UGANDA BELLMON ANALYSIS

Market Impact and Food Security

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TABLE OF CONTENTS

p. 1	SUMMARY INTRODUCTION
p. 4	Geography
	[Figure 1 Average Rainfall]
p. 5 bis	[MAP 1 & 2 Uganda, Growing Season, by District]
	[MAP 3 Uganda, Crop Planting Season]
p. 6	Political Economy
p. 7	Agriculture
p. 8	Diet and Food Security
p .10	[Figure 2 Uganda, Food Consumption, by major Food Group]
p.12	Starches: Production, Consumption and trade
p.15	{Insert - THE WHEAT TRAP}
p.16	{Insert - AVOIDING THE WHEAT TRAP}
p.18	Fats: Production, Consumption and Trade
p.19	[Figure 3 Uganda, Fats & Oils Consumption, by Major Fat and Oil]
p.21	Proteins: Production, Consumption and Trade
p.24	Agricultural Inputs and Services To Agriculture
p.24	Food Assistance Strategy - *Other Donors (WFP)* - *USAID*
APPENDIX	List of Participants
PHOTOS	Appropriate Technology

TABLES

p.7	TABLE 1:	Uganda, Land Use by Category (land only)
p.7	TABLE 2:	Uganda, Agricultural Production, selected years
p.8	TABLE 3:	Uganda, Population Distribution and Caloric Requirements
p.9	TABLE 4:	Uganda, Nutritional Intake vs. Recommended Levels, 1995
p.11	TABLE 5:	Uganda, Food Consumption by District, 1995
p.12	TABLE 6:	Uganda, Cereal and Other Starch Production, selected years
p.13	TABLE 7:	Uganda, Food Availability vs Consumption, starches
p.13	TABLE 8:	Uganda, Imports of Principal cereals, selected years.
p.18	TABLE 9:	Uganda, Production of Vegetable Seeds, selected years
p.19	TABLE 10:	Uganda, Imports/Exports of principal Vegetable Oils and Fats, selected years.
p.21	TABLE 11:	Uganda, Meat, Milk, Fish and Egg Production, selected years
p.22	TABLE 12:	Uganda, Trade by Commodity Group, selected years

SUMMARY INTRODUCTION

Public Law 480, commonly known as PL 480, provides for concessional sales and grants of United States commodities, to countries constituting potential markets in the case of concessional sales, or which are chronically food insecure or facing emergency situations in the case of grants. Section 403 (a) (1) of Public Law 480 requires that "adequate storage facilities will be available in the recipient country... to prevent the spoilage or waste of the commodity".[1] Sections 403 (a)(2) and (b) require that "The Secretary[2] or the Administrator[3], as appropriate, shall ensure that the importation of United States agricultural commodities and the use of local currencies for development purposes will not have a disruptive impact on the farmers or the local economy of the recipient country." Together these sections of the PL 480 Law make up what is known as the Bellmon Amendment, named for their sponsor. Respon-sibility for concessional sales (Title I) is assigned to the Secretary of Agriculture while grant food aid, except for 416 (b) surplus disposal programs and Food For Progress, are the responsibility of the Administrator of U.S.A.I.D.

Authority for making the "Bellmon" determination is delegated by the U.S.A.I.D. Administrator to the Director of the Office of Food For Peace. In recent times analysis is most often prepared by a Private Voluntary Organization making a proposal to manage food aid resources under Title II of the legislation. The Mission Director in the recipient country reviews the analysis and makes a recommendation on which the final determination is based. The practice for government to government programs under Title III differs somewhat and the analysis may more often be prepared directly by U.S.A.I.D. An analysis is required for each proposal.

On going food aid programs in Uganda have required a number of Bellmon analyses in recent years. The joint monetization program developed for Uganda and managed by Agricultural Cooperative Development International (ACDI/VOCA) has required that ACDI/VOCA regularly prepare an analysis for all the various PVO programs under their umbrella monetization. A proposed expansion of the food aid program in 1999 to include an additional PVO Techno-Serve and a large increase in the quantity of wheat shipped, necessitated the preparation of a new Bellmon analysis. Techno-Serve prepared an analysis accompanying its proposal submission. ACDI as lead monetizer will be charged with managing the increased sales resulting from

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[1] Public Law 480, as amended through P.L. 104-130, April 9, 1996.

[2] PL 480 op cit., "The term 'Secretary' means Secretary of Agriculture unless otherwise specified in this Act." [Section 402(8)].

[3] PL 480, op cit., "The term 'Administrator' means the Administrator of the Agency for International Development, unless otherwise specified in this Act." [Section 402 (1)]

approval of the Techno-Serve proposal.

In consideration of the expansion of the program USAID/Kampala requested the economist of the Bureau for Humanitarian Response, the Bureau responsible within USAID for managing the food aid programs, to review existing Bellmons, identify potential alternate commodities and generally examine the possibilities of expansion of the food aid program. In addition to the growing size of the program, Uganda's favorable conditions as a food producer within the East Africa Region and its recent growth were factors leading USAID/Kampala to request this general review of the program.

The field mission was accomplished over three weeks from August 20 to September 11, 1998 with additional time spent in reviewing basic documentation on the Ugandan agricultural situation and preparing the final report. The economist was assisted by an agronomist on leave from the Uganda Ministry of Agriculture, Animal Industry and Fisheries as well as by staff at USAID/Kampala.

The findings are generally favorable to the continuance of the food aid program at the enhanced levels proposed and to contemplating modest increases as appropriate. Note is made that the advent of war in the Congo, with the consequent disruption of harvests there, will result in rising food prices and shortages throughout the Central and East African regions. In this context food aid will serve largely as an economic stabilizer allowing currencies to maintain their value and economies to function normally. An end to the war should lead to a review of the situation.

With regard to specific commodities currently being monetized vegetable oil and rice are experiencing increased demand due to the war and are not produced in sufficient quantities locally. Current levels of food aid in these commodities have no disincentive effect and may be increased somewhat. [note: only Italy is currently donating monetized rice to Uganda in addition to commercial imports]. The demand for wheat flour and to a lesser extent wheat is also rising due to the war and increased urbanization in Uganda, although its demand in the war zones is expected to increase less rapidly than vegetable oil or rice which are easier to consume. Uganda's status as a surplus starch producer, with the exception of wheat and rice, was of some concern in assessing these markets. Our conclusion was that increased wheat consumption resulting from urbanization was a phenomenon likely to continue through commercial channels regardless of the food aid configuration. Nevertheless, the promotion of other starch flours in bread and alternative foods is something currently being explored successfully in Uganda and for which monetized food aid proceeds could provide positive support. We recommend exploring additional use of food aid proceeds (a small post harvest technology project already exists) to support enhanced uses of domestic starches. A modest program to promote soybean meal feeding to dairy cattle could also be envisaged. Such a program would need to be carefully developed so as to enhance the demand for local protein meals, rather than compete with them.

While current levels of wheat and vegetable oil do not constitute in and of themselves a disincentive to local production or disrupt markets, the wheat market, in particular, is

experiencing cash payment difficulties among many of the participants. Credit from importer to miller to baker is the usual sales mode. Unfortunately the PL 480 program is restricted from sales on credit and consequently has experienced difficulties in marketing wheat shipments at certain times at reasonable prices. For this reason flexibility must be given to ACDI, the consortium monetizer in consultation with its partners, to recommend the calling forward of additional vegetable oil or substituting rice as the season progresses, depending on market conditions. For the coming season and as long as the war in the Congo continues none of these commodities will have adverse Bellmon effects in the quantities envisaged.

Geography

Uganda is a country of East Africa covering an area of 242,554 sq. km., about the size of the state of Oregon. The current population is estimated at about 20 million people, mostly in rural areas (including a significant number of refugees and displaced persons in the north and west). Unique features of Uganda's geography make it very well suited for agricultural production. Uganda is landlocked, situated within the "Rift Valley" and "Eastern Highlands" of Africa. The southern half of the country is situated in the "Interlacustrine Region" bordered by Lake Victoria to the South and smaller lakes to the north and west. Uganda is located on the Equator from four (4) degrees north to 1 1/2 degree south latitude. Never-theless, elevation of the entire country above 900 meters give it a moderate climate.

The climate may be generally characterized as "Modified tropical". Three sub-climatic zones can be differentiated by rainfall and altitude.

> Northern Zone - Northern Savanna, relatively dry, rainfall less than 1,000 mm and elevation of 1,100 meters.
>
> Lakes Region - Semi-tropical, relatively moist, rainfall, exceeds 1,000 mm and elevation of 1,100 meters.
>
> Highlands - (South east and west) Modified Tropical/Temperate, rainfall exceeds 1,000mm and elevation over 1,500 meters.

While rainfall levels would generally be considered low at tropical latitudes, temperatures averaging 22 dc (72df) throughout the year with minimum temperatures of 16 dc (61df) and maximum temperatures of 27 dc(82df) imply low evaporation rates and high moisture retention . Rainfall is regular throughout the year averaging about 100 mm per month with a peak in April/May and a minor second peak in October/November At least half the country has two growing seasons a spring and fall season [see MAPS 1 and 2: Uganda, Growing Season by District and Map 3: Uganda, Crop Planting Season]. Regular rainfall throughout the year contributes to moisture retention, as runoff is reduced, and helps sustain perennial crops {Figure 1].[4]

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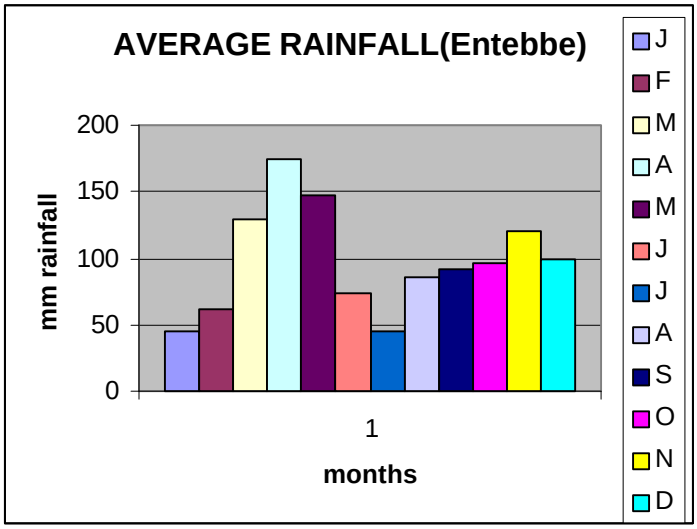
[4] Entebbe rainfall data in Figure 1 from: Geography and Climate of Uganda [molweny@arch.adelaide.edu.au}.

FIGURE 1: AVERAGE RAINFALL



Because of the unusual climatic conditions a variety of both temperate zone and tropical crops can be grown successfully. A typically tropical crop, the banana, is thought to have been domesticated in Uganda, because of the diversity of the genetic material found there, while numerous staples, ranging from cassava to potatoes and millet to maize and wheat, grow successfully. While the banana is probably South Asian in origin, as the only seed producing wild forms are found there, domestication and cultivation appear to have the longest history in Uganda as evidenced in the genetic diversity found there. Among the oilseeds tropical oils as palm may do well in certain areas of the country, while temperate zone soybeans and sunflower grow successfully throughout. Among the perennial crops, tea and coffee are grown successfully, as are many tropical fruits. Only the deciduous fruits requiring hard wintering as apples and pears seem not to be generally found, although even here some may be grown on the high plateaus in the highland regions. Soils are of the general laterite type found throughout Africa although clay loams are common in the south and silty loams in the North. The high degree of organic matter is atypical and results from the more moderate climate and resulting plant cover over time.

Political Economy

Uganda became independent of British colonial rule in October 1962. It's history and development were somewhat differentiated from the neighboring British, ruled East African states of Kenya and Tanzania in that while administratively ruled there was little expatriate settlement in Uganda. Taxes in-kind obliged local peasants to produce export oriented commodities and had the effect of penetrating and dislocating local productive and organizational structures. Uganda was fairly prosperous from independence to 1970 as part of the East African Community(EAC) with Kenya and Tanzania. Postal, rail and other public works were managed in common by the EAC, although no strong sense of regional unity developed during this period. The Community broke up in 1977 and has recently been revived (1996).

Between 1979 and 1985 Uganda underwent a period of severe political disruption with ensuing destruction of economic and social infrastructure. While attempting to derive support from the larger international political currents engulfing Africa (e.g., the anti-apartheid movement, socialism, democratization, pan-Africanism and African nationalism), local political forces in Uganda seemed ultimately cast adrift in a largely domestic disaster. One notable feature was the exiling of the local Indian population and nationalization of their property.

The National Resistance Movement (NRM) came to power in 1986 led by the current President. The movement enjoyed widespread popular support, although encountering some continuing resistance in the northern areas of the country. The NRM embarked on a liberal economic and political system in an effort to rebuild the country. Indian property was restored in 19XX and many Indians have returned. They occupy a prominent place in Ugandan business. Growth has been sustained in the period since 1986 at rates averaging over 5 %, although from a very low base. The local infrastructure is slowly being refurbished with restoring of the national road network being a governmental priority. Progress has been made in recent years in resurfacing the main national routes. An international class tourist infrastructure has been in great part restored and is an attractive asset when peace prevails in the region.

Manufacturing, construction and services have been the leading growth sectors with rates of growth well into double digits. Agriculture, which accounts for 85% of employment and more than half of gross output, has lagged other sectors, with growth at or somewhat below the overall average and showing only modest gains on a per capita basis. A high level of external debt, some of it due for rescheduling and forgiveness, and low domestic savings are two of the principal impediments to further growth. The distribution of growth has tended to favor urban over rural areas, although Uganda is still an overwhelmingly rural populated country. The imbalance of growth tends to be partially offset by a sharp civil service reduction during the period (i.e., largely affecting urban households), from 213,000 civil servants in 1993 to less than 150,000 in 1995, a decline of over 25%. Per capita income estimated at $256 in 1994 still left Uganda one of the poorer countries of the world, in spite of the progress made.

Agriculture

More than 85% of the population of Uganda is engaged wholly or partially in agriculture and lives in rural areas. Smallholders account for over 90% of agricultural output, albeit a much smaller percent of export agriculture. Ugandan farm families consist of an estimated 2.5 million farm households 80 % of which cultivate an average of slightly less than 2.5 ha. of land each. Land use in Uganda is classified as follows:

TABLE 1: Uganda, Land Use by category (land only)

Category	Percent	Category	Percent
Arable Land	23 %	Forest & Woodland	30 %
Grasslands	25 %	Permanent Crops	9 %
Other	13 %	TOTAL	100 %

[An additional equivalent of 16 % of the national territory consists of water in the form of several major lakes and river systems.]

Tools consist of the basic hoe and occasionally other small farm implements. Animal traction and tilling instruments had been fairly widespread in the northern savanaha has declined dramatically as a result of cattle rustling and civil unrest. A wide variety of crops are produced in Uganda.

TABLE 2: Uganda, Agricultural Production, selected years (MTx 000)

Year	Bananas	Cereals	Potatoes	Cassava	Pulses	Oilseeds
1987	7,039	1,220	1,859	3,101	374	163
1990	7,842	1,580	1,917	3,420	498	257
1993	8,222	1,880	2,278	3,139	540	295
1996	9,144	1,588	1,866	2,245	356	285
1997(est.)	9,303	1,625	2,254	2,291	346	248

Source: Ministry of Agriculture, Animal Industry and fisheries, Statistical Yearbook, 1998

Diet and Food Security

For the 89 % of the population living in rural areas, the average share of spending on food, drink and tobacco is 68 percent and spending on food is 63.4 percent of total expenditure. For the remaining 11% of urban population the average share of spending on food, drink and tobacco is 54.7% with spending on food accounting for 43%. The weighted average is 63.6% and 56.8% respectively.[5]

While the World Health Organization recommends a minimum caloric consumption of 2,200 calories per person per day with only light physical activity, actual recommendations vary considerably with age, sex, heavy physical labor, pregnancy and lactation. Using the population distribution from the 1995 Ugandan Demographic and Health Survey(UDHS) and indicated recommended calorie levels we derive an average caloric recommendation for the Ugandan population of 2,139 calories per day. FAO recommendations for protein and fat levels are 57.6 g and 20.3 g respectively. [6],[7]

TABLE 3: Uganda, Population Distribution and Caloric Requirements[8]

Age Group	% Male	Calories Req.	% Female	Calories Req.
0 - 4	20.0	1600	19.6	1600
5 - 9	17.7	1600	17.3	1600
10 - 14	14.7	3000	13.9	2350
15 - 19	9.2	3000	9.2	2350
20 - 24	7.3	2900	8.9	2100
25 - 29	6.7	2900	7.2	2100
30 - 34	5.1	2900	5.5	2000
35 - 39	4.5	2900	4.4	2000

[5] Uganda National Household Survey 1993/94.

[6] FAO "Handbook on Human Nutritional Requirements 1974".

[7] For a full vetting of many "food security" issues see also, Riley, Barry, Food Security In Uganda, prepared for High Value Horticulture plc., Fairfax, CA, August 1994, pp. 52.

[8] Population distribution from, Statistics Department, Uganda Ministry of Finance and Economic Planning, Demographic and Health Survey 1995, financed by USAID.

40 - 44	3.2	2700	2.6	1900
45 -49	2.3	2700	1.7	1900
50 - 54	2.1	2500	3.0	1800
55 - 59	1.8	2500	1.8	1800
60 - 64	1.6	2350	1.7	1700
65 - 69	1.4	2350	1.1	1700
70 - 74	0.8	2200	0.8	1600
75 - 79	0.5	2200	0.5	1600
80 +	0.8	2200	0.6	1600
residual	0.3	2200	0.1	2200

Out of 35,601 UDHS survey respondents 17,240 or 48.4%, were male, 18, 323 female, or 51.4%, (36 respondents did not indicate gender or had an unclear survey response at time of tabulation). The survey was considered to be random and so should closely correspond to the actual configuration of the Ugandan population. The preponderance of females in the Ugandan population is explained by the almost three decades of civil war and political turmoil. The civil turmoil combined with the HIV/Aids epidemic and other health problems all have contributed to the very young age configuration of the population, although this is not untypical of a developing African country.

TABLE 4: Uganda, Nutritional Intake vs. Recommended Levels, 1995[9]

Category	Consumption	Recommendation	% Recommended
Calories	2400	2420 (UNDP) 2139 calculated	99 112
Proteins	50	57.6(FAO)	86
Fats	19	20.3(FAO)	94

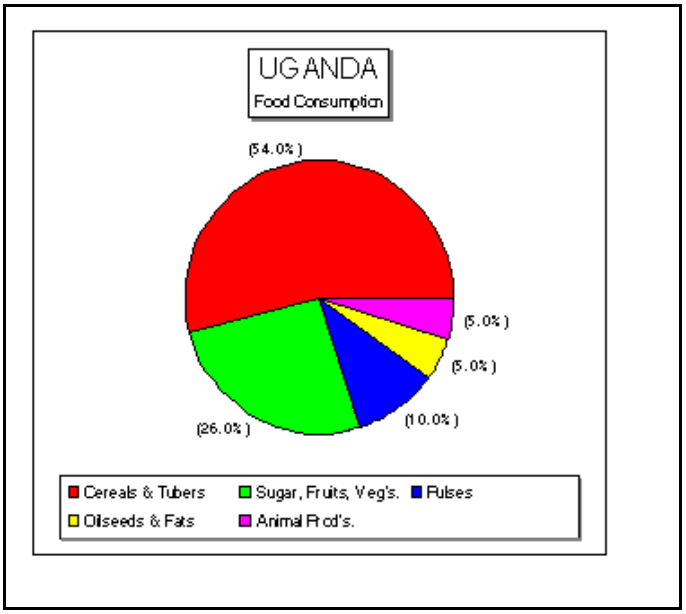
Inspite of the calculated adequacy of nationally computed caloric levels the 1988/89 Uganda Demographic Health Survey reported 45 percent of children suffer from stunting. While

[9] Export Policy Analysis Unit (EPAU), Ministry of Finance and Economic Planning Paper No. 4, Food Security and Exports- Food Security Framework 1995 (Nutritional Food Requirements), Kampala, January 1996 (financed by USAID); UNDP: Human Development Report 1993; FAO: Handbook on Human Nutritional Requirements, 1974.

declining to 38 % stunted ,15 % severely, -- some data suggest that overall stunting may be as high as 50% -- by the time of the 1995 UDHS survey, this still represents a significant number of children wh0 are food insecure. Several factors serve to explain the discrepancy between the national average consumption levels and the levels of food insecurity indicated in the demographic surveys.

Firstly, national food production and availability figures are unreliable and vary significantly from year to year. Secondly, even adequate national levels can hide wide local divergences and food insecurity. This is the case in Uganda as we shall see later. Third, actual food consumption is considerably less than calculated availability as a result of spoilage and other losses. Finally, the nationally documented protein deficiency contributes to overall food insecurity but has especially detrimental effects for growing children leading to stunting and other childhood related growth problems.

Using FAO Food Balance sheets to calculate the composition of the diet leads to a distribution in terms of major food sources as follows: cereals and tubers (including cooking bananas or matoke) 54%, sugar, fruits and vegetables 26%, pulses 10 %, animal products 5 % and oilseeds and fats 5% [Figure 2].[10] It is clear from this indicative distribution of major food sources in the diet that the Ugandan diet is heavy in starches and low in fats and protein. This is consistent with a national agricultural production where cereal, tuber and banana production dominate and animal production is in its early stages of recovery after a period of decline. If we begin to disaggregate the food production and presumed availability data by region we find a quite differentiated picture in terms of food security for many of the regions.



[10] FAO production yearbook, as cited in Ojok, Rita- Laker, The Uganda Oilseed Complex, Doctoral Dissertation, University of Michigan 1995, p. 6.

TABLE 5: Uganda, Food Consumption by District, 1995[11], [% Daily requirement]

District	Calories	Proteins	Fats	District	Calories	Proteins	Fats
Jinja	107	104	82	Iganga	114	99	85
Kamuli	105	86	68	Tororo	110	104	56
Mbale	112	116	72	Kapchor	114	91	55
Kumi	96	48	85	Soroti	88	65	77
Moroto	85	57	68	Kotido	82	62	70
Apac	110	84	85	Lira	106	82	88
Kitgum	113	85	89	Gulu	111	83	88
Moyo	76	66	72	Arua	110	90	84
Nebbi	106	83	82	Masindi	101	92	96
Hoima	91	86	89	Kabarole	96	85	109
Bundibu	78	84	94	Kasese	104	93	106
Kabale	98	84	110	Rukungir	64	82	101
Busheny	83	102	110	Mbarara	85	103	116
Rakai	92	97	96	Masaka	94	100	109
Mpigi	102	96	101	Mukono	99	89	116
Luwero	88	82	99	Mubende	99	68	97
Kampala	104	68	107	**TOTAL**	**99**	**86**	**94**

Of course trade in food stuffs does assist in mitigating deficits in many districts but because of the high percent of household incomes spent on food, many households in poorer districts can simply not afford the supplementary food that would be required to bring their consumption levels to those recommended. High rates of spoilage and losses also serve to widen the discrepancy between calculated availability from production and actual household consumption. This also serves to explain the high rates of stunting and other nutritional problems observed through direct survey methods. An examination of production, consumption and trade patterns by major nutritional group will help us to better understand the steps Uganda needs to take to reach food security.

[11]EPAU, op cit. p. 60.

Starches:Production, Consumption and Trade

Uganda is uniquely well endowed for the production of cereals and other starches, with two growing seasons, moderate temperatures and adequate rainfall the year round. With the exception of wheat and rice it is a surplus producer of millet, maize (some years), sorghum, tubers (cassava, sweet and irish potatoes) and bananas, plantain and cooking bananas. A comparative analysis of production costs done in 1993 show rice, matoke millet and sorghum to rank from first to fourth, in that order, in gross margin per hectare and return to labor in a comparison of thirteen (13) crops. Cassava also ranked high.[12]

TABLE 6: Uganda, Cereal and Other Starch Production, selected years[13]

Year	Banana	Millet	Maize	Sorg	Rice	Wheat	Potato	Cassav
1987	7039	518	357	315	20	10	1859	3101
1990	7842	560	602	360	54	4	1917	3420
1993	8222	610	804	383	74	9	2278	3139
1996	9144	440	759	298	82	9	1866	2245
1997	9303	502	740	294	80	9	2254	2291

Production of bananas (all types), maize, rice and potatoes have increased since 1987 while cassava has declined significantly as a result of mosaic disease. New resistant varieties have been developed but require more processing to be palatable. Table 7 below shows per capita consumption based on survey data as compared with availability for the major cereal and other starches. Consumption ranges from 38 to 76 % of crop availability for all the major starches produced in Uganda. This leaves significant quantities of these commodities for export within the East and Southern African region which, with the exception of Uganda, is largely deficitary in starch production.

Practically all of Uganda's regional trading partners are major cereal importers with large quantities imported by Kenya, Mozambique, Ethiopia, Somalia, Malawi and Sudan. Other starches are also traded, but to a lesser extent, regionally. Only wheat and rice and in certain

[12] Bank of Uganda, Agricultural Secretariat, "Economics of Crop Production - Gross Margin and Comparative Advantage Analysis", Kampala, Nov. 1993, p.34.

[13] Ministry of Agriculture, Animal Industries and Fisheries, Statistical Dept. in 1998 Statistical Yearbook of Uganda, Kampala 1998, p. 83.

drought years maize are imported into Uganda. The penetration of wheat and rice in urban markets, because of the ease in preparation of rice, and the facile consumption of wheat in bread form, has occurred with economic growth in the last few years. This phenomenon occurs to the disadvantage of local starches whose consumption and price will gradually suffer if these "fast" foods continue to garner a larger share of the consumers appetite for starches.

TABLE 7: Uganda, Food Availability vs. Consumption, starches[14]

Commodity	Availability per Capita	Consumption per Capita	Consumption/ Availability %
Maize	45	23	51
Millet	39	15	38
Cassava	218	131	60
Sweet Potato	128	81	63
Banana	286	217	76

Though consumption data are unavailable bread and rice consumption have increased dramatically in Uganda, especially in the urban center of Kampala and some regional towns, in recent years.

TABLE 8: Uganda, Imports of Principal cereals, selected years[15]
IMPORTS (Qty.: MT)

Year	Wheat & Durum	Wheat Flour	Rice
1997	3,021	71,580	51,734
1996	2,137	19,865	13,098
1995	247	55,681	9,927

[14]EPAU, op cit., p.64.

[15]Min. of Agriculture, Office of Statistics, unpublished material.

While rice production has some potential to increase in Uganda to meet growing demand, wheat is circumscribed by its agro-ecological potential under existing production technologies. It is insufficiently drought resistant for most of the northern areas of Uganda, where millet and sorghum pose less risk to the farmers, while humidity in the southern zones make it susceptible to disease unless regularly treated with plant protectants. Given the current necessity to import virtually all fungicides over long distances, local wheat production is for the most part not competitive with imported wheat or wheat flour, exception made of production occurring on the high plateaus in the east and western parts of the country. the technology of wheat and bread production is the need for high protein wheat varieties as a certain percent of bread flour. These varieties normally require overwintering and can not be grown in Uganda. It is this type of wheat (Hard Red Winter) which is currently being brought in under Title II and which is the principal type imported commercially. Wheat and rice compete favorably with other locally produced starches in large part because their preparation time is considerably less than the local porridges which are produced at home. The "matoke" porridge the technology of wheat and bread production is the need for high protein wheat varieties as a certain percent of bread flour. These varieties normally require overwintering and can not be grown in Uganda. It is this type of wheat (Hard Red Winter) which is currently being brought in under Title II and which is the principal type imported commercially. Wheat and rice compete favorably with other locally produced starches in large part because their preparation time is considerably less than the local porridges which are produced at home. The "matoke" porridge produced from cooking bananas requires

THE WHEAT TRAP

Africa is finding itself more and more caught up in what is being termed the "wheat trap".

During the past 20 or 30 years, certain governments as well as private companies have responded to consumer demand by establishing wheat mills. As a result, various countries now spend large amounts of foreign exchange importing wheat to feed those mills. The bulk of the flour produced is used to make bread for the the working population, as well as for the small expatriate population living in the towns and cities.

Bread is a convenient food because it is ready to eat, easily carried around, and not messy like porridges and gruels. Its taste is highly acceptable, it gives the feeling of bulk and fullness, and it is relatively cheap. With large numbers of people migrating from rural areas to the cities, the demand for bread has increased.

However, the population is being fed on food the country does not grow, with scarce foreign exchange being used to import wheat to produce flour. More foreign exchange is also spent on spare parts and foreign managers to maintain the flour mills. The process not only damages the economy but the indigenous African cereals as well. They are left in a state of underdevelopment and inadequate processing.

1 from - National Academy press, Lost Crops of Africa, p.310, Wash. DC 1996, USAID funding.

lengthy steaming. New mosaic resistant cassava needs fermentation to be palatable. While wheat is milled and baked industrially, local cereals and tubers also require reduction into starch. Production of cassava flour, sweat potato flour and matoke occur largely in the home with rudimentary technologies. While cereal production technologies can change over time, so too do milling and baking technologies and consumer preferences. It is here that perhaps the most immediate potential exists for using more of Uganda's domestic production to fulfill its food needs. Excellent baking technologies exist for incorporating up to 30 % of the flour for bread from sweet potato or cassava flour. Demand for this flour should encourage some of the cottage industry in milling to develop. Demonstration equipment is available which can be reproduced by small metal working firms [see - Appendix "Appropriate Technology" Photo Illustrations]. The National Agricultural Research Station at Kawanda has developed excellent baking technology for the use of sweet potato and cassava flour in bread. The post-harvest support project financed by USAID has supported basic processing technologies. Support for a national promotion campaign for "Uganda First" food technologies could provide a credible way for the GOU and USAID to help insure long term food security based on Uganda's comparative advantage in indigenous starches.

AVOIDING THE WHEAT TRAP

Fifty scientists from the 10 countries grouped in the Southern African Development Coordination Conference (SADCC), are now being trained to breed and produce sorghum hybrids. Soon, that number of trainees is expected to double. Why all the excitement?

To help reduce the region's dependence on imported wheat, researchers in Zimbabwe have developed hybrid strains of sorghum and millet that are designed for use in making flour and bread.

For most people in the region maize is the staple, but the crop does not grow well in the drier areas. Researchers are trying to develop substitutes that can be mixed with wheat for bread or maize for mealies. Any surplus could be sold to make quality malt.

In the farm tests, the new hybrids have produced bigger yields than existing varieties. The researchers expect to have white grained hybrid sorghum for milling very soon. It is hoped that the white sorghum will satisfy a popular preference for white maize meal. A local milling company is already working with a nongovernmental organization called Enda-Zimbabwe to set up pilot mills in rural areas to grind the hybrid grains for bread.

Before people in areas of low rainfall can be persuaded to abandon their often futile efforts to grow maize, good varieties of the new hybrids must be available in large quantities of the seed.

2 from Lost Crops of Africa, op cit., p.309.

In the interim until such programs effect milling and purchasing habits, PL 480 Title II wheat can help meet a manifest need and allay currency costs associated with commercial imports. In the context of the current war in the Congo and increased demand from the East this assistance will help maintain food supplies in the region.

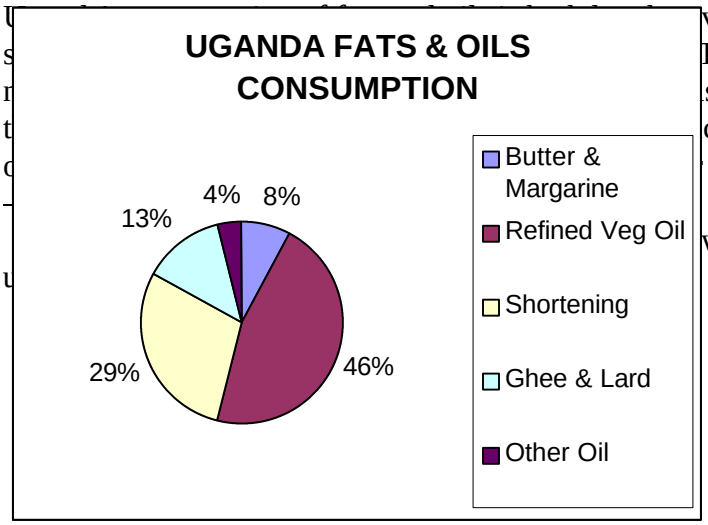
A problem exists in the commercialization of wheat resulting in large part from the rapid growth of the milling and baking industries. Many of the new millers and bakers who have so rapidly expanded to meet the growing demand for wheat and wheat flour in Uganda lack the financial resources to purchase supplies and require some form of supplier credit to operate. As PL 480 must be sold on a "cash" basis, marketing large quantities of PL 480 wheat has proved a challenge for ACDI in the past and may well continue to do so. Maximum flexibility must be given to ACDI in the context of an expanded program to time its "call forwards" and potentially switch commodities as conditions warrant. While not a market condition subject to a negative Bellmon finding, good functioning of the program and full cost recovery dictate this type of flexibility for the lead monetizer.

Fats: Production, Consumption and Trade

Consumption of fats is largely from vegetable oil supplemented by small quantities of milk and animal fats. Much crushing is done at the household level using mortar and pestle. More than adequate industrial capacity exists, the great majority of which currently goes unused. Much of the capacity had been put in place decades earlier when significant amounts of cotton were produced for export and cotton seed was available for crushing purposes. As cotton production has sharply declined and other oilseed production increased only marginally, most of this capacity is falling into a gradual decline. If production does not increase dramatically within the next few years, much of this equipment will be ill fit for use. Table 9 shows current production of the principal oilseeds. Only small percents are marketed as farmers prefer to consume locally as marketing margins are large and prices to farmers low. The problem is aggravated by a lack of storage at the farm level obliging farmers to sell all of their produce at harvest time, lack of adequate quality and quantity to stimulate market competition among traders; and large quantities of imported raw (semi-raw) materials. The processors are in a much stronger pricing position given the available supplies and their risk in carrying the stocks forward.

TABLE 9: Uganda, Production of Vegetable Seeds, selected years[16]
(x 000 MT)

Year	Peanuts	Soybeans	Simsim	Sunflower	Cotton[17]	Total[18]
1987	122	8	33	NA	NA	163
1990	158	37	62	NA	4	257
1993	153	67	75	35	8	340
1996	125	87	73	44	10	329
1997 (e)	91	84	73	48	12	296



ven comparative developing country
The consumption percentages in Fig.3 do
s consumed in sauces (peanut, simsim)
cture of fat and oil consumption from
capita consumption for Uganda at 2.29

wer from separate Ministry of Agriculture

kg. per capita, less than half that of Zambia, a third of Cameroon. Consumption has increased significantly since that time but remains low. Imports account for most of the fats consumed as vegetable oil and margarine, although approximately 9,000MT of vegetable oilseed is crushed locally. In addition, as mentioned, direct home consumption from on farm processing accounts for a large but difficult to determine share of national consumption. There are also some exports and re-exports of vegetable oil and margarine, a trade which is seen to be increasing with the increased demands from the war zone in the Congo

TABLE 10: Uganda, Imports/ Exports of Principal Vegetable Oils and Fats, selected years[20]
IMPORTS (Qty.: MT)

YEAR	Margarine &(H)Fats	Soya	Palm Oil	Olive	Sun & Safflower	Coco-nut	Rape	Maize
1997	5586	698	31532	5026	38878	221	566	147
1996	12241	110	71548	1	7669	60	356	240
1995	12205	421	23134	10	17827	74	104	244

(Table 10 cont'd.)
EXPORTS (Qty, MT)

YEAR	Margarine &(H)Fats	Soya	Palm Oil	Olive	Sun & Safflower	Coco-nut	Rape	Maize
1997	1089	0	1979	1	349	0	0	2
1996	569	1	4679	96	27	0	720	0
1995	338	0	1050	1	46	0	0	0

ACDI through various implementing partners have used proceeds from the sale of Title II vegetable oil to support oilseed production and marketing in Uganda. The program has taken a number of well thought out steps to enhance farm technology and support the processing sector. Nevertheless, self-sufficiency can not be envisaged in the near term and the war in the Congo will place additional demand on available supplies of fats and oils. Title II continues to be a needed resource to support the sector.

[20] Min. of Agriculture, Dept. of Statistics, unpublished data.[(H)Fats - Hydrogenated].

Proteins: Production, Consumption and Trade

Production of protein rich foods by principal commodity is given in Table 11 below:

Table 11: Uganda, Meat, Milk, Fish and Egg Production, selected years[21]

Year	Milk	Beef	Goat & Mutton	Pork	Chick-en	Fish	Eggs
1992	248,279	69,583	20,334	7,727	9,407	190,310	8,744
1993	261,697	69,738	31,505	12,441	11,591	194,116	9,149
1994	271,392	71,920	34,655	13,685	12,306	197,998	9,957
1997 P	550,000	90,000	45,000	25,000	18,000	200,000	13,000

[P- Projected]

Of all commodities, perhaps the largest gains in production have been made in milk where production has virtually doubled since the early 1990's. This is largely the result of an increase in herds among smallholders, aided in part by projects like Heifer Project Intererational and Land O' Lakes. Very little intensification of production has occurred and consequently continued gains in production can be anticipated. Cattle herds were decimated by cattle rustling in the late 1980's. The extent of the losses and continued insurgency and terrorism in the North has prevented the herds from being rebuilt. Beef production has suffered consequently as has small ruminant meat production, especially in the North. Fish continues to be a source of protein in certain areas around the lakes. Much of this is exported to the DRC. Industrial poultry and egg production is still in its infancy. Most poultry and egg production is from free range animals.

Protein consumption per capita is low in Uganda. Milk consumption is estimated to be only 80 % of that required for a balanced diet (1994) and meat consumption at 66%(1994). Total protein consumption is estimated at 86 % of requirements. This low level of consumption, much lower for certain regions and segments of the population, is one of the principal reasons for stunting in children.

Potential exists for greatly increasing protein production and consumption to the general improvement of diets and health. Milk production in particular appears to have reached a stage of rapid development with a significant milk collection and dairy infrastructure already in

[21]EPAU, op cit., p. 86.

place. Veterinary services are good largely because farmers are willing to assist in the displacement and costs of the local Ministry of Agriculture extension agent. These are most often well trained and experienced agents who have some access to the appropriate veterinary drugs commercially.

Cows are currently fed on locally grown forages with little or no protein supplement. What feed supplement is bought is usually low in protein content because of its general lack of availability locally. As milk production responds very favorably to even modest additions of protein in the diet, additional protein from vegetable oilseed meal (a by-product of vegetable oil production) would help accelerate milk production and increase the demand for local oilseeds as well. PL 480 soybean meal in modest amounts might be able to be used in a carefully designed program to introduce farmers to the benefits of increased protein feeding. Care must be taken, however, not to dampen the demand for locally produced meals and to phase out of the program in favor of local protein sources in a rapid time frame.

TABLE 12: Uganda, Trade by Commodity Group, slected years[22]

IMPORTS($ U.S. x 000)

YEAR	Cereals & Preparations	Veg. Oil	Sugar & Honey	Meats & Preparations	Dairy Prod. & Eggs
1997	87742	40199	19010	1670	1437
1996	48448	30426	10931	290	2376
1995	39741	27376	26694	290	2657
1994	38338	21042	10365	208	2817
1993	26971	7929	12270	80	1784

REEXPORTS

YEAR	Cereals & Preparations	Veg. Oil	Sugar & Honey	Meats & Preparations	Dairy Prod. & Eggs
1997	17906	2067	618	NA	103
996	14341	22136	145	NA	0
1995	15522	1093	256	NA	2
1994	10275	7	474	NA	52
1993	NA	NA	NA	NA	NA

EXPORTS

[22]Uganda Statistical Yearbook 1998

YEAR	Cereals & Preparations	Veg. Oil	Sugar & Honey	Meats & Preparations	Dairy Prod. & Eggs
1997	25101	2210	713	13	476
1996	19272	22546	231	0	254
1995	26603	1440	427	37	275
1994	30044	7	660	23	239
1993	23518	14	42	9	47

NET (Imports - (Exports + Re-exports)

YEAR	Cereals & Preparations	Veg. Oil	Sugar & Honey	Meats & Preparations	Dairy Prod. & Eggs
1997	44735	37782	17679	1657	1287
1996	14835	(14256)	10555	290	2122
1995	(2384)	24843	26011	253	2380
1994	(1981)	21082	9231	185	2526

Agricultural Inputs and Services To Agriculture

Surveys taken by the IDEA Project and the EPAU Unit of the Ministry of Agriculture in 1995[23] showed very low levels of chemical fertilizer use, less than 1% of respondents, modest use of insecticides and pesticides 10% and use of improved seeds ranging from 71% of rice and 29% of maize to 15 and 20% for soybeans and sunflower and 1-5% for sorghum and millet.

Projects like IDEA and Sasakawa Global 2000 have been successfully promoting chemical fertilizer use and improved seed varieties. However, while Uganda possesses phosphate reserves there is no domestic nitrogen or potassium sources and these fertilizers will need to be imported long distances at relatively high prices. More needs to be done in researching domestic sources of fertilizer from plant residues, coffee husks, animal manures and treated urban wastes. Donors and international agricultural experts need to demonstrate imagination and commitment to solving African problems in an African context if the numerous local resources are to be brought to bear on the long term problem of soil fertility.

The same may said to be true of extension services where expensive World Bank financed commitments to "training and visit" extension systems have failed to reach most farmers on a systematic or regular basis, with the sole exception of veterinary services as noted above. Here a more creative use of radio could reach farmers on a regular basis with timely information in a cost effective manner. Research needs to be simplified, appropriate and presented in a manner to capture the attention of an otherwise busy farming family. Other health and family issues can also be addressed through public information disseminated in this fashion. A periodic hourly program capturing a national audience (but translated into the many local languages) could go a long way in creating an informed public, schooled in the information which most effects its quality of life.

Food Assistance Strategy

- *Other Donors* (WFP)

The World Food Program has feeding and food for work programs for the estimated 340,000 displaced persons in Northern Uganda and additionally brings food purchased locally in Uganda to its feeding centers in Rwanda, Northern Uganda and Southern Sudan. Such purchases create demand for local food stuffs and offset the effect of donated food on local prices. In 1998 through September a total of 55,000 MT of maize and beans were procured locally. A total procurement of 70,000 MT is planned for the year valued at $24 million. Approximately 500 MT is shipped north monthly to Sudan.[24] Cargos received by the WFP/Kampala in 1997 totaled

[23] IDEA/EPAU, Food Security Survey, 1995, 18 Districts, EPAU op cit p.180.

[24] Personal communication from Michael Jones, Director World Food Program kampala.

155,104 MT, including 2,038 MT tons of wheat and 5,470 MT of vegetable oil. Pulses totaling 26,186 MT were the largest category. This compares to 161,462 MT in 1996 and 177,347 in 1995. Much of this food is subsequently shipped out of Uganda to WFP programs in Rwanda, Democratic Republic of Congo Tanzania and Burundi. Approximately 50,000 MT remained in Uganda in school feeding programs, emergency relief and feeding center programs in 1997.[25]

- *Other Donors*

Italy, Canada, the EU and other donors contribute food assistance to Uganda. Every effort needs to be made to coordinate levels and programs through regularly scheduled meetings hosted by the GOU.

- *USAID*

Currently three cooperating sponsors Africare, World led to begin a new five year program in December of this year. *Sub-grantees and contraced programs in agriculture have supported the work of the food aid cooperating sponsors on food security* ACDI/VOCA has been acting as the joint monetizing agent for the consortium and is currently seeking to sign a Memorandum of Understanding(MOU) with the consortium which would allow the proceeds of any one commodity sale to be split by the members of the consortium proportionally to their original grant. This review also recommends flexibiltiy on the part of Food for Peace, USAID/Kampala and the consortium members in allowing ACDI/VOCA after joint consultations to recommend the call forward of wheat, vegetable oil or rice depending on the vicissitudes of marketing conditions in very thin and volatile markets. This Bellmon analysis also determined that importation of some rice and possibly soybean meal in conjunction with a well structured program in support of the dairy sector may take place without disincentives to local production and markets. The CS's should do further analysis to determine exact amounts.

Beyond the mechanics of the program co-ordination will be strengthened by periodic meetings of consortium members. These meetings should include other contractors and grantees working in support of SO-1. The consortium's work will be supported by the creation of a Washington Uganda Country Team, meeting periodically and including representatives of all the consortium members and USAID. In addition to the work already being undertaken the study recommends enhanced support for uses of domestically produced starch and a small program supporting enhanced feeding of protein foods to dairy cattle.

The work of extending new technology to peasant farmers with small land holdings is slow and labor intensive. The focus of Title II cooperating sponsors seems well chosen and directed. Monetized food aid in Uganda has supported rapid economic growth, both by saving scarce foreign exchange, which has then been used to purchase inputs (petroleum, machinery) which

[25]WFP, op.cit. Uganda statistical office.

support growth, and by its impact on transfering skills to the rural sector. More attention and follow-through and more coordination among the cooperating sponsors and with other donors and the GOU are suggestions that can be made on the margin. Government commitment for this program has existed to date and should be sought for future activities. Vegetable oil production, especially the GOU/IFAD palm oil project, sugar production and a national campaign for "Ugandan Food (starch) Consumption" are all areas where government attention appears lacking or misplaced. A better informed and more committed donor community could also provide support in these areas.