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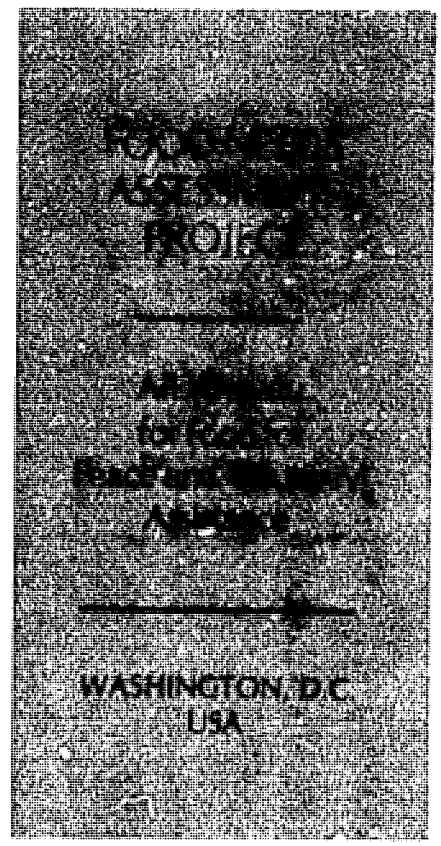
FOOD NEEDS ASSESSMENT: ZAIRE

October 1989 & March 1990



ZAIRE

FOOD NEEDS ASSESSMENT

Millie Gadbois
October 1989
A.I.D. Contract No.
OTR-0000-C-00-7232-00

ZAIRE FOOD NEEDS ASSESSMENT

October 1989

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EXECUTIVE SUMMARY

The results of the 1989 analysis show deficits for all crops except for pulses, taking into account projected commercial imports and food aid. No reliable data were available for existing stocks. (The existence, albeit unlikely, of substantial on-farm or other public or private stocks could of course alter the deficit levels). The 1989 balance was calculated based on historical averages for all crops except for rice and maize, which were estimated using a linear equation model.

The total food deficit calculated for Zaire in 1989 (in milled terms) is approximately 453,486 metric tons, or 13.5 kilograms per capita. Zaire's domestic production provides 93 percent of the total consumption needs. Commercial food imports provide another two percent of total consumption needs, leaving a negative balance of 341,309 metric tons or six percent of the total consumption needs. (Table 2 presents the 1989 Food Balance).

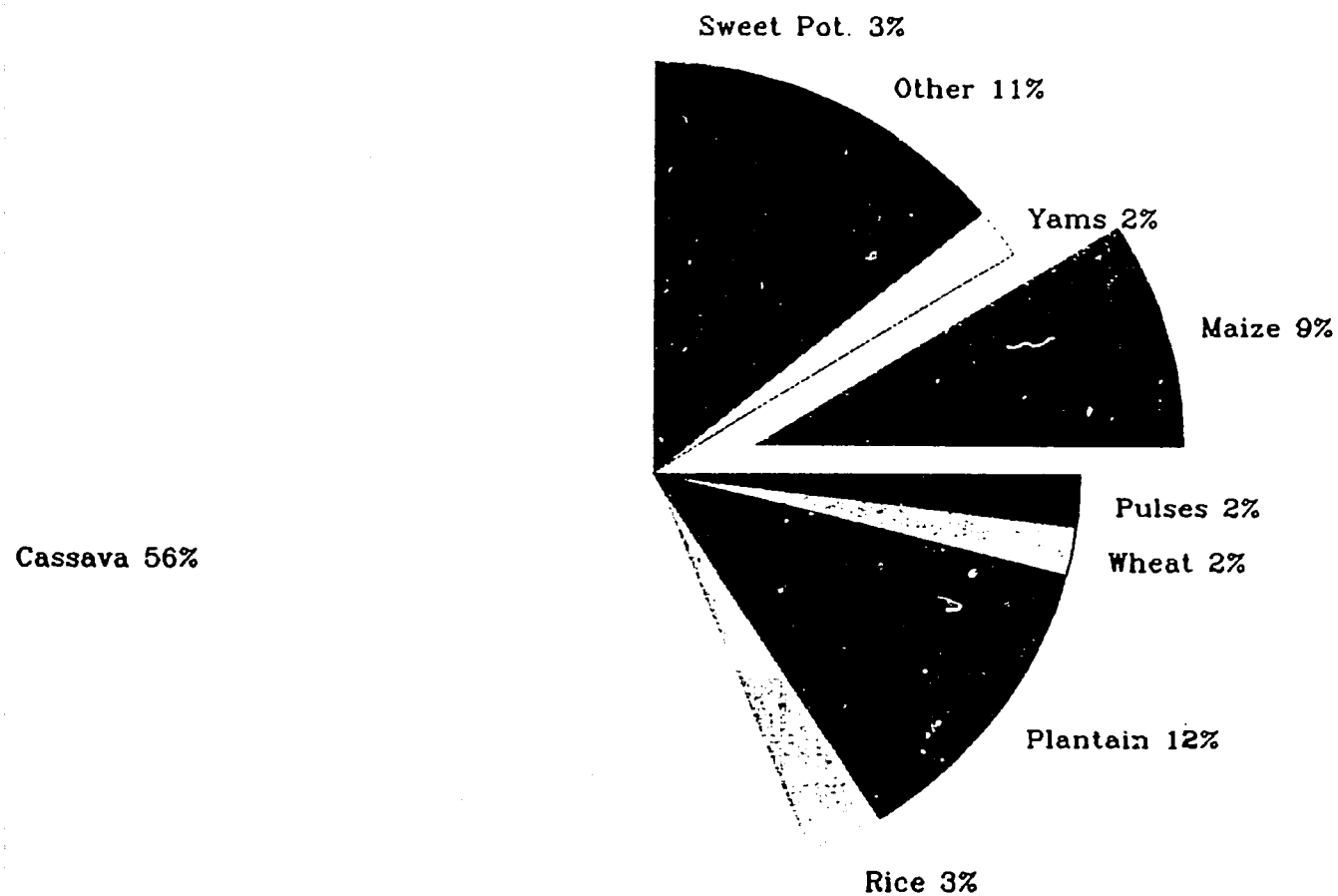
Gross production of the ten major commodities is estimated at 19,743,873 metric tons, a small increase over the previous year's harvest, but not yet attaining the gross production levels attained in the early- to mid-1980's, which averaged over 20.3 million metric tons in the early to mid-1990's. To estimate total available supply, gross production was adjusted downward to account for losses due to use of production for seed and other post-harvest losses. The percentage of production lost to non-food use was calculated on a varying percentage basis, depending on the crop.

Since 1982, the Government of Zaire has undertaken a program aimed at removing the macro-economic and agricultural policy factors which have constrained the development of agriculture in Zaire. Also, the government is seriously attempting to improve the state of agricultural services, such as transport, research and extension, input supply and credit, which have all been deteriorating. While it is too early to see the impact of the reforms, the liberalization of agricultural prices and the removal of marketing controls have served to increase real producer prices, according to a World Bank report (1989). The lack of any observable supply response from farmers is perhaps attributable to both the lack of farm to market roads and marketing credit.

The Food Needs Assessment of Zaire was undertaken in Washington, D.C. from September 14-28, 1989. Principal data sources included FAO, ERS/USDA and Zairian government documents. The dearth of available data for 1988 necessitated the use of the 1983-1987 data as the base period. A Food Needs Assessment was also undertaken for the period 1988-1993 using a simple econometric model written in SAS, which predicts trends in future production, total available supply, supply per capita, available calories per capita, imports, and food aid. (The model and the results are discussed in Section VI.)

Ten commodities were included in the 1989 Zaire Food Needs Assessment: Maize, rice, wheat, millet/sorghum, pulses, cassava, yams, plantains, and sweet and Irish potatoes. Indeed, the limitation of the analysis to ten commodities does not adequately illustrate the consumption picture in Zaire, where a multiplicity of crops are consumed in important quantities. Data on peanuts, palm oil, bananas, tarrow and other tubers would have enhanced the completeness of the present analysis.

COMMODITY COVERAGE
Share of Total Diet



FNA 1989-ZAIRE

Figure 1

TABLE 1: GENERAL PARAMETERS USED IN THE ZAIRE FOOD NEEDS ASSESSMENT

GENERAL DATA REPORT

Food Needs Assessment: ZAIRE

Consumption Year: Jan/Dec

Current Year (year of analysis):	1989	Current Year Population:	33,300
Historical Years T-1:	1987	Historical Year T-1 Population (000)	32,300
T-2:	1986	T-2 Population (000)	30,850
T-3:	1985	T-3 Population (000)	30,363
T-4:	1984	T-4 Population (000)	29,671
T-5:	1983	T-5 Population (000)	28,966

Commodities Included in Assessment:	Base =)	Maize	Pulses	Rice	Wheat	Mil/Sorg	Sweet Pot	Yams	Cassava	Plaintain	Potatoes
Caloric equivalent (calories/ UNMILLED kilogram)		3,570	3,377	3,530	3,320	3,450	1,210	1,120	1,490	1,350	820
/ Caloric equivalent of base commodity		3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570
= Base Commodity Equivalent Coefficient (.00)		1.00	0.95	0.99	0.93	0.97	0.34	0.31	0.42	0.38	0.23
Milling extraction rate (.00)		85%	70%	65%	75%	90%	85%	85%	80%	80%	85%

Source: FAO

Maize was chosen as the base commodity given its importance as the major cereal. Figure 1 presents the share of the diet by commodity. In Zaire, cereal consumption accounts for only 14 percent of total consumption. It is cassava which plays the overwhelmingly predominant position in the Zairean diet, accounting for over 70 percent of the total calories consumed. Plantain is the second most important crop, accounting for about 12 percent of total production. (Table 1 presents the ten major commodities studied, and some general parameters used in undertaking the assessment, including population data for the period, the caloric equivalent of the major crops and their milling extraction rates.)

A more detailed discussion of crop production, food consumption and demand is presented in Sections II and III. Section IV discusses both general methodological issues and those specific to Zaire.

TABLE 2: ZAIRE FOOD NEEDS ASSESSMENT 1989

CURRENT YEAR FOOD BALANCE — ZAIRE

Current Year: 1989

Commodity	Maize	Pulses	Rice	Wheat	Mil/Sorg	CEREALS ALL	Sweet Pot.	Yams	Cassava	Plaintain	Potatoes	TOTAL	TOTAL RCE
Per capita consumption (UNMILLED kg/yr)	23.4	3.5	11.8	5.6	1.9	46.2	7.6	5.6	371.6	34.6	4.3	470.0	219.0
x Population (thousands)	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300	33,300
= Total consumption requirement	779,838	117,040	391,796	186,793	64,046	1,539,513	253,958	186,549	12,375,488	1,152,975	142,624	15,651,107	7,292,041
Gross domestic food production	797,386	131,000	304,850	19,994	66,992	1,320,222	378,605	232,483	16,414,587	1,321,000	186,830	19,853,727	8,900,688
- Total non-food use	79,739	13,100	30,485	2,599	6,699	132,622	136,298	53,471	4,267,793	264,200	67,259	4,921,642	2,090,728
= Net domestic food production	717,647	117,900	274,365	17,395	60,293	1,187,600	242,307	179,012	12,146,795	1,056,800	119,571	14,932,084	6,809,959
- Net change in stocks	0	0	0	0	0	0	0	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0	0	0	0	0	0	0	0
= Domestic food supply	717,647	117,900	274,365	17,395	60,293	1,187,600	242,307	179,012	12,146,795	1,056,800	119,571	14,932,084	6,809,959
Total consumption requirement (from above)	779,838	117,040	391,796	186,793	64,046	1,539,513	253,958	186,549	12,375,488	1,152,975	142,624	15,651,107	7,292,041
- Domestic food supply (from above)	717,647	117,900	274,365	17,395	60,293	1,187,600	242,307	179,012	12,146,795	1,056,800	119,571	14,932,084	6,809,959
= Import requirement	62,191	(860)	117,431	169,398	3,753	351,913	11,651	7,537	228,694	96,175	23,053	719,023	482,082
- Total commercial food imports	0	240	83,106	62,740	0	146,086	0	0	0	0	104	146,190	140,773
= FOOD DEFICIT (UNMILLED)	62,191	(1,100)	34,324	106,658	3,753	205,327	11,651	7,537	228,694	96,175	22,949	572,833	341,309
x Milling extraction rate (m.e.r.)	85%	70%	65%	75%	90%		85%	85%	80%	80%	85%		
= FOOD DEFICIT (MILLED)	52,862	(770)	22,311	79,993	3,378	157,775	9,904	6,406	182,955	76,940	19,507	453,486	267,152
= Food Deficit Per Capita Milled (in kilograms)	1.5	--	0.7	2.4	0.1	4.7	0.3	0.2	5.5	2.3	1.7	13.6	8.02

Notes:

1. All quantities are in metric tons unless otherwise indicated.
2. The base period used was 1983-87.
3. Per capita consumption was based on a historical average for all crops except rice and maize which were based on a linear trend from base consumption levels.
4. Pulses, of course, are not cereals but are included in the cereals section so as not to omit them. In Zaire five non-cereals are not sufficient to cover the major non-cereals consumed regularly.

I. INTRODUCTION

Zaire is richly endowed with natural resources and has the potential for abundant agricultural, forestry, and hydroelectrical power. Agriculture is the most important sector in the economy in terms of employment, providing direct employment to approximately three-fourths of the labor force. Agriculture contributes more than one-fifth of the Gross Domestic Product (GDP). The mining sector is second in importance, contributing a large proportion of foreign exchange earnings.

Although Zaire is potentially the richest state of the African continent, it has experienced a severe economic decline in recent years. According to World Bank estimates, Zaire's Gross National Product (GNP), measured at average 1983-1985 prices, was US $5.220 million in 1987. From 1973 to 1985, Zaire's GNP declined approximately one percent per year in real terms. The country's per capita GNP of $170 is one of the lowest in Sub-Saharan Africa.

Zaire has tremendous potential in agricultural exports. Zaire produces several tropical crops for export. Coffee is the principal agricultural export. In 1985, coffee contributed ten percent of total export earnings, and total production of coffee rose to 90,000 metric tons in 1986. Other cash crops include palm kernels, tea, cocoa, rubber and cotton. The country also produces a number of food crops such as cassava, maize, rice, yams, sweet potatoes, plantains and pulses.

Mining contributes a large portion of Zaire's GDP. The country's principal wealth lies in its copper mines and in the extensive deposits of cobalt. Gold, copper, diamonds, uranium, zinc, tin and petroleum are also mined in fairly large quantities. The manufacturing sector, which produces goods mainly for the domestic market, contributes approximately two percent of the GDP. In the 1980s, industrial development has decelerated for several reasons, including a lack of foreign investment and raw materials and management and transportation problems.

In the early 1980s, reports from international organizations indicated some degree of economic growth in Zaire. Gains in productivity resulted from the introduction of a severe austerity program, which included a reduction in public spending, removal of price controls, tightening of fiscal and monetary policies, and devaluation of the Zaire by 77.5 percent. In spite of these stabilization policies, the total external debt continued to increase in the mid-1980s due to the deterioration in Zaire's external terms of trade, although the GDP had grown by 2.5 percent in both 1985 and 1986, and the rate of inflation had been reduced from over 100 percent in the early 1980s to 20 percent.

The latter half of the 1980s showed a slowing down of economic growth and a loss of the grounds gained in the early part of the decade. In 1987, debt servicing accounted for 56 percent of government expenditure and was equivalent to 30 percent of foreign exchange earnings in that year. The consumer price index rose by 64.7 percent between January and October, 1987.

The deteriorating economic conditions have had a negative impact on agriculture. Recent trends in agricultural growth have shown that agricultural productivity has remained constant while the population growth rate increased. Zaire has resorted to increasing levels of food imports, especially of cereals and meat, to feed the growing population of over 33 million, and to satisfy changing the consumer preferences of the growing urban population. The value of cereal imports increased from $17.6 million in 1970 to $166.7 million in 1987, an increase of 94.4 percent. Meat

imports during the same period have increased by 136 percent. It is likely that food imports will increase in the 1990s, as population growth continues to increase at a faster rate than food production. It is, therefore, necessary for Zaire to constantly monitor its food production and supply in relation to its food needs in order to ensure balanced economic growth.

The population of Zaire in 1989 is estimated at 30.3 million. The population growth rate is approximately three percent per year, and 47 percent of the population is under 15 years of age. Nearly 40 percent of the population lives in urban areas. The World Bank estimates that population growth has been double that of the increase in GDP, leading to an almost 50 percent decline in GNP per capita.

This paper will assess Zaire's food needs and the FNA methodology.

II. FOOD NEEDS ASSESSMENT

The Food Needs Assessment of Zaire begins with the evaluation of the major crops produced and consumed by the Zairean population. The evaluation of food needs will not include meat production and consumption. The evaluation begins with cereals, although they are clearly of secondary importance to cassava in their contribution to total caloric intake.

A. Crop Production

Agricultural production in Zaire has stagnated from independence in 1960 until the early 1980s. According to World Bank estimates, annual growth in output has varied between -1.7 percent and 2.3 percent, well below the rate of population increases. Increases in food imports have compensated for the reduced or stagnant per capita food supply, thereby maintaining a relatively constant per capita availability of calories. The major reasons for the stagnation of the agricultural sector in spite of its enormous potential are:

- Lack of investment in the sector by both the government of Zaire (GOZ) and the private sector
- Government pricing and exchange rate policies which reduced producer incentives and diminished the competitiveness of Zaire's exports in the world market
- Almost total lack of farm-to-market roads and the agricultural support services available to producers.

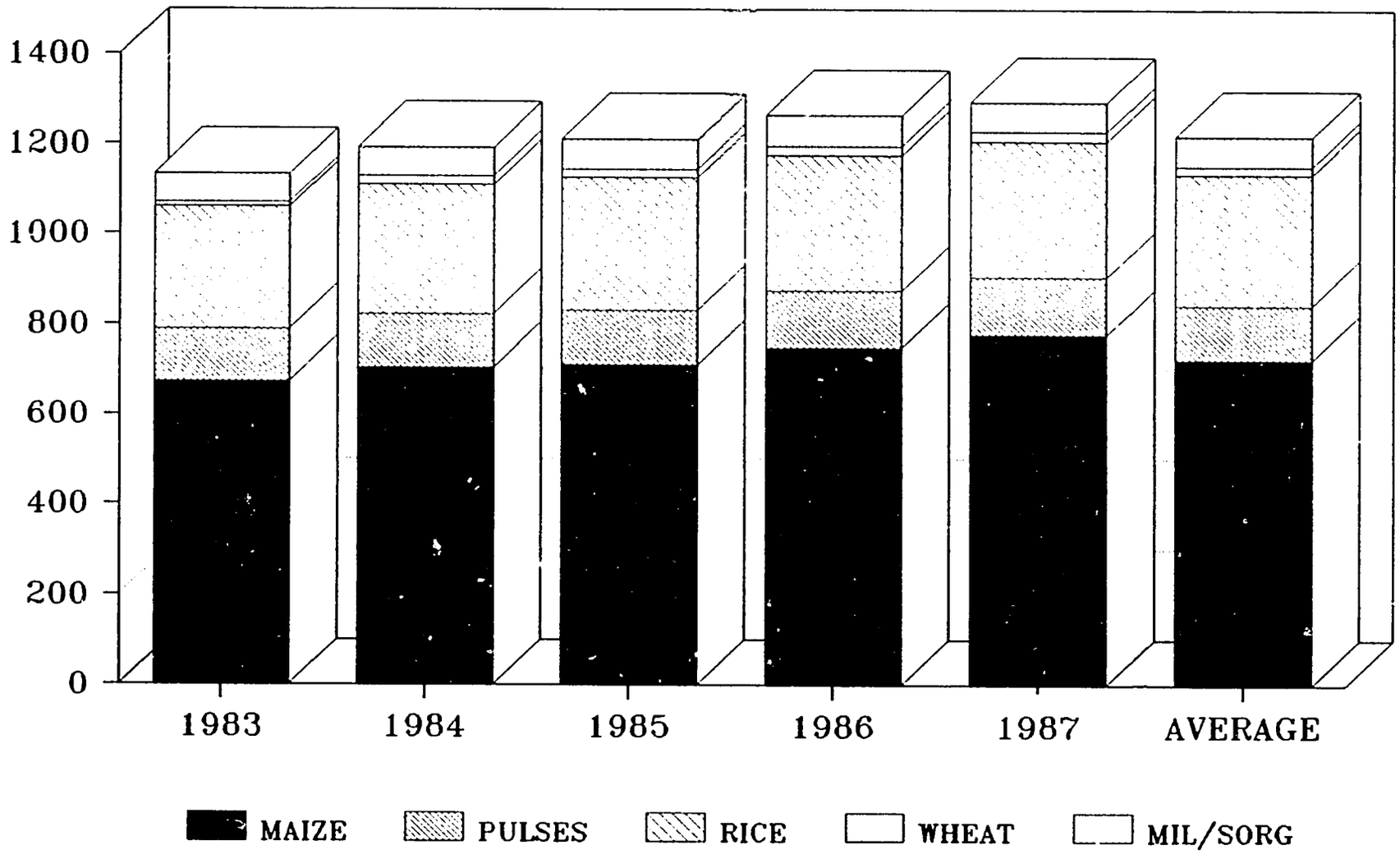
Although a program of liberalization measures in the agricultural sector has been undertaken since 1982, there has been a limited supply response on the part of farmers. The FAO crop production index has shown only marginal increases over the past three years. The stability in crop production is a result of zero increases in the introduction of new lands into production and a stagnation of yields obtained for most crops.

The crops most widely consumed in Zaire in order of importance are cassava, plantains, maize, rice, sweet potatoes, wheat, yams, potatoes, pulses and millet/sorghum. Table 3 presents the relative importance of the ten major food crops between 1983 and 1987 in terms of total production and supply. Figure 1 illustrates the share of total diet for each crop.

The overwhelming importance of cassava and the relative unimportance of cereals is a unique characteristic of Zaire food production and consumption. Cassava traditionally accounts for approximately 65 percent of the total area cultivated in Zaire. (The cultivated area of maize is a distant second, accounting for 25 percent of the total.) Cassava is by far the major source of carbohydrates, minerals and vitamins in Zaire.

GROSS DOMESTIC PRODUCTION (CEREAL)

UNMILLED M/T (MILLIONS)

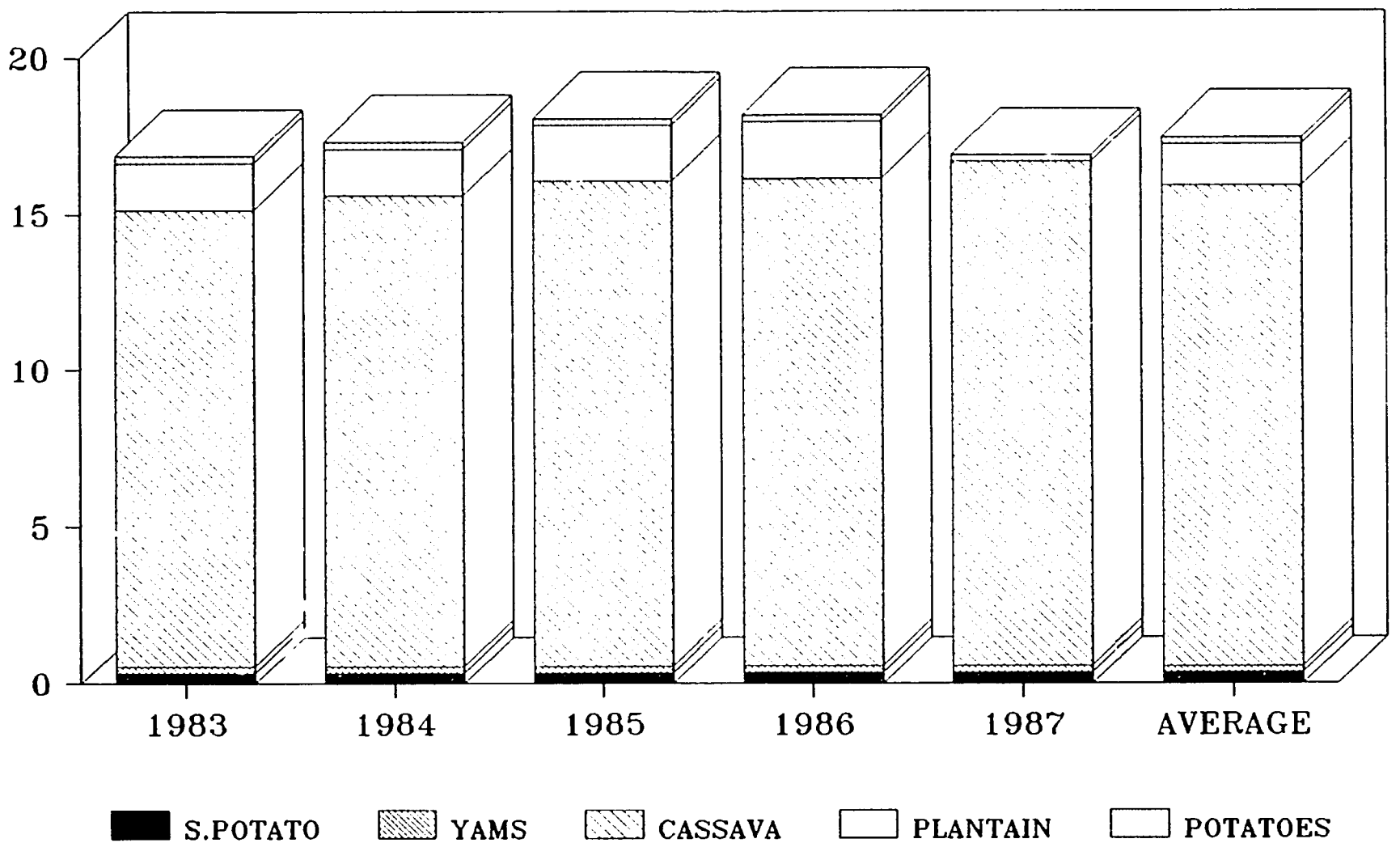


Graph 1

FNA 1989-ZAIRE

GROSS DOMESTIC PRODUCTION (NON-CEREAL)

UNMILLED M/T (MILLIONS)



Graph 2

FNA 1989-ZAIRE

TABLE 3

RELATIVE IMPORTANCE OF MAJOR CROPS IN TERMS OF GROSS PRODUCTION AND AVAILABLE FOOD SUPPLY IN ZAIRE 1983-1987[1]

CROPS	GROSS PRODUCTION	AVAILABLE FOOD SUPPLY	AS % OF TOT. PROD.	AS % OF SUPPLY
	(in tons)	(in tons)		
MAIZE	722,350	728,922	4%	5%
PULSES	122,088	110,839	1%	1%
RICE	290,865	303,304	2%	2%
WHEAT	18,521	170,658	1%	1%
MILLET/SORGHUM	64,998	58,498	1%	1%
SWEET POTATOES	362,406	231,940	2%	2%
YAMS	215,278	170,237	1%	1%
CASSAVA	15,361,995	11,311,275	82%	79%
PLANTAIN	1,321,000	1,038,850	7%	7%
POTATOES	200,200	129,974	1%	1%
TOTAL	18,679,701	14,254,497		

[1] Total supply is the combined sum of net production, commercial imports and food aid. Source: Extrapolation from Zaire Food Needs Assessment and FAO data.

1. Cereals

a) Maize

Maize is produced in almost all the regions of Zaire and is the most important of all the cereal crops. It comprised 67 percent of total cereal surface area planted in 1985. Maize production also accounted for 67 percent of total cereal production in 1985.

Population shifts from rural to urban areas have resulted in increased demand for maize. The country has recently experienced shortages of maize for both human consumption and for animal feed production, and has increasingly resorted to commercial maize imports. Maize imports have averaged over 37,000 tons annually between 1983-1987.

Maize is consumed as a vegetable as well as a 'tot' or cereal when the corn is converted into a corn meal and then boiled into a soft dough and eaten with meat and sauce. Maize is also roasted and eaten on the cob.

In 1987, maize production was estimated at 800,000 metric tons, an increase of three percent over the previous year. Maize production is likely to remain stable between 1988 to 1993 while imports will continue to increase in order to meet supply deficits arising from increased population demands. (Projections of trends in production, consumption and per capita food availability for the years 1989-1993 are discussed in Section VI.)

b) Rice

Rice is second in importance to maize both in terms of area planted and production of cereals. In 1989, estimates of rice production totaled 305,000 tons of paddy. In 1988, the area planted was approximately 335,000 hectares. Rice comprised 25 percent of total cereal production.

Major rice producing areas are the rain forest regions of
Haute Zaire, Kivu and Equateur. The majority of the production is rainfed rice, although there has been an increased interest in irrigated rice in the past decade. The contribution of irrigated rice in total production remains relatively small.

Rice is produced both for sale in the urban areas and for home consumption. Domestic rice production has not met local consumption needs. Rice imports in 1987 totaled 60,000 tons in 1987 and have risen steadily from a low of 4,000 tons in 1983. In 1989 rice imports are estimated at 83,000 metric tons. Imports in rice are likely to remain fairly constant between 1990 and 1993, and maize imports are expected to increase. This will, of course, depend on world commodity prices and consumer food habits.

c) Wheat

Wheat production has been relatively minor, averaging 18,500 tons between 1983 through 1987. In 1989, wheat production is expected to remain fairly constant at 18,500 metric tons. Wheat production contributes only marginally to cereal production. According to FAO

documentation, wheat production began in the mid-1970s when production was barely 2,000 tons. In the 1980s, production has shown remarkable increases and is expected to remain fairly constant in the coming years.

Wheat consumption has been mainly in the form of bread. Most of the wheat used for bread is imported. In 1987, Zaire imported 132,000 tons of wheat for local consumption. Wheat is mainly consumed in the urban centers of the country.

d) Millet and Sorghum

Millet and sorghum are produced in the more arid parts of Zaire. Sorghum and millet are third in terms of contribution of total cereal production. In 1988, production of millet and sorghum totalled 77,000 metric tons. Production in 1989 is estimated to total just under 70,000 tons, a decrease of nine percent.

Sorghum and millet are eaten throughout the regions and urban centers. They are converted to a flour which is used as the base of a porridge or 'tot.' Per capita consumption has remained relatively stable over the last five years. Zaire, as many African countries, does not import sorghum or millet for local consumption.

2. Non-Cereals

a) Cassava

Cassava is not only the most important starch in the Zaire diet, but the major source of carbohydrates, minerals and vitamins. Cassava or manioc comprises more than half the total area cultivated in Zaire. Production of cassava is undertaken in all the regions of the country. Traditional techniques and local varieties are used in the cultivation of the crop. In 1987, a total of 2.3 million hectares of cassava were put into production. The average yield is roughly seven tons. Cassava produces the most calories per hectare, even more than the cereals combined. Cassava production is likely to continue to show increases in the next five years.

The cassava plant produces both tubers and leaves for human consumption. The tubers are responsible for about 56 percent of all starches eaten in Zaire. The cassava tuber is predominantly eaten boiled, but is sometimes converted to farina, 'tot,' or cassava bread. Increases in cassava production in the near future will help to reduce total commercial food import needs.

Cassava is not imported from other countries. Domestic production is responsible for 100 percent of its total consumption.

In 1989, cassava production is estimated at just under 16,500 metric tons, a slight increase over the 1988 production of 16,000 tons.

b) Yams and Other Tubers

Yams, sweet and Irish potatoes contribute a small portion of the Zairean caloric needs. Yams and sweet potatoes are grown in the wetter parts of the country. The true importance of these

tubers is not fully measured, since a large portion of these crops, except for Irish potatoes, are home consumed. Irish potatoes, mainly produced in Haute Zaire, are grown as a cash crop, and marketed in urban areas. Production of these tubers is likely to remain stable in the coming years.

Irish potatoes are the only tuber imported for local consumption. Imports are expected to increase in the next few years if local production does not increase to meet increases in urban demand.

c) Plantain

Plantains are produced in the wetter areas of Zaire. Plantain production has increased tremendously over the past decade. In 1977, plantain production was under 700,000 tons, while production in 1989 is estimated t 1.7 million tons. A number of new varieties resistant to nematode and borers have been introduced into the country by the International Institute of Agriculture (IITA). The new varieties have produced yields superior to the traditional local varieties.

Most of the plantain production in Zaire is domestically consumed. The real value of the crop cannot be determined since it is harvested continuously throughout the year. Production is expected to increase in the next five years and will cover an increasing amount of Zaire's caloric needs.

d) Pulses

Pulses of all sorts are grown throughout Zaire. Data on all pulses have been aggregated. The production of pulses has increased over the past five years, from 115,600 tons in 1983 to over 130,000 in 1989.

The consumption of pulses is expected to increase in the near future. Educational programs which have emphasized the importance of pulses to human nutrition are likely to trigger increased future demand.

AVERAGE PER CAPITA CONSUMPTION BY CROP IN ZAIRE
(1983-87)

CROP	AVERAGE ANNUAL CONSUMPTION PER CAPITA*	CALORIC VALUE OF UNMILLED KILOGRAM	TOTAL ANNUAL CALORIES PROVIDED	PERCENTAGE OF TOTAL CALORIES PROVIDED BY CROP
Maize	19.4	3,570	69,258	11%
Pulses	2.5	3,377	8,443	1%
Rice	6.5	3,530	22,945	4%
Wheat	4.2	3,320	13,944	2%
Millet/Sorghum	1.7	3,450	5,865	1%**
Sw. Potatoes	6.5	1,210	7,865	1%
Yams	4.8	1,120	5,376	1%**
Cassava	27.7	1,350	37,395	6%
Plantain	297.3	1,490	442,977	72%
Potatoes	3.4	820	2,788	1%**
Total	374		616,856	

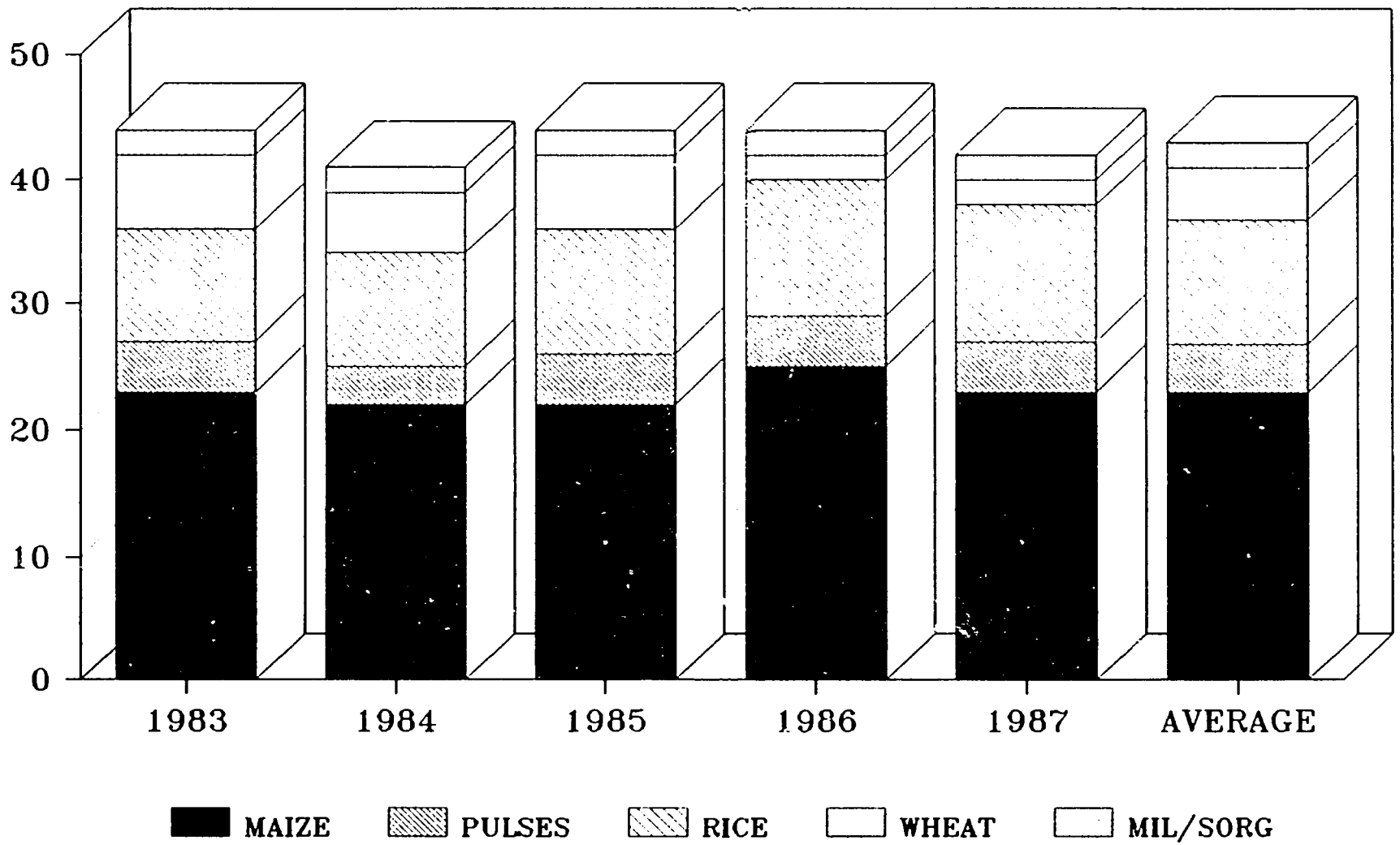
* In unmilled kilograms per year.
** Less than 1%

SOURCE: Extrapolation from Food Needs Assessment for Zaire, FAO and ERS/USDA data.

Table 4

PER CAPITA CONSUMPTION (CEREAL)

UNMILLED KILOGRAMS

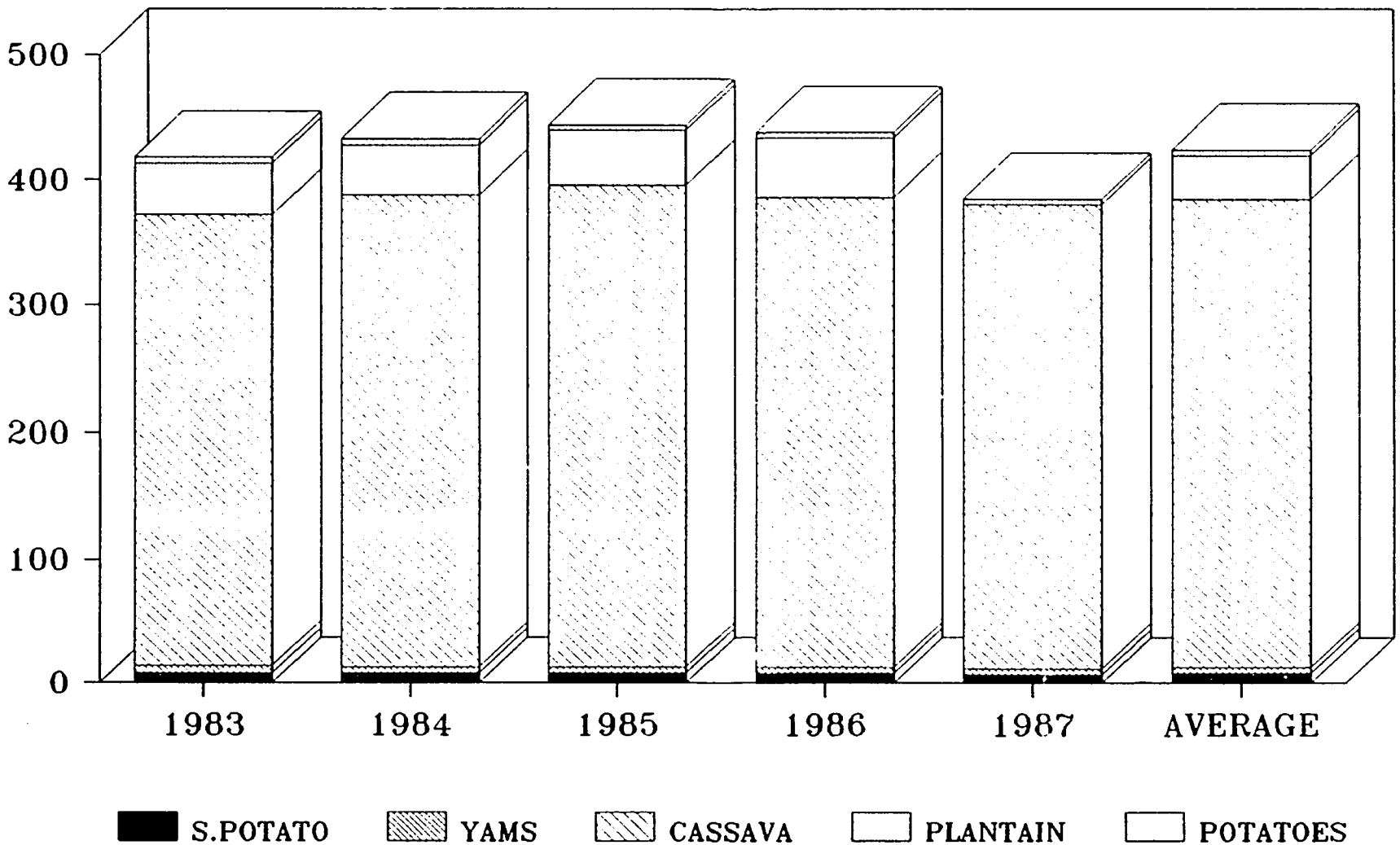


Graph 3

FNA 1989-ZAIRE

PER CAPITA CONSUMPTION (NON-CEREALS)

UNMILLED KILOGRAMS



Graph 4

FNA 1989-ZAIRE

III. FOOD CONSUMPTION AND DEMAND

Food consumption in Zaire is based on a diet of starches. Cassava is the principal energy source. Cassava output in cereal equivalents is approximately 85 percent of the total output of rice, maize and wheat. Cassava represents about 72 percent of the total calories consumed on average annually in Zaire, while cereals only account for 17 percent. Table 4 presents the average per capita consumption by crop for the 1983-1987 period.

Per capita food consumption in Zaire remained fairly constant between 1983 and 1987. The results from the Food Needs Assessment showed per capita consumption of cassava as being very high. A glance at Table 2 shows that per capita cassava consumption on a milled maize-based equivalent was 286 to 306 kilograms per capita per annum. The per capita consumption on a milled basis for plantains ranged from 27.7 to 38 kgs. per capita per annum. This makes plantain the second most highly consumed food in Zaire. The per capita consumption of rice, wheat and maize were 20, 4.0, and 6.5, respectively.

The data in Table 2 and in the historical commodity tables located in the annex illustrate that, on a per capita basis of maize equivalent, Zaire is less than self-sufficient in cereal equivalent, and there has been a decline in per capita cereal equivalent over the past five years. Cassava, as the most important starch consumed, supplies nearly three-quarters of the total calories consumed. The projected deficit in food supply will have to be satisfied through imports, food aid, or through increased crop production. Given that the growth rate in production has been weak in past years, food balances will have to be supplied through imports and food aid.

Slight increases in yields of cassava and maize could greatly reduce the food import demand. Maize yield increases could only be attained if fertilizer use increases, as maize production requires high chemical fertilizer inputs. Fertilizer use per hectare cultivated in Zaire is minuscule (about two kgs/ha.) and is not likely to show any great increase in the near future.

There has been great emphasis placed on cassava production in recent years. New varieties which have shown much promise and can double per hectare yields are already available to farmers. The major problems associated with increasing cassava production are the lack of farm-to-market roads which limit the quantity of the crop which can be marketed, and the limited supply of able-bodied labor in the countryside. The exodus of young men to urban centers leaves an increasingly large part of agricultural production to women. In addition, urban consumers are demonstrating greater preference for rice and wheat which must be imported. Cassava consumption has also been associated with certain nutritional disorders, which further reduces its demand by wealthy urban consumers.

Food production per capita will continue to decline unless certain measures are taken to solve the many problems facing agricultural development. Agricultural programs are given very little budgetary support. In 1982, for example, the share of total government expenditure allocated to agriculture was only 1.9 percent of the total budget. The situation has improved in recent years, but not enough to encourage small producers, who remain the backbone of Zairean agriculture.

Improvements must be made in extension, marketing, transportation, land availability and crop diversification, in addition to changes in the macro-policy framework to create farmer incentives.

But even if the government could double its efforts to provide farmers with the input requirements for increased production, the food needs of Zaire's rapidly expanding population would still have to depend on food imports to meet the consumption demands of the population.

IV. FOOD IMPORTS

Food imports have traditionally made up for domestic supply shortages in urban areas. Food aid, principally from the United States and Canada, has accounted for more than 50 percent of total of total imports for some crops in some years. In 1984, for example, out of total wheat imports of 137,000 metric tons, 112,000 tons were in food aid and only 25,000 tons were commercially imported. In 1985, 62 percent of total wheat imports were in the form of food aid. Table 6 below presents the distribution of total imports into food aid and commercial imports. With the exception of maize, Zaire seems to have become increasingly dependent on food imports of rice and wheat. (Maize imports have declined from an average of nearly 140,000 tons from 1977 and 1981 to just under 37,000 tons after 1981.)

The increasing importance of food imports is due to the sluggish growth of agricultural production which has not kept pace with the rate of increase in population growth and urbanization. The importation of cheap cereal imports has depressed both retail cereal prices and the retail prices of starches and pulses as urban consumers have increasingly substituted cheap imports for the traditional foods. The availability of cheap food in urban areas has a dual impact on the agricultural sector. It attracts people to urban centers because prices of the cheap imports are low and it discourages farmers who receive low prices for their crops.

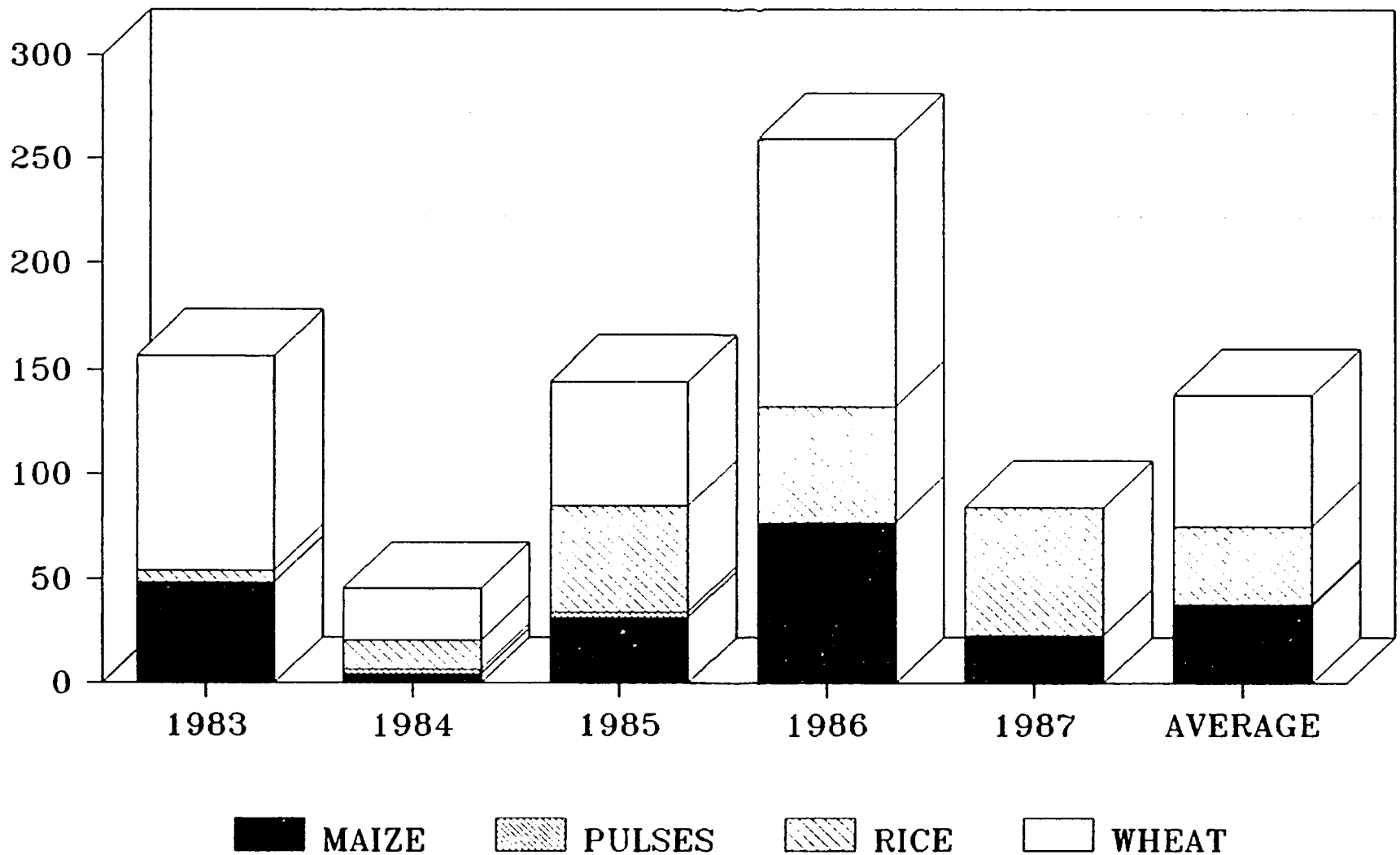
Population growth is expected to continue at an annual rate of more than three percent. Consumer demand for food will continue to increase at a faster rate because of the increase in rural to urban migration. Food production is likely to remain fairly stable. According to a World Bank report (1989), cassava production is expected to remain constant. Cassava root tuber consumption is likely to decline at an annual rate of 0.4 percent per year. This is translated in future demand for imported grains to supply the eventual food deficit.

The importance of wheat, maize and rice imports has been on the increase. Cereals are imported through direct purchases and through food aid. Commercial imports of wheat and rice have increased over the past five years. Maize imports, however, have been on the decline. Table 6 presents food aid commercial imports and total imports data for rice, maize and wheat for 1977-1988.

Zaire has developed into a potential major importer of U.S. cereals in the last five years. Previously, most of the U.S. food grains had been received in the form of food aid. Cereal imports from the European Community (EC) have doubled in the past five years and EC countries are anticipating future increases in cereal sales to Zaire.

COMMERCIAL FOOD IMPORTS (CEREAL)

UNMILLED M/T (THOUSANDS)

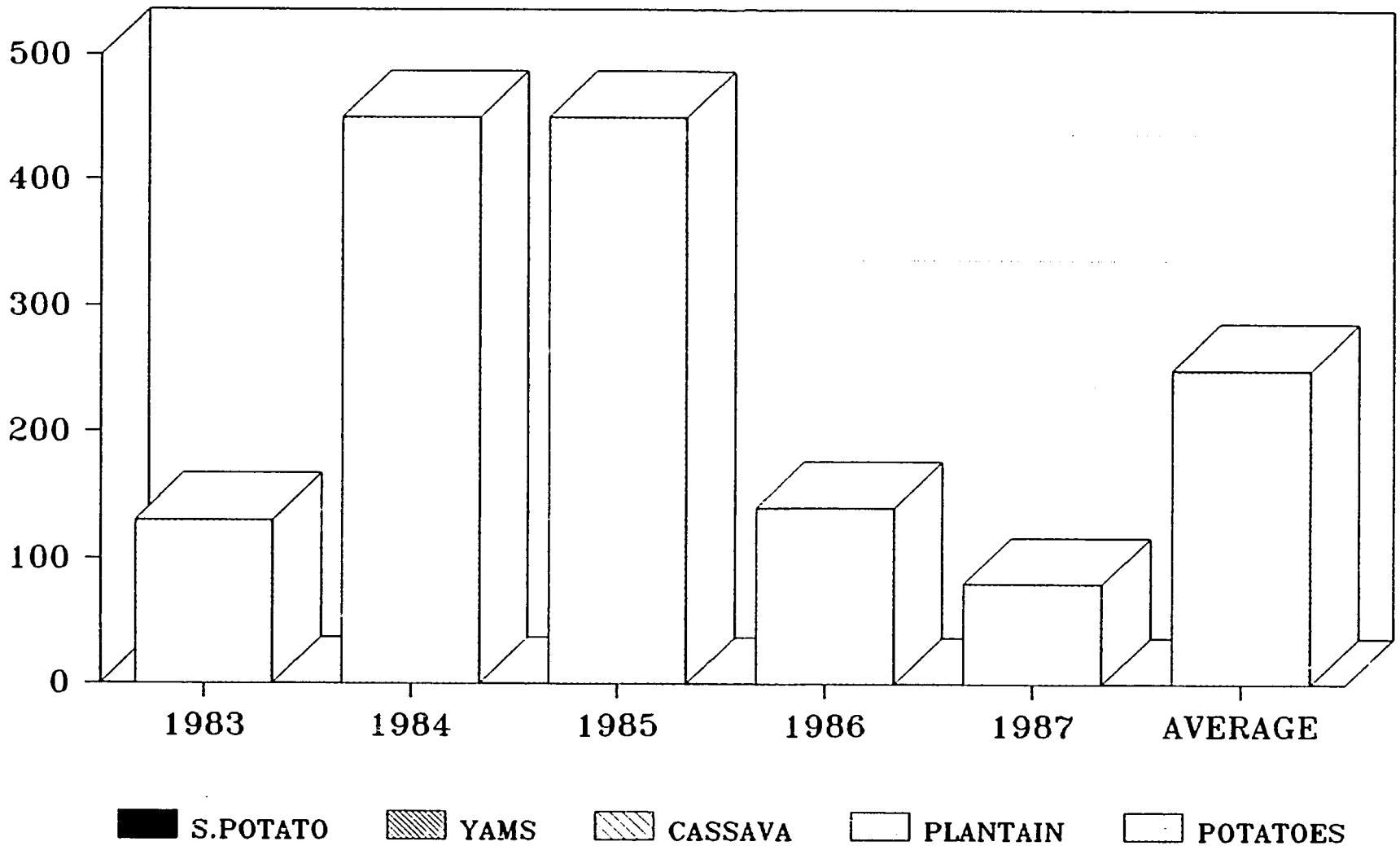


Graph 5

FNA 1989-ZAIRE

COMMERCIAL FOOD IMPORTS (NON-CEREALS)

UNMILLED M/T (MILLIONS)



Graph 6

FNA 1989-ZAIRE

V. METHODOLOGY

A. General Comments

The template developed by the FNA Project is based on the food balance sheet approach used by the FAO and partially adopted by the World Bank and the Economic Research Service (ERS/USDA). It is used to calculate food production and consumption and then to determine future food needs. Data on crop production, number of hectares planted, yield, and food and nonfood uses for the ten principal crops produced and consumed in Zaire were collected from FAO, USDA and Zairean government documents. Total production minus nonfood use, quantity used for seed and post-harvest spoilage losses were considered net domestic production. Net domestic production was then converted to a milled equivalent basis. Food imports were added to net domestic production to obtain the total available food supply. Total food supply was then calculated on a cereal equivalent basis. The caloric content of maize was used as the base to determine cereal equivalents for all foods. Unmilled cereal equivalent was then divided by the total population to obtain the cereal equivalent per capita. (The analysis was also undertaken using cassava as the base commodity, given cassava's predominant position in the Zairean diet.)

The FNA model used is rather standard, and as do all food balance models, it uses only aggregate data. The objective of calculating food needs is to estimate and to hopefully prevent future food crises. The use of aggregate data does not allow for regional analysis, as food needs are calculated for the country as a whole. Disaggregated data by region would help to show the areas or regions with the most need. Often countries with a positive food balance have regions or sub-regions with important deficits. The problem is not, of course, total availability of supply, but rather that of distribution between regions or groups within the population.

Food surpluses within the country are usually transported to urban centers for sale. There should be an effort to use the model to predict future food surpluses for three to five years.[2] This will be a much better indicator of future quantities to be imported to meet urban consumer needs. The difference between production and consumption is inadequate to measure future food import needs. Nor are previous food imports adequate to predict future food imports. Consumer price indices, in addition to indices of consumer real incomes, should be included in the model in order to determine how consumers are likely to respond to falling prices or changes in income. On the supply side, the model should also take into account producer prices trends and their impact on future supply.

The present FNA model only estimates the Food Needs Assessment for the current or upcoming year. Data for the calculation of food needs are usually one or two years in arrears; th ' is, the 1988 data needed to calculate food needs for 1989, for example, are not available at the time of analysis. The Food Needs Assessment therefore often becomes obsolete before it can be used, and it certainly is not available in time for planning purposes on the part of local or

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[2] The consultant has written a SAS econometric program to predict future food needs in Zaire for the 1989-1993 period, using the data collected for the FNA. Results of the trends projected by the model are discussed in Section VI.

international agencies, except of course in emergency situations. But it would be hoped that FNA could also be used by governments or agencies for medium-term planning purposes. The model should be improved so that projection can be made for at least five years forward. To do this, the model should be able to accommodate at least 10 years of historic data. The ten years of time series data will be used to estimate trends and swings in production, consumption, and food needs.

Food consumption is calculated on the basis of food availability and the total population. Efforts should be made to estimate food needs to meet the food requirements of the population, and to satisfy past deficiency by those segments of the population which have been undernourished.

The model should be refined so that price and income data can be incorporated in projecting future food demands. Information on malnutrition and food needs for poverty groups should also be incorporated in the model. By further refining the FNA model it can be of increased use to national and international policy makers.

The presentation of the template results should also be given in a framework in which readers are able to see the percentage contribution of each crop to the total food supply on both a cereal equivalent and caloric basis. The template results should also produce a food caloric deficit by year based on the country's recommendations.

B. Methodological Issues Concerning Zaire

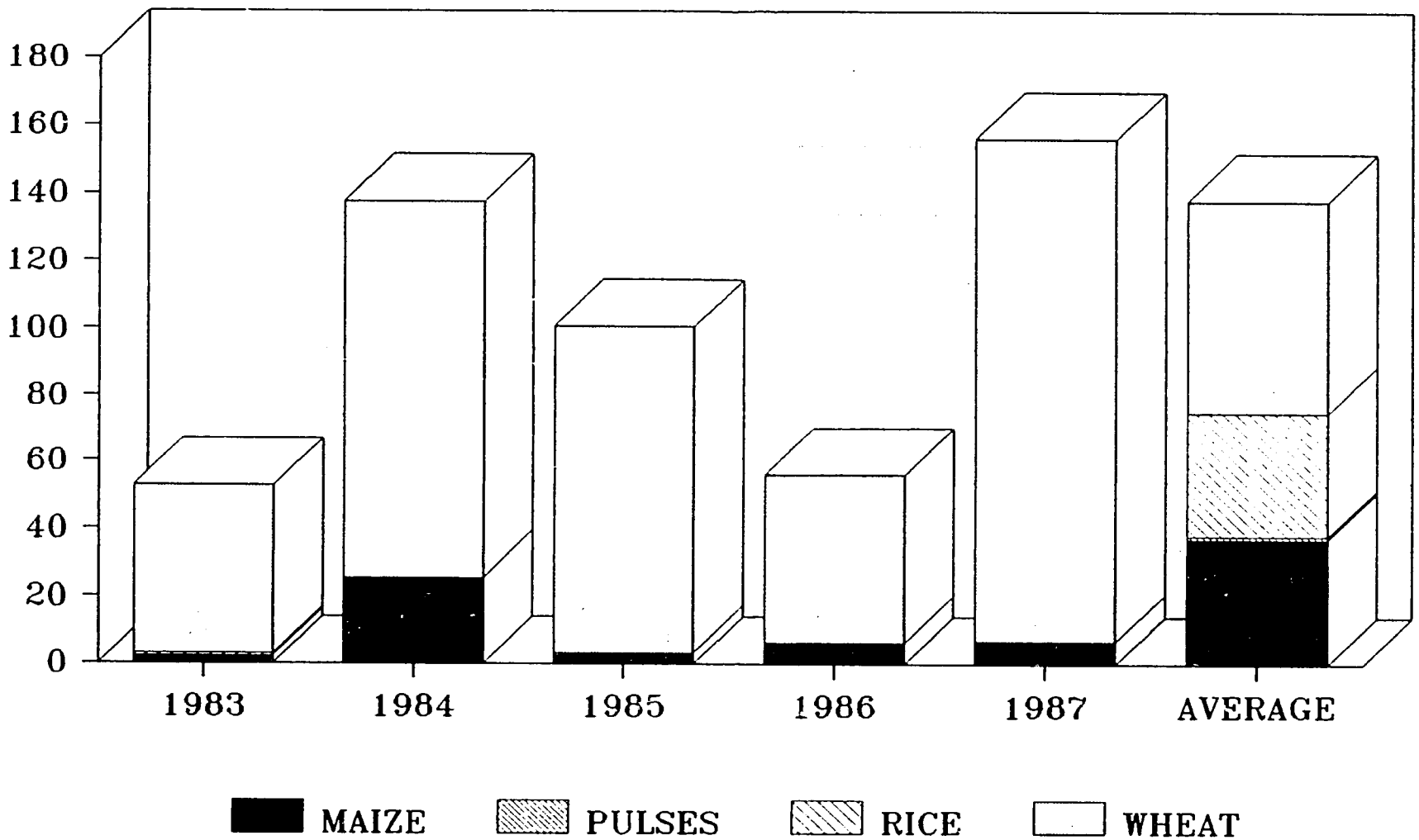
Zaire is an atypical country in that cereal consumption plays a relatively minor role in average consumption. The overwhelming predominance of cassava in the Zairean diet has been referred to earlier in the analysis. It accounts for over 70 percent of total hectares planted and for more than 60 percent of total calories in Zaire. Cassava is thus the base commodity; but cassava is not a cereal. The template does not, however, take into consideration the possibility of a non-cereal being the base commodity. Yet if we analyze the food needs scenario of Zaire without giving appropriate attention to cassava, an incomplete picture of food needs in Zaire is the result. (Another gap in the FNA is the absence of any consideration of meat and dairy caloric intake. In quite a few developing countries, especially those with substantial pastoral populations, meat and dairy product consumption form an important part of the diet, even for poorer groups.)

Zaire produces a variety of foods which are rich in energy and are consumed in certain regions. Foods such as peanuts, which provide a rich source of energy, should also be included in the model. For such large and diverse countries as Zaire, the limitation to only ten commodities presents an incomplete picture. Products such as palm oil, bananas, tarrow and other tubers, if included, would alter the results obtained in the present model.

In general the template software was found to be easily understandable, although it is exceedingly slow without a computer with a hard disk. Without a hard disk, I almost think that it would be better to carry out analyses by hand. Certain bugs remain in the print/graphs option especially when the analysis is dealing with the full complement of five cereals and five non-cereals. Work needs to be undertaken to develop charts and bar graphs which are more applicable to the economics of Food Needs Assessment.

FOOD AID (CEREAL)

UNMILLED M/T (THOUSANDS)



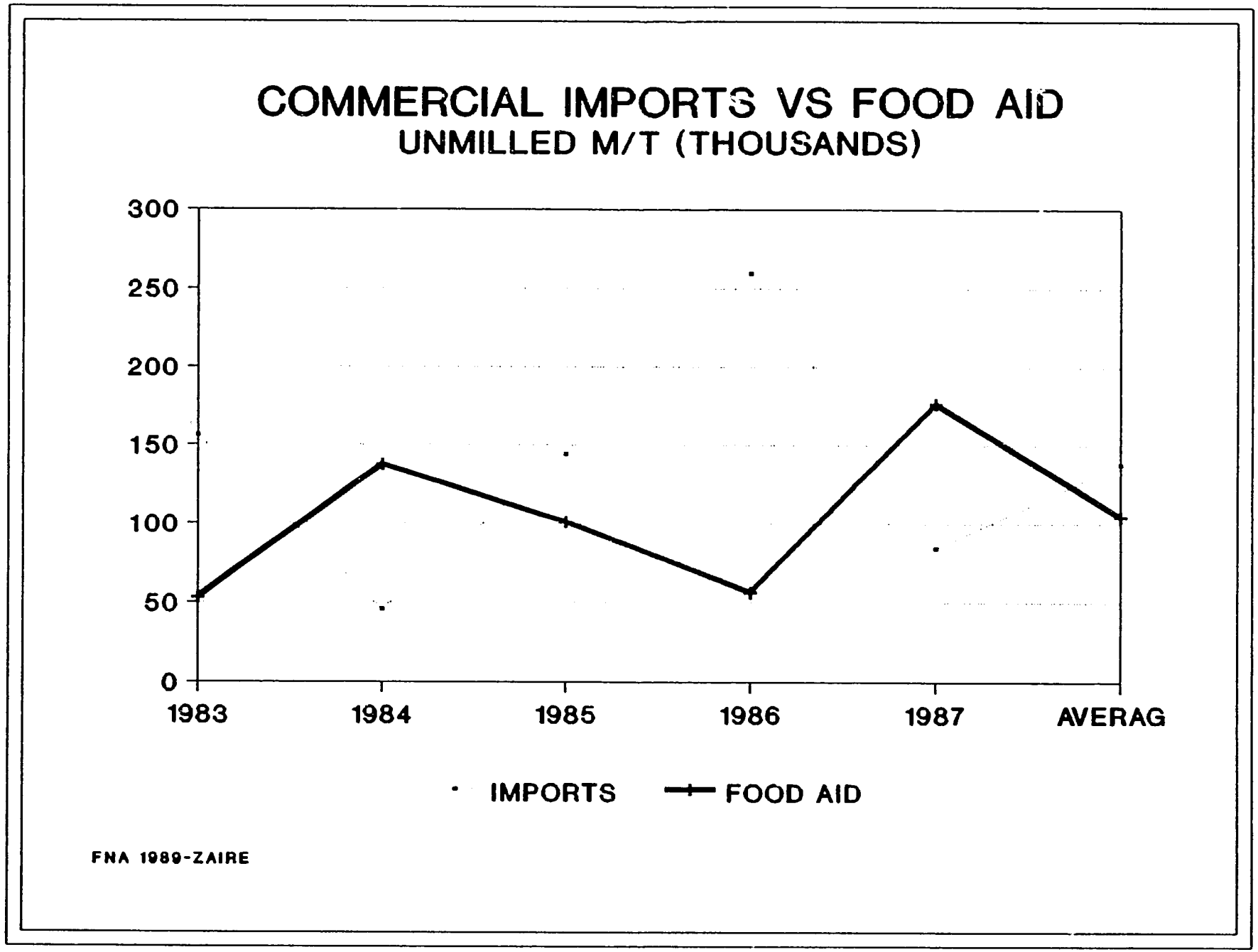
FNA 1989-ZAIRE

Graph 7

VI. CONCLUSIONS

The results of the 1989 Food Needs Assessment project deficits for all cereals and non-cereals, excluding pulses, which indicate a surplus of 770 tons. The largest deficits projected are in cassava and wheat, in which the food deficit per capita is estimated at 5.5 and 4.7 milled kilograms per capita, respectively (or aggregately at 183,000 and 80,000 tons). There were slight estimated deficits in rice, millet/sorghum, sweet potatoes and yams.

Total agricultural production in 1989 is estimated at just under 20 million metric tons. This represents a small increase over the previous years' harvests. Domestic agricultural production furnishes 93% of Zaire's total consumption needs, commercial imports 2%, leaving a negative balance of nearly 350,000 M/T or approximately 6% of total consumption needs.


COMMERCIAL IMPORTS VS FOOD AID
UNMILLED M/T (THOUSANDS)
300
250
200
150
100
50
0
1983
1984
1985
1986
1987
AVERAG
IMPORTS
FOOD AID
FNA 1989-ZAIRE

Graph 8

ANNEXES

I. REFERENCES

II. LIST OF PEOPLE CONTACTED

III. STATISTICAL ANNEX

IV. TREND ANALYSIS TABLES

ANNEX 1

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ANNEX II

LIST OF PEOPLE CONTACTED

Gary Eilerts	Deputy Project Manager/Ethiopian Country Analyst, Famine Early Warning Systems Project (FEWS), AID/Washington Africa Bureau, Tulane/Pragma Group
Myron Golden	AF/CCWA/AID/Washington
Wade Gregory	Senior Associate, Pragma Corporation, Falls Church, Virginia
Margaret Mashon	Economist, ERS/USDA, Washington, D.C.
Charles May	Social Scientist, Famine Early Warning Systems Project (FEWS), AID/Washington Africa Bureau, Tulane/Pragma Group
Jon O'Rourke	Acting Director, FVA/PPM, AID/Washington
John B. Parker	Agricultural Economist, ERS/USDA, Washington, D.C.
Thomas Ross	Project Officer, FVA/PPM, AID/Washington
Patricia Scheid	Economist, ERS/USDA, Washington, D.C.
Christopher Trappman	World Bank

ANNEX III

STATISTICAL ANNEX

Total Imports (Food Aid and Commercial) of Rice, Maize and Wheat in Zaire*

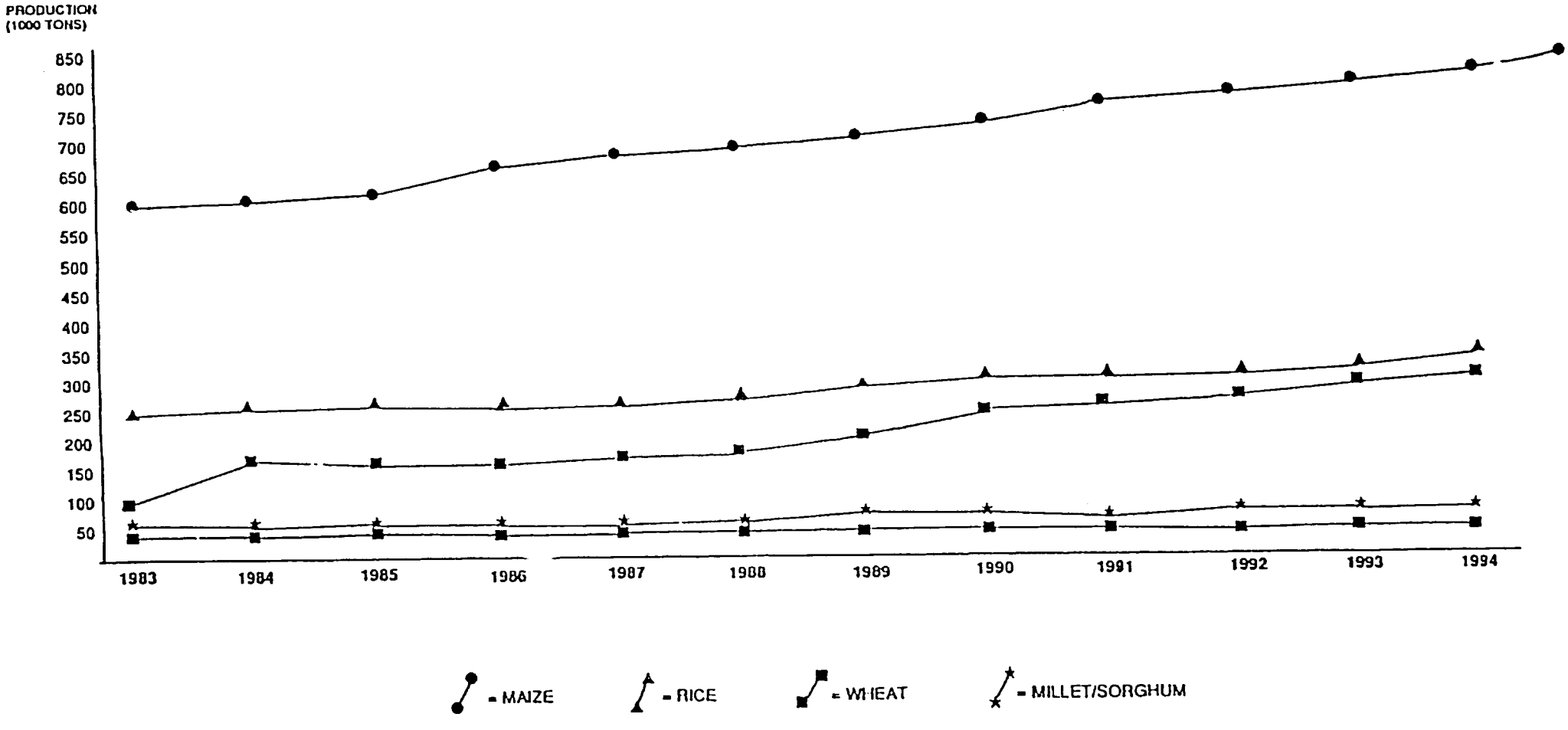
1977-88

Year	Rice			Maize			Wheat			Grand Total
	Food Aid	Comm. Imports	*Total*	Food Aid	Comm. Imports	*Total*	Food Aid	Comm. Imports	*Total*	
1977	16,000	39,100	55,100	8,400	123,600	132,000	5,400	114,600	120,000	307,100
1978	21,700	0	21,700	5,400	154,600	160,000	49,200	54,800	104,000	285,700
1979	20,700	9,300	30,000	3,800	137,200	141,000	36,100	83,900	120,000	291,000
1980	15,400	600	16,000	3,200	143,800	147,000	55,800	47,200	103,000	266,000
1981	4,000	6,000	10,000	0	119,000	119,000	93,400	63,600	157,000	286,000
1982	6,000	6,000	12,000	0	69,000	69,000	103	145,897	146,000	227,000
1983	615	5,538	6,153	2,400	48,600	51,000	49,900	102,100	152,000	209,153
1984	0	13,846	13,846	25,500	4,500	30,000	112,000	25,000	137,000	180,846
1985	0	50,769	50,769	3,400	31,600	35,000	97,400	59,600	157,000	242,769
1986	0	55,385	55,385	6,300	77,100	83,400	49,900	127,000	176,900	315,685
1987	0	61,075	61,075	6,800	23,200	30,000	149,300	0	149,300	240,375
1988	N/A	37,323	37,323				N/A	62,740	62,740	100,063

*In metric tons

Source: ERS/USDA, FAO and Synthèse de la Situation Agricole de l'Agriculture Zairoise République du Zaire, Département de l'Agriculture et du Développement Rural, Service d'Etudes et Planification, 1986.

PROJECTED CEREAL PRODUCTION IN ZAIRE 1983 - 1994



SOURCE: ECONOMETRIC MODEL OF FUTURE TRENDS IN ZAIRE CEREAL PRODUCTION

20.

ANNEX IV

TREND ANALYSIS TABLES

ZAIRE FOOD NEEDS

DEP VARIABLE: X59

PER CAPITA SUPPLY OF FOOD (1977-1993)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	1410.18485	1410.18485	8.907	0.0204
ERROR	7	1108.21176	158.31597		
C TOTAL	8	2518.39662			

ROOT MSE	12.58237	R-SQUARE	0.5600
DEP MEAN	364.2197	ADJ R-SQ	0.4971
C.V.	3.454609		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	339.97971	9.14087790	37.193	0.0001
X1	1	4.84799761	1.62437663	2.985	0.0204

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	364.8	344.8	7.7336	326.5	363.1	309.9	379.8	19.9282
1978	2	347.9	349.7	6.4295	334.5	364.9	316.3	383.1	-1.8227
1979	3	344.2	354.5	5.3052	342.0	367.1	322.2	386.8	-10.3387
1980	4	341.5	359.4	4.4977	348.7	370.0	327.8	391.0	-17.8661
1981	5	358.0	364.2	4.1941	354.3	374.1	332.9	395.6	-6.1966
1982	6	381.8	369.1	4.4977	358.4	379.7	337.5	400.7	12.7394
1983	7	368.5	373.9	5.3052	361.4	386.5	341.6	406.2	-5.4114
1984	8	380.9	378.8	6.4295	363.6	394.0	345.4	412.2	2.0875
1985	9	390.5	383.6	7.7336	365.3	401.9	348.7	418.5	6.8805
1986	10	.	388.5	9.1409	366.8	410.1	351.7	425.2	.
1987	11	.	393.3	10.6104	368.2	418.4	354.4	432.2	.
1988	12	.	398.2	12.1195	369.5	426.8	356.8	439.5	.
1989	13	.	403.0	13.6551	370.7	435.3	359.1	446.9	.
1990	14	.	407.9	15.2091	371.9	443.8	361.2	454.5	.
1991	15	.	412.7	16.7765	373.0	452.4	363.1	462.3	.
1992	16	.	417.5	18.3538	374.1	460.9	364.9	470.2	.
1993	17	.	422.4	19.9386	375.2	469.5	366.6	478.1	.
1994	18	.	427.2	21.5294	376.3	478.2	368.3	486.2	.

SUM OF RESIDUALS	7.95808E-13
SUM OF SQUARED RESIDUALS	1108.212
PREDICTED RESID SS (PRESS)	2045.015

Table 1

ZAIRE FOOD NEEDS

DEP VARIABLE: X20

POPULATION TRENDS (1977-1994)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	33507437.40	33507437.40	7546.035	0.0001
ERROR	7	31082.82222	4440.40317		
C TOTAL	8	33538520.22			

ROOT MSE	66.63635	R-SQUARE	0.9991
DEP MEAN	27425.56	ADJ R-SQ	0.9989
C.V.	0.2429717		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	23689.05556	48.41018612	489.340	0.0001
X1	1	747.30000	8.60271583	86.868	0.0001

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	24451.0	24436.4	40.9571	24339.5	24533.2	24251.4	24621.3	14.6444
1978	2	25101.0	25183.7	34.0505	25103.1	25264.2	25006.7	25360.6	-82.6556
1979	3	26009.0	25931.0	28.0964	25864.5	25997.4	25760.0	26102.0	78.0444
1980	4	26682.0	26678.3	23.8198	26621.9	26734.6	26510.9	26845.6	3.7444
1981	5	27339.0	27425.6	22.2121	27373.0	27478.1	27259.5	27591.7	-86.5556
1982	6	28248.0	28172.9	23.8198	28116.5	28229.2	28005.5	28340.2	75.1444
1983	7	28966.0	28920.2	28.0964	28853.7	28986.6	28749.2	29091.2	45.8444
1984	8	29671.0	29667.5	34.0505	29586.9	29748.0	29490.5	29844.4	3.5444
1985	9	30363.0	30414.8	40.9571	30317.9	30511.6	30229.8	30599.7	-51.7556
1986	10	30850.0	31162.1	48.4102	31047.6	31276.5	30967.3	31356.8	-312.1
1987	11	32300.0	31909.4	56.1927	31776.5	32042.2	31703.2	32115.5	390.6
1988	12	33300.0	32656.7	64.1849	32504.9	32808.4	32437.9	32875.4	643.3
1989	13	.	33404.0	72.3174	33233.0	33575.0	33171.4	33636.5	.
1990	14	.	34151.3	80.5476	33960.8	34341.7	33904.1	34398.5	.
1991	15	.	34898.6	88.8485	34688.5	35108.7	34635.9	35161.2	.
1992	16	.	35645.9	97.2018	35416.0	35875.7	35367.2	35924.5	.
1993	17	.	36393.2	105.6	36143.5	36642.9	36097.9	36688.4	.
1994	18	.	37140.5	114.0	36870.8	37410.1	36828.2	37452.7	.

SUM OF RESIDUALS	721.9333
SUM OF SQUARED RESIDUALS	694956.6
PREDICTED RESID SS (PRESS)	81663989

DEP VARIABLE: X2

ESTIMATES OF MAIZE PRODUCTION (1977-94)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	39360931430	39360931430	20.739	0.0026
ERROR	7	13285197338	1897885334		
C TOTAL	8	52646128768			

ROOT MSE	43564.73	R-SQUARE	0.7477
DEP MEAN	518781.3	ADJ R-SQ	0.7116
C.V.	8.397512		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	390717.33	31649.03954	12.345	0.0001
X1	1	25612.80000	5624.18192	4.554	0.0026

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	459000	416330	26776.5	353013	479647	295412	537248	42669.9
1978	2	450000	441943	22261.2	389303	494583	326258	557628	8057.1
1979	3	477000	467556	18368.5	424121	510991	355758	579353	9444.3
1980	4	464000	493169	15572.7	456346	529992	383770	602567	-29168.5
1981	5	468000	518781	14521.6	484443	553120	410194	627369	-50781.3
1982	6	474000	544394	15572.7	507570	581218	434995	653793	-70394.1
1983	7	603880	570007	18368.5	526572	613442	458209	681804	33873.1
1984	8	633600	595620	22261.2	542980	648259	479935	711305	37980.3
1985	9	639552	621233	26776.5	557916	684549	500315	742150	18319.5
1986	10	672622	646845	31649.0	572007	721684	519515	774175	25776.7
1987	11	698922	672458	36737.0	585588	759328	537705	807212	26463.9
1988	12	720000	698071	41962.1	598846	797296	555040	841102	21929.1
1989	13	.	723684	47278.8	611886	835481	571661	875706	.
1990	14	.	749297	52659.5	624776	873817	587687	910906	.
1991	15	.	774909	58086.3	637556	912263	603218	946601	.
1992	16	.	800522	63547.4	650255	950789	618335	982710	.
1993	17	.	826135	69034.8	662892	989378	633106	1019164	.
1994	18	.	851748	74542.5	675481	1028014	647586	1055909	.

SUM OF RESIDUALS	74169.6
SUM OF SQUARED RESIDUALS	15130854086
PREDICTED RESID SS (PRESS)	12461974 6807

Table 3

DEP VARIABLE: X4

RICE PRODUCTION IN ZAIRE (1977-1994)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	5355050848	5355050848	294.541	0.0001
ERROR	7	127267046	18181006.57		
C TOTAL	8	5482317894			

ROOT MSE	4263.919	R-SQUARE	0.9768
DEP MEAN	225865.4	ADJ R-SQ	0.9735
C.V.	1.887814		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	178629.11	3097.66545	57.666	0.0001
X1	1	9447.26667	550.46960	17.162	0.0001

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	192600	188076	2620.8	181879	194274	176241	199911	4523.6
1978	2	191700	197524	2178.8	192372	202676	186201	208846	-5823.6
1979	3	207000	206971	1797.8	202720	211222	196029	217913	29.0889
1980	4	221400	216418	1524.2	212814	220022	205711	227126	4981.8
1981	5	225000	225865	1421.3	222505	229226	215237	236493	-865.4
1982	6	229500	235313	1524.2	231709	238917	224605	246020	-5812.7
1983	7	243360	244760	1797.8	240509	249011	233818	255702	-1400.0
1984	8	257400	254207	2178.8	249055	259359	242885	265530	3192.8
1985	9	264829	263655	2620.8	257457	269852	251820	275489	1174.5
1986	10	271652	273102	3097.7	265777	280427	260639	285564	-1449.8
1987	11	271652	282549	3595.7	274047	291051	269360	295738	-10897.0
1988	12	274500	291996	4107.1	282285	301708	277997	305996	-17496.3
1989	13	.	301444	4627.4	290501	312386	286564	316323	.
1990	14	.	310891	5154.1	298703	323078	295073	326708	.
1991	15	.	320338	5685.2	306895	333782	303534	337143	.
1992	16	.	329785	6219.7	315078	344493	311954	347617	.
1993	17	.	339233	6756.8	323255	355210	320340	358125	.
1994	18	.	348680	7295.9	331428	365932	328697	368662	.

SUM OF RESIDUALS	-29843.1
SUM OF SQUARED RESIDUALS	554235382
PREDICTED RESID SS (PRESS)	60338624422

Table 4

DEP VARIABLE: X5

WHEAT PRODUCTION (1977-93)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	232318468	232318468	23.834	0.0018
ERROR	7	68230109.73	9747158.53		
C TOTAL	8	300548578			

ROOT MSE	3122.044	R-SQUARE	0.7730
DEP MEAN	7818	ADJ R-SQ	0.7406
C.V.	39.93405		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	-2020.66667	2268.11236	-0.891	0.4026
X1	1	1967.73333	403.05414	4.882	0.0018

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	1740.0	-52.9333	1918.9	-4590.5	4484.6	-8718.4	8612.6	1792.9
1978	2	3400.0	1914.8	1595.3	-1857.6	5687.2	-6375.7	10205.3	1485.2
1979	3	4500.0	3882.5	1316.4	769.8	6995.3	-4129.4	11894.4	617.5
1980	4	5400.0	5850.3	1116.0	3211.3	8489.2	-1989.7	13690.3	-450.3
1981	5	4500.0	7818.0	1040.7	5357.2	10278.8	36.1405	15599.9	-3318.0
1982	6	5400.0	9785.7	1116.0	7146.8	12424.7	1945.7	17625.7	-4385.7
1983	7	9437.0	11753.5	1316.4	8640.7	14866.2	3741.6	19765.4	-2316.5
1984	8	18590.0	13721.2	1595.3	9948.8	17493.6	5430.7	22011.7	4868.8
1985	9	17395.0	15688.9	1918.9	11151.4	20226.5	7023.4	24354.4	1706.1
1986	10	17395.0	17656.7	2268.1	12293.4	23019.9	8531.6	26781.7	-261.7
1987	11	18652.0	19624.4	2632.7	13398.9	25849.9	9967.4	29281.4	-972.4
1988	12	17400.0	21592.1	3007.2	14481.2	28703.1	11341.9	31842.4	-4192.1
1989	13	.	23559.9	3388.2	15548.0	31571.8	12665.3	34454.5	.
1990	14	.	25527.6	3773.8	16603.9	34451.3	13946.0	37109.2	.
1991	15	.	27495.3	4162.7	17652.0	37338.7	15191.1	39799.5	.
1992	16	.	29463.1	4554.1	18694.3	40231.9	16406.7	42519.4	.
1993	17	.	31430.8	4947.3	19732.1	43129.5	17597.5	45264.1	.
1994	18	.	33398.5	5342.1	20766.5	46030.6	18767.4	48029.7	.

SUM OF RESIDUALS	-5426.2
SUM OF SQUARED RESIDUALS	86818123
PREDICTED RESID SS (PRESS)	3492115257

Table 5

DEP VARIABLE: X6

PROJECTED PRODUCTION OF MILLET AND SORGHUM

ANALYSIS OF VARIANCE

(1977-94)

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	257698795	257698795	3.119	0.1207
ERROR	7	578370621	82624374.39		
C TOTAL	8	836069416			

ROOT MSE	9089.795	R-SQUARE	0.3082
DEP MEAN	46705.67	ADJ R-SQ	0.2094
C.V.	19.46187		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	36343.50000	6603.58302	5.504	0.0009
X1	1	2072.43333	1173.48750	1.766	0.1207

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	47700.0	38415.9	5586.9	25204.9	51627.0	13186.4	63645.5	9284.1
1978	2	48600.0	40488.4	4644.8	29505.1	51471.7	16350.6	64626.1	8111.6
1979	3	36000.0	42560.8	3832.6	33498.1	51623.5	19234.2	65887.4	-6560.8
1980	4	27000.0	44633.2	3249.2	36949.9	52316.5	21807.1	67459.3	-17633.2
1981	5	45000.0	46705.7	3029.9	39541.0	53870.4	24048.9	69362.5	-1705.7
1982	6	45000.0	48778.1	3249.2	41094.8	56461.4	25952.0	71604.2	-3778.1
1983	7	56722.0	50850.5	3832.6	41787.8	59913.3	27523.9	74177.1	5871.5
1984	8	55814.0	52923.0	4644.8	41939.7	63906.3	28785.2	77060.7	2891.0
1985	9	58515.0	54995.4	5586.9	41784.3	68206.5	29765.9	80224.9	3519.6
1986	10	62070.0	57067.8	6603.6	41452.7	72683.0	30500.4	83635.3	5002.2
1987	11	59369.0	59140.3	7665.2	41014.8	77265.7	31023.9	87256.6	228.7
1988	12	60300.0	61212.7	8755.4	40509.3	81916.1	31369.3	91056.1	-912.7
1989	13	.	63285.1	9864.7	39958.5	86611.7	31565.6	95004.6	.
1990	14	.	65357.6	10987.4	39376.2	91338.9	31637.7	99077.4	.
1991	15	.	67430.0	12119.7	38771.2	96088.8	31606.5	103254	.
1992	16	.	69502.4	13259.2	38149.2	100856	31489.0	107516	.
1993	17	.	71574.9	14404.1	37514.2	105635	31299.3	111850	.
1994	18	.	73647.3	15553.3	36869.2	110425	31048.9	116246	.

SUM OF RESIDUALS	4318.2
SUM OF SQUARED RESIDUALS	604277632
PREDICTED RESID SS (PRESS)	1208806917

TABLE 6

DEP VARIABLE: X9

ESTIMATE CASSAVA PRODUCTION (1977-94)

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	9.41868E+12	9.41868E+12	53.434	0.0002
ERROR	7	1.23388E+12	176268996728		
C TOTAL	8	1.06526E+13			

ROOT MSE	419844	R-SQUARE	0.8842
DEP MEAN	9852889	ADJ R-SQ	0.8676
C.V.	4.261126		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	7871866.75	305009.61	25.809	0.0001
X1	1	396204.45	54201.62924	7.310	0.0002

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	8861470	8268071	258051	7657872	8878271	7102757	9433386	593399
1978	2	8598670	8664276	214536	8156974	9171577	7549390	9779161	-65605.6
1979	3	8760000	9060480	177022	8641887	9479073	7983060	10137901	-300480
1980	4	8906000	9456685	150078	9101805	9811564	8402382	10510987	-550685
1981	5	9620000	9852889	139948	9521962	10183816	8806406	10899372	-232889
1982	6	10804000	10249093	150078	9894214	10603973	9194791	11303396	554907
1983	7	10365939	10645298	177022	10226705	11063891	9567877	11722718	-279359
1984	8	11135409	11041502	214536	10534201	11548804	9926617	12156388	93906.6
1985	9	11624513	11437707	258051	10827507	12047906	10272392	12603021	186806
1986	10	11521356	11833911	305010	11112672	12555150	10606801	13061022	-312555
1987	11	11909160	12230116	354044	11392929	13067302	10931464	13528767	-320956
1988	12	.	12626320	404399	11670061	13582579	11247899	14004742	.
1989	13	.	13022525	455638	11945104	14099945	11557448	14487601	.
1990	14	.	13418729	507492	12218690	14618768	11861261	14976197	.
1991	15	.	13814934	559792	12491225	15138642	12160298	15469569	.
1992	16	.	14211138	612422	12762977	15659299	12455352	15966924	.
1993	17	.	14607342	665305	13034133	16180552	12747073	16467612	.
1994	18	.	15003547	718385	13304824	16702270	13035991	16971103	.

SUM OF RESIDUALS	-633511
SUM OF SQUARED RESIDUALS	1.43459E+12
PREDICTED RESID SS (PRESS)	3.81708E+12

TABLE 7

28.

DEP VARIABLE: X10

ESTIMATED PLANTAIN PRODUCTION

ANALYSIS OF VARIANCE
(1977-94)

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	1	403009450931	403009450931	488.621	0.0001
ERROR	7	5773524951	824789279		
C TOTAL	8	408782975882			

ROOT MSE	28719.14	R-SQUARE	0.9859
DEP MEAN	995139.4	ADJ R-SQ	0.9839
C.V.	2.885942		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0	PROB > |T|
INTERCEP	1	585358.28	20863.97500	28.056	0.0001
X1	1	81956.23333	3707.62565	22.105	0.0001

OBS		ACTUAL	PREDICT VALUE	STD ERR PREDICT	LOWER95% MEAN	UPPER95% MEAN	LOWER95% PREDICT	UPPER95% PREDICT	RESIDUAL
1977	1	679626	667315	17651.8	625574	709055	587602	747027	12311.5
1978	2	746842	749271	14675.2	714569	783972	673008	825534	-2428.7
1979	3	820705	831227	12109.1	802593	859861	757527	904927	-10522.0
1980	4	901874	913183	10266.0	888908	937459	841064	985302	-11309.2
1981	5	991070	995139	9573.0	972503	1017776	923555	1066723	-4069.4
1982	6	1089088	1077096	10266.0	1052820	1101371	1004977	1149215	11992.3
1983	7	1196800	1159052	12109.1	1130418	1187686	1085352	1232752	37748.1
1984	8	1184000	1241008	14675.2	1206307	1275710	1164745	1317271	-57008.1
1985	9	1346250	1322964	17651.8	1281224	1364705	1243252	1402677	23285.6
1986	10	1467200	1404921	20864.0	1355585	1454256	1320981	1488860	62279.4
1987	11	1599248	1486877	24218.1	1429610	1544144	1398043	1575710	112371
1988	12	1743180	1568833	27662.6	1503421	1634245	1474543	1663123	174347
1989	13	.	1650789	31167.6	1577089	1724490	1550572	1751007	.
1990	14	.	1732746	34714.7	1650658	1814833	1626208	1839283	.
1991	15	.	1814702	38292.2	1724154	1905249	1701518	1927886	.
1992	16	.	1896658	41892.3	1797598	1995718	1776555	2016761	.
1993	17	.	1978614	45509.8	1871000	2086229	1851364	2105865	.
1994	18	.	2060570	49140.6	1944370	2176770	1925981	2195160	.

SUM OF RESIDUALS	348997.5
SUM OF SQUARED RESIDUALS	52676373121
PREDICTED RESID SS (PRESS)	6.00666E+12

TABLE 8

PRELIMINARY FOOD NEEDS ASSESSMENT

ZAIRE: 1990

March 20, 1990

Melanee Lowdermilk, AID/FNA Project
Ministere de l'Agriculture/SEP

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ZAIRE

PRELIMINARY FOOD NEEDS ASSESSMENT

I. SUMMARY:

An assessment of the 1990 food supply and utilization situation was conducted in Zaire, December 1 - 14, 1989. The commodities covered in the national level assessment included maize, rice, wheat, manioc, plantain, and peanuts. The outlook for 1990 is one of deficits for all commodities except manioc which shows a small surplus. Of the cereals, wheat registers the largest shortfall with a deficit of 94,035 MT (unmilled) before food aid; maize and rice show deficits in 1990 of 39,497 MT (unmilled) and 47,220 MT (milled) respectively. A surplus of 13,106 MT (milled) was evident for manioc indicating that domestic production is adequate to support average consumption levels over the past 5 years. Tables 1 and 2 present the food balance situation by commodity for 1990.

A 'commodity gap' analysis was conducted to ascertain the deficit/surplus situation for cotton in 1990. Given a production level of 13,222 MT and per capita utilization of .9 kilos/year, a deficit emerges for seed cotton of 20,050 MT. Converting seed cotton to cotton fibre at 35% yields a deficit for cotton fibre of 7,018 MT. Aid commitments of cotton fibre reduce the projected deficit for 1990 to 3,318 MT. The 1990 balance for cotton is shown in Table 3.

Per capita availability for maize, manioc, plantain, and peanuts in 1990 was estimated using an average of per capita availability over the past 5 years. Linear trend estimates of 1990 per capita availability were used for both rice and wheat. For the current year, per capita availability was multiplied by the population to arrive at a total consumption requirement. It should be noted that per capita availability reflects 'apparent consumption' rather than actual food intake per person.

A breakdown of 1990 food aid commitments by commodity and donor is presented in Table 4.

II. METHODOLOGY

1) Commodities Included in the Assessment:

Six commodities covering a substantial part of the Zairian diet were included in the 1990 food needs assessment: maize, rice, wheat, manioc, plantain, and peanuts. These commodities combined contribute approximately 80% to total caloric intake. Manioc emerges as the principal dietary staple with a share of 56% of total caloric intake followed by maize at 9%. Figure 1 presents the contribution to per capita calorie consumption by commodity. These share of the diet figures, however, are national averages and do not reflect regional or rural-urban differences. Significant differences in consumption across regions exist in Zaire. For example, in terms of the aliment de base, maize rather than manioc predominates in the regions of Shaba, Kasai-Oriental, and Kasai-Occidental. Furthermore, some commodities are consumed almost exclusively in urban areas. Wheat in Zaire emerges as the primary example of a food consumed in cities rather than in rural areas.

2) Base Period of Analysis:

The period of analysis for the 1990 assessment includes calendar years 1985 - 1989. Data on production, imports/exports, non-food uses, and per capita availability were collected for 5 historical years. The data used in the assessment are stored on computers at both SEP (Service d'Etudes and Planification) and USAID/Kinshasa, and should be updated/refined as more reliable estimates become available.

Summary commodity tables for the base period are included in the Statistical Annex.

3) Adjustments for Non-Food Uses: Seed, Feed, and Losses.

Gross production of all commodities was adjusted downwards to account for seed requirements, feed use, and post-harvest losses. Net domestic production thus reflects what is available for human consumption after the harvest. In addition, milling extraction rates were applied to commodities included in the assessment as follows: maize (.85), rice (.60), wheat (.75), manioc (.30), plantain (.90), and peanuts (.70). Table 5 presents a breakdown of technical conversion factors by commodity.

4) Per Capita Consumption/Availability:

Average per capita availability over a base period adjusted for current population is most commonly used by AID/W and FAO to estimate the total consumption requirement in the current year; the food balance thus reflects the amount of food necessary to maintain the current population at a status quo level of consumption. In this assessment, average per capita availability was used for maize, manioc, plantain, and peanuts as consumption appeared relatively stable over the base period. Linear trend estimates of per capita consumption/availability, however, were utilized for rice and wheat. Studies of urban food consumption in Zaire confirm an increase in rice and wheat consumption suggesting that a trend estimate would better reflect this recent change in consumption patterns.

5) Data Sources and Limitations:

The weakness of statistical data is evident across all sectors in Zaire, with agriculture being no exception. Data on production, area planted and yields by crop are scarce, and if available are often inconsistent. Thus, data on agricultural production should be interpreted with caution. The sole source of agricultural production data used in this assessment is the Departement de l'Agriculture/Service d'Etudes et Planification, (SEP). Official statistics on the 1988 agricultural campaign are not yet released; linear trend estimates based on historical data are used to calculate domestic crop production for 1988 and subsequent years. For production it would be preferable to use estimates based on yields per hectare and area planted (and expected) to be harvested. Given the lack of area and yield data for recent years in Zaire, this assessment uses trend estimates to reflect the historical trend of production. Data on imports and food aid are those of the Office des Douanes et Accises (OFIDA), USAID/Kinshasa, and World Food Program (WFP). It should be noted that the estimate of commercial imports for the 1990 food balance is based on past performance. In the absence of information on the import plans and priorities of the Zairian government in calendar year 1990 the assessment assumes a commercial import level equal to that of the previous year. No reliable data were available for stocks in Zaire; therefore, no adjustment was made to the domestic food supply to account for a drawdown or build-up of stocks by year. Annex 1 presents a list of individuals/organizations contacted and data sources.

6) Training in the FNA Methodology/Software:

One of the primary objectives of the TDY was to train staff at the Service d'Etudes et Planification in both the food needs assessment methodology and software/template. Five training

sessions were conducted at the Ministere de l'Agriculture using data collected in-country by SEP and the consultant. These sessions included an overview of the methodology and hands-on training using the FNA software package. A basic understanding of the equations underlying the food balance sheet combined with a working knowledge of the FNA template/software will provide SEP personnel with the tools necessary to conduct assessments in the future. It should be remembered that the results of any assessment are dependent on the quality of the data used; given data limitations in Zaire, the deficit/surplus situation by commodity should be viewed as indicative.

For a complete list of training sessions and participants please see Annex 2.

III. CEREALS:

1) Maize:

Production: Maize is cultivated throughout Zaire, with the regions of Shaba, Kasai-Oriental, Kasai-Occidental emerging as the principal production zones. For the most part, production is characterized by traditional cultivation techniques with observed yields of .8 - 1.0 MT per hectare in 1986/87.(1) Average yields per hectare in Zaire are low; improved seed varieties and fertilizer are not commonly used in maize cultivation. Although maize production projects in Shaba and Kasai-Oriental have recorded increases in output, data from the Departement de l'Agriculture show that per capita maize production has stagnated since 1985, with production just keeping pace with population growth.

Per Capita Availability: Maize represents the principal cereal in Zaire, both in terms of production and consumption. Although manioc is the primary staple on a national level, maize figures prominently in the diet in certain regions. In addition, in some areas substantial quantities of maize are used to produce local beer. National per capita availability of maize has remained fairly stable over the base period, averaging 20.3 kilos (unmilled)/year. Since 1985, official maize imports -- commercial and concessional -- have likewise remained stable averaging 55,000 MT/year. Although unofficial imports of maize flour from Zambia are widely acknowledged, actual quantities crossing the border into the Shaba region are unknown.

Food Balance: With an 1990 estimate of gross production of 773,961 MT and imports equal to last year's level, a deficit emerges for maize of 39,497 MT (unmilled).

2) Rice:

Production: Trends in rice production show some increase over the past 5 years, rising from 297,167 MT in 1985 to 314,370 MT (unmilled) in 1989. Similar to the case of maize, however, per capita rice production has stagnated since the mid-1980's. Imports of rice have increased rapidly contributing to a stabilization of national per capita availability at approximately 7 kilos (milled)/year. In urban areas there is evidence of a shift in consumption away from traditional staples towards both rice and wheat. Joseph Houyoux examines the shift in urban consumption in a 1986 study of household expenditure/consumption patterns: (Budgets des Menages: Kinshasa). In this study, Houyoux compares the 1986 results with those from similar household expenditure surveys conducted in 1969 and 1975. Data from the Kinshasa surveys show that per capita consumption of rice has increased from .61 kilos/month in 1969 to 1.07 kilos/month in 1986; for the same period per capita manioc consumption declined by 25%. A breakdown of per capita monthly consumption of principal food commodities in Kinshasa is presented in Table 6.

Food Balance: With an estimate of paddy production of 318,210 MT the import requirement for 1990 is 85,520 MT (milled). Netting out projected commercial imports in 1990 of 38,300 MT (milled) yields a deficit before food aid of 47,220 MT (milled).

3) Wheat:

Production/Imports: Very little wheat is produced in Zaire with production reaching only 6,000 MT in 1989. Total wheat imports, however, are substantial averaging 245,710 MT (unmilled) per year over the base period. Commercial wheat imports have increased in recent years rising from 113,352 MT in 1985 to 172,658 MT (unmilled) in 1989. On an annual basis food aid represents approximately 35% of total wheat imports.

Food Balance: In the past 5 years per capita availability of wheat has averaged 7.7 kilos (unmilled)/year. This figure, however, represents national availability and obscures differences in rural-urban consumption patterns. Wheat is consumed primarily in urban areas in the form of wheat flour/bread. For example, data from the 1986 household expenditure survey conducted by BEAU/Houyoux (Bureau d'Etudes d'Amenagement et d'Urbanisme) show that consumption of bread in Kinshasa averaged 19 kilos/person/year. Assuming commercial imports in 1990 of 172,700 MT (unmilled) -- maintaining last

year's level of imports -- wheat shows a substantial shortfall before food aid of 94,035 MT (unmilled). Food aid commitments to date reduce the projected wheat deficit to 56,035 MT (unmilled) in 1990.

IV. NON-CEREALS:

1) Manioc:

Production: Data on manioc production show a steady increase in output over the base period. Manioc is by far the dominant food crop across regions; in 1985 manioc represented approximately 50% of total area cultivated in staple crops. Although manioc is cultivated throughout the country, Kivu, Bandundu, Shaba, and Kasai-Occidental stand out as major producing regions in terms of hectares planted. Table 7 shows area cultivated by staple crop and region.

Per Capita Availability: As the primary dietary staple, manioc is consumed in both rural and urban areas. Annual per capita availability on a national basis has averaged 136.7 kilos (milled) over the past 5 years. Although only manioc roots were considered in this analysis, both roots and leaves are consumed in Zaire. The roots are dried, ground into flour, and then prepared as a thick dough (chickwangue or fufu) served as the staple of the principal meal; manioc leaves are prepared as a vegetable dish mixed with palm oil and spices.(2) With manioc production estimated at 17,982,000 MT (unmilled) in 1990, the food balance situation is one of surplus. The surplus, albeit small, indicates that domestic production is adequate to support status quo consumption levels, (i.e. average per capita availability over the past 5 years).

2) Plantain and Peanuts:

Domestic production of both plantain and peanuts has shown a slight increase over the past 5 years, with annual per capita availability averaging 49.5 and 9.9 kilos (unmilled) respectively. In contrast to manioc, however, deficits emerge when calculating the food balance for plantain and peanuts. The results of this assessment indicate that domestic production of these two food crops is inadequate to support status quo consumption levels in 1990.

3) Cotton:

A 'commodity gap' analysis was conducted to ascertain the deficit/surplus situation for cotton in 1990. Domestic production of seed cotton has been declining over the base period averaging 17,600 MT per year. Imports of cotton fibre, for the most part concessional, have contributed substantially to per capita utilization/availability over the past 5 years. Given an estimated production level of 13,222 MT in 1990 and per capita utilization of .9 kilos/year, a deficit emerges for seed cotton of 20,050 MT. Converting seed cotton to cotton fibre at 35% yields a deficit for cotton fibre of 7,018 MT. Aid commitments of cotton fibre reduce the projected deficit for 1990 to 3,318 MT. Table 3 shows the 1990 commodity balance for cotton before food aid.

The commodity gap for cotton was estimated based on average per capita utilization over the past 5 years. In Zaire an installed capacity for fabric production exists of approximately 14,000 MT of cotton fibre. The calculation of the deficit using a demand oriented approach (i.e. installed capacity) would result in a larger deficit for cotton than shown in this assessment.

V. ISSUES RAISED:

1) Data Reliability:

The weakness of statistical data on the agricultural sector is evident in Zaire. In this assessment the absence of official agricultural production statistics required the use of estimates for 1988 and subsequent years. In addition, although available for recent years food import data is likewise weak. Given the problem of data reliability, the results of any quantitative analysis should be interpreted with caution.

2) The Need for a Regional Breakdown of Analysis:

The preliminary 1990 food needs assessment was conducted using aggregate data to generate a picture of the national food supply and utilization situation. In a country as vast as Zaire the analysis should likewise be done at a regional level to reflect variations in production, consumption, and trade across regions. The calculation of the food balance situation by region would require detailed information on production and inter-regional trade. Unfortunately, the dearth of reliable agricultural statistics at present would limit this type of analysis to the regions of Shaba and Bandundu.

3) **Nutrition:**

As noted at the outset, the per capita availability estimates used in this assessment reflect what is available for consumption rather than actual food intake levels. Although average per capita calorie availability appears adequate in Zaire, malnutrition is a serious problem. A recent report by the World Bank highlights the nature and extent of malnutrition in Zaire, (Zaire: Population, Health and Nutrition, 1989). On a national basis approximately 25% of young children are undernourished in Zaire, with Kivu emerging as the region where malnutrition is the most severe.(3) In sum, the standard food balance sheet approach to estimating food needs provides information on import requirements, and does not address the question of distribution or access to food.

Further studies of the food consumption and nutrition situation in Zaire will be conducted in 1990 with the assistance of the donor community. These studies include: (i) Etude de consommation et pratiques alimentaires des menages (Programme d'ajustement des secteurs sociaux/composante dimensions sociales), and (ii) Etude de l'impact socio-economique des politiques economiques et financieres (USAID/Cornell University).

TABLES

ZAIRE: FOOD NEEDS ASSESSMENT, (1990)

TABLE 1:

	MAIZE	RICE	WHEAT	MANIOC	PLANTAIN	PEANUTS
FOOD DEFICIT *	39497	78699	94035	-43685	136730	18611
- FOOD AID COMMITMENTS:	0	38833	38000	0	0	0
UNCOVERED FOOD DEFICIT:	39497	39866	56035	-43685	136730	18611
X MILLING EXTRACTION RATE	0.85	0.60	0.75	0.30	0.90	0.70
UNCOVERED FOOD DEFICIT: MILLED	33572	23919	42026	-13106	123057	13028

*: A NEGATIVE (-) FOOD DEFICIT IS A SURPLUS

NOTES:

A) ALL QUANTITIES IN METRIC TONS

B) ALL QUANTITIES IN UNMILLED TERMS UNLESS NOTED

C) BASE PERIOD: 1985 - 1989

YEAR: JAN/DEC

D) PER CAPITA CONSUMPTION: AVERAGE PER CAPITA AVAILABILITY OVER THE BASE PERIOD

E) NON-FOOD USES:

	MAIZE	RICE	WHEAT	MANIOC	PLANTAIN	PEANUTS
SEED	0.05	0.05	0.02	0.00	0.00	0.13
FEED	0.03	0.00	0.00	0.02	0.01	0.00
WASTE/LOSSES	0.10	0.07	0.05	0.08	0.10	0.05
MILLING EXTRACTION RATE	0.85	0.60	0.75	0.30	0.90	0.70

F) POPULATION BASED ON 1984 CENSUS WITH 3% GROWTH RATE

ZAIRE:

TABLE 2:

FOOD NEEDS ASSESSMENT: 1990

	MAIZE	RICE	WHEAT	MANIOC	PLANTAIN	PEANUTS
PER CAPITA CONSUMPTION (UNMILLED KG/YEAR)	20.3	11.9	7.7	455.6	49.5	9.9
X POPULATION (THOUSANDS)	35429	35429	35429	35429	35429	35429
= TOTAL CONSUMPTION REQUIREMENT	718645	422557	272966	16140115	1753239	352517
GROSS DOMESTIC FOOD PRODUCTION	773961	318210	6700	17982000	1816302	407202
- TOTAL NON-FOOD USE	139313	38185	469	1798200	199793	73296
= NET DOMESTIC FOOD PRODUCTION	634648	280025	6231	16183800	1616509	333906
NET DOMESTIC FOOD PRODUCTION (FROM ABOVE)	634648	280025	6231	16183800	1616509	333906
- NET CHANGE IN STOCKS	0	0	0	0	0	0
- TOTAL FOOD EXPORTS	0	0	0	0	0	0
= DOMESTIC FOOD SUPPLY	634648	280025	6231	16183800	1616509	333906
TOTAL CONSUMPTION REQUIREMENT (FROM ABOVE)	718645	422557	272966	16140115	1753239	352517
- DOMESTIC FOOD SUPPLY (FROM ABOVE)	634648	280025	6231	16183800	1616509	333906
= IMPORT REQUIREMENT	83997	142533	266735	-43685	136730	18611
- TOTAL COMMERCIAL FOOD IMPORTS	44500	63833	172700	0	0	0
= FOOD DEFICIT (UNMILLED)	39497	78699	94035	-43685	136730	18611
X MILLING EXTRACTION RATE	0.85	0.60	0.75	0.30	0.90	0.70
= FOOD DEFICIT MILLED	33572	47220	70526	-13106	123057	13028

NOTES:

ALL QUANTITIES IN METRIC TONS UNLESS NOTED

A NEGATIVE (-) FOOD DEFICIT IS A SURPLUS

ZAIRE:

TABLE: 3

COMMODITY GAP ANALYSIS: COTTON

	COTTON
PER CAPITA UTILIZATION (UNMILLED KG/YEAR)	0.9
X POPULATION (THOUSANDS)	35429
= TOTAL UTILIZATION	33272
DOMESTIC PRODUCTION	13222
- NET CHANGE IN STOCKS	0
- TOTAL EXPORTS	0
= TOTAL DOMESTIC AVAILABILITY	13222
TOTAL UTILIZATION (FROM ABOVE)	33272
- TOTAL DOMESTIC AVAILABILITY (FROM ABOVE)	13222
= IMPORT REQUIREMENT	20050
- TOTAL COMMERCIAL IMPORTS	0
= DEFICIT, (UNMILLED)	20050
X MILLING EXTRACTION RATE	0.35
= DEFICIT, (MILLED)	7018

NOTES:

(A) ALL QUANTITIES IN METRIC TONS UNLESS NOTED

(B) MILLING EXTRACTION RATE: SEED COTTON CONVERTED TO COTTON FIBRE AT .35

ZAIRE:

TABLE: 4

FOOD NEEDS ASSESSMENT: 1990

ZAIRE: FOOD AND COMMODITY AID IMPORTS/COMMITMENTS, (Calendar Year 1990)

COMMODITY	METRIC TONS	PROJECTED ARRIVAL DATE IN-COUNTRY	DONOR		
WHEAT	38000	March - May 1990	USAID		
				WHEAT TOTAL:	38000 Metric Tons
RICE, (MILLED)	23300	April - June 1990	USAID		
				RICE TOTAL:	23300 Metric Tons
MAIZE					
				MAIZE TOTAL:	0 Metric Tons
COTTON, (FIBRE)	3700	Jan. - Feb. 1990	USAID		
				COTTON TOTAL:	3700 Metric Tons

DATA SOURCE:

USAID/KINSHASA AND WORLD FOOD PROGRAM, (December 1989)

ZAIRE:

TABLE: 5

FOOD NEEDS ASSESSMENT: 1990

TECHNICAL COEFFICIENTS:

COMMODITY	CALORIES/ UNMILLED KILO	MILLING EXTRACTION RATE, (MER)	SEED USE	FEED USE	POST HARVEST LOSSES	SHARE IN TOTAL CALORIE INTAKE
MAIZE	3570	0.85	0.05	0.03	0.10	0.09
RICE, (PADDY)	3530	0.60	0.05	--	0.07	0.03
WHEAT	3320	0.75	0.02	--	0.05	0.02
MANIOC	1490	0.30	--	0.02	0.08	0.56
PLANTAIN	1350	0.90	--	0.01	0.10	0.05
PEANUTS	5490	0.70	0.13	--	0.05	0.04

DATA SOURCES:

COEFFICIENTS:

Manioc: IFPRI. Trends and Prospects for Cassava in Zaire, February 1989.

MER:

All Other Commodities: FAO. Technical Conversion Factors. Agricultural Commodity Projections for 1975 and 1985. Vol. 1. Methodological Notes/Statistical Annex, (Rome, Italy: 1967), and SEP, (Service d'etudes et Planificantion: Ministere d'Agriculture), December, 1989.

NON-FOOD USES:

All Other Commodities: FAO. Zaire: Food Balance Sheet. 1979-81 Average, (Rome, Italy: 1983).

SHARE IN TOTAL CALORIE INTAKE:

FAO. Zaire: Food Balance Sheet. 1979-81 Average, (Rome, Italy: 1983).

FOOD CONSUMPTION PATTERNS: KINSHASA

TABLE: 6

PER CAPITA MONTHLY CONSUMPTION (KILOS)

	1969	1975	1986
MANIOC	6.12	5.38	4.60
BREAD	1.77	1.17	1.58
MANIOC LEAVES	1.59	1.33	1.30
BANANAS	0.92	0.42	0.57
RICE	0.61	0.74	1.07
FISH	0.95	0.77	0.92
BEANS	0.39	0.37	0.33
BEEF (WITHOUT BONE)	0.36	0.20	0.28
TOMATOES	0.36	0.22	0.19
SUGAR	0.35	0.47	0.43
TOTAL	13.42	11.07	11.26
N =	1471	1367	205

NOTE: N = Number of Households

SOURCE:

Joseph Houyoux, Niwembo Kinavwuidi, et Onya Okito. Budgets des Menages: Kinshasa, 1986. Bureau d'Etudes d'Amenagement et d'Urbanisme (BEAU), Kinshasa, 1986.

ZAIRE:

TABLE: 7

FOOD NEEDS ASSESSMENT:

AREA CULTIVATED (HECTARES) BY CROP AND REGION: 1985

	MAIZE	RICE (PADDY)	MANIOC	PLANTAIN	PEANUTS
KINSHASA	20400	3200	85800	12800	26000
BAS-ZAIRE	31300	5100	128700	18900	33700
BANDUNDU	119600	21500	343400	30700	107200
EQUATEUR	127300	56700	218900	21000	59800
HAUT-ZAIRE	133200	102600	239500	64600	85900
KIVU	95000	78500	358400	113400	52600
SHABA	127300	6600	287600	9200	72000
KASAI - OCCIDENTAL	101900	30100	266800	7800	63100
KASAI - ORIENTAL	93400	29300	216500	7100	47600
TOTAL	849400	333600	2145600	285500	547900

DATA SOURCE:

DEPARTEMENT DE L'AGRICULTURE. ANNUAIRE DES STATISTIQUES AGRICOLES, 1979 - 1985.
SERVICE D'ETUDES ET DE PLANIFICATION AGRICOLE/DIVISION DE LA STATISTIQUE AGRICOLE.

ANNEX 1:

ZAIRE FOOD NEEDS ASSESSMENT: 1990

Melanee Lowdermilk

CONTACTS:

1) DEPARTEMENT DE L'AGRICULTURE:
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Mohamed Ben Senia, (Agricultural Planning Advisor)
Brook Greene, (Economic Analysis Advisor)
Adel Labib, (Data Processing Specialist)
Suha Satana, (Data Collection Advisor)

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Kifle Negash, (ARD/Agricultural Policy/Data Analysis)
David Kingsbury, (ARD/Program Specialist)
Glenn Rogers, (Program Office: Research)

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Bikangi Nikiabungu, (Chef de Division des Etudes)

4) INSTITUT NATIONAL DE LA STATISTIQUE, (INS): DEPARTEMENT DU PLAN.

Citoyen Niwembo Kinavwuidi, (Statistique)

5) OFFICE DES DOUANES ET ACCISES, (OFIDA).

Citoyen Mwamba, (Bureau Informatique)

6) WORLD BANK

Christopher Trapman, (Economist)

ANNEX 2:

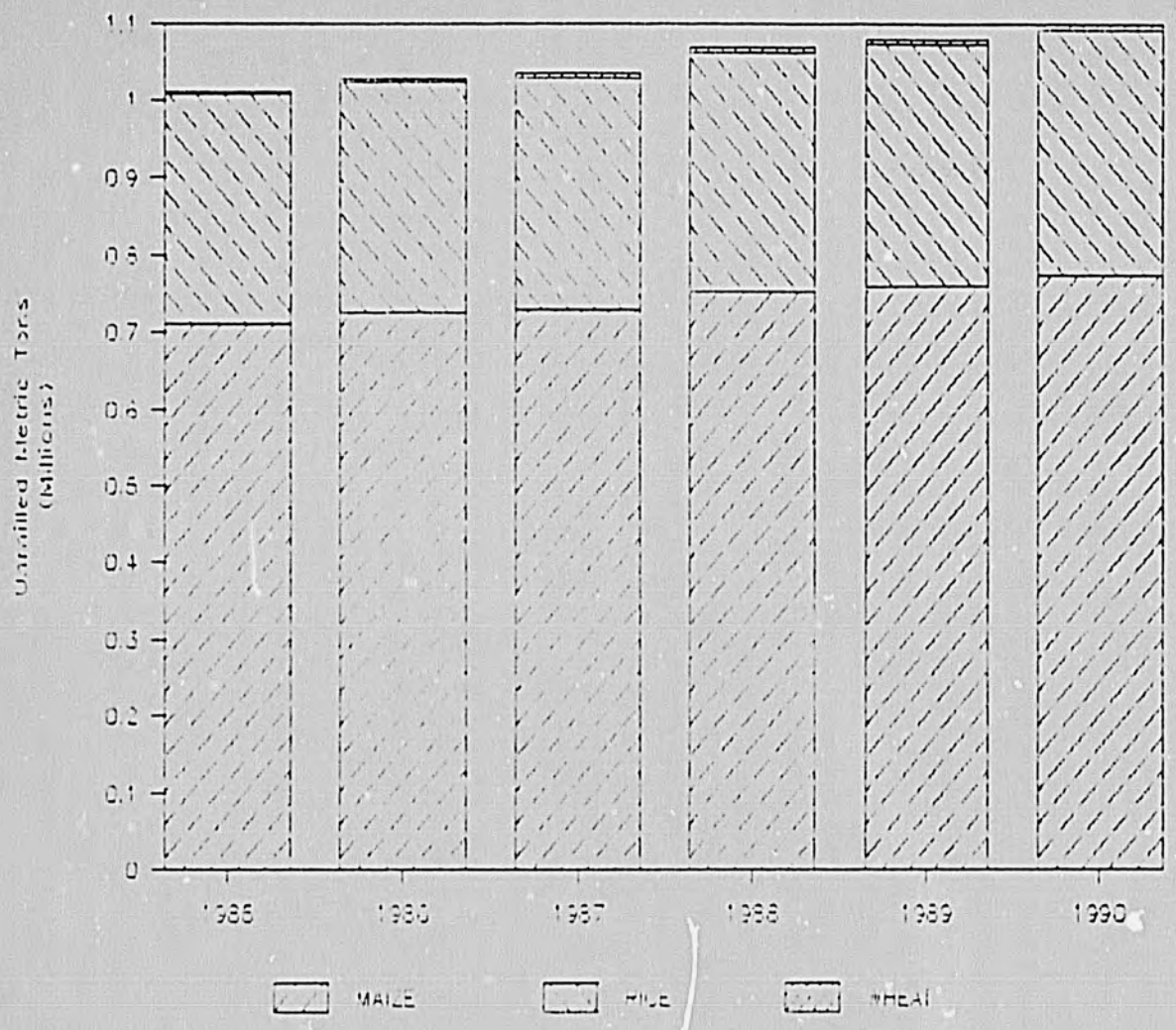
TRAINING IN FNA METHODOLOGY AND TEMPLATE/SOFTWARE:

DEPARTEMENT DE L'AGRICULTURE:
DIRECTION DU SERVICE D'ETUDES ET PLANIFICATION, (SEP).

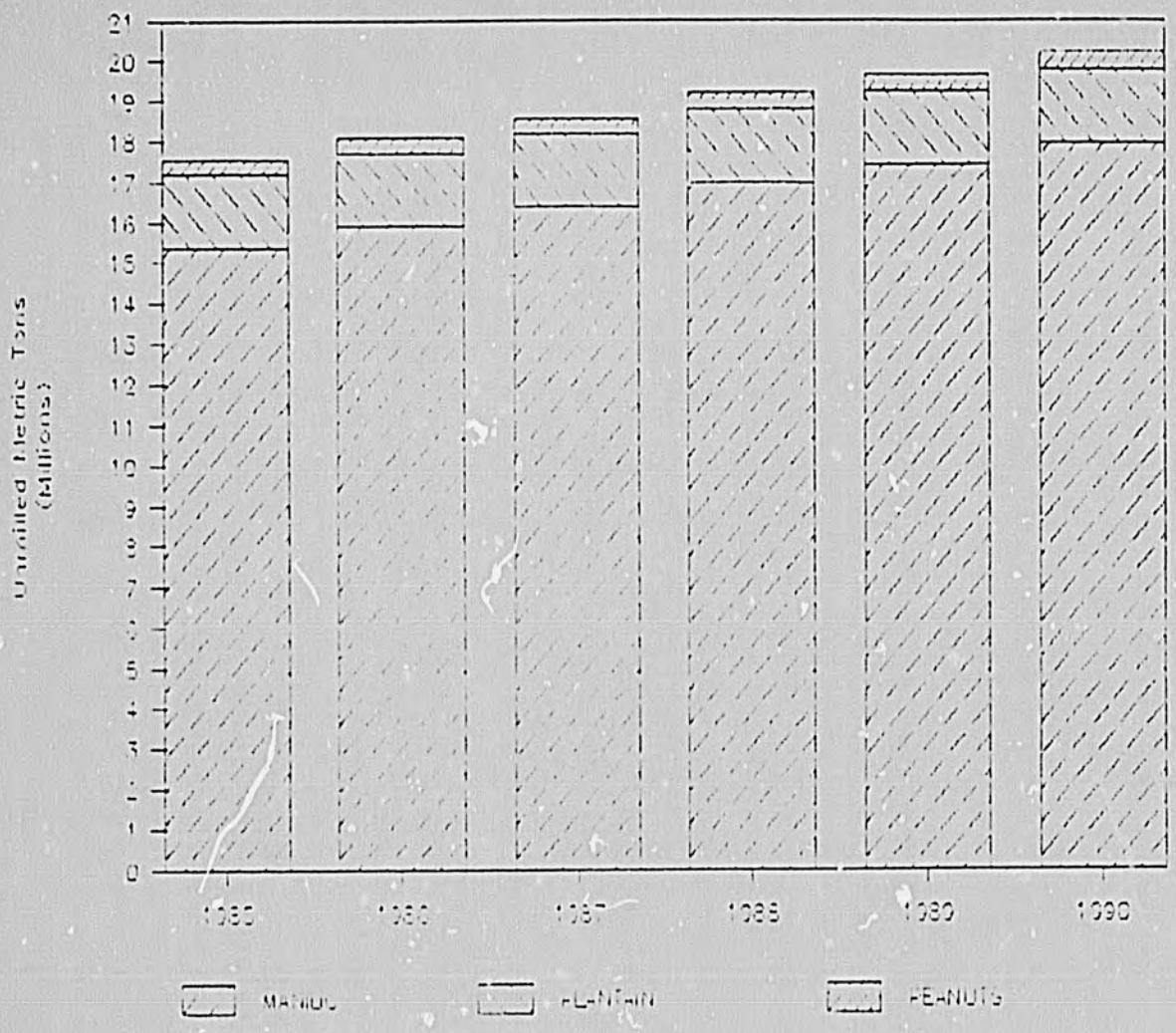
DATE:	December 7, 1989
PARTICIPANTS:	Brook Greene, SEP Kiesolo Ntemo, SEP Kassenga Ali Zibuka, SEP David Kingsbury, USAID
DATE:	December 8, 1989
PARTICIPANTS:	Mansinsa Mvuala, SEP Quan Dinh, SEP Adel Labib, SEP Negash Kifle, USAID
DATE:	December 11, 1989
PARTICIPANTS:	Doug Barnett, SEP Suha Satana, SEP
DATE:	December 12, 1989
PARTICIPANTS:	Mohamed Ben-Senia, SEP Kiesolo Ntemo, SEP Kassenga Ali Zibuka, SEP
DATE:	December 13, 1989
PARTICIPANTS:	Adel Labib, SEP

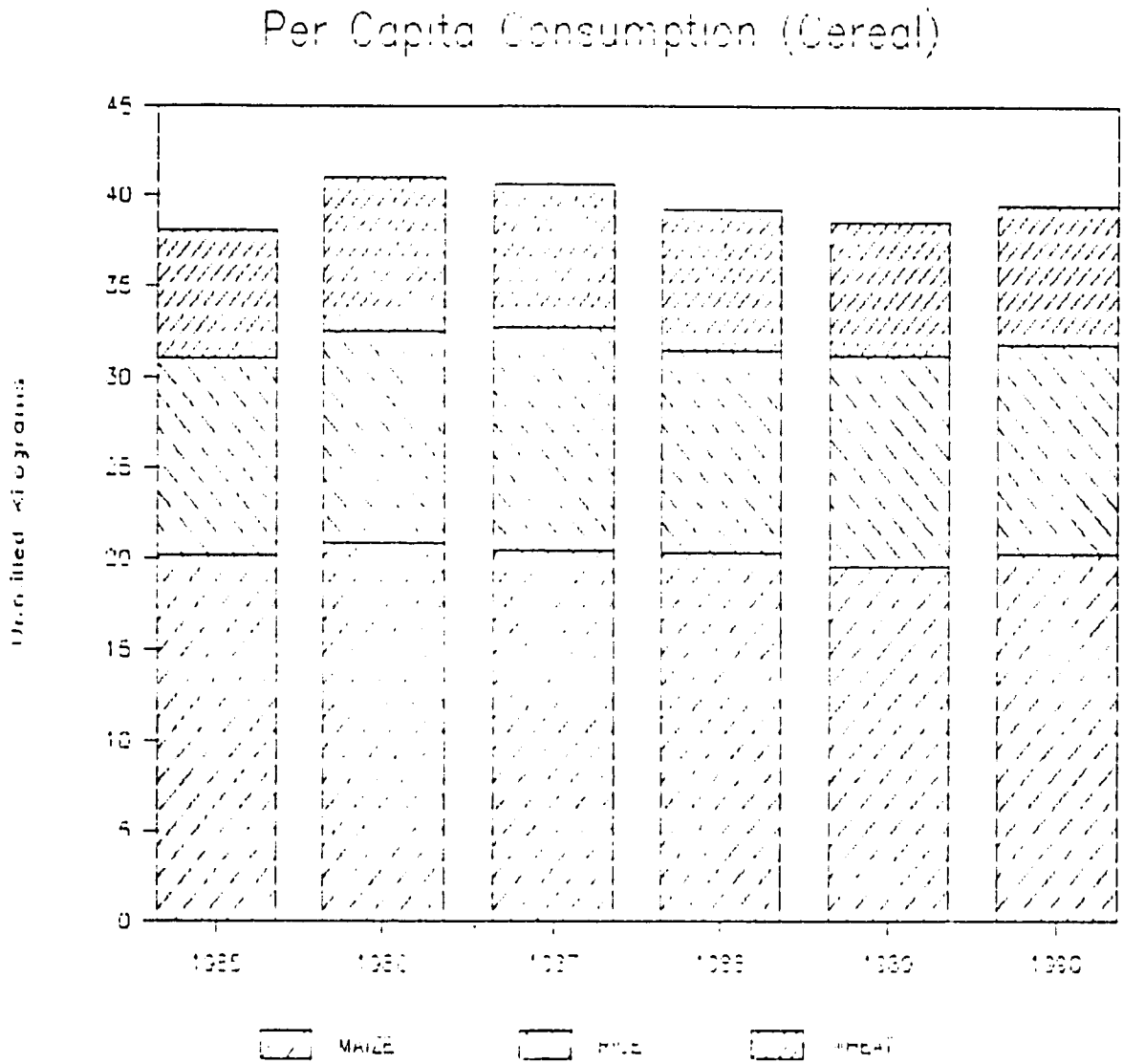
FIGURES

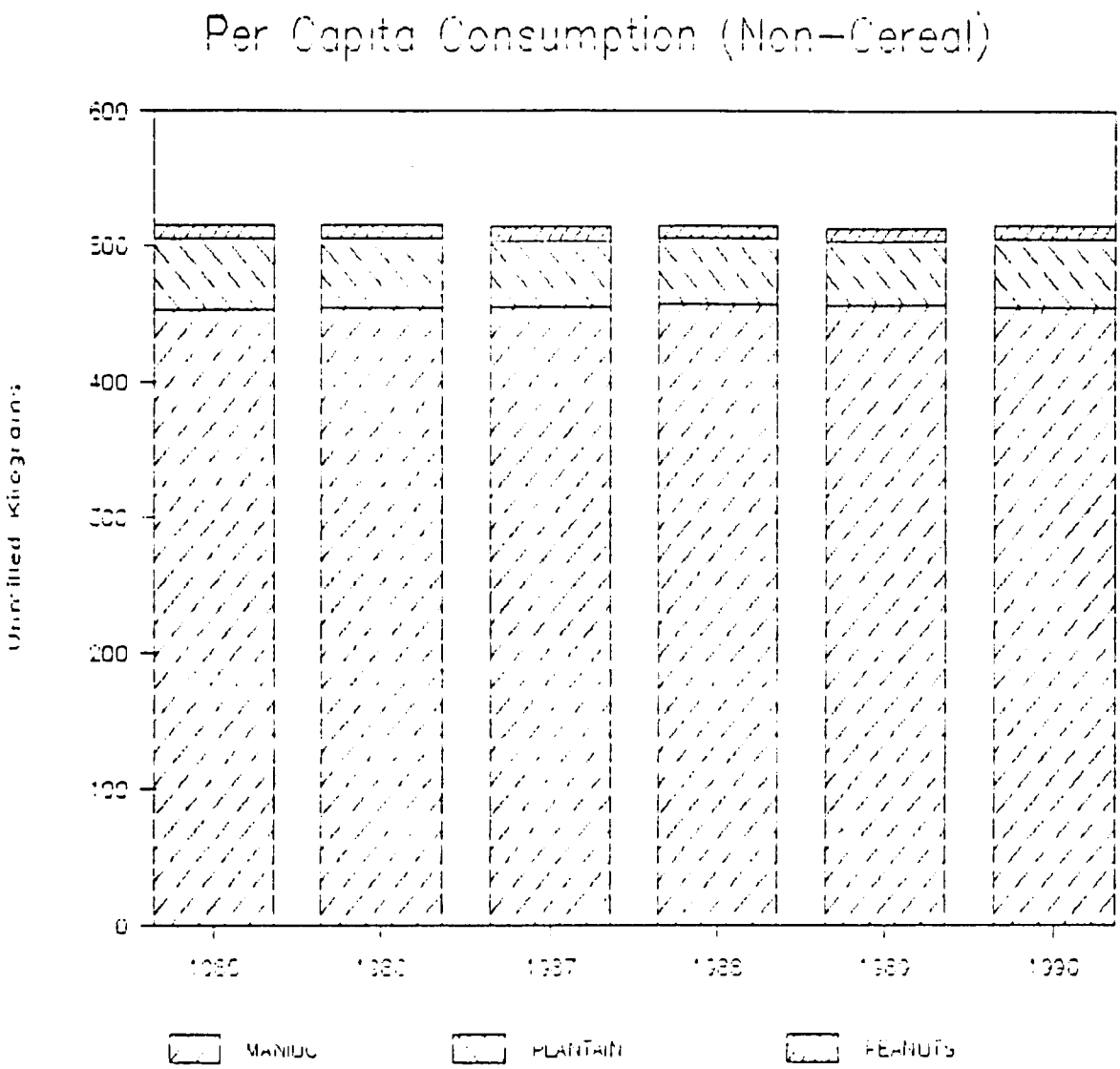
Gross Domestic Production (Cereal)



Gross Domestic Production (Non-Cereal)




Per Capita Consumption (Cereal)
45
40
35
30
25
20
15
10
5
0
1985
1986
1987
1988
1989
1990
MAIZE
RICE
WHEAT


Per Capita Consumption (Non-Cereal)
600
500
400
300
200
100
0
Unmilled Kilograms
1986
1987
1988
1989
1990
MANDIOC
PLANTAIN
PEANUTS

STATISTICAL APPENDIX

GENERAL DATA REPORT

Food Needs Assessment: ZAIRE

Consumption Year: JAN/DEC

Current Year (year of analysis):	1990	Current Year Population:	35,429
Historical Years T-1:	1989	Historical Year T-1 Population (000)	34,397
T-2:	1988	T-2 Population (000)	33,395
T-3:	1987	T-3 Population (000)	32,423
T-4:	1986	T-4 Population (000)	31,478
T-5:	1985	T-5 Population (000)	30,562

Commodities Included in Assessment: Base ==)	MAIZE	RICE	WHEAT			MANIOC	PLANTAIN	PEANUTS		
Caloric equivalent (calories/ UNMILLED kilogram)	3,570	3,530	3,320	0	0	1,490	1,350	5,490	0	0
/ Caloric equivalent of base commodity	3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570	3,570
= Base Commodity Equivalent Coefficient (.00)	1.00	0.99	0.93	0.00	0.00	0.42	0.38	1.54	0.00	0.00
Milling extraction rate (.00)	85%	60%	75%	0%	0%	30%	90%	70%	0%	0%

COMMODITY: MAIZE (Base) ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	710,500	725,590	730,000	753,280	760,100	735,894
- Total non-food uses	127,890	130,606	131,400	135,590	136,818	132,461
= Net domestic food production	582,610	594,984	598,600	617,690	623,282	603,433
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	582,610	594,384	598,600	617.690	623,282	603,433
+ Total commercial food imports	35,000	58,000	56,000	57,717	44,528	50,249
+ Food Aid	0	4,000	8,000	4,000	5,000	4,200
= Total food supply	617,610	656,384	662,600	679,407	672,810	657,882
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	20.2	20.9	20.4	20.3	19.6	20.3
= PER CAPITA CONSUMPTION (MILLED kg/year)	17.2	17.7	17.4	17.3	16.6	17.2

COMMODITY: RICE ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	297,170	298,670	300,170	310,830	314,370	304,242
- Total non-food uses	35,660	35,840	36,020	37,300	37,724	36,509
= Net domestic food production	261,510	262,830	264,150	273,530	276,646	267,733
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	261,510	262,830	264,150	273,530	276,646	267,733
+ Total commercial food imports	69,750	105,042	51,688	84,583	63,858	74,984
+ Food Aid	0	0	84,860	15,050	62,470	32,476
= Total food supply	331,260	367,871	400,698	373,164	402,974	375,193
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	10.8	11.7	12.4	11.2	11.7	11.6
= PER CAPITA CONSUMPTION (MILLED kg/year)	6.5	7.0	7.4	6.7	7.0	6.9

COMMODITY: WHEAT

ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	3,000	4,000	5,000	5,000	6,000	4,600
- Total non-food uses	210	280	350	350	420	322
= Net domestic food production	2,790	3,720	4,650	4,650	5,580	4,278
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	2,790	3,720	4,650	4,650	5,580	4,278
+ Total commercial food imports	113,352	206,673	156,415	156,689	172,658	161,157
+ Food Aid	99,478	56,423	93,978	98,882	74,000	84,552
= Total food supply	215,620	266,816	255,043	260,221	252,238	249,988
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	7.1	8.5	7.9	7.8	7.3	7.7
= PER CAPITA CONSUMPTION (MILLED kg/year)	5.3	6.4	5.9	5.8	5.5	5.8

COMMODITY: MANIOC

ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	15,400,000	15,900,000	16,400,000	17,000,000	17,440,000	16,428,000
- Total non-food uses	1,540,000	1,590,000	1,640,000	1,700,000	1,744,000	1,642,800
= Net domestic food production	13,860,000	14,310,000	14,760,000	15,300,000	15,696,000	14,785,200
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	13,860,000	14,310,000	14,760,000	15,300,000	15,696,000	14,785,200
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	13,860,000	14,310,000	14,760,000	15,300,000	15,696,000	14,785,200
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	453.5	454.6	455.2	458.2	456.3	455.6
= PER CAPITA CONSUMPTION (MILLED kg/year)	136.1	136.4	136.6	137.4	136.9	136.7

COMMODITY: PLANTAIN'.

ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	1,795,100	1,796,600	1,798,100	1,799,100	1,818,540	1,801,488
- Total non-food uses	197,461	197,626	197,791	197,901	200,039	198,164
= Net domestic food production	1,597,639	1,598,374	1,600,309	1,601,199	1,618,501	1,603,324
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	1,597,639	1,598,374	1,600,309	1,601,199	1,618,501	1,603,324
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	1,597,639	1,598,374	1,600,309	1,601,199	1,618,501	1,603,324
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	52.3	50.8	49.4	47.9	47.1	49.5
= PER CAPITA CONSUMPTION (MILLED kg/year)	47.0	45.7	44.4	43.2	42.3	44.5

COMMODITY: PEANUTS.

ZAIRE

	1985	1986	1987	1988	1989	Average
Gross domestic food production	386,000	386,000	390,000	399,300	403,440	393,348
- Total non-food uses	69,480	69,840	70,200	71,874	72,619	70,803
= Net domestic food production	316,520	316,160	319,800	327,426	330,821	322,545
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	316,520	316,160	319,800	327,426	330,821	322,545
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	316,520	316,160	319,800	327,426	330,821	322,545
/ Population (thousands)	30,562	31,478	32,423	33,395	34,397	32,451
= PER CAPITA CONSUMPTION (UNMILLED kg/year	10.4	10.1	9.9	9.8	9.6	9.9
= PER CAPITA CONSUMPTION (MILLED kg/year)	7.2	7.1	6.9	6.9	6.7	7.0

ZAIRE: POPULATION AND GROWTH RATE

Growth Rate =	3.0 %
1984	29671407
1985	30561549
1986	31478396
1987	32422748
1988	33395430
1989	34397293
1990	35429212

SOURCE: Census 1984

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

MAIZE PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	673070
1984	703950
1985	710500
1986	725590
1987	730000
1988	753280
1989	760100

DATA SOURCE:

1983 - 1988: DEPARTEMENT DE L'AGRICULTURE/SEP, (Decembre 1989).

1988 - 1989: ESTIMATES

ZAIRE:

FOOD NEEDS ASSESSMENT:

MAIZE IMPORTS, (METRIC TONS): 1985 - 1989

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1985	35000	0	35000
1986	58000	4000	62000
1987	56000	8000	64000
1988	57717	4000	61717
1989	44528	5000	49528

DATA SOURCES:

COMMERCIAL IMPORTS: 1985 - 1987: DEPARTEMENT DE L'AGRICULTURE/SEP, (Decembre 1989)

1988 - 1989: OFIDA, (Decembre, 1989)

CONCESSIONAL IMPORTS: FAO

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

RICE, (PADDY) PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	271333
1984	286000
1985	297167
1986	298667
1987	300167
1988	310833
1989	314367

DATA SOURCE:

1983 - 1988: DEPARTEMENT DE L'AGRICULTURE/SEP, (Decembre 1989).

1988 - 1989: ESTIMATES

ZAIRE:

FOOD NEEDS ASSESSMENT:

RICE IMPORTS, (METRIC TONS): 1984 - 1989

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	31530	3000	34530
1985	41850	0	41850
1986	63025	0	63025
1987	31013	50916	81929
1988	50750	9030	59780
1989	38315	37482	75797

DATA SOURCES:

OFIDA AND USAID/KINSHASA, (December 1989).

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

WHEAT PRODUCTION: 1983 - 1990

YEAR	PRODUCTION (Metric Tons)
1983	2000
1984	3000
1985	3000
1986	4000
1987	5000
1988	5000
1989	6000
1990	7000

DATA SOURCE:

DEPARTEMENT DE L'AGRICULTURE. AUTOSUFFISANCE ET SECURITE ALIMENTAIRE AU ZAIRE. DRAFT, JUILLET 1989.

ZAIRE: DRAFT, JANUARY 1990

FOOD NEEDS ASSESSMENT:

WHEAT IMPORTS, (METRIC TONS): 1984 - 1989

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	117543	105296	222839
1985	113352	99478	212830
1986	206673	56423	263096
1987	156415	93978	250393
1988	156689	98882	255571
1989	172658	74000	246658

NOTE: All Quantities in Wheat Equivalent Terms.

DATA SOURCES:

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

MANIOC PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	14600000
1984	15000000
1985	15400000
1986	15900000
1987	16400000
1988	17000000
1989	17440000

DATA SOURCE:

1983 - 1988: DEPARTEMENT DE L'AGRICULTURE, (December 1989).

1988 - 1989: ESTIMATES

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

PLANTAIN PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	1703000
1984	1749000
1985	1795100
1986	1796600
1987	1798100
1988	1799100
1989	1818540

DATA SOURCE:

1983 - 1988: ANNUAIRE DES STATISTIQUES AGRICOLES, 1979 - 1988.

1989: ESTIMATE

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

PEANUTS PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	366000
1984	375000
1985	386000
1986	388000
1987	390000
1988	399300
1969	403440

DATA SOURCE:

1983 - 1987: DEPARTEMENT DE L'AGRICULTURE, (Decembre 1989).

1988 - 1989: ESTIMATES

ZAIRE:

FOOD NEEDS ASSESSMENT: 1990

SEED COTTON PRODUCTION: 1983 - 1989

YEAR	PRODUCTION (Metric Tons)
1983	26800
1984	20800
1985	20700
1986	19100
1987	17000
1988	16200
1989 *	14890

* = Estimate

DATA SOURCE:

DEPARTEMENT DE L'AGRICULTURE. ANNUAIRE DES STATISTIQUES AGRICOLES, 1979 - 1985 AND 1986 - 1988. SERVICE D'ETUDES ET DE PLANIFICATION AGRICOLES/ DIVISION DE LA STATISTIQUE AGRICOLE.

ZAIRE

FOOD NEEDS ASSESSMENT:

COTTON IMPORTS, (METRIC TONS): 1984 - 1989

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	232	0	232
1985	520	4906	5426
1986	220	7440	7660
1987	0	3694	3694
1988	0	1446	1446
1989	0	3822	3822

DATA SOURCES:

OFIDA AND USAID/KINSHASA, (December 1989)

NOTES

(1) Departement de l'Agriculture. Autosuffisance et Securite Alimentaire au Zaire: Problemes et Options. Draft, Octobre 1989, p. 15.

(2) Tshikala Tshibaka and Kamanda Lumpungu, Trends and Prospects for Cassava in Zaire. International Food Policy Research Institute, IFPRI. Washington, DC, February 1989, p. 20.

(3) World Bank. Zaire: Population, Health and Nutrition. Washington, DC, May 15, 1989, pp. 11 - 12.

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Tshikala Tshibaka and Kamanda Lumpungu. Trends and Prospects for Cassava in Zaire. International Food Policy Research Institute, IFPRI. Washington, DC, February 1989.

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World Bank. Zaire: Toward Sustained Agricultural Development, Agriculture Sector Memorandum. The World Bank, Washington, DC. September 26, 1988.