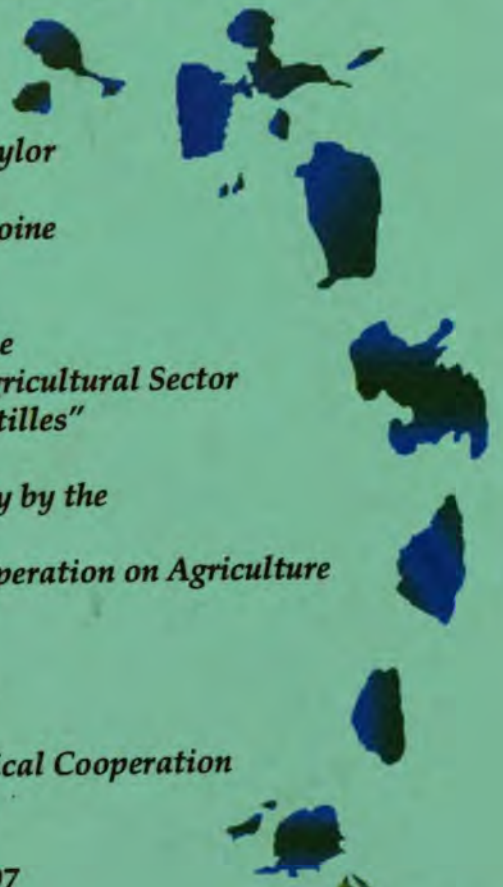
Current Food and Domestic Demand Situation in the Countries of the Lesser Antilles



by

Timothy G. Taylor
and
Patrick A. Antoine
for the

Study on the
"Competitiveness of the Agricultural Sector in the Lesser Antilles"

undertaken jointly by the

Inter-American Institute for Cooperation on Agriculture (IIICA)

and the

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COOPERATION FRANÇAISE

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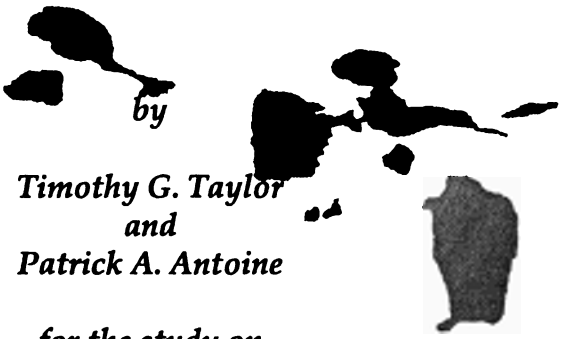

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Cover design by Diane Francis

IICA/FMTC Competitiveness Study

Table of Content

The purpose of this section is to describe and evaluate the current food and domestic demand situation in the target countries of this study. To accomplish this task a three-prong approach is utilized. First, the general agricultural trade balance of each country is summarized for the 1961 to 1994 period. While such broad measures do not provide direct information regarding the commodities that are the primary focus of this study, they do provide the necessary context critical to the of individual commodities. Next, existing domestic production and trade data are presented and used to describe historical trends for selected target commodities. The final prong in this attack presents estimated Engel functions for selected commodities and countries. These functions, which relate per capita consumption to per capita gross domestic product (GDP) are then used to project consumption levels over the next decade.

The analysis of the food and domestic demand situation for the countries and commodities that are the focus of this study is made difficult by the paucity of existing data. Indeed, the analysis is necessarily incomplete as data for certain commodities and countries are nonexistent. There are sufficient data, however, to capture the general tenor of the food and domestic demand situation.. Unless otherwise noted, all data used in this were obtained form the Food and Agriculture Organization (FAO) via the FAOSTAT database[1] accessible via the World Wide Web (WWW).

It should be noted that analysis of the general food situation in the Caribbean Community has been undertaken previously. Most notable, are a series of studies under the auspices of CARICOM as part of the conceptualization of the Regional Food and Nutrition Strategy begun in the early 1970s. Especially noteworthy was a study[2] conducted by researchers at the University of the West and published in 1985. This study , which attempted to construct a regional allocation model using mathematical programming techniques, is one of the few existing quantitative assessments of the Caribbean food situation conducted on a comprehensive basis.

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1. The WWW location for the FAOSTAT database is http://apps.fao.org/lim500/agri_db.pl

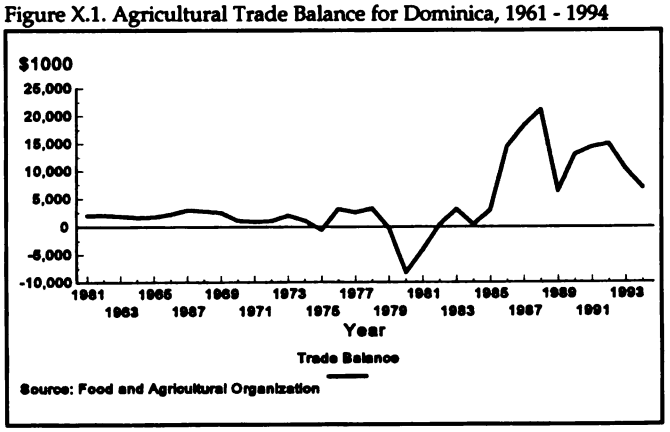
2. *Elaboration of a Regional Allocation Model for Twenty-Eight Food Commodities Produced and Consumed in the Caribbean Community.*

AGRICULTURAL TRADE BALANCES

This section provides an overview of the agricultural trade performance of the seven countries contained in the study as well as a comparative situation for Barbados, Jamaica and Trinidad and Tobago over the 1961-1994 period. Such aggregate measures of sectoral performance cannot shed light on the specific commodities under investigation this study. However, these measures do provide the insight into the past performance of the agricultural sectors as well as illustrating recent trends in performance

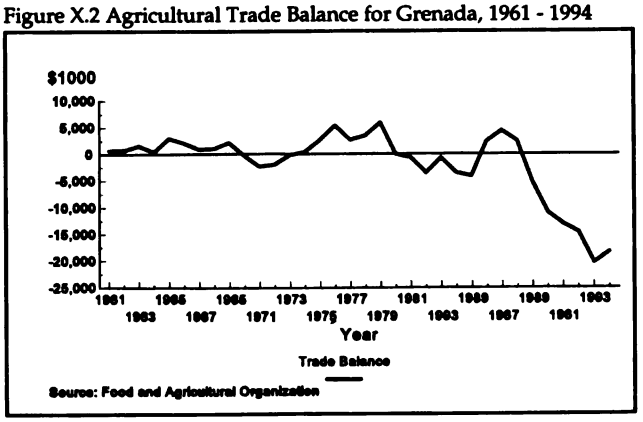
The agricultural trade balance for Dominica is depicted in Figure X1. In contrast to Barbados, the agricultural trade balance for Dominica has generally been positive. Indeed, the only years in which Dominica exhibited a negative agricultural trade balance were 1980 and 1981. Prior to 1980, the trade balance remained fairly stable ranging between $1.0 and $3.0 million. However, after incurring a record deficit of more than $8.0 million in 1981, the agricultural trade surplus reached a record of over $21.0 million in 1988. Since then the trade surplus has declined substantially. In 1994 the agricultural trade surplus stood at about $7.0 million.

Figure X.1. Agricultural Trade Balance for Dominica, 1961 - 1994



To a large extent, the agricultural trade balance in Dominica is driven by exports in general, and conditions in world banana markets in particular (see Appendix A, Figure A.1.) Since 1989, agricultural imports into Dominica have declined somewhat. Agricultural exports, while continuing to show a generally positive trend, have showed considerable variation. This variation is reflected in the agricultural trade balance.

Figure X.2 Agricultural Trade Balance for Grenada, 1961 - 1994



As shown in Figure X.2, the agricultural trade balance in Grenada, though exhibiting considerable fluctuation over the 1961 to 1978 period, was generally positive. However, beginning in 1989, the trade balance turned negative reaching over $20.0 million in 1993. Though the deficit improved somewhat in 1994, it remains in excess of $18.0 million. This

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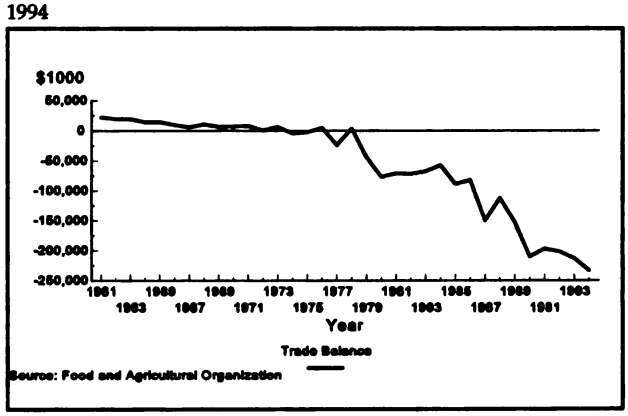
deterioration has largely been driven by a decline in the value of agricultural exports (see Appendix A, Figure A.2). Since 1989, imports of agricultural products in Grenada have remained relative constant ranging between $27.0 and $32.0 million annually. However, agricultural exports have declined sharply from over $21.0 million in 1989 to $11.3 million in 1994 reflecting difficulties in the markets for nutmeg and cocoa.

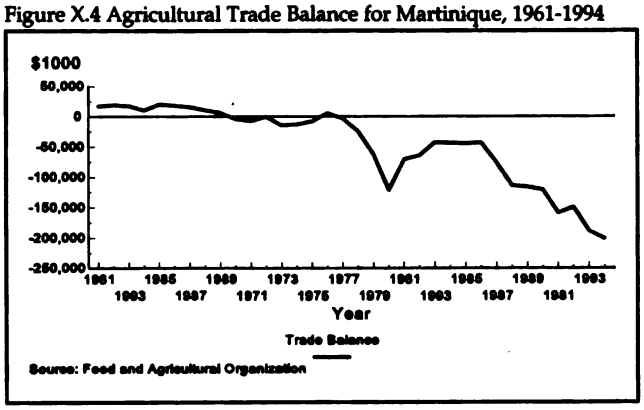
Figure X.3 exhibits the balance of agricultural trade for Guadeloupe over the 1961 to 1994 period. As can be seen, the agricultural trade balance declined consistently over the entire period of analysis. From 1961 to 1978 the trade balance deteriorated slowly, but remained generally positive. However, beginning in 1979, the trade balance turned negative and deteriorated significantly. Indeed the deficit increased from $43.8 million in 1979 to over $233.0 million in 1994. The increase in the agricultural trade deficit over the 1979 to 1994 period has been primarily driven by increased imports and inconsistent export performance (see Appendix A, FigureA.3). From 1979 to 1985, the annual value of agricultural exports declined from $104.0 million to $55.0 million. Since 1985, the value of exports has increased, but remains below the levels achieved in the late 1970s. In contrast, agricultural imports have increased significantly over this period, increasing from $103.4 million in 1978 to $326.9 million in 1994.

Figure X.3 Agricultural Trade Balance for Guadeloupe, 1961 - 1994



The behavior of the agricultural trade balance for Martinique over the 1961 to 1994 period mirrors that of its sister island Guadeloupe. As seen in Figure X.4 from 1961 to 1969, the agricultural trade balance was positive but declining. Beginning in 1970, the agricultural trade balance turned negative, and after 1988 deteriorated rapidly. Indeed, from 1988 to 1994, the trade deficit increased from $133.5 million to $201.1 million. As has been observed for other several other countries, the deterioration of the agricultural trade balance has been characterized by stagnating agricultural export growth and rapidly

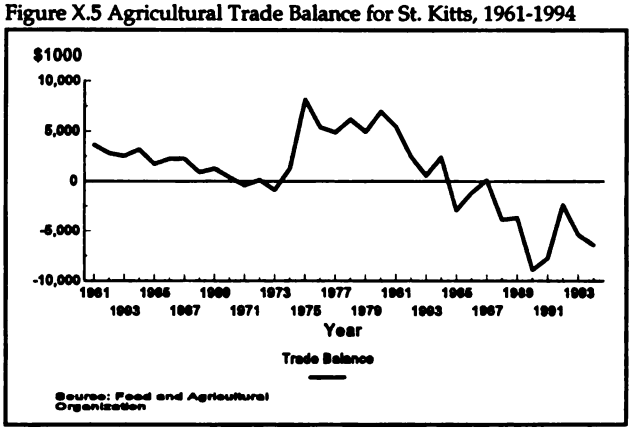
Figure X.4 Agricultural Trade Balance for Martinique, 1961-1994



increasing imports (see Appendix A, Table A.4). Over the 1976 to 1985 period, the annual value of agricultural exports ranged between $83.0 and $94.4 million (except for 1980 when exports dropped to $44.7 million). In 1986, the value of agricultural exports jumped to $139.0 million, but has since declined to a 1994 level of $116.6 million. In contrast, the value of agricultural imports since has increased dramatically. The value of agricultural imports in 1976 stood at $89.2 million as compared to $262.1 million in 1994.

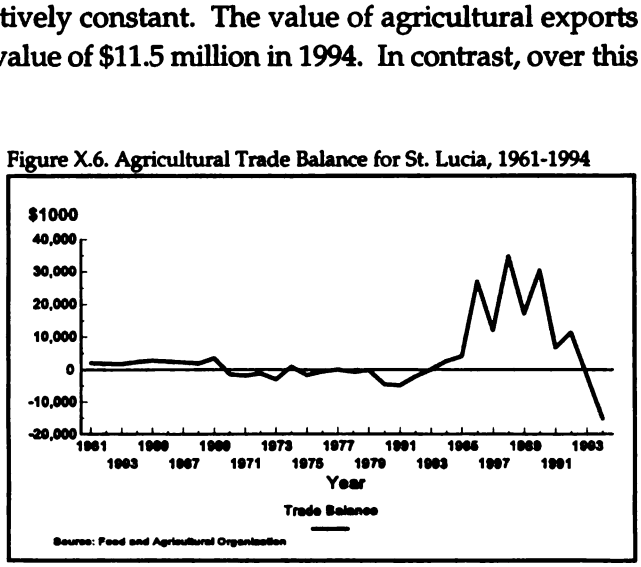
The agricultural trade balance for St. Kitts is presented in Figure X.5. The behavior of the trade balance in St. Kitts is characterized by two distinct periods. From 1961 to 1970, St. Kitts exhibited a small, but declining agricultural trade surplus. After a small deficit in 1971, the agricultural trade surplus increased sharply, reaching a peak of $8.2 million in 1975. Since then the agricultural trade balance declined before slightly rebounding in 1992. In 1985 the agricultural trade surplus turned into a trade deficit. In 1994, the agricultural trade deficit was valued at $6.4 million.

Figure X.5 Agricultural Trade Balance for St. Kitts, 1961-1994



The behavior of the agricultural trade balance in St. Kitts is closely tied to the behavior agricultural imports (see Appendix A, Figure A.5). Since 1980, the value of agricultural exports from St. Kitts has remained relatively constant. The value of agricultural exports in 1980 was $15.2 million compared to a value of $11.5 million in 1994. In contrast, over this same period, the value of agricultural imports has increased from $8.2 million to just over $18.0 million.

Figure X.6. Agricultural Trade Balance for St. Lucia, 1961-1994



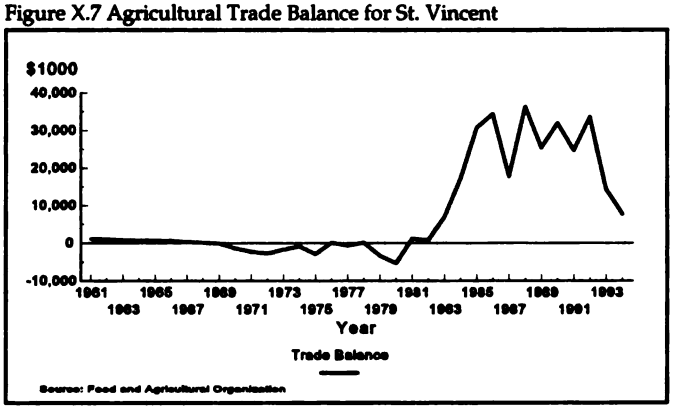
As depicted in Figure X.6, the behavior of the agricultural trade balance in St. Lucia stands in marked contrast to the trade balance for those countries previously discussed. Over the 1961 to 1985 period, the trade balance moderately fluctuated between small trade surpluses and deficits. The largest surplus was $3.5 million in 1969 and the largest deficit was $4.8 million in 1981. Over the 1986 to 1992 period, however, St, Lucia exhibited significant and widely

fluctuating trade surpluses. Indeed, over this period the agricultural trade surplus varied between a high of $34.8 million in 1988 and a low of $6.8 million in 1992. Since 1993, St. Lucia has experienced an agricultural trade deficit. In 1994, the value of this deficit was $15.2 million.

The wide fluctuation of the agricultural trade balance in St. Lucia is closely tied to variation in agricultural exports which are dominated by bananas (see Appendix A,Figure A.6). Both agricultural imports and exports have exhibited significant growth in St. Lucia. Since 1980, agricultural imports have increased from $23.8 million to almost $70.0 million in 1994. Agricultural exports have also increased, rising from $19.3 million in 1980 to a peak of $85.6 million in 1990. Since 1985, however, agricultural exports fluctuated widely, ranging from a high of $85.6 million in 1990 to a low of $34.7 million in 1985.

The behavior of the agricultural trade balance for St. Vincent is similar in character to that of St. Lucia. As seen in Figure X.7, from 1961 to 1980, the agricultural trade balance for St. Vincent fluctuated between small surpluses and deficits. Over this period, the maximum surplus was $1.1 million in 1961 and the maximum deficit was $5.3 million in 1980. Beginning in 1981, St. Vincent experienced significant and widely fluctuating trade surpluses. Over the 1981 to 1994 period, the largest agricultural trade surplus was $36.3 million in 1988 and the smallest surplus was $7.8 million in 1994.

Figure X.7 Agricultural Trade Balance for St. Vincent

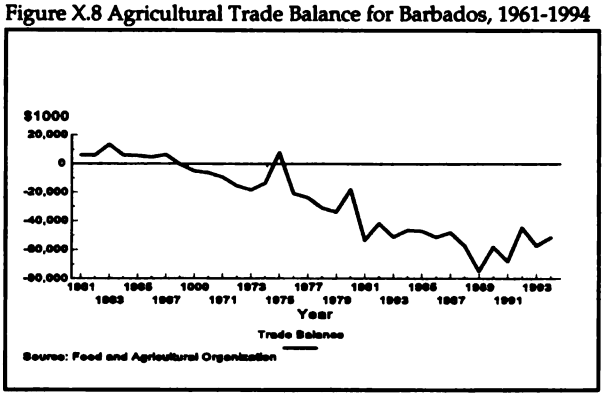


As was the case with St. Lucia, the behavior of the agricultural trade balance in St. Vincent is closely tied to the performance of agricultural exports (see Appendix A,Figure A.7). Agricultural imports in St. Vincent have increased consistently since 1980. In 1980, the value of agricultural imports was $18.7 million compared to almost $30 million in 1994. Exports rose more rapidly, but with much wider variation. In 1980, the value of agricultural exports stood at $13.3 million as compared to a peak of $62.7 million in 1992. Over the 1985 to 1995 period, however, exports fluctuated between a high of $62.7 million and a low of $37.4 million.

The agricultural trade balance for Barbados over the 1961 to 1994 period is shown in Figure X.8. As can be seen with the exception of a positive spike in 1975, the agricultural trade balance in Barbados has been negative since 1969. Though the agricultural trade deficit has

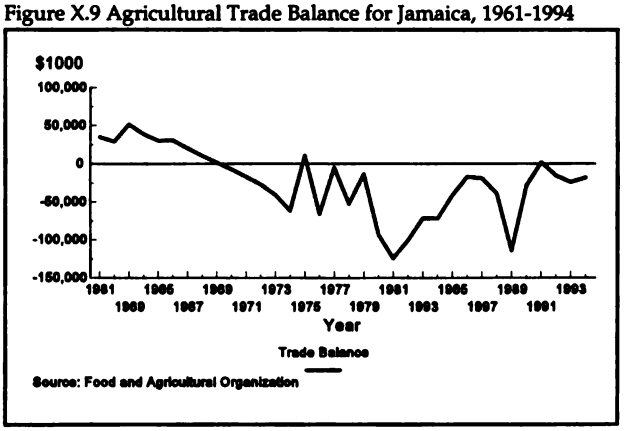
improved from its historic high of almost $75 million in 1989, it remains in excess of $50 million. The growth in the agricultural trade deficit has occurred primarily due the rapid growth of imports in relation to exports (see Appendix A, Figure A.8). While exports of agricultural products from Barbados rose fairly consistently from $21.2 million in 1961 to almost $60 million in 1994, imports of agricultural products increased dramatically from $15.1 million to over $110 million over the same period.

Figure X.8 Agricultural Trade Balance for Barbados, 1961-1994



The agricultural trade balance for Jamaica over the 1961 to 1994 period is depicted in Figure X.9. From 1961 to 1969, the trade balance was positive but declining. Since 1970, the agricultural trade balance has fluctuated widely, but has generally remained negative. It should be noted, however, that the agricultural trade deficit has improved dramatically since 1989, decreasing from $114.4 million to $18.1 million in 1994. The behavior of the agricultural trade balance in Jamaica since 1980 appears to have been driven largely by export performance (see Appendix A, Figure A.9). Over the 1980 to 1994 period imports of agricultural products have remained relatively constant. The value of agricultural imports in 1980 was $224.8 million compared to $262.1 million in 1994. In contrast, agricultural exports have fluctuated between a low of $127.6 million and a high $167.5 million over the 1980 to 1986 period before increasing dramatically. Indeed, the value of agricultural exports increased from$186.4 million in 1988 to almost $244.0 million in 1994.

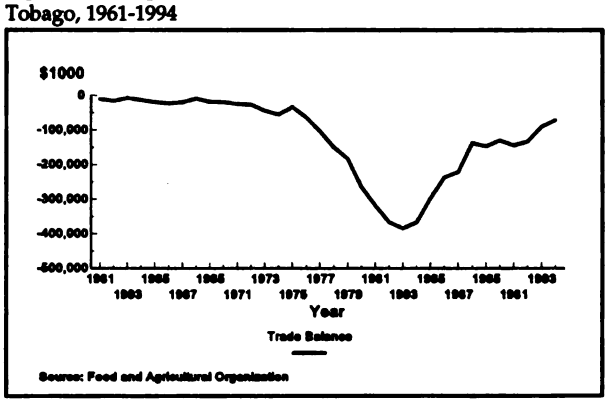
Figure X.9 Agricultural Trade Balance for Jamaica, 1961-1994



The agricultural trade balance for Trinidad and Tobago over the 1961 to 1994 period is presented in Figure X.10. As can be seen, Trinidad and Tobago has experienced agricultural trade deficits over the entire period of analysis. From 1961 to 1974, the agricultural trade deficit declined slightly, increasing from about $10.0 million in 1961 to 26.6 million in 1972. Beginning in 1973, however, the agricultural trade deficit increased precipitously to a high

of almost $384.3 million in 1983. Since 1984 the agricultural trade deficit has improved consistently. However, in 1994, the agricultural trade deficit still stood at $71.1 million.

Figure X.10 Agricultural Trade Balance for Trinidad and Tobago, 1961-1994



The behavior of the agricultural trade deficit in Trinidad and Tobago can be explained by a combination of trends in both agricultural exports and imports (see Appendix A, Figure A.10). From 1975 to 1984, agricultural imports increased significantly from $147.1 million to $414.7 million. Over this same period of time, agricultural exports declined. Indeed, the value of agricultural exports stood at $113.8 million in 1995 as compared to $47.8 million in 1984. Beginning in 1985, however, these trends reversed. From 1985 to 1994 agricultural imports declined from $343.3 million to $215.6 million. In contrast agricultural exports increased from $45.4 million to $144.4 million over this same period. Furthermore, agricultural exports have exceeded $100.0 million in every year since 1989.

Summary

It is difficult to render broad and definitive conclusions from the behavior of the agricultural trade balances of the ten countries in this study. However, some insights into the general food situation can be deduced. Interestingly, these insights seem to fall along the line of a categorization of these countries that is often used. Specifically, these countries can be grouped into what is termed the *moderately developed countries* (MDC): Barbados, Jamaica and Trinidad and Tobago, the French islands: Guadeloupe and Martinique, and the Organization of Eastern Caribbean States (OECS): Dominica, Grenada, St. Lucia, St. Kitts and St. Vincent.

The MDC countries have generally exhibited negative agricultural trade balances over the period of analysis. However, while the trade deficits in Jamaica and Trinidad have lessened considerably in recent years, that in Barbados has shown little improvement. The deterioration of the agricultural trade balance in Barbados appears to be tied to the difficulties experienced by the sugar industry and increased competition for agricultural lands. In contrast, the improvements in the agricultural trade balances in Jamaica and Trinidad are likely due to a combination of general economic reforms (structural adjustment), trade liberalization and increased emphasis on developing their agricultural sectors.

variable. Of interest is the fact that the regional dominance of St. Lucia in terms of mango production does not carry over to exports. Indeed, Jamaica, tends to be the region's leading exporter of mangoes with St. Lucia generally ranking second. This perhaps reflects Jamaica's access to superior transportationlinkages to external markets. It is also interesting to note that St. Vincent, which ranks fifth in terms of regional production on an annual basis is the region's third largest exporter of mangoes. This can a least partially be explained the fruit-fly free status enjoyed by mango exports from St. Vincent.

Table Y.1 Mango Production by Country (metric tons)

Year	Dominica	Grenada	Guade/ loupe	Jamaica	Martin/ ique	St. Lucia	St. Vincent	Trinidad
1980	2900	1805	720	3700	1510	29000	1575	340
1981	3000	1841	540	3800	840	28000	1728	350
1982	3100	1933	540	3800	840	28000	1801	360
1983	3200	1727	915	3900	472	27000	2268	370
1984	3500	1769	1028	3900	472	27000	2938	380
1985	3920	1877	1172	4000	472	26000	2662	390
1986	4055	1930	1336	4000	472	26000	1891	400
1987	3821	1437	1743	4000	460	25000	2269	410
1988	3600	1458	1554	4000	460	25000	2000	420
1989	3400	1500	1230	4000	460	24000	1900	430
1990	3200	1500	1050	4000	500	24000	1800	430
1991	3100	1600	1230	4000	266	25000	1700	430
1992	3100	1600	1150	4500	490	25500	1600	430
1993	3000	1650	1102	5000	490	26000	1500	430
1994	3000	1650	1130	5000	500	26500	1400	430
1995	3000	1700	1130	5000	500	27000	1400	430

Year	Dominica	Grenada	Guade /loupe	Jamaica	Martin/ ique	St . Lucia	St. Vincent	Trinidad
1980	2900	1805	720	3700	1510	29000	1575	340
1981	3000	1841	540	3800	840	28000	1728	350
1982	3100	1933	540	3800	840	28000	1801	360
1983	3200	1727	915	3900	472	27000	2268	370
1984	3500	1769	1028	3900	472	27000	2938	380
1985	3920	1877	1172	4000	472	26000	2662	390
1986	4055	1930	1336	4000	472	26000	1891	400
1987	3821	1437	1743	4000	460	25000	2269	410
1988	3600	1458	1554	4000	460	25000	2000	420
1989	3400	1500	1230	4000	460	24000	1900	430
1990	3200	1500	1050	4000	500	24000	1800	430
1991	3100	1600	1230	4000	266	25000	1700	430
1992	3100	1600	1150	4500	490	25500	1600	430
1993	3000	1650	1102	5000	490	26000	1500	430
1994	3000	1650	1130	5000	500	26500	1400	430
1995	3000	1700	1130	5000	500	27000	1400	430

Table Y.2 Volume and Value of Mango Exports by Country

	Dominica		Jamaica		St. Lucia		St. Vincent		Trinidad	
Year	Vo. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)
1980	47	12	173	158	239	72	334	190	108	24
1981	30	7	284	245	90	38	347	204	41	9
1982	0	0	351	310	165	79	522	262	36	5
1983	77	19	456	582	304	153	471	249	0	1
1984	154	38	318	380	434	121	1737	835	0	0
1985	178	45	576	397	91	46	1760	799	0	0
1986	242	93	242	259	459	215	590	349	7	5
1987	106	27	575	429	443	189	365	221	14	14
1988	81	50	882	711	572	300	441	250	63	39
1989	53	24	416	382	460	206	281	128	96	54
1990	115	46	607	562	451	184	193	88	39	9
1991	66	54	1384	1105	657	213	190	90	17	9
1992	66	54	1031	961	742	282	190	90	75	40
1993	66	54	681	463	513	205	190	90	143	61
1994	66	54	926	666	696	396	190	90	220	133
1995										

Food Crops

Of the five commodities included in the food crops component of this study, adequate data exist to assess production and export trends in three: plantain, sweet potato and yams. As shown in Table Y.3, regional production of plantains is dominated by Jamaica. Annual production of plantains in Jamaica has risen over the past decade and half from almost 25,000 mt in 1980 to over 35,000 mt in 1995. The second largest producer of plantains is Martinique.

Year	Dominica	Grenada	Guadeloupe	Jamaica	Martinique	St. Lucia	St. Vincent
1980	1344	379	2500	24855	1500	1256	1465
1981	1478	371	3940	24143	1800	1493	2200
1982	1565	460	4380	28408	6600	1539	1988
1983	1393	423	6300	25101	7920	1846	1743
1984	1530	374	7540	30570	8400	1892	3500
1985	1820	400	8180	30403	8400	1800	4222
1986	2161	652	7964	30563	10920	1800	4619
1987	2122	673	8204	28167	9100	1800	2776
1988	1900	677	8757	26172	11000	1900	3090
1989	1700	680	5600	26000	11050	2000	3646
1990	1600	680	6510	27565	11000	2000	2945
1991	1600	700	6319	26692	11900	2000	2200
1992	1200	700	6540	28469	11200	2000	2200
1993	1200	710	6878	35811	12000	2000	1500
1994	1000	720	7000	35372	12000	2000	1500

From 1980 to 1986, production of plantains in Martinique increased dramatically from an annual level of 1500 mt in 1980 to almost 11,000 mt in 1986. Since then, annual production has been relatively stable ranging between 9,000 and 12,000 mt. Plantain production in Guadeloupe also increased significantly since 1980. Production levels over the last five years have ranged between 6500 and 7000 mt per year. The remaining countries for which data are available are Dominica, Grenada, St. Lucia and St. Vincent. Since 1990, plantain production in Dominica and St. Vincent has exhibited significant declines, while production in Grenada and St. Lucia has remained fairly constant.

Table Y.4 displays the annual volume and value of plantain exports for Dominica, Jamaica and St. Lucia. As can be seen both the annual volume and value of plantain exports are highly variable for all three countries. Of special note is the fact that over the 1986 to 1991 period, the largest exporter of plantains was Dominica, despite the fact that is ranked forth in annual production. It is also noteworthy, that Dominica has not recorded exports of plantains since 1992. It can also be seen in Table Y.4 that Jamaica, despite its significant annual production of plantains exports a very small proportion its crop.

Table Y.4 Volume and Value of Plantain Exports by Country

	Dominica		Jamaica		St. Lucia	
Year	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)
1980	0	0	25	15	0	0
1981	0	0	30	32	0	0
1982	310	176	187	43	0	0
1983	502	282	276	67	0	0
1984	622	350	77	20	462	150
1985	645	379	508	154	445	150
1986	1844	845	583	188	482	165
1987	1196	382	1877	532	210	69
1988	1032	494	511	250	208	72
1989	1263	461	128	85	176	68
1990	1298	751	131	81	164	92
1991	1379	776	256	89	189	90
1992	0	0	421	91	234	117
1993	0	0	406	109	135	68
1994	0	0	577	320	0	0

Although no reliable trade data exist for sweet potatoes, credible production data do exist for several countries. As seen in Table Y.5, data on sweet potato production are reported for Barbados, Guadeloupe and St. Kitts. Guadeloupe is by far the largest producer of sweet potatoes with production in 1995 of almost 5,000 mt. It should be noted that although production in Guadeloupe has been relatively stable since 1990, current production levels are down significantly from the production levels of 8,000 to 9,000 mt per year exhibited over the 1981 to 1986 period. In comparison to Guadeloupe, sweet potato production in Barbados and St. Kitts is small with respective annual production rates of 125 mt and 210 mt reported from 1995.

Table Y.5 Sweet Potato Production by Country (metric tons)

Year	Barbados	Guadeloupe	St. Kitts
1980	430	4850	125
1981	430	8270	135
1982	430	8270	140
1983	430	9090	150
1984	420	8160	150
1985	420	7068	150
1986	420	8210	150
1987	420	7290	150
1988	400	6600	155
1989	380	6030	155
1990	360	4603	160
1991	300	5130	160
1992	280	5130	170
1993	250	5450	180
1994	90	4940	190
1995	125	4940	210

As shown in Table Y.6, data on yam production is available for all of the target countries in this study except Barbados and Trinidad. Yam production is dominated by Jamaica. Since 1980, annual production levels of yams in Jamaica have increased from over 132,000 mt to almost 234,000 mt in 1995. The French islands of Guadeloupe and Martinique are the next largest producers of yams. Yam production in both countries has varied over the 1980 to 1995 period. In 1995, yam production in Guadeloupe was estimated to be just over 6,800 mt while in Martinique, production was estimated at 7,500 mt. Dominica and St. Lucia also produced significant quantities of yams. Since 1990, yam production in Dominica has ranged between 5,100 and 5,400 mt per year, and annual production in St. Lucia has ranged between 4,000 and 4,300 mt

Table Y.6 Yam Production by Country (metric tons)

Year	Dominica	Grenada	Guadeloupe	Jamaica	Martinique	St Kitts	St Lucia	St Vincent
1980	4950	459	6600	132893	8800	430	3600	3265
1981	5280	482	9400	136410	7200	430	3650	4320
1982	5350	506	9875	116978	9000	430	3700	3902
1983	5027	456	10166	130633	9200	430	3700	4500
1984	5139	455	9882	149060	13920	420	3800	7300
1985	5500	400	8731	163763	14280	420	3800	6000
1986	6600	272	10608	165633	13200	420	3800	2000
1987	5700	284	11129	175628	10550	420	3800	2000
1988	5500	288	11549	166864	8000	400	3850	2100
1989	5400	290	8129	133281	7320	380	4000	2000
1990	5400	320	8810	161462	8200	360	4000	2000
1991	5300	320	12895	186104	6900	300	4100	2000
1992	5300	350	12860	214386	7450	280	4100	2000
1993	5100	350	13230	221928	6000	250	4200	2000
1994	5150	360	6850	233907	7500	90	4300	2000
1995	5150	370	6850	233907	7500	125	4300	2000

Export data for yams are reported for Dominica, Jamaica, St. Lucia and St. Vincent. However, as indicated in Table Y.7 only Jamaica exported yams in significant volume. Since 1980, the volume and value of yam exports from Jamaica have increased. In 1980, Jamaica exported about 2,400 mt of yams valued at $1.9 million. In 1994, the volume of yam exports increased to almost 11,000 mt valued at $10.9 million.

Table Y.7 Volume and Value of Yam Exports by Country

	Dominica		Jamaica		St. Lucia		St. Vincent	
Year	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol (mt)	Value ($1000)	Vol. (mt)	Value ($1000)
1980	0	0	2414	1907	78	39	275	158
1981	0	0	2551	2115	70	35	409	252
1982	0	0	4363	3541	0	0	635	387
1983	70	74	5796	5739	51	27	1236	772
1984	90	102	5891	3600	40	20	3893	2390
1985	63	53	8174	4487	20	11	2827	1650
1986	35	28	8236	5795	10	6	712	431
1987	54	24	9118	7463	6	4	526	320
1988	87	43	8567	7909	9	4	638	387
1989	61	59	6012	8718	1	1	324	214
1990	107	124	8293	8083	3	4	172	111
1991	131	157	9160	9196	1	1	186	110
1992	131	157	10330	8096	0	0	279	168
1993	131	157	11376	9646	0	0	260	120
1994	131	157	10719	10908	0	0	260	120
1995								

Exotics

Commodities designated as exotics in this study include mandarins, tangerines and limes. As shown in Table Y.8, data on mandarin and tangerine production are reported for only Guadeloupe and Jamaica. Jamaica is the largest producer by a considerable margin. Since 1980, annual production of mandarins and tangerines has varied widely from a low of 3,800 mt reported for 1987 to a high of just over 28,000 in 1990. Since 1992, annual production has been reported as constant at 16,000 mt. Annual production of mandarins and tangerines in Guadeloupe over the 1980 to 1995 period varied from a low of 17 mt in 1980 to a high of 853 mt in 1988. Current annual production is estimated to be about 150 mt.

Table Y.8 Manderine/Tangerine Production by Country (metric tons)

Year	Guadeloupe	Jamaica
1980	17	14249
1981	19	8703
1982	22	7139
1983	136	9293
1984	191	8467
1985	233	10886
1986	398	8408
1987	402	3806
1988	853	10384
1989	226	11830
1990	160	28261
1991	183	14337
1992	111	16000
1993	200	16000
1994	150	16000
1995	150	16000

Existing trade data from mandarins and tangerines are scant. No exports have been recorded since 1980 (in fact since 1961) for any of the target countries in this study. However, as shown in Table Y.9, Barbados, Guadeloupe and Martinique have reported small, but increasing volumes of imports since 1980. Barbados, which imported an estimated 400 mt valued at $330 thousand in 1994 is the largest importer. Guadeloupe and Martinique imported 123 mt and 28 mt, respectively in that same year. Though import volumes remain small, it is noteworthy that import volumes have more than doubled in all three countries since 1989.

As shown in Table Y.10, Dominica is the largest producer of limes among the countries included in this study. Since 1980, annual production in Dominica has declined slightly, from over 6,500 mt in 1982 to 5,000 mt in 1995. The next largest producers of limes are Martinique, St. Vincent and Trinidad. Since 1988, estimated production has been similar in

Table Y.9 Volume & Value of Tangerine& Mandarin Orange Imports by Country

	Barbados		Guadeloupe		Martinique	
Year	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)
1980	0	0	21	27	26	28
1981	0	0	5	5	2	2
1982	0	0	6	7	3	3
1983	93	79	12	12	4	5
1984	54	42	5	5	2	3
1985	123	94	6	9	7	8
1986	29	17	19	26	3	7
1987	24	16	6	11	6	9
1988	95	70	10	11	5	8
1989	175	111	31	43	9	16
1990	150	104	99	153	10	20
1991	299	236	122	158	9	15
1992	399	337	45	101	20	27
1993	396	343	126	143	19	30
1994	400	330	123	162	28	49
1995						

Table Y.10 Lime Production by Country (metric tons)

Year	Dominica	Grenada	Guadeloupe	Jamaica	Martinique	St. Lucia	St. Vincent	Trinidad
1980	6188	496	496	496	410	141	800	800
1981	6380	422	422	422	150	208	800	800
1982	6513	443	443	443	700	213	750	750
1983	6078	337	337	337	1500	202	750	750
1984	6258	153	153	153	2450	222	700	700
1985	6357	150	150	150	1780	220	700	700
1986	5834	97	97	97	1715	230	750	750
1987	5564	90	90	90	1750	240	750	750
1988	5400	88	88	88	800	250	800	800
1989	5200	90	90	90	810	260	800	800
1990	5200	100	100	100	862	270	850	850
1991	5100	100	100	100	850	280	850	850
1992	5100	110	110	110	907	290	850	850
1993	5000	110	110	110	785	300	860	860
1994	5000	120	120	120	850	310	860	860
1995	5000	130	130	130	850	320	870	870

Exports of limes are reported only for Dominica and Martinique. As can be seen in Table Y.11, Over the 1980 to 1994 period, the volume of exports reported for Dominica have ranged from a low of 87 mt in 1988 to a high of 260 mt in 1981. Since 1992, exports have been reported at 180 mt valued at $110,000. Exports from Martinique have been highly variable. The highest reported export volume was almost 1,600 mt 1984. However, in five of the years since 1980, reported exports have been 20 mt or less. No exports were reported for Martinique 1994.

Imports of limes over the 1980 to 1994 period are shown in Table Y.12. Over this period, Guadeloupe and Martinique have generally been the largest importers of limes. From 1987 to 1994, lime imports into Guadeloupe have ranged between 100 and 395 mt per year, while in Martinique, imports ranged between 21 and 241 mt over the same time period. Barbados has reported a small but increasing volume of lime imports since 1980. In 1994, Barbados imported an estimated 50 mt of lime valued at $50,000. It may be noted that lime imports by Trinidad have at times been significant (e.g. 1986 and 1988). However, since 1990, lime imports have been rather minor , with none reported in 1994.

Table Y.11 Volume and Value of Lime Exports by Country

	Dominica		Martinique	
Year	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)
1980	173	47	1	1
1981	260	70	16	15
1982	207	55	329	69
1983	191	52	440	165
1984	245	67	1572	480
1985	239	65	1072	314
1986	204	56	0	0
1987	168	46	1498	500
1988	87	58	299	107
1989	118	57	141	112
1990	187	105	147	135
1991	183	118	72	49
1992	180	110	6	5
1993	180	110	3	4
1994	180	110	0	0
1995				

Table Y.12 Volume and Value of Lime Imports by Country

	Barbados		Guadeloupe		Martinique	
Year	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol (mt)	Value ($1000)
1980	19	19	96	160	72	128
1981	19	21	71	74	41	51
1982	21	21	32	44	53	46
1983	9	8	25	41	3	3
1984	17	15	19	12	14	4
1985	18	12	3	3	8	9
1986	23	10	10	9	3	2
1987	13	7	15	15	4	3
1988	19	15	100	136	41	61
1989	41	26	165	210	21	33
1990	37	21	395	648	74	125
1991	59	31	314	491	182	358
1992	26	27	275	423	66	94
1993	42	42	264	406	241	259
1994	50	50	221	373	206	362
1995						

Vegetables

Hot peppers, melons and tomatoes comprise the target commodities classified as vegetables in this study. Of these, data of sufficient reliability could be obtained only for tomatoes. As shown in Table Y.13, tomato production was reported in only Grenada and Martinique. Since 1980, tomato production in Grenada has been relatively minor. Over the 1980 to 1995 period, production showed no clear trend, varying between low of 35 mt in 1986 and a high of 58 mt in 1995. Tomato production in Martinique declined somewhat over most of the 1980s, reaching a low of 2420 mt in 1988. Since 1988, annual production has oscillated around a level of 2500 mt per year.

Table Y.13 Tomato Production by Country (metric tons)

Year	Grenada	Martinique
1980	48	2850
1981	45	4750
1982	54	3680
1983	49	4010
1984	47	4840
1985	53	4820
1986	35	4420
1987	36	3100
1988	40	2420
1989	50	2530
1990	50	2600
1991	55	2520
1992	55	2990
1993	55	2300
1994	57	2500
1995	58	2500

Martinique and St. Lucia have reported moderate levels of tomato imports. Imports into Martinique have been highly varied. As shown in Table Y.14, the highest reported levels of imports occurred in 1980 (334 mt) and 1990 (309 mt) while over the 1983 to 1986 period, annual imports were less than 10 mt. In St. Lucia, imports increased significantly during the 1980s, reaching a peak of 150 mt in 1989. Over the 1990 to 1994 period, imports have been steady ranging between 115 and 120 mt per year.

Table Y.14 Volume and Value of Tomato Imports by Country

	Martinique		St. Lucia	
Year	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)
1980	334	545	0	0
1981	270	374	50	74
1982	39	59	30	46
1983	8	8	38	59
1984	0	0	27	33
1985	1	1	43	55
1986	5	12	38	57
1987	67	112	136	191
1988	96	163	133	206
1989	49	85	150	181
1990	309	417	105	166
1991	83	123	115	184
1992	183	384	117	179
1993	295	399	120	225
1994	99	158	120	225
1995				

Livestock

The livestock considered in this study include chickens, goats, hogs, and sheep. The amount and type of data available vary by animal and related animal products. However, data were generally available for both live animal stocks and trade in related meat products for only chickens and poultry products, hogs and pork products and sheep and related products. Although some data on trade in live animals exist, the volume of this trade has been small and sporadic. As such, trade in live animals is not considered in this section.

As seen in Table Y.15, among the target countries in this study, Jamaica has the largest estimated stocks of chickens. Since 1980, the number of live birds has increased from about 5.0 million to a current level of 7.0 million. The dominance of the Jamaica is evidenced, by the fact that the reported chicken stock for the second leading country, Martinique, was only 370 thousand birds in 1994.

Table Y.15 Chicken Stocks by Country (1000 head)

Year	Dominica	Grenada	Guade /loupe	Jamaica	Martin/ ique	St. Kitts	St. Lucia	St. Vincent	Trinidad
1980	108	108	150	5000	450	78	189	189	189
1981	115	115	190	5000	560	80	199	199	199
1982	115	115	100	4500	620	81	209	209	209
1983	115	115	250	5000	630	82	220	220	220
1984	120	120	215	5000	460	83	240	240	240
1985	120	120	290	4000	520	84	240	240	240
1986	123	123	290	4500	370	80	250	250	250
1987	126	126	283	5500	290	60	250	250	250
1988	133	133	318	5000	290	60	260	260	260
1989	110	110	322	5700	350	55	230	230	230
1990	130	130	301	7500	350	56	220	220	220
1991	130	130	310	7600	360	57	220	220	220
1992	130	130	319	7500	380	59	230	230	230
1993	130	130	320	7000	370	60	230	230	230
1994	130	130	320	7000	370	60	240	240	240
1995	130	130	320	7000		60	250	250	250

Imports of poultry for all the target countries except Barbados over the 1980 to 1994 period are shown in Table Y.16. Jamaica is the largest importer of poultry, with 1994 imports of 23.4 mt valued in excess of $11.3 million. St. Lucia, Guadeloupe and Martinique are the next leading importers with reported 1994 import volumes of 8.2 million, 8.1 million and 8.5 million mt, respectively. Since 1980, Grenada, Guadeloupe, Martinique, St. Lucia and St. Vincent have exhibited definitive increases in imports of poultry products. Imports into the remaining countries have exhibited no clear trends.

	Dominica		Grenada		Guadeloupe		Jamaica		Martinique		St. Kitts		St. Lucia		St. Vincent		Trinidad	
Year	Vol. (mt)	Value $1000	Vol. (mt)	Value $1000	Vol. (mt)	Value $1000	Vol. (mt)	Value $1000	Vol. (mt)	Value ($1000)	Vol. (mt)	Value ($1000)	Vol . (mt)	Value ($1000)	Vol. (mt)	Value $0000)	Vol. (mt)	Value ($1000
1980	838	932	1679	1277	5035	9287	22991	8723	4637	8868	1059	889	2602	2600	1835	1277	4243	6283
1981	1187	1392	1925	1566	5428	8454	24821	9690	5278	8497	1364	1223	3454	3158	1952	1710	2660	3789
1982	1200	1300	2141	1671	6130	8247	29422	10633	5798	8118	1277	1095	3703	3436	2563	2082	887	1241
1983	1604	1440	1994	1559	6744	7816	22024	8002	6069	7479	1432	1204	3798	3333	2621	1879	2681	1783
1984	1906	1948	2066	1714	6589	7788	20470	9792	5908	7222	1425	1300	4017	3810	2745	2360	1140	2076
1985	1652	1546	2527	2166	7547	9042	25373	12693	6926	8844	1426	1148	4090	3717	3123	2268	1232	1976
1986	2021	1911	2630	2315	7418	10930	29631	16018	6194	10144	1832	1637	5194	4592	3977	2623	1200	1675
1987	2099	2152	2971	2649	8106	13251	27479	15896	6556	12348	1824	1763	5441	4962	3842	3037	1197	1200
1988	2217	2442	2948	2796	6646	11428	26378	16462	6733	12615	2050	3100	5034	4688	4058	3191	1177	950
1989	2234	2717	3294	3370	6174	10633	20956	13077	7028	12826	1780	1809	6087	7239	4128	3751	2260	1165
1990	2374	2869	3199	3407	5742	11433	21373	15134	7269	15797	2500	3800	5280	6728	4437	3933	1585	1562
1991	2628	3165	3484	3502	6741	12800	23223	14866	7371	14838	2400	3700	6778	8299	4492	4030	1127	887
1992	1100	1300	1700	1900	7010	13811	26011	22470	7485	15933	2000	2900	6783	8624	4980	4175	1067	852
1993	500	600	3646	7358	7155	12780	35679	20832	8420	15728	2000	3000	6942	9230	2800	2500	934	801
1994	800	1100	3000	6500	8089	14901	24349	11385	8473	16077	2000	3100	8168	10347	3900	3600	764	563
1995																		

Stocks of live hogs over the 1980 to 1995 period are reported in Table Y.17. As was the case for chickens, Jamaica has by far the largest estimated stocks of live hogs. Over the 1980 to 1995 period, the stock of live hogs in Jamaica has shown no clear trend ranging from a low of 150,000 head in 1991 to a high of 230,000 head in 1985. The next largest hog stocks were reported for Trinidad, Martinique, Guadeloupe and St. Lucia. Over the 1980 to 1995 , the number of live hogs reported in Guadeloupe and Trinidad has declined significantly.

Table Y.17 Hog Stocks by Country (head)

Year	Dominica	Grenada	Guade/ loupe	Jamaica	Martin/ ique	St. Kitts	St. Lucia	St. Vincent	Trinidad
1980	8000	2300	45000	210000	37000	1670	9720	6100	60000
1981	7000	2200	43000	215000	40000	1670	9963	6500	60000
1982	6000	2200	36300	200000	40000	1670	10460	7000	61000
1983	5500	2300	43000	200000	36000	1670	10964	7500	72000
1984	5000	2450	46000	210000	45000	1680	11553	8000	76000
1985	4800	2650	46000	230000	38000	1680	11550	8673	73000
1986	5000	2600	44000	200000	39500	1690	11600	9000	62000
1987	5000	2500	41000	190000	39500	1700	11700	10000	72000
1988	5000	2500	43000	195000	41500	1730	11800	11700	65000
1989	4500	2500	38000	215000	38000	1710	11800	10800	50000
1990	5000	2500	32400	220000	39000	1730	12000	9900	54000
1991	5000	2500	15000	150000	40000	1760	12200	9000	54000
1992	5000	2500	16400	180000	38000	1780	12400	9100	54000
1993	5000	2500	14000	210000	34000	1820	12600	9200	48000
1994	5000	2500	14000	210000	34000	1820	12700	9300	48000
1995	5000	2500	14000	210000	34000	1820	12800	9400	48000

As shown in Table Y.18, Guadeloupe is the largest, and only significant importer of pork products among the target countries in this study. Imports of pork products into Guadeloupe have increased from 461 mt valued at $1.7 million in 1980 to over 1500 mt valued at $4.2 million in 1994. As can be seen, imports of pork products over the 1980 to 1994 period for the remaining countries have either been sporadic (Trinidad, Jamaica and St. Lucia) or characterized by low volumes (Grenada and Dominica).

Table Y.18 Volume and Value of Pork Imports by Country

	Dominica		Grenada		Guadeloupe		Jamaica		St. Lucia		Trinidad	
Year	Vol. (mt)	Value $1000	Vol (mt)	Value $1000	Vol. (mt)	Value $100	Vol (mt)	Value $1000	Vol. (mt)	Value $1000	Vol . (mt)	Value $1000
1980	27	24	38	43	461	1741	54	137	194	189	1180	2513
1981	21	28	17	36	487	1606	16	32	145	160	1652	3720
1982	25	32	7	25	643	1499	0	0	60	89	854	2192
1983	7	11	40	41	408	1166	18	70	54	79	973	2558
1984	10	15	16	49	426	1119	0	0	43	43	159	310
1985	8	12	18	41	579	1558	0	0	33	49	120	250
1986	5	14	0	0	699	1987	19	55	8	27	258	682
1987	8	13	22	38	780	2507	90	215	2	7	0	0
1988	19	26	24	74	937	2949	113	248	7	16	0	0
1989	42	50	47	104	895	3022	153	245	38	118	35	23
1990	0	0	19	58	973	3681	208	428	78	212	137	244
1991	0	0	14	56	1252	4507	217	578	90	276	38	99
1992	0	0	18	72	1158	4257	25	26	190	420	0	0
1993	0	0	20	70	1623	4735	19	43	204	615	229	501
1994	0	0	20	60	1540	4214	19	43	230	680	574	1073
1995												

Data on sheep flocks were available for seven of the ten countries in this study. As can be seen in Table Y.19, Barbados has the largest sheep flock with an estimated 41,000 head in 1995. In general, the sheep flocks for those countries contained in Table Y.19 have been remarkably stable over the 1985 to 1995 period.

Table Y.19 Sheep Flocks by Country (head)

Year	Barbados	Dominica	Grenada	Guadeloupe	St. Kitts	St. Lucia	St. Vincent
1980	50000	5900	14000	14000	13900	12702	12500
1981	48000	6200	15830	15830	13900	13210	13000
1982	47000	6500	15900	15900	14000	13735	13500
1983	45000	6800	15000	15000	14100	14287	14500
1984	43000	7000	14000	14000	14200	14858	15780
1985	42000	7200	14000	14000	14300	14900	15780
1986	41000	7400	13000	13000	14400	15000	16000
1987	40000	7400	12000	12000	14500	15200	14800
1988	40000	7600	12000	12000	14600	15400	13600
1989	39120	7400	11000	11000	14400	15500	13400
1990	40000	7500	11000	11000	14000	15700	13200
1991	40000	7500	11500	11500	13800	15800	12000
1992	41000	7600	11500	11500	13500	15800	12000
1993	41000	7600	11600	11600	13000	15900	12000
1994	41000	7600	11600	11600	13500	16000	12500
1995	41000	7600	11700	11700	13500	16000	13000

Imports of mutton and lamb products over the 1980 to 1994 period are shown in Table Y. 20. Barbados and Guadeloupe are by far the largest importers. From 1980 to 1991, imports of lamb and mutton into Barbados increased from 934 mt valued at $1.7 million to over 3,300 mt valued at $4.1 million. Since 1991, imports have declined to a 1994 level of 2,400 mt. Imports into Guadeloupe have increased fairly consistently, almost doubling over the 1980 to 1994 period from 1,100 mt per year to just over 2,100 mt per year. Imports of lamb and mutton products into St. Kitts and St. Lucia have increased since 1980, but volumes remain small.

Table Y.20 Volume and Value of Mutton/Lamb Imports by Country

	Barbados		Dominica		Grenada		Guadeloupe		St. Kitts		St. Lucia		St. Vincent	
Year	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)	Volume (mt)	Value ($1000)
1980	934	1726	11	28	7	23	1101	2765	24	22	76	189	0	0
1981	779	1789	17	48	7	26	1105	3062	9	32	55	155	0	0
1982	892	1886	10	28	8	28	973	2515	3	10	61	163	0	0
1983	1020	1636	8	23	10	27	1038	2336	6	23	21	100	6	22
1984	1378	2395	10	31	5	19	934	2079	5	21	39	115	0	0
1985	1771	2566	9	26	8	27	1073	2272	5	20	62	149	7	33
1986	2002	2641	9	25	2	7	1132	2393	4	15	79	175	8	31
1987	2734	4136	9	24	8	28	1520	3496	26	82	191	337	9	36
1988	2510	3905	15	44	8	27	1456	3826	6	20	272	504	17	47
1989	2793	4655	16	54	11	41	1480	3964	8	40	279	528	11	38
1990	2847	4188	10	35	8	21	1641	5194	60	120	243	540	15	44
1991	3312	4189	20	60	10	36	1907	5207	80	110	271	675	20	50
1992	2781	3944	0	0	2	3	1761	4600	80	130	317	768	20	50
1993	2271	3656	0	0	7	12	1977	5264	80	140	315	748	20	50
1994	2400	3600	0	0	6	15	2127	5207	140	210	400	960	20	50
1995														

As noted in the introduction, the goal of this section of the study is to assess the domestic food situation and demand for the selected agricultural commodities in the target countries. The paucity of existing data precluded direct estimation of demand equations, thus requiring analysis of the domestic demand situation to be undertaken indirectly. The previous sections have provided some of the building blocks critical to this process. Though data are scarce, there are sufficient data on a small subset of commodities and countries to undertake econometric investigation of the income consumption relationships. Though the results of these estimations do not provide for definitive inferences regarding domestic food consumption patterns, they do provide the basis for some general insights and observations.

It is well known that the demand for any commodity may be considered to be a function of its own price, the price of competing or related products, and income. This relationship follows from the postulate that consumption choices of consumers are made in accordance with the goal of maximizing their well-being (utility) when faced with a given set of market prices and given level of income. This general demand relationship can be expressed algebraically as:

(1) $$q = f(p_q, p_o, y)$$

where q denotes the quantity demanded (consumed), p_q is the price of commodity q, p_o denotes a vector of prices of other commodities and y represents the consumer's income level.

If the market prices facing the consumers[3] are held constant, the price terms may be deleted from the demand equation in (1) to yield:

(2) $$q = g(y).$$

This equation expresses the consumption decisions of consumers solely as a function of variation in income, and is termed the income-consumption or Engel function.

This equation can be used to classify commodities according to whether they are normal, inferior, or luxury goods. This is accomplished by using the income or Engel elasticity (denoted ε_y), which measures the percentage change in consumption given a percentage change in income. If $\varepsilon_y > 1$, a one percent increase in income results in an increase in consumption of greater than one percent. In such circumstances, a commodity is considered

3. Actually, only relative commodity prices must remain constant. Such an assumption is not as untenable as it may it may seem.

it can be seen that the estimated *difference* in the Engel elasticities in the base country and country j for a given commodity is given by β_j. As these parameters are directly estimated in (3), the statistical significance of these parameters provide a direct test of the similarity of income-consumption relationships across countries.

As seen in Table Z.1, Income elasticity estimates for grape consumption (excluding wine) were estimated for Guadeloupe and Martinique. The estimated elasticities are similar for both countries. A one percent increase in per capita GDP is expected to increase per capita grape consumption in Guadeloupe and Martinique by 0.35 and 0.22 percent respectively.

Table Z.1 Estimated Income Elasticities for Grapes

Country	Guadeloupe	Martinique
Elasticity	0.350	0.222

Appendix Table B.1 exhibits historical per capita consumption of grapes over the 1975 to 1994 period and projected consumption to 2004. When growth in GDP per capita is factored in, per capita consumption of Grapes in Guadeloupe and Martinique is projected to increase at an annual rate of 3.8 and 2.5 percent, respectively. This suggest that consumption levels in 2004 should reach about 6.5 kg per capita in Guadeloupe and 5.4 kg per capita in Martinique.

Income elasticities for plantains were estimated for Dominica, Guadeloupe, Jamaica and St. Lucia. As can be seen from Table Z.2, there is considerable variation in the estimates across countries. The estimated income elasticities for St. Lucia and Dominica are negative. This suggests that domestic markets for plantains are saturated and that further increases in per capita GDP will result in decreased per capita consumption. In contrast, the estimated elasticities for Guadeloupe and Jamaica are positive, indicating plantain consumption will increase with increases in per capita GDP.

Table Z.2 Estimated Income Elasticities for Plantains

Country	Dominica	Guadeloupe	Jamaica	St. Lucia
Elasticity	-1.198	0.503	0.726	-0.067

Historic per capita consumption levels of plantains over the 1975 to 1994 period and projections to 2004 are presented in appendix Table B.2. The differences in estimated income elasticities are reflected in both the absolute levels of per capita consumption as well as their trends. Per capita consumption levels in Dominica and St. Lucia are considerably

lower than in Guadeloupe and Jamaica, and are trending downward. Indeed, consumption levels in Dominica and St. Lucia are projected to decline to 4.9 and 4.8 kg per capita, respectively, by 2004. Per capita consumption in Guadeloupe and Jamaica are projected to increase to just over 15 kg per capita by 2004.

The estimated income elasticities for tomatoes are presented in Table Z.3 for Guadeloupe, Martinique and St. Lucia. The estimated elasticity for Guadeloupe is -0.38 suggesting that tomatoes are revealed as an inferior good. In contrast, the estimated Engel elasticity for Martinique at 0.008 suggests very little consumption response to income changes in that country. For St. Lucia, a one percent increase in GDP per capita is estimated to increase tomato consumption by 0.66 percent.

Table Z.3 Estimated Income Elasticities for Tomatoes

Country	Martinique	St. Lucia	Guadeloupe
Elasticity	0.008	0.655	-0.375

Tomato consumption levels over the 1975 to 1994 period, as well as projected consumption levels to 2004 are presented in appendix Table AZ.3. It is immediately apparent that consumption levels in St. Lucia are considerable lower than those exhibited by the French islands. However, consumption in St. Lucia is projected to increase from present levels to almost 2.2 kg per capita by 2004. Tomato consumption in Guadeloupe is projected to decline to about 6.8 kg per capita in 2004, while consumption in Martinique is expected to increase slightly to about 9.4 kg per capita.

Estimated income elasticities for oranges, mandarins and tangerines were estimated for seven countries. As seen in Table Z.4, the estimated income elasticities vary widely across the seven countries investigated. St. Lucia, exhibited a negative estimated income elasticity of -0.076. At the other extreme, the estimated elasticities for Martinique and St. Lucia were 0.887 and 0.986, respectively. The respective income elasticity estimates for Dominica, Barbados and Jamaica were 0.346, 0.463 and 0.54.

Table Z.4 Estimated Income Elasticities for Orange and Tangerines

Country	Barbados	Dominica	Guadeloupe	Jamaica	Martinique	St. Lucia	St. Vincent
Elasticity	0.463	0.346	0.616	0.540	0.887	-0.076	0.986

The wide variation in income elasticity estimates is mirrored by the variation in per capita consumption levels across countries. As can be seen in appendix Table B.4, Dominica has been generally exhibited the highest per capita consumption levels while St. Vincent has had

the lowest. In 1994, per capita consumption in Dominica was estimated at 47.5 kg per year as opposed to 2.52 kg in St. Vincent. The remaining five countries all had consumption levels in excess of 20 kg per capita in 1994. Consistent with the estimated Engel elasticities, per capita consumption levels projected for 2004 increase for all countries except St. Lucia.

Income elasticities for sweet potatoes were estimated for Barbados, Guadeloupe and St. Kitts. As seen in Table Z.5, the estimated elasticities for Barbados and Guadeloupe were -0.564 and -0.207, respectively. This suggests that per capita consumption is likely to decline with increases in GDP per capita. In contrast, the estimated income elasticity for St. Kitts was 0.138. This suggests that increases in per capita GDP should result in increased consumption levels.

Table Z.5 Estimated Income Elasticities for Sweet Potatoes

Country	Barbados	Guadeloupe	St. Kitts
Elasticity	-0.564	-0.207	0.138

Appendix Table B.5 displays historical per capita consumption over the 1975 to 1994 period and projected consumption levels to 2004. The annual variation in consumption levels for Barbados and Guadeloupe until 1990 are difficult to explain. In general, however, consumption in these two countries was considerably higher than in St. Kitts until the mid-1990s. It should be noted that the per capita consumption projections suggest that St. Kitts will have higher consumption levels than Barbados and Guadeloupe beginning in 2003.

Estimated income elasticities for yam consumption are presented in Table Z.6. Of the seven countries for which elasticities were estimated, five exhibited negative values. Barbados exhibited the largest negative elasticity of -0.714 and St. Lucia the smallest with -0.049. The estimated income elasticities for Guadeloupe, Martinique and St. Vincent were -0.437, -0.306 and -0.149, respectively.

The estimated income elasticities for Dominica and Jamaica were positive at 0.478 and 0.392 respectively.

Table Z.6 Estimated Income Elasticities for Yams

Country	Barbados	Dominica	Guade/ loupe	Jamaica	Martin/ ique	St. Lucia	St. Vincent
Elasticity	-0.714	0.392	-0.437	0.478	-0.306	-0.049	-0.149

Historical consumption levels as well as projected consumption levels to 2004, are presented in appendix Table B.6. As is true of other commodities examined, there is considerable variation in per capita consumption levels across countries. In 1994 per capita consumption of yams in Barbados was estimated at 4.3 kg while in Jamaica per capita consumption was estimated to be more than 84 kg. Consistent with the estimated income

elasticities, per capita consumption levels are projected to decline in Barbados, Guadeloupe, Martinique St. Lucia and St. Vincent, and to increase in Jamaica and Dominica. As a result, the cross-country disparity in per capita consumption levels is projected to increase.

Income elasticities for beef consumption were estimated for 8 countries. As can be seen in Table Z.13, all estimated income elasticities are positive and less than 0.5. Barbados and Dominica had the smallest estimated income elasticities of 0.041 at 0.040 respectively. St. Lucia and Guadeloupe had the largest income elasticities of 0.361 and 0.377.

Table Z.7 Estimated Income Elasticities for Beef

Country	Barbados	Dominica	Guadel/ oupe	Jamaica	Martin/ ique	St. Kitts	St. Lucia	St. Vincent
Elasticity	0.041	0.040	0.377	0.066	0.200	0.250	0.361	0.165

Per capita consumption levels over the 1975 to 1994 period and projected consumption levels to 2004 are presented in appendix Table B.7. Though consumption levels vary across countries, the degree of variation is much less that exhibited by the crops previously discussed. In 1994, St. Lucia had the highest per capita consumption at almost 21 kg. St. Vincent, with a per capita consumption of 4.6 kg exhibited the lowest consumption in 1994. The small income elasticities are reflected in the projected per capita consumption projections. All countries investigated are projected to experience moderate increases in per capita consumption.

In contrast to beef, the estimated income elasticities for pork consumption differed considerably across countries. In five of eight countries examined, the estimated elasticity was negative. As can be seen from Table Z.8, however, the estimated elasticities for Barbados, Dominica, St. Lucia and St. Kitts were very near zero, ranging between -0.085 to -0.026. The estimated elasticity for Jamaica was -0.123. Both Guadeloupe and St. Vincent had positive income elasticities that were virtually identical (0.039).

Table Z.8 Estimated Income Elasticities for Pork

Country	Barbados	Dominica	Guadel /oupe	Jamaica	Martin/ ique	St. Kitts	St. Lucia	St. Vincent
Elasticity	-0.050	-0.026	0.390	-0.123	0.177	-0.085	-0.047	0.386

Appendix Table B.8 exhibits per capita consumption levels over the 1975 to 1994 period as well as projected consumption levels to 2004. In 1994, per capita consumption levels ranged from a low of 3.2 kg in Jamaica to 19.87 kg in Martinique. Consistent with the estimated income elasticities, pork consumption is projected to decrease slightly in Barbados, Dominica, St. Lucia and St. Kitts and to increase in Guadeloupe and St. Vincent. Consumption in Jamaica in projected to decline to about 2.5 kg per capita by 2004.

The estimated income elasticities for poultry are presented in Table Z.9. As can be seen from the estimated elasticities, poultry consumption is the most responsive to income change of all livestock products analyzed. St. Kitts had the smallest estimated income elasticity of 0.467, while Barbados has the largest elasticity of 0.949. Except for Dominica ($\varepsilon_y = 0.621$), all remaining countries had estimated income elasticities in excess of 0.74. These estimated elasticities suggest that the potential exists for significant increases in poultry consumption.

Table Z.9 Estimated Income Elasticities for Poultry

Country	Barbados	Dominica	Guadeloupe	Martinique	St.Kitts	St.Lucia	St. Vincent
Elasticity	0.949	0.620	0.801	0.790	0.467	0.744	0.929

This potential is confirmed in appendix Table B.9. As can be seen, per capita poultry consumption is the highest of all livestock products considered in this study. Consumption in 1994 ranged from almost 21 kg per capita in St. Lucia to about 43 kg per capita in Barbados. As can bee seen, per capita consumption is expected to increase significantly in all of the countries investigated

SUMMARY AND CONCLUSIONS

As noted in the introduction to this section, the lack of consistent and reliable data for the target commodities and countries considerably limited the scope of empirical analysis of the food and demand situation. Indeed, for some commodity groups such as cut flowers, no reliable data could be obtained. However, for the remaining commodity groupings, some empirical analysis was possible, and hence some inferences and conclusions may be drawn. In offering these conclusions, this section first discusses the individual commodity groupings, and then analyzes some sector-wide indicators for country groupings before rendering final conclusions.

Fresh Fruits

There were 7 fresh fruits identified as target commodities: avocado grapes, guava, passionfruit, pineapple and mango. Of these commodities, data sufficient for empirical analysis existed for only grapes and mangoes. Income elasticities for grapes were only estimated for Guadeloupe and Martinique. The estimated value of these elasticities (see Table ZZ.1) indicate that annual growth in per capita consumption will be moderate, averaging 3.85% and 2.5%, respectively. The data on mangoes did not permit estimation of Engel functions. However, the production and trade data that do exist indicate that mangoes are widely produced, and represent a major non-traditional export. Indeed, significant production of mangoes was reported in 7 of the 10 target countries in this study, and 5 of these countries (Dominica, Jamaica, St. Lucia, St. Vincent and Trinidad) reported exports.

The significance of the export volumes of mangoes should not be overlooked. Like most commodities in the fresh fruit grouping, there are relatively few commercial plantings of mangoes. Furthermore, domestic markets for these commodities remain largely informal. This, in part explains the general absence of data on many of these commodities. However, in spite of the absence of commercial plantings, mangoes have successfully penetrated export markets in both Europe and North America. This is no doubt in part due to the level of *consumer awareness and familiarity* with mangoes in external markets. This suggests there may be some export potential from other commodities in this grouping if similar levels of consumer awareness can be developed.

Table ZZ.1 Estimated Annual Growth Rates* in Per Capita Consumption for Selected Commodities and Countries

Commodity	Barbados	Dominica	Guade/ loupe	Jamaica	Martini/ que	St. Kitts	St. Lucia	St. Vincent
Grapes	--	--	3.85	--	2.49	--	--	--
Plantains	--	-10.9	5.53	2.83	--	--	-0.72	--
Tomatoes	--	--	-3.41	--	0.09	--	6.42	--
Manderines etc.	4.95	3.15	6.77	--	9.94	--	-0.74	8.97
Sweet Potato	-6.03	--	-2.28	--	--	1.35	--	--
Yams	-7.64	3.57	-4.81	1.87	-3.42	--	-0.48	-1.36
Beef	0.44	0.37	4.14	0.26	2.24	2.45	3.86	1.50
Pork	-0.53	-0.23	4.29	-0.48	1.98	-8.33	-0.50	3.51
Poultry	10.16	5.65	8.81	--	8.84	4.58	7.96	8.45

* Estimated growth rates were calculated using the estimated Engel Functions and the assumption that future rates of increase in per capita GDP would mirror the average rates of change exhibited over the past five years.

Food Crops

There were six food crops targeted for analysis in this study: arrowroot, breadfruit, dasheen plantain, sweet potato and yam. However, adequate data existed to empirically analyze only three: plantains, sweet potatoes and yams. As seen in Table ZZ.1, the estimated annual growth rates in per capita consumption vary considerably across commodities and countries. In the case of plantains, per capita consumption is estimated to *decrease* at an annual rate of almost 11% in Dominica, but by less than 1% in St Lucia. In contrast, annual per capita consumption is expected to *increase* in Guadeloupe and Jamaica by 5.5% and 2.8%, respectively.

Similar inferences are obtained for sweet potatoes and yams. The estimated annual changes in sweet potato consumption ranged from a decrease of 6.0% in Barbados to an increase of 1.35 % in St. Kitts. As shown in Table ZZ.1, in five of the seven countries for which Engel functions were estimated, per capita consumption of yams is expected to decrease. The

projected annual rate of decrease in consumption ranged from 7.64% in Barbados to 0.48% in St. Lucia. Increases in annual per capita consumption were estimated at 3.6% in Dominica and 1.87% in Jamaica.

Yams and Plantains, and to a lesser extent sweet potatoes, are widely produced in the target countries and to a certain extent can be considered *staple* food items. This partially explains the frequency of declining consumption estimates which suggest high rates of market saturation. Of the target commodities analyzed in this study, plantains and yams are also among the most prominent export crops. Indeed, plantain exports are reported for Dominica, Jamaica and St. Lucia and yam exports are reported for Dominica, Jamaica, St. Lucia and St. Vincent.

Vegetables

Three commodities comprised the vegetable category in this study: hot peppers, tomatoes and melons. Of these, empirical analysis was only possible for tomatoes, and for this commodity, only three countries could be analyzed. As seen in Table ZZ.1, the estimated annual growth rate in per capita consumption of tomatoes varied considerably across countries. St. Lucia is projected to increase per capita consumption at an annual rate of over 6.4% while per capita consumption in Martinique is expected to remain relatively constant. In contrast, annual per capita consumption in Guadeloupe is expected to decrease at a rate of 3.4%.

It is difficult to explain the disparities in these estimates. The large increases in St. Lucia may be correlated with the dramatic increase in tourism experienced over the last decade. This, however, cannot be verified. The contrasting estimates for the french islands of Guadeloupe and Martinique are more difficult to explain. Indeed, given the paucity of data, no explanation is offered.

Given the limited data that exist, and the wide range in estimated changes in per capita consumption, it is difficult to make any general inferences regarding the domestic market for vegetables in general, and tomatoes in particular. However, it can be noted that the paucity of data is indicative of the informal nature of domestic markets for these crops. It should also be noted that tomatoes, like many other vegetable enjoy certain elements of protection from import competition. At present, the domestic markets for tomatoes are not being filled solely from domestic supplies, and the potential for doing so is unclear. While it does not appear that demand growth will be substantial, neither is it clear that the formalization of domestic markets necessary for significant increases in locally supplied vegetables is occurring.

Exotics

The commodities comprising this category included limes, and a composite of manderines and tangerines. Limited production and trade data exist for both of these commodities. However, Engel functions could only be estimated for manderines and tangerines. As

notable in the regard are whole chickens produced in Barbados, Jamaica and Trinidad.[4] In most instances, however, these gains have been realized through various combinations of domestic support and protection from import competition. Taken as a whole, the domestic consumption of beef and poultry is expected to increase, the latter substantially. On balance pork consumption is expected to decline.

The ability of domestic producers to meet the likely expansion in the demand for livestock products remains unclear. While the capacity to produce exists, especially as regards poultry, the associated costs of protection and support to the industry may become prohibitive. This is especially true given the current movement toward trade liberalization, both within CARICOM and in the western hemisphere.

The general picture that emerges from the analysis of these commodities is captured in Table ZZ.2 which summarizes the production and trade patterns for the commodities analyzed above. It is readily apparent that those commodities falling in the fresh fruit (mangoes) and food crop (plantain, sweet potato and yam) groupings are the most widely produced in significant volumes, and comprise the vast majority of commodities for which exports are reported. Commodities in the exotics grouping (primarily limes) are also widely produced. Though exports are reported for two countries, limes and manderines/tangerines are also imported in several countries. In the vegetable grouping, only one crop (tomato) has recorded production and in only one country. For livestock products, the importance of imports in fulfilling local demand is apparent.

Care must be taken in generalizing the domestic food and demand situation in the target countries of this study. However, some general conclusions, may be drawn. The data presented in Table ZZ.2, and the absence of data on many of the other crops included in this study calls attention to the small scale of agricultural production and informal nature of domestic markets. In many cases, this reflects the reality that many indigenous commodities, especially those comprising the fresh fruit and food crop groupings, can supply domestic markets without the development of commercial production systems, or formal market structures. Given that projected growth in domestic per capita consumption of these commodities is expected to be moderate, it appears that this *system* may well be adequate in supplying domestic markets. The ability of such informal system to support expanded intra-regional or extra-regional trade is uncertain. Mangoes, and those commodities in the food crop grouping represent unique situations that may not be easily replicable with other commodities.

In terms of less indigenous crops (e.g. exotics and vegetables) the scant data that exist attest to the small and informal nature of the markets for these commodities as well. Domestic markets for these commodities are not generally satisfied by local production. Further, in

4. Personal communication with various individuals in target countries.

many countries domestic production is only "competitive" with imported production when import protection measures are in force. There appears to be some potential for increasing the degree to which domestic markets are supplied by local (or regional production) of these commodities in these two groupings. However, the markets for these commodities must become more formalized to ensure the marketing efficiencies and reliability required by the ultimate consuming sectors are achieved. Additionally, some degree of specialization in production may well be required to ensure the production occurs in adequate volumes.

Table ZZ.2 Production and Trade Patterns by Commodity and Country

Commodity	Barbados	Dominica	Grenada	Guade/ loupe	Jamaica	Martin /ique	St Kitts	St. Lucia	St. Vincent	Trini/ dad
Mango	–*	P, "E ""	P	–	P,E	P	–	P,E	P,E	P,E
Plantain	–	P,E	P	P	P,E	P	–	P,E	P	–
S. Potato	P	–	–	P	–	–	P	–	–	–
Yam	–	P,E	P	P	P,E	P	P	P,E	P,E	
Orange etc.	I """"	–	–	P,I	P	I	–	–	–	–
Limes	I	P,E	P	P,I	P	P,E,I	–	P	P	P
Tomato	–	–	P	–	–	P,I	–	I	–	–
Poultry	–	I	I	I	I	I	I	I	I	I
Pork	–	I	I	I	I	–	–	I	–	I
Lamb	I	I	I	I	–	–	I	I	–I	–

* denotes missing or unavailable data
"" denotes production data reported
""" denotes export data reported
"""" denotes import data reported

The situation in livestock is difficult to assess. Most of the target countries have significant livestock industries, especially as regards poultry. However, these industries are heavily reliant on imported intermediate goods, and are both subsidized and protected. Additionally, all of the target countries in the study rely on imports to satisfy domestic demand. It does not seem that this situation is likely to change. Thus, the degree to which domestic demand is supplied by local production may be more related to the willingness of governments to continuing supporting the production of these commodities, rather than improvements in "competitiveness" driven by fundamental market forces.

Having examined these individual commodities and rendering some conclusions concerning the domestic food and demand situation based on them, it is useful to conclude this section by examining some broad measures of agricultural production over the past twenty years. In accomplishing this task, it seems appropriate to proceed along the lines of the regional tripartite regional grouping of the MDCs, OECS and French territories.

Tables ZZ.3 through ZZ.5 present 3-year moving averages of per capita production indexes[5] for food, crops and livestock in Barbados, Jamaica and Trinidad. The food production indexes reveals a sharp contrast between Barbados, which has experienced a decline in per capita food production since the mid-1980s, and Jamaica and Trinidad which have experienced increases. Examining Tables ZZ.3 and ZZ.4, it can be seen that the decline in the food production index for Barbados is primarily related to declining crop production. The increase in the food production index in Jamaica in largely attributable to increases in both crop and livestock production since the mid-1980s. The increase in the food production index for Trinidad, is more moderate than that exhibited by Jamaica, and has been mainly driven by increases in crops production since the mid-1980s.

These indexes suggest that among the MDCs, Jamaica and Trinidad are improving their agricultural production capacity and are perhaps poised to become more significant exporters both intra-regionally and extra-regionally. This reflects the large size of these two countries relative to OECS countries and the French territories and the economic reforms undertaken by Jamaica and Trinidad in the past few years. In contrast, it appears that food production in Barbados is facing increased difficulties, and has a less certain future. Much of Barbadian agriculture is tied to the fortunes of the country's sugar industry, which, in recent years, has experienced difficulties. While significant efforts to reverse these difficulties are being expended, it is unclear how successful they will be.

Table ZZ.3. Per Capita Food Production Indexes for MDCs

Period Ending	Barbados	Jamaica	Trinidad
1976	98.67*	99.83	151.11
1979	113.27	100.51	126.11
1982	103.61	90.66	112.66
1985	95.85	94.07	99.02
1988	97.83	94.06	95.74
1991	95.26	106.73	102.45
1994	84.19	110.58	104.43

* 3-Year Moving 1989-91 = 100

5. These indexes are constructed and published the Food and Agriculture Organization (FAO), and were obtained from the FAOSTAT database.

Table ZZ.4 Per Capita Crop Production Indexes for MDCs

Period Ending	Barbados	Jamaica	Trinidad
1976	150.54*	115.77	182.6
1979	169.32	116.18	146.43
1982	140.63	102.12	111.15
1985	132.78	103.66	88.59
1988	108.778	100.91	93.03
1991	99.04	106.58	102.53
1994	85.43	121.62	99.14

* 3-Year Moving 1989-91 = 100

Table ZZ.5 Per Capita Livestock Production Indexes for MDCs

Period Ending	Barbados	Jamaica	Trinidad
1976	60.01*	80.53	106.66
1979	74.44	83	101.79
1982	79.64	80.79	112.53
1985	76.82	82.25	109.96
1988	91.59	85.48	97.97
1991	95.31	107.13	100.01
1994	88.54	98.74	99.58

* 3-Year Moving 1989-91 = 100

Tables ZZ.6 through ZZ.8 present the food, crop and livestock production indexes for the OECS countries included in this study. The food production indexes vary considerably across countries. Since 1976, Grenada and St. Kitts have exhibited a downward trend in per capita food production while production in St. Lucia has been relatively stable. Dominica and St. Vincent exhibited increases in per capita food production from 1976 until the until the late-1980s before declining. With the exception of the significant increase in per capita livestock production exhibited in Dominica, the per capita crop and livestock indexes for the remaining countries exhibit trends similar to their food production indexes.

With the exception of Grenada, the countries in this grouping are heavily dependent upon banana production. The behavior of the per capita food and crop production indexes in these OECS countries are dominated by this crop. As such it is difficult to draw conclusions concerning the production of non-traditional crops and livestock products. However, it seems clear that as long as the some from of preferential access to the European market remain in force, banana production will remain the dominant agricultural activity. This will in all likelihood impede the development of significant increases in the supply of locally

produced non-traditional products to domestic or regional markets. Should preferential access cease, significant structural transformation will have to occur if the potential of increasing non-traditional production is to be transformed into reality.

The per capita food, crop and livestock production indexes for Guadeloupe and Martinique are presented in the Tables ZZ.9 through ZZ.11. Since the mid-1980s the per capita food production indexes for both countries have declined significantly. Examination of Tables ZZ.10 and ZZ.11 indicated these declines have been fairly uniform for both crop and livestock production. The trends in these indexes underscore the rather disturbing increase in the agricultural trade deficits exhibited by both countries.

The precise forces driving the behavior of these indexes are unclear. However, unless the trends of the last ten to fifteen years reverse, it is clear that both Guadeloupe and Martinique will become increasingly dependent on imports to be their domestic food demands.

Table ZZ.6 Per Capita Food Production Indexes for Selected OECS Countries

Period Ending	Dominica	Grenada	St. Kitts	St. Lucia	St Vincent
1976	70.31*	118.74	121.84	72.56	70.3
1979	62.46	126.97	145.88	76.15	76.97
1982	667	121.7	135.48	96.64	74.74
1985	80.52	116.51	120.99	87.51	101.97
1988	108.46	109.09	117.37	100.02	100.36
1991	98.13	99.11	103.69	100.23	101.56
1994	88.62	102.3	97.82	93.9	80.29

* 3-Year Moving 1989-91 = 100

Table ZZ.7 Per Capita Crop Production Indexes for Selected OECS Countries

Period Ending	Dominica	Grenada	St. Kitts	St. Lucia	St Vincent
1976	*74.65	115.99	130.58	74.65	67.5
1979	66.19	127.45	157.17	76.40	75.48
1982	70.02	121.25	142.14	68.96	72.05
1985	82.32	117.12	126.25	89.84	102.26
1988	108.49	110.62	121.24	100.96	99.95
1991	96.76	99.78	104.33	100.63	102.07
1994	87.34	109.88	98.26	94.83	78.60

* 3-Year Moving 1989-91 = 100

Table ZZ.8 Per Capita Livestock Production Indexes for Selected OECS Countries

Period Ending	Dominica	Grenada	St. Kitts	St. Lucia	St Vincent
1976	50.02*	112.71	91.78	93.98	89.63
1979	58.79	108.79	102.53	99.76	88.19
1982	64.48	108.34	109.87	102.95	98.42
1985	83.63	101.24	102.55	107.15	104.59
1988	99.18	99.75	102.77	103.49	104.86
1991	100.90	100.51	100.81	100.26	97.48
1994	105.66	104.51	95.30	100.23	97.38

*3-Year Moving 1989-91 = 100

Table ZZ.9 Per Capita Food Production Indexes for Guadeloupe and Martinique

Period Ending	Guadeloupe	Martinique
1976	140.71*	117.49
1979	140.23	93.03
1982	131.19	103.91
1985	130.46	110.32
1988	121.72	97.76
1991	95.45	100.04
1994	95.30	85.98

*3-Year Moving 1989-91 = 100

Table ZZ.10 Per Capita Crop Production Indexes for Guadeloupe and Martinique

Period Ending	Guadeloupe	Martinique
1976	160.03*	120.95
1979	142.08	97.57
1982	133.24	95.41
1985	124.34	105.11
1988	126.17	98.83
1991	97.95	98.50
1994	94.35	83.50

*3-Year Moving 1989-91 = 100

Table ZZ.11 Per Capita Livestock Production Indexes for Guadeloupe and Martinique

Period Ending	Guadeloupe	Martinique
1976	102.77*	94.72
1979	128.99	107.38
1982	140.51	117.32
1985	144.55	118.67
1988	120.10	101.86
1991	94.95	101.23
1994	90.63	91.19

* 3-Year Moving 1989-91 = 100

APPENDIX A

Agricultural Exports and Imports by Country

Figure A.1. Agricultural Exports and Imports for Dominica, 1961-1994

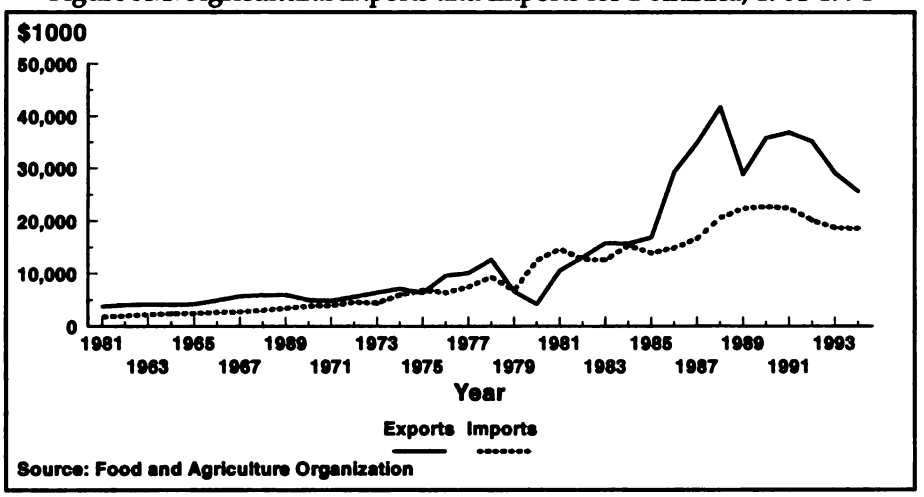


Figure A.3 Agricultural Exports and Imports for Grenada, 1961 to 1994

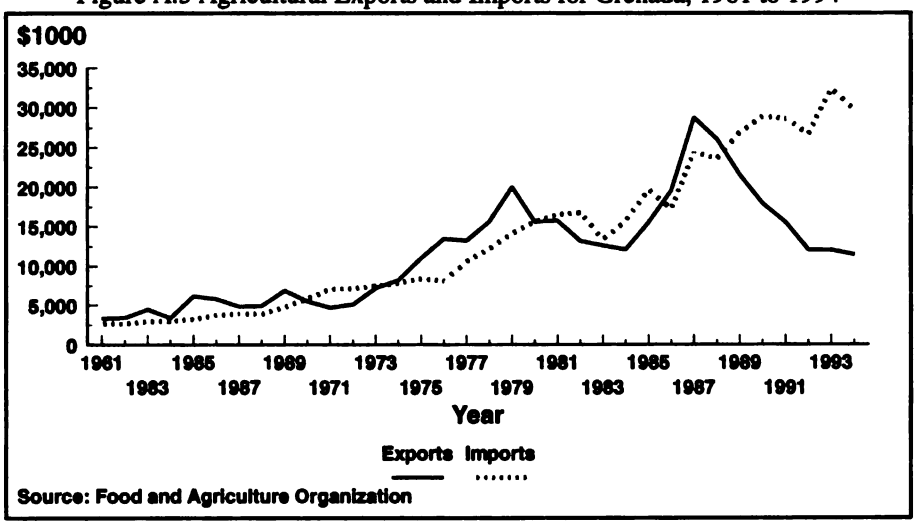


Figure A.4 Agricultural Exports and Imports for Guadeloupe, 1961 to 1994

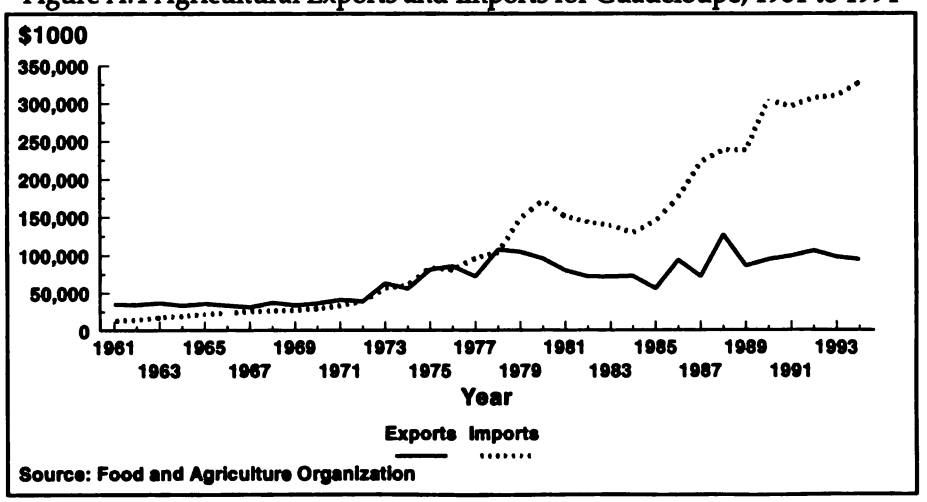


Figure A.4 Agricultural Exports and Imports for Martinique, 1961 to 1994

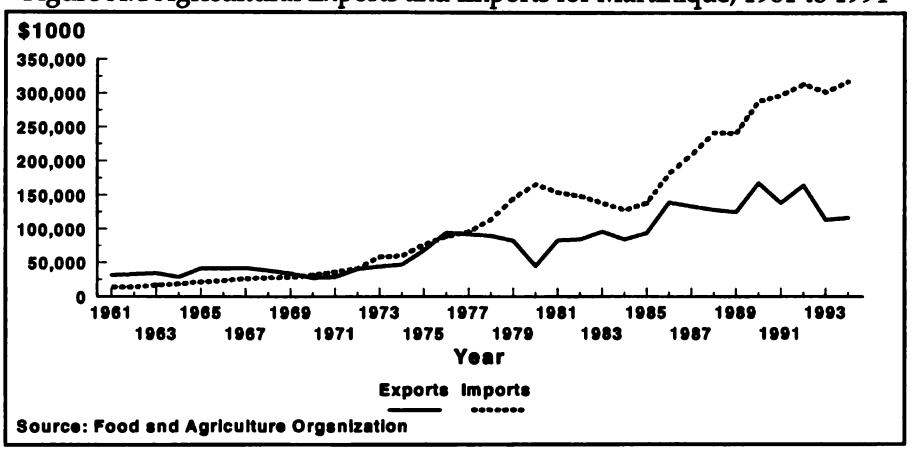


Figure A.5 Agricultural Exports and Imports for St. Kitts, 1961 to 1994

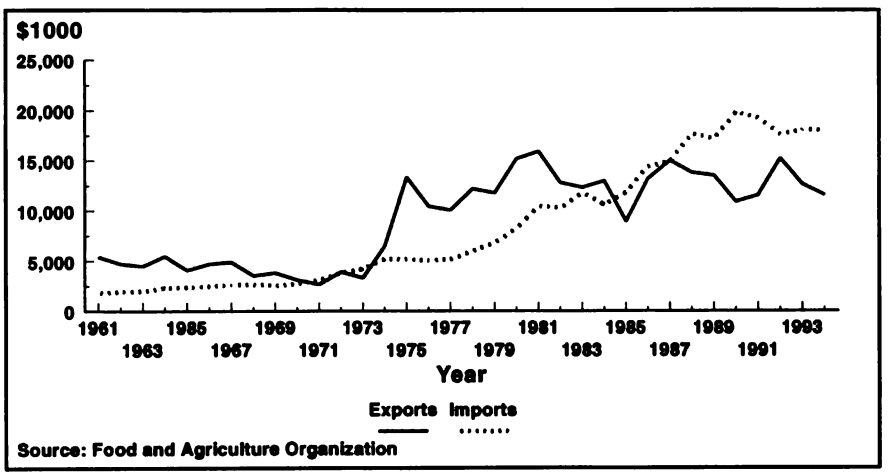


Figure A. 6 Agricultural Exports and Imports for St. Lucia, 1961 to 1994

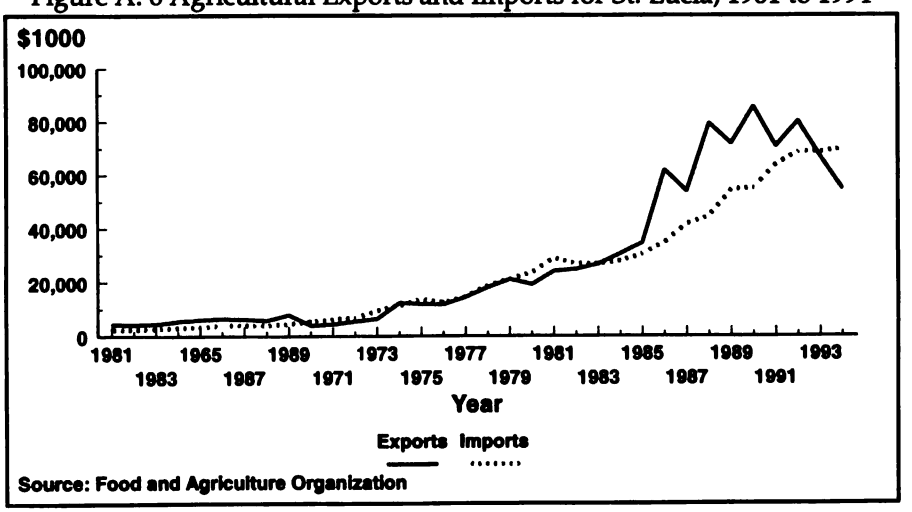


Table A.9 Agricultural Exports and Imports for St. Vincent, 1961 to 1994

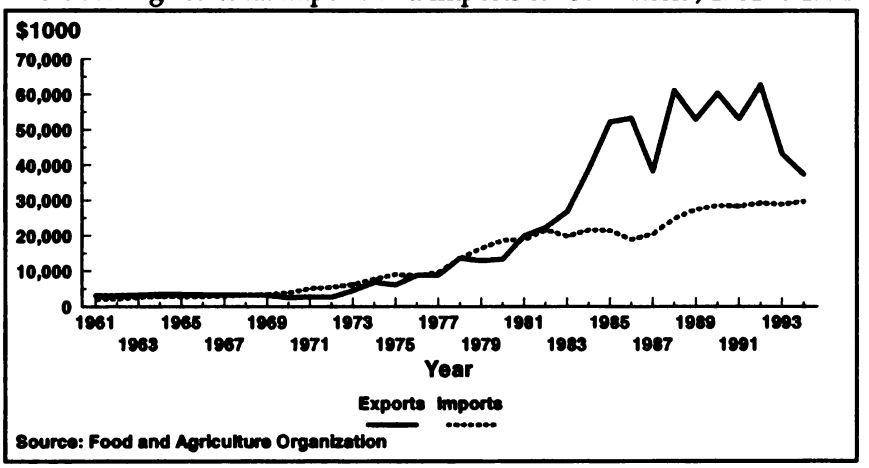


Figure 8, Agricultural Exports and Imports for Barbados, 1961-1994

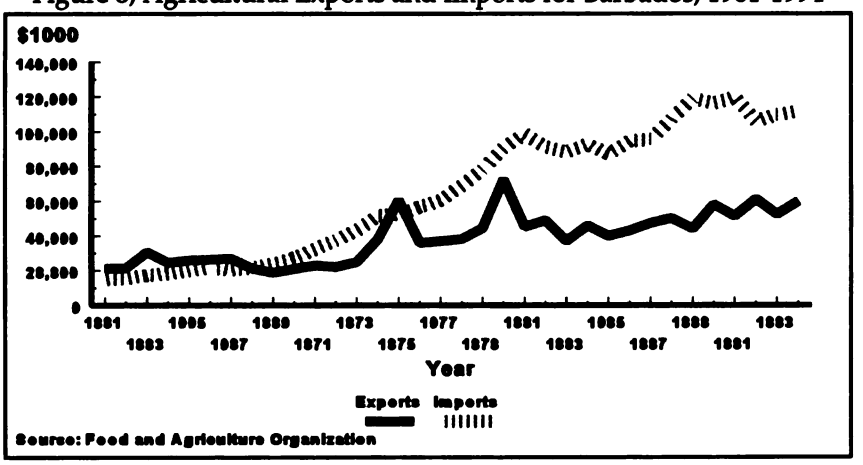


Figure A. 9, Agricultural Exports and Imports for Jamaica, 1961-1994

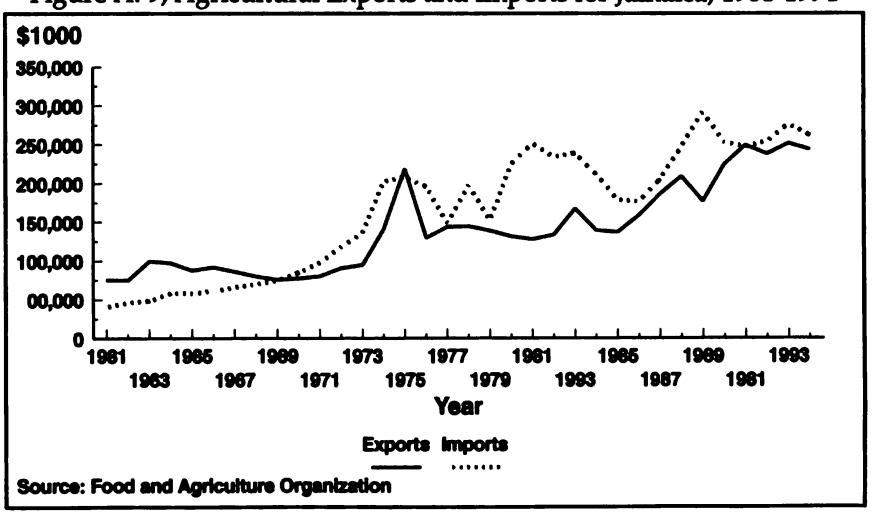
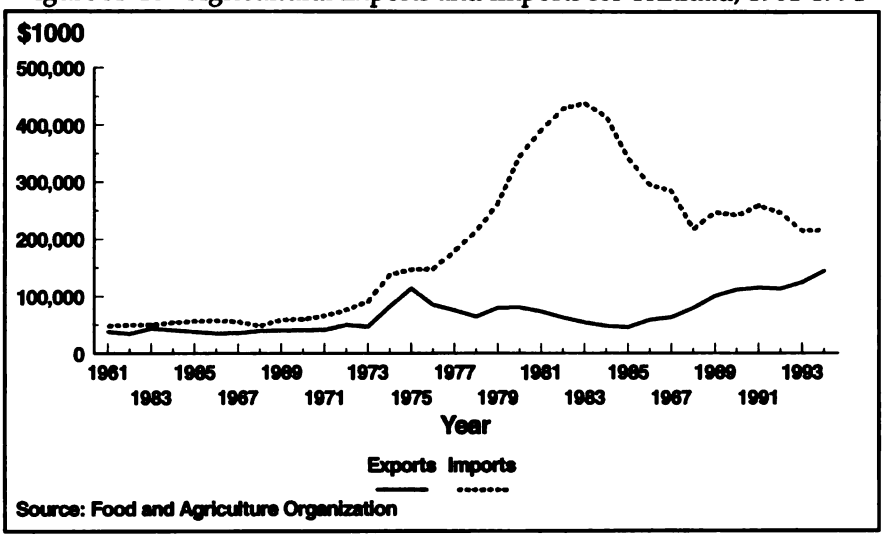


Figure A. 10 - Agricultural Exports and Imports for Trinidad, 1961-1994



APPENDIX B

Historical Per Capita Consumption, 1975 to 1994 and Projected Per Capita Consumption to 2004

Table B.1 Per Capita Consumption of Grapes (kg/yr)

Year	Guadeloupe	Martinique
1975	1.14	1.21
1976	0.96	1.04
1977	1.2	1.55
1978	0.92	0.99
1979	1.23	1.26
1980	1.1	1.63
1981	0.94	1.76
1982	1.13	1.59
1983	1.1	1.63
1984	1.07	1.41
1985	0.96	1.44
1986	1.25	1.92
1987	1.54	2.49
1988	3.71	3.57
1989	3.62	5.37
1990	3.6	5.84
1991	3.72	6.32
1992	3.76	5.8
1993	4.1	5.34
1994	5.31	4.77
1995	5.33	4.78
1996	5.37	4.80
1997	5.43	4.83
1998	5.52	4.89
1999	5.63	4.93
2000	5.76	5.0
2001	5.91	5.08
2002	6.1	5.17
2003	6.31	5.27
2004	6.56	5.39

Table B.2 Per Capita Consumption of Plantains (kg/yr)

Year	Dominica	Guadeloupe	Jamaica	St. Lucia
1975	0	15.85	8.03	0
1976	27.78	15.81	6.67	0
1977	31.51	12.2	8.06	0
1978	31.08	11.5	10.12	9.29
1979	27.03	7.34	10.47	6.16
1980	13.51	6.12	10.59	6.56
1981	12.16	9.55	10.15	7.66
1082	10.96	10.46	11.67	7.82
1983	9.59	14.78	10.07	9.23
1984	8.33	17.33	12.17	5.52
1985	6.94	18.43	11.75	5.12
1986	4.17	17.6	11.66	4.75
1987	8.45	17.79	10.1	6.8
1988	8.45	18.63	9.91	7.22
1989	4.23	11.7	9.99	7.82
1990	4.23	13.32	10.55	7.79
1991	2.82	12.7	10.11	7.49
1992	2.82	12.89	10.65	7.05
1993	11.27	13.32	13.35	7.72
1994	8.45	11.37	13.01	7.09
1995	7.62	11.43	13.05	7.04
1996	6.2	11.56	13.12	6.95
1997	4.55	11.75	13.23	6.81
1998	3.01	12.01	13.38	6.63
1999	1.8	12.35	13.57	6.41
2000	1	12.76	13.81	6.16
2001	0.47	13.27	14.08	5.87
2002	0.21	13.87	14.40	5.56
2003	0.81	14.57	14.77	5.24
2004	0.03	15.4	15.2	4.9

Table B.3 Per Capita Consumption of Tomatoes (kg/yr)

Year	Guadeloupe	Martinique	St. Lucia
1975	2.84	8.29	0
1976	2.32	6.1	0
1977	2.3	10.48	0
1978	1.51	10.68	0
1979	1.81	6.46	0
1980	1.97	8.79	0
1981	6.58	13.78	0.73
1982	6.82	10.12	0.4
1983	7.82	10.89	0.67
1984	9.18	12.93	0.49
1985	11.47	12.72	0.89
1986	12.03	13.31	1.09
1987	10.54	9.55	1.46
1988	10.1	8.19	1.39
1989	9.12	8.41	1.46
1990	9.78	9.14	1.65
1991	8.85	8.71	1.45
1992	11.36	9.87	1.45
1993	11.17	8.85	1.54
1994	8.42	8.95	1.51
1995	8.39	8.96	1.52
1996	8.33	8.97	1.54
1997	8.23	8.1	1.57
1998	8.11	9.03	1.61
1999	7.96	9.07	1.67
2000	7.78	9.12	1.73
2001	7.58	9.18	1.81
2002	7.35	9.24	1.91
2003	7.11	9.32	2.03
2004	6.85	9.40	2.16

Table B.4 Per Capita Consumption of Oranges, Mandarins and Tangerines (kg/yr)

Year	Barbados	Dominica	Guadeloupe	Jamaica	Martinique	St. Lucia	St. Vincent
1975	19.8	31.36	1.39	25.96	3.39	9.2	5.55
1976	19.7	17.44	2.65	18.92	4.11	8.07	4.45
1977	18.15	36.3	2.68	17.41	5.09	15.37	4.74
1978	22.32	29.65	2.8	20.62	5.03	18.74	4.88
1979	22.39	26.68	5.48	12.52	8.43	27.92	2.29
1980	27.68	26.85	4.83	17.35	10.06	37.64	4.03
1981	27.61	25.07	5.73	6.31	8.11	29.52	5.48
1982	29.75	25.14	9.01	11.79	8.22	20.68	5.78
1983	21.08	20.03	5.45	17.36	7.36	17.1	2.19
1984	25.05	21.43	6.23	4.4	6.67	19.07	3.79
1985	38.4	25.49	4.45	10.06	5.45	16.91	2.24
1986	38.43	53.94	7.33	8.53	4.7	23.63	2.19
1987	44.5	55.17	9.04	24.56	2.01	35.74	1.81
1988	47.47	56.35	8.84	16.78	6.38	37.86	3.28
1989	31.15	48.44	6.08	25.44	7.28	38.89	1.89
1990	31.88	47.25	11.44	33.36	8.2	38.41	2.19
1991	40.46	47.46	10.09	23.25	12.43	40.81	2.13
1992	23.09	46.45	13.3	17.56	16.36	39.37	1.93
1993	31.1	47.49	17.55	19.7	20.97	41.49	2.55
1994	31.11	47.49	26.07	20.99	19.75	40.9	2.52
1995	31.25	47.64	26.25	21.03	19.95	40.60	2.54
1996	31.54	47.94	26.60	21.12	20.34	40.00	2.59
1997	31.98	48.39	27.15	21.26	20.96	39.12	2.66
1998	32.58	49.01	27.89	21.44	21.80	37.97	2.76
1999	33.34	49.78	28.85	21.66	22.91	36.59	2.88
2000	34.28	50.73	30.04	21.94	24.31	34.99	3.04
2001	35.41	51.86	31.49	22.27	26.05	33.22	3.24
2002	36.74	53.18	33.24	22.64	28.20	31.30	3.48
2003	38.30	54.71	35.32	23.08	30.82	29.28	3.77
2004	40.11	56.46	37.78	23.57	34.03	27.18	4.12

Table B.5 Per Capita Consumption of Sweet Potatoes (kg/yr)

Year	Barbados	Guadeloupe	St. Kitts
1975	16.55	11.89	1.44
1976	19.58	9.88	1.73
1977	18.36	8.62	1.31
1978	18.12	9.64	1.48
1979	7.75	9.34	1.48
1980	16.71	9.64	1.84
1981	10.62	16.29	2
1982	13.18	16.05	2.07
1983	12.19	17.33	2.28
1984	5.39	15.24	2.28
1985	6	12.94	2.28
1986	7	14.74	2.28
1987	10.59	12.84	2.28
1988	6.07	11.41	2.4
1989	7.2	10.24	2.4
1990	4.88	7.65	2.48
1991	5.87	8.38	2.48
1992	6.1	8.21	2.62
1993	6.81	8.57	2.85
1994	3.35	7.63	3.02
1995	3.15	7.47	3.02
1996	2.78	7.17	3.03
1997	2.31	6.73	3.04
1998	1.8	6.19	3.06
1999	1.32	5.58	3.08
2000	0.91	4.92	3.11
2001	0.59	4.25	3.16
2002	0.36	3.6	3.17
2003	0.2	2.98	3.21
2004	0.11	2.41	3.25

Table B.6 Per Capita Consumption of Yams (kg/yr)

Year	Barbados	Dominica	Guadeloupe	Jamaica	Martinique	St. Lucia	St. Vincent
1975	24.62	13.61	29.63	60.76	27.44	26.64	11.29
1976	20.89	15.65	29.54	52.66	21.61	26.87	12.66
1977	20.83	18.99	13.99	54.62	15.14	26.79	10.53
1978	23.8	21.91	10.73	64.91	15.18	27.47	19.79
1979	18.4	16.96	9.08	67.59	12.15	27.42	19.07
1980	27.41	26.22	9.08	56.19	12.15	26.56	19.9
1981	12.71	28.11	12.82	56.87	9.88	26.55	20.2
1982	16.64	29.15	13.27	46.94	12.27	27.28	23.4
1983	14.88	25.81	13.42	51.04	12.43	26.4	23.4
1984	11.25	26.07	12.78	57.56	18.59	26.77	23.17
1985	8.57	28.36	11.07	61.66	18.84	26.5	22.94
1986	6.75	35.88	13.19	61.71	17.27	26.16	8.74
1987	9.07	30.52	13.57	64.85	13.64	25.78	8.65
1988	4.35	28.9	13.82	61.63	10.23	25.89	8.57
1989	8.98	28.63	9.55	49.49	9.25	26.56	9.43
1990	9.58	28.1	10.14	59.28	10.25	26.14	9.35
1991	7.16	27.13	14.58	65.15	8.53	26.41	9.26
1992	5.73	26.11	14.25	78.07	9.11	26.04	9.17
1993	7.08	25.97	14.42	79.97	7.28	26.48	6.36
1994	4.31	26.28	7.32	84.18	7.2	26.72	6.31
1995	4.27	26.37	7.29	84.34	7.18	26.71	6.3
1996	4.19	26.56	7.22	84.65	7.13	26.68	6.28
1997	4.06	26.85	7.12	85.13	7.07	26.64	6.25
1998	3.91	27.23	6.98	85.77	6.98	26.6	6.21
1999	3.72	27.72	6.82	86.57	6.88	26.53	6.16
2000	3.51	28.32	6.63	87.55	6.75	26.45	6.1
2001	3.28	29.04	6.41	88.7	6.61	26.36	6.03
2002	3.03	29.88	6.18	90.04	6.45	26.26	5.96
2003	2.77	30.85	5.92	91.56	6.27	26.15	5.87
2004	2.52	31.97	5.65	93.29	6.09	26.03	5.78

Table B.7 Per Capita Consumption of Beef (kg/yr)

Year	Barbados	Dominica	Guadeloupe	Jamaica	Martinique	St. Kitts	St. Lucia	St. Vincent
1975	17.8	5.34	24.6	12.4	12.12	4.85	10.85	3.46
1976	23.32	5.37	24.42	12.38	14.49	5.85	11.44	3.13
1977	23.5	5.85	23.49	10.23	14.39	6.72	12.43	3.81
1978	23.35	5.35	22.36	12.31	13.5	7.2	13.02	4.31
1979	19.23	3.51	25.18	8.06	14.23	6.43	11.11	4.25
1980	14.36	3.79	27.22	7.31	14.81	7.68	8.05	3.57
1981	22.7	3.69	25.06	7.73	14.34	10.6	7.43	3.27
1982	24.64	3.66	24.57	7.89	14.92	12.3	9.51	3.21
1983	25.46	4.08	24.67	8.64	12.52	13.8	8.96	3.43
1984	23.88	5.18	24.45	8.46	14.31	11.27	10.27	3.56
1985	26.67	5.56	24.03	7.27	13.55	14.14	11.84	3.27
1986	21.42	5.28	12.22	7.99	13.96	17.62	12.94	3.1
1987	17.69	4.46	10.97	7.85	13.35	16	11.68	5.01
1988	14.94	4.69	12.64	8.49	13.51	15.62	10.85	4.78
1989	17.06	4.97	10.48	8.4	13.11	11.7	14.31	5.29
1990	16.31	4.99	9.32	7.84	13.39	11.66	11.81	4.78
1991	15.16	4.85	10.41	7.9	13.01	9.96	13.74	5.56
1992	13.09	5.35	10.35	8.5	13.77	8.79	14.82	4.87
1993	12.08	5.65	10.53	8.26	13.1	11.32	14.8	5.47
1994	11.4	6.37	10.31	7.92	12.92	9.22	20.78	5.53
1995	11.39	6.37	10.35	7.92	12.95	9.24	20.86	5.54
1996	11.38	6.36	10.44	7.93	13.01	9.29	21.02	5.55
1997	11.37	6.36	10.57	7.93	13.09	9.36	21.27	5.58
1998	11.35	6.35	10.74	7.94	13.21	9.45	21.6	5.61
1999	11.32	6.33	10.97	7.95	13.36	9.56	22.02	5.66
2000	11.3	6.32	11.24	7.96	13.54	9.71	22.53	5.71
2001	11.26	6.3	11.57	7.98	13.76	9.87	23.15	5.77
2002	11.22	6.29	11.96	7	14	10.07	23.87	5.84
2003	11.18	6.26	12.42	8.01	14.29	10.3	24.71	5.92
2004	11.13	6.24	12.94	8.03	14.61	10.55	25.68	6.01

Table B.8 Per Capita Consumption of Pork (kg/yr)

Year	Barbados	Dominica	Guadeloupe	Jamaica	Martinique	St. Kitts	St. Lucia	St. Vincent
1975	28.79	8.01	3.93	3.25	9.99	5.6	7.84	4.36
1976	30.26	8.4	3.91	3.47	10.13	5.8	8.44	4.89
1977	30.16	9.06	4.16	3.96	10.55	5.08	10.7	5.15
1978	30.6	9.01	5.89	3.59	10.68	5.19	9.62	5.24
1979	26.52	9.51	7.28	2.9	11.43	7.14	11.69	5.51
1980	29.17	9.61	7.17	3.96	11.36	7.93	9.25	5.67
1981	31.19	8.72	6.58	3.71	12.64	6.24	8.75	6
1982	28.7	10.51	8.13	3.29	13.23	6.11	8.31	6.62
1983	25.14	8.53	8.2	3	13.55	6.53	8.4	6.89
1984	22.27	8.1	8.32	3.11	14.04	7.45	8.79	9.05
1985	23.17	7.64	8.54	3.12	13.01	6.37	8.43	8.46
1986	19.77	8.45	11.95	2.6	13.33	5.6	8.58	8.65
1987	20.22	9.55	12.43	2.93	13.63	5.93	9.32	11.1
1988	18.49	10.65	12.85	3.47	14.36	5.35	6.19	8.64
1989	20.52	11.03	13.46	3.69	14.53	4.73	10.53	10.37
1990	19.07	8.89	13.72	3.22	14.75	3.85	6.13	11.37
1991	20.83	5.72	11.6	1.82	17.07	4.99	9.45	10.96
1992	19.04	6.14	11.03	2.67	17.17	4.56	19.24	11.8
1993	18.82	6.84	12.75	3.3	17.81	5.23	12.04	8.88
1994	19	6.74	12.72	3.22	19.87	6.09	11.84	7.92
1995	18.9	6.72	12.77	3.20	19.9	6.03	11.83	7.95
1996	18.7	6.7	12.88	3.17	19.99	5.92	11.82	8
1997	18.4	6.65	13.05	3.13	20.11	5.76	11.8	8.09
1998	18.02	6.59	13.28	3.07	20.27	5.55	11.78	8.2
1999	17.54	6.51	13.56	2.99	20.47	5.29	11.75	8.35
2000	16.99	6.42	13.92	2.91	20.71	5	11.72	8.72
2001	16.37	6.32	14.34	2.81	21	4.68	11.68	8.74
2002	15.7	6.20	14.84	2.71	21.34	4.35	11.63	8.99
2003	14.96	6.08	15.42	2.59	21.72	3.99	11.58	9.27
2004	14.18	5.94	16.1	2.47	22.15	3.64	11.52	9.6

Table B.9 Per Capita Consumption of Poultry (kg/yr)

Year	Barbados	Dominica	Guadeloupe	Martinique	St. Kitts	St. Lucia	St. Vincent
1975	20.9	9.56	9.58	8.34	13.53	10.85	10.8
1976	21.8	10.42	10.57	8.9	16.07	11.44	13.63
1977	19.32	13.64	12.75	11.07	15.8	12.43	13.47
1978	23.22	14.86	12.76	11.9	20.68	13.02	14.43
1979	29.35	15.2	13.87	12.98	20.82	11.11	16.9
1980	31.02	13.55	15.99	13.04	20.57	8.05	17.6
1981	33.28	18.34	16.6	13.7	25.82	7.43	18.1
1982	34.14	16.92	17.78	14.54	24.36	9.51	24.13
1983	31.93	22.25	18.51	15.5	27.65	8.96	24.51
1984	32.33	26.19	18.08	13.96	27.56	10.27	24.5
1985	30.8	22.94	20.37	16.19	27.6	11.84	26.99
1986	35.05	27.58	20.59	15.65	34.74	12.94	34.53
1987	37.72	29	22.51	17.15	34.65	11.68	32.33
1988	39.71	30.66	23.91	19.71	39.5	10.85	33.12
1989	53.01	30.9	23.92	22.12	34.55	14.31	33.85
1990	48.52	33.01	24.29	22.32	47.43	11.81	36.61
1991	44.18	36.31	24.82	23.45	45.69	13.74	36.96
1992	38.25	35.92	25.79	23.52	38.62	14.82	41.19
1993	37.94	36.2	25.24	25.84	39.56	14.8	43
1994	42.87	34.93	26.89	26	39.56	20.78	30.38
1995	43.31	35.13	27.13	26.23	39.74	20.95	30.64
1996	44.19	35.53	27.61	26.7	40.11	21.28	31.16
1997	45.55	36.13	28.34	27.41	40.66	21.79	31.95
1998	47.43	36.95	29.36	28.39	41.41	22.49	33.05
1999	49.89	38.01	30.67	29.67	42.37	23.4	34.47
2000	53	39.32	32.33	31.28	43.54	24.54	36.25
2001	56.9	40.9	34.38	33.27	44.96	25.95	38.45
2002	61.69	42.78	36.87	35.69	46.63	27.64	41.13
2003	67.56	45.01	39.9	38.63	48.59	29.69	44.36
2004	74.75	47.62	43.56	42.19	50.86	32.14	48.26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Autor
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Fecha Devolución
Nombre del solicitante