHASING A VARIETY OF MEATS

| Varieties of meat purchased | IPCL | | | | | Total Sample |
|---|---|---|---|---|---|---|
| | I % | II % | III % | IV % | Unknown % | % |
| 1-2 | 64 | 50 | 43 | 34 | 66 | 51 |
| 3-4 | 33 | 44 | 48 | 47 | 34 | 41 |
| 5-8 | 3 | 6 | 9 | 19 | -- | 8 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

Animal Products

Purchases of eggs, milk, margarine, butter and cheese took 14 per cent of the MB consumers' food pesos. There was an increase in the percentage of the food pesos for these products within the ascending IPC Levels. IPCL I and II spent 9 and 12 per cent, the Unknown IPCL used 14 per cent, with III and IV allocating 16 and 17 per cent of their money for animal products (Table 15). These products, with the per cent of families purchasing them and the average amounts obtained during the survey week, are given in Table 18.

Eggs.--Sixty-nine per cent of the households invested in an average of 16 eggs per unit. The weekly consumption was considerably less for IPCL I households with an average of nine eggs as compared to twenty-six eggs for IPCL IV households. The highest percentages of families selecting eggs were found in IPCL II (80 per cent), Unknown

TABLE 18: EGGS, MILK AND MILK PRODUCTS: PER CENT OF FAMILIES BUYING AND AVERAGE AMOUNT PURCHASED

| | | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | I | | II | | III | | IV | | Unknown | | | |
| Category | Measure | % buying | Mean amt. | % buying | Mean amt. | % buying | Mean amt. | % buying | Mean amt. | % buying | Mean amt. | % buying | Mean amt. |
| Eggs | unit | 58 | 9.0 | 80 | 15.0 | 63 | 16.0 | 70 | 26.0 | 73 | 13.0 | 69 | 16.0 |
| Raw milk | bottle | 46 | 6.0 | 41 | 10.1 | 46 | 11.4 | 49 | 19.0 | 35 | 12.8 | 43 | 11.9 |
| Condensed milk | can | 3 | 1.0 | -- | -- | 4* | 1.0 | 5* | -- | -- | -- | 4 | 1.0 |
| Powdered milk | pound | 22 | 1.2 | 19 | 1.0 | 14 | 2.0 | 2 | 1.0 | 8 | 2.0 | 13 | 1.5 |
| Pasteurized milk | bottle | 41 | 3.6 | 57 | 7.0 | 59 | 9.2 | 49 | 16.4 | 58 | 5.6 | 53 | 8.4 |
| Margarine | pound | 8 | .8 | 7 | .6 | 21 | 1.1 | 32 | 1.5 | 21 | 1.0 | 18 | 1.0 |
| Butter | pound | 5 | .6 | 17 | 1.0 | 16 | .8 | 41 | 1.1 | 6 | 1.3 | 17 | 1.0 |
| Cheese | pound | -- | -- | 7 | .7 | 29 | 1.1 | 56 | 1.3 | 15 | 1.3 | 27 | 1.1 |
| Other | -- | -- | -- | -- | -- | 2* | -- | 12* | -- | -- | -- | 7* | -- |

*The quantity purchased was not specified.

(73 per cent), and IV (70 per cent). The lowest percentages were attained by IPCL III (63 per cent) and I (58 per cent).

Milk.--Seasonally, milk was in short supply when the study was conducted. A mean of 8.4 bottles of pasteurized milk was bought by 53 per cent of the sample. An average of 11.9 bottles of raw milk was obtained by 43 per cent of the homes. Thirteen per cent of the sample bought an average of 1.5 pounds of powdered milk and 4 per cent purchased condensed milk. A higher percentage of IPC Levels II, III, and Unknown invested in pasteurized milk than in raw milk. Level IV had the same percentages for both, while a slightly higher number of IPCL I families selected raw milk instead of the pasteurized product. The number of bottles purchased per family increased from an average of six bottles in IPCL I to nineteen bottles of raw milk per family in IPCL IV. The average purchases of pasteurized milk ranged in ascending order from 3.6 bottles to 16.4 bottles of pasteurized milk.

Raw milk may have been less favored because of the unsanitary conditions surrounding its handling. Milk cans are neither adequately washed nor sterilized; a dipper is used to measure the amount into the consumer's own container, and "watering down" is a frequent complaint. Raw milk sold for about 15 per cent less than pasteurized milk and was extremely variable in quality.

Powdered milk was selected more by the lower IPC

families with IPCL IV buying very little of this product. According to the PIMUR study, reconstituted powdered milk cost over $4.90 pesos per liter while pasteurized milk sold for $2.78 pesos per liter (2:158). Powdered milk was expensive due to such factors as: low quality and volume of the milk from which the dried product was made, high production cost, consumption limited to the infant population, and high cost of packaging (48:25).

Cheese.--Cheese was purchased by 27 per cent of the households with each family buying an average of 1.1 pounds. The consumption of this item was primarily limited to the upper classes with IPCL IV buying slightly more than III. The Unknown IPCL purchased an average of 1.3 pounds although only 15 per cent of the group favored cheese.

Margarine and butter.--Slightly more margarine (18 per cent than butter (17 per cent) was selected by the MB families. Higher percentages of IPCL I, III, and Unknown selected margarine while higher percentages of II and IV selected butter. The average amount for either of these products ranged from .6 pounds to 1.5 pounds per family with the two upper IPC Levels and Unknown having the highest amounts available per family.

The purchase of animal products not detailed in the preceding sections was made only by IPCL III and IV. In general, higher percentages of the upper IPC families purchased eggs, milk, and milk products. A great deal of difference in percentages existed for margarine, butter, and

cheese, with the number of families buying these products increasing as the IPCL increased. The average amount of these products, along with eggs, raw and pasteurized milk, was also greater for the upper IPC Levels. Powdered milk was the only product showing descending percentages from Levels I through IV.

Grains

The MB consumers spent 15 per cent of their total food pesos for grains. This category represented the third highest expenditure group with expenditures for meat and processed foods considerably higher. The lower IPC families used larger amounts of their food pesos (19 and 17 per cent) for grains than did the upper IPC households (15 and 11 per cent), and the Unknown IPCL (15 per cent). (See Table 15.) The number and per cent of families buying grains are shown in Table 19.

Rice.--Rice was purchased by 92 per cent of the families. It was the grain most-used by all the IPC Levels. More IPC I and Unknown families purchased this commodity than was noted for the other levels, although the percentages were high for all families.

Red kidney beans.--Seventy-six per cent of the sample selected the red kidney beans known as frijoles. Again, the highest percentage of families purchasing this grain was found at the lowest IPCL. These legumes constituted the second most-purchased grain at all levels.

Lentils.--Lentils were purchased by 47 per cent of the sample. This was the third most-purchased grain for

TABLE 19. NUMBER AND PER CENT OF FAMILIES BUYING GRAINS

| Grains | IPCL | | | | | | | | | | Total sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % |
| Rice | 36 | 97 | 47 | 87 | 50 | 89 | 37 | 90 | 47 | 98 | 217 | 92 |
| Peas | 12 | 32 | 14 | 26 | 24 | 43 | 25 | 61 | 14 | 29 | 89 | 38 |
| Red kidney beans | 32 | 86 | 37 | 69 | 44 | 79 | 30 | 73 | 36 | 75 | 179 | 76 |
| Chick-peas | -- | -- | 2 | 4 | 3 | 5 | 3 | 7 | -- | -- | 8 | 3 |
| Green beans | 7 | 19 | 9 | 17 | 9 | 16 | 18 | 44 | 10 | 21 | 53 | 22 |
| Lentils | 13 | 35 | 22 | 41 | 31 | 55 | 24 | 59 | 22 | 46 | 112 | 47 |
| Corn | 21 | 57 | 19 | 35 | 25 | 45 | 15 | 37 | 22 | 46 | 102 | 43 |
| Other | 1 | 3 | 1 | 2 | 3 | 5 | -- | -- | 4 | 8 | 9 | 4 |

IPCL II, III, and Unknown. A higher percentage of upper IPC families than lower included lentils among their commodities. The percentages ranged from 35-59 per cent for IPCL I through IV, with the Unknown Level falling between II and III.

Corn.--Forty-three per cent of the sample selected corn. This staple was the third grain most-purchased by IPCL I and Unknown. It ranked fourth with IPCL II and III and sixth with IPCL IV. IPCL I had the highest percentage of families including corn in their purchases during this survey week. IPCL II and IV had the lowest percentages for the inclusion of corn in the Market Baskets.

Peas.--Peas were bought by 38 per cent of the households. This grain was preferred by the two upper IPC levels (43 and 61 per cent), with IPCL IV families choosing it as their third most-preferred grain. Peas ranked fifth in the choices made by IPCL I, II, and III. For the Unknown IPCL, peas were the fourth most-purchased grain.

Green beans.--Twenty-two per cent of the sample included green beans in their Market Baskets. This commodity was primarily an upper IPCL food since forty-four per cent of IPCL IV purchased it as compared to 16-21 per cent of the families in the other levels. Green beans ranked as the fifth grain of choice for IPCL IV and Unknown, and sixth for the remaining levels.

Chick-peas.--Only 3 per cent of the total households invested in chick-peas. No purchases were made by IPCL I, and Unknown; only two to three families in each of the other

levels considered this commodity. This was the grain least-selected by the MB households.

The purchase of other grains not detailed in this discussion was made by 4 per cent of the sample. From 2-8 per cent of all the families, except IPCL IV which made no purchases from this category, included some other grain in their Market Baskets. In general, the purchase of peas, green beans, and lentils showed an increase from the lower to the upper IPCL. Rice, red kidney beans, and corn were selected more by the lower IPC households. Chick-peas were not a favored commodity.

Vegetables

Nine per cent of the food pesos of the MB families was invested in vegetables. Vegetables (and fruits) represented the lowest expenditures among the categories of food products (Table 15). IPCL I and Unknown used 12 and 11 per cent of their food pesos for vegetables with IPCL II, III, and IV allocating 10, 7 and 8 per cent, respectively.

The vegetable category, as did the fruit category, included those foods most important in terms of the Cali consumer's expenditures for vegetables (Table 20). They were considered representative of the wide variety available in the market. Their quantity and quality at any given time is affected by seasonal variations.

TABLE 20. NUMBER AND PER CENT OF FAMILIES BUYING VEGETABLES

| Vegetable | IPCL I | | II | | III | | IV | | Unknown | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % |
| Arraccaha | 18 | 49 | 20 | 37 | 25 | 45 | 18 | 44 | 17 | 35 | 98 | 42 |
| Onions: bulb | 11 | 30 | 24 | 44 | 24 | 43 | 33 | 80 | 14 | 29 | 106 | 45 |
| green | 36 | 97 | 45 | 83 | 43 | 77 | 40 | 98 | 42 | 88 | 206 | 87 |
| Corn-on-the cob | 1 | 3 | 2 | 4 | 4 | 7 | 10 | 24 | 5 | 10 | 22 | 9 |
| Potatoes | 37 | 100 | 50 | 93 | 49 | 88 | 39 | 95 | 46 | 96 | 221 | 94 |
| Beets | 11 | 30 | 19 | 35 | 21 | 38 | 22 | 54 | 13 | 27 | 86 | 36 |
| Cabbage | 16 | 43 | 22 | 41 | 29 | 52 | 24 | 59 | 21 | 44 | 112 | 47 |
| Tomato | 35 | 95 | 47 | 87 | 45 | 80 | 40 | 98 | 43 | 90 | 210 | 89 |
| Yuca | 28 | 76 | 43 | 80 | 46 | 82 | 28 | 68 | 36 | 75 | 181 | 77 |
| Carrots | 17 | 46 | 31 | 57 | 33 | 59 | 32 | 78 | 18 | 38 | 131 | 56 |
| Others | 22 | 59 | 35 | 65 | 43 | 77 | 33 | 80 | 27 | 56 | 160 | 68 |

Potatoes.--Ninety-four per cent of all the families invested in potatoes. One hundred per cent of the lowest IPC families purchased this commodity. Potatoes constituted the preferred vegetable at all levels, except IV, where tomatoes and green onions were slightly preferred to potatoes.

Tomatoes.--The second most selected vegetable was tomatoes; 89 per cent of the families selected this product. Ninety-eight per cent for IPCL IV, represented the highest percentage of families purchasing tomatoes, while 80 per cent for IPCL III represented the lowest percentage.

Onions.--Onions were divided into two types: bulb and green. Green onions were selected by 87 per cent of the sample with the bulb type purchased by only 45 per cent. Except for one family in each level, all of IPCL I and IV invested in green onions; the percentages in the remaining levels ranged from 77-88 per cent. IPCL IV purchased the most onions of the bulb variety, but this type ranked low with the other levels.

Yuca.--The root vegetable, yuca, was favored by 77 per cent of the households. It was selected by 80-82 per cent of the families in IPCL II and III, and by around 75 per cent of the households in I and Unknown. This food was chosen by 68 per cent of IPCL IV.

Carrots.--Fifty-six per cent of the households chose carrots, with the highest percentage of families (78 per cent) found in IPCL IV, and the lowest percentage (38 per cent) in the Unknown IPCL. The percentage of families purchasing

carrots increased throughout the ascending IPC levels.

Cabbage.--Cabbage was the only leafy vegetable included in the categories. It was chosen by 47 per cent of the consumers. In general, the percentages of families including this product (41-59 per cent) increased as the IPCL increased with IPCL II showing the lowest percentage.

Arracacha.--The root arracacha was purchased by 42 per cent of the households. Forty-nine per cent of IPCL I, 37 per cent of IPCL II, and 35 per cent of the Unknown IPC families purchased this food. Forty-five per cent of IPCL III and 44 per cent of IPCL IV households included arracacha in their purchases.

Beets.--Thirty-six per cent of the households selected beets. IPCL IV families showed the highest percentage (54 per cent). The figures for the other three ascending levels ranged from 27-38 per cent with the Unknown Level having the smallest percentage.

Corn-on-the-cob.--Nine per cent of the sample purchased corn-on-the-cob (choclo). This was the least-purchased vegetable for all the IPC groups. Twenty-four per cent of IPCL IV families purchased this corn as compared to 3-10 per cent for the other levels.

Vegetables not listed in the preceding discussion were purchased by 68 per cent of the sample. The highest percentages for these were found in the upper IPC levels. In general, the percentages of families who purchased bulb onions, corn-on-the-cob, beets, cabbage, and carrots showed

an increase from the lowest to the highest IPCL. Arracacha, potatoes, tomatoes, and yuca, in general, showed decreasing percentages of families purchasing them as the IPCL increased.

Fruits

Eight per cent of the MB food pesos was expended for fruits. IPCL IV spent 11 per cent as compared to 6 per cent for IPCL I, III, and Unknown, and 7 per cent for IPCL II (Table 15). The number and percentage of families purchasing from this category are shown in Table 21.

Plantain.--Green plantain was purchased by 89 per cent of the sample and ripe plantain by 56 per cent. Percentage-wise, there was relatively little difference in the number of families purchasing green plantain in the various levels. Ripe plantain was selected by a higher percentage of IPCL I and III, than by II and IV, with the Unknown IPCL revealing the lowest percentage. Green plantain was the fruit selected by the highest percentage of families in the MB sample.

Lulos.--The tropical fruit lulo was represented in 44 per cent of the purchases. It was preferred by 78 per cent of IPCL IV and 57 per cent of IPCL III families. One-third or less of the remaining households within each level purchased this fruit.

Bananas.--Forty per cent of the families selected bananas. Again, more upper IPC families (46 and 59 per cent) than lower ones (35 and 37 per cent) used this fruit with the

TABLE 21. NUMBER AND PER CENT OF FAMILIES BUYING FRUITS

| Fruit | IPCL I Number buying | IPCL I % | IPCL II Number buying | IPCL II % | IPCL III Number buying | IPCL III % | IPCL IV Number buying | IPCL IV % | IPCL Unknown Number buying | IPCL Unknown % | Total Sample Number buying | Total Sample % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avocados | -- | -- | 2 | 4 | 2 | 4 | 5 | 12 | 11 | 23 | 20 | 8 |
| Bananas | 13 | 35 | 20 | 37 | 26 | 46 | 24 | 59 | 11 | 23 | 94 | 40 |
| Lemons | 6 | 16 | 9 | 17 | 17 | 30 | 16 | 39 | 10 | 21 | 58 | 25 |
| Lulos | 8 | 22 | 18 | 33 | 32 | 57 | 32 | 78 | 14 | 29 | 104 | 44 |
| Tangerines | -- | -- | 1 | 2 | 1 | 2 | 8 | 20 | -- | -- | 10 | 4 |
| Mangos | 5 | 14 | 13 | 24 | 12 | 21 | 11 | 27 | 6 | 13 | 47 | 20 |
| Blackberries | 2 | 5 | 5 | 9 | 12 | 21 | 27 | 66 | 7 | 15 | 53 | 22 |
| Oranges | 11 | 30 | 21 | 39 | 26 | 46 | 27 | 66 | 10 | 21 | 95 | 40 |
| Plantain: | | | | | | | | | | | | |
| ripe | 24 | 65 | 28 | 52 | 37 | 66 | 23 | 56 | 21 | 44 | 133 | 56 |
| green | 34 | 92 | 48 | 88 | 51 | 91 | 36 | 88 | 41 | 85 | 210 | 89 |
| Papaya | -- | -- | 1 | 2 | -- | -- | 8 | 20 | 1 | 2 | 10 | 4 |
| Pineapple | -- | -- | 4 | 7 | 9 | 16 | 20 | 49 | 5 | 10 | 38 | 16 |
| Tomate de árbol | -- | -- | -- | -- | 4 | 7 | 9 | 22 | 1 | 2 | 14 | 6 |
| Grapes | 1 | 3 | -- | -- | 7 | 13 | 8 | 20 | 1 | 2 | 17 | 7 |
| Zapote | -- | -- | -- | -- | -- | -- | 2 | 5 | -- | -- | 2 | 1 |
| Other | 4 | 11 | 8 | 15 | 16 | 29 | 19 | 46 | 7 | 15 | 54 | 23 |

least percentages found in the Unknown IPCL (23 per cent).

Oranges.--Forty per cent of the families bought oranges. This fruit was also favored by the two upper IPC Levels (46 and 66 per cent) compared to the other three groups (21-39 per cent).

Lemons.--Lemons were represented in the purchases of 25 per cent of the sample. More than twice as many families in the upper two levels (30 and 39 per cent) than in the lower ones (16 and 17 per cent) bought lemons. The Unknown IPCL (21 per cent) was located between Levels II and III.

Blackberries.--Blackberries were selected by 22 per cent of the families. Sixty-six per cent of IPCL IV households selected this fruit. The remaining percentages ranged from 5-21 per cent with the lowest percentage noted for IPCL I.

Mangos.--One-fifth of the MB households bought mangos. This fruit was secured by higher percentages of families in IPCL II, III, and IV (21-27 per cent) than by IPCL I and Unknown (14 and 13 per cent).

Pineapple.--Pineapple was purchased by 16 per cent of the households. It was selected by 49 per cent of IPCL IV and by 7-16 per cent of IPCL II, III, and Unknown. None of the lowest IPC households bought this fruit.

Avocados.--Avocados were one of the least-purchased fruits. They were selected by 8 per cent of the sample with no purchases made by IPCL I. The percentages ranged from 4-23 per cent with the Unknown IPCL having the highest

percentage of families choosing avocados.

Grapes.--Seven per cent of the sample bought grapes. This fruit was primarily an upper IPCL selection even though it ranked low among the fruits chosen by the upper levels during this period of study. None of the IPCL II families and only one family in IPCL I and Unknown purchased grapes.

Tomate de árbol.--Only 6 per cent of the sample chose tomate de árbol. No purchases were made by IPCL I and II. The percentages ranged from 2-22 per cent with the highest percentage pertaining to IPCL IV, and the lowest to Unknown.

Papaya.--Papaya was purchased by 4 per cent of the MB families. No purchases were made by IPCL I and III; only one family in IPCL II and Unknown, and eight in IPCL IV said they purchased papaya.

Tangerines.--Four per cent of the households also chose tangerines. IPCL I and Unknown made no purchases; only one family in IPCL II and III, with eight in IPCL IV, provided tangerines for consumption.

Zapote.--The only purchase of zapote was made by two families in IPCL IV.

Twenty-three per cent of the sample purchased fruits not included in the above items. The highest percentages of families who made other selections were found in the upper IPC levels. In general, the consumption of fruit increased as the IPCL increased. Plantain was a favorite at all levels. All the remaining fruits were represented in less

than 44 per cent of the Market Baskets.

Processed Foods

Expenditures for processed foods ranked second to meat. Twenty-five per cent of the food budget for the entire sample was used for these foods. Level I used 28 per cent of its budget for processed foods, IPC II, III, and Unknown used 26 per cent, while IPCL IV spent 23 per cent of its food pesos for processed commodities (Table 15).

As shown in Table 22, the products purchased by the highest percentages of families were: panela (76 per cent), sugar (75 per cent), bread (72 per cent), coffee (69 per cent), macaroni products (65 per cent), condiments (60 per cent), lard (58 per cent), salt (56 per cent), chocolate (55 per cent), and oil (43 per cent). The percentages for the remaining items ranged from 1-20 per cent.

Colombiharina and Incaparina, the two high protein supplementary foods used for infant feedings, were purchased at this time by only nineteen of the 236 families in the survey. Colombiharina was secured by the two lowest IPCL families and the Unknown IPCL. Incaparina was selected by one to three families in each of the IPC levels.

The processed foods were not used in the analysis of the nutritional quality of the food. The reasons for this are given in a later section. (See pages 103-104).

TABLE 22. NUMBER OF FAMILIES BUYING PROCESSED FOODS

| Category | IPCL | | | | | Total sample | |
|---|---|---|---|---|---|---|---|
| | I | II | III | IV | Unknown | | |
| | No. | No. | No. | No. | No. | No. | % |
| Arepas | 5 | 7 | 14 | 4 | 11 | 41 | 17 |
| Oil | 8 | 22 | 26 | 27 | 10 | 93 | 43 |
| Oats | 3 | 2 | 6 | 7 | 3 | 21 | 9 |
| Sugar | 34 | 34 | 42 | 33 | 34 | 177 | 75 |
| Coffee | 29 | 35 | 34 | 27 | 37 | 162 | 69 |
| Cerelac | -- | -- | -- | 1 | -- | 1 | 1 |
| Beer | -- | -- | -- | 1 | -- | 1 | 1 |
| Colorings | -- | -- | 1 | -- | -- | 1 | 1 |
| Condiments | 23 | 31 | 34 | 24 | 29 | 141 | 60 |
| Colombiharina | 3 | 1 | -- | -- | 4 | 8 | 3 |
| Chocolate | 27 | 28 | 28 | 16 | 30 | 129 | 55 |
| Chocavena | -- | 2 | 3 | 4 | -- | 9 | 4 |
| Frescavena | -- | -- | -- | -- | -- | -- | -- |
| Canned goods | 2 | 4 | 15 | 17 | 6 | 44 | 19 |
| Soft drinks | 3 | 1 | 7 | 5 | 4 | 20 | 8 |
| Flour | | | | | | | |
| areparina | 1 | 2 | 2 | 13 | 2 | 20 | 8 |
| almidón | -- | -- | 1 | 2 | -- | 3 | 1 |
| wheat | 6 | 9 | 12 | 12 | 9 | 48 | 20 |
| Incaparina | 2 | 3 | 2 | 1 | 3 | 11 | 5 |
| Juices | -- | 1 | 2 | 7 | 3 | 13 | 6 |
| Lard | 28 | 34 | 28 | 14 | 30 | 134 | 58 |
| Panela | 33 | 33 | 43 | 29 | 42 | 180 | 76 |
| Bread | 25 | 37 | 46 | 30 | 33 | 171 | 72 |
| Macaroni, etc. | 26 | 28 | 39 | 24 | 37 | 154 | 65 |
| Pochito | -- | -- | -- | -- | -- | -- | -- |
| Salt | 21 | 26 | 37 | 24 | 24 | 132 | 56 |
| Tomato sauce | -- | 2 | 15 | 14 | 4 | 35 | 15 |
| Soups | 1 | 2 | 3 | 9 | 3 | 18 | 8 |
| Cornstarch | 2 | 1 | 7 | 7 | 7 | 24 | 10 |
| Others | 10 | 14 | 22 | 17 | 17 | 80 | 34 |

## Animal Products Purchased by Families With Children Under Five Years of Age

Among the 236 MB families, there were 137 (58 per cent) with children under five years of age. As shown in Table 23, the majority of the families had one or two children in this age category. The upper IPC families had the highest number of families with only one preschool child. The highest percentage with two preschoolers was registered for the Unknown IPCL. The two lowest IPC groups had the highest percentages with three preschool children. None of the upper IPC households had four or five children under five years of age.

### Animal Products

The animal products considered were the same ones detailed for the population as a whole. The percentages of families who purchased eggs, milk, margarine, butter, and cheese were quite similar to those for the total MB sample (See Table 18). Except for powdered milk and butter, the descending order of percentages was identical. These details are shown in Table 24.

Eggs.--Eggs were selected by 66 per cent of the families with preschool children (69 per cent for the total sample). Seventy-seven per cent of the Unknown IPCL bought eggs as compared to 69 per cent for IPCL II, 68 per cent for IV, 61 per cent for III, and 58 per cent for IPCL I.

Milk.--Pasteurized milk was purchased by 52 per cent of the families with preschool children (53 per cent for the

TABLE 23. DISTRIBUTION OF PRESCHOOL CHILDREN AMONG THE MB FAMILIES

| IPCL | Number of children per household | | | | | | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | % | 2 | % | 3 | % | 4 | % | 5 | % | No. | % |
| I (N=26) | 9 | 34 | 8 | 31 | 6 | 23 | 2 | 8 | 1 | 4 | 26 | 19 |
| II (N=32) | 14 | 44 | 9 | 28 | 8 | 25 | -- | -- | 1 | 3 | 32 | 23 |
| III (N=38) | 28 | 74 | 7 | 18 | 3 | 8 | -- | -- | -- | -- | 38 | 28 |
| IV (N=19) | 15 | 78 | 2 | 11 | 2 | 11 | -- | -- | -- | -- | 19 | 14 |
| Unknown (N=22) | 10 | 45 | 10 | 45 | 1 | 5 | 1 | 5 | -- | -- | 22 | 16 |
| Total | 76 | 56 | 36 | 26 | 20 | 15 | 3 | 2 | 2 | 1 | 137 | 100 |

TABLE 24. PERCENTAGE OF MB FAMILIES WITH CHILDREN UNDER FIVE YEARS OF AGE THAT PURCHASED EGGS, MILK, AND MILK PRODUCTS

| Category | IPCL I (N=26) | | IPCL II (N=32) | | IPCL III (N=38) | | IPCL IV (N=19) | | IPCL Unknown (N=22) | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % | Number buying | % |
| Eggs | 15 | 58 | 22 | 69 | 23 | 61 | 13 | 68 | 17 | 77 | 90 | 66 |
| Raw milk | 13 | 50 | 12 | 38 | 20 | 53 | 9 | 47 | 8 | 36 | 62 | 45 |
| Condensed milk | -- | -- | -- | -- | 1 | 3 | 2 | 11 | -- | -- | 3 | 2 |
| Powdered milk | 6 | 23 | 5 | 16 | 7 | 18 | 1 | 5 | 3 | 14 | 22 | 16 |
| Pasteurized milk | 12 | 46 | 18 | 56 | 18 | 47 | 11 | 58 | 12 | 55 | 71 | 52 |
| Margarine | 1 | 4 | 3 | 9 | 10 | 26 | 7 | 37 | 5 | 23 | 26 | 19 |
| Butter | 2 | 8 | 3 | 9 | 5 | 13 | 6 | 32 | 1 | 5 | 17 | 12 |
| Cheese | -- | -- | 2 | 6 | 12 | 32 | 13 | 68 | 3 | 14 | 30 | 22 |
| Other | -- | -- | -- | -- | -- | -- | 2 | 11 | -- | -- | 2 | 1 |
| None | 1 | 4 | 1 | 3 | -- | -- | -- | -- | 1 | 5 | 3 | 2 |

total sample). It was preferred to the raw product selected by 45 per cent of this sub-sample (43 per cent for total sample). A higher percentage of IPCL I and III selected the raw milk, while higher percentages of II, IV and Unknown chose the pasteurized product. Powdered milk was chosen more by the low IPC families with canned milk selected only by the two upper levels.

Margarine and butter.--Margarine was purchased by 19 per cent of the families with preschoolers with 12 per cent buying butter (18 and 17 per cent, respectively, for the total sample). The upper IPC families purchased more margarine and butter than did the lower levels, yet a higher percentage of families selected margarine over butter.

Cheese.--Twenty-two per cent of the households with preschoolers selected cheese (27 per cent for total sample). IPCL I recorded no cheese purchases during the survey week. In IPCL II, only 6 per cent of the households bought cheese as compared to 32 per cent for IPCL III and 14 per cent for the Unknown IPCL. Sixty-eight per cent of the highest IPCL Levels selected cheese.

Two of the IPCL IV families chose items not listed above. One family in each of Levels I, II, and Unknown did not purchase eggs, milk and milk products during the survey week. However, with only three of the total families making no purchases, 98 per cent of the families with preschoolers did provide some amount of calories and proteins from this food group. The percentage of small children receiving milk

by breast-feeding was unknown. Instead of milk, or with milk, a few of the MB families were using high protein replacement foods. Among the eight families in the total sample who used Colombiharina, five had children under five years of age. Incaparina was used by a total of eleven families with seven of these also having preschoolers.

## The Food Pesos

When the weekly expenditures for the MB foods were compared with the amounts these families had estimated in the broader Consumer Survey, it was found that the lowest IPCL most nearly approximated its actual expenditures--97 per cent, as compared to 94 per cent for IPCL III, 90 per cent for IPCL II and IV, and 80 per cent for the Unknown IPCL. Since earlier it was shown that the low IPC families spent higher percentages of the income for food, it may have been that they were more aware of their expenditures.

As shown in Table 25, the MB families spent an average of $224 pesos per family for food; only IPCL III and IV exceeded this average. The average food pesos spent per family ($160-356 pesos) and per capita ($19-65 pesos) increased through each of the ascending IPC levels.

TABLE 25. COMPARISON OF THE FOOD PESOS SPENT PER FAMILY AND PER CAPITA WITH THE AMOUNTS THE MB FAMILIES ESTIMATED THAT THEY SPENT*

| IPCL | Number of families | Average weekly food pesos per family in MB | Total number of persons | Average weekly food pesos per capita | Average weekly estimated food expenditures | Estimated food pesos as per cent of actual expenditures |
|---|---|---|---|---|---|---|
| I | 37 | $ 160 | 315 | $ 19 | $ 19.5 | 97 |
| II | 54 | 199 | 386 | 28 | 31.0 | 90 |
| III | 56 | 226 | 319 | 40 | 42.5 | 94 |
| IV | 41 | 356 | 224 | 65 | 72.5 | 90 |
| Unknown | 48 | 177 | 289 | 29 | 36.0 | 81 |
| Total | 236 | $ 224 | 1533 | $ 36 | $ 40.5 | 90 |

*The exchange rate at the time of the survey was $17 pesos per United States dollar.

The estimation of food expenditures was taken from the General Consumer Survey. The weekly food pesos were calculated from the actual MB expenditures.

## Determination of the Calorie and Protein Content of the MB Foods

The Colombian food composition tables, supplemented by the Venezuelan tables, were used to determine the calorie and protein content of the MB purchases. Once the amount of each purchase had been determined, this amount was broken down into one hundred gram units and multiplied by the number of calories or grams of protein per one hundred gram unit. This equation was explained in Chapter III.

The Market Basket for each family was analyzed separately. The quantity of animal proteins was first determined and then added to the factors for grains, vegetables, and fruits to obtain the total protein. Since the purchases represented weekly amounts and the needed requirements as given in Table 5 (page 51) were on a daily basis, both animal proteins and calories were reduced to a daily basis. These were then divided by the nutritional requirements estimated for each individual family to determine what percentage of the daily need was being met.

### Difficulties Encountered

The major difficulty encountered in the analysis concerned the size of the fruits and vegetables purchased by the unit. Since the data did not give the size, an average measurement was assumed. These measurements, along with the composition of each food analyzed, are given in Appendix C.

The value of the tubers yuca and arracacha were not included in the study; they are usually sold by the piece

with the size determined by the vender. During the analysis, various foods had to be excluded because the amount purchased by the family was not given. The processed foods were not included in the analysis for the following reasons: no unit of measurement was given for oil or bread; the size of a unit of panela was difficult to determine; coffee had little nutritional value unless served with milk or sugar; some of the processed foods were considered as staples and would not have contributed greatly to the daily nutrition of the family; lard is high in calories, but the per cent used in cooking, as well as the amount reaching family members, would vary greatly; chocolate was the one exception which could have been considered since it is high in calories, exceeding those of sugar or panela.

Bone was not considered since no composition of beef stock was found and the amount of meat remaining on a bone is variable. Grains and potatoes were sometimes purchased in amounts which appeared to be more than the family would consume weekly, yet the total amount was included in the analysis as these foods were readily available for consumption if the family so desired.

It should also be mentioned that various items in the composition tables, such as bananas and potatoes, consisted of several varieties, each bearing its own nutritional value. This difficulty was overcome by using the mean number of calories and proteins as representative of the food item.

## Comparison of the Protein-Calorie Content of the Market Basket with the Requirements Estimated for Each Family

The nutritional content of the purchased foods was determined by analyzing the calories and proteins available per capita per day in the Market Basket and comparing these with the total needs estimated for each family. The data for the entire MB sample was reviewed. It was then divided so that a comparison could be made between families with children under five years of age and those without preschool children.

### The Total Sample

The total sample was lacking in its estimated protein-calorie requirements, even though many families surpassed their estimated animal protein needs. The data for the total sample is shown in Table 26.

Calories.--Since only 16 per cent of the Colombian families received more than 80 per cent of their estimated calorie needs, and since even 100 per cent of their needs closely approximated a minimal requirement, it is readily apparent that the majority of the sample had insufficient calories available for consumption.

Total proteins.--The percentage of MB families meeting 80 per cent or more of their estimated total protein requirements was greater than those for calories, even though slightly more than half of the families were still meeting less than 80 per cent of their estimated total

TABLE 26. PERCENTAGE OF THE ESTIMATED DAILY PROTEIN-CALORIE REQUIREMENTS MET BY FOOD PURCHASES OF ALL MB FAMILIES

| Per cent range | Calories | | | Total protein | | | Animal protein | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of families | % | Cum. % | No. of families | % | Cum. % | No. of families | % | Cum. % |
| Above 400 | -- | -- | -- | -- | -- | -- | 5 | 2 | 2 |
| 300-399 | 1 | 1 | 1 | 1 | 1 | 1 | 13 | 6 | 8 |
| 200-299 | 1 | 1 | 2 | 5 | 2 | 3 | 37 | 16 | 24 |
| 100-199 | 11 | 5 | 7 | 56 | 24 | 27 | 85 | 36 | 60 |
| 90- 99 | 12 | 5 | 12 | 29 | 12 | 39 | 13 | 5 | 65 |
| 80- 89 | 10 | 4 | 16 | 15 | 6 | 45 | 9 | 4 | 69 |
| 70- 79 | 22 | 9 | 25 | 20 | 8 | 53 | 12 | 5 | 74 |
| 60- 69 | 26 | 11 | 36 | 23 | 10 | 63 | 13 | 5 | 79 |
| 50- 59 | 29 | 12 | 48 | 23 | 10 | 73 | 11 | 5 | 84 |
| 40- 49 | 33 | 14 | 62 | 30 | 13 | 86 | 12 | 5 | 89 |
| 30- 39 | 45 | 19 | 81 | 20 | 8 | 94 | 13 | 5 | 94 |
| 20- 29 | 31 | 13 | 94 | 12 | 5 | 99 | 6 | 3 | 97 |
| 10- 19 | 15 | 6 | 100 | 2 | 1 | 100 | 4 | 2 | 99 |
| Below 10 | -- | -- | -- | -- | -- | -- | 3 | 1 | 100 |
| Total | 236 | 100 | 100 | 236 | 100 | 100 | 236 | 100 | 100 |

protein requirements was greater than those for calories, even though slightly more than half of the families were still meeting less than 80 per cent of their estimated total protein needs. The percentage of families who purchased sufficient foods to meet 100 per cent or more of their requirements was about four times greater for total proteins than calories.

Animal proteins.--The animal proteins available in the Market Basket were judged more than adequate for 60 per cent of the sample, whereas 100 per cent or more of the total proteins was obtained by only 27 per cent of the households. Approximately three-quarters of the sample met 70 per cent or more of their estimated animal protein requirements.

The cumulative percentages showed significant increases throughout the per cent ranges from calories to total protein and animal protein.

Families With Children Under Five Years of Age

The 137 families with children under five years of age, were similar to the total sample in that they did not adequately meet their estimated calorie and protein needs. Lower percentages of these households met 100 per cent of their estimated total requirements when compared with the households without preschoolers. These percentages are given in Tables 27-29.

Calories.--Only 3 per cent of the families with preschoolers had sufficient food to meet 100 per cent of

their estimated needs. These families were from the two upper IPC levels. A few families in each IPC level (8 per cent for the total sub-sample) met from 80-99 per cent of their needs. Thus 89 per cent of the families with small children met less than 80 per cent of their estimated calorie requirements.

Total protein.--Twenty-six per cent of the families with preschoolers met 100 per cent or more of their estimated needs. Again, higher percentages of the upper IPC Levels (III, 40 per cent; and IV, 58 per cent) adequately met their total protein needs as compared to the lower and Unknown IPC Levels (I, 4 per cent; II, 16 per cent; Unknown, 9 per cent). Approximately three-fourths of the families with small children met less than 80 per cent of their daily total protein requirements. However, all but one of the families with preschoolers in IPCL IV had sufficient food to given them 80 per cent or more of their total protein requirements; one family purchased more than twice its estimated needs.

Animal protein.--Slightly over half (56 per cent) of the sub-sample with preschoolers met 100 per cent or more of their estimated animal protein requirements. The families meeting 100 per cent of their needs increased throughout the ascending IPC Levels as follows: I, 19 per cent; II, 50 per cent; III 65 per cent; IV, 100 per cent; and Unknown, 45 per cent. The acquisition of animal proteins thus appeared to be directly related to the purchasing power of the families.

TABLE 27. PER CENT OF DAILY CALORIE REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITH CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL | | | | | | | | | | Total sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | 3 | 11 | 5 | 16 | 2 | 5 | -- | -- | 2 | 9 | 12 | 9 |
| 20- 39 | 16 | 62 | 15 | 47 | 5 | 13 | 1 | 5 | 10 | 45 | 47 | 34 |
| 40- 59 | 4 | 15 | 7 | 21 | 13 | 35 | 7 | 37 | 7 | 32 | 38 | 28 |
| 60- 79 | 2 | 8 | 4 | 13 | 14 | 37 | 4 | 21 | 1 | 5 | 25 | 18 |
| 80- 99 | 1 | 4 | 1 | 3 | 2 | 5 | 5 | 26 | 2 | 9 | 11 | 8 |
| 100-199 | -- | -- | -- | -- | 2 | 5 | 2 | 11 | -- | -- | 4 | 3 |
| Total | 26 | 100 | 32 | 100 | 38 | 100 | 19 | 100 | 22 | 100 | 137 | 100 |

TABLE 28. PER CENT OF DAILY TOTAL PROTEIN REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITH CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | -- | -- | 1 | 3 | -- | -- | -- | -- | 1 | 5 | 2 | 1 |
| 20- 30 | 8 | 31 | 4 | 13 | 4 | 10 | -- | -- | 4 | 18 | 20 | 15 |
| 40- 59 | 10 | 38 | 12 | 37 | 6 | 16 | 1 | 5 | 8 | 36 | 37 | 27 |
| 60- 79 | 5 | 19 | 8 | 25 | 5 | 13 | -- | -- | 5 | 23 | 23 | 16 |
| 80- 99 | 2 | 8 | 2 | 6 | 8 | 21 | 6 | 32 | 2 | 9 | 20 | 15 |
| 100-199 | 1 | 4 | 5 | 16 | 15 | 40 | 11 | 58 | 2 | 9 | 34 | 25 |
| 200-299 | -- | -- | -- | -- | -- | -- | 1 | 5 | -- | -- | 1 | 1 |
| Total | 26 | 100 | 32 | 100 | 38 | 100 | 19 | 100 | 22 | 100 | 137 | 100 |

TABLE 29. PER CENT OF DAILY ANIMAL PROTEIN REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITH CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL I | | II | | III | | IV | | Unknown | | Total sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | 3 | 12 | 1 | 3 | 1 | 3 | -- | -- | 1 | 5 | 6 | 4 |
| 20- 39 | 6 | 23 | 3 | 9 | 1 | 3 | -- | -- | 5 | 23 | 15 | 11 |
| 40- 59 | 5 | 19 | 5 | 16 | 1 | 3 | -- | -- | 2 | 9 | 13 | 9 |
| 60- 79 | 3 | 12 | 3 | 9 | 4 | 10 | -- | -- | 3 | 13 | 13 | 9 |
| 80- 99 | 4 | 15 | 4 | 13 | 6 | 16 | -- | -- | 1 | 5 | 15 | 11 |
| 100-199 | 5 | 19 | 15 | 47 | 11 | 29 | 7 | 37 | 8 | 36 | 46 | 34 |
| 200-299 | -- | -- | 1 | 3 | 10 | 26 | 6 | 32 | 2 | 9 | 19 | 14 |
| 300-399 | -- | -- | -- | -- | 4 | 10 | 4 | 21 | -- | -- | 8 | 6 |
| Above 400 | -- | -- | -- | -- | -- | -- | 2 | 10 | -- | -- | 2 | 2 |
| Total | 26 | 100 | 32 | 100 | 38 | 100 | 19 | 100 | 22 | 100 | 137 | 100 |

Families Without Children Under Five Years of Age

Higher percentages of the ninety-nine households without children under five years of age met 100 per cent of their estimated protein-calorie requirements than did those with small children. Nevertheless, these families also did not adequately meet their total nutritional needs. Tables 30-32 detail the percentages of the estimated daily calories and proteins met by families without preschool children.

Calories.--Only 9 per cent of the households met 100 per cent or more of their estimated calorie needs. These were from Levels III, IV, and Unknown (11, 23, and 8 per cent respectively). With only 11 per cent of this sub-sample meeting 80-99 per cent of their needs from the MB foods, it is evident that the majority of the households (80 per cent) were not adequately supplying the calorie needs of their members. All of IPCL I and II met less than 80 per cent of their requirements.

Total Protein.--Thirty-seven per cent of the families without preschoolers met 100 per cent or more of their estimated total proteins. The percentages of families meeting 100 per cent also increased as the IPC level increased (I, 9 per cent; II, 14 per cent; III, 50 per cent; IV, 82 per cent; and Unknown, 19 per cent). Almost half (48 per cent of this total sub-sample received less than 80 per cent of their calculated total protein requirements.

Animal Proteins.--Sixty-six per cent of the households without children under five years of age supplied

TABLE 30. PER CENT OF DAILY CALORIE REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITHOUT CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | 1 | 9 | -- | -- | -- | -- | -- | -- | 2 | 7 | 3 | 3 |
| 20- 39 | 7 | 64 | 9 | 41 | 6 | 33 | 2 | 9 | 5 | 20 | 29 | 30 |
| 40- 59 | 1 | 9 | 9 | 41 | 3 | 17 | 1 | 5 | 10 | 38 | 24 | 24 |
| 60- 79 | 2 | 18 | 4 | 18 | 3 | 17 | 10 | 45 | 4 | 15 | 23 | 23 |
| 80- 99 | -- | -- | -- | -- | 4 | 22 | 4 | 18 | 3 | 12 | 11 | 11 |
| 100-199 | -- | -- | -- | -- | 2 | 11 | 4 | 18 | 1 | 4 | 7 | 7 |
| 200-299 | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 4 | 1 | 1 |
| 300-399 | -- | -- | -- | -- | -- | -- | 1 | 5 | -- | -- | 1 | 1 |
| Total | 11 | 100 | 22 | 100 | 18 | 100 | 22 | 100 | 26 | 100 | 99 | 100 |

TABLE 31. PER CENT OF DAILY TOTAL PROTEIN REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITHOUT CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20- 39 | 5 | 46 | 2 | 9 | -- | -- | -- | -- | 5 | 20 | 12 | 12 |
| 40- 59 | 2 | 18 | 6 | 27 | 2 | 11 | 2 | 9 | 4 | 15 | 16 | 16 |
| 60- 79 | 2 | 18 | 6 | 27 | 6 | 33 | -- | -- | 6 | 23 | 20 | 20 |
| 80- 99 | 1 | 9 | 5 | 23 | 1 | 6 | 2 | 9 | 6 | 23 | 15 | 15 |
| 100-199 | 1 | 9 | 3 | 14 | 9 | 50 | 14 | 64 | 4 | 15 | 31 | 32 |
| 200-299 | -- | -- | -- | -- | -- | -- | 4 | 18 | -- | -- | 4 | 4 |
| 300-399 | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 4 | 1 | 1 |
| Total | 11 | 100 | 22 | 100 | 18 | 100 | 22 | 100 | 26 | 100 | 99 | 100 |

TABLE 32. PER CENT OF DAILY ANIMAL PROTEIN REQUIREMENTS MET BY WEEKLY FOOD PURCHASES OF FAMILIES WITHOUT CHILDREN UNDER FIVE YEARS OF AGE

| Per cent range | IPCL | | | | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I | | II | | III | | IV | | Unknown | | | |
| | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % | Number of families | % |
| Below 19 | 1 | 9 | -- | -- | -- | -- | -- | -- | -- | -- | 1 | 1 |
| 20- 39 | 1 | 9 | 2 | 9 | -- | -- | -- | -- | 1 | 4 | 4 | 4 |
| 40- 59 | 5 | 46 | 2 | 9 | -- | -- | -- | -- | 3 | 12 | 10 | 10 |
| 60- 79 | 2 | 18 | 3 | 14 | 1 | 6 | 1 | 5 | 5 | 20 | 12 | 12 |
| 80- 99 | -- | -- | 5 | 23 | -- | -- | -- | -- | 2 | 7 | 7 | 7 |
| 100-199 | 2 | 18 | 10 | 45 | 12 | 66 | 5 | 23 | 10 | 38 | 39 | 40 |
| 200-299 | -- | -- | -- | -- | 4 | 22 | 12 | 54 | 2 | 7 | 18 | 18 |
| 300-399 | -- | -- | -- | -- | 1 | 6 | 1 | 5 | 3 | 12 | 5 | 5 |
| Above 400 | -- | -- | -- | -- | -- | -- | 3 | 13 | -- | -- | 3 | 3 |
| Total | 11 | 100 | 22 | 100 | 18 | 100 | 22 | 100 | 26 | 100 | 99 | 100 |

from 100 to 400 per cent of their estimated animal proteins. Those who more than exceeded their estimated needs were from the two upper IPC Levels and Unknown.

The percentages of families adequately meeting their animal proteins also increased throughout the ascending IPC Levels (I, 18 per cent; II, 45 per cent; III, 94 per cent; IV, 95 per cent; and Unknown, 57 per cent).

Comparison

Throughout all of the IPC Levels in both of these sub-samples, the percentage of families meeting their estimated requirements increased as the IPCL increased. In both groups, 100 per cent of IPCL I and II families met less than 80 per cent of their calorie needs, the families without small children in Levels III, IV, and Unknown had higher percentages meeting 80 per cent or more of their calorie needs than did those with preschoolers.

For total proteins, higher percentages of families with preschoolers in Levels I, II, and Unknown met less than 80 per cent of their needs as compared to those without small children. IPCL III and IV families with preschoolers had higher percentages of their families meeting 80 per cent or more of their total protein needs as compared to those without preschoolers.

For animal proteins, higher percentages of families with children in Levels II, III, and Unknown received less than 80 per cent of their needs than was noted for those

without children. The reverse was true for Levels I and IV, where more families with preschoolers than without met 80 per cent or more of their required animal proteins.

In both groups the Unknown IPCL was located between Levels I and II for both total and animal proteins. However, the percentages for calories placed the Unknown IPCL between Levels II and III. Thus for all practical purposes, the Unknown IPCL can be considered with the lower IPC Levels with respect to the nutritional adequacy of their Market Baskets.

# CHAPTER VI

## DISCUSSION OF BASIC FINDINGS AND RECOMMENDATIONS

This concluding chapter presents a discussion of the results of the MB analysis. It discusses the analysis within the context of the ecological forces which appeared to influence the nutritional adequacy of the MB foods. Recommendations for research and implications for education are also considered.

### Discussion of Results

The analysis of the MB foods was primarily centered around the nutritional quality of the foods as they related to the estimated protein-calorie needs of the families. However, the analysis also provided insight into the types of foods chosen by Colombian families; it also revealed the categories of foods receiving the greatest share of the food pesos at the time of the survey. It also revealed that the purchase of preferred foods--especially animal protein--appeared related to the purchasing power of the various IPC levels.

The MB analysis showed that meat and processed foods (29 and 25 per cent, respectively) accounted for slightly over half of the total food expenditures for the sample. The percentage of the food pesos expended for meat and

animal products increased from the lowest through the highest IPC level. The percentage of the food pesos spent for fruits was greatest for IPCL I, but there was little variation in the lower percentages expended by the other levels. The percentages of the food peso used for grains, vegetables, and processed foods decreased through each of the IPC levels.

In the broader Consumer Study, the MB families had estimated the proportion of the income expended for food. When a comparison with the actual MB expenditures was made, all of the IPC levels, except Unknown, had estimated their weekly food expenditures to within 90-97 per cent of the amounts which were calculated from their Market Basket purchases. The estimations made by IPCL I more nearly approximated their actual expenditures than did those made by IPCL IV.

Beef was found to be the most purchased meat for all IPC levels. But less than half of the families purchased pork and only about one-third selected fish. Few families purchased viscera, which is usually considered an economical source of protein. Higher priced meats such as chicken, ham, lunch meat, and sausages were primarily limited to the more economically able. It was found that the lower IPC levels tended to select a smaller variety of meats, and lesser amounts than did families from the upper IPC levels.

All animal products, except powdered milk, were

purchased by higher percentages of upper IPC families. Only powdered milk showed descending percentages from IPC I through IV. Eggs were the animal product purchased by the highest percentage of families. In general, the average amounts of animal products selected increased throughout the ascending IPC levels, with considerable differences shown between IPCL I and IV for eggs, and raw or pasteurized milk. Eggs and milk were the major sources of animal protein for the sample. Margarine, butter, and cheese were minor sources of protein for the low income families. These foods were purchased more by the high IPC levels.

Families with preschool children showed increasing percentages throughout the IPC levels for the purchase of margarine, butter, and cheese, but these foods were also minor sources of protein for the low IPC families. Three of the families with preschoolers did not record purchases of animal products during the survey week.

As in the total MB sample, families with preschoolers selected eggs and raw or pasteurized milk as their major sources of animal protein, even though less than 66 per cent of the families purchased these products. The data were not tabulated to show the per cent of households that did not purchase any type of milk. These families with preschoolers also preferred pasteurized milk slightly over the raw product. The lower IPC families purchased more of the powdered milk than did the upper classes although powdered milk was more expensive than the liquid product. This could

be due to the lack of refrigeration. Only 38 per cent of the MB families possessed a refrigerator.

Peas, green beans and lentils showed an increase from the lower to the upper IPC Levels. Rice, red kidney beans, and corn were selected more by lower IPC families. Very few families (none from IPC I and Unknown) selected chick-peas. If the consumption of beans, chick-peas, and lentils--which are more desirable in terms of protein quality--could be expanded, this would considerably increase the quality of the diets. The fact that corn was purchased by a higher percentage of the lower IPC families may have implications for the introduction of the new strain of high-lysine corn into the diets of the lower income classes.

In general, bulb onions, corn-on-the-cob, beets, cabbage, and carrots showed an increase from the lowest to the highest IPC level. Potatoes were a favorite purchase at all levels with 100 per cent of IPC I purchasing this vegetable. There was only a slight difference between Levels I and IV with respect to the percentages of families purchasing arracacha, green onions, and tomatoes. Yuca was selected by higher percentages of IPC Levels II and III.

The percentages of families consuming fruits generally increased as the IPCL increased. Green plantain was the most purchased fruit of all IPC levels. The variety of fruits selected by IPCL IV was greater than for all the others with IPCL I and II purchasing the least variety.

The two upper IPC Levels also purchased a slightly wider variety of processed foods. The processed foods selected by from 50-76 per cent of the families (in descending order) were panela, sugar, bread, coffee, macaroni products, condiments, lard, salt, and chocolate. Canned goods were primarily upper-class purchases.

On the basis of the foregoing discussion, it appears that the percentages of families purchasing a food item, especially foods high in proteins, as well as fruits, was directly related to the IPC Level of the family. Variety and quantity also seemed to be related to the purchasing power of the MB families.

With respect to the adequacy of the MB foods to meet the estimated protein-calorie requirements of the families, it was found that the percentage of families meeting their estimated amounts of calories and total proteins was low, even though many households exceeded their estimated animal protein requirements.

The inadequacy of the MB purchases was most evident in the lower IPC Levels, and in the Unknown IPCL. Only 7 per cent of the total sample achieved 100 per cent of their calorie requirements. None of these were from the two lower IPC Levels. Twenty-seven per cent of the sample obtained 100 per cent or more of their total protein requirements. Only a very small percentage of these were low IPC households. Sixty per cent of all MB households selected sufficient animal proteins to adequately meet their

estimated needs. Higher percentages of families at all levels met 100 per cent or more of their animal protein needs, with the percentages of families meeting two to four times their estimated requirements also showing a graduated increase.

In the comparison of families with and without small children, it was found that families with preschoolers did not meet their total nutritional requirements as adequately as did those without preschoolers. However, within each of these sub-groups, the percentages of families meeting 100 per cent or more of their protein-calorie needs increased as the IPCL increased.

The results of these findings leads the writer to assume that the protein-calorie adequacy of the foods selected by the MB households was closely related to their purchasing power.

Reh cited various studies in which income appeared to be a decisive influence on food practices. This was more important than caste, occupation, and the educational level of the parents of the preschool children studied. The correlation between income and diet has been shown in studies from the United Kingdom and the United States. It has also been shown that the gaps between the diets of the lower and the upper income groups narrowed as the general standard of living rose. However, Reh cited a number of studies to show that the quality of the diet may fail to improve as the income rises (47:36-37).

## Ecological Forces Influencing the Nutritional Quality of the Market Basket

During the review of the literature, and the MB analysis, several interrelated concepts seemed to emerge as force fields influencing the nutritional quality of the foods purchased by the ama de casa. In the MB Survey, this person, with relatively little assistance from her family, chose the foods which comprised her MB. In Lewin's terms, she was the major "gatekeeper" controlling the foods which entered her household. It is assumed that she also controlled the preparation of these foods and their final distribution to the family. And, although the contents of the MB probably do not represent all of the foods available to the Colombian families during the survey week, they are assumed to represent the bulk of the food purchases. Thus the managerial behavior of the ama de casa within any specific situation relative to food would decidedly influence the nutritional status of the family. Actually, more detailed information of the food preparation and eating situation within a home is needed before a diet qualifies as adequate or inadequate.

The numerous studies cited in the review of the literature served to emphasize that multivariables, or ecological forces as the writer chooses to call them, are indeed seen as determinants or influences of the nutritional status of a family. Various researchers stressed the influence of family instability, sibling rank, poverty,

unemployment, non-nutritional conditioning diseases and infections. Practices within the home, such as cooking methods, food classification, child-feeding practices, and types of food combinations used at a meal, were also seen as important forces. The literature indicated other conditions within the home such as sanitary facilities, size and type of the home, family size, the mother's education, intelligence, and food ideologies. One researcher (Cravioto) strongly felt that the mother and the home are the two major factors in the nutrition of the children.

What, then, were the variables which influenced the quality of the foods purchased by the Colombian ama de casa? The MB data seemed to indicate that there were some interdependent social, economic, physical, and psychological forces which influenced the purchase decisions. Within these environmental categories were the force fields of family characteristics, economic assessibility to foods, the physical availability of foods, cultural attitudes, and the ama de casa in the choice situation. The degree of mutual interdependence and relative weight of these conceptual forces could not be determined by this research. That they were influencing forces is apparent in the following discussion.

Family Characteristics

The major family characteristics which appeared to directly influence the ama de casa in her food choices were: income, pesos available for food, residential area,

unemployment, education, family size, and the location of each family member in one of the three age ranges.

Income.--Over three-fourths of the families were middle or lower-middle class according to income; the incomes ranged from $800 to $6,000 pesos. The average number of pesos per family member for the total sample was $427 pesos; the average range throughout the ascending IPC levels was $98 to $1,113 pesos. A low income plus a large family considerably reduced the IPC, and influenced the location of the families within one of the IPC levels.

Residential area.--Over three-fourths of the families lived in upper-lower,or lower-lower class areas; the SEL according to income tended to be higher than the socio-ecnomic level of the barrio in which each MB family lived. Thus income alone was not a definite indicator of where a family might be located in the city.

Food pesos.--The lowest IPC families spent most of their income for food; the proportion of income spent for food decreased as the IPC level increased. For all the families, meat and processed foods claimed more than half of the pesos spent on the MB purchases. The amount of food pesos available to the ama de casa was dependent upon both income and family composition.

Unemployment.--Twenty per cent of the male and female jefes de familia were unemployed; the rate was highest for the Unknown IPC Level and the two lowest IPC Levels. This directly influenced the amount the

ama de casa had to spend for food, and also influenced the location of the family in one of the IPC levels.

Education.--The general level of education for a large proportion of the jefes de familia and amas de casa was a primary education; the son or daughter, or other family member was usually the most educated member of the family. Although the upper IPC levels, for the most part, had completed more years of schooling, the lower IPC families I and II, and the Unknown IPCL, had the highest percentages for the participation of the family in deciding where the ama de casa should make her purchases and what she should purchase. Actually, IPCL IV was the only level in which the jefes de familia were more educated than the children, and although the amas de casa were the least educated, 68 per cent of them did not have the assistance of their families in food purchase decisions. The least cooperation in decision purchases was received by the amas de casa in IPCL III.

Family size. As stated earlier, the number of family members influenced the location of the MB families within the IPC levels, as well as the number of pesos available per person. The sample averaged 6.6 members per family with a range of two to fifteen members per family. The lowest IPC levels averaged the most persons per family. Since they had more total members per family, this may account for the fact that the low IPC amas de casa spent more of their income for food. Family size also influenced

the adequacy of the purchased foods, since the protein-calorie content had to be divided among more persons.

Age.--Family members were placed in an age range, rather than at a specific age level; this influenced the estimation of the families' total requirements since a mean had to be found for the range, rather than summing the actual requirements for each family member according to age level. The protein-calorie requirements for each ascending age range increased as the age range increased, so that the number of persons falling in each range increased or decreased the total family requirements.

Economic accessibility

Whether the foods were economically accessible to the families appeared to be influenced by the income of the family, family composition, and the prices of food.

Income.--As the purchasing power of the amas de casa increased, there was improvement in the amount and types of food purchased by the IPC levels; there was also an increase in food expenditures for meat and animal products. Fruits became more accessible to the families as the IPC level rose.

Family composition.--Again, this force decreased the number of food pesos available per capita; it probably limited the quantity and quality of foods the ama de casa could afford.

Food prices.--The type of food retailing service was a determining factor on food prices; it also influenced the

quality of some items and the variety of choice available. Food in the neighborhood tiendas was usually higher, sometimes lower in quality and the variety of foods was limited. These were the stores frequented by many of the lower IPC families, since the larger markets and supermarkets were primarily located outside the lower socio-economic residential areas. Trips outside the neighborhood for food purchases required expenditures for public transportation by that segment of the sample who could least afford this extra demand. Food specials did not appear to affect the decision of the ama de casa to shop where these were offered.

The price of powdered milk was greater than that of the raw or pasteurized product, yet the more expensive dried product was purchased more by the lower IPC families. An important factor here may have been the lack of refrigeration since about two-thirds of the total sample did not own refrigerators.

Physical Availability

The physical availability of food items was influenced by the residential area of the ama de casa, transportation means, and seasonal variations in the types and quantities of foods.

Residential area.--As stated previously, greater variety and better quality foods were available in the supermarkets which were primarily located in the upper-class barrios. A limited supply of food characterized the neighborhood tiendas so that the lower-classes were forced

to make their major purchases outside their neighborhoods, which required utilizing scarce pesos for public transportation rather than for food. Thus transportation to obtain an item was also dependent upon the economic means of the family. If this was not available, the item may have been excluded from the Market Baskets of many of the amas de casa.

Seasonal variations. The foods placed in the MB Survey were those available in the city at the time. Noticeably lacking from the vegetable list were green, leafy vegetables. However, these may have been included in the unspecified category.

## Cultural Attitudes

The influence of cultural attitudes was not as apparent as the other three ecological force fields. However, the fact that the ama de casa purchased the items she did, indicated that these were culturally accessible to her as food for her family. The fact that high percentages of the food pesos were spent for meat by all the IPC levels indicated that some values (which Lewin called "inducing forces" (33:41) were operative in the decision situation. These inducing forces may have been related to family composition, the variety and quality of the available foods, or their economic accessibility.

## Present Choice Situation

In Figure 1, the present choice situation refers to

the strength or relative weight of the preceding force fields at the time the purchase decision was made. It was evident the ama de casa was influenced in her decisions by the previously discussed forces, but the strength of the influences was not as apparent.

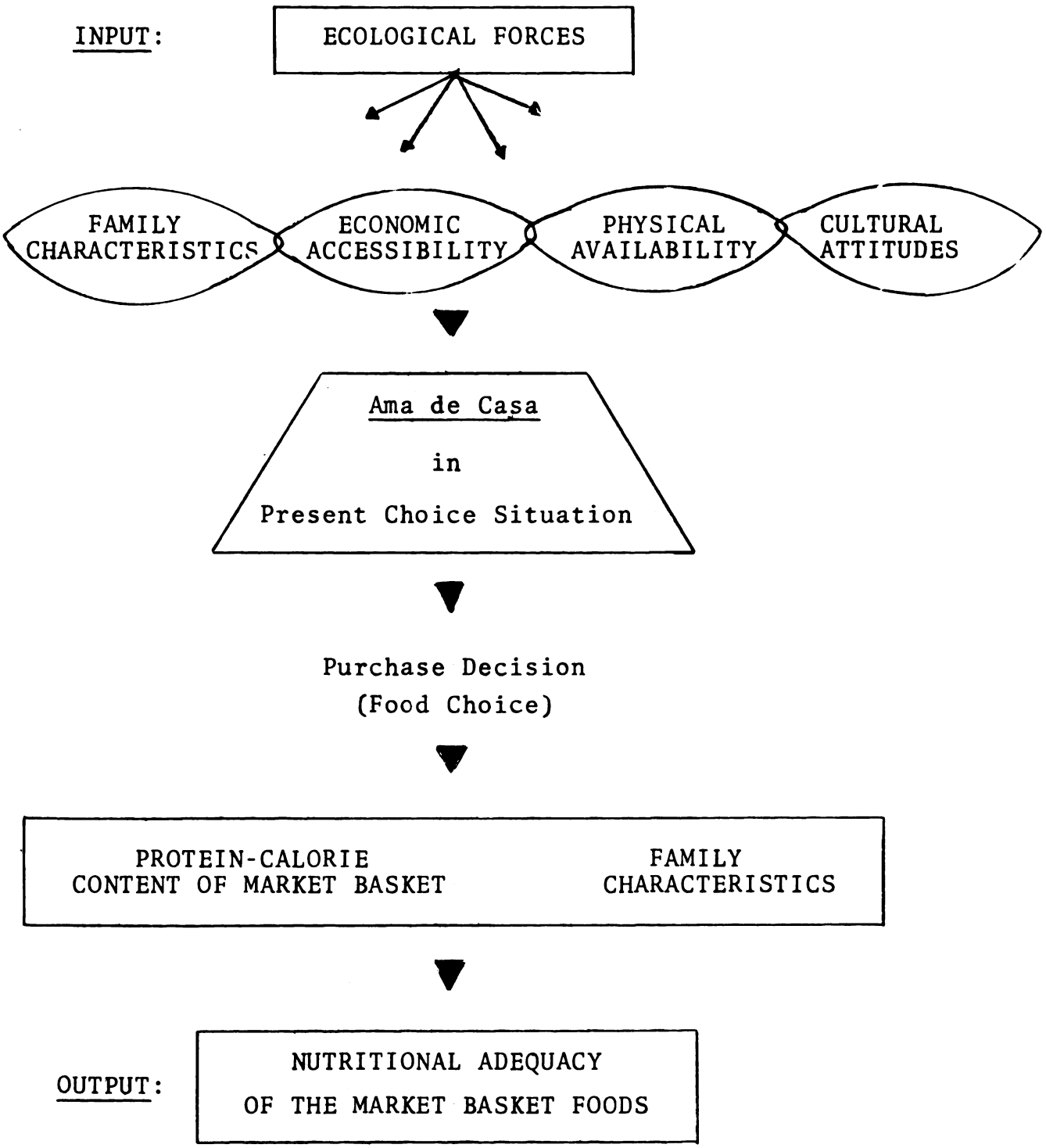
By controlling the purchase decision--the place to purchase, and the food choices represented in the Market Basket--the ama de casa was herself an important force in establishing the nutritional quality of the foods.

The available proteins and calories, and the estimated needs of the family according to family composition (age and number) determined the output of the entire analysis, that is, the nutritional quality of the MB foods.

## Limitations of the Study

The nature of the data and the design of the study limited the scope of focus. The primary interest was the adequacy of the Market Basket to meet the needs of the families. The determination of adequacy was limited to the protein-calorie content of selected foods, while the determination of the families' requirements for these nutrients was limited by the lack of specific data on age, sex, and health status. The focus upon a sub-division of the sample into families with or without preschoolers was, by design, limited to a discussion of the proteins and calories available to these families in their Market Baskets.

FIG. 1 ECOLOGICAL FORCES INFLUENCING THE NUTRITIONAL ADEQUACY OF THE MB FOODS



A primary limitation of the study, which originated from both the nature of the data and the research design, concerns the ecological forces which appeared to influence the nutritional adequacy of the MB foods. There existed no clear delineation of the degree to which the various forces influenced each other (degree of overlapping). It was apparent that the ama de casa reacted to ecological forces and was herself a force, but the strength or relative weight of these variables could not be determined. This was also true for the degree of influence existing between the protein-calorie content of the Market Basket and family characteristics.

## Recommendations for Research

The recommendations for future research center primarily around those forces which ultimately influence the nutritional status of the MB families.

1. The ecological force fields should be studied to determine the weight the various forces within each field have upon food practices such as food purchase decisions, food preparation, and the distribution of food within the family. This should also include evaluation of the relative importance of the ecological forces.

2. A study should focus upon the ama de casa as the "gatekeeper" who controls the flow of food into and within the family field. This would include the ecological forces which influence her decisions during her food purchases.

The term ama de casa should be clarified so that the exact relationship to other family members is known.

3. Research emphasis could also be placed upon the influence of such forces as the mother's I.Q., her education, and food ideologies and the influence of these upon the nutritional status of her preschool children.

4. Educational innovations in school should also be explored to determine their effect upon the food decisions of the family (or the adoption of innovations).

5. A descriptive study should be conducted to determine the type of nutrition instruction given through the various levels of the educational system. Some forces for consideration would be the validity and appropriateness of the instruction to the means and needs of the families, and an attempt should be made to determine the influence of the children upon the food purchases of their families.

6. The type of education which would enable the ama de casa to more adequately utilize her available resources or which would influence her food ideologies also needs to be explored.

7. What happens to the food once it enters the family field is a basic concern. It is recommended that studies be performed to determine the basic staple(s) and food combinations which the families customarily use. This should include an evaluation of the amino-acid quality of the food combinations and the way the types of foods reinforce each other with respect to amino acids. It

should also include those ecological forces which would influence the ability of the families to avail themselves of these combinations. For example: Are the dark, green, leafy vegetables which Jelliffe recommended for a food mix available to the families in Cali, or would different combinations be more advantageous?

## Implications for Education

It is recommended that education for nutrition focus on the basic staple(s) which a family uses and upon the food combinations used throughout the day for various members of the family. Special emphasis should be given to the need of the preschool child to have a portion of the preferred animal proteins. The family needs to be instructed in the value of its basic staple relative to the protein quality. The mixes available to the family according to its economic means should also be stressed (see previous discussion on Jelliffe's mixes, pages 17-18).

Education needs to consider the value of protein from all sources. In the MB analysis, few families purchased the high protein supplementary foods, even though many had used these at some time for their children. If the basic foods a family uses were enriched with the essential amino acids, or if a way were found to make supplementary products desirable to the people, then commercial promotion and nutrition education could effectively supplement each other. Government agencies also need to be educated as to

the needs of the Colombian people, since policy also affects physical availability, cultural attitudes toward foods, as well as their economic accessibility.

It should also be stressed (as shown in the review of the literature, pages 32-33), that all education should be within the resources of the time, money, and effort of the Colombian consumer. With respect to educational innovations, the dissemination of new ideas and practices have been shown to spread from their source to opinion leaders and then to their followers through personal communication channels. Thus, educational thrusts need to determine the identity of the influential groups in order to maximize the educational outcomes. All applied nutrition programs must have those qualities suggested earler by Jelliffe and Rogers (see pages 32-33). In essence, they must be acceptable to the people concerned, compatible with their beliefs and values, not too complex, adoptable in stages, communicable, and clearly connected with the desired end-results of improved nutrition.

To provide a more holistic view of the nutrition situation within the Colombian homes, the writer recommends that additional research following recommendations cited in this thesis, be undertaken on the same MB sample. Such an input would provide additional guidelines for remedial programs and nutrition education.

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## LITERATURE CITED


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# APPENDIX A

## APPENDIX A

## LIBRO DE CODIGO PARA EL ESTUDIO TECNICO DE CONSUMIDORES*

Estudio Técnico 07-1

| Coluna | Contendio del Estudio | Codigo |
|---|---|---|
| Tarjeta 1 | | |
| 1-2 | Número del Estudio | 07 |
| 3 | Número de Sub-Encuesta | 1 |
| 4-6 | Número de Entrevista | 001-692 |
| 12 | Estrato | 1-7 (Ver lista Nivel Socio-Económico) |
| 13 | Acostumbra Ud. en general ensayar sitios diferentes en donde mercar? | 1. Sí 2. No 3. A veces |
| 14 | Participan los miembros de su familia con opiniones sobre qué y dónde se deben comprar los viveres? | 1. Sí 2. No 3. A veces |
| | Diciden sobre alimentos | |
| 15 | El ama de casa | 1. Sí 2. No |
| 16 | El jefe de la familia | 1. Sí 2. No |
| 17 | El ama de casa y el jefe de la familia | 1. Sí 2. No |
| 18 | Todos los miembros de la familia | 1. Sí 2. No |
| 19 | Los hijos majores | 1. Sí 2. No |
| 20 | La sirvienta | 1. Sí 2. No |
| 21 | Otros familiares | 1. Sí 2. No |
| 22 | Otros | 1. Sí 2. No |
| | Diciden sobre lugares de compra | |
| 23 | El ama de casa | 1. Sí 2. No |
| 24 | El jefe de familia | 1. Sí 2. No |
| 25 | El ama de casa y el jefe de la familia | 1. Sí 2. No |
| 26 | Todos los miembros de la familia | 1. Sí 2. No |
| 27 | Los hijos mayores | 1. Sí 2. No |
| 28 | La sirvienta | 1. Sí 2. No |
| 29 | Otros familiares | 1. Sí 2. No |
| 30 | Otros | 1. Sí 2. No |

*Se incluye solamente el contenido del estudio usado en esta tesis.

| Columa | Contendio del Estudio | Código |
|---|---|---|
| | INFORMACION DEMOGRAFICA | |
| 31-32 | Composición de la unidad familiar<br><br>De cuántas personas se compone esta familia y que viven actualmente en esta casa? (incluyendo el servicio)<br><br>Cuántas de estas personas son mayores de 15 años, cuántas entre 5 y 15 y cuántas menores de 5 años? | 01-89, total de personas |
| 33-34 | Adultos (mayores de 15 años) | 01-98 |
| 35-36 | Niños (entre 5 y 15 años) | 00-98 |
| 37 | Niños (menores de 5 años, incluyendo hijos del servicio) | 0-8 |
| | EDUCACION | |
| | Cuántos años de educación completó el jefe de esta familia? | |
| 38 | Escuela primaria | 0-5, años |
| 39 | Secundaria | 0-5, años |
| 40 | Universidad | 0-8, años |
| 41-42 | Total de educación | 00-19, años |
| 43 | Escuela especial (u industrial, comercial, agrícola, etc.) | 0-8, años |
| 44-45 | Total de educación (con escuela especial | 00-27, años |
| 46-47 | Cuál es la edad del jefe de la familia? | 01-98, años |
| 48 | Tiene trabajo actualmente el jefe de la familia? | 1. Sí 2. No |
| 53 | El jefe de la familia trabaja (o acostumbra trabajar) por cuenta propia o empleado? | 1. Por cuenta propia<br>2. Empleado<br>3. De ambas formas |
| | LUGAR DE NACIMIENTO | |
| 60 | El jefe de familia nació en el campo o en la ciudad? | 1. En el campo<br>2. En la ciudad<br>3. No sabe |
| 61 | Ha vivido siempre en Cali el jefe de la familia? | 1. Sí 2. No<br>3. No sabe |

| Columna | Contenido del Estudio | Código |
|---|---|---|
| 62-63 | Cuánto hace que el jefe de la familia vive en Cali? | 01-96, años<br>97, de 1 a 3 meses<br>98, de 4 a 11 meses |
| 64-65 | Cuánto tiempo llevan viviendo en el mismo barrio? | 01-96, años<br>97, de 1 a 3 meses<br>98, de 4 a 11 meses |
| 66 | El jefe de la familia es hombre o mujer? | 1. Hombre<br>2. Mujer |
| | Cuántos años de educación completó el ama de casa? | |
| 67 | Años de primaria | 0-5, años |
| 68 | Años de secundaria | 0-6, años |
| 69 | Años de Universidad | 0-8, años |
| 70-71 | Total de años de educación | 00-19, años |
| 72 | Años de escuela especial (industrial, comercial, hogar, etc) | 00- 8, años |
| 73-74 | Total de años de educación (con escuela especial) | 00-27, años |
| 75-76 | Cuál es la edad de la ama de casa? | 01-98, años |
| 77 | Sin contar al jefe de familia, cuántas personas de esta familia están trabajando actualmente? | 0-8, personas<br>CERO, si no hay personas trabajando |
| Tarjeta 2 | | |
| 9 | De los miembros que componen esta familia quién es el que más educación ha recibido? | 1. El jefe de familia<br>2. El ama de casa<br>3. Hijo - Hija<br>4. Sobrino - Sobrina<br>5. Otro<br>En caso de contestar 3, 4, u 0, complete lo siguiente: |
| | Cuántos años de educación completó (o está completando) esta persona? | |
| 10 | Primaria | 0-5, años |
| 11 | Secundaria | 0-6, años |
| 12 | Universidad | 0-8, años |
| 13-14 | Total de educación | 00-19, años |
| 15 | Años de escuela especial (industrial, comercial, etc.) | 0-8, años |

| Columna | Contendio del Estudio | Código |
|---|---|---|
| 16-17 | Total de años de educación (con escuela especial) | 00-27, años |
| Tarjeta 7 | | |
| 13 | Alguna vez ha alimentado a sus niños con Incaparina, Colombiarina, Cerelac, Pochito? | 1. Sí 2. No |
| 14 | Qué hace Ud. cuando aparece un nuevo producto alimenticio en Cali? | 1. Trata de ensayarlo tan pronto como puede.<br>2. Trata ensayarlo cuando oye buenos comentarios de fuentes en las cuales Ud. confía.<br>3. Usualmente no le interesan mucho los nuevos productos alimenticios<br>4. No sabe |
| 36-40 | Se puede saber cuál es el ingreso total de esta familia mensualmente? | 00001-99999, pesos/mes |
| 41-44 | De este dinero, approximadamente cuánto se utiliza en comprar alimentos? | 0001-9998, pesos/quincena |
| 45 | En los últimos 30 días ha ido a comprar en los días de ventas especiales de tiendas o supermercados o de ciertos almacenes como Ley, Tía, en que ofrecen descuentos para determinados artículos alimenticios? | 1. Sí 2. No |
| 46 | La última vez que hizo su compra principal de alimentos, qué transporte utilizó? | 1. A pie, ida y vuelta<br>2. En bus, ida y vuelta<br>3. En taxi, ida y vuelta<br>4. Ida a pie, regreso en taxi<br>5. Ida en bus, regreso en taxi |

| Columna | Contendio del Estudio | Código |
|---|---|---|
| | | 6. En automóvil particular de un pariente o amigo<br>7. En vehículo propio<br>8. Servicio a domicilio<br>0. Otros |
| Tarjeta 8 | | |
| | INFORMACION | |
| 10 | Cada cuánto leen periódicos en esta casa? | 1. No leen<br>2. Diariamente<br>3. Los fines de semana<br>4. Los fines de semana y días feriados<br>5. De vez en cuando |
| | Cuáles periódicos acostumbra leer en su casa? | |
| 11 | Colombiano | 1. Sí 2. No |
| 12 | Crisol | 1. Sí 2. No |
| 13 | Espacio | 1. Sí 2. No |
| 14 | Espectador | 1. Sí 2. No |
| 15 | Occidente | 1. Sí 2. No |
| 16 | País | 1. Sí 2. No |
| 17 | Siglo | 1. Sí 2. No |
| 18 | Tiempo | 1. Sí 2. No |
| 19 | Otros | 1. Sí 2. No |
| | Pertenencias de la FAMILIA | |
| | En esta casa tienen. . . .? | 1. Sí<br>2. No<br>3. No funciona |
| 28 | Aspiradora | |
| 29 | Bicicleta para transportarse al trabajo | Como la columna 28 |
| 30 | Carro | Como la columna 28 |
| 31 | Estufa (eléctrica o de gas) | Como la columna 28 |

| Columna | Contendio del Estudio | Código |
|---|---|---|
| 32 | Estufa de petróleo | Como la columna 28 |
| 33 | Lavadora | Como la columna 28 |
| 34 | Licuadora | Como la columna 28 |
| 35 | Máquina de coser | Como la columna 28 |
| 36 | Muebles de comedor | Como la columna 28 |
| 37 | Muebles de Sala | Como la columna 28 |
| 38 | Nevera | Como la columna 28 |
| 39 | Plancha | Como la columna 28 |
| 40 | Radio eléctrico | Como la columna 28 |
| 41 | Radio de pilas | Como la columna 28 |
| 42 | Radiola (Tocadisco, equipo estereofónico) | Como la columna 28 |
| 43 | Televisor | Como la columna 28 |

# APPENDIX B

## APPENDIX B

## LIBRO DE CODIGO PARA EL ESTUDIO TECNICO DE CANASTA DE MERCADO*

Estudio Técnico 07-2

| Columna | Contenido del Estudio | Código |
|---|---|---|
| 1- 2 | Número del Estudio Técnico | 07 |
| 3 | Número de Sub-Encuesta | 2 |
| 4- 6 | Número de Entrevista | 001-692 |
| 10 | Nivel Socio-Económico (Estrato) | 0-7 |
| | | 1. Alta |
| | | 2. Media alta |
| | | 3. Media |
| | | 4. Media Obrera |
| | | 5. Obrera |
| | | 6. Tugurio |
| | | 7. Otras |
| 11-15 | Qué cantidad compra para cada alimento? | 00000-99998 |
| 16-18 | Qué alimentos compra | 101-686 |
| 21-25 | Cuál es el precio unitario del alimento comprado? | 00000-99998 centavos por Unidad |
| 26-30 | Cuál es el valor total por cada alimento comprado | 00000-99998 pesos |
| 34 | Quién compra los alimentos? | |
| | | 1. Ama de casa |
| | | 2. Esposo |
| | | 3. Ama de casa y esposo |
| | | 4. Servicio |
| | | 5. Otro |

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# APPENDIX C

APPENDIX C

THE MARKET BASKET ANALYSIS:
KEY TO UNITS OF MEASUREMENT, CALORIES AND PROTEINS
IN 100 GRAMS OF FOOD

| Category | Measurement* | Calories 100 G | Proteins 100 G |
|---|---|---|---|
| **Meat** | | | |
| Beef | Pound | 279 | 17.7 |
| Pork | Pound | 283 | 16.0 |
| Fish | Pound | 100 | 19.2 |
| Chicken | Pound | 178 | 20.2 |
| Viscera | Pound | 150 | 21.5 |
| Ham | Pound | 400 | 24.0 |
| Lunch meat | Pound | 210 | 14.8 |
| Sausages | 40 Gram Unit | 362 | 13.3 |
| **Animal Products** | | | |
| Eggs | 50 Gram Unit | 82 | 6.4 |
| Raw milk | 995 Gram Bottle | 60 | 3.4 |
| Condensed milk | 404.3 Gram Can | 138 | 7.0 |
| Powdered milk | Pound | 407 | 25.2 |
| Pasteurized milk | 995 Gram Bottle | 50 | 3.4 |
| Margarine | Pound | 719 | 0.6 |
| Butter | Pound | 732 | 1.2 |
| Cheese | Pound | 239 | 25.0 |
| **Grains** | | | |
| Rice | Pound | 350 | 8.2 |
| Peas | Pound | 308 | 23.9 |
| Kidney beans | Pound | 262 | 18.2 |
| Chick-peas | Pound | 339 | 19.6 |
| Green beans | Pound | 29 | 2.1 |
| Lentils | Pound | 315 | 23.5 |
| Corn | Pound | 326 | 14.2 |
| **Vegetables** | | | |
| Arracacha | Unit | -- | -- |
| Cebolla: bulb | Pound | 33 | 1.4 |
| green | 100 Gram Bunch | 26 | 1.2 |
| Corn-on-the-cob | 100 Gram Unit | 136 | 4.7 |
| Potatoes | Pound | 86 | 2.1 |
| Beets | Pound | 42 | 1.4 |

| Category | Measurement* | Calories 100 G | Proteins 100 G |
|---|---|---|---|
| Cabbage | 2 Pound Head | 20 | 1.4 |
| Tomato | Pound | 17 | 0.9 |
| Yuca | Unit | -- | -- |
| Carrots | Pound | 36 | 0.7 |
| Fruits | | | |
| Avocado | 225 Gram Unit | 127 | 1.6 |
| Bananas | 200 Gram Unit | 84 | 1.2 |
| Lemons | 100 Gram Unit | 26 | 0.3 |
| Lulos | .45 Gram Unit | 23 | 0.6 |
| Tangerines | 50 Gram Unit | 38 | 9.7 |
| Mangos | 100 Gram Unit | 58 | 0.5 |
| Blackberries | Pound | 23 | 0.6 |
| Oranges | 125 Gram Unit | 35 | 0.7 |
| Plantain: ripe | Pound | 113 | 1.5 |
| Plantain: green | Pound | 125 | 1.3 |
| Papaya | 453.6 Gram Unit | 30 | 0.5 |
| Pineapple | 907.2 Gram Unit | 51 | 0.4 |
| Tomate de arbol | 100 Gram Unit | 30 | 1.4 |
| Grapes | Pound | 33 | 0.5 |
| Zapote | 100 Gram Unit | 100 | 1.2 |

* The calculations were made using 4.536 units of 100 Grams in one pound.