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RWANDA: FOOD NEEDS ASSESSMENT (1990)

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RWANDA

FOOD NEEDS ASSESSMENT: 1990

I. SUMMARY:

An assessment of the 1990 food supply and utilization situation was conducted in Rwanda July 16 - August 3, 1990. Commodities covered in the assessment included maize, sorghum, rice, wheat, beans, manioc, potatoes, sweet potatoes, and bananas. Per capita production of staple food crops has been declining over the past 5 years. Unfavorable weather conditions in 1989 resulted in a marked decline in total production of most food crops over the previous year. For 1990, total production of food crops is estimated to be 5% below the poor 1989 harvests. Given relatively low production levels coupled with population growth of 3.7%, deficits emerge in 1990 for all food crops except rice and potatoes. Following a year of localized drought and food shortages, the data show that the aggregate 1990 food supply is unable to cover 'status quo' consumption levels of staple foods.

The food balance situation for cereals prior to food aid shows a deficit of 37,476 MT (unmilled) for coarse grains and 3,790 MT (unmilled) for wheat. Due to a draw down in stocks, rice shows a small surplus indicating that production and commercial imports are adequate to support status quo consumption. Food aid arrivals to date of 10,630 MT (unmilled) reduce the aggregate cereal deficit to 30,636 MT (unmilled) in 1990. It should be noted that legumes and tubers form the dietary staples in Rwanda, with cereals contributing only 6% to daily caloric intake. In 1990 beans (the principal source of calories and protein in the Rwandan diet) show a deficit of 63,210 MT. Food aid imports of 1,565 MT serve to reduce this deficit only slightly; however, unofficial imports of beans from Uganda and Zaire estimated at 26,500 MT reduce the deficit to 35,045 MT. The outlook for tubers and bananas is likewise one of shortfalls with the exception of potatoes which show a small surplus.

It should be noted that when calculating the 1990 food balance, average per capita availability over a base period of five historic years was used as a proxy for consumption. Per capita availability (estimated at 1,800 calories/person/day) was multiplied by the current population to arrive at the total consumption requirement.

Tables 1 and 2 provide a detailed breakdown of the food balance situation by commodity. Food aid imports for 1990 are presented in Table 3.

RWANDA: FOOD NEEDS ASSESSMENT, (1990) TABLE 1:

	MAIZE	SORGHUM	RICE	WHEAT	BEANS	MANIOC	POTATOES	SWEET POTATOES	BANANAS
FOOD DEFICIT *	22297	15179	-4521	3790	63210	183671	-4096	171997	129176
FOOD AID COMMITMENTS:	7629	1205	0	1796	1565	0	0	0	0
UNCOVERED FOOD DEFICIT:	14668	13974	-4521	1994	61645	183671	-4096	171997	129176
% MILLING EXTRACTION RATE	0.70	0.60	0.65	0.74	1.00	0.30	0.85	0.85	0.95
UNCOVERED FOOD DEFICIT: MILLED	10268	8384	-2939	1476	61645	55101	-3482	146197	122717

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

	MAIZE	SORGHUM	RICE	WHEAT	BEANS	MANIOC	POTATOES	SWEET POTATOES	BANANAS
PER CAPITA DEFICIT: (KILOS)	3.05	2.07	-0.62	0.52	8.64	25.10	-0.56	23.50	17.65
DEFICIT AS A % OF GROSS DOMESTIC PRODUCTION:	0.20	0.10	-0.66	0.38	0.33	0.94	-0.02	0.24	0.06

NOTES:

A) ALL QUANTITIES IN METRIC TONS UNLESS NOTED

B) ALL QUANTITIES IN UNMILLED (UNPROCESSED) TERMS UNLESS NOTED

C) BASE PERIOD: 1984, 1986 - 1989. YEAR: JAN/DEC

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

E) NON-FOOD USES:

	MAIZE	SORGHUM	RICE	WHEAT	BEANS	MANIOC	POTATOES	SWEET POTATOES	BANANAS
SEED	0.03	0.01	0.02	0.01	0.07	--	0.19	--	--
WASTE/LOSSES	0.04	0.04	0.03	0.10	0.03	0.06	0.06	0.06	0.02
MILLING EXTRACTION RATE	0.70	0.60	0.65	0.74	1.00	0.30	0.85	0.85	0.95

F) POPULATION BASED ON 1978 CENSUS WITH 3.7% GROWTH RATE

G) PER CAPITA DEFICIT AND DEFICIT AS A % OF GROSS PRODUCTION CALCULATED PRIOR TO FOOD AID.

TABLE 2:

CURRENT YEAR FOOD BALANCE
Current Year: 1990

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL RCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.4	32.8	50.1	25.1	115.9	298.6	565.9	203.1
x Population (thousands)	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318
= Total consumption requirement	124,553	161,502	15,068	16,775	317,897	240,123	366,671	183,783	847,900	2,184,954	4,141,327	1,486,352
Gross domestic food production	109,755	150,758	6,900	10,000	277,413	189,889	194,681	250,505	719,045	2,097,732	3,729,265	1,296,419
- Total non-food use	7,683	7,538	345	1,100	16,656	18,989	11,681	62,626	43,143	41,955	195,059	73,203
= Net domestic food production	102,072	143,220	6,555	8,900	260,747	170,900	183,000	187,879	675,902	2,055,777	3,534,206	1,223,216
- Net change in stocks	0	(3,102)	(9,255)	0	(12,357)	(2,113)	0	0	0	0	(14,470)	(10,849)
- Total food exports	0	0	0	0	0	0	0	0	0	0	0	0
= Domestic food supply	102,072	146,322	15,810	8,900	273,105	173,013	183,000	187,879	675,902	2,055,777	3,548,676	1,234,065
Total consumption requirement (from above)	124,553	161,502	15,068	16,775	317,897	240,123	366,671	183,783	847,900	2,184,954	4,141,327	1,486,352
- Domestic food supply (from above)	102,072	146,322	15,810	8,900	273,105	173,013	183,000	187,879	675,902	2,055,777	3,548,676	1,234,065
= Import requirement	22,481	15,179	(742)	7,875	44,792	67,110	183,671	(4,096)	171,997	129,176	592,650	252,288
- Total commercial food imports	184	0	3,779	4,085	8,048	3,900	0	0	0	0	11,948	9,680
= FOOD DEFICIT (UNMILLED)	22,297	15,179	(4,521)	3,790	36,744	63,210	183,671	(4,096)	171,997	129,176	580,702	242,608
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	15,608	9,108	(2,939)	2,804	24,581	63,210	55,101	(3,482)	146,198	122,717	408,325	179,514

II. METHODOLOGY:

A food needs assessment identifies the magnitude and commodity composition of the national food deficit/surplus for a given year. Information generated from an assessment provides policy-makers with a view of the food supply and utilization situation, and identifies possible commodities for food aid programming. Five years of historical data are collected to serve as a base period when calculating the national level 1990 food balance. Base period data serve as a comparative reference and highlight trends over time. Key variables in the analysis include: production, consumption, imports/exports, stocks, population, and caloric values of staple foods.

1) Commodity Coverage:

The commodities included in the 1990 assessment include maize, sorghum, rice, wheat, beans, manioc, potatoes, sweet potatoes, and bananas. Legumes and tubers contribute the bulk to daily calorie consumption in both rural and urban Rwanda. Cereals play a minor role in the diet, and on a national level represent only 6% of total calorie intake. Of the cereals, rice and wheat are consumed primarily in urban areas. Data from the rural and urban household consumption studies conducted by MINIPLAN were used to estimate national level shares of total calorie consumption as follows[1]: beans (31%), sweet potatoes (17%), manioc (13%), bananas (8%), cereals (6%), and potatoes (4%). Figure 1 presents national level calorie shares; for a breakdown of consumption for urban and rural areas see Table 4.

2) Base Period of Analysis:

Five years of historical data are used as a base period when calculating a current year balance. For Rwanda the base period of analysis includes data from calendar years 1984 and 1986 - 1989. The 1985 agricultural year was excluded from the analysis due to data limitations, (i.e. ASPAP/Projet Enquetes Agricioles did not collect production data for the full year). The period January - December defines the consumption year, and includes the two principal harvest of January and June/July.

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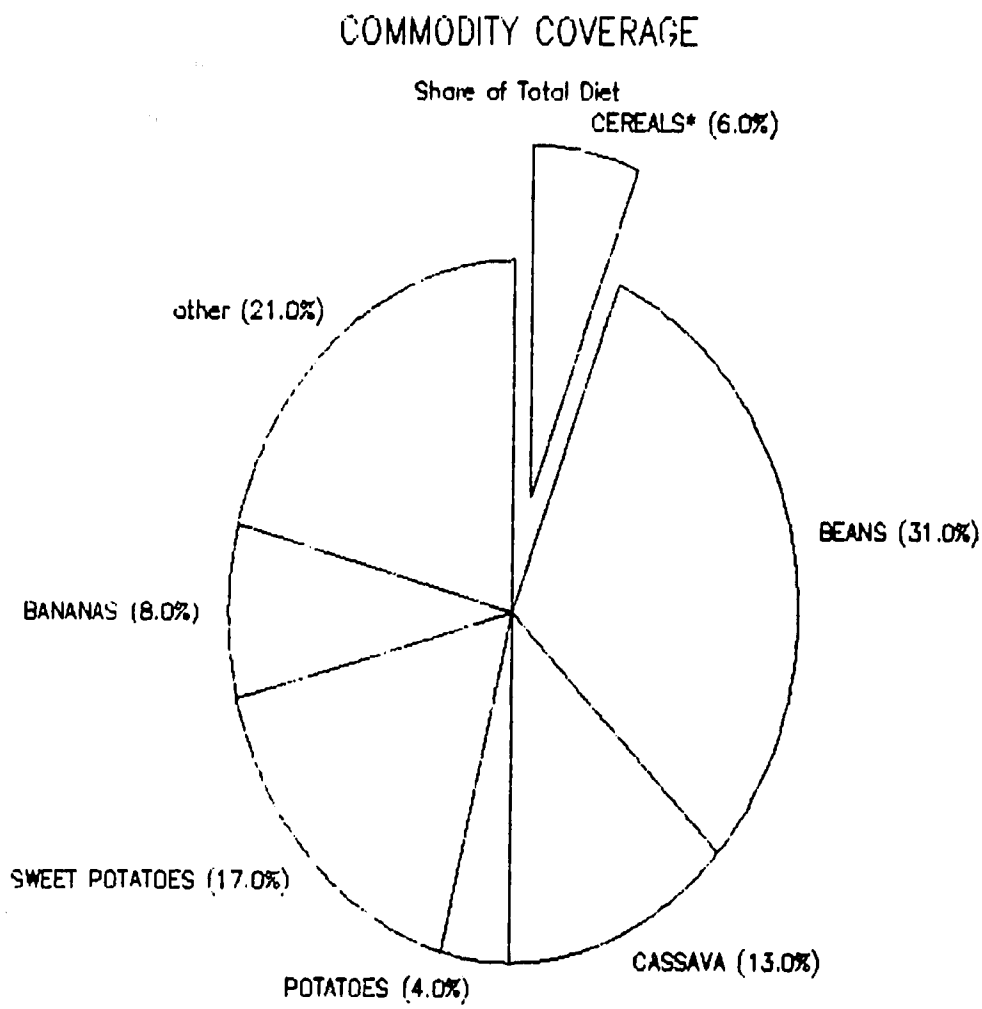
[1]MINIPLAN: Ministere du Plan, Republique Rwandaise. Enquete Nationale sur le Budget et la Consommation des Menages: Milieu Rural, Decembre 1988; Preliminary Results, Enquete Nationale sur le Budget et La Consommation des Menages: Milieu Urban, (Forthcoming).

FIGURE 1: NATIONAL LEVEL
========= CONSUMPTION, (1984/85)



3) Per Capita Availability:

The food needs assessment methodology typically uses average per capita availability over the base period as a proxy for consumption. The total consumption requirement in the current year is determined by multiplying population by an average per capita availability figure. Thus, consumption is estimated based on historic data on food availability (production, imports/exports, and stocks) rather than nutritional requirements. In quantity terms average per capita availability expressed in unmilled kilos/person/year is as follows: cereals (43.4 kilos), beans (32.8 kilos), manioc (50.1 kilos), potatoes (25.1 kilos), sweet potatoes (115.9 kilos), and bananas (298.6 kilos). When converted to calorie terms, per capita availability is estimated at 1,800 calories/person/day.

In terms of actual calorie intake, data collected in 1985 by MINIPLAN indicate much higher per capita daily consumption levels than cited above: rural (2,444 calories) versus urban (2,611 calories)[2]. The data in this assessment show a decline in per capita availability of staple foods over the base period. If availability can be taken as a rough proxy for consumption, then there has been a significant deterioration in food intake levels over the past 5 years.

4) Population:

The Rwandan population in 1990 is estimated at 7,318,000. Population figures used in this assessment are based on the 1978 census factoring in a 3.7% growth rate. Although urbanization has been increasing in recent years, the proportion of the total population living in rural areas remains substantial at 93%.

5) Non-Food Uses:

Domestic food production was adjusted downwards to account for non-food uses such as seed requirements, animal feed, and post-harvest losses. In addition, milling extraction rates were applied to all commodities to reflect losses attributed to processing. The milling extraction rate is defined as the percentage of the raw product left after milling/processing into the form in which foods will be consumed.

A breakdown of non-food uses for Rwanda is presented in Table 4.

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[2]Ibid. Note that MINIPLAN urban consumption figures are preliminary.

6) Base Commodity Equivalent (BCE) Conversion:

The base commodity is defined as the most important cereal in the diet. Maize was selected as the base commodity in Rwanda since sorghum, the principal cereal, is consumed primarily as beer. To add and compare commodities of different caloric values a base commodity equivalent (BCE) coefficient is calculated. As shown in the last column of Table 2, the quantities of each commodity are converted into the equivalence (in caloric terms) of the base commodity maize.

7) Data Sources:

The principal source of agricultural data used in this assessment was ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural/MINAGRI). The data collection methodology employed by ASPAP is based on a survey conducted on a random sample of farm households representative of agro-ecological zones and prefectures. National level production data is determined by weighting the sample data by population. Systematic data collection by ASPAP has been ongoing since 1984 with a one season hiatus in 1985. The Ministry of Agricuture (MINAGRI) has been collecting a parallel set of data on the agricultural sector in Rwanda. In contrast to ASPAP, however, MINAGRI data is based on observations by agents in the field with little or no training in systematic data collection. Given a greater degree of reliability, ASPAP production data for staple food crops was used for the five year base period. Rice and wheat production data was provided by MINAGRI. It should be noted that both ASPAP and MINAGRI use 1986 as the base case 'normal' production year. The Banque Nationale du Rwanda (BNR) provided data on food imports, both commercial and concessional. Current food aid import data was provided by WFP/Kigali. Stock information was collected from OPROVIA, (Office National pour le Developpement et la Commercialisation des Produits Vivriers et des Productions Animales).

Annex 1 presents a complete list of data sources and individuals contacted. The data used in the assessment are presented in tabular form in Annex 2.

III. AGRICULTURAL SECTOR:

1) General:

Agriculture represents the principal source of employment and income in Rwanda. The economy is predominantly agrarian, with agriculture contributing 40% to GDP. Approximately 93% of the population derive a livelihood from agriculture, primarily the cultivation of staple food crops and coffee and tea. Subsistence production characterizes the agricultural sector: principal food crops cultivated include beans, manioc, potatoes, sweet potatoes, bananas, maize and sorghum. Average farm size is 1.2 hectares, with over half of households citing holdings of less than 1 hectare. Coffee is the principal cash crop in Rwanda representing more than 75% of export earnings.

Since the early 1980's the Government of Rwanda has espoused a policy of food self sufficiency. Food crop production was able to keep pace with population growth until recently, due to an expansion of cultivated land. Since 1984, however, population growth of 3.7% has overtaken increases in staple food crop production. Population growth combined with limited arable land, depletion of soils, and low yields of staple crops has contributed to a decline in per capita production over the past 5 years. Data from ASPAP show that per capita production of staple food crops has fallen in a steady linear fashion from 650 kilos in 1984 to 549 kilos in 1989. Given limited cultivable land, significant improvements in crop yields will be necessary to simply maintain current consumption levels. Tables 5 and 6 present total production and production per capita of staple food crops over the base period.

Annex 3 presents projected food deficits for the period 1991 - 1995 maintaining current consumption (per capita availability) at 1,800 calories per day. Given a population growth rate of 3.7%, the size of the aggregate food deficit nearly doubles over the next five years. (It should be noted that projected food deficits were calculated using linear trend estimates for production and imports).

2) 1989 Agricultural Season

Unfavorable weather conditions in 1989 resulted in a poor June harvest, and acute regional food shortages developed over the year. Factors cited as contributing to the decline in production were: (i) irregular rainfall (ii) declining soil fertility due to population pressure on the land, (iii) pest infestation and plant diseases, and (iv) insufficient seeds/boutures, fertilizer, and pesticides. The relatively poor harvests of 1989 highlight the precarious food security

situation in Rwanda as segments of the population were unable to acquire adequate food either through home production or purchases. A study commissioned by OXFAM in November 1989 noted that 600,000 people were adversely affected in the South and Southwest of the country, and identified an at risk population of 60,000. The Government of Rwanda issued an official request for emergency food aid in December 1989. The donor community response to this request has included providing financial and food resources for distribution to affected populations. Food aid received in 1990 includes 10,630 MT (unmilled) of cereals and 1,565 MT of legumes.

As early as April 1989 there were indications that the food situation was deteriorating. Under the aegis of MINAGRI, an inter-ministerial team of technicians issued a report on the January and June/July 1989 harvests. There were indications at that time of impending food shortages in the West and Southwestern prefectures of Kibuye, Gikongoro, and Butare. By November of 1989 the prefecture of Gitarama was also added to the list of regions seriously affected by the disette. Official government recognition of the food emergency, however, came only in December 1989, 6 months after the initial MINAGRI report was issued. At that time, emergency food aid was requested to assist affected populations until the June/July 1990 harvest.

3) 1990 Agricultural Season:

Insufficient rains early in the planting season followed by excessive rainfall in November 1989 resulted in below average January harvest of legumes and coarse grains. MINAGRI estimates for the 1990 June/July harvest show improvement in production, albeit small, for some food crops. Key food staples such as beans, manioc, and sweet potatoes, however, show a decline in production over the 1989 ASPAP estimates. Thus, aggregate output in 1990 is estimated to be 5% below that of the 1989 agricultural year. Although no official estimates have been released to date, given adequate rainfall the outlook for coffee production in 1990 is favorable. This suggests an increase in purchasing power for those rural households producing coffee as a cash crop.

Informal interviews of rural households in the Prefectures of Ruhengeri and Butare indicate a deterioration of the food situation over the past year. The 1990 bean harvest was noted as being particularly poor. Production of other crops such as sweet potatoes and sorghum was likewise considered below normal. Inadequate seeds/boutures for the September planting season was reported by all households. The relatively poor harvest and the depletion of on-farm stocks suggest that the periode de soudure, September through December 1990, will again be characterized by regional food shortages. Strategies cited by households to cope with shortfalls include: (i) working for better-off neighbors

for cash or in-kind payment, (ii) migration to other regions in search of work, (iii) consumption of beer bananas, and (iv) emergency food aid and seeds distributed by the Commune. Since 1989, however, opportunities to work for cash or in-kind payment have become increasingly difficult to find in the South and Southwest of the country.

The 1990 food balance situation by crop is presented below. Preliminary production estimates for 1990 are those provided by MINAGRI. ASPAP data for the 1990 agricultural year are still being processed, and will not be released until the Fall. (As an alternative scenario, Table 7 presents the food balance using linear trend estimates for 1990 production based on ASPAP production data over the 5 year base period).

IV. FOOD CROPS:

1) Cereals:

Production: Aggregate production of cereals peaked at 307,825 MT in 1986 and declined to 234,840 MT in 1989. Estimates for 1990 show an improvement in cereals production of 18% over the previous year. Of the cereals, sorghum figures most prominently in terms of both production and consumption. Approximately 80% of sorghum production is used to make beer, with the remaining 20% consumed as either bouillie (porridge) or pate (thick dough made from sorghum flour). In 1990 sorghum production is estimated at 150,758 MT. As the second most important cereal, maize shows a 17% improvement over the previous year's harvest with a production estimate of 109,755 MT in 1990. Yields of coarse grains are relatively low, with output per hectare in 1989 estimated at 761 kilos (sorghum) and 723 kilos (maize). On average, production of wheat and rice together account for only 5% of total cereal output. Production estimates for 1990 for rice and wheat are 6,900 MT and 10,000 MT respectively.

Per Capita Availability: Annual per capita availability of cereals has averaged 43.4 unmilled kilos over the base period disaggregated as follows: sorghum (22.1 kilos), maize (17 kilos), wheat (2.3 kilos), and rice (2.1 kilos). Given low levels of production, wheat and rice availability has been augmented by both commercial and food aid imports. For the country as a whole, cereals represent only 6% of total daily calorie consumption in Rwanda. The rural-urban breakdown of calorie shares shows that rice, and to a lesser extent wheat, are consumed primarily in urban areas.

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Imports: Total cereal imports have fallen over the past five years averaging 21,353 MT per year. Food aid represents approximately 60% of total cereal imports, and is primarily in the form of wheat, wheat flour, rice, and maize flour. Of the cereals, wheat and rice consistently register the highest import levels, both commercial and concessional. Maize flour imports are for the most part concessional, with average food aid imports of 2,701 MT (milled) per year.

Food Balance: Despite the increase in aggregate cereal output in 1990, the food balance situation prior to food aid shows a deficit of 37,476 MT (unmilled) for coarse grains and 3,790 MT (unmilled) for wheat. Due to a draw down of stocks, rice shows a small surplus indicating that production and commercial imports are adequate to support status quo consumption. Food aid imports to date of 10,630 MT reduce the aggregate cereal deficit to 30,636 MT . The uncovered deficit by cereal in 1990 is: (i) maize 14,668 MT (unmilled), and (ii) sorghum 13,974 MT (unmilled), and (iii) wheat 1,994 MT (unmilled).

2) Beans:

Production: As the Rwandan dietary staple, beans are produced throughout the country occupying approximately 16% of cultivated land. Beans are cultivated primarily for on-farm consumption, with only 10.2% of production being

commercialized.[3] Average bean yields per hectare was estimated at 815 kilos in 1989. Output of beans rose from 256,504 MT in 1984 to a high of 278,287 MT in 1986. Production, however, has been falling in recent years with 1989 bean output 25% lower than 1986 levels. MINAGRI estimates for 1990 bean production indicate a decline of 9% over the previous year's harvest. The poor bean harvest was attributable in part to irregular rainfall during the growing season, accompanied by hail in the Southern part of the country. Insect infestation was also cited as contributing to low yields.

Per Capita Availability: Beans play an important role in the Rwandan diet in both rural and urban areas. Data from the rural and urban consumption surveys conducted by MINIPLAN show that beans contribute on average 31% to daily calorie intake. Beans are also the primary source of protein in the diet. Average per capita availability over the base period is estimated

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[3]Scott Loveridge, Uses of Farm and Market Survey Data to Inform Food Security Policy in Rwanda, (Ph.D. Dissertation: Michigan State University). MINAGRI, Service des Enquetes et des Statistiques Agricoles, 1988, p. 35.

at 32.8 kilos/year. Per capita availability, however, has been falling in recent years, from 39.2 kilos/year in 1984 to 27.2 kilos/year in 1989. When converted to calories, the decline in the availability of beans over the base period represents 100 calories/person/day.

Imports: Official bean imports have grown rapidly over the base period from a low of 1 MT in 1984 to a high of 3,914 MT in 1989. It should be noted, however, that a significant quantity of beans is unofficially imported from neighboring countries, namely Uganda, Zaire, and Tanzania. A study of the bean sub-sector in Rwanda reports that 36,164 MT or 14% of production was imported unofficially in 1986.[4]

Food Balance: The data show that bean production in 1990 is unable to support average per capita availability. Given the continuing decline in production, a deficit of 63,210 MT emerges for beans. Food aid imports of 1,565 MT serve to reduce this shortfall only slightly; however, unofficial imports estimated at 26,600 (14% of production) reduce the deficit to 35,045 MT.

3) Tubers:

Manioc, Potatoes, and Sweet Potatoes are the principal tubers in the Rwandan diet. Production of potatoes and sweet potatoes shows marked variation over the base period. Total output of manioc has declined progressively since 1987. For 1990, the outlook for both manioc and sweet potatoes is one of relatively poor harvests at 194,681 MT and 719,045 MT respectively. The lack of boutures and spreading pest infestation (mealy bug and African green spider mite) have contributed to low manioc production levels. Estimates of potato production in 1990, in contrast, indicate a 5% increase in output over the previous year. Similar to other dietary staples, per capita availability of tubers has fallen over the past five years from 200.5 kilos/year in 1984 to 169.6 kilos/year in 1989. When calculating the current year balance, substantial deficits emerge for manioc (183,671 MT unprocessed) and sweet potatoes (171,997 MT unprocessed). Potatoes show a small surplus indicating that production is adequate to support average per capita consumption levels.

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[4]Ibid, p. 36.

4) Bananas:[5]

In Rwanda, bananas are the most important food crop in terms of both quantity produced and hectares planted. Approximately 75% of total banana output goes towards the manufacture of local beer. In 1990 production is estimated to be 2% lower than 1989 levels at 2,097,732 MT. Given an average per capita availablity figure of 298.6 kilos, a deficit emerges for bananas of 129,176 MT (unprocessed).

V. ISSUES:

1) Food Security:

In recent years there has been a deterioration of national and household level food security in Rwanda due to rapid population growth and limited cultivable land. Per capita production of staple food crops has been declining over the base period. Per capita availability has likewise been falling suggesting a progressive decline in food consumption levels. Intensification of agricultural production coupled with efforts to curb population growth will be necessary to arrest the decline in consumption. The regional food shortages of 1989/90 clearly show that growing portions of the population experience food insecurity: households have inadequate access to food, either through home production or purchases.

2) Malnutrition:

The chronic nature of malnutrition in the South and Southwestern regions of Rwanda was also highlighted by the 1989/90 food emergency. A study of the nutrition situation in the Prefectures of Kibuye, Gikongoro, Butare, and Gitarama was commissioned by UNICEF in December of 1989.[6] The aim of the study was to: (i) identify persons affected by the disette, and (ii) design measures to address the food emergency: distribution of food and medical rations. The results of the study showed that moderate and severe malnutrition was experienced by 30.3% and 17.5% of the sample population

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[5]Due to data limitations, production figures include only cooking and beer bananas.

[6]Bertrand Desmoulins. Report on the Mission on the Food Emergency in Rwanda. UNICEF/Rwanda, January 1990.

respectively.[7] Malnutrition was cited as being a chronic rather than a transitory phenomenon: the regional food shortages of 1989 aggravated an existing problem of poor nutritional status.

3) Food Assistance/Aid:

The food balance situation for calendar year 1990 is one of deficits for all food crops with the exception of rice and potatoes. In Rwanda food stress will be exacerbated during the periode de soudure, September - December 1990, prior to the January 1991 harvest. Of the commodities included in the assessment, beans emerge as most appropriate for food aid programming given their principal role in the diet and high calorie and protein content. Above average bean harvests in the neighboring countries of Uganda and Tanzania provide opportunities for trilateral food aid transactions. A trilateral transaction involves a donor country supplying commodities to an exporting developing country, which then supplies a third 'recipient' country with a commodity appropriate for local consumption; the commodity received by the the third country recipient is one that is not readily available for food aid distribution by the first country donor.[8] Issues to be considered in assessing a triangular transaction for Rwanda include: (i) cost effectiveness, (ii) timeliness of food delivery, and (iii) appropriateness of recipient food aid commodity, in this case beans, for local consumption.

[7]Sample: children between the ages of 1 and 5 years old.

[8]Alice L. Morton, Warren J. Enger, G. Reginald King, and Alexander F. McCalla. Trilateral Food Aid Transactions: U.S.G. Experience in the 1980's. AID: Washington, DC 1989, p. 1.

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RWANDA FOOD NEEDS ASSESSMENT: 1990

TABLES

RWANDA:

TABLE: 3

FOOD NEEDS ASSESSMENT: 1990

FOOD AID IMPORTS/COMMITMENTS, (Calendar Year 1990).

COMMODITY	METRIC TONS	DONOR		
WHEAT	1450	Canada	WHEAT TOTAL:	1450 Metric Tons
WHEAT FLOUR	21	USAID/CRS		
	235	USAID/CRS	WHEAT FLOUR:	256 Metric Tons
MAIZE	362	Denmark		
	3640	Germany		
	2398	Japan	MAIZE TOTAL:	6400 Metric Tons
MAIZE FLOUR	350	USAID/CRS		
	301	USAID/CRS		
	208	USAID/CRS	MAIZE FLOUR TOTAL:	860 Metric Tons
SORGHUM	1205	Italy	SORGHUM TOTAL:	1205 Metric Tons
BEANS	265	EEC		
	1000	EEC		
	300	Germany	BEANS TOTAL:	1565 Metric Tons

DATA SOURCE: WFP/Kigali, July 1990.

RWANDA: FOOD NEEDS ASSESSMENT, 1990

TABLE: 4

TECHNICAL COEFFICIENTS:

COMMODITY	CALORIES/ KILO	MILLING EXTRACTION RATE (%)	SEED USE (%)	LOSSES (%)	RURAL SHARE IN TOTAL CALORIE INTAKE, (%)	URBAN SHARE IN TOTAL CALORIE INTAKE, (%)
MAIZE	3225	70	3	4	4.0	1.1
SORGHUM	3038	60	1	4	0.9	0.6
RICE	2070	65	2	3	0.4	7.7
WHEAT	2688	74	1	10	--	--
BEANS	3031	100	7	3	32.3	17.6
MANIOC	1023	30	--	6	12.3	19.0
POTATOES	574	85	19	6	3.5	10.2
SWEET POTATOES	1081	85	--	6	17.4	6.0
BANANAS						
Cooking	802	95	--	1	7.9	3.6
Beer	196		--	2	0.3	0.7
					21.0	33.5

Other Foods:

Calories/Kilo: Calorie figures used by ASPAP, Source: MINAGRI/SESA, Description Sommaire des Principales Characteristiques de l'Agriculture au Rwanda: ENA 1984, Rapport 2, fevrier 1987.

Coefficients: MINAGRI, Rwanda, (July 1990)
OPROVIA, Rwanda, (July 1990)
L'Enquete Nationale Agricole: 1984.

Share of Calorie Intake: Ministere du Plan, Republique Rwandaise. Enquete Nationale sur le Budget et la Consommation des Menages: Milieu Rural, Decembre 1988; Preliminary Results, Enquete Nationale sur le Budget et la Consommation des Menages: Milieu Urban, (Ministere du Plan: Forthcoming).

RWANDA:

TABLE: 5

FOOD NEEDS ASSESSMENT: 1990

STAPLE FOOD CROP PRODUCTION (METRIC TONS): 1984 - 1989

	1984	1986	1987	1988	1989
MAIZE:	111475	135003	102438	128041	93955
SORGHUM:	171057	158878	150217	140584	126865
BEANS:	256504	278287	204637	223904	210317
MANIOC:	324208	361899	389592	346123	310549
POTATOES:	251372	241466	180988	171217	238605
SWEET POTATOES:	730927	861904	799286	649079	771460
BANANAS:	1982287	1801949	1949413	2065442	2125141
PER CAPITA PRODUCTION:	0.650	0.607	0.575	0.577	0.549

DATA SOURCES:

Production: ASPAP, July 1990.

Population: Based on 1978 Census with 3.7% Growth Rate.

RWANDA:

TABLE: 6

FOOD NEEDS ASSESSMENT: 1990

STAPLE FOOD CROP PRODUCTION (METRIC TONS): 1984 - 1989

	1984	1986	1987	1988	1989
MAIZE:					
Total	111475	135003	102438	128041	93955
Per Capita	0.019	0.021	0.016	0.019	0.013
SORGHUM:					
Total	171057	158878	150217	140584	126885
Per Capita	0.029	0.025	0.023	0.021	0.018
BEANS:					
Total	256504	278287	204637	223904	210317
Per Capita	0.044	0.044	0.031	0.033	0.030
MANIOC:					
Total	324208	361899	389592	346123	310549
Per Capita	0.055	0.057	0.059	0.051	0.044
POTATOES:					
Total	251372	241466	180988	171217	238605
Per Capita	0.043	0.038	0.028	0.025	0.034
SWEET POTATOES:					
Total	730927	861904	799286	849079	771460
Per Capita	0.124	0.136	0.122	0.125	0.109
BANANAS:					
Total	1982287	1801949	1949413	2065442	2125141
Per Capita	0.337	0.285	0.297	0.304	0.301

DATA SOURCES:

Production: ASPAP, July 1990.

Population: Based on 1978 Census with 3.7% Growth Rate.

TABLE 7: 1990 FOOD BALANCE USING
LINEAR TREND PRODUCTION ESTIMATES
(ASPAP: July 1990)

CURRENT YEAR FOOD BALANCE
Current Year: 1990

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL BCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.4	32.8	50.1	25.1	115.9	298.6	565.9	203.1
x Population (thousands)	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318	7,318
= Total consumption requirement	124,553	161,502	15,068	16,775	317,897	240,123	366,671	183,783	847,900	2,184,954	4,141,327	1,486,352
Gross domestic food production	101,582	117,533	5,551	9,930	234,596	190,703	333,546	187,995	823,004	2,149,607	3,919,449	1,337,072
- Total non-food use	7,111	5,877	278	1,092	14,357	19,070	20,013	46,999	49,380	42,992	192,811	73,295
= Net domestic food production	94,471	111,656	5,273	8,838	220,238	171,632	313,533	140,996	773,623	2,106,615	3,726,638	1,263,777
- Net change in stocks	0	(3,102)	(9,255)	0	(12,357)	(2,113)	0	0	0	0	(14,470)	(10,849)
- Total food exports	0	0	0	0	0	0	0	0	0	0	0	0
= Domestic food supply	94,471	114,758	14,528	8,838	232,596	173,745	313,533	140,996	773,623	2,106,615	3,741,108	1,274,625
Total consumption requirement (from above)	124,553	161,502	15,068	16,775	317,897	240,123	366,671	183,783	847,900	2,184,954	4,141,327	1,486,352
- Domestic food supply (from above)	94,471	114,758	14,528	8,838	232,596	173,745	313,533	140,996	773,623	2,106,615	3,741,108	1,274,625
= Import requirement	30,082	46,743	540	7,936	85,301	66,377	53,138	42,787	74,276	78,339	400,218	211,727
- Total commercial food imports	184	0	3,779	4,085	8,048	3,900	0	0	0	0	11,948	9,680
= FOOD DEFICIT (UNMILLED)	29,898	46,743	(3,239)	3,852	77,253	62,477	53,138	42,787	74,276	78,339	388,270	202,048
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	20,928	28,046	(2,106)	2,850	49,719	62,477	15,941	36,369	63,135	74,422	302,063	157,737

GENERAL DATA REPORT

Food Needs Assessment: RWANDA

Consumption Year: JAN/DEC

Current Year (year of analysis):	1990	Current Year Population:	7,318
Historical Years T-1:	1989	Historical Year T-1 Population (000)	7,057
T-2:	1988	T-2 Population (000)	6,895
T-3:	1987	T-3 Population (000)	6,562
T-4:	1986	T-4 Population (000)	6,328
T-5:	1984	T-5 Population (000)	5,885

Commodities Included in Assessment: Base ==>	MAIZE	SORGHUM	RICE	WHEAT		BEANS	MANIOC	POTATOES	S/POTATOE	BANANAS
Caloric equivalent (calories/ UNMILLED kilogram)	3,225	3,038	2,070	2,688	0	3,031	1,023	574	1,081	778
/ Caloric equivalent of base commodity	3,225	3,225	3,225	3,225	3,225	3,225	3,22[illegible]	3,225	3,225	3,225
= Base Commodity Equivalent Coefficient (.00)	1.00	0.94	0.64	0.83	0.00	0.94	0.32	0.18	0.34	0.24
Milling extraction rate (.00)	70%	60%	65%	74%	0%	100%	30%	85%	85%	95%

COMMODITY: MAIZE (Base) RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	111,475	135,003	102,438	128,041	93,955	114,182
- Total non-food uses	7,803	9,450	7,171	8,963	6,577	7,993
= Net domestic food production	103,672	125,553	95,267	119,078	87,378	106,190
- Net change in stocks	0	231	(233)	152	(152)	(0)
- Total food exports	0	0	0	0	0	0
= Domestic food supply	103,672	125,322	95,500	118,926	87,530	106,190
+ Total commercial food imports	92	734	83	7	3	184
+ Food Aid	8,145	6,113	2,613	1,693	733	3,859
= Total food supply	111,909	132,169	98,196	120,626	88,266	110,233
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	19.0	20.9	15.0	17.7	12.5	17.0
= PER CAPITA CONSUMPTION (MILLED kg/year)	13.3	14.6	10.5	12.4	8.8	11.9

COMMODITY: SORGHUM

RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	171,057	158,878	150,217	140,584	126,885	149,524
- Total non-food uses	8,553	6,355	7,511	7,029	6,344	7,158
= Net domestic food production	162,504	152,523	142,706	133,555	120,541	142,366
- Net change in stocks	(1,156)	900	(338)	(687)	224	(211)
- Total food exports	0	0	0	0	0	0
= Domestic food supply	163,660	151,623	143,044	134,242	120,317	142,577
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	163,660	151,623	143,044	134,242	120,317	142,577
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	27.8	24.0	21.8	19.7	17.0	22.1
= PER CAPITA CONSUMPTION (MILLED kg/year)	16.7	14.4	13.1	11.8	10.2	13.2

COMMODITY: RICE RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	7,919	8,440	6,581	6,892	6,000	7,166
- Total non-food uses	396	422	329	345	300	358
= Net domestic food production	7,523	8,018	6,252	6,547	5,700	6,808
- Net change in stocks	271	(446)	529	(417)	9,083	1,804
- Total food exports	0	0	0	0	0	0
= Domestic food supply	7,252	8,464	5,723	6,964	(3,383)	5,004
+ Total commercial food imports	5,258	5,363	238	66	7,969	3,779
+ Food Aid	4,838	9,469	6,962	91	0	4,272
= Total food supply	17,349	23,296	12,923	7,121	4,586	13,055
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	2.9	3.7	2.0	1.0	0.6	2.1
= PER CAPITA CONSUMPTION (MILLED kg/year)	1.9	2.4	1.3	0.7	0.4	1.3

COMMODITY: WHEAT RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	3,070	5,504	6,294	8,100	8,000	6,194
- Total non-food uses	338	605	692	891	880	681
= Net domestic food production	2,732	4,899	5,602	7,209	7,120	5,512
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	2,732	4,899	5,602	7,209	7,120	5,512
+ Total commercial food imports	4,903	4,920	882	5,845	3,874	4,085
+ Food Aid	9,293	9,696	5,355	766	761	5,174
= Total food supply	16,928	19,515	11,839	13,820	11,755	14,771
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	2.9	3.1	1.8	2.0	1.7	2.3
= PER CAPITA CONSUMPTION (MILLED kg/year)	2.1	2.3	1.3	1.5	1.2	1.7

COMMODITY: BEANS RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	256,504	278,287	204,637	223,904	210,317	234,730
- Total non-food uses	25,650	27,829	20,464	22,390	21,032	23,473
= Net domestic food production	230,854	250,458	184,173	201,514	189,285	211,257
- Net change in stocks	(10)	(1,363)	(68)	754	1,304	123
- Total food exports	0	0	0	0	0	0
= Domestic food supply	230,864	251,821	184,241	200,760	187,981	211,133
+ Total commercial food imports	1	470	2	174	3,914	912
+ Food Aid	0	974	0	27	71	214
= Total food supply	230,865	253,265	184,243	200,961	191,966	212,260
/ Population (thousands)	5,885	6,329	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	39.2	40.0	28.1	29.5	27.2	32.8
= PER CAPITA CONSUMPTION (MILLED kg/year)	39.2	40.0	28.1	29.5	27.2	32.8

COMMODITY: MANIOC

RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	324,208	361,899	389,592	346,123	310,549	346,474
- Total non-food uses	19,452	21,714	23,376	20,767	18,633	20,788
= Net domestic food production	304,756	340,185	366,216	325,356	291,916	325,686
- Net change in stocks	0	(12)	3	(10)	38	4
- Total food exports	0	0	0	0	0	0
= Domestic food supply	304,756	340,197	366,213	325,366	291,878	325,682
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	304,756	340,197	366,213	325,366	291,878	325,682
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	51.8	53.8	55.8	47.8	41.4	50.1
= PER CAPITA CONSUMPTION (MILLED kg/year)	15.5	16.1	16.7	14.3	12.4	15.0

COMMODITY: POTATOES

RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	251,372	241,466	180,988	171,217	238,605	216,730
- Total non-food uses	62,843	60,367	45,247	42,804	59,651	54,182
= Net domestic food production	188,529	181,100	135,741	128,413	178,954	162,547
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	188,529	181,100	135,741	128,413	178,954	162,547
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	188,529	181,100	135,741	128,413	178,954	162,547
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	32.0	28.6	20.7	18.9	25.4	25.1
= PER CAPITA CONSUMPTION (MILLED kg/year)	27.2	24.3	17.6	16.0	21.6	21.3

COMMODITY: S/POTATOES

RWANDA

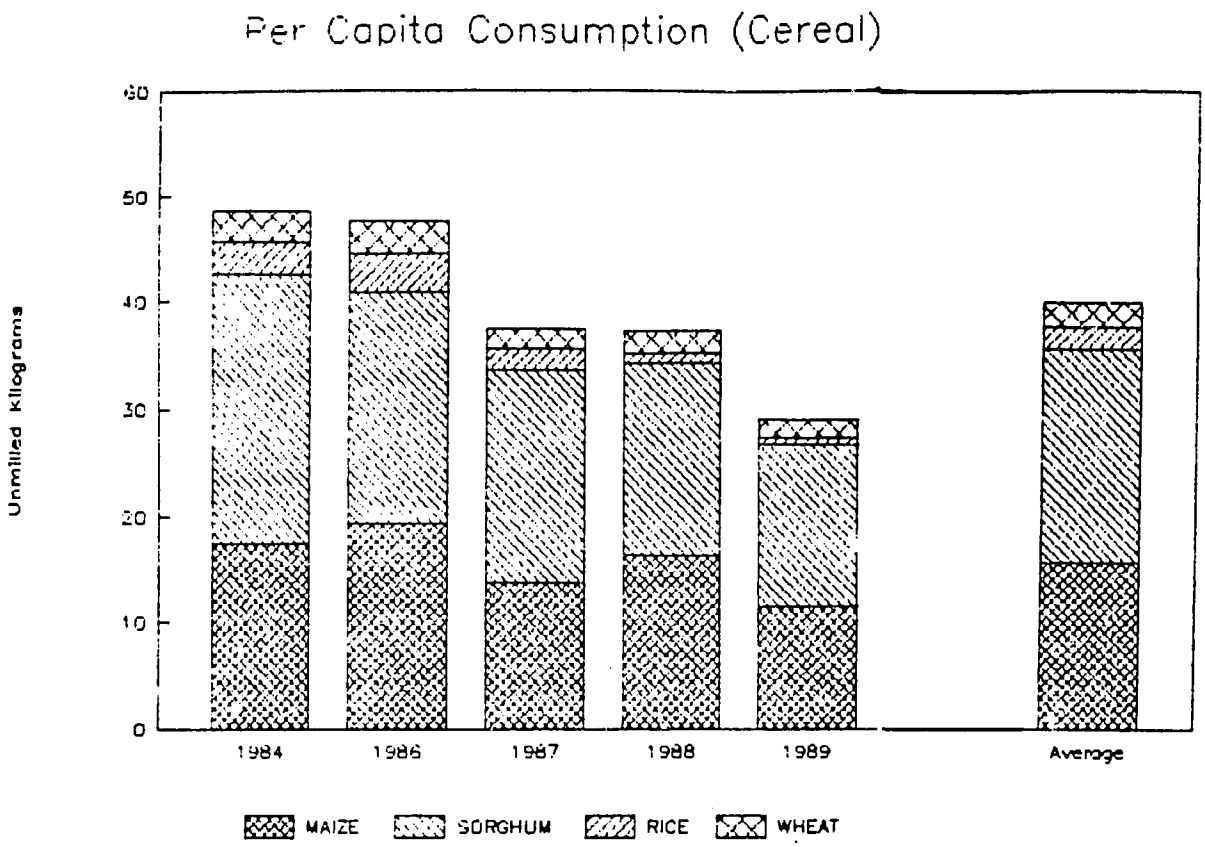
	1984	1986	1987	1988	1989	Average
Gross domestic food production	730,927	861,904	799,286	849,079	771,460	802,531
- Total non-food uses	43,856	51,714	47,957	50,945	46,288	48,152
= Net domestic food production	687,071	810,190	751,329	798,134	725,172	754,379
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	687,071	810,190	751,329	798,134	725,172	754,379
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	687,071	810,190	751,329	798,134	725,172	754,379
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	116.7	128.0	114.5	117.3	102.8	115.9
= PER CAPITA CONSUMPTION (MILLED kg/year)	99.2	108.8	97.3	99.7	87.3	98.5

COMMODITY: BANANAS RWANDA

	1984	1986	1987	1988	1989	Average
Gross domestic food production	1,982,287	1,801,949	1,949,413	2,065,442	2,125,141	1,984,846
- Total non-food uses	39,646	36,039	38,988	41,309	42,503	39,697
= Net domestic food production	1,942,641	1,765,910	1,910,425	2,024,133	2,082,638	1,945,149
- Net change in stocks	0	0	0	0	0	0
- Total food exports	0	0	0	0	0	0
= Domestic food supply	1,942,641	1,765,910	1,910,425	2,024,133	2,082,638	1,945,149
+ Total commercial food imports	0	0	0	0	0	0
+ Food Aid	0	0	0	0	0	0
= Total food supply	1,942,641	1,765,910	1,910,425	2,024,133	2,082,638	1,945,149
/ Population (thousands)	5,885	6,328	6,562	6,805	7,057	6,527
= PER CAPITA CONSUMPTION (UNMILLED kg/year	330.1	279.1	291.1	297.4	295.1	298.6
= PER CAPITA CONSUMPTION (MILLED kg/year)	280.6	237.2	247.5	252.8	250.8	253.8

RWANDA FOOD NEEDS ASSESSMENT: 1990

FIGURES


Per Capita Consumption (Cereal)
Unmilled Kilograms
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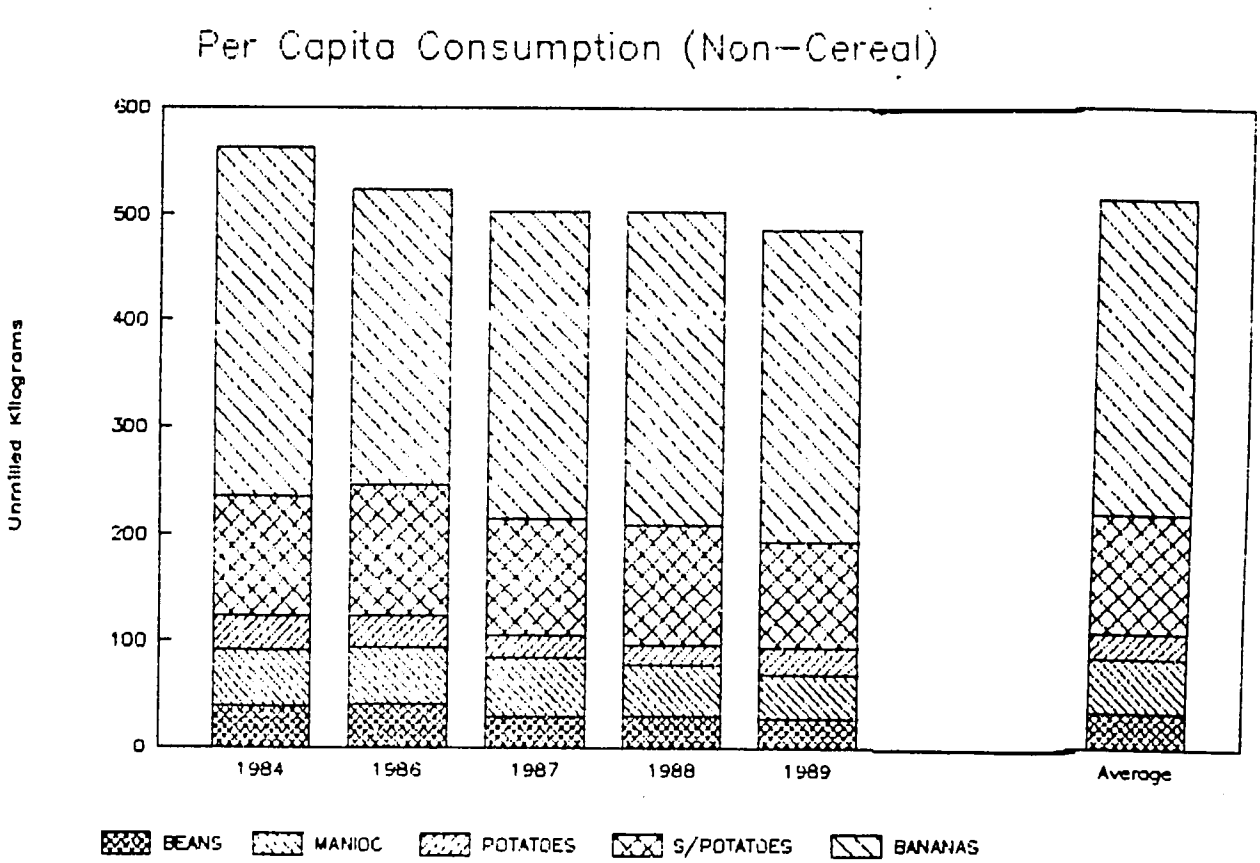
50
40
30
20
10
0
1984
1986
1987
1988
1989
Average
MAIZE
SORGHUM
RICE
WHEAT


Per Capita Consumption (Non-Cereal)
Unmilled Kilograms
600
500
400
300
200
100
0
1984
1986
1987
1988
1989
Average
BEANS
MANIOC
POTATOES
S/POTATOES
BANANAS

RWANDA FOOD NEEDS ASSESSMENT: 1990

ANNEX 1

RWANDA: FOOD NEEDS ASSESSMENT, (1990) ANNEX 1:

Melanee Lowdermilk

I. CONTACTS:

1) USAID/RWANDA:

James Graham, (Director)
Paul Crawford,(Agricultural Development Officer)
Antoine Ruzigamanzi, (ADO Project Officer)
Joan La Rosa, (Population and Health Officer)
Harold Marwitz, (Rwanda Desk Officer: AID/W)

2) CRS: CATHOLIC RELIEF SERVICES

Thomas Dart, (Country Representative)
Stephanie Laughlin, (Assistant Country Representative)
Antoine Twagirayezu, (Title II Program Manager)
Bernadette Mukangarambe, (Title II Program Assistant)

3) WFP: WORLD FOOD PROGRAM

Laura Lo Castro, (Acting Country Representative)
Clement Boyer

4) FAO:

Bernard Tossou, (Representative)

5) OXFAM:

David Waller, (Regional Director: Rwanda, Burundi, Kivu/Zaire).

6) ASPAP/MINAGRI: PROJET ENQUETES AGRICOLES ET ANALYSE DES POLITIQUES ECONOMIQUES DU SECTEUR RURAL.

Serge Rwamasirabo, (Chef de Projet)

7) ASPAP/MINIPLAN (MINISTERE DU PLAN): PROJET ENQUETES AGRICOLES ET ANALYSE DES POLITIQUES ECONOMIQUES DU SECTEUR RURAL.

James S. Ansoanuur, (Agricultural Economist)
Nick Minot, (Short-term Consultant/USAID)

8) MINAGRI: MINISTERE DE L'AGRICULTURE, DE L'ELEVAGE ET DES FORETS

Callixte Ntambabazi, (Chef de Division Promotion des Cultures Legumineuses, Cerealieres, et des Tubercules)
Damascene J. Muzirakugisha, (Directeur des Intrants Agricoles)
Telesphore Niyitegeka, (Agricultural Statistics)

9) OPROVIA: OFFICE NATIONAL POUR LE DEVELOPPEMENT ET LA COMMERCIALISATION DES PRODUITS VIVRIERS ET DES PRODUCTIONS ANIMALES

Athanase Mpengekeze, (Chef de Section Marketing)
Alphonse Ntamitondero, (Agro-Economiste, Chef de Section Etudes, Programmes et Evaluation).
Rene Lajot, (Conseiller Technique)

10) BNR: BANQUE NATIONALE DU RWANDA

Jean-Bosco Ndungutse, (Chef du Service Statistiques)
Ildephonse Gashumba, (Directeur du Change)
Jean-Baptiste Muberuka, (Directeur-Adjoint du Change)

11) MINAFFET: MINISTERE DES AFFAIRES ETRANGERES ET DE LA COOPERATION INTERNATIONALE

Dominique Mulindahabi, (Direccteur General a.i. de la Cooperation Multilateral).
Pio Nzeyimana

II. <u>TRAINING IN FNA METHODOLOGY AND TEMPLATE/SOFTWARE</u>:

USAID/RWANDA:

Antoine Ruzigamanzi, (ADO Project Officer).

RWANDA FOOD NEEDS ASSESSMENT: 1990

ANNEX 2: FOOD AND AGRICULTURAL STATISTICS

1984 - 1990

RWANDA: POPULATION AND GROWTH RATE

Growth Rate = 3.7 %

1981	5277020
1982	5472270
1983	5674744
1984	5884709
1985	6102443
1986	6328234
1987	6562379
1988	6805187
1989	7056978
1990	7318087

SOURCE: Census 1978

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

MAIZE PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	111475
1985	NA
1986	135003
1987	102438
1988	128041
1989	93955
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

SORGHUM PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	171057
1985	NA
1986	158878
1987	150217
1988	140584
1989	126885
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

RICE, (PADDY) PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	7919
1985	4137
1986	8440
1987	6581
1988	6892
1989	6000
1990	6900

DATA SOURCE:

1984 - 1988: MINAGRI. RAPPORT ANNUEL, 1987 ET 1988. MINISTERE DE L'AGRICULTURE, DE L'ELEVAGE, ET DES FORETS, REPUBLIQUE RWANDAISE.

1989 - 1990: MINAGRI. PREVISIONS DES RECOLTES DES CULTURES VIVRIERES, SAISONS A ET B, 1990.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

WHEAT PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	3070
1985	4994
1986	5504
1987	6294
1988	8100
1989	8000
1990	10000

DATA SOURCE:

1984 - 1988: MINAGRI. RAPPORT ANNUEL, 1987 ET 1988. MINISTERE DE L'AGRICULTURE, DE L'ELEVAGE, ET DES FORETS, REPUBLIQUE RWANDAISE.

1989 - 1990: MINAGRI. PREVISIONS DES RECOLTES DES CULTURES VIVRIERES, SAISONS A ET B, 1990.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

BEAN PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	256504
1985	NA
1986	278287
1987	204637
1988	223904
1989	210317
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

MANIOC PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	324208
1985	NA
1986	361899
1987	389592
1988	346123
1989	310549
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

POTATO PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	251372
1985	NA
1986	241466
1987	180988
1988	171217
1989	238605
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

SWEET POTATO PRODUCTION: 1984 - 1990

YEAR	PRODUCTION (Metric Tons)
1984	730927
1985	NA
1986	861904
1987	799286
1988	849079
1989	771460
1990	

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

BANANA PRODUCTION: 1984 - 1990

YEAR	TOTAL PRODUCTION (Metric Tons)	BANANAS: COOKING (Metric Tons)	BANANAS: BEER (Metric Tons)
1984	1982287	607525	1374762
1985	NA	NA	NA
1986	1801949	451010	1350939
1987	1949413	495843	1453570
1988	2065442	523734	1541708
1989	2125141	499515	1625626
1990			

DATA SOURCE:

ASPAP/MINAGRI, (Projet enquetes agricoles et analyse des politiques economiques du secteur rural), Kigali, Rwanda.

RWANDA:

FOOD NEEDS ASSESSMENT:

MAIZE IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	2	575	577
1985	0	2417	2417
1986	0	714	714
1987	3	0	3
1988	0	0	0
1989	0	0	0
1990 *	96	0	96

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

MAIZE FLOUR IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	63	5299	5362
1985	247	3788	4035
1986	514	3779	4293
1987	56	1829	1885
1988	5	1185	1190
1989	2	513	515
1990 *	0	152	152

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

RICE IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	3418	3145	6563
1985	6726	2979	9705
1986	3486	6155	9641
1987	155	4525	4680
1988	43	59	103
1989	5180	0	5180
1990 *	880	0	880

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

WHEAT IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	0	4893	4893
1985	83	3176	3259
1986	112	823	935
1987	0	4270	4270
1988	5325	0	5325
1989	3874	0	3874
1990 *	3824	766	4591

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

WHEAT FLOUR IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	3628	3256	6884
1985	5545	2074	7619
1986	3558	6566	10124
1987	653	803	1456
1988	385	567	952
1989	0	563	563
1990 *	0	181	181

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

BEAN IMPORTS, (METRIC TONS): 1984 - 1990

YEAR	COMMERCIAL	CONCESSIONAL	TOTAL IMPORTS
1984	1	0	1
1985	2	4896	4898
1986	470	974	1444
1987	2	0	2
1988	174	27	201
1989	3914	71	3985
1990 *	2369	35	2404

*: January - March, 1990

DATA SOURCE: BNR, Banque Nationale du Rwanda, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

OPROVIA STOCK BALANCES: OPENING AND CLOSING LEVELS.

		1984	1985	1986	1987	1988	1989
MAIZE:							
	Opening	0	0	2	233	0	152
	Closing	0	2	233	0	152	0
SORGHUM:							
	Opening	1914	758	3003	3903	3565	2878
	Closing	758	3003	3903	3565	2878	3102
RICE:							
	Opening	65	241	329	39	383	112
	Closing	241	329	39	383	112	416
BEANS:							
	Opening	238	228	1486	123	55	809
	Closing	228	1486	123	55	809	1613
MANIOC							
	Opening	0	0	23	11	14	4
	Closing	0	23	11	14	4	42

NOTE: Opening Level Balances: January 1st
Closing Level Balances: December 31st

DATA SOURCE: OPROVIA, July 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

NATIONAL LEVEL STOCK BALANCES AS OF JANUARY 1, 1990:

	METRIC TONS
RICE:	
Riz	3000
Paddy	4000
SORGHUM: (*)	3000
BEANS:	500
VEGETABLE OIL: (**)	300

(*): OPROVIA
(**): OPROVIA AND TRAFIPRO

DATA SOURCE: USAID/KIGALI, July 1990.

RWANDA FOOD NEEDS ASSESSMENT: 1990

COMPARISON OF MINAGRI AND ASPAP STATISTICS: 1984 - 1989

RWANDA:

FOOD NEEDS ASSESSMENT: 1990

PRODUCTION ESTIMATES (METRIC TONS): 1990, SEASONS A AND B

	SEASON A	SEASON B	TOTAL PRODUCTION
MAIZE	98733	11022	109755
SORGHUM	16641	134117	150758
BEANS	120071	69818	189889
MANIOC	84764	109917	194681
POTATOES	123508	126997	250505
SWEET POTATOES	301614	417431	719045
BANANAS	778793	1318939	2097732

DATA SOURCES:

MINAGRI. RAPPORT SUR L'ETAT DES CULTURES ET DES PREVISIONS DES RECOLTES DES PRINCIPALES CULTURE VIVRIERES: SAISON 1990 A. 2 JANVIER 1990.

MINAGRI. RAPPORT SUR LES PREVISIONS DE RECOLTES DE LA SAISON CULTURALE 1990 B. 11 JUIN 1990.

MINISTERE DES AFFAIRES ETRANGERES ET DE LA COOPERATION INTERNATIONALE, 18 JUILLET 1990.

RWANDA:

FOOD NEEDS ASSESSMENT:

1990 PRODUCTION (METRIC TONS): LINEAR TREND ESTIMATES

	SEASON A	SEASON B	TOTAL (Season A + B)	ANNUAL PROJECTION
MAIZE	91053	10526	101579	101582
SORGHUM	5166	112365	117531	117533
BEANS	117802	72903	190705	190703
MANIOC	170498	163085	333583	333546
POTATOES	102459	85543	188002	187995
SWEET POTATOES	401543	421464	823007	823004
BANANAS	993540	1156076	2149616	2149607

DATA SOURCE: ASPAP, (July 1990).

RWANDA: FOOD NEEDS ASSESSMENT

PRODUCTION ESTIMATES (METRIC TONS): 1989, SEASONS A AND B

	SEASON A	SEASON B	TOTAL PRODUCTION
MAIZE	88814	0	88814
SORGHUM	21686	141910	163596
BEANS	115994	34718	150712
MANIOC	228641	206046	434687
POTATOES	120092	152917	273009
SWEET POTATOES	373267	393418	766685
BANANAS	1269264	879861	2149125

DATA SOURCE: MINAGRI, SITUATION ALIMENTAIRE AU RWANDA, OCTOBRE 1989.

PRODUCTION ESTIMATES (METRIC TONS): 1989, SEASONS A AND B

	SEASON A	SEASON B	TOTAL PRODUCTION
MAIZE	82608	11346	93954
SORGHUM	7743	119142	126885
BEANS	139587	70730	210317
MANIOC	155767	154783	310550
POTATOES	123981	114624	238605
SWEET POTATOES	394785	376675	771460
* BANANAS	969335	1155806	2125141

*: Includes cooking and beer bananas only.

DATA SOURCE: ASPAP, JUILLET 1990

RWANDA: FOOD NEEDS ASSESSMENT

PRODUCTION ESTIMATES (METRIC TONS): 1988, SEASONS A AND B

	SEASON A	SEASON B	TOTAL PRODUCTION
MAIZE	80740	7173	87913
SORGHUM	20653	117388	138041
BEANS	114993	69437	184430
MANIOC	228647	257557	486204
POTATOES	109175	169908	279083
SWEET POTATOES	414741	491773	906514
BANANAS	1103708	1256945	2360653

DATA SOURCE: MINAGRI, SITUATION ALIMENTAIRE AU RWANDA, OCTOBRE 1989.

PRODUCTION ESTIMATES (METRIC TONS): 1988, SEASONS A AND B

	SEASON A	SEASON B	TOTAL PRODUCTION
MAIZE	115038	13002	128040
SORGHUM	15994	124590	140584
BEANS	148500	75403	223903
MANIOC	183062	163060	346122
POTATOES	95417	75799	171216
SWEET POTATOES	406749	442330	849079
* BANANAS	983438	1082005	2065443

*: Includes cooking and beer bananas only.

DATA SOURCE: ASPAP, JUILLET 1990

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RWANDA:

FOOD NEEDS ASSESSMENT: 1990

PRODUCTION (METRIC TONS): 1984 - 1987

	1984	1985	1986	1987
MAIZE	101885	99452	89590	90182
SORGHUM	182620	227549	193197	187686
BEANS	227329	313597	270972	265920
MANIOC	523791	578510	469562	498653
POTATOES	263191	335447	268668	275377
SWEET POTATOES	811893	979142	892890	878191
BANANAS	2055953	2418790	2265699	2262596

DATA SOURCE:

MINAGRI. RAPPORT ANNUEL, 1987. MINISTERE DE L'AGRICULTURE, DE L'ELEVAGE, ET DES FORETS, REPUBLIQUE RWANDAISE.

RWANDA FOOD NEEDS ASSESSMENT: 1990

ANNEX 3: PROJECTED FOOD DEFICITS

1991 - 1995

Notes:

1) Per Capita Consumption: 1,800 calories/day.

2) Population Growth Rate: 3.7%.

3) Production: Linear Trend Estimates based on 1985 - 1989 ASPAP Data.

4) Imports: Linear Trend Estimates based on 1985 - 1989 BNR Data.

Food Needs Assessment

CURRENT YEAR FOOD BALANCE
Current Year: 1991

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL BCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.5	32.8	50.1	25.1	115.9	298.6	566.0	203.2
x Population (thousands)	7,589	7,589	7,589	7,589	7,589	7,589	7,589	7,589	7,589	7,589	7,589	7,599
= Total consumption requirement	129,013	167,717	15,937	17,455	330,122	248,919	380,209	190,484	879,565	2,266,075	4,295,374	1,541,730
Gross domestic food production	89,606	107,013	4,785	10,733	212,137	170,723	307,617	189,257	789,259	2,279,624	3,948,617	1,308,640
- Total non-food use	6,272	5,351	239	1,181	13,043	17,072	18,457	47,314	47,356	45,592	188,834	69,644
= Net domestic food production	83,334	101,662	4,546	9,552	199,094	153,651	289,160	141,943	741,903	2,234,031	3,759,782	1,238,996
- Net change in stocks	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
= Domestic food supply	83,334	101,662	4,546	9,552	199,094	153,651	289,160	141,943	741,903	2,234,031	3,759,782	1,238,996
Total consumption requirement (from above)	129,013	167,717	15,937	17,455	330,122	248,919	380,209	190,484	879,565	2,266,075	4,295,374	1,541,730
- Domestic food supply (from above)	83,334	101,662	4,546	9,552	199,094	153,651	289,160	141,943	741,903	2,234,031	3,759,782	1,238,996
= Import requirement	45,679	66,055	11,391	7,902	131,027	95,268	91,049	48,541	137,662	32,044	535,592	302,734
- Total commercial food imports	202	0	4,852	4,318	9,372	4,924	0	0	0	0	14,296	11,543
= FOOD DEFICIT (UNMILLED)	45,477	66,055	6,539	3,585	121,655	90,345	91,049	48,541	137,662	32,044	521,296	291,191
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	31,834	39,633	4,250	2,653	78,370	90,345	27,315	41,260	117,013	30,442	384,744	221,592

Food Needs Assessment

CURRENT YEAR FOOD BALANCE
Current Year: 1992

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL RCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.5	32.8	50.1	25.1	115.9	298.6	566.0	203.2
x Population (thousands)	7,870	7,870	7,870	7,870	7,870	7,870	7,870	7,870	7,870	7,870	7,870	7,870
= Total consumption requirement	133,790	173,927	16,527	18,101	342,345	258,136	394,287	197,537	912,133	2,349,982	4,454,420	1,598,816
Gross domestic food production	87,488	95,609	4,482	11,824	199,402	169,748	284,527	203,607	792,579	2,337,222	3,987,085	1,305,814
- Total non-food use	6,124	4,780	224	1,301	12,429	16,975	17,072	50,902	47,555	46,744	191,677	69,501
= Net domestic food production	81,363	90,828	4,258	10,523	186,973	152,773	267,456	152,705	745,024	2,290,477	3,795,408	1,236,314
- Net change in stocks	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
= Domestic food supply	81,363	90,828	4,258	10,523	186,973	152,773	267,456	152,705	745,024	2,290,477	3,795,408	1,236,314
Total consumption requirement (from above)	133,790	173,927	16,527	18,101	342,345	258,136	394,287	197,537	912,133	2,349,982	4,454,420	1,598,816
- Domestic food supply (from above)	81,363	90,828	4,258	10,523	186,973	152,773	267,456	152,705	745,024	2,290,477	3,795,408	1,236,314
= Import requirement	52,427	83,099	12,269	7,578	155,372	105,363	126,831	44,832	167,109	59,505	659,012	362,503
- Total commercial food imports	220	0	7,263	5,334	12,817	6,654	0	0	0	0	19,471	15,582
= FOOD DEFICIT (UNMILLED)	52,206	83,099	5,006	2,244	142,555	98,709	126,831	44,832	167,109	59,505	639,541	346,921
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	36,544	49,859	3,254	1,660	91,318	98,709	38,049	38,107	142,043	56,530	464,755	259,857

Food Needs Assessment

CURRENT YEAR FOOD BALANCE
Current Year: 1993

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL RCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.5	32.8	50.1	25.1	115.9	298.6	566.0	203.2
x Population (thousands)	8,161	8,161	8,161	8,161	8,161	8,161	8,161	8,161	8,161	8,161	8,161	8,161
= Total consumption requirement	138,737	180,358	17,138	18,770	355,004	267,681	408,866	204,841	945,860	2,436,875	4,619,126	1,657,934
Gross domestic food production	74,498	84,578	3,732	12,772	175,579	148,707	278,635	202,766	776,516	2,400,820	3,983,024	1,270,906
- Total non-food use	5,215	4,229	187	1,405	11,035	14,871	16,718	50,691	46,591	48,016	187,923	65,991
= Net domestic food production	69,283	80,349	3,545	11,367	164,544	133,836	261,917	152,074	729,925	2,352,804	3,795,101	1,204,915
- Net change in stocks	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
= Domestic food supply	69,283	80,349	3,545	11,367	164,544	133,836	261,917	152,074	729,925	2,352,804	3,795,101	1,204,915
Total consumption requirement (from above)	138,737	180,358	17,138	18,770	355,004	267,681	408,866	204,841	945,860	2,436,875	4,619,126	1,657,934
- Domestic food supply (from above)	69,283	80,349	3,545	11,367	164,544	133,836	261,917	152,074	729,925	2,352,804	3,795,101	1,204,915
= Import requirement	69,454	100,009	13,593	7,403	190,459	133,844	146,949	52,767	215,935	84,071	824,025	453,019
- Total commercial food imports	311	0	8,169	4,518	12,997	8,104	0	0	0	0	21,101	16,936
= FOOD DEFICIT (UNMILLED)	69,143	100,009	5,424	2,886	177,462	125,740	146,949	52,767	215,935	84,071	802,924	436,083
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	48,400	60,005	3,526	2,135	114,067	125,740	44,085	44,852	183,545	79,867	592,156	329,933

Food Needs Assessment

CURRENT YEAR FOOD BALANCE
Current Year: 1994

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL BCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.5	32.8	50.1	25.1	115.9	298.6	566.0	203.2
x Population (thousands)	8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463
= Total consumption requirement	143,871	187,032	17,772	19,465	368,141	277,586	423,996	212,421	980,862	2,527,052	4,790,058	1,719,286
Gross domestic food production	73,523	74,362	3,229	14,083	165,197	134,787	269,121	187,626	784,470	2,480,175	4,021,376	1,264,093
- Total non-food use	5,147	3,718	161	1,549	10,575	13,479	16,147	46,907	47,068	49,603	183,780	63,926
= Net domestic food production	68,377	70,644	3,067	12,534	154,622	121,308	252,973	140,720	737,402	2,430,571	3,837,596	1,200,167
- Net change in stocks	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
= Domestic food supply	68,377	70,644	3,067	12,534	154,622	121,308	252,973	140,720	737,402	2,430,571	3,837,596	1,200,167
Total consumption requirement (from above)	143,871	187,032	17,772	19,465	368,141	277,586	423,996	212,421	980,862	2,527,052	4,790,058	1,719,286
- Domestic food supply (from above)	68,377	70,644	3,067	12,534	154,622	121,308	252,973	140,720	737,402	2,430,571	3,837,596	1,200,167
= Import requirement	75,494	116,388	14,705	6,931	213,519	156,278	171,023	71,702	243,460	96,481	952,462	519,119
- Total commercial food imports	380	0	7,572	5,187	13,138	8,839	0	0	0	0	21,977	17,870
= FOOD DEFICIT (UNMILLED)	75,115	116,388	7,134	1,744	200,380	147,439	171,023	71,702	243,460	96,481	930,484	501,249
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	52,580	69,833	4,637	1,291	128,341	147,439	51,307	60,946	208,941	91,657	886,630	379,584

Food Needs Assessment

CURRENT YEAR FOOD BALANCE
Current Year: 1995

RWANDA

Commodity	MAIZE	SORGHUM	RICE	WHEAT	CEREALS ALL	BEANS	MANIOC	POTATOES	S/POTATOES	BANANAS	TOTAL	TOTAL BCE
Per capita consumption (UNMILLED kg/yr)	17.0	22.1	2.1	2.3	43.5	32.8	50.1	25.1	115.9	298.6	566.0	203.2
x Population (thousands)	8,776	8,776	8,776	8,776	8,776	8,776	8,776	8,776	8,776	8,776	8,776	8,776
= Total consumption requirement	149,192	193,950	18,430	20,185	381,756	287,853	439,678	220,278	1,017,138	2,620,514	4,967,216	1,782,873
Gross domestic food production	63,972	63,186	2,647	14,972	144,776	122,779	247,340	198,082	766,222	2,564,189	4,043,388	1,242,197
- Total non-food use	4,478	3,159	132	1,647	9,417	12,278	14,840	49,520	45,973	51,284	183,312	61,754
= Net domestic food production	59,494	60,027	2,514	13,325	135,360	110,501	232,499	148,561	720,249	2,512,905	3,860,076	1,180,443
- Net change in stocks	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
= Domestic food supply	59,494	60,027	2,514	13,325	135,360	110,501	232,499	148,561	720,249	2,512,905	3,860,076	1,180,443
Total consumption requirement (from above)	149,192	193,950	18,430	20,185	381,756	287,853	439,678	220,278	1,017,138	2,620,514	4,967,216	1,782,873
- Domestic food supply (from above)	59,494	60,027	2,514	13,325	135,360	110,501	232,499	148,561	720,249	2,512,905	3,860,076	1,180,443
= Import requirement	89,698	133,923	15,915	6,860	246,396	177,352	207,178	71,716	296,889	107,608	1,107,140	602,430
- Total commercial food imports	410	0	9,598	5,410	15,417	10,402	0	0	0	0	25,819	20,855
= FOOD DEFICIT (UNMILLED)	89,289	133,923	6,317	1,450	230,979	166,950	207,178	71,716	296,889	107,608	1,081,322	581,575
x Milling extraction rate (m.e.r.)	70%	60%	65%	74%		100%	30%	85%	85%	95%		
= FOOD DEFICIT (MILLED)	62,502	80,354	4,106	1,073	148,035	166,950	62,154	60,959	252,356	102,228	792,682	438,449