JAMAICA

FOOD AID DISINCENTIVES STUDY

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I. BACKGROUND

USAID/Jamaica's FY 1988-89 Action Plan was reviewed in AID/W on March 24-25, 1987. The Action Plan proposed a food aid level substantially above previously planned levels. The question arose: will continued high levels of concessional food assistance conflict with the Mission's (and government's) efforts to increase domestic food production? The AID/W review committee recommended that an analysis be undertaken on the impact of concessional food aid on domestic food production in Jamaica. This analysis, a "Food Aid Disincentives Study", would serve as one input for determining the PL 480 Title I level for FY 1988-89. The analysis was undertaken in Jamaica during a two week period in May/June 1987.

Section II provides an overview of the size and composition of the PL 480 program. Section III summarizes the role of the agriculture sector in the Jamaican economy. Section IV focuses on domestic food production and consumption, quantifies the food gap, and indicates how the gap is being met with commercial and concessional imports. Section V addresses the government's strategy to achieve food self-sufficiency through import substitution. Section VI estimates future food import requirements. Section VII suggests possible alternatives to food aid. Section VIII reports conclusions and recommendations.

II. THE PL 480 FOOD AID PROGRAM IN JAMAICA

Food aid will represent over one-half of total bilateral economic assistance provided by the U.S. to Jamaica in FY 1987. Table 1 shows that the quantity of food aid, and the proportion of food aid to total economic assistance, has grown substantially in recent years.

In FY 1981-83, PL 480 food aid averaged about $18 million per year and represented about 16% of total U.S. economic assistance. This year, FY 1987, the food aid level is two and one-half times the earlier level in absolute terms ($45 million) and more than three times the earlier level in relative terms (53%).

The U.S. is providing four commodities under the FY 1987 PL 480 Title I program: (a) wheat/wheat flour, (b) rice, (c) corn/sorghum, and (d) soybeans. The wheat and wheat flour, rice, and oil processed from the soybeans are used for human consumption. Most of the corn and all of the sorghum and the soybean cake are used for animal feed.

Although corn and sorghum are used for human consumption in many countries, this is generally not the case in Jamaica. (Only a limited amount of corn, about 11%, is ground into corn meal.) Therefore, while imported corn and sorghum could have a disincentive effect on the production of domestically produced commodities which are used as animal feed (such as cassava), one would not expect imported corn and sorghum to have a disincentive effect on the production of commodities used for human consumption (such as rice). Similarly, one would not expect imported rice and wheat to have a disincentive effect on domestic corn production. In spite of the fact all three commodities (rice, wheat and corn) are cereals, and even though the three commodities are substitutes for one another in many countries, this is not the case in Jamaica.

Table 2 summarizes the quantity of Title I food aid provided by the U.S. to Jamaica over the past five years, 1983-87. From 1984 to 1985 the volume of cereals food aid provided by the U.S. more than doubled, from 101,000 tons to 223,000 tons. This reflects a doubling of the rice level and a tripling of the corn/sorghum level. The oil level was also tripled from 1984 to 1985, and the wheat and wheat flour level was nearly tripled from 1984 to 1986. Thus, the magnitude of the PL 480 program has been expanding substantially in volume as well as dollar terms in recent years.

TABLE 1.--Magnitude of PL 480 Food Aid and U.S. Economic Assistance (Obligations), Jamaica, FY 1981-89 ($ 000)

	1981 Actual	1982 Actual	1983 Actual	1984 Actual	1985 Actual	1986 Actual	1987 Est.	1988 Planned	1989 Planned
Food Aid	17,100	17,500	20,000	20,200	44,800	48,000	44,900	46,000	46,000
Economic Assistance	60,900	126,400	97,000	89,900	131,900	76,100	39,200	63,600	63,600
DA	12,900	31,400	27,200	37,600	26,400	17,500	14,500	18,600	18,600
ESF	41,000	88,000	54,300	52,300	80,500	58,600	24,700	45,000	45,000
Other	7,000	7,000	15,500	--	25,000	--	--	--	--
Total Assistance	78,000	143,900	117,000	116,100	176,700	124,100	84,100	109,600	109,600
Food Aid as a % of Total Assistance	21.9	12.2	17.1	22.6	25.4	38.7	53.4	42.0	42.0

Source: USAID/Jamaica.

TABLE 2.--Magnitude of PL 480 Title I Food Aid Commodities, Jamaica, 1983-87 (tons)

	1983	1984	1985	1986	1987 Est.
Rice	16,300	16,300	32,690	35,600	32,000
Wheat/Wheat Flour	42,060	52,820	89,550	139,600	109,000
Corn/Sorghum	39,100	31,800	101,200	101,600	88,000
Total Cereals	97,460	100,920	223,440	276,800	229,000
Vegetable Oil	2,660	1,800	6,150	--	--
Soybeans	--	--	--	--	35,500

Source: Jamaica Commodity Trading Company (JCTC), 1983-86; and USAID/Jaimaca, Title I Agreement, 1987. The 1987 level for soybeans has been proposed by USAID/Jamaica as part of the amendment of the FY 1987 Title I agreement.

III. AGRICULTURE'S ROLE IN THE JAMAICAN ECONOMY

Agriculture, though important, plays a relatively less important role in the Jamaican economy than is typically the case in most developing countries, especially in Asia and Africa. And this role seems to be declining. For example, in 1980 agriculture's contribution to GDP (excluding production for own consumption) was 8.3% (according to the 1986 FAO/World Bank Agricultural Sector Policy Review); by 1985, it had declined to 5.7%.1/ (In contrast, though, the IMF estimates agriculture's contribution to GDP in 1984/85 at 8.7%.) In 1984, agriculture absorbed 24% of the Jamaican labor force, high by U.S. and developed country standards, but relatively low by developing country standards.

In 1980, agriculture's share of total exports was 8.3%; by 1985, it had increased to 12.7%. However, the increase in share was due not to an absolute increase in agricultural exports, but rather to a fall in bauxite and alumina exports. Indeed, agricultural exports declined in absolute terms from 1980 to 1985.

Of the total value of agricultural exports in 1984, sugar comprised 70%; coffee, 9%; pimento, 7%; cocoa, 6%; and root crops, 6%. The country's heavy dependence on sugar as the principal foreign exchange earner within the agricultural sector is striking. And the rationale underpinning the government's policy to promote export diversification is understandable.

In 1980, food accounted for 16.8% of total imports; by 1984, the proportion of food imports to total imports had grown to 17.4%. The main food items that are imported include (a) corn, (b) wheat, (c) rice, (d) soybeans, and (e) wheat and milk products.

Cereals comprise about one-third of the average Jamaican diet according to USDA estimates.2/ Of the cereals, wheat is by far the most important (22% of the diet); rice ranks a weak

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1/ United Nations, Food and Agriculture Organization, Jamaica Agricultural Sector Policy Review, Report of the FAO/World Bank Cooperative Programme Investment Centre (Rome: FAO, September 24, 1986), p. 3.

2/ U.S., Department of Agriculture, Economic Research Service, World Food Needs and Availabilities (Washington, D.C.: U.S. Government Printing Office, August 1986), p. 175.

second (8%); and, as indicated above, corn is relatively minor (2%), since it is used primarily as animal feed and consumed indirectly. Yams and sweet potatoes comprise another 6% of the diet.

One element of the government's present agriculture strategy is to achieve national "self-sufficiency" in rice, corn, cassava and soybeans. With the exception of cassava, these commodities, together with wheat and wheat flour, are the same as those provided by the U.S. under the PL 480 program. This would seem to raise questions concerning the compatibility between Jamaica's strategy of food self-sufficiency and the provision of PL 480 food aid. In fact, however, the government has no intention of becoming 100% self-sufficient in any of these commodities. Instead, the government has established targets for increasing the production of these commodities, and these targets (which are defined as a percentage of total self-sufficiency) are well below 100%; see Table 4.

A primary objective of the import substitution strategy is to save foreign exchange. This has become an increasingly important objective because of the growing demand to service external debt. In 1985/86 the debt service ratio was 64.7% (46.6% with rescheduling); in 1986/87 it is projected by the IMF to increase to 72.1% (50.7% with rescheduling). In short, foreign exchange equal to more than one-half the value of the country's exports is needed to service debt. When foreign exchange is also needed to purchase imported food commodities, the pressure to increase domestic food production is understandable. Finally, devaluation of the Jamaican dollar has made imported commodities, including food commodities, relatively more expensive in local currency terms, and this also has reinforced the strategy to encourage food self-sufficiency.

The issue is whether or not the government's import substitution (or self-sufficiency) strategy makes economic sense, given the country's apparent comparative advantage in producing agricultural commodities other than corn, soybeans and rice.[1/] This issue is addressed in Section V.

1/ Or course, some land may be suitable only for the production of certain crops (such as swamp land for rice production).

IV. THE FOOD GAP

Domestic Food Production

Table 3 provides production, acreage, and price data for rice and corn, the only two cereal crops which Jamaica produces (in even minimal quantities) which are also provided as Title I food aid. The table provides comparable data for yams and sweet potatoes (possible substitutes for rice) and cassava (a possible substitute for corn). Production data are also provided for vegetable oil. The data vary depending on their source (GOJ, USDA, or JCTC), which reflects the various ways of defining a year (crop year, fiscal year, or calandar year). (Note that JCTC's production estimates for both rice and corn are zero for most years. This reflects the fact that domestic production of these commodities, relative to import requirements, is insignificant from the perspective of a commodity trading organization.)

Rice. Domestic production of food crops has fluctuated over the past decade. In the case of rice, GOJ data show that production varied from 1,300 tons to 2,600 tons between 1977 and 1982. Then it increased dramatically, doubling between 1982 and 1983 and tripling between 1982 and 1984. This may reflect the emphasis accorded to rice as one of the commodities included under the government's food self-sufficiency program. But 1986 was disappointing because production decreased to less than one-half the 1984 level. Still, average annual rice production during the five-year period 1982-86 (3,752 tons) was 85% higher than average annual rice production during the five-year period 1977-81 (2,030 tons). Variations in acreage explain these changes more so than variations in yield. Price data are not available to test whether or not there has been any change in production in response to price changes.

Corn. In contrast, average annual corn production has decreased from 7,218 tons during 1977-81 to 4,157 tons during 1982-86, or by 42%. Unlike rice production, corn production decreased steadily and substantially from 1976 to 1982, falling by 72%; since 1982, however, corn production has increased steadily but slowly, by about 47% over the four year period, perhaps in response to the government's strategy of food self-sufficiency. The increase in corn production since 1982 is closely associated with increased acreage allocated to corn. And this acreage expansion may well have occurred in response to substantial increases in producer prices for corn. The farm gate price of corn increased four years in a row, from 35J¢/lb. in 1982 to 86J¢/lb. in 1986, an increase of 146% over the four year period.

TABLE 3.--Production, Acreage, and Farm Gate Prices; Rice, Corn, Cassava, Yams/Sweet Potatoes; Jamaica; 1976-87

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Production (short tons)												
Rice (GOJ)	--	2,623	1,584	1,341	2,554	2,050	1,693	3,734	5,913	4,696	2,724	
Rice (USDA)	5,455	1,818	909	1,818	1,818	1,818	2,727	4,545	3,636	3,636	3,636	
Rice (JCTC)			0	0	0	0	4,545	4,545	4,545			
Corn (GOJ)	12,280	10,233	8,669	7,339	4,842	5,007	3,411	4,027	4,056	4,290	5,001	
Corn (USDA)		5,455	4,545	11,818	12,727	6,364	7,273	6,364	4,545	6,364	6,364	6,364
Corn (JCTC)			0	0	0	0	0	0	4,545			
Cassava (GOJ)	23,070	36,989	39,517	31,521	25,567	24,118	18,692	18,947	21,690	19,681	18,212	
Yams/Sweet Potatoes (GOJ)	149,830	181,791	241,576	202,409	175,348	183,434	152,397	170,553	203,881	215,435	212,588	
Yams/Sweet Potatoes (USDA)		180,000	180,000	173,000	184,000	150,000	120,000	137,000	150,000	150,000	150,000	150,000
Vegetable Oil (JCTC)			8,909	9,900	10,273	9,291	10,000	10,091				
Acreage (acres)												
Rice (GOJ)	--	2,623	1,584	1,682	2,254	1,846	1,420	2,144	3,867	3,466	1,920	
Corn (GOJ)	15,050	13,897	11,969	10,096	7,135	7,671	5,872	6,976	7,079	7,384	10,833	
Cassava (GOJ)	5,665	7,525	8,172	6,215	4,912	4,836	4,053	4,077	4,168	3,905	3,318	
Yams/Sweet Potatoes (GOJ)	32,404	34,758	45,405	36,624	31,962	32,954	28,288	32,124	37,069	38,576	37,862	
Farm Gate Price (J¢/lb.)												
Rice (GOJ)	--	--	--	--	--	--	--	--	--	140	118	
Corn (GOJ)[a/]	6	20	20	23	40	34	35	45	54	78	86	
Cassava (GOJ)[b/]	10	12	11	12	14	15	18	18	27	39	47	
Yams/Sweet Potatoes (GOJ)[c/]	16	20	18	25	43	40	44	52	58	65	76	

a/ Weighted average of three varieties of corn (hybrid, ordinary and sweet). (Production and acreage data for corn exclude sweet corn, which was grown only in 1977 and 1986, and then in only negligible quantities.)

b/ Weighted average of two varieties of cassava (bitter and sweet).

c/ Weighted average of sweet potatoes and eight varieties of yam (lucea, negro, renta, St. Vincent, sweet, tau, yellow and other.)

Source: Government of Jamaica, Ministry of Agriculture, Data Bank and Evaluation Division; USDA, ERS; (USDA data for 1977/78 etc. are tabulated under 1977); JCTC.

Cassava. Cassava, like corn, is used for animal feed. And average annual cassava production decreased at about the same rate as corn production, 38%, from 31,542 tons during the earlier period (1977-81) to 19,444 tons during the latter period (1982-86). As in the case corn production, changes in cassava production reflect farily closely changes in acreage allocated to cassava. Unlike corn production, however, which has increased annually since 1982, cassava production has fluctuated during this period -- and this is in spite of the fact that the farm gate price of cassava increased by 161% over four years, from 18J¢/lb. in 1982 to 47J¢/lb.in 1986. Cassava, like rice and corn, is included in the self-sufficiency strategy.

Yam and Sweet Potato. Production of yams and sweet potatoes has remained relatively constant over time: about 197,000 tons per year, on average, in the 1977-81 period and about 191,000 tons in the 1982-86 period. During the latter period, however, production increased by 39% (almost 10% per year, on average). Producer prices increased by 73% during this period.

Domestic Food Consumption

Although it is important to try to understand how variations in domestic food production are associated with variations in acreage, producer prices, and other factors, it is equally important to keep in mind that domestic food production in Jamaica constitutes a very, very small proportion of domestic food consumption. For example, a 100% increase in domestic rice and corn production, commodities provided under Title I, would do little to close the extraordinarily large gap between the consumption and production of these commodities. Table 4 indicates the magnitude of this gap for staple food commodities in 1984.

The table shows that none of the wheat and wheat flour consumed in Jamaica is produced domestically. It is technically infeasible to produce wheat in Jamaica, implying that wheat imports will be required for the foreseeable future. Of all the rice consumed in Jamaica in 1984, 93% was supplied by imports. The proportion of imported corn to total corn consumption was 97%; and for soybeans, it was 100%. About 91% of the vegetable oil consumed in 1984 was imported. The conclusion is striking. Jamaica produces well under 10% of all of its staple food requirements; the remainder, over 90%, must be imported.

TABLE 4.--Consumption and Production of Staple Food Commodities, Jamaica, 1984, short tons

	Consumption	Production	Degree of Self-sufficiency 1984 (%)	Target Rate of Self-sufficiency 1988/89 (%)[a/]
Wheat	180,000	0	0	0
Rice	60,000	4,000	7	42
Corn (feed)	150,000	5,000	3	34
Cassava (feed)		20,000		13
Soybeans (feed)		0	0	13
Vegetable Oil (copra)	17,250	1,500	9[b/]	7.5

a/ For corn, soybeans and cassava, the target rate is expressed as a percentage of feed requirements.

b/ Oil consumption increased in 1985 to 23,000+ tons, so that oil production is currently less than 5% of self-sufficiency, not 9% as it was in 1984.

Source: Jamaica Agricultural Sector Policy Review, Volume 1, pp. 6 and 20; Volume 2, Working Paper 3, pp. 19 and 25 (based on revised national targets for Agro 21 program, January 1986); JCTC (November 5, 19[illegible]) for consumption figures for wheat and vegetable oil.

Food Imports

The U.S. is the major source of all of these imported commodities, including those imported commercially as well as concessionally. Table 5 indicates the magnitude of these imports.

Rice. Over the past five years, Jamaica has imported, on average, 54,000 tons of rice, most of which (92%) has been from the U.S. Over the five year period, about one-half of the rice was imported commercially and one-half concessionally. Relatively more commercial imports were reported in the early years, while relatively more concessional imports were reported in the latter years. This reflects the fact that food aid was substituting for commercial sales.

Wheat/Wheat Flour. In the case of wheat and wheat flour, Jamaica has imported, on average, about 187,000 tons per year over the past five years, about three quarters of which (74%) is from the U.S. About 40% of the imports have been commercial and 60% concessional. Like concessional rice imports, virtually all concessional wheat imports are from the U.S.

Corn. In the case of corn, 100% of both commercial and concessional imports have been from the U.S. They have averaged about 147,000 tons per year, divided about equally between commercial and concessional sales. But like rice, and to a lesser extent wheat, there has been a decided shift toward concessional sales and away from commercial sales in recent years.

Vegetable Oil/Soybeans. Jamaica imported increasing levels of vegetable oil (but no soybeans) in 1983, 1984, and 1985, on both commercial and concessional terms. In 1985, about one-half the total was provided on concessional terms (all by the U.S.). About 60% of the commercial sales were supplied by the U.S. In 1986 and 1987, Jamaica imported soybeans, but no vegetable oil, all from the U.S. Some of the beans were processed into oil.

In 1976-78, cereal food aid (from all sources) represented 6% or more of total cereal consumption in only 17 of 98 developing countries. Jamaica was among the 17 countries then,

TABLE 5.--Food Imports (Commercial and Concessional), Jamaica, FY 1983-87 (000 metric tons)

Rice

	1983	1984	1985	1986	1987	Average
Commercial	30.9	30.7	23.4	21.4	33.0	27.9
of which U.S.	29.9	30.7	20.4	13.4	25.0	23.9
Concessional	16.3	16.3	32.7	35.6	31.0	26.4
of which U.S.	16.3	16.3	32.7	35.6	29.0	26.0
Total	47.2	47.0	56.1	57.0	64.0	54.3
of which U.S.	46.2	47.0	53.1	49.0	54.0	49.9

Wheat/Wheat Flour

	1983	1984	1985	1986	1987	Average
Commercial	132.9	127.1	105.4	36.2	98.0	99.9
of which U.S.	36.7	91.8	67.9	7.4	60.5	52.9
Concessional	42.1	52.8	89.6	143.9	106.0	86.9
of which U.S.	42.1	52.8	89.6	139.6	102.0	85.2
Total	174.9	179.9	195.0	180.1	204.0	186.8
of which U.S.	78.7	144.6	157.4	147.0	162.5	138.0

Corn

	1983	1984	1985	1986	1987	Average
Commercial	133.9	127.0	39.3	14.3	55.0	73.9
of which U.S.	133.9	127.0	39.3	14.3	55.0	73.9
Concessional	39.1	31.8	101.2	101.6	90.0	72.7
of which U.S.	39.1	31.8	101.2	101.6	90.0	72.7
Total	173.0	158.8	140.5	115.9	145.0	146.6
of which U.S.	173.0	158.8	140.5	115.9	145.0	146.6

TABLE 5.--Continued

Vegetable Oil

	1983	1984	1985	1986	1987
Commercial	3.3	5.2	5.9		
of which U.S.	2.2	5.0	3.6		
Concessional	2.7	1.8	6.2		
of which U.S.	2.7	1.8	6.2	0.0	0.0
Total	6.0	7.0	12.1	10.8	
of which U.S.	4.9	6.8	9.7		

Soybeans

	1983	1984	1985	1986	1987
Commercial				53.1	
of which U.S.				53.1	
Concessional				0.0	35.5
of which U.S.				0.0	35.5
Total				53.1	
of which U.S.				53.1	

Source: JCTC Correspondence, November 5, 1985 (for the years 1983, 1984, and 1985); JCTC, via Kingston 06460, June 25, 1987 (for the year 1986); JCTC Correspondence, December 10, 1986 (for the year 1987). (The JCTC estimate for cereal food aid in 1987 is 221,000 tons, somewhat lower than the estimate included in the Title I agreement (229,000 tons) and cited in Table 2.)

and is no doubt among this group in 1987.[1/] Haiti was the

1/ Barbara Huddleston, "Economic Effects of Food Aid: Some Theoretical Issues," unpublished draft, 1982, cited in A.I.D., "Background Paper and Guide to Addressing Bellmon Amendment Concerns on Potential Food Aid Disincentives and Storage," July 31, 1985, p. 8. In 1984, cereal food aid constituted about 25% of total cereal consumption in Jamaica; all of the food aid was provided by the U.S.

only other country in Latin America and the Caribbean that was in this category in 1976-78. A.I.D. guidelines recommend that a food aid disincentives analysis be undertaken for countries where the proportion of food aid approaches 10% or more of total food consumption.1/

In Jamaica, where rice is produced for human consumption and corn is used almost exclusively as animal feed, such an analysis should examine the extent to which imported rice and wheat might compete with domestically produced rice (and possibly yams and sweet potatoes); the extent to which imported corn and sorghum might compete with domestically produced corn and cassava; and the extent to which imported soybeans and vegetable oil might compete with domestically produced oil (copra).

1/ A.I.D., "Background Paper and Guide to Addressing Bellmon Amendment Concerns on Potential Food Aid Disincentives and Storage," July 31, 1985, p. 8.

V. ACHIEVING FOOD SELF-SUFFICIENCY THROUGH IMPORT SUBSTITUTION

To what extent does the government's import substitution strategy make financial sense from the small farmer's point of view? Table 6 summarizes the returns to labor for various crops in 1985 when the basic wage was J$20 per day (US$3.65 per day).[1/] It shows that the returns per person-day for each of the crops listed in the table was higher than the basic wage. However, the returns to labor for import substitution crops (rice and corn) are very low relative to the returns to labor for non-import substitution crops (especially traditional and non-traditional export crops and high value crops). This is true not only for small farms (as shown in the table), but for large farms as well. Therefore, in the absence of subsidies farmers will prefer not to produce rice and corn, and instead will choose to produce crops with a higher financial rate of return to labor. In other words, the production of import substitution crops is simply not as profitable as the production of virtually all other crops.

Does import substitution make sense from an economic point of view? That is, should the government encourage the investment of scarce resources in the production of rice, corn, and other cereal crops, or alternatively can the country's agricultural resources be invested more productively elsewhere? The Jamaica Agricultural Sector Policy Review suggests that, based on February 1986 prices, investments designed to achieve food self-sufficiency are probably not warranted.

Rice. Rice production is unlikely to attract commercial investors since the return per acre is only J$415 (about US$75) for large mechanised farms and J$210 (about US$38) for small farms.[2/] As shown in Table 6, the net return to labor for small farmers is just J$31 per day (less than US$6 per day) which, while higher than the wage rate, is lower than the return to labor for virtually all alternative crops. Other things being equal, farmers will choose to grow crops which are more profitable than rice.

Therefore, if the government's 42% self-sufficiency target for rice is to be achieved, higher producer prices for rice

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1/ The exchange rate in June 1987 was approximately US$1.00 = J$5.50.

2/ Jamaica Agricultural Sector Policy Review, Volume 1, p. 13.

TABLE 6.--Returns to Labor for Selected Crops Produced by Small Farmers, Jamaica, J$, 1985

Crop	Days per Crop per Acre	Return per Person-Day	Return to Labor per Crop
Blue Mountain Coffee	74	368	27,232
Onion	145	114	16,530
Lowland Coffee	66	94	6,204
Newly Established Citrus	97	96	9,312
Citrus pre-project	17	72	1,224
Cassava	53	58	3,074
Pumpkin	48	55	2,640
Rehabilitated Citrus	64	53	3,392
Yellow Yam	121	48	5,808
Cabbage	99	48	4,752
Red Pea	54	44	2,376
Coconut	62	31	1,922
GREEN CORN	44	31	1,364
RICE	33	31	1,023
CORN	44	25	1,100
Cocoa	19	25	475
BASIC WAGE		20	

Source: Jamaica Agricultural Sector Policy Review, Volume 2, Working Paper 3, pp. 40-41.

will be required. In February 1986 the paddy price was close to the import parity price. This implies that higher producer prices would require some degree of subsidy. Farm gate prices for rice could be increased either by imposing duties on rice imports or by subsidizing rice production costs. According to the Agricultural Sector Policy Review, the costs of protecting Jamaica's domestic rice economy would be about J$25 million per year (about US$4.5 million per year) plus the costs of administering the program. These costs would be born by consumers (in the case of import tariffs) or by taxpayers (in the case of subsidies). In the latter case, fiscal resources would be obtained by taxing productive sectors of the economy in order to subsidize the less productive rice sector.1/

1/ Ibid., p. 26; Volume 2, Working Paper No. 3, pp. 25-27.

Corn. Similarly, at the controlled corn price the return per acre is only J$408 (about US$74) on large mechanised farms and J$340 (about US$61) on small labor intensive farms; the return to labor, as shown in Table 6, is only J$25 per day (less than US$5 per day). Again, these returns are far lower than farmers can earn by producing export or high value crops. As in the case of rice, domestic corn production can be protected, thereby making it more attractive for farmers to produce corn. However, in order to avoid harming the livestock industry, which relies of reasonably priced corn, the protection would have to take the form of subsidies rather than tariffs. A subsidy of about J$35 million per year would be required to achieve the 34% target rate of self-sufficiency for corn.[1/] A subsidy to encourage corn production would have the same implications for taxpayers as a subsidy to encourage rice production.

Soybeans and Cassava. An alternative to corn production may be increased soybean and/or cassava production, both of which are substitutes for corn when they are used as animal feed. In the case of soybeans, the FAO/World Bank report concludes that production is not profitable at 1986 prices. But in the case of cassava, the return per acre of J$700-800 (about US$127-145) may make it an economically viable substitute for corn.[2/]

Since the Jamaica Agricultural Sector Policy Review was undertaken, the Ministry of Agriculture has reportedly dropped corn and cassava from the self-sufficiency program, having determined that the production of these crops is not economically viable.[3/] A similar dicision has not yet been made for rice.

Copra. Jamaica is clearly deficient in vegetable oil production. Estimates for 1984 indicate that domestic copra provided only about 5% of total vegetable oil consumed, and this may be on the high side. The FAO/World Bank report estimates that if half the coconuts produced under the government's Copra Production Acceleration Programme were delivered to the Coconut Board for copra processing, the proportion of vegetable oil demand met from local production would increase to 7.5%. The problem is getting the coconuts to

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1/ Ibid., Volume 2, Working Paper No. 3, pp. 27-30.

2/ Ibid., p. 30.

3/ Meeting with Director of Policy and Planning, Ministry of Agriculture, May 28, 1987.

the Coconut Board for processing, since prices on the local market are 50% higher than those offered by the Board. (When the Board has raised prices in the past, local market prices have increased as well.)[1/]

In 1985 the landed import cost of soybean oil was $670 per ton. The price of locally produced oil in that year was $1,355 per ton. Local production costs are so much higher than international prices as to indicate that domestic production is uneconomic. On the other hand, production at 1985 prices was profitable to the growers, and coconuts are often produced on land which would not be suitable for other crops. Thus, there may be some scope for import substitution.

Conclusion. There is clearly domestic market demand for rice, corn, and vegetable oil. The issue is whether these commodities should be produced domestically or imported. If the government chooses the path of import substitution, one or both of two instruments is available to make domestic production profitable: (a) an import duty (born by consumers) can be imposed to protect domestic production of these commodities; or (b) domestic production of these commodities can be subsidized by increasing taxes.

In the absence of subsidies, Jamaica does not appear to have a comparative advantage in the production of rice, corn, or soybeans, and wheat production is technically not feasible. Under these circumstances, the potential for PL 480 rice, corn, wheat or soybeans to discourage domestic production is negligible. As stated in A.I.D./W guidelines, "The country should produce those commodities which offer greater production and income potential to the nation and the farmer."[2/] These guidelines are consistent with overall A.I.D. policy which encourages countries to pursue a strategy of food self-reliance in contrast to food self-sufficiency, thereby enabling them to reap the benefits of international trade.

The implications of this approach as applied to Jamaican agriculture seem clear. The chief foreign exchange earners in the agriculture sector are bananas and coffee (traditional export crops) and high value fruits, vetetables and horticultural crops (non-traditional export crops). The

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1/ Jamaica Agricultural Sector Policy Review, Volume 2, Working Paper 3, p. 19.

2/ A.I.D., "Background Paper and Guide to Addressing Bellmon Amendment Concerns on Potential Food Aid Disincentives and Storage," p. 10.

production of these commodities, rather than import substitution crops, should probably be encouraged.

VI. FOOD IMPORT REQUIREMENTS

It is important to recognize that while food aid need not hamper agricultural growth in Jamaica, it is not costless. Even concessional loans must be repaid, and the country should not import more food than is required to meet its needs. Jamaica's "status quo" food import requirements in 1986/87, according to USDA, were 446,000 tons; its "nutrition based" import requirements were less, only 401,000 tons.[1/] In short, the quantity of food imports required to maintain Jamaica's average per capita food consumption at current levels is greater than the quantity required to maintain the average Jamaican diet at a nutritionally adequate level. (There are relatively few countries where this is the case; among them are Egypt and The Gambia.) This suggests that the level of food aid that is being provided to Jamaica may be too high.

Table 7 uses USDA data (corrected and updated as necessary) to estimate Jamaica's import requirements of rice, wheat, corn and vegetable oil in FY 1987/88. The table is not designed to calculate a particular food aid level that will not have a disincentive effect on domestic production. Indeed, virtually any level of cereals can be imported by Jamaica without hampering domestic cereal production. Moreover, a "food aid disincentives study" normally focuses on past trends; it does not involve estimating future trends.

What the table does do is provide a point of departure for estimating future food aid needs based on USDA data.[2/] It suggests that Jamaica will need to import 52,000 tons of rice in 1987/88; 181,000 tons of wheat and wheat flour; and 191,000 tons of corn; data are not available to estimate import requirements for vegetable oil. The estimates for rice, wheat

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1/ USDA, Economic Research Service, World Food Needs and Availabilities, 1986/87, August 1986, p. 176. Estimates for 1987/88 are somewhat lower: 398,000 tons of cereals must be imported to meet the country's "status quo" requirements; 381,000 tons, to meet the "nutrition based" requirements. (World Food Needs and Availabilities, 1987/88, July 1987, p. 150.)

2/ An excellent manual and user-friendly template (written in Lotus 1-2-3) are available to aid analysts in quantifying projected food deficits and food aid needs in individual countries. See Laura Tuck, A Manual for Food Needs Assessment (Washington, D.C.: A.I.D., June 1985). A May 1987 version of the template is available.

TABLE 7.--Food Import Requirements, Jamaica, 1983/84 - 1987/88 (000 tons)

Rice

	1983/84	1984/85	1985/86	1986/87	1987/88
Beginning Stocks	1	4	4	4	4
Local Production	3	5	4	4	4
Imports	49	52	50	51	52
Exports	0	0	0	0	0
Total Supply	53	61	58	59	60
Consumption	49	57	54	55	56
Ending Stocks	4	4	4	4	4

Wheat/Wheat Flour

	1983/84	1984/85	1985/86	1986/87	1987/88
Beginning Stocks	0	0	0	0	0
Local Production	0	0	0	0	0
Imports	162	178	180	178	181
Exports	0	0	0	0	0
Total Supply	162	178	180	178	181
Consumption	162	178	180	178	181
Ending Stocks	0	0	0	0	0

Corn (Feed and Non-feed)

	1983/84	1984/85	1985/86	1986/87	1987/88
Beginning Stocks	8	10	10	10	10
Local Production	7	5	7	7	10
Imports	170	172	170	190	191
Exports	0	0	0	0	0
Total Supply	185	187	187	207	211
Consumption	175	177	177	197	201
Ending Stocks	10	10	10	10	10

TABLE 7.--Continued

Vegetable Oil

	1983/84	1984/85	1985/86	1986/87	1987/88
Beginning Stocks	0.0	0.0	0.0	0.0	0.0
Local Production	11.3	10.22	11.0	11.1	n.a.
Imports	5.96	7.03	12.07	10.8	n.a.
Exports	0.0	0.0	0.0	0.0	n.a.
Total Supply	17.26	17.25	23.07	21.9	n.a.
Consumption	17.26	17.25	23.07	21.9	n.a.
Ending Stocks	0.0	0.0	0.0	0.0	n.a.

Source: USDA for rice, wheat, and corn; JCTC for vegetable oil. USDA estimated population growth between 1985/86 and 1986/87 at 5.1% and 5.0%, respectively; these rates were adjusted downward to 2% per year for both years, and this lower rate was used to estimate import requirements for rice, wheat and corn.

and corn imports indicated in Table 7 are not comparable to those indicated in Table 5. The cause for the large discrepancy between USDA data (Table 7) and JCTC data (Table 5) is unclear and requires further analysis.

In spite of the data inconsistency, however, there is no doubt that substantial food imports will be required to meet domestic consumption requirements. While food aid can play an important role in meeting this need in the short term, there must be alternatives to food aid in the long term.

VII. ALTERNATIVES TO FOOD AID

This analysis suggests that the PL 480 Title I food aid program in Jamaica, while large, has not been a disincentive to domestic food production and is not likely to be a disincentive in the future. But this does not mean that food aid should be considered a long-term solution to meeting the country's food requirements.

There are essentially three alternatives to food aid: (a) encouraging food self-sufficiency by implementing a strategy of import substitution, even if this requires a producer subsidy; (b) encouraging food self-reliance by implementing a strategy of export promotion, and using foreign exchange earnings to purchase food on the international market; and (c) changing food habits to encourage increased consumption of yams and sweet potatoes in lieu of rice and wheat.

The first alternative (to restrict food imports and implement a strategy of import substitution) was implemented in Jamaica in the 1970s when, as now, foreign exchange was a key constraint to the country's growth. The result was predictable. Food imports which had averaged $145 million per year during 1970-75, decreased to only $60 million per year, on average, during 1977-80 (in constant prices).[1/] At the same time, largely because of these trade restrictions, domestic food production increased. (It is important to recall that this period of reduced food imports was also marked by an increase in civil and political unrest.) However, while the evidence suggests that a reduction of food imports is associated with an increase in domestic food production, the evidence does not suggest that investments to increase domestic food production represent the best use of scarce domestic resources or the best alternative to food aid. To the contrary, domestic production of rice and corn is probably inappropriate -- except to the extent that land and labor resources would otherwise remain unutilized -- since subsidies would be required to make domestic production profitable.[2/]

1/ A.I.D., Jamaica: The Impact and Effectiveness of the PL 480 Title I Program, February 1984, p. 14.

2/ On the other hand, referring to Jamaican agriculture during this period, the FAO/World Bank report states that "the only bright spot in the sector was the vibrancy of domestic food crop production which had grown steadily during the 1970s due to restrictions on food imports because of the declining availability of foreign exchange." Jamaica Agricultural Sector Policy Review, Vol. 1, p. 23.

The second alternative to food aid is based on a strategy of food self-reliance (in contrast to food self-sufficiency), a strategy which encourages the production of those crops in which a country has a comparative advantage. It is an export-oriented strategy, one that enables a country to reap the benefits of international trade. It leads to efficient resource allocation.[1/] However, implementation of this alternative to food aid will not satisfy Jamaica's food needs in the short or medium term. There are two reasons. First, in view of the country's high debt service ratio, there is insufficient foreign exchange available to purchase commercially on the international market all of the food needed to meet domestic requirements. Second, Jamaica will need time to increase the production of non-traditional export crops, which is probably the most effective way to boost foreign exchange earnings. During this transitional period, or until the foreign exchange constraint is otherwise relaxed, the PL 480 food aid program can help alleviate Jamaica's balance of payments problems without hampering domestic growth of the agriculture sector.

The third alternative to food aid would require the population to substitute yams, sweet potatoes and perhaps other domestically produced foods for imported rice and wheat, and to add cassava as a source of starch as well as a source of animal feed. This would involve a major change in established food preferences, and the new diet would probably be less nutritious than the current diet. Therefore, while altering taste preferences may be technically feasible, it is not a desirable alternative to food aid.

1/ See, for example, Scott R. Pearson, Timothy E. Josling, and Walter P. Falcon, Food Self-reliance and Food Self-sufficiency: Evaluating the Policy Options (Washington, D.C.: Aurora Associates, Inc., June 1986).

VIII. CONCLUSIONS AND RECOMMENDATIONS

1. The PL 480 Title I program in Jamaica is large and growing larger. As a proportion of total U.S. economic assistance it has more than tripled from 16% in 1981-83 to 53% in 1987.

2. Jamaica depends on imports to supply more than 97% of its cereal requirements (wheat and wheat flour, rice, and corn). The wheat and wheat flour and rice are used for human consumption; the corn is used primarily as animal feed. The U.S. is the major supplier of these commodities, under both commercial and concessional terms.

3. Jamaica faces a severe foreign exchange constraint which is manifested by a debt service ratio estimated at 51%, with rescheduling, in 1986/87. This has prompted the government to encourage food self-sufficiency (not defined as 100% self-sufficiency) for some food commodities currently being imported, including rice and corn. Although domestic rice production has increased somewhat in the past several years, perhaps in response to the government's program, the production target will clearly not be reached. Domestic corn production has actually declined in recent years, and corn has since been dropped from the self-sufficiency program. Cassava has also been dropped.

4. In the absence of higher producer prices supported by a government subsidy, Jamaican farmers will find it more profitable to produce crops other than rice or corn. In addition, Jamaica does not appear to have a comparative advantage in the production of rice, corn, or soybeans, and wheat production is technically not feasible. Under these circumstances, a strategy of export promotion (with an emphasis on non-traditional export crops) is more appropriate than a strategy of import substitution.

5. There appears to be an inverse relationship between rice and wheat imports on the one hand and the domestic production of rice, yams and sweet potatoes on the other. A similar inverse relationship exists for imported corn and domestically produced corn and cassava. It is not clear whether or not these relationships are statistically significant. In any event, variations in the production of agricultural commodities are typically associated with many variables, only one of which is the import level; weather is among the more important other variables. Although it is possible for food imports to increase to such an extent that domestic food prices are depressed, the evidence suggests that this has not been case in Jamaica; to the contrary, producer prices have increased over the period

under consideration.

6. Additional considerations in support of the conclusion that the PL 480 Title I program is not having a substantial disincentive effect on domestic food production in Jamaica are:

   -- Jamaica produces no wheat because it is technically not feasible to do so.

   -- Jamaica produces about 7% of its rice requirement; although the government's target is to produce 42% by 1988/89, most analysts believe the target will not be reached, largely because it is more profitable to grow alternative crops on the land the government has disignated for rice.

   -- Jamaica produces about 3% of its corn requirement, measured as a percentage of requirements for animal feed. The government's target was to produce 34% by 1988/89. Corn has been dropped from the program because it is not economically feasible to produce and, as with rice, it is more profitable to produce other crops.

7. Concessional imports (including PL 480 Title I food aid) tend to substitute for commercial imports; they are not additional to commercial imports. If food aid shipments were interupted, the government would probably allocate foreign exchange to purchase food on commercial terms on the world market.

8. Under these circumstances, virtually any level of food aid could be provided to Jamaica without hampering domestic food production. However, food aid is not costless, and the country should not import more food than required to meet domestic needs. The food import level required to satisfy average consumption over the past five years (the status quo level) is higher than the food import level required to satisfy nutrition-based needs.

9. Food aid can make a positive contribution to alleviating Jamaica's balance of payments constraint. This is a particularly important contribution when the demand for foreign exchange to service external debt is increasing.

10. Food aid is never a satisfactory long term solution for meeting any country's food deficit. There are three alternatives to food aid. Of these, an emphasis on food self-reliance which encourages the production of those commodities in which a country has a comparative advantage

is normally preferable to an undue emphasis on food self-sufficiency or an attempt to alter current diets and taste preferences.

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