# BELIZE FOOD, NUTRITION AND HEALTH ASSESSMENT 1992

## SUMMARY PRESENTATION

NOVEMBER 24, 1992

BELIZE

INCAP Publication DCI/001

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# I. INTRODUCTION

*The best decisions and actions that planners and policy-makers can undertake to improve a situation are those that are based on the clear and precise knowledge of the existing conditions. This is particularly true for the formulation of policies and the choice of appropriate actions to improve the Food and Nutrition situation of a country.*

*The Government of Belize with support from INCAP, PAHO/WHO and CFNI has carried out the present "Assessment of the Food and Nutrition Situation" based on the revision of existing data. It has featured the valuable input of a technical team representing the health, agriculture, social development and education sectors, hereby addressing to a large extent the intersectoriality of the food and nutrition problem.*

*Initially, work was done on the elaboration of a causal model which fundamentally identifies and displays the interrelationship of those factors within the Belizean context that the team felt to be important determinants of the nutritional situation. (See annex 1)*

*Basically, it was agreed that the nutritional situation of the population depends on two major elements. One is the BIOLOGICAL UTILIZATION of foods consumed by the individual and the other is the actual FOOD INTAKE. Each one of these is being affected by a series of factors. For example, the biological utilization of the foods consumed by children and adults may be affected by the presence of an infection, such as diarrhoea, which in turn may be influenced by the existence of poor environmental conditions and sanitary facilities and access to health services.*

*Both biological utilization and food intake are influenced by factors such as education and cultural patterns. These factors have an effect on the food intake by influencing the decision on the quality (types) and quantity of foods that the individual or the family consumes, but its availability is certainly also determined by the production and marketing practices as well as income and price to the consumer which consequently determines the purchasing power.*

*Data to substantiate each factor identified in the hypothetical causal model was gathered from a series of existing sources. The analysis of this information will be publicized in a final and more extensive document.*

*This presentation is a summary of the "Assessment" Document and initially gives a description of the nature and magnitude of the nutritional problems identified and goes on to describe those factors that directly or indirectly contribute to the nutritional status of the population. A brief review of the existing policies in the different sectors pertinent to food and nutrition is included. The major issues have been identified and their respective recommendations are listed. Finally, general recommendations are made by the team for decision-and policy makers in an effort to improve the food and nutrition problems in Belize, emphasizing an intersectorial approach.*

*We trust that this attempt to provide a global description of the food and nutrition situation will be a useful tool for both the political and technical levels as they continue to strive and plan for more comprehensive and coherent strategies and programmes responding to the needs of the Belizean people.*

## II. NUTRITION SITUATION IN BELIZE

### *2.1. DESCRIPTION OF THE PROBLEM*

*The nutritional status of a population is an important indicator of the development state of a country. In Belize, the principal nutritional problems are manifested in both the young and adult population and from the epidemiological point of view the problems can be grouped into the following categories:*

- *Under and over nutrition in children*
- *Low Birth Weight*
- *Specific micro-nutrient deficiencies (especially Vitamin A and Iron)*
- *Chronic Diseases Non-communicable (Diabetes, Hypertension, and Heart Diseases)*

*- Under and Overnutrition in Children under Five Years*

*The nutritional status of children provides a general idea of the food and nutrition situation of the general population.*

*For the purpose of this study, data from the child health clinic cards for 1992 were analyzed utilizing the weight for age index as an indicator for global nutritional status. The WHO classification with cut-off point of -1 Standard Deviation for malnutrition was used.(20) It is important to keep in mind that this information was limited to clinic-attending population whose characteristics may differ from that of the general population, and that, in size this is not a representative sample and results could be biased. It is important to note that those children in the 'mild' malnutrition category accounting for the majority of the cases are representing those who by WHO standards do not have the optimum weight for age and are at a risk of becoming moderately or severely malnourished if adequate measures or interventions are not taken.*

*According to the weight for age indicator, 59.2% of the children studied throughout the country were considered to be in the normal weight for age category, and 25.4% were suffering from some degree of malnutrition: 19.2% mildly malnourished, 4.9% moderately malnourished and 1.3% with severe malnutrition. The age groups mostly affected were the 1 to 2 years followed by the 6 to 12 months of age. (Figures 1 and 2)*

*The data by district shows that Toledo had the highest prevalence: 45.3% of the children with some degree of malnutrition and 15.5% with moderate and severe conditions. (Figure 3)*

*There seems to be an inverse relation between the practice of exclusive breastfeeding up to 4 months and the prevalence of malnutrition in children under 6 months by district. (Figure 5)*

*In regards to evidence of overnutrition in children under five years, the same review indicated that 15.4% of the children presented some degree of obesity. The majority or 11.0% were at a low risk of being obese, 3.3% were at high risk and 1.0% were obese. (Figure 1)*

*Data collected in 1981 by CFNI, analyzed by the Gomez Classification, also indicated the Toledo as the District with by far the largest prevalence of malnutrition. (Figure 4)*

*- Low Birth Weight*

*The weight of a child at birth depends to a large extent on the nutritional and health status of the mother, not only during the pregnancy, but even before she conceives. It has been found to be a good indicator in predicting the child's outcome in regards to growth and development and its incidence may also be an indirect indicator of maternal nutrition in general.*

*Medical statistics for 1991 indicate an overall figure of 5.5% of infants with low birth weight (less than 2,500 grams), the values ranging from 2.1% in the Corozal District to 7.9% in the Belize District.*

*Belize City Hospital recorded for the same year an incidence of 8.2% which compares favorably with a figure of 10.0% quoted for 1981 and 1983 in the Sandra Farnum's Report.(8)(Figure 6)*

*Neighboring countries in the region report similar figures of incidence of low birth weight such as Trinidad and Tobago 3.2% and Costa Rica 6.7%.(18)*

*- Specific Micronutrient Deficiencies*

a. *Vitamin A and Zinc Deficiency in School Children*

*A 1989 study on micronutrient deficiencies in school-age children from the different parts of the country showed that approximately 40.0% of the children studied had an adequate Vitamin A liver reserve, 55.0% had marginal values and about 5.0% had very low liver reserves of Vitamin A (RDR > 50%). (Figure 7)*

*Zinc serum levels were also investigated in the same sample, and the study found low levels (<80 µg/dl) in approximately 40.0% of the children.(Figure 8)*

*For both Vitamin A and Zinc, the Garifuna, East Indians and Ketchi children (who are mainly found in the southern districts of Stann Creek and Toledo) had lower values compared to other ethnic groups. (17)*

b. *Iron Deficiency in School Age Children*

*Anaemia can interfere with a child's growth and well-being and may indicate inadequate dietary patterns in population groups.*

*Recent data indicates that anaemia is not a very serious problem in children 3 to 8 years of age. However, mean values slightly below normal of 11.0g/dl were detected in the Garifuna and East Indian groups of children studied (10.7 and 10.9g/dl respectively). (17) (Figure 9)*

c. *Iron Deficiency in Pregnant Women*

*A 1984 Study had indicated that approximately 43.0% of women attending prenatal clinics in the country of Belize were anaemic. (8)*

*Despite the existing relatively high prenatal coverage and Iron/Folate Supplementation for pregnant women, a 1988 Review identified 40.0% of the antenatals with haemoglobin values less than 11.0g/dl, and no significant difference between urban and rural. (Figure 10)*

*Cayo and Toledo Districts showed the highest prevalence of women with less than 10.0 grams (23% and 21% respectively).*

*-Chronic Non-Communicable Diseases*

a. *Morbidity*

*Medical Statistics for the Country indicate that Chronic Diseases, such as Hypertension and Endocrine Disorders were persistently present in the principal causes of hospitalization in the past decade.*

b. *Mortality*

*Heart Diseases were the principal cause of death for 1983-1984 and 1989-1990, followed by Diseases of the Respiratory System, Cerebrovascular Disease and Hypertension with an increasing tendency. (Figure 11)*

*A considerable increase has been observed in deaths due to Chronic Diseases in the Country. Figures indicate that deaths due to hypertensive disease, endocrine/immune disorders, ischemic heart disease, cerebrovascular disease, atherosclerosis and malignant neoplasms accounted for 17.9% of all the deaths that occurred in 1976, and during 1986 and 1988 these diseases accounted for approximately 27.0% of the total mortality. (Figure 12)*

*To a certain extent, chronic diseases have been associated with inadequate dietary patterns. In Belize, the situation of increased morbidity and mortality due to these diseases may be related to the fact that the apparent increase in food availability in the past decades has been largely at the expense of simple sugar, food from animals, and fats and oils.(Figure 40) Thus the total fat availability per person per day during the period 1961 to 1988 increased from 56 to 73 grams compared to the recommended 42 grams. Seventy percent of the fat is derived from animal sources, thus increasing the consumption of saturated fats which have been strongly associated to chronic diseases. (Figure 41)*

## III. DETERMINANTS OF THE NUTRITIONAL PROBLEMS

### *3.1 BIOLOGICAL UTILIZATION*

*Different factors determine the utilization of foods consumed by individuals. The health status, for one, affects the capacity of the body to assimilate and utilize ingested nutrients. On the other hand, food availability, access and demand for health services are also important determining factors. Environmental conditions, water and sanitation are other important influencing factors of the health situation.*

#### *3.1.1. Health Situation*

*Morbidity*

*The principal causes of hospitalization in the recent years have been: Other Diseases of the Respiratory System, Diseases of other parts of the Digestive System, Abortion and Direct Obstetric Causes, Intestinal Infectious Diseases, Endocrine, Metabolic and Immunity Disorders, Hypertensive Heart Disease and Certain Conditions Originating in the Perinatal Period. There have been slight differences in the ranks and rates of these diseases.(13) (Figure 13)*

*In regards to Diarrhoea and Acute Respiratory Infections (ARI) in Children, the 1991 Family Health Survey reports that during the two weeks prior to interview, almost 11.0% of children less than 5 years of age had diarrhoeal disease and 40.0% were reported to have presented symptoms of ARI. For both conditions the incidence was higher in the first two years of life and it was slightly more prevalent in the rural than urban areas (9.9%). The Maya Ketchi, Mestizo and Garifuna were the most affected ethnic groups.(7) (Figure 14)*

*Malaria appears to be the major communicable disease contributing to the general morbidity. In 1990 there was a rate of 17 cases per 1,000 inhabitants and in 1991 the figure rose to 20. Malaria incidence is particularly higher in the Cayo and Toledo Districts.(14)*

*Mortality*

*There has been a slight downward trend in the Total Death Rate in the country. The General Mortality Rate was 6.8 in 1970, 4.9 in 1980 and 4.2 deaths per 1000 inhabitants in 1989. This last figure is comparable to that of Costa Rica (4.0) and Panama (3.8). When analyzed by sex the male death rates tend to be slightly higher. (6) (Figure 15)*

*A descending tendency is observed in the Infant Mortality Rate (IMR) for the past twenty years, from 49 per 1,000 live births in 1969-70 to 23 in 1982-83. This decrease was mainly at the expense of a decline in mortality due to diarrhoea and respiratory infections. Thereafter, according to official figures, the IMR has almost remained stable (22.5 infant deaths/1,000 live births in 1990) and Perinatal Causes accounted for 47.0% of them. According to the 1991 Census and recent Reviews conducted by the MOH, there is indication of a higher IMR for the Country.(15,16) (Figures 16,17,18)*

*There has been some discrepancy between the official figures on Maternal Mortality and recent reviews conducted by the MOH. While official figures in the 1980's ranged from 3 to 6 deaths per 10,000 live births, recent reviews indicated a rate of 19.9 in 1990 and 14.7 in 1991. Principal causes include post partum hemorrhage and pre-eclampsia.(6,15,16) (See Figure 19)*

*3.1.2 Health Services:*

*Government facilities are by far the primary source of Health care in the country.*

*The basic infrastructure for Health Care delivery is provided by a national network of 34 health centres, 17 health posts and 7 hospitals.*

*In 1990, the Belize City Hospital which is the referral center for the country concentrated 47.0% of the total number of Hospital beds available and 57.0% of all the admissions to the public health services.*

*The overall rates for 1992 available for physicians, dentists and nurses are not too low and compare favourably with those reported by other countries in the region, (physicians 6.3; dentists 0.65; registered nurses 5.5 and auxiliary nurses 7.3 per 10,000 population). However, the rates by district have a consistently wide range for all the categories, with Toledo district having the lowest values for physicians and nurses, and the Cayo district the lowest for dentists. (Figure 20,21)*

*The Ministry of Health figure for 1991 indicates an overall coverage of 80.0% for prenatal care. Approximately 76.0% of all deliveries are institutional, Belize and Cayo Districts with the highest values and Toledo District with the lowest of 36.0%. (Figure 22,23)*

*The coverage of post partum follow up may be lower than 50.0% according to the Family Health Survey. Urban women were more likely to assist to post partum check up and it was positively associated with higher educational achievement. (Figure 24)*

*In regards to immunization coverage in children, there has been a slowly ascending pattern as from 1984. In 1991, the coverage for Measles was 76.0%, BCG 81.0%, Polio and DPT 82.0%. (Figure 25)*

### *3.1.3 Environmental Health*

*Overall, the water situation has improved and in 1991 approximately 80.0% of the population had access to water through different types of facilities and 20.0% still rely on unimproved sources, primarily in the rural areas especially in both northern districts of Orange Walk and Corozal.(5) (Figure 26)*

*Sanitation still constitutes a major problem. More than half of the population or 57.0% rely on unimproved sources for human waste disposal. This situation is fairly the same in all the districts, but is more predominant in the Stann Creek, Toledo and Orange Walk districts.(5) (Figure 27)*

### *3.1.4 Issues*

1. *Discrepancies for some indicators have been shown between the official figures and specific studies. Moreover data gaps can be identified in the Medical information system and it must be emphasized that although a vast amount of information is collected it is not always orientated to an efficient use of the information.*

2. *The southern districts of Toledo and Stann Creek consistently appear to show the higher occurrence of health related problems such as, malnutrition, iron and zinc deficiency, diarrhoea and respiratory diseases in children, low institutional deliveries, poor postpartum care coverage, anaemia in pregnant women, and poor sanitary conditions.*

3. *Although there has been a decreasing trend in Infant and Child Mortality especially due to a decrease in infectious diseases, the principal contributors - Conditions Originating in the Perinatal Period, Respiratory and Diarrhoeal Diseases - have remained. These*

*conditions, particularly diarrhoeal disease, acute respiratory infections and prematurity affect and may aggravate the nutritional status of children and vice versa.*

4. *There is a problem of malnutrition affecting the children in the country. Overall, 25.0% of children under five years that attended clinic were suffering from some degree of undernutrition. The Toledo district had the highest percentage of undernourished children (45.3%). On the other hand, 20.0% of the children in the Belize District had some risk of obesity and 1.4% were obese.*

5. *A high percentage of children between the ages of 3 to 8 years of age are affected by specific micronutrient deficiencies such as Vitamin A and Zinc. The ethnic groups most affected were the Garifuna, Maya Ketchi and East Indian. This may be related to poor dietary patterns and/or increased prevalence of infections.*

6. *Anaemia is considered a major problem in pregnant women. Approximately 40% of antenatal patients were found to have values of Hemoglobin below normal. The districts with highest prevalence were Cayo and Toledo.*

7. *Chronic diseases including heart, cerebrovascular and hypertensive diseases persistently appears as the principal causes of death in Belize in the past decade. Other nutrition related chronic diseases such as cancer and diabetes were also within the first ten causes of death. Expressed as a percentage of total mortality, chronic diseases showed an increase of approximately 10% in a ten year period (27% in 1988 versus 17% in 1978).*

8. *In terms of hospitalization, an indirect indicator of general morbidity, nutrition related non-communicable diseases such as endocrine/metabolic and hypertensive/heart diseases appear among the principal causes for 1990 and 1991.*

9. *There are no child spacing services within government institutions.*

### *3.1.5. Recommendations*

1. *To strengthen and improve the medical information system in order to fill the gaps identified and improve the efficient and timely generation and use of information.*

2. *To improve the availability and accessibility of health care services especially for mothers and children in priority areas with particular reference to the Toledo District. Child spacing services should be provided as part of the regular health system.*

3. *To develop and strengthen programs that will focus on the preventive/curative measures that address the problem of chronic diseases in adult and elderly population,e.g hypertension and heart disease, diabetes, cerebrovascular disease. Educational programs addressing the prevention of these problems should be promoted including those targeting school age children.*

4. *Organize effective educational campaigns supported by policy development so that basic nutritional practices, including breastfeeding and weaning are improved.*

5. *Special attention should be given to micronutrient deficiencies such as iron and vitamin A. It is therefore recommended that Iron-Folate Supplementation for pregnant women be evaluated and other long-term interventions such as food fortification to address the problem of Iron and Vitamin A Deficiency be considered.*

6. *To strengthen the nutritional unit with trained staff, appropriate infrastructure and budgetary allocation so as to develop an effective machinery for the purpose of planning and evaluation of nutritional programs.*

7. *To improve the coverage of water and sanitation services particularly in the Districts of Toledo and Stann Creek.*

8. *To conduct a weight for height survey in Toledo District in order to identify the exact extent of malnutrition.*

## *3.2 FOOD CONSUMPTION*

*Food Consumption or Food Intake is one of the principal determinants of nutritional status. Food Intake is in turn determined by Food Acquisition, Family Size and Cultural Patterns. Cultural Patterns is directly related to ethnicity and lifestyles and may be influenced by education and socio-economic consideration. Cultural Patterns directly impact the level of food purchases, food production, the quality, quantity and degree of food preparation, and frequency of food intake. In Belize there are a number of ethnic groups (Creole, Mestizo, Garinagu, Maya, Ketchi,*

*East Indians, Chinese and Arabs) all of which consume different diets and these diets are not necessarily related to any nutrition and health objectives. Family size determines the level of expenditure on food and the amount of food individuals in the family will consume. In some families consumption is determined by size, age and or pecking order, in most cases leaving the children and the elderly undernourished. This may vary between ethnic groups. Food Acquisition is dependent on Food Availability, Food Prices and Purchasing Power. Food Prices are affected by the rate of inflation, demand and supply conditions, transportation and other marketing costs. Food Prices are normally on an upward trend; however in Belize there are price controls in place which keeps the prices for essential commodities such as flour, rice, beans, and sugar within affordable limits for consumers. This practice may create disincentive for domestic production of such commodities, at times further fuelling the food import bill.*

### *3.2.1 Food Availability*

*Food supplies in Belize is a function of food imports and domestic food production. Domestic food production is influenced by government's socio-economic and labour policies and a demand for certain locally grown commodities to fill the ethnic market needs. Economic policies to support export crop development, for foreign exchange earnings and employment creation, stimulated farmers and labour to move out of food crop production to the more lucrative export crop production. This in itself creates a further dependence on food imports. The policy to make basic food commodities available to consumers at affordable prices, through price controls and subsidies, creates disincentives for domestic food production further fuelling the food import bill. Cheap food policies are distinct features of Third World countries where labour rates are low and capital accumulation occurs. Low agricultural labour rates pushes labour outside of the agricultural sector to more lucrative sectors and simultaneously forces agricultural labour to get involved in food crop production to supplement their incomes. Farmers involved in food crop production will grow those commodities which fit neatly into the dietary and consumption patterns of the populace and will automatically find a market.*

*The quantity and quality of imported food items and locally grown crops are based mainly on socio-economic considerations and have little, if any, direct relationship to nutrition and health implications. The government, as a measure of food security, is encouraging the attainment of self-sufficiency in the domestic production of basic food items such as rice, corn, beans, root crops, vegetables and fruits. The diversified production of these commodities in a farming systems approach at the individual farm level will not only stabilize incomes but will also bring about a balanced level of nutrition. The provision of good quality nutritious food items,*

*supported with suitable nutrition and health education programmes and proper food quality and safety controls, will allow Belizeans with adequate incomes to consume well balanced and nutritious meals and to exercise healthy lifestyles.*

*National Food Availability*

*National food availability is herein described as the sum total of Net Imports, Net Farm Production, and Home Production. Net Imports represents Total Imports less Re-Exports and in 1990 (see Figure 28) amounted to $63.3 million BZ, accounting for 27.4% of National Food Availability. Net Farm Production is the difference between Total Farm Production and Exports and amounted to $48.9 million BZ or 21.2% of National Food Availability in 1990. Home Production represents production from households whose major purpose of agricultural production was for home use. This is the largest component of National Food Availability (valued at $231 million BZ) and accounts for $118.8 million BZ or 51.4% of National Food Availability. This means that production at the subsistence level is responsible for feeding a large segment of the population especially in the rural areas where wages tend to be lower and ethnic diets persist. "Food From Animals" is the largest food group ($113.2 million BZ) in National Food Availability (See Figure 29) and is followed at a distance by "Staples" ($42 million BZ) and then "Vegetables" ($26.8 million BZ) which implies that Belizeans are heavy consumers of animal products.*

*Farm Production*

*Farm Production involves commercial and/or semi-commercial activities to produce commodities for the export trade and also for domestic consumption and processing. Commodities involved include rice, corn, R.K. Beans, pig, milk, poultry, beef, bananas, oranges, grapefruit, sugar and fish products (see Figure 30,31,32 and 33). Belize is relatively self-sufficient in corn, beans, fresh pork, fresh milk, poultry and beef. There is a serious effort afoot to bring rice production to self sufficiency levels and to export any surplus thereafter.*

*Home Production*

*This refers to production done on subsistence farms or plots chiefly for home consumption by household members. Any surplus production is sold on the local market. This type of production is mainly done to supplement income of low wage earners, and information on this type of production is rarely available except in cases where some survey is carried out such as the 1990 Household Expenditure Survey which is quite infrequent. Home production include*

*such items as milk, beef, pork, poultry and game meat in the "Food From Animals" group, and corn, rice, and beans in the "Staples" group all of which find themselves into ethnic dishes and this varies according to the ethnic and/or cultural group involved. For example, East Indians would grow more cereals and grains while Garinagu would grow more root crops and tubers. Information on Home Production on a regular basis is very important as Home Production accounts for 51.4% of National Food Availability and is also responsible for major consumption patterns of Belizeans especially the poor rural farmers and workers.*

*Imports*

*Food imports is the second largest component of National Food Availability after Home Production and is very important in terms of the types and quantities of food items being imported. For example, "Food From Animals" is responsible for 31.62% of Total Food Imports in 1990 (see Figure 34) while "Staples" accounted for 18.69% of food imports. Large amount of funds are expended on imports of those two food groups ($22.3 million BZ on "Food From Animals" and $13.2 million BZ on "Staples") and it is important to know whether import substitution activities can take place.*

*Despite the fact that Food Imports as a percentage of Total Imports have been decreasing over the years, from 19.57% in 1986 to 16.51% in 1990 (See Figure 35), the value of food imports have been steadily increasing, from $43 million BZ in 1986 to $63 million BZ in 1990. Food imports need to be looked at carefully not only in terms of import substitution and foreign exchange savings, but also in terms of the nutrition and health aspects.*

*Per Capita Food Availability And Consumption*

*Although National Food Availability was valued at $231 million BZ in 1990, this does not mean that food was readily and equally available to all Belizeans at any time. Actual food availability for the individual consumer will be dependent on such factors as geographic location (urban or rural), age, family size, incomes, food prices and other factors as may be influenced by culture and ethnicity.*

*National per capita food availability was estimated to be $1252.99 BZ per annum. This varies considerably from food group to food group (see Figure 36). For example, per capita availability for the "Food From Animals" food group was 2.7 times higher ($613.90 BZ) than that for the "Staples" food group ($227.90 BZ) while others in descending order in 1990 were $145.30 BZ for "Vegetables", $58.22 BZ for "Legumes and Nuts", $56.60 BZ for "Fats and Fat*

*Substitute", $55.83 BZ for "Miscellaneous", $53.97 BZ for "Fruits" and $41.27 BZ for "Mixed Food Groups (Others)". This gives us a good idea of the relative availability of the various food groups to Belizeans and their related importance in the dietary patterns of the Belizean people.*

*Prices may be the single most important determinant affecting the availability of food to consumers. This may be followed closely by location and location related factors. The supplies control (prices) regulations No. 30 of 1987 was set in place to control the maximum wholesale and retail prices of some imported and locally produced commodities, deemed essential commodities, such as flour, rice, beans and sugar. Those commodities that are price controlled show very little, if any, differences in prices within individual commodities from district to district (see Figure 37,38). This may be so because of transportation costs as in the case of flour which is $.47/lb. in Belize City compared to $0.50/lb. in Punta Gorda. White sugar is $0.33/lb. in Belize City, the point of distribution, compared to $0.39/lb in Punta Gorda, the farthest distance away. Commodities which are not price controlled, and produced in rural ares tend to be highest in retail prices in Belize City as opposed to the District Towns. For example, pork chops and T-bone steak tend to be cheapest in Toledo $2.64 and $3.30 per lb. respectively and most expensive in Belize City ($5.19 and $4.76 per lb. respectively). This may be so because of demand and supply reasons along with transportation and other added costs related to the points of production, import and distribution.*

*The value of total food consumed, obtained from Food Expenditures and Home Consumption in Belize in 1990 was estimated at $226 million Bz, slightly lower than the value of National Food Availability estimated at $231 million BZ which indicated that there was some surplus/carry-over stocks to the year 1991. National per capita food consumption was stated at $1225.89 BZ per annum, with $1,381.25 for rural areas and $1124.24 for urban areas. The value for per capita food consumption per district (See Figure 39) varies considerably with Cayo being the highest ($1,715.23) followed by Belize ($1,231.22) and Corozal ($1,095.04). Stann Creek was the lowest ($918.24), with Toledo slightly higher ($1,042.46 and then Orange Walk ($1,051.50) This may be so because of more abundant foods in the Cayo District related to the point of production but also due to greater Home Production and possibly better incomes. This may serve as a good indicator of "hotspots" for malnutrition and anemia.*

*Per capita Food Availability and consumption figures by nutrients - calories, protein and fat are not available at this time but steps must be taken to determine those values and also to establish a food basket of minimum nutrient requirements for maintaining good health and high productivity at the work place.*

### *3.2.2 Purchasing Power*

*Food Purchasing Power is determined by income, food prices, food availability, expenditure on non-food commitments, bargaining ability, and the degree to which priority is given to food acquisition as may be influenced by education and other socio-economic factors. Income is determined by Earned Income and other sources of Income such as pensions, gratuities, and remittances; while Earned Income and Other Sources of Income are affected by the level of employment as influenced by labour policies and overall socio-economic policies. Income is also affected by other factors such as economic activity status and level of education attained.*

*INCOME*

*The mean annual income at the national level is estimated at $7581 or $632 monthly. The mean annual income at the urban level is $8998 or $750 monthly. The mean annual income at the rural level is $6126 or $510 monthly. The minimum wage for manual workers engaged in agriculture, agro-industry or export oriented industries is $2.00 per hour and $2.25 per hour for other manual workers.*

*Monthly per capita food expenditure at the national level is $77.28, with the urban level ($82.53) greater than the rural level ($69.84). This implies that approximately 12% of monthly income is spent on food at the national level, 11% at the urban level, and 14% at the rural level.*

*INCOME BY ECONOMIC ACTIVITY*

*One of the factors which determine income is economic activity status of the population 15 years or older. At the country level, 50.5% of the population 15 years or older worked or had a job, 2% looked for work or wanted work, while 34.3% attended home duties and 7.7 % attended school during the reference week. At the urban level, 51% worked or had a job, 2.4% looked for work or wanted work, while 28.9% attended home duties and 10.7% attended school. At the rural level, 50% worked or had a job, 1.6% looked for work or wanted work, while 39.6% attended home duties and 4.7% attended school. The overall unemployment rate was estimated at 19.6% in 1991.*

*Another factor that determines income is other sources of income such as pensions, gratuities, and remittances. Pensions and gratuities paid by the Government of Belize increased from $7.3 million Bze in 1990/91 fiscal year to $9.7 million Bze in the 1991/92 fiscal year. Workers remittances for 1990 amounted to $27.38 million Bze.*

*INCOME BY LEVEL OF EDUCATION*

*At the national level, 76% of the population reached at least a primary level of education, while 22% had no formal education. At the urban level, 81% of the urban population reached at least a primary level while 15% had no formal education. At the rural level, 70% of the rural population reached at least the primary level, while 28% had no formal education. The percentage of population reaching the secondary level vary considerably between urban and rural. At the national level, 14% of the population reached the secondary level, compared to 22% at the urban level and 6% at the rural level.*

*The mean annual income of an individual with no formal level of education is estimated at $4789. The mean annual income of an individual with a primary level of education is $6270, while the mean income of an individual with a secondary level of education is $8887. On the extreme, the mean income of an employed person with a university level of education is $18,765.*

*FACTORS AFFECTING FOOD PRICES*

*The present Consumer Price Index (CPI) is the country's official measure of inflation since 1980. The price index reflects changes in consumer prices using 1980 prices as the basis for the series. The CPI therefore measures changes in price levels relative to 1980 prices.*

*The Index of Food Prices increased by 16.6% during the 5 years between 1987 and 1991 at the national level. The Index of Food Prices increased at a faster rate than the national level for Cayo (20.2%), Orange Walk (19.8%), and Stann Creek (17.6%) during the same 5 year period. The index of food prices increased at the lowest rate for Corozal (14.8%) and Toledo (12.3%).*

*Efficiencies in the marketing and distribution of food items are key factors affecting the final price to consumers and access to good quality foods by the poor and needy. The market and distribution channels for imported food items are well established and perfected over the years under the mercantile trade. The marketing and redistribution of locally grown food stuff is not well organized, highly inefficient, and requires serious attention, in particular, as it affects perishable commodities and small farmer welfare.*

*Further studies should be carried out to better analyze the purchasing power of people at the various income levels so as to be able to adjust wages and salaries to allow consumers the necessary purchasing power to acquire the minimum nutrient requirement for healthy living and to meet other mandatory living expenses.*

### *3.2.3 Issue in Food Availability, Marketing and Distribution, food Acquisition and Consumption*

1. *There is a need for a conscious, well planned, and comprehensive Food and Nutrition Policy assigning responsibilities to the various sectors - Agriculture and Fisheries, Trade and Commerce, Health, Education and Social Development. This will call for changes in labor policies, and channelling/redirecting of investments and other resources to implement such a policy.*

2. *A well established data base is required at the start up of implementation the Food and Nutrition Plan against which new and continuous information and data will be measured in the monitoring and evaluation of Food and Nutrition Programmes and related activities.*

3. *The proper execution of a fully integrated plan should make nutritious foods readily available to educated consumers at affordable prices to develop a well balanced plain of nutrition and good health, while simultaneously providing a fair return to farmers on their investments to allow for improved standards of living.*

### *3.2.4 Recommendations*

1. *In the short run, a food basket and minimum nutrient requirements should be established and adjustments in the wage rates must be made to allow consumers the purchasing power to acquire the minimum food basket.*

2. *Agriculture should increase the supply of rice, legumes and nuts, fruits, vegetables (especially green leafy vegetables), root crops and tubers (a source of complex carbohydrates), and fish products for local consumption.*

3. *Adjustments must be made in the trade and marketing environment to allow for better pricing efficiencies of food commodities to satisfy both producers and consumers.*

4. *Food and nutrition education programmes must be set in motion to sensitize consumers to purchase those good quality products which are nutritious and will bring about balanced diets and healthy bodies.*

5. *Social Development must step up activities in the area of income generating projects, especially those in agroprocessing, for better nutrition and health.*

## *3.3 EDUCATION*

### *3.3.1 Formal Education*

*Through education in Food and Nutrition it is expected that individuals, families and communities learn to use their own skills and techniques to produce a change in attitude which is necessary to adequately produce, store, prepare, select and consume the foods that are vital and essential for appropriate growth and development.*

*There is no data available on the nutritional status of school-age children, but what is available indicates some specific micro-nutrient deficiencies such as Vitamin A and Iron. Iron deficiency will certainly have an impact on the child's productivity in school. This is certainly sufficient justification to exert some effort in characterizing the nutritional situation of those children in primary schools in order to have the necessary tools that will facilitate the identification of appropriate and adequate short, medium and long-term interventions to improve the nutritional status of school-age children.*

*Education as an intervention yields a long-term effect, therefore the introduction and integration of Food and Nutrition Education at an early age is essential and probably the best strategy in order to reap the benefits of good food and nutritional habits of a population. Furthermore, for many children formal education begins and ends in the primary schools for statistics indicate approximately 87.0% of primary school enrollments in 1990-1991 and that only half of these students completing primary school go on to high school.*

*The present situation within primary level education is as follows:*

- *The Draft Education Policy does not address Food and Nutrition as a major component of the Primary School Curriculum.*
- *There is no Nutrition Syllabus per se in the Teacher's Curriculum, nevertheless topics on Food and Nutrition are addressed through different channels such as REAP, SHEP, Home Economics, Science and Early Childhood Programmes.*
- *The 1990-1991 statistics indicate an 87.0% of primary school enrollments, a gradual increase throughout the decade of the 1980's; only half of these students completing primary school go on to high school.*
- *There are reports of a high Literacy Rate for Belize, nevertheless in 1992 there are no data that can allow decision-makers to determine trends and the present situation.*

*With this brief description it can be concluded that the success of Food and Nutrition Education as an intervention at the primary school level is determined by the importance given to this issue and the major focus of primary education as guided by educational policies in the Country.*

*There is a need to sensitize decision-makers and teachers of the importance of Food and Nutrition Education and its integration into the Primary School Curriculum where there is a concentration of 87.0% of school-age children, the primary target audience for Food and Nutrition Education.*

### *3.3.2 Issues in Formal Education:*

1. *The Draft Education Policy does not address Food and Nutrition as a major component of the Primary School Curriculum.*
2. *Health and Nutrition is not recognized or emphasized within formal education.*
3. *Lack of incorporation of the SHEP and REAP Programmes into the General Primary Education Curriculum due to the tendency of focusing on examinable subjects.*
4. *Lack of training and motivation of teachers to implement the Food and Nutrition component of the Health curriculum.*
5. *Literacy is a major determinant in defining education interventions and at present there is no official position concerning literacy rate.*

*3.3.3. Recommendations in Formal Education:*

1. *Include Food and Nutrition as a major component of the Draft Education Policy.*
2. *Sensitize education officers and local managers as to the importance of food and nutrition within formal education.*
3. *Include Food and Nutrition as an examinable subject in the Belize National Selection Examination.*
4. *Provide regular training to teachers on food and nutrition and motivate their interest in this topic.*
5. *Determine the literacy rate by district.*

*3.3.4. Informal Education*

*Presently, there are several education programmes that address topics in regards to Nutrition and Health including the one carried out by the Ministry of Health through the Health Education and Community Participation Bureau (HECOPAB).*

*The Ministry of Social Development also carries out these types of programmes at the 4-H Center, Listowell Boys Training School, Belize Youth Development Center, and the Home Economics and Maternal/Child Health Programmes at the community level.*

*The training provided in most instances is similar in that it focuses primarily on food production, while the nutrition aspect is given little emphasis. To a large extent, trainees in these Centres consume most of the food they produce.*

*The Home-Economics programme, under the Department of Women's Affairs addresses both the theoretical and practical aspects of Nutrition targeting Women's Groups at the district level. They learn about the nutritional value and importance of the different food groups and participate in the preparation of practical and nutritious dishes. The Department has other areas of focus and it appears that the food and nutrition component is not allotted sufficient time to create more impact. The Childhood Development component includes topics on child nutrition, which especially helps young mothers who need to have clear knowledge and concepts regarding the diet of growing children.*

*The Maternal and Child Health Programme uses different methodologies to disseminate information and education on a variety of topics, including nutrition and health. This is done*

*primarily through the Child Health Clinics and HECOPAB. The Health Education Bureau concentrates on group exercises, radio programmes, lectures and presentations at schools and workshops, pamphlets and a series of other means targeting different social groups.*

*It appears that, although nutrition and health is being addressed through informal means of education, more importance needs to be given to these topics at different levels in order to obtain a wider coverage and firmer impact.*

### *3.3.5. Issues in informal education*

1. *Inadequate coordination between the Ministries of Social Development, Health and Agriculture in regards to their Food and Nutrition Programmes.*

2. *Existing Programmes are geared towards food production without emphasizing its nutritional value.*

### *3.3.6. Recommendations in informal education:*

1. *Upgrade the implementation of existing programmes in order to link food production with its nutritional value.*

## *3.4. CULTURE*

### *3.4.1. Food habits*

*Belize's multi-ethnic characteristics determines a wide variety in regards to food habits and patterns of consumption. At this point, however, information available in this area is merely descriptive in nature since there has not been a countrywide survey to quantitatively document food consumption at the household level.*

*Rice, beans and corn are staple foods that form part of the basic diets of most of the population, although the specific combinations with other foods for various dishes varies in the different ethnic groups.*

*The diet of the "creoles", mainly concentrated in the Belize district, largely consists of wheat flour, breads, cheese, eggs, milk beverages, rice, beans, and fried or stewed meats.*

*The mestizos form an important percentage of the population. Their diet is rich in corn as main ingredient for certain preparations like the tamales or the tortillas to accompany main meals. Beans, eggs, meats, spicy meat soups and pepper are popular. Ketchi and Maya Indian diets consist of a similar pattern, but corn and staples are a more important portion of their meals.*

*The Garifuna staple diet largely consists of cassava, plantain, cocoa, accompanied with fish or other meats. Coconut oil or milk is very typical in garifuna cooking.*

*Similarly, the East Indians include "ground foods" in their diet, and also wheat flour, rice, meats, legumes and some fruits and vegetables.*

*In general, staples, legumes, food from animals, and fats predominate in the majority of the belizeans' diets while vegetables and fruits take lesser importance.*

### *3.4.2. Issues*

*1. There is lack of information on food consumption at the household level.*

### *3.4.3. Recommendations*

*1. To conduct a National Food Consumption Survey at the household level.*

## IV. GENERAL RECOMMENDATIONS

1. *Efforts should be directed at establishment and implementation of a long term Food and Nutrition Plan for Belize with emphasis on an integrated approach at both rural and urban levels.*

2. *Appoint a multisectoral food and nutrition task force to develop a National Food and Nutrition plan and to monitor the implementation of planned activities.*

3. *Establish a secretariat within a designated Ministry to coordinate and support the activities of the Food and Nutrition multisectoral task force.*

4. *Establish and implement a National Food and Nutrition Information System and data base to support the National Plan,*

5. *Update the nutrition curriculum of the School Health Education Programme, and integrate Food and Nutrition Components into the Curriculum of all learning institutions.*

6. *Strengthen the existing information systems in the various sectors in order to fill the gaps identified in the present assessment.*

7. *Promote Public Communication programmes to inform and sensitize the population in relation to appropriate food consumption.*

8. *Adopt an integrated approach to rural development for an improved food, nutrition and health status particularly in the Belize, Stann Creek and Toledo Districts.*

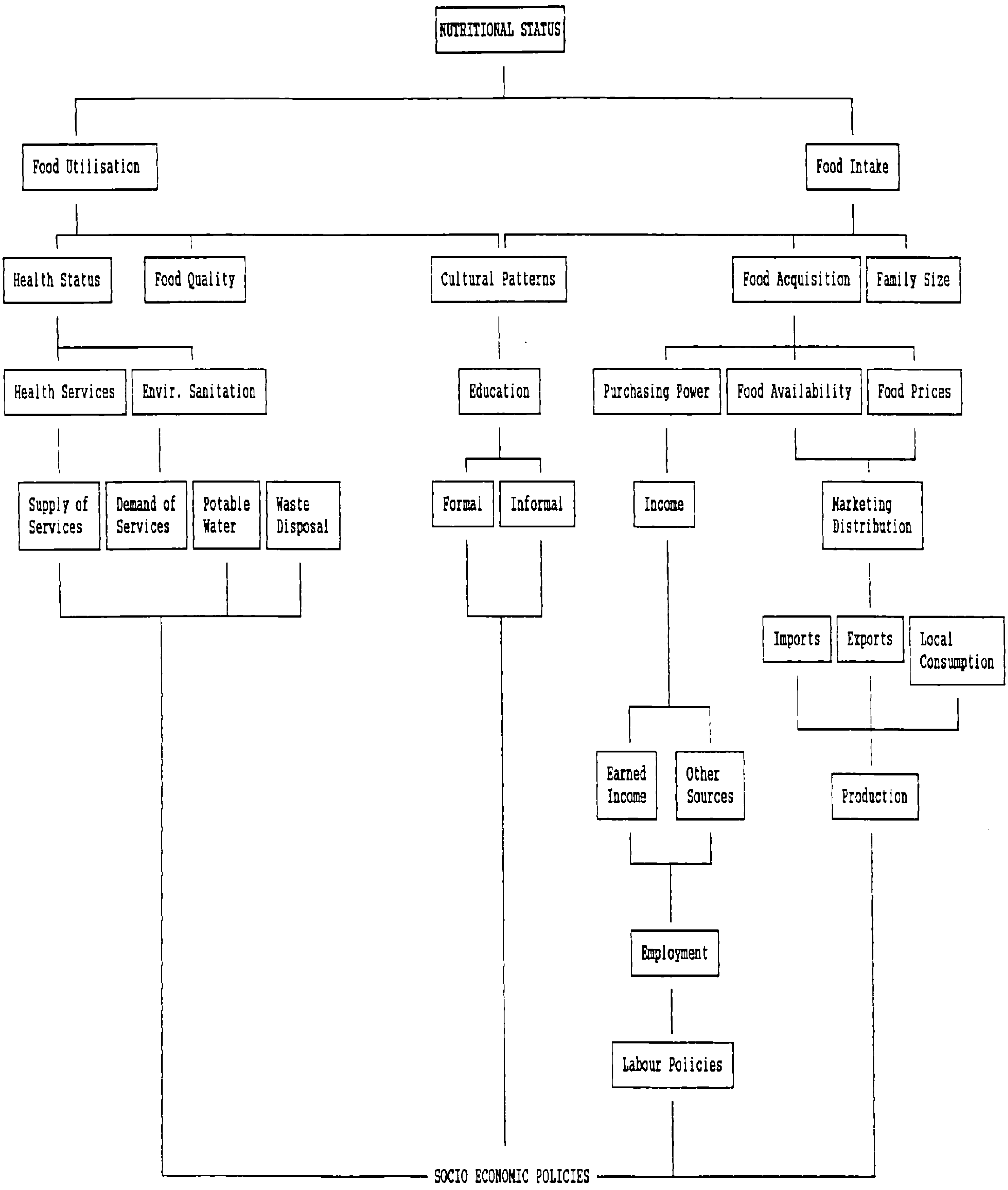
9. *Sensitize and train key persons from the different sectors in food and nutrition.*

10. *Conduct a survey on Food Consumption at the household level.*

# V. ANNEXES

**ANNEX 1**

3RD AND FINAL VERSION
BELIZE NUTRITIONAL ASSESSMENT
CAUSAL MODEL




BELIZE NATIONAL FOOD AND
NUTRITION TEAM
MARCH 25/92

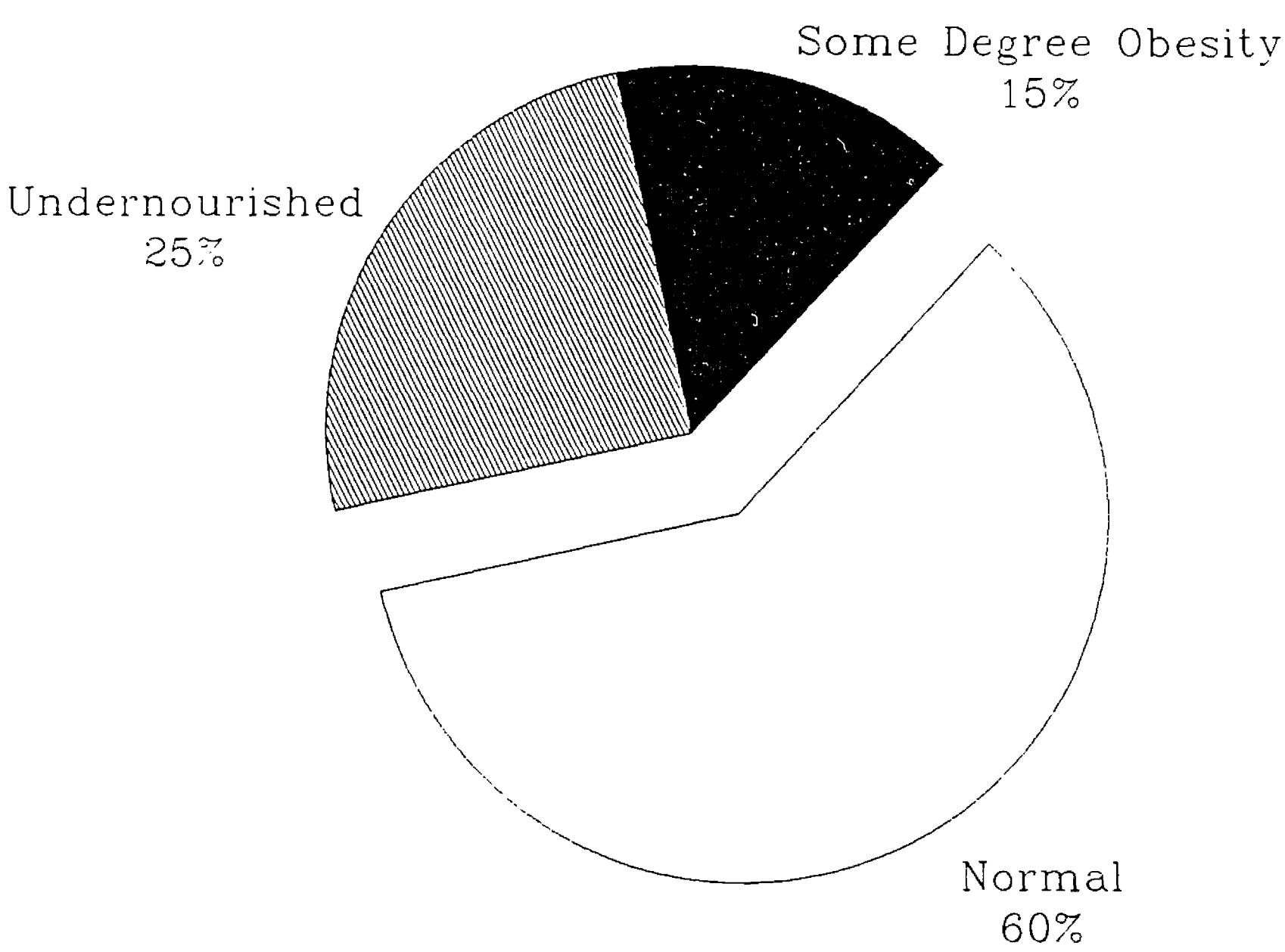
# BELIZE NATIONAL FOOD AND NUTRITION ASSESSMENT

## TEAM COMPOSITION
## 1992

| SECTOR | NAME OF PERSON | POST |
|---|---|---|
| Ministry of Health | Dr. Ramon Figueroa | Director Maternal and Child Health Program |
| | Ms. Gilda Dennison | Nutrition Officer |
| | Ms. Dorla McKenzie | Public Health Nurse |
| Ministry of Education | Mrs. Maria Magana | National Coordinator, Drug Prevention Program |
| Ministry of Agriculture | Mr. Wendell Parham | Policy Analyst |
| Ministry of Social Development | Ms. Anita Zetina | Ag. Director, Department of Women's Affairs |
| Central Statistical Office | Mr. David Garcia | Statistician |
| | Mr. Martin Aldana | Statistician |
| INCAP/PAHO | Dr. Ninette Reneau | Nutrition Consultant |
| | Dr. Yma Alfaro | Nutrition Consultant |
| UWI - School of Continuing Studies | Mr. Dudley Augustine | Training Coordinator for the Community Development Training Program |

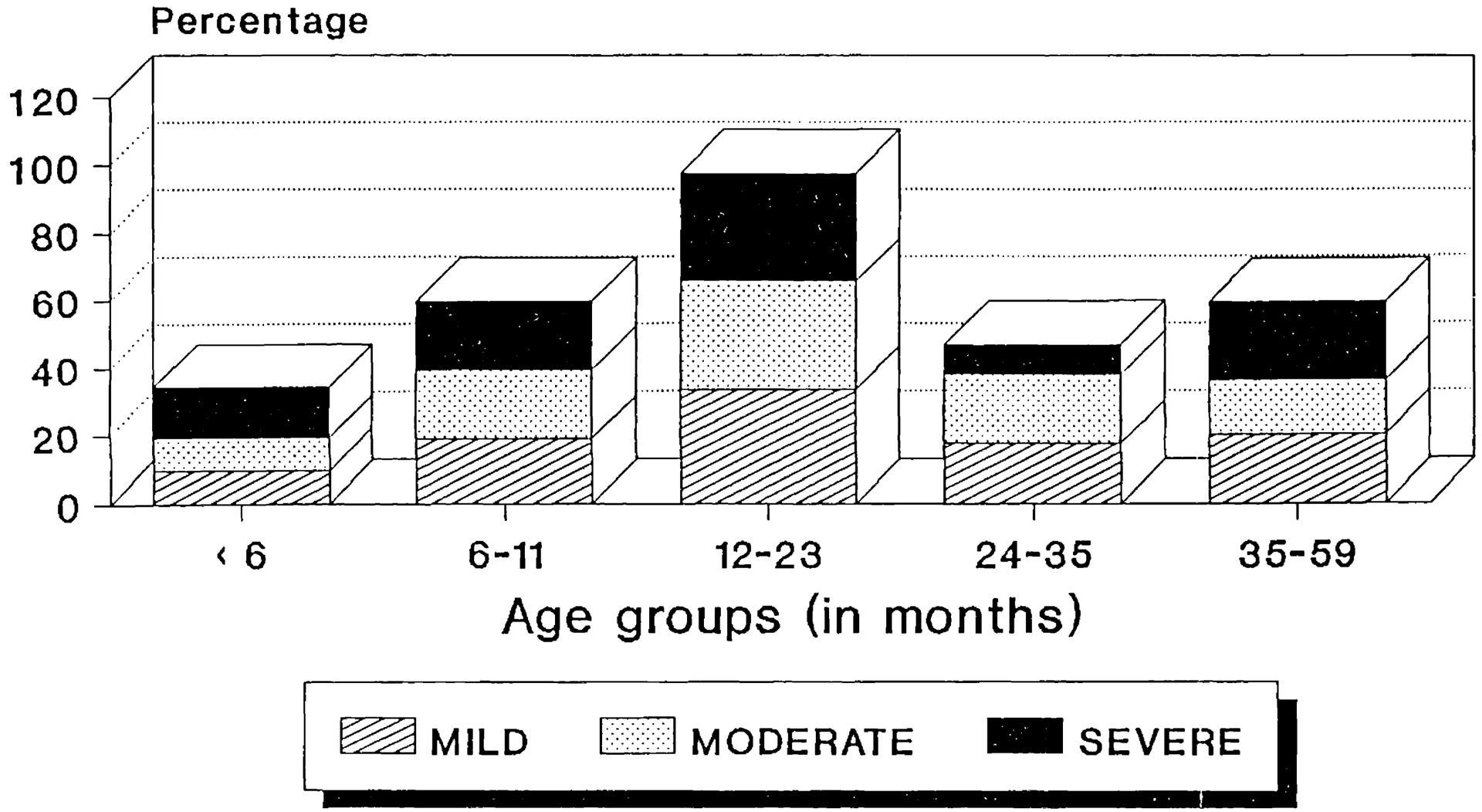
**FIGURE 1**

# NUTRITIONAL STATUS OF CHILDREN UNDER 5 YEARS – WEIGHT FOR AGE INDICATOR
## Belize Jan–Mar 1992




Source: BNAT., A Review of Growth Monitoring Data in Health Centers of Belize

# PERCENTAGE OF CHILDREN ‹ 5 YEARS WITH SOME DEGREE OF MALNUTRITION BY AGE GROUP USING WHO CLASSIFICATION - JAN-MAR 1992




Source: A Review of Growth Monitoring Data of Children under 5 Years In Health Centres of Belize.

FIGURE 2

# CHILDREN UNDER 5 YEARS WITH SOME DEGREE OF MALNUTRITION USING WHO CLASSIFICATION CUT-OFF POINT -1 SD. BELIZE JAN-MAR '92

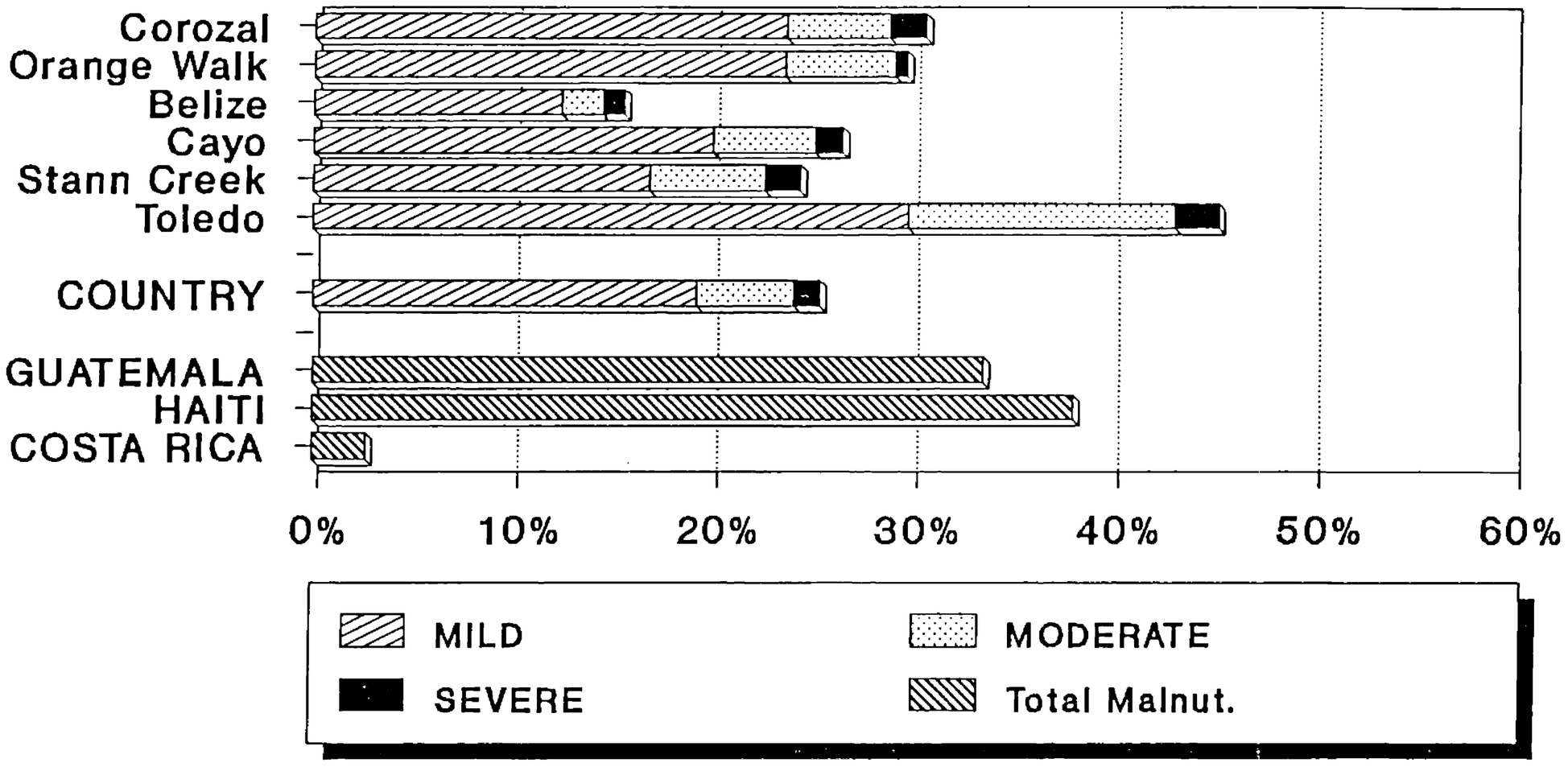



FIGURE 3

Source:
-Health Centres Data. BNAT, 1992.
-Health Cond. In the Americas, WHO 1990.

# PERCENTAGE OF CHILDREN WITH SOME DEGREE OF MALNUTRITION BY DISTRICT, USING GOMEZ CLASSIFICATION -BELIZE 1981-

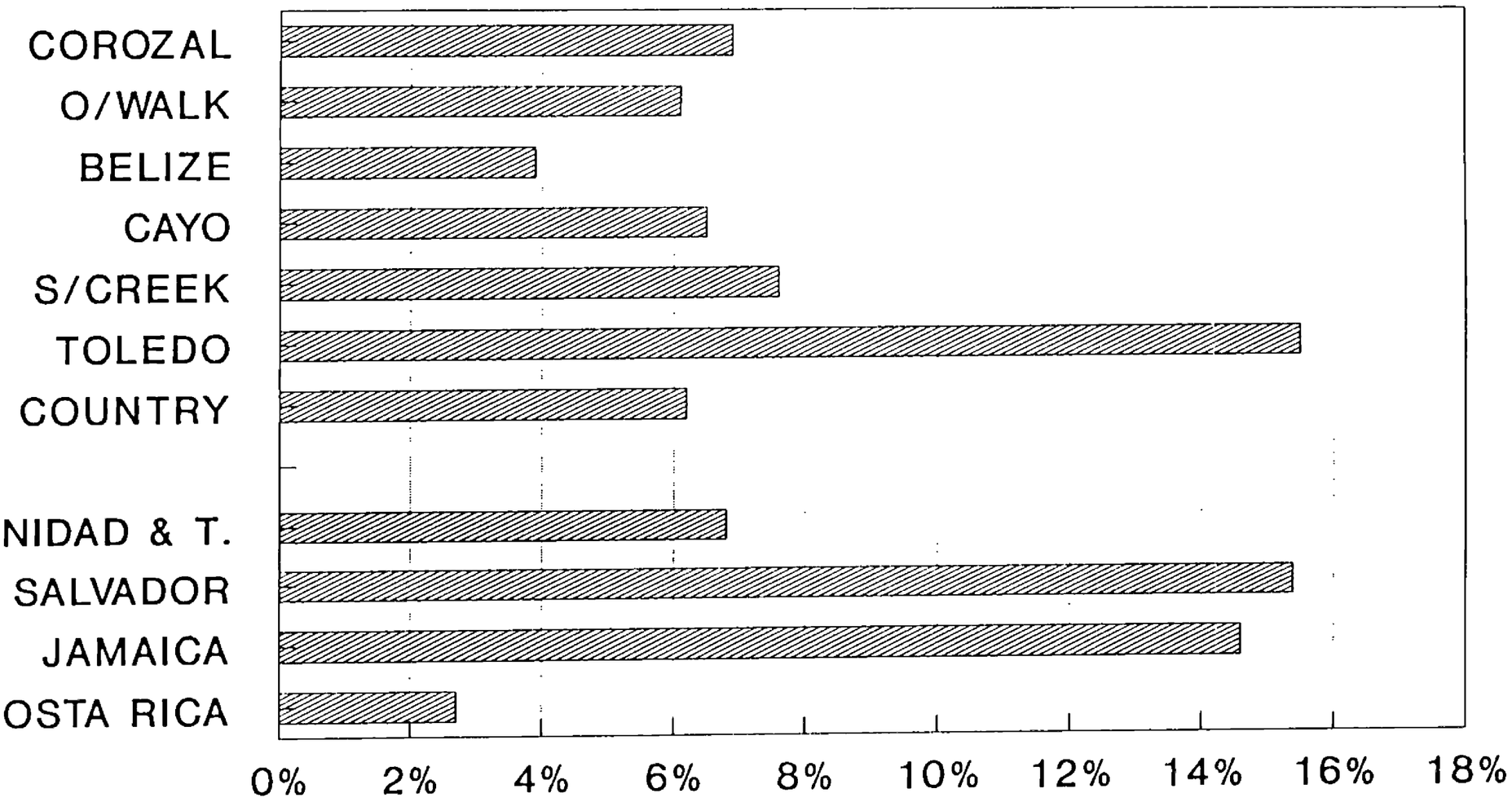
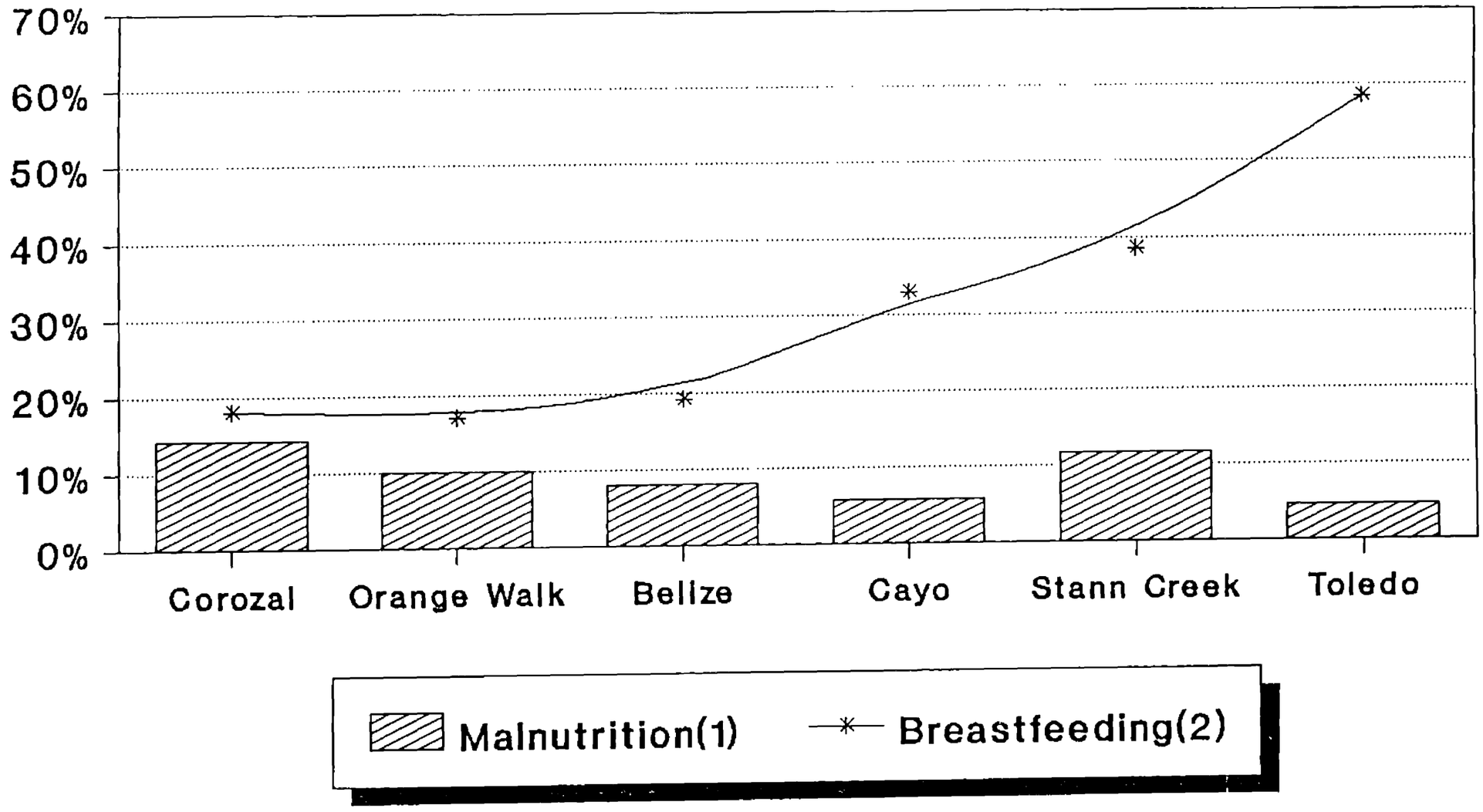



FIGURE 4

Source:
-Belize Health Centers Information, CFNI
-Health Conditions of the Americas, WHO

# MALNUTRITION IN CHILDREN <6 MONTHS AND EXCLUSIVE BREASTFEEDING BELIZE 1991

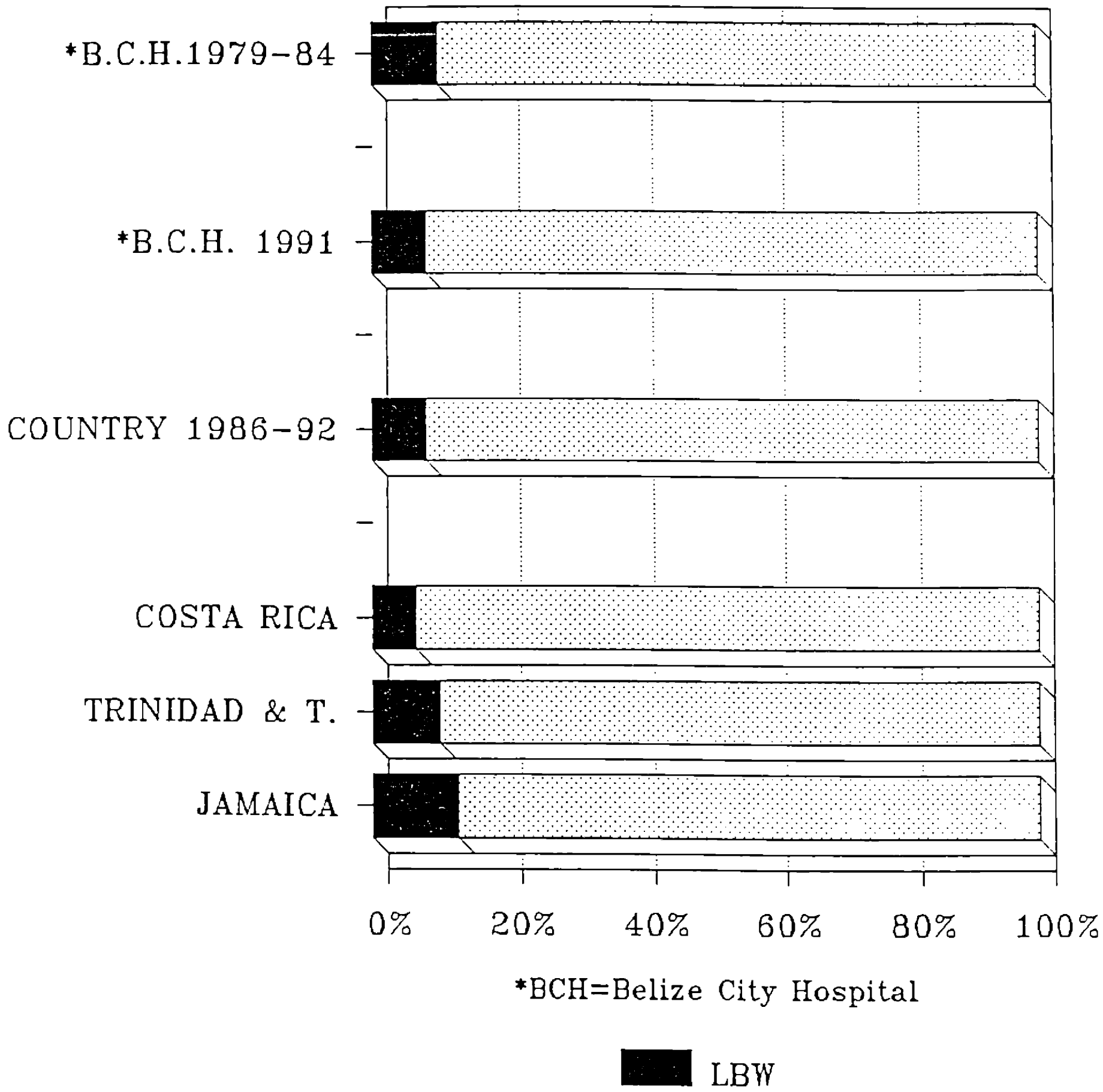



• Expressed as a percentage of children
< 1 year registered in the Clinics
Source:1.)BNAT Study 2.)MCH Report,1991

FIGURE 5

FIGURE 6

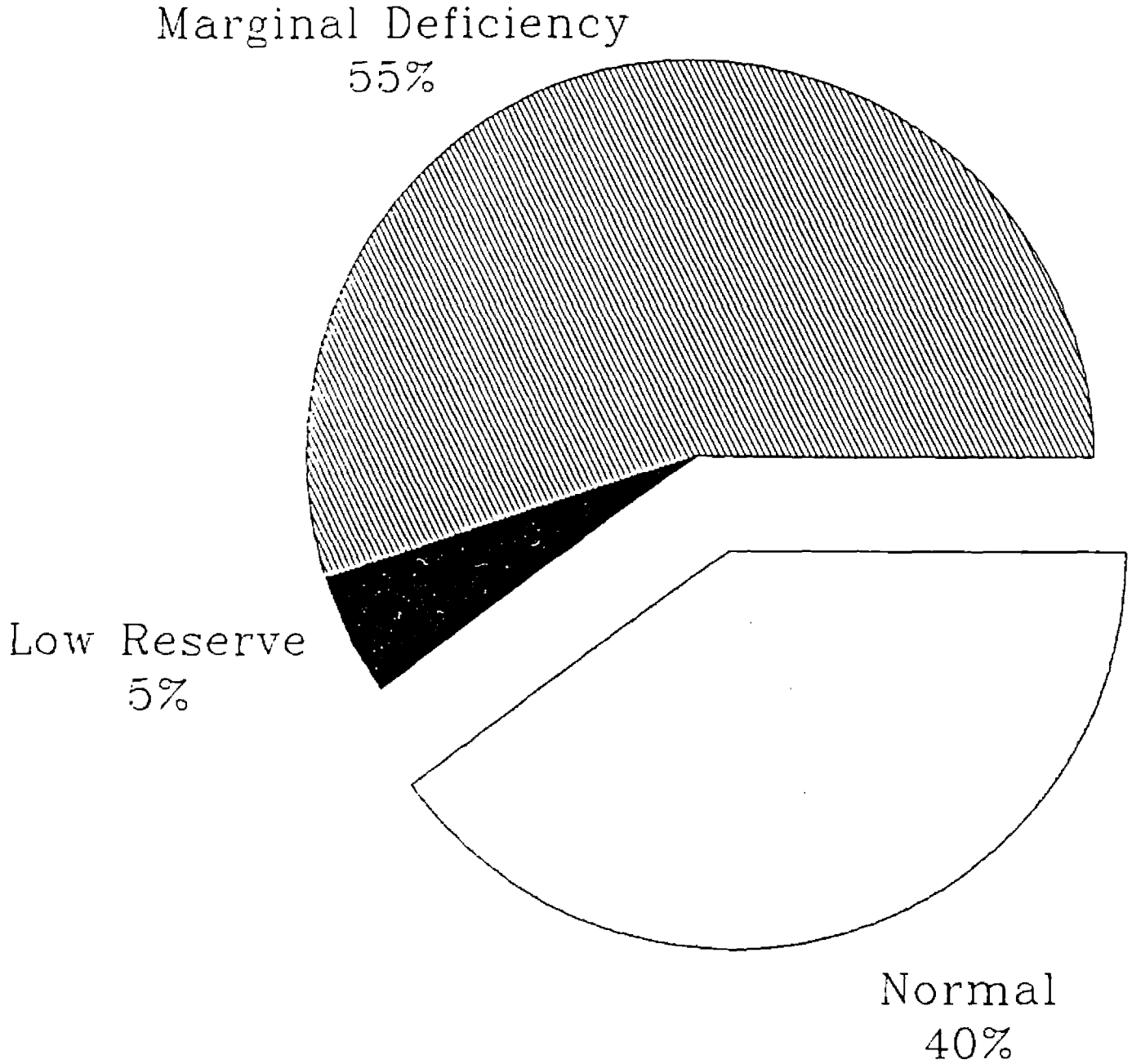
# Incidence of Low Birth Weight
## (Different Sources)




Sources: 1.Farnum, S. Assessment Report
2. Medical Statistics Office 3.Child
Clinics Data 3.Health Cond. in Americas

FIGURE 7

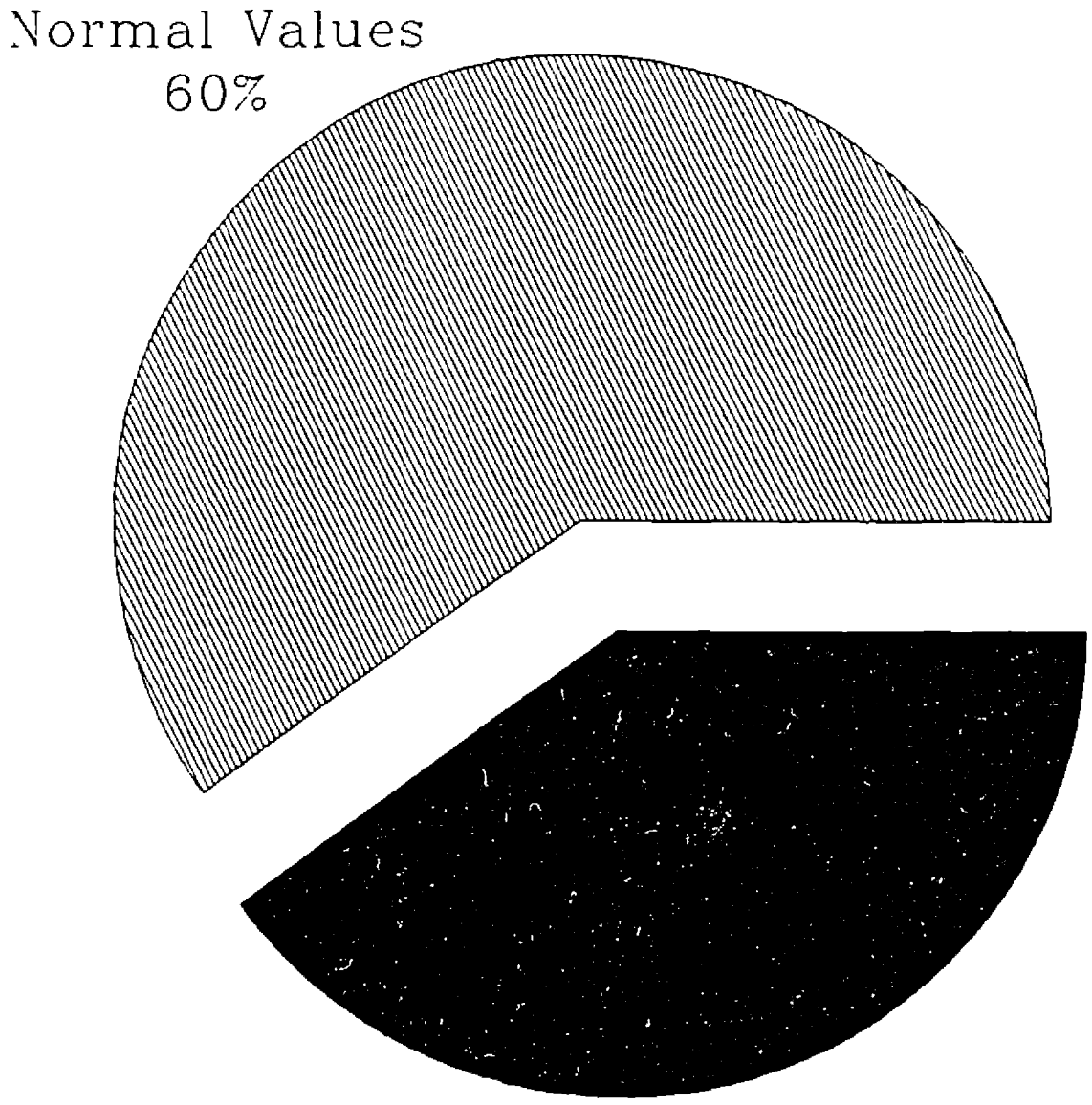
# Status of Vitamin A in Children Belize 1989




Source:An Assessment of the Vitamin A status in the Children of Belize, 1989. Lincoln University.

FIGURE 8

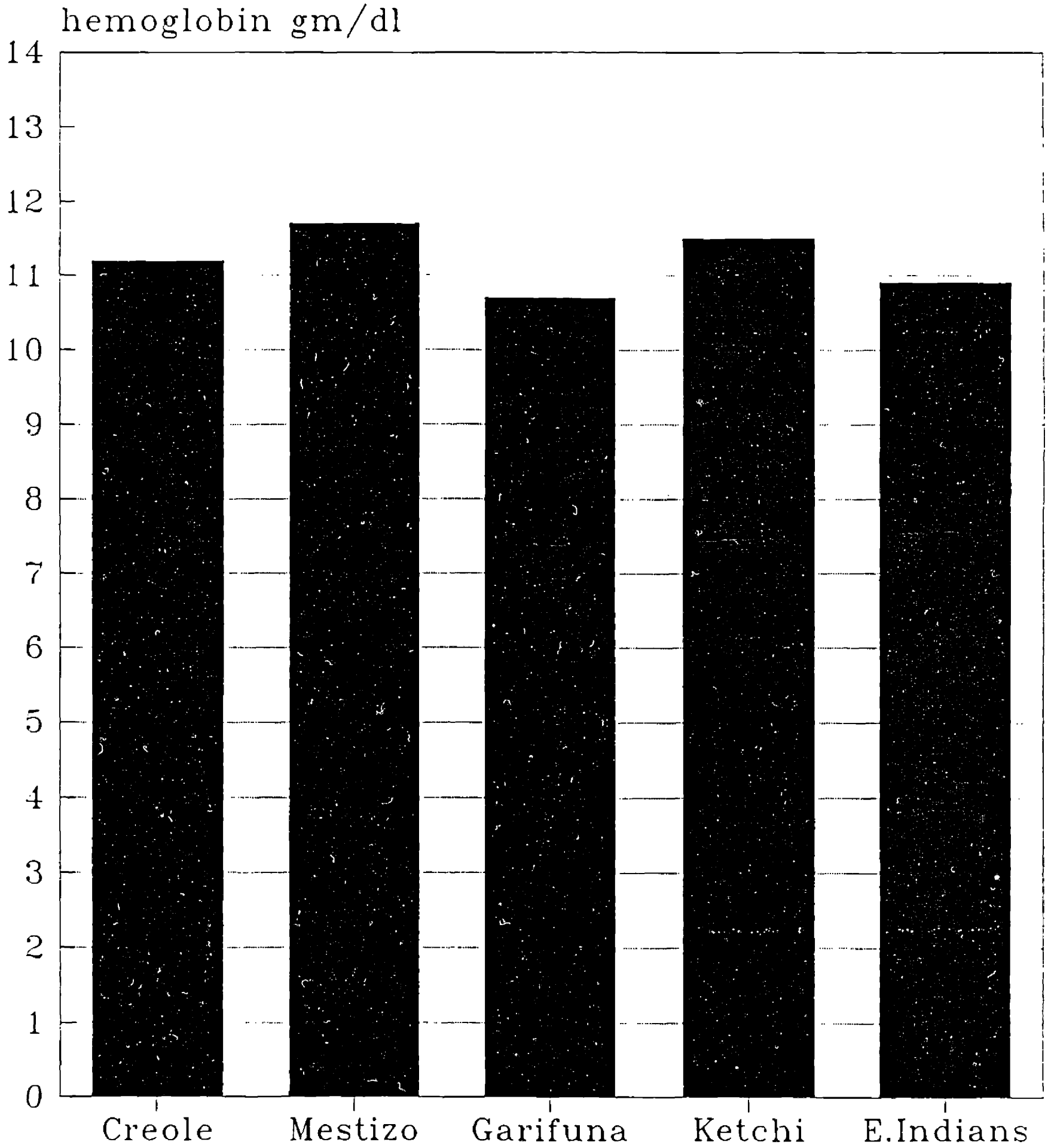
# Zinc Status in Children Belize 1989




Source:An Assessment of the Vitamin A status in the Children of Belize, 1989. Lincoln University.

FIGURE 9

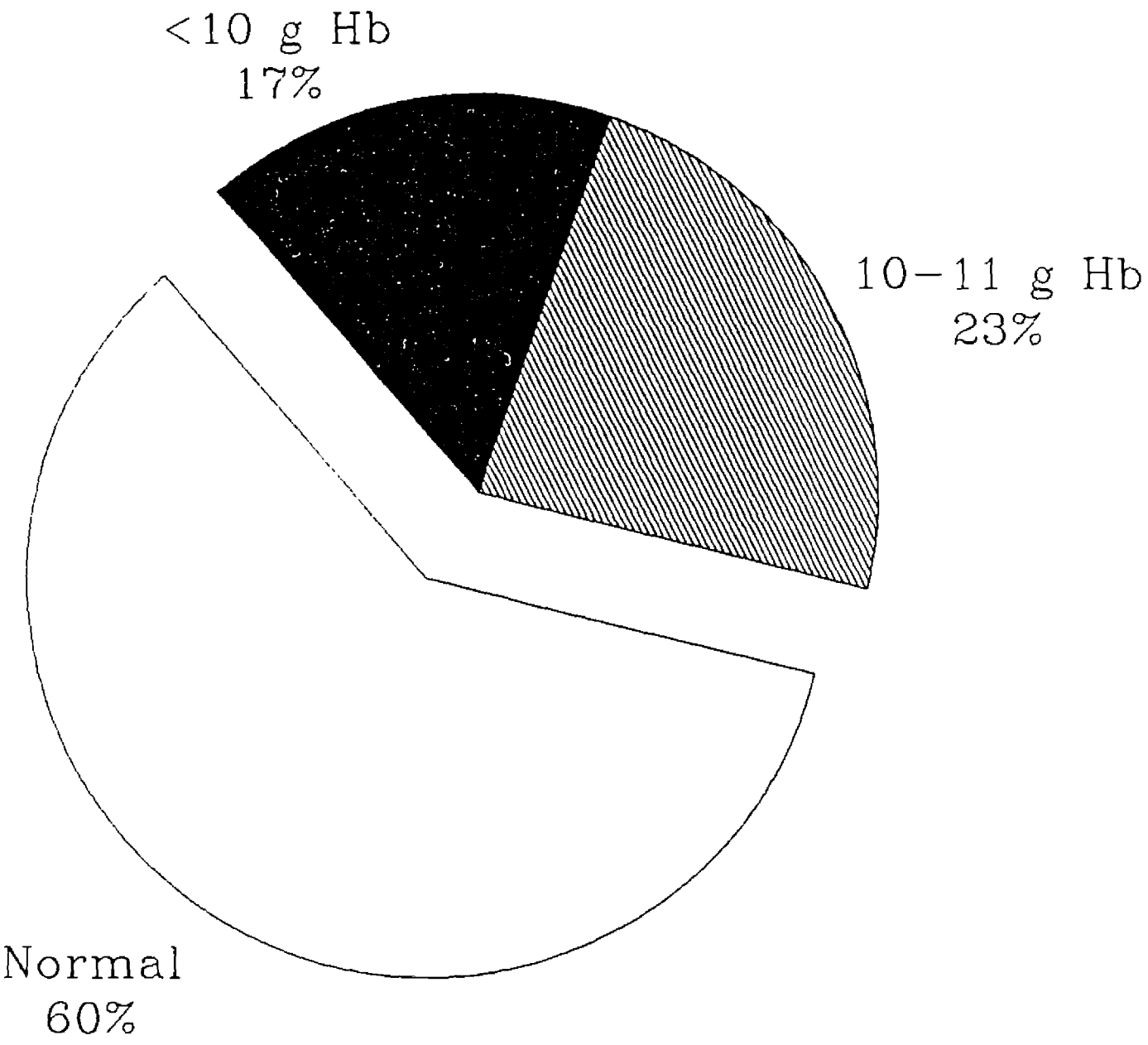
# ANAEMIA IN CHILDREN 3–8 YEARS OF AGE
# BELIZE 1989




Source: An Assessment of the Vitamin A status of the children of Belize, 1989. Lincoln University.

FIGURE 10

# PREVALENCE OF ANAEMIA IN PREGNANT WOMEN ATTENDING HEALTH CLINICS BELIZE 1988




SOURCE: Hof, A. Survey of Anaemia in pregnant women. Ministry of Health 1989

# PRINCIPAL CAUSES OF DEATH
# BELIZE 1983-1990

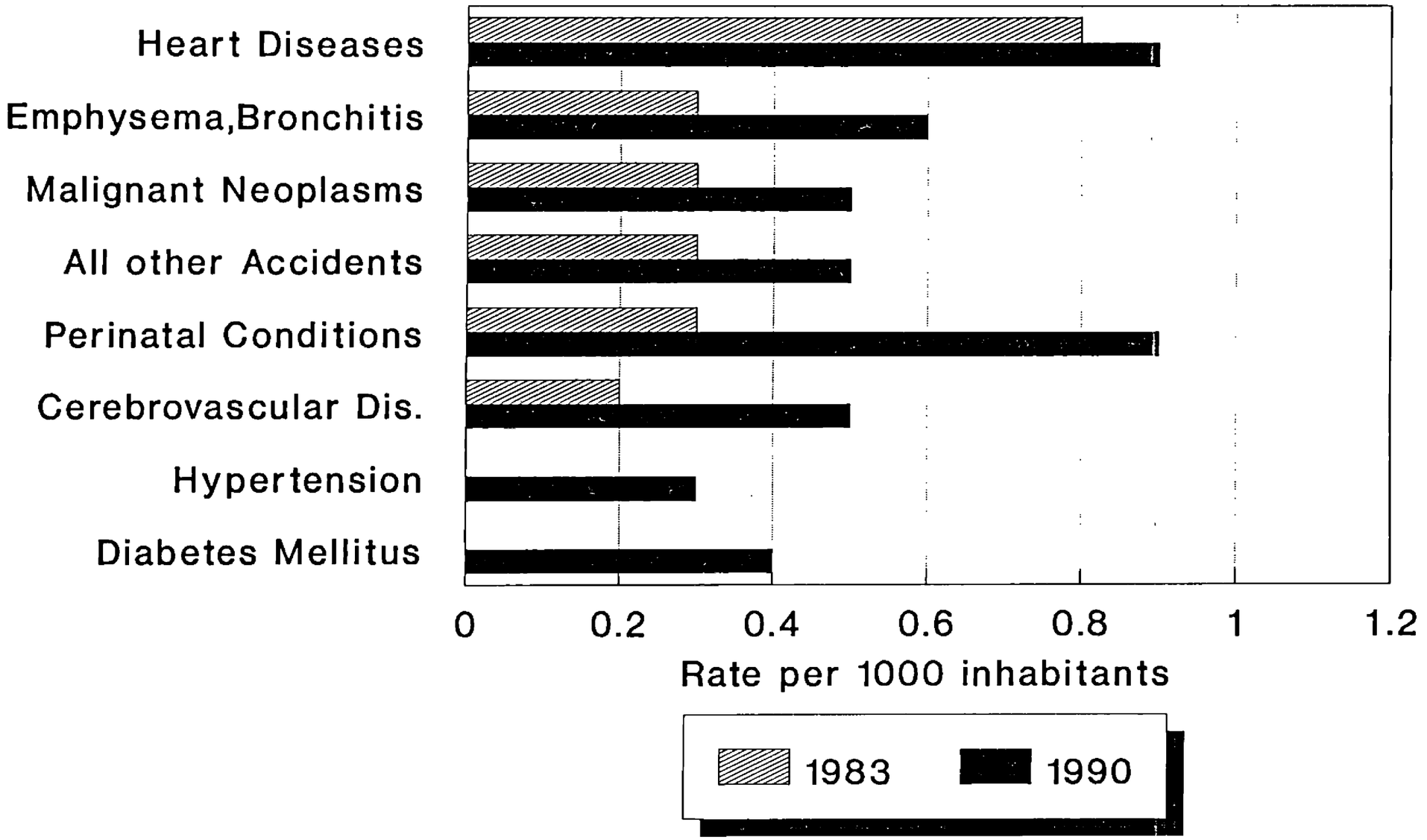



FIGURE 11

Source: Medical Statistical Office

# Changing Patterns of Mortality in Belize
# 1976, 1986 and 1988

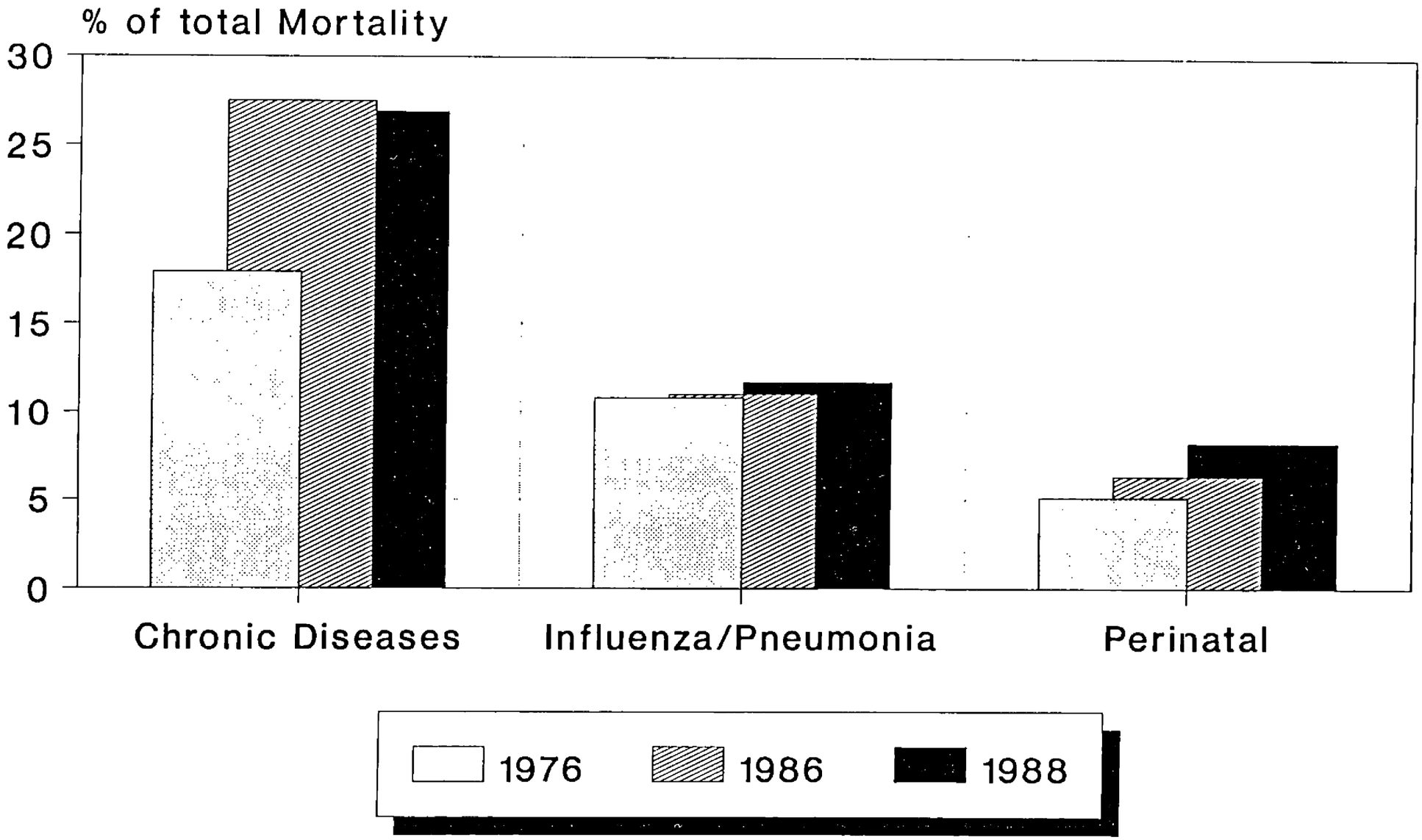



FIGURE 12

1)Health Conditions in the Americas
1973-1976 and 1990. PAHO
2)NHPS, Ministry of Health, Belize, 1990

# PRINCIPAL CAUSES OF HOSPITALIZATION
# BELIZE 1990-1991

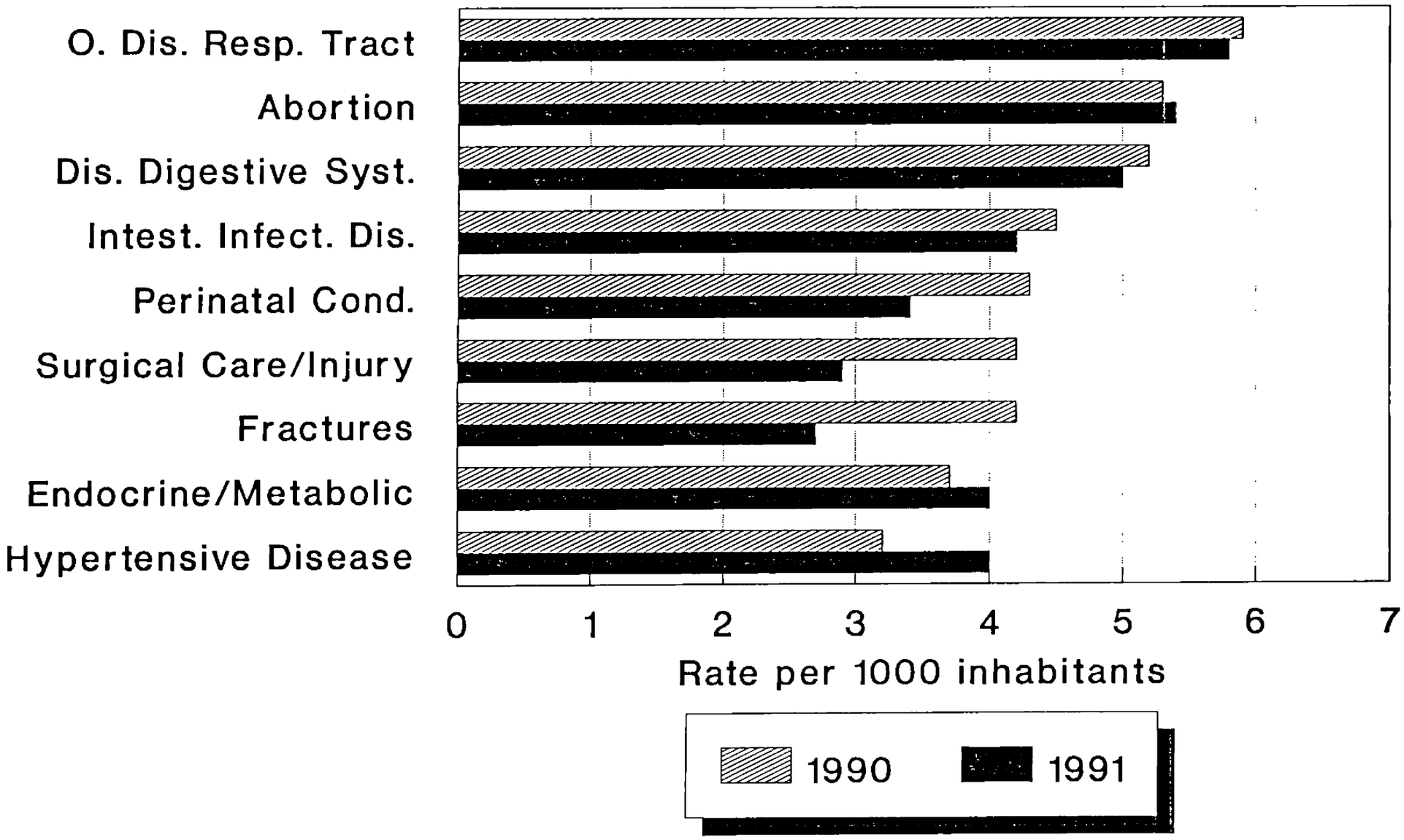
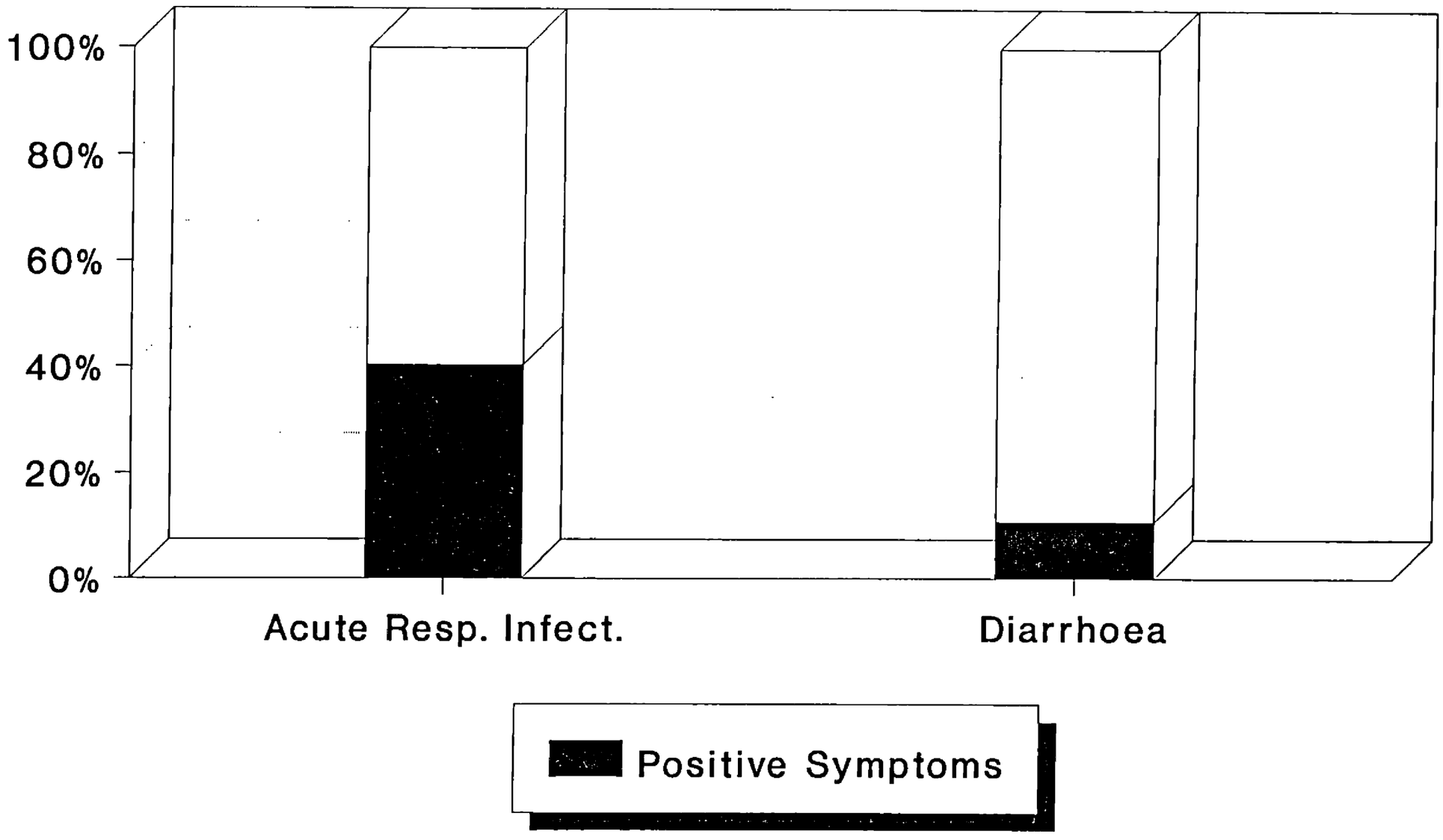



FIGURE 13

Source: Medical Statistical Office

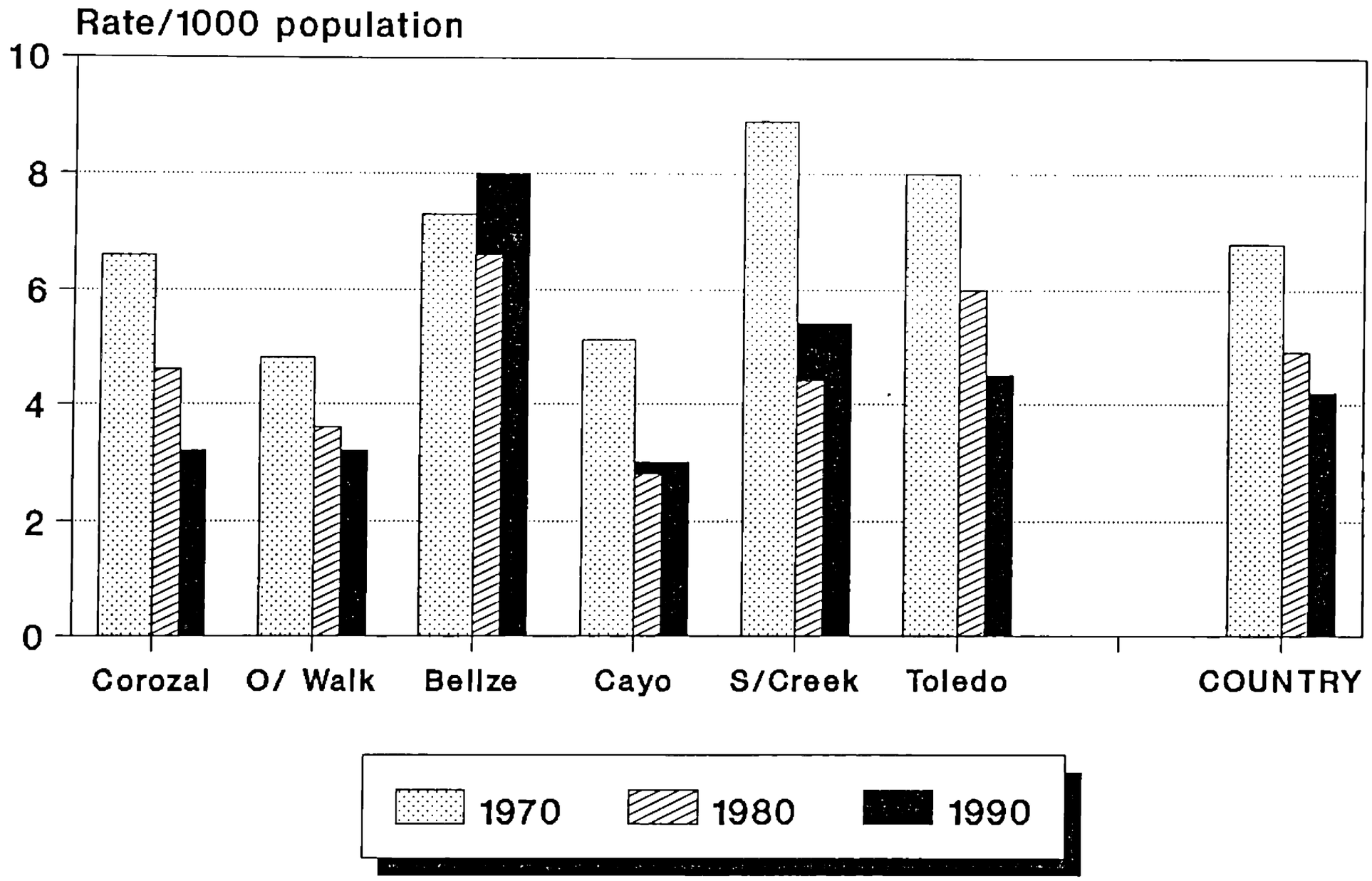
# Acute Respiratory Infections & Diarrhoea
# Percentage of Children <5 years with symptoms




Source:1991 Family Health Survey, C.S.O.

FIGURE 14

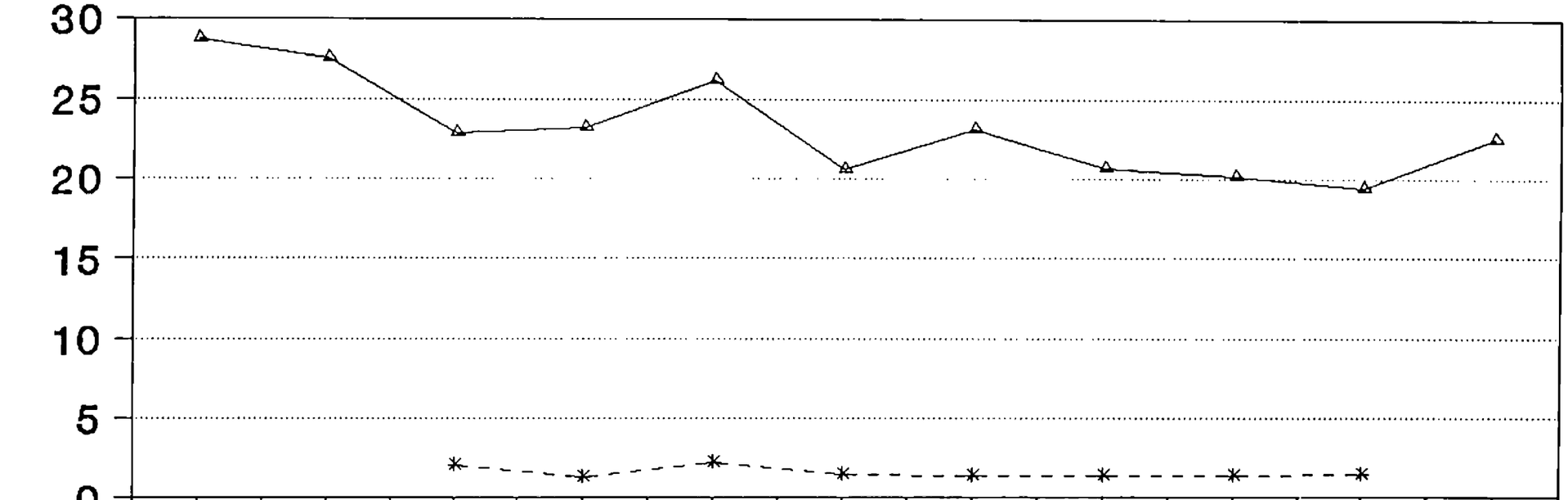
# General Mortality Rates by District
# Belize 1970, 1980 and 1990




Source: Abstract of Statistics 1991

FIGURE 15

# INFANT AND CHILD MORTALITY
# BELIZE 1980-1990

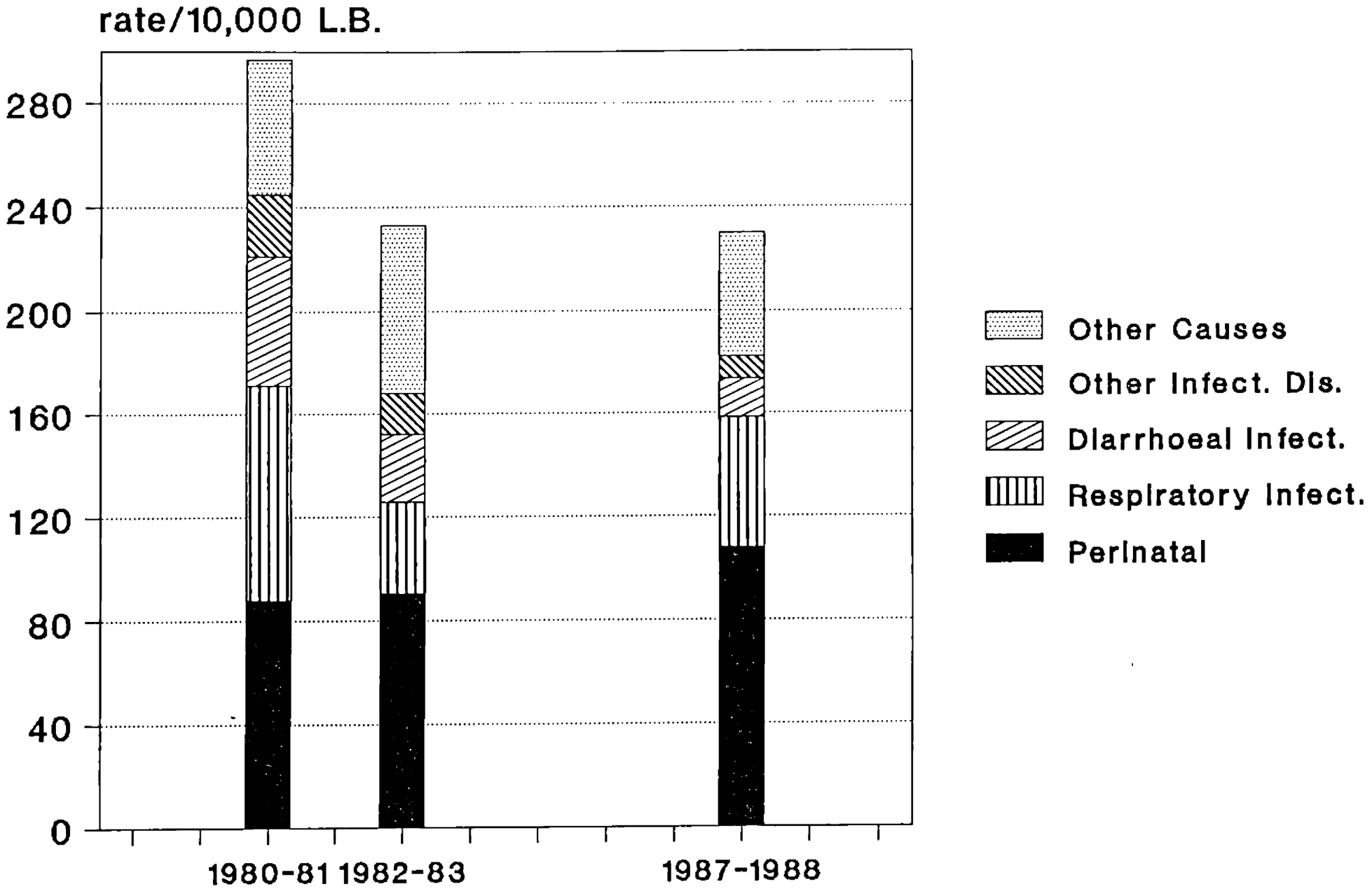



| | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IMR | 28.7 | 27.5 | 22.9 | 23.2 | 26.2 | 20.6 | 23.1 | 20.7 | 20.2 | 19.4 | 22.5 |
| CMR | | | 2.1 | 1.3 | 2.2 | 1.5 | 1.4 | 1.4 | 1.4 | 1.5 | |


Source: Abstracts of Statistics
- IMR= deaths/1000 live births
- CMR= deaths/1000 population

FIGURE 16

# Infant Mortality by Groups of Causes

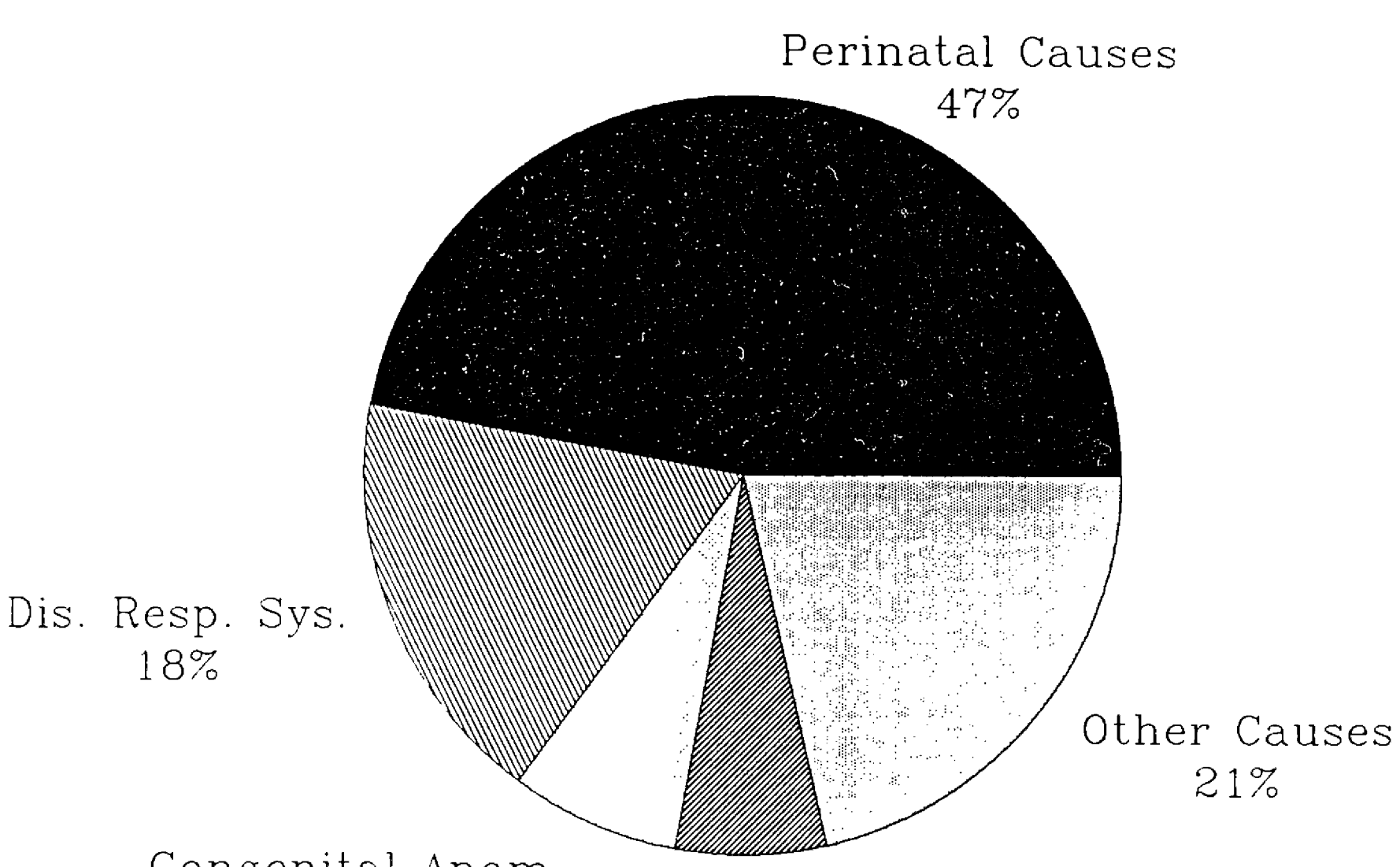



Source: Mortalidad en la Ninez
INCAP, UNICEF, CELADE 1990

FIGURE 1.17

FIGURE 18

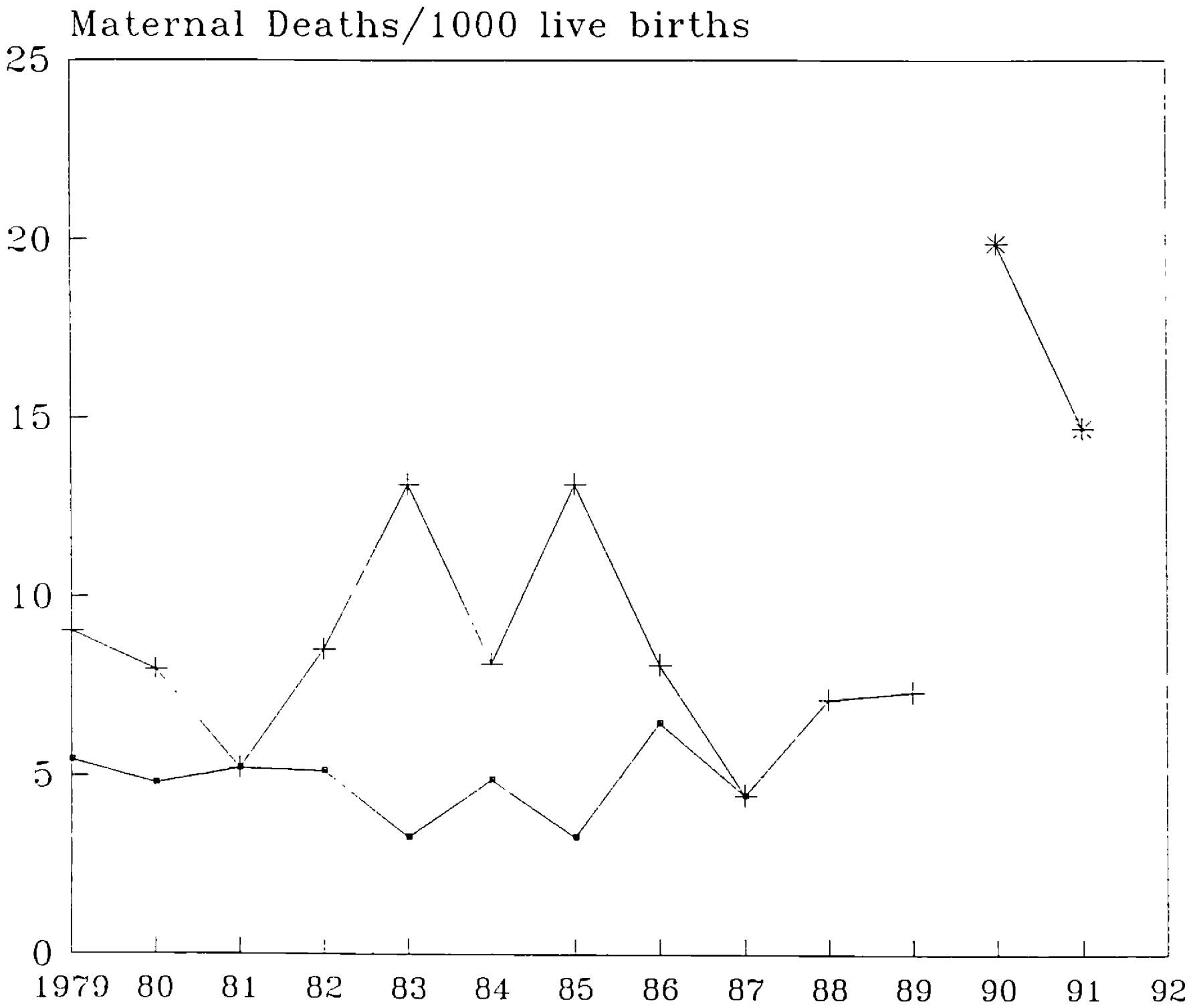
# Principal Causes of Infant Deaths
# Belize 1988




Source:Medical Statiscal Office

FIGURE 19

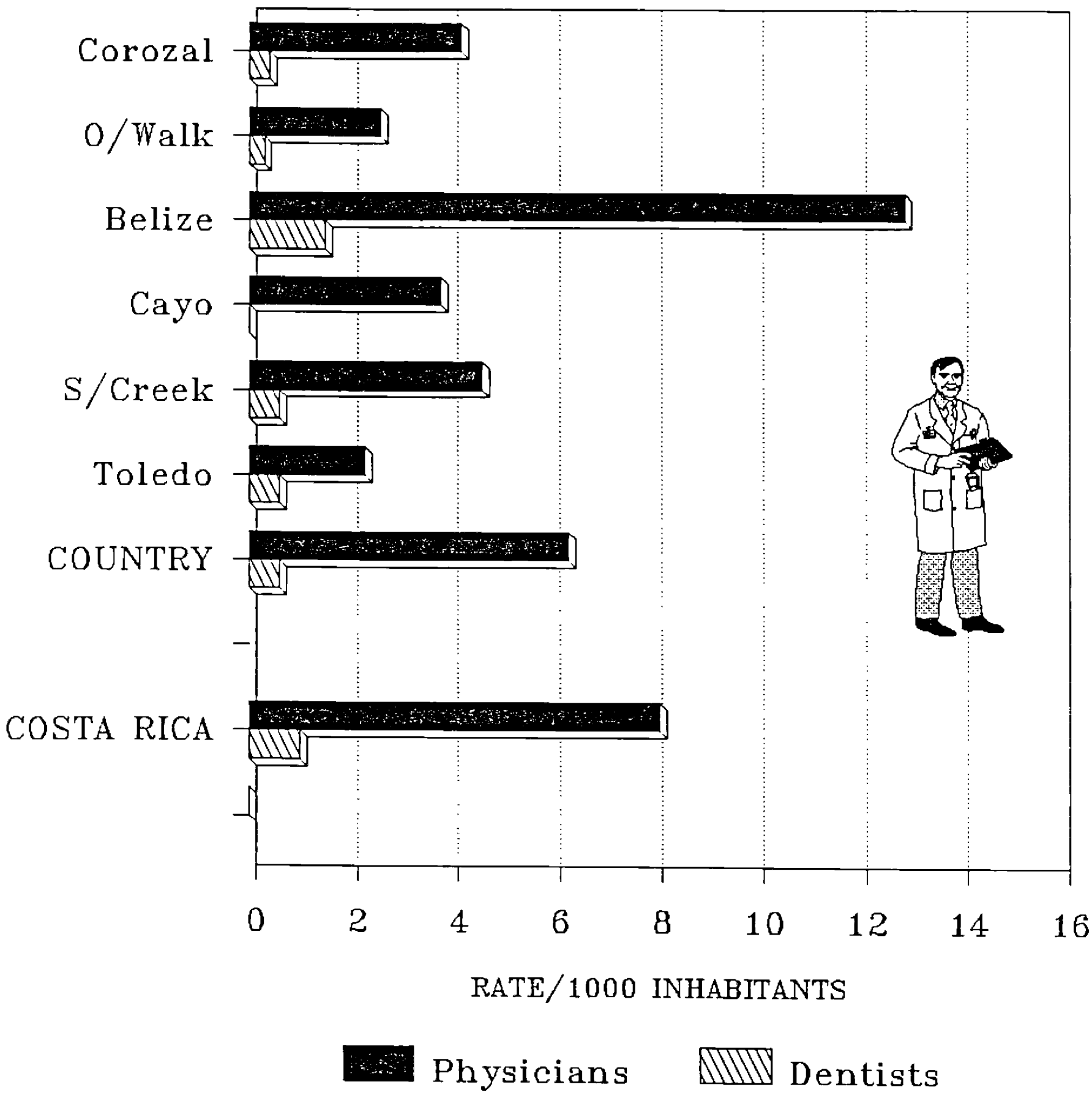
# -MATERNAL MORTALITY IN BELIZE-
# 1979-1991
# (Rates from different sources)




Sources: 1) Abstracts of Statistics
2) Smith, F."MMR Review, 1990"
3) Moguel, A. "MMR Review, 1990, 1991"

FIGURE 20

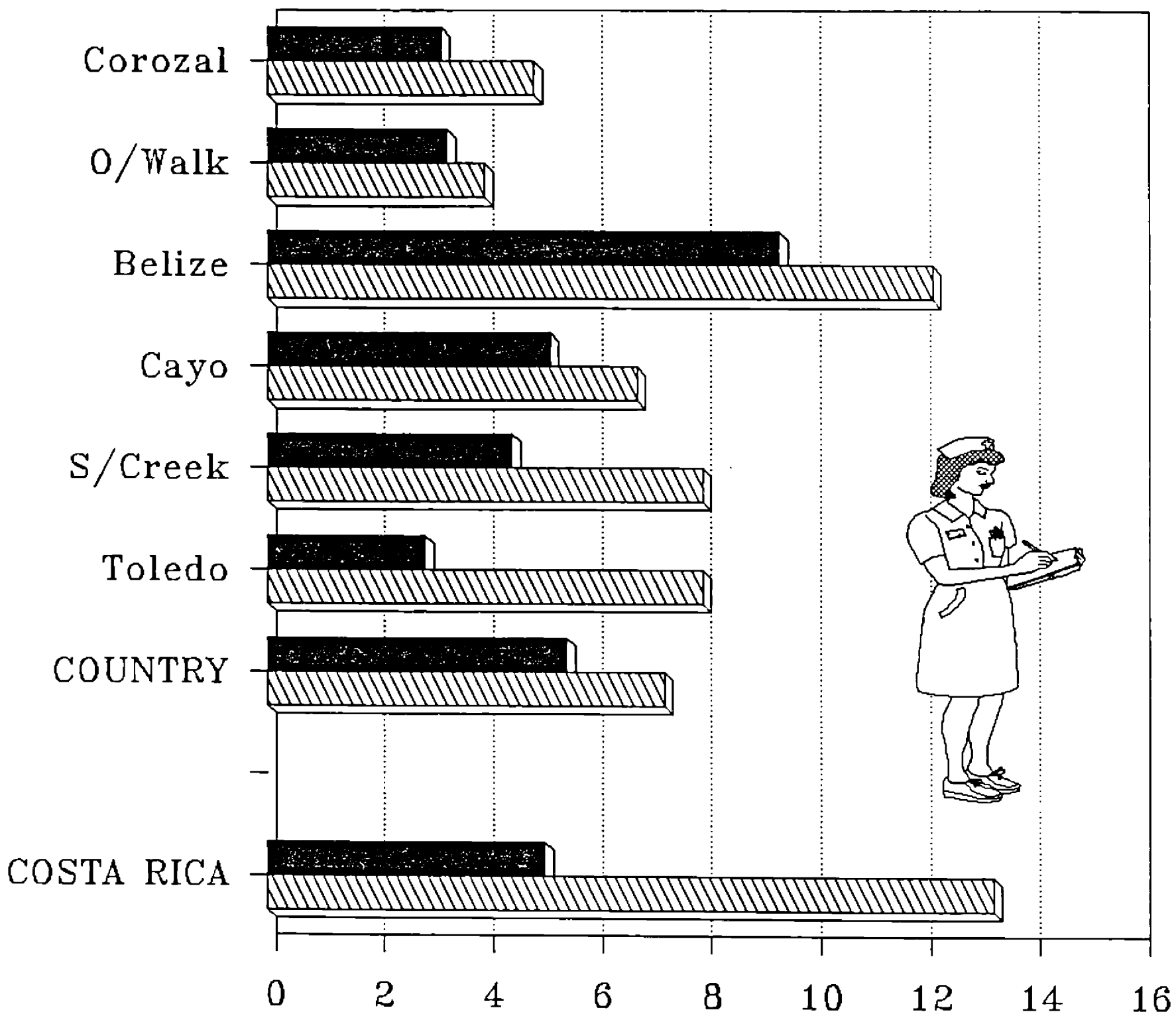
# PHYSICIANS AND DENTISTS RATES BY DISTRICT 1992




Source: Medical Department, MOH.

FIGURE 21

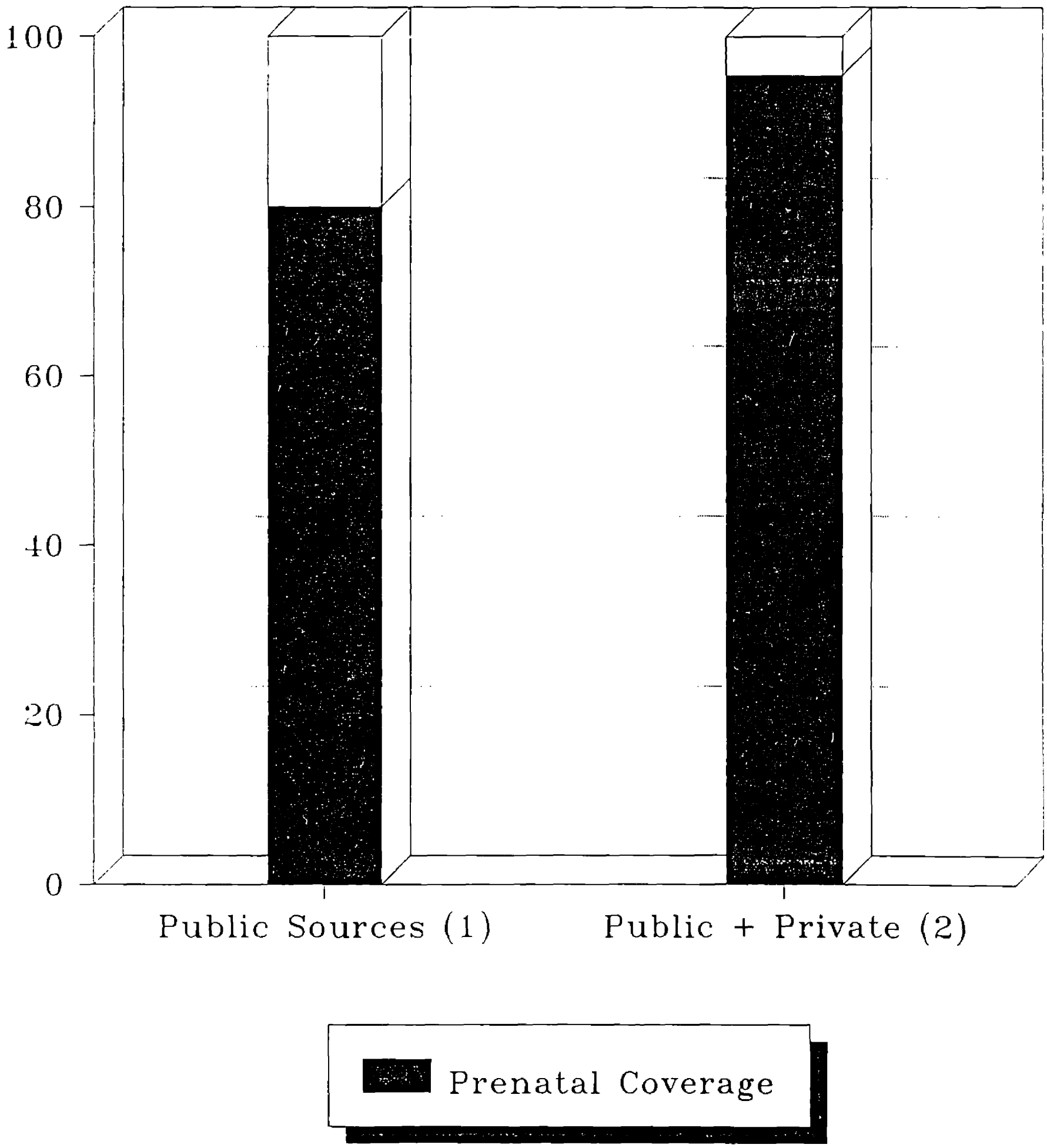
# NURSING PERSONNEL BY DISTRICT BELIZE 1992




Source: Medical Department, MOH.

FIGURE 22

# Percentage of Prenatal Coverage
# Belize - 1991




Sources 1.) MCH Programme, MOH.
2.) Family Health Survey, 1991.

# Deliveries by type of attention received by district - Belize 1991

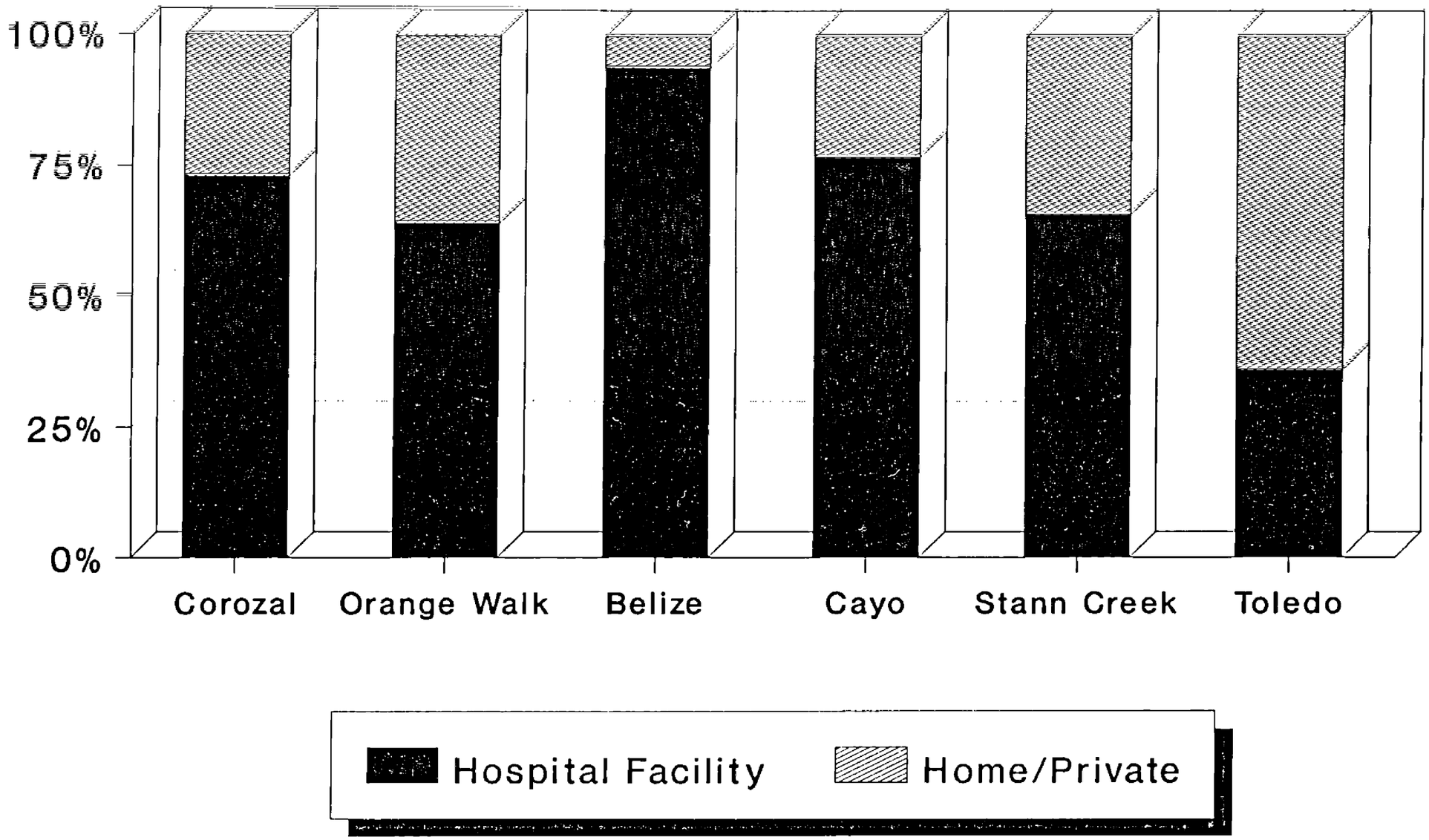
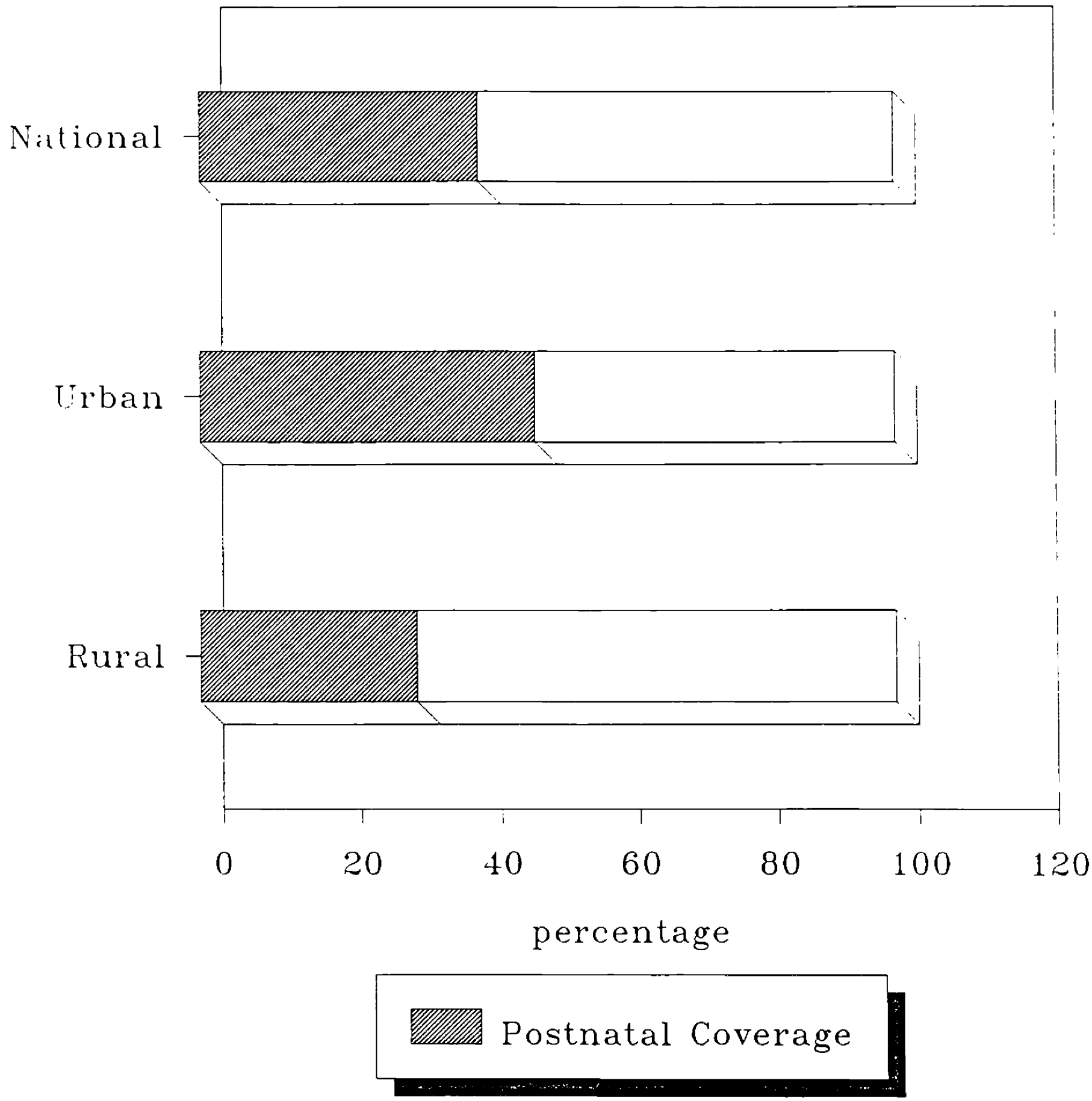



FIGURE 23

MCH programme
Ministry of Health

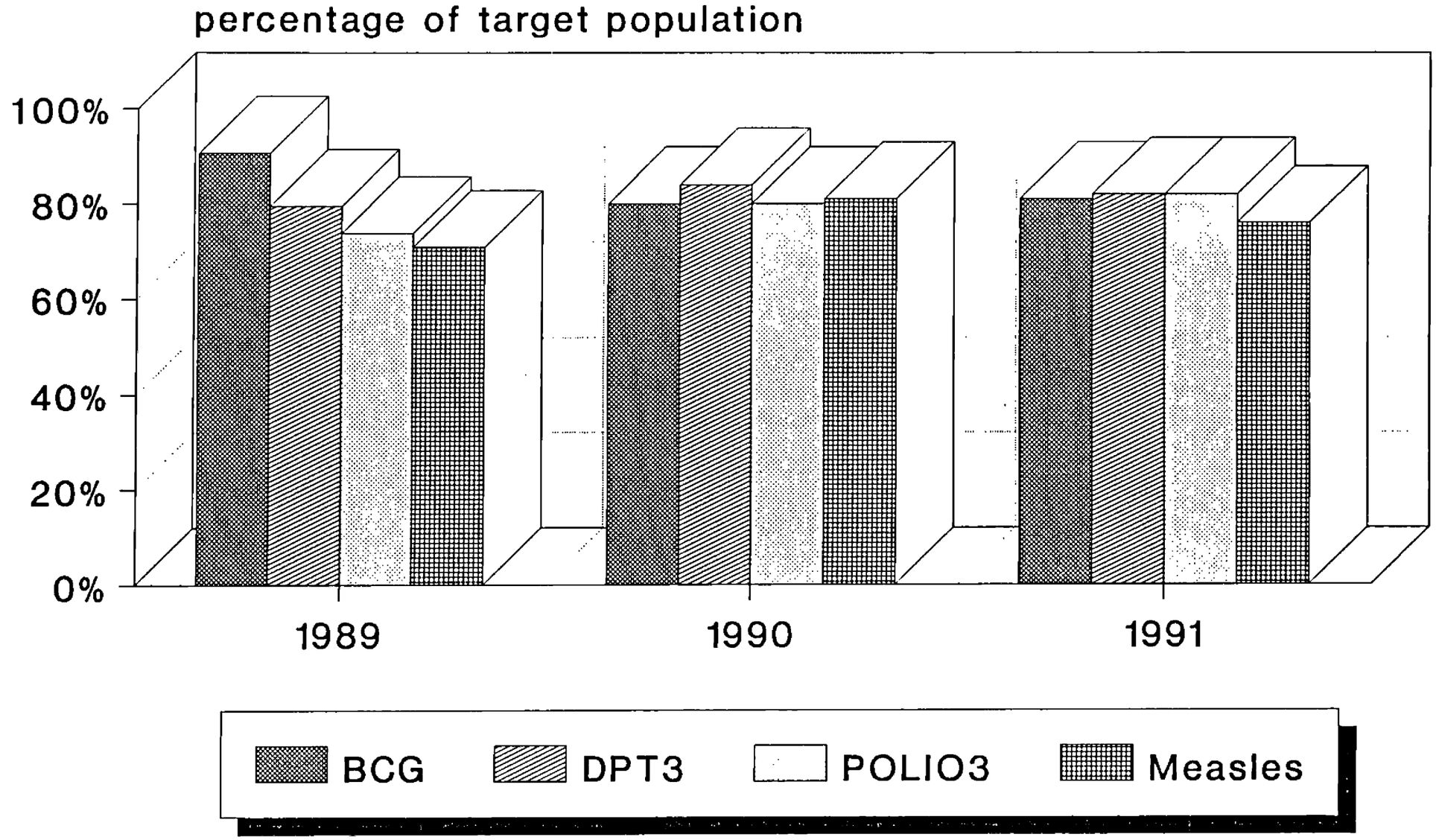
FIGURE 24

# Postnatal Coverage by the Public Health Services Belize, 1991




Source: MCH Programme, MOH.

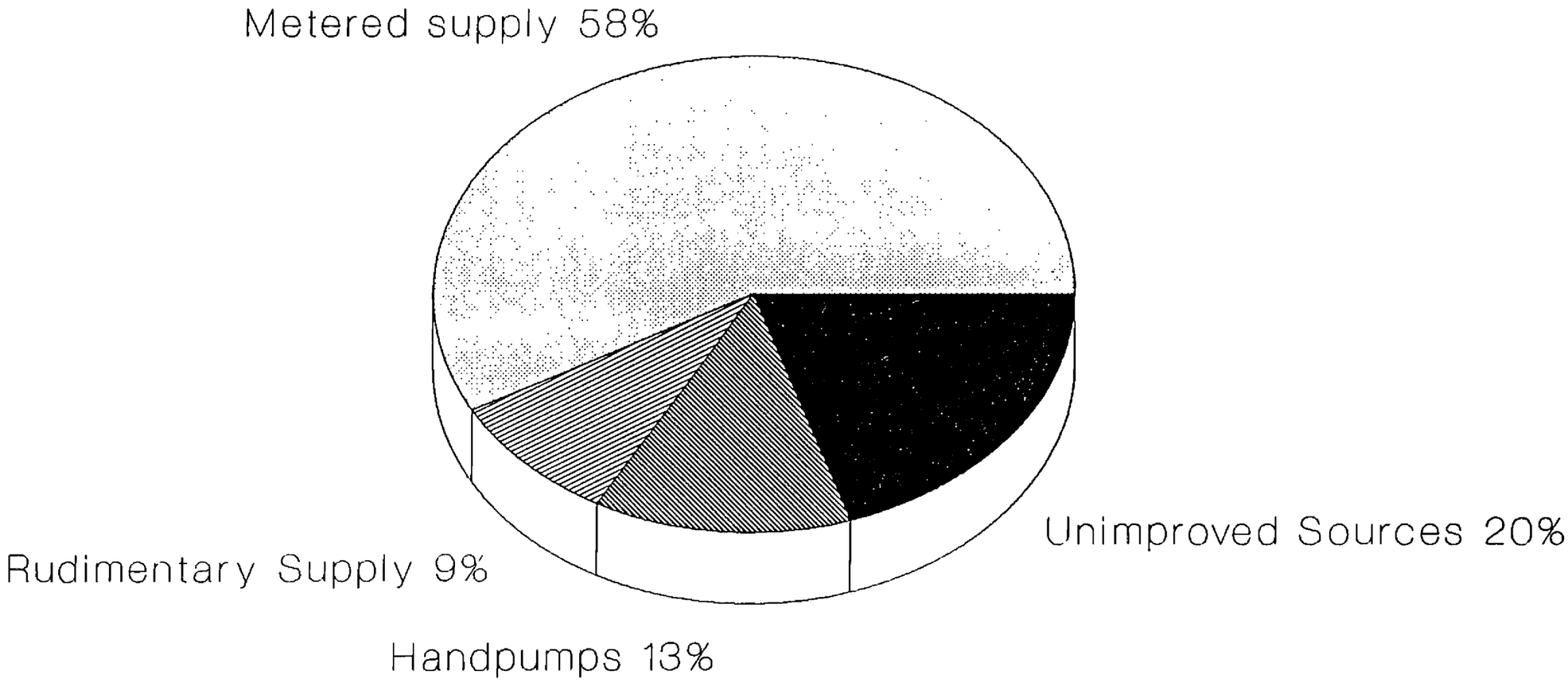
# IMMUNIZATION COVERAGE
# IN TARGET INFANT POPULATION
# BELIZE 1989-1990-1991




MCH DEPARTMENT, MOH.

FIGURE 25

# PERCENTAGE OF POPULATION WITH ACCESS TO WATER BY TYPE OF SYSTEMS BELIZE 1990




**Source: WASA**

FIGURE 26

# SANITATION STATUS BY TYPE OF FACILITIES
# BELIZE 1990

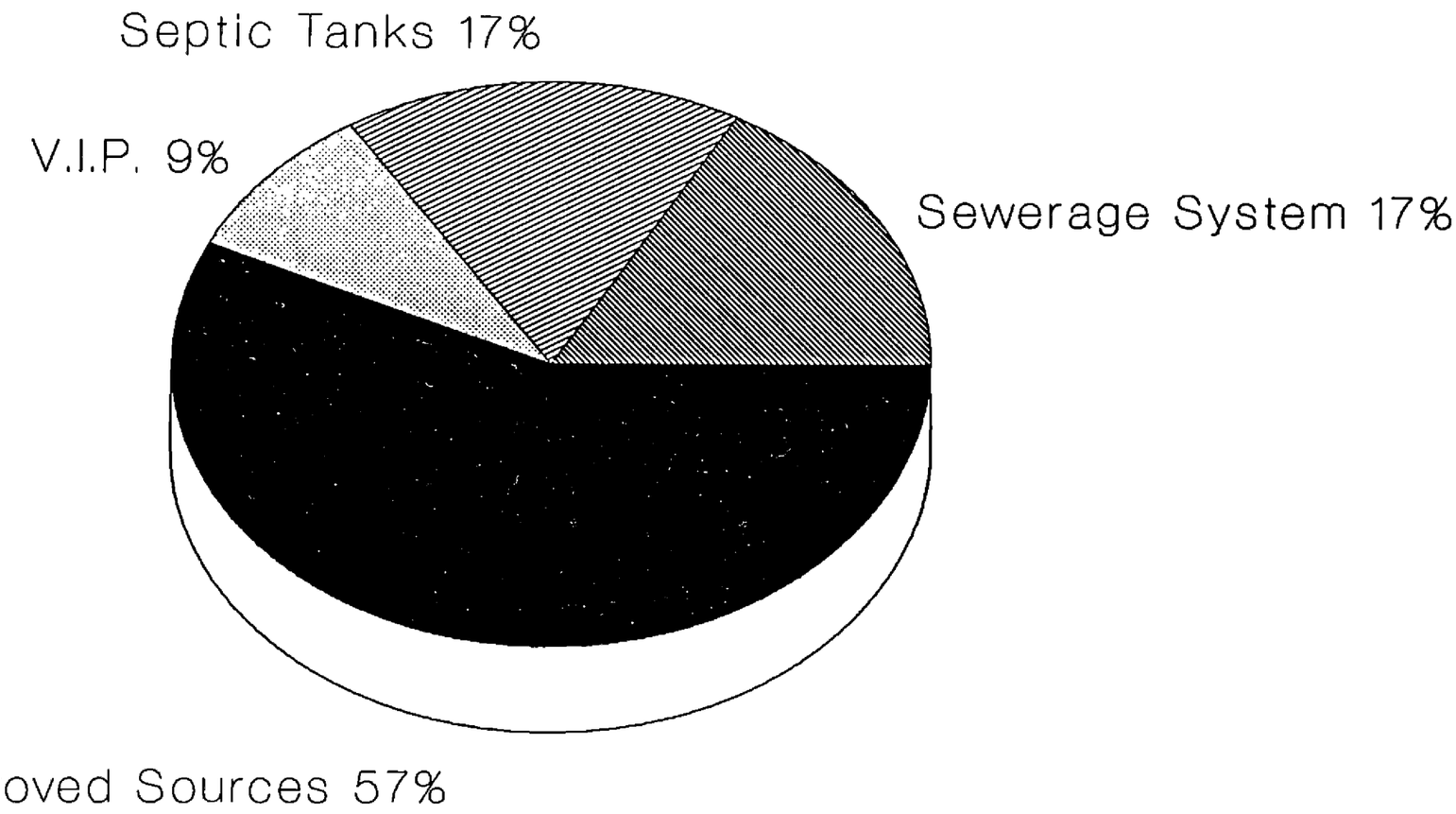
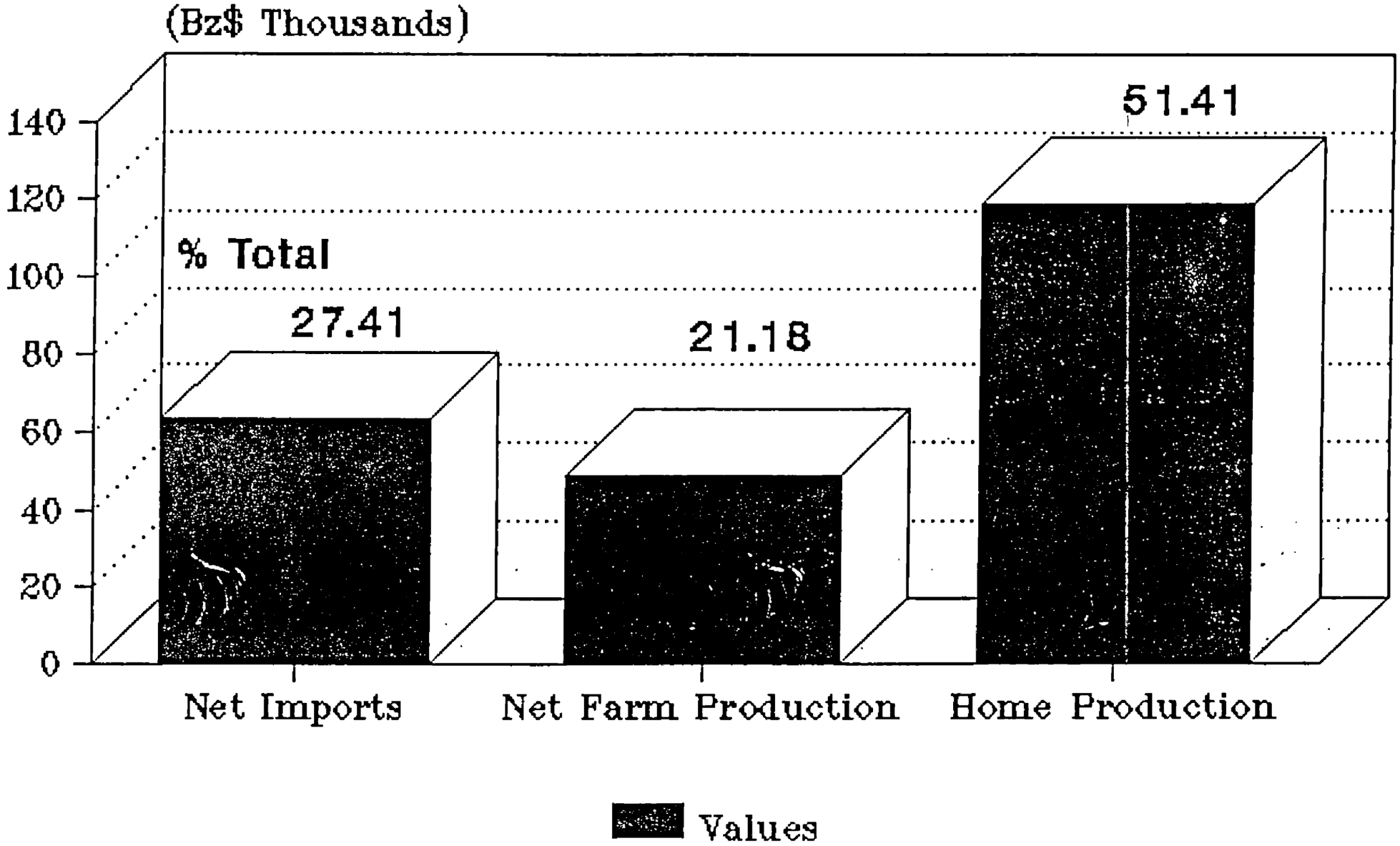



FIGURE 27

**Source: WASA**

# NATIONAL FOOD AVAILABILITY
## 1990




Source: Trade Report & H.E.S

# NATIONAL FOOD AVAILABILITY
## BY FOOD GROUPS 1990

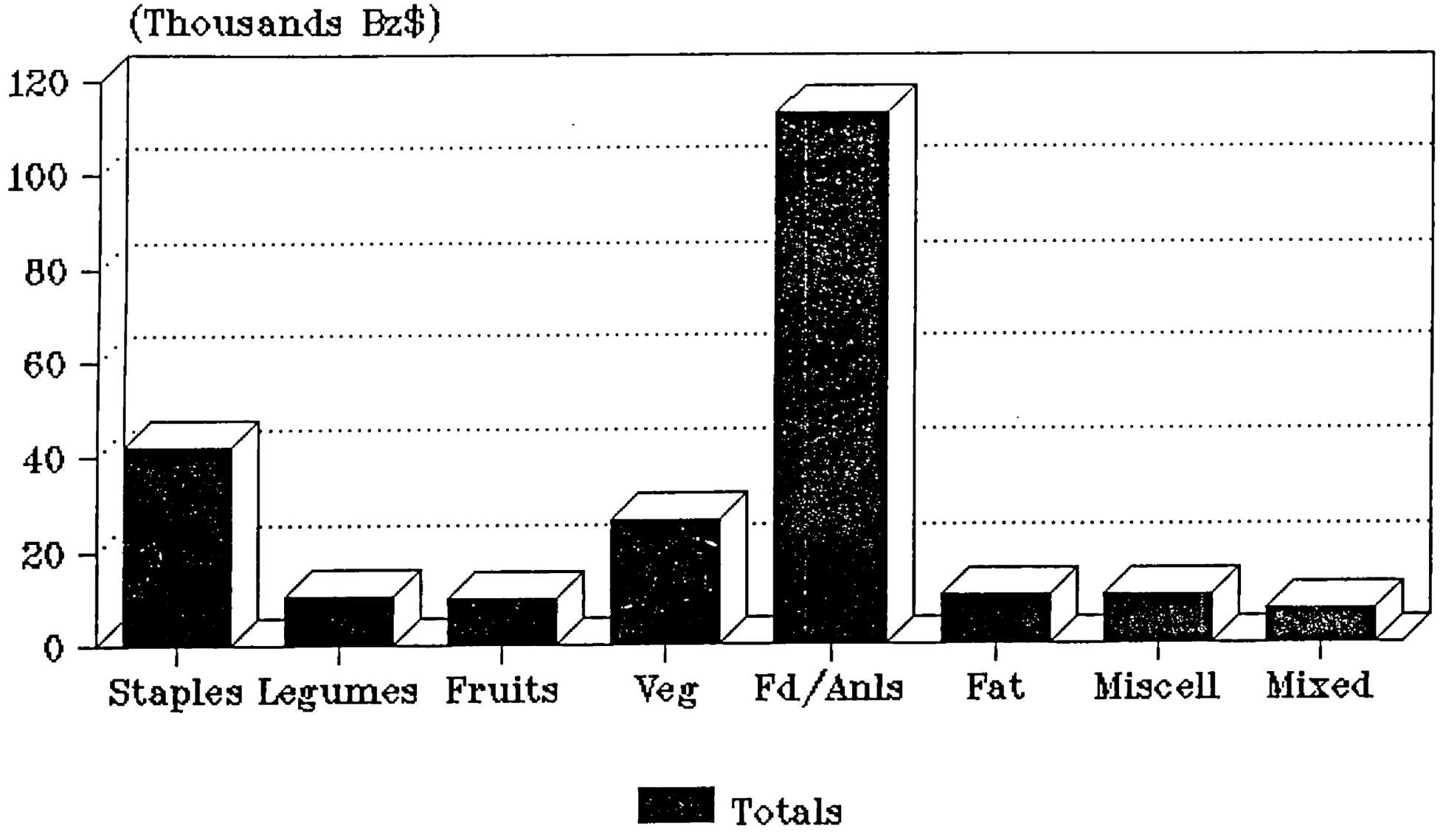



FIGURE 29

Source: Trade Report & H.E.S

# CROPS AND LIVESTOCK PRODUCTION
## 1980-1991

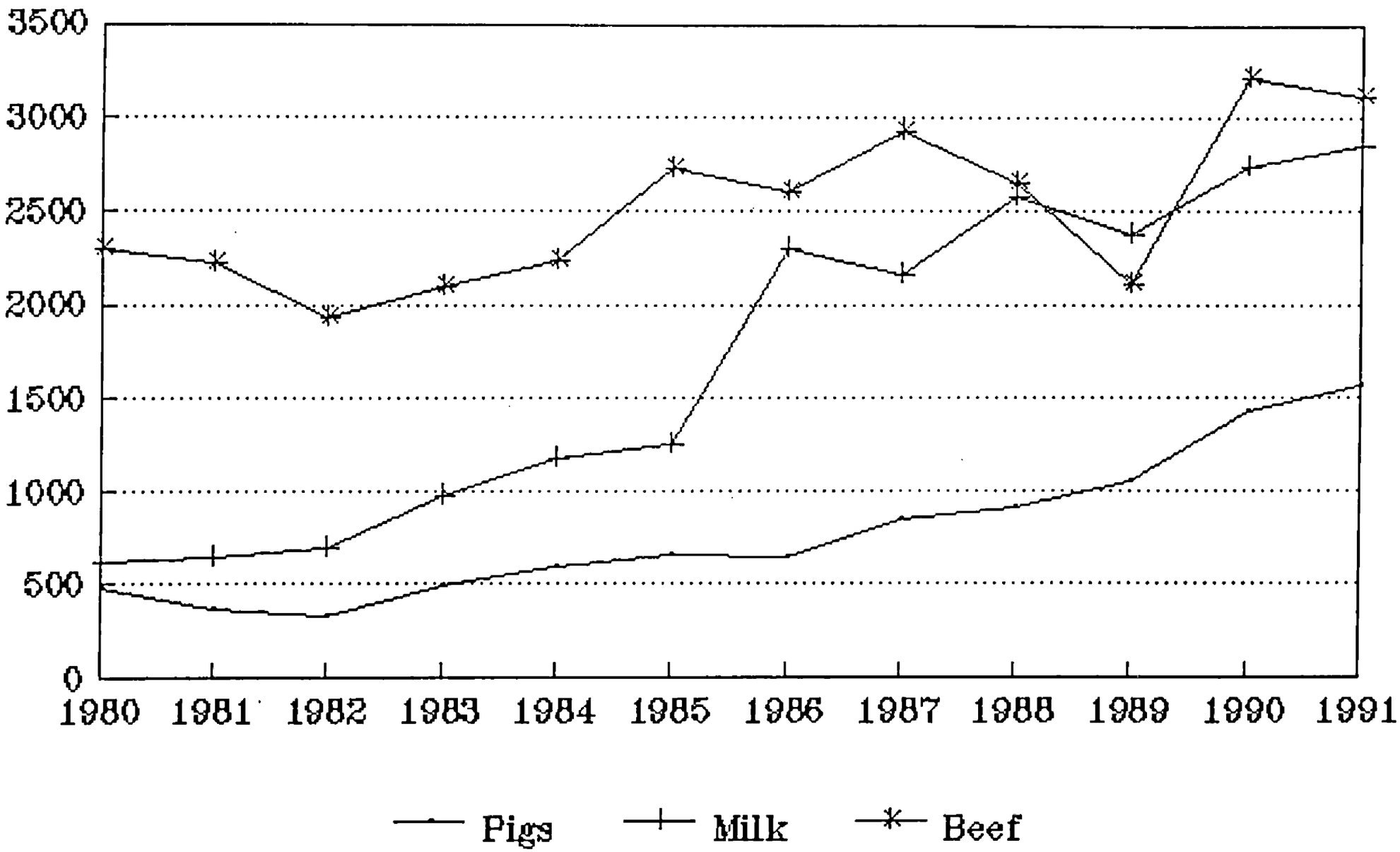



FIGURE 30

**Source:Ministry/Agriculture & Fisheries**

# CROPS AND LIVESTOCK PRODUCTION
## 1980–1991

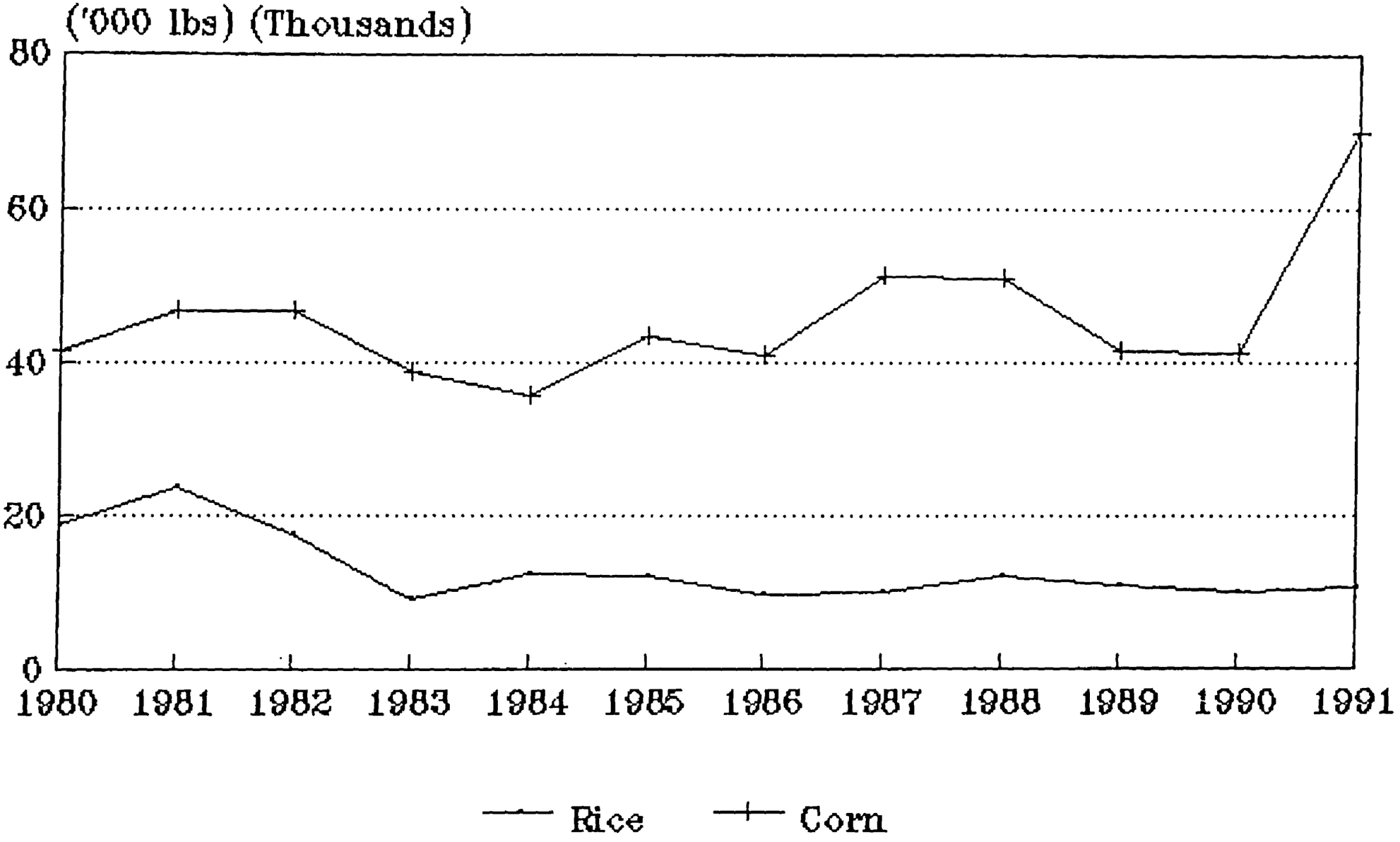



FIGURE 31

**Source:Ministry/Agriculture & Fisheries**

# CROPS AND LIVESTOCK PRODUCTION
## 1980-1991

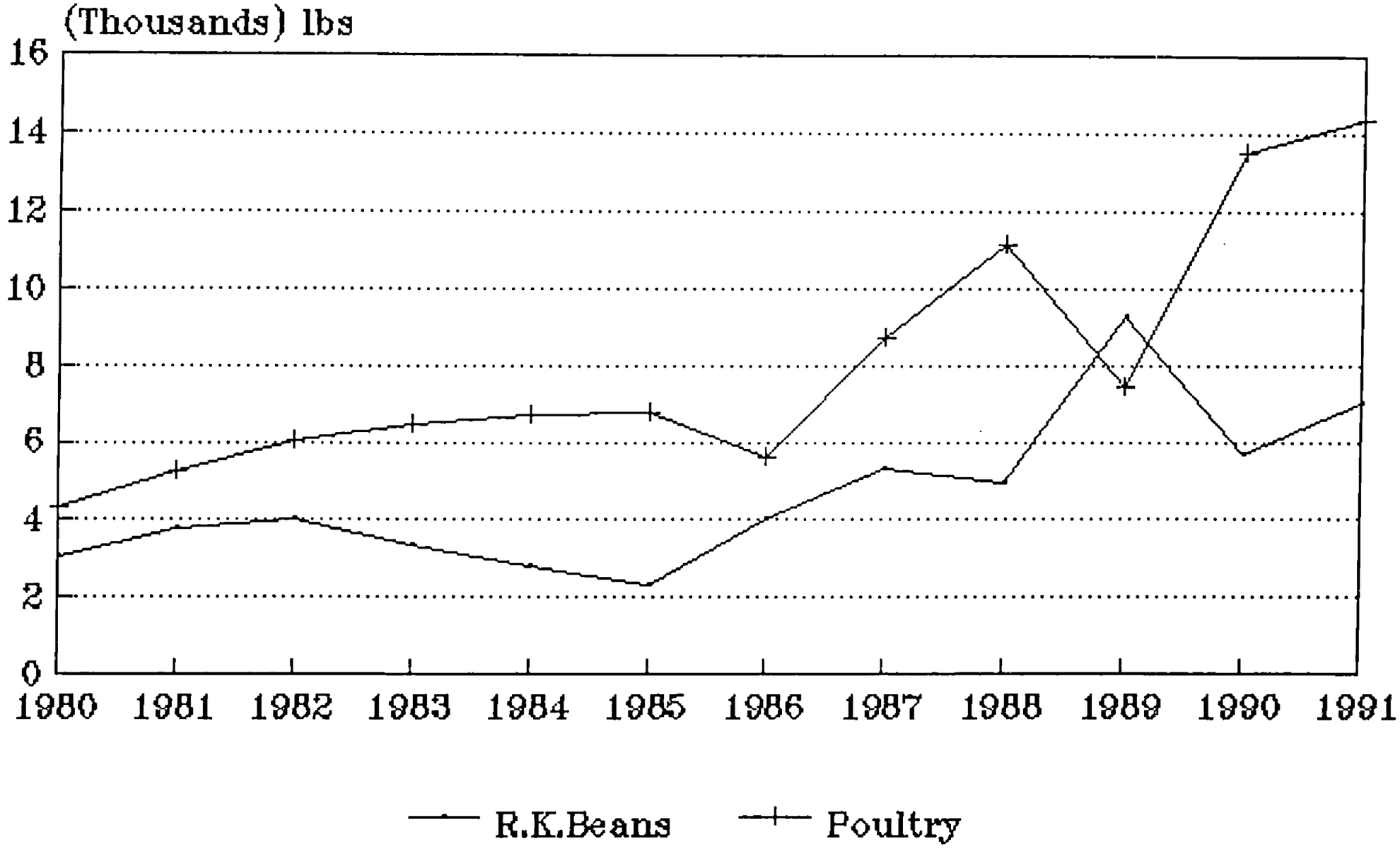



FIGURE 32

**Source:Ministry/Agriculture & Fisheries**

# CROPS AND LIVESTOCK PRODUCTION
## BY DISTRICT (1990)

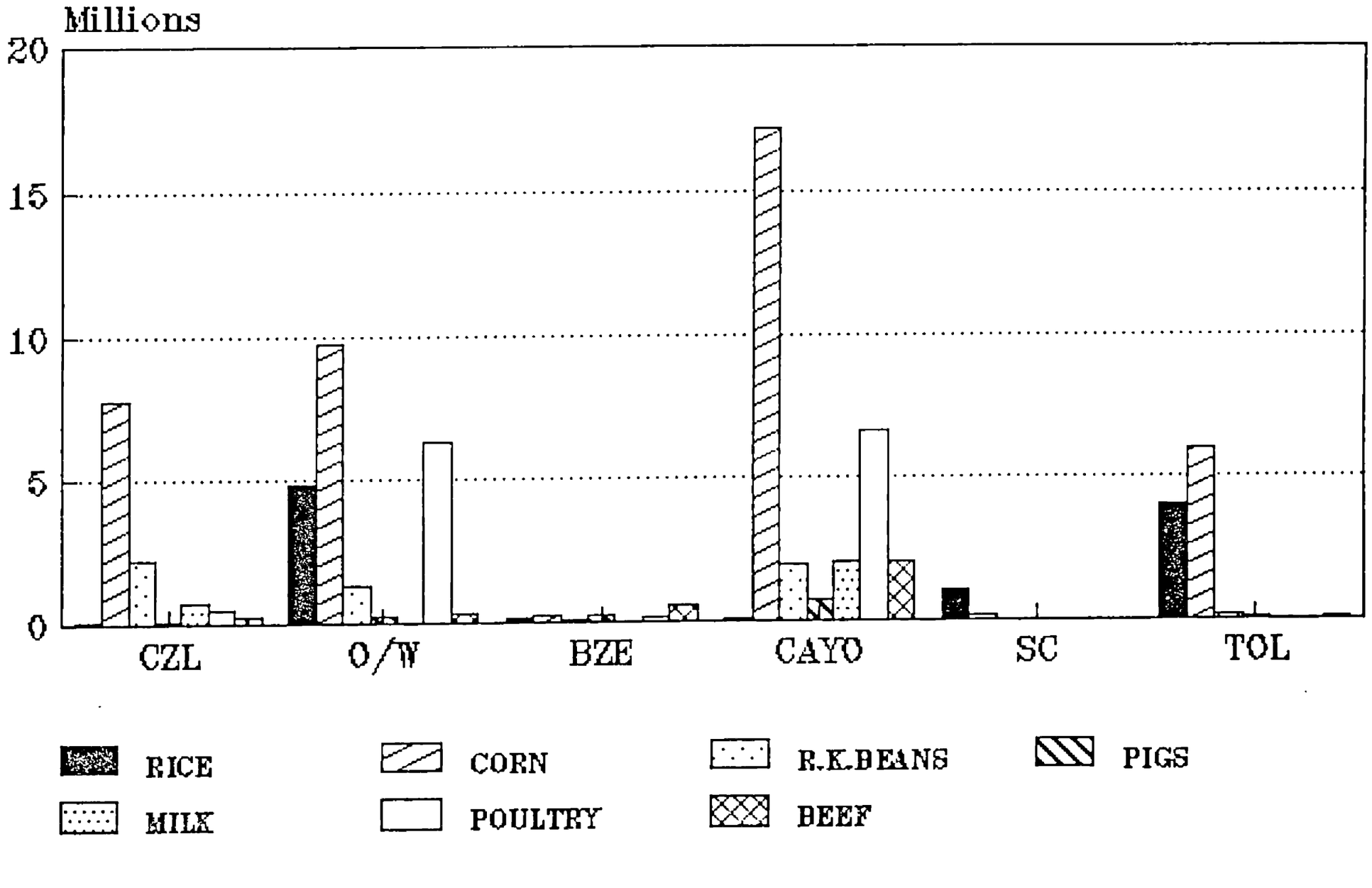



FIGURE 33

Source:MAF

# FOOD VALUE IMPORTS BY FOOD GROUPS AS A % OF TOTAL FOOD IMPORTS(1990)

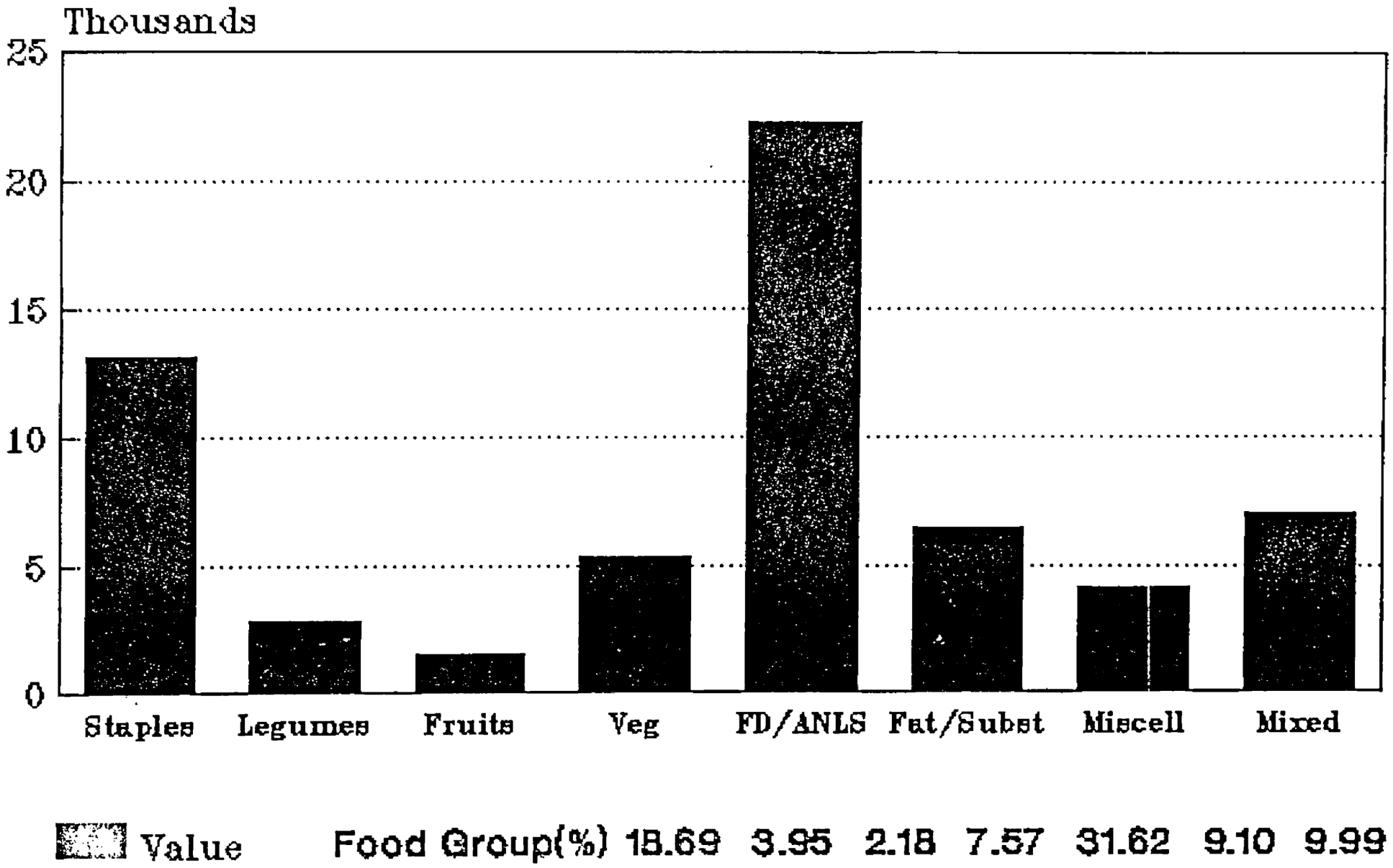



FIGURE 34

Source:Trade Report

# TOTAL FOOD IMPORTS AND FOOD IMPORTS AS A % OF TOTAL IMPORTS

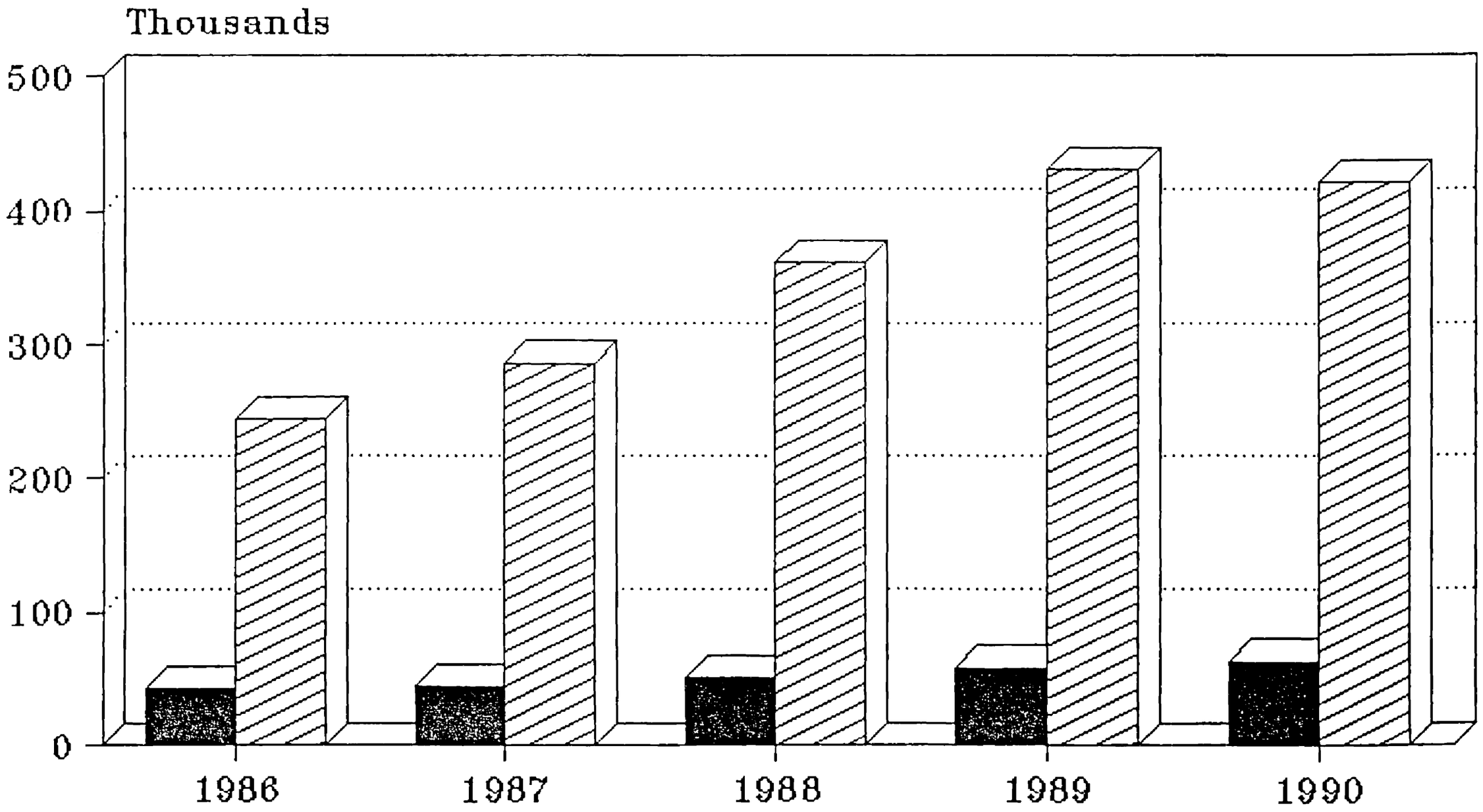
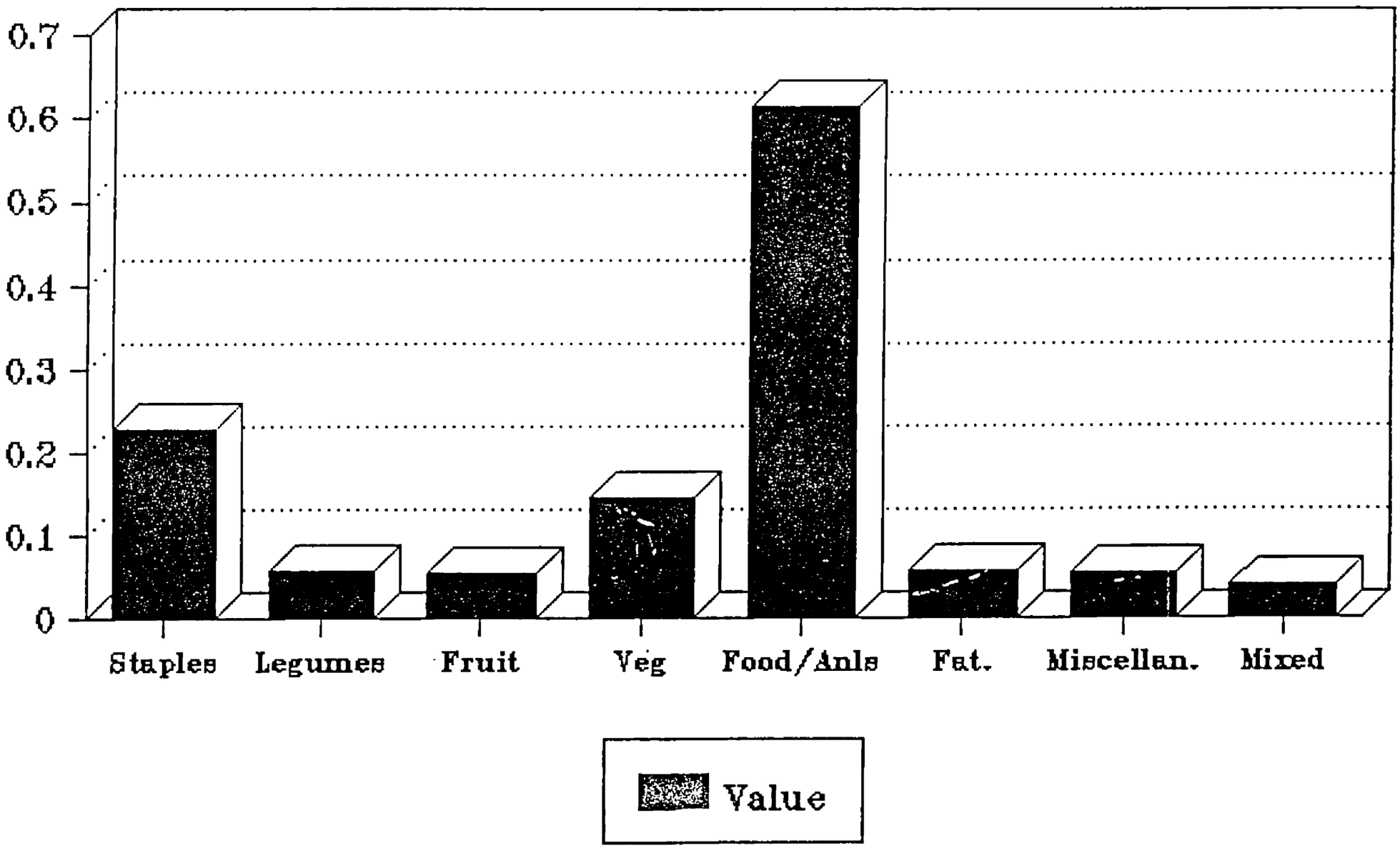



FIGURE 35

Source:Trade Reports

| | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|
| Food Import(%) | 19.57 | 18.31 | 15.71 | 15.42 | 18.51 |

# Per Capita Availability
## 1990




Source: Trade Report & H.E.S

FIGURE 36

# AVERAGE PRICES FOR ESSENTIAL COMMODITIES
## 1990

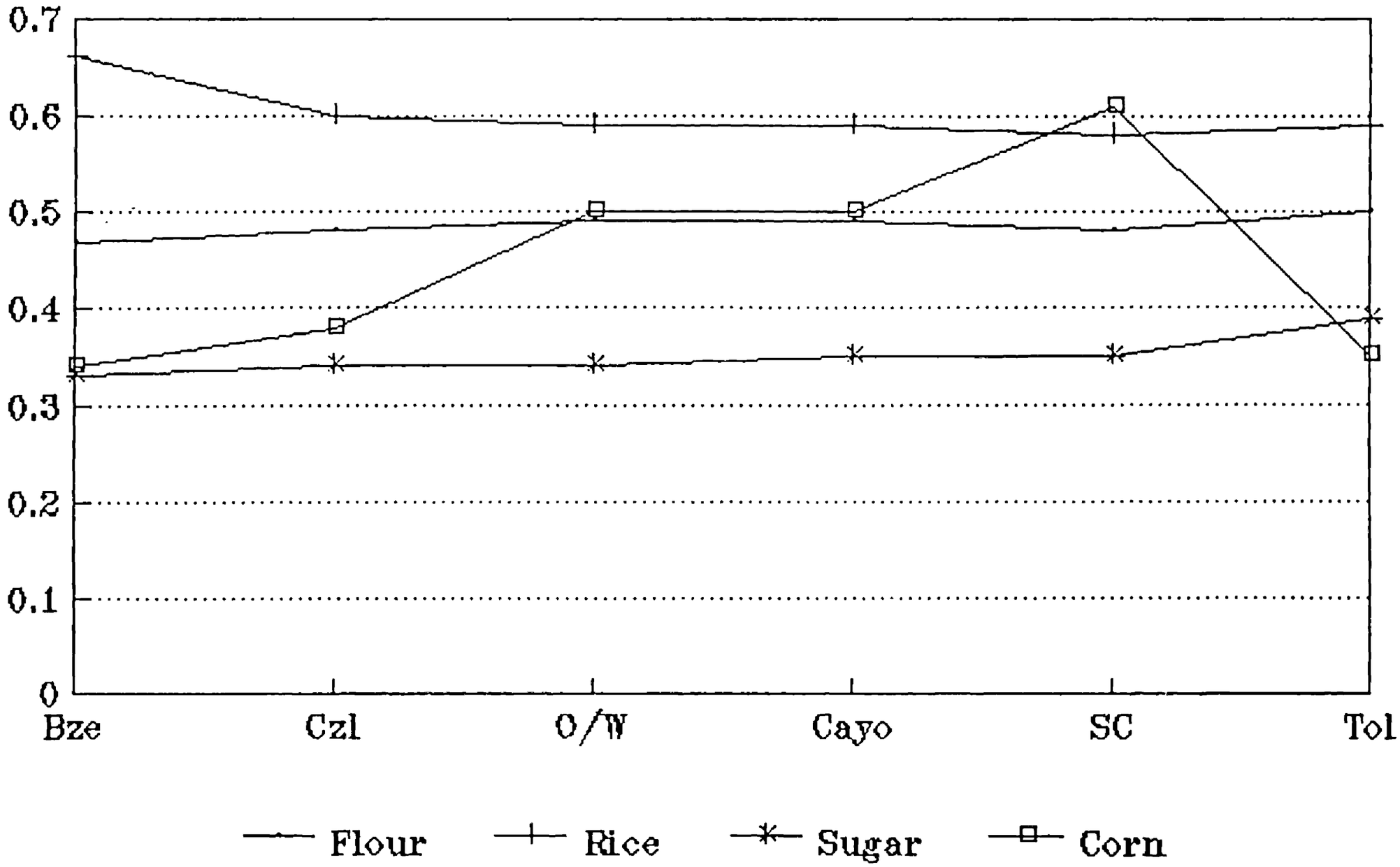



FIGURE 37

Source:C.P.I

# AVERAGE PRICES FOR ESSENTIAL COMMODITIES
## 1990

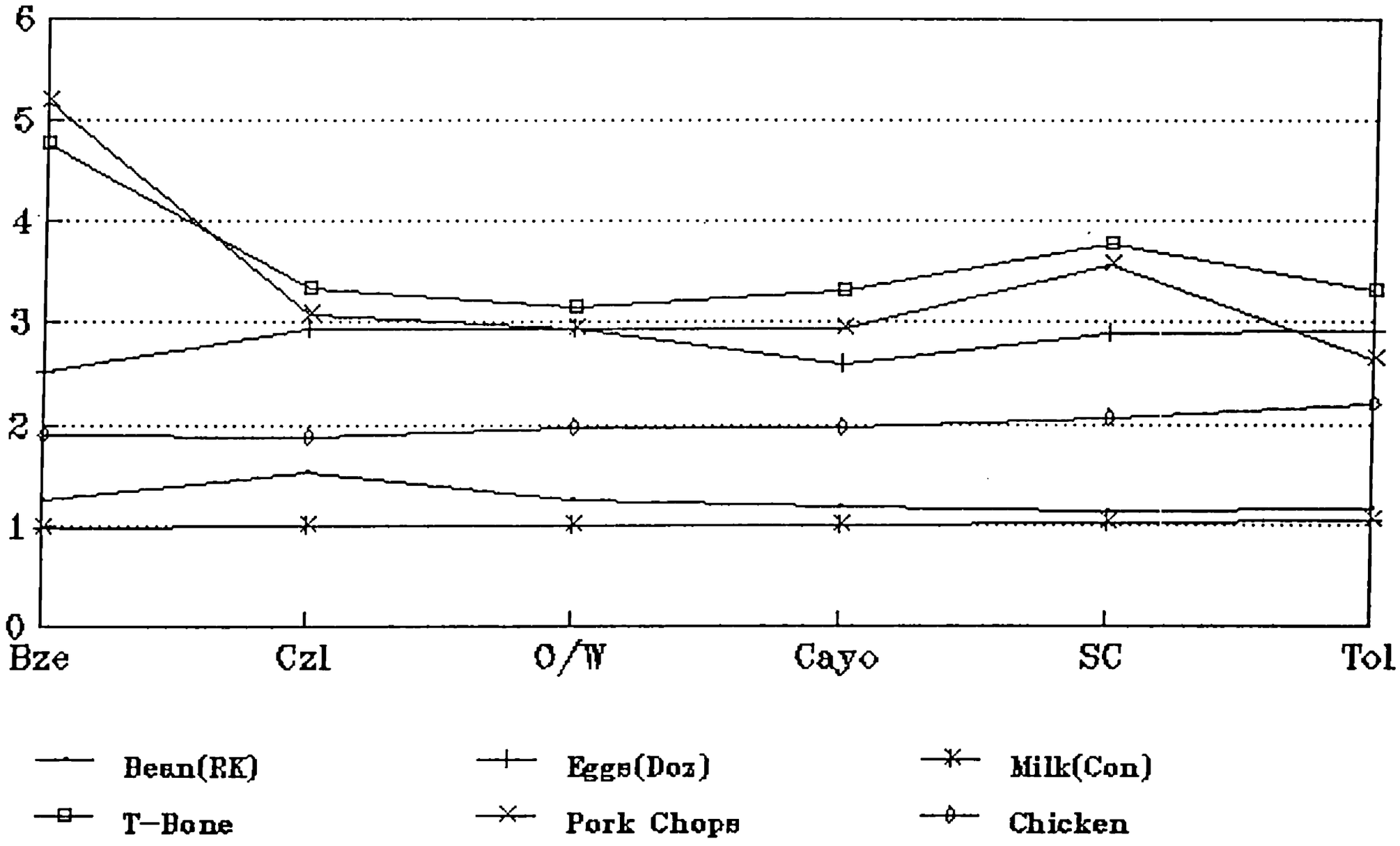



FIGURE 38

Source:C.P.I

# PER CAPITA FOOD CONSUMPTION BY DISTRICT

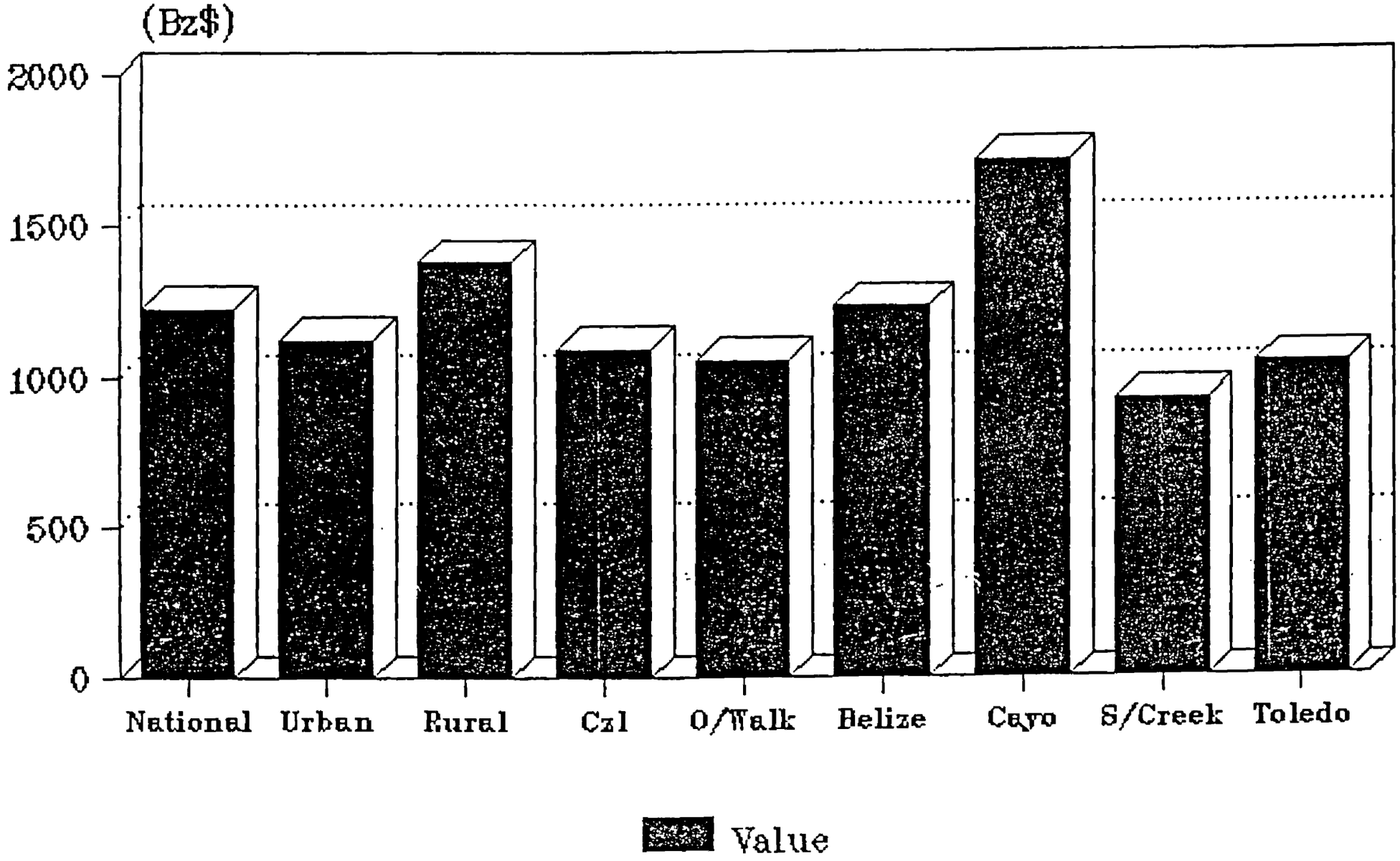



FIGURE 39

Source:H.E.S

# FIGURE 40

## PATTERNS OF NUTRIENT AVAILABILITY IN BELIZE 1961-63 TO 1986-88

| Nutrients | 1961-63 | 1971-73 | 1981-83 | 1986-88 | % Imported |
|---|---|---|---|---|---|
| Calorie (Kcal/caput/day REQ. 2250 kcal. | 2349 | 2573 | 2656 | 2628 | 34.5 |
| Protein gm/caput/day REQ. 43 gm | 63.3 | 63.8 | 67.7 | 70.2 | 35.2 |
| Fat (Tool) gm/caput/day REQ. 37.5 GM | 56.1 | 64.3 | 67.6 | 72.9 Veg - 30% Animal - 70% | 68.3 |
| % of Total Cal. REQ. 15% | 21.5 | 22.5 | 22.9 | 25.0 | |

Source: Sinha D.P, Changing Patterns of Food Availability in the Caribbean and their implications for health and disease (under preparation).

# FIGURE 41

**PATTERNS OF FOOD AVAILABILITY IN BELIZE**
**1961-63 TO 1986-88**

| Food Groups | % of Energy | | | |
|---|---|---|---|---|
| | 1961-63 | 1971-73 | 1981-83 | 1986-88 |
| Cereals<br>REQ. 40% | 41.6 | 37.1 | 35.4 | 34.1 |
| Roots and Tubers<br>REQ. 10% | 1.9 | 1.3 | 2.0 | 2.2 |
| Pulses and Nuts<br>REQ. 5% | 4.8 | 5.8 | 5.8 | 4.1 |
| Fruits and Vegetables<br>REQ. 15% | 9.4 | 8.1 | 7.2 | 9.0<br><1.0 Veg.<br>8.0 Fruit |
| Sugar<br>REQ. 5% | 11.5 | 17.0 | 17.3 | 15.1 |
| Food from Animals (Meat, Fish, Dairy, Eggs)<br>REQ. 15% | 16.5 | 17.3 | 18.2 | 19.7 |
| Fats and Oils<br>REQ. 10% | 11.2 | 10.4 | 10.2 | 10.9 |

Source: Sinha D.P Changing Patterns of Food Availability in the Caribbean and their implications for Health and Disease (under preparation).

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