



**POSTHARVEST INSTITUTE FOR PERISHABLES**

A REPORT ON PRODUCTION AND EXPORT OF SELECTED  
PERISHABLE CROPS IN THE CBI COUNTRIES REQUIRING  
QUARANTINE TREATMENT FOR U.S. ENTRY

by Robert O. Brooks

Postharvest Institute for Perishables  
in  
Cooperation with  
Peace Corps and U.S. AID

PIP/CBI/July-Sept 84/No. 54



**University of Idaho**

in cooperation with  
United States Agency for  
International Development

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by

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## Preface

The purpose of the following report is to present the best summary available of Caribbean export crops affected by the EDB ban. The summary will include current effects and projections for the future.

The study was designed to include data obtained by Peace Corps personnel in Barbados, Belize, Costa Rica, Dominican Republic, Guatemala, Haiti, Honduras and Jamaica. Of these countries, only five responded. Nothing was received from Barbados, Haiti or Honduras. The reasons for no response are not known. Several concentrated efforts were made to obtain data from the nonresponding countries, but to no avail.

It will be seen in the information received from the five responding countries that the data are very incomplete. Consequently it was very difficult or impossible in many instances to formulate reliable estimates of the current situations or to make future projections for crops or countries.

It is possible or probable that more production or export data could be obtained from the countries and, therefore, more reliable projections could be generated. To do so, however, would require more time and resources than were available for the study presented here.



## Introduction

The U.S. Environmental Protection Agency's September 1, 1984 ban on the soil and postharvest fumigant ethylene dibromide (EDB) has caused major problems within the Caribbean Basin Initiative (CBI) area. This postharvest fumigant has been used on a number of fresh fruit and vegetable crops to kill fruit flies and other pests which infest these agricultural products. The fact-finding report by Cavin, Bolton and Cummings (PIP/Caribbean/Feb-Mar 84/No. 39) explains the postharvest pest problems and the immediate impact of the ban. The EDB ban has impacted citrus, mangoes and papaya exports from the Central American countries to the U.S. while mangoes are the only crops affected from the Caribbean nations.

Currently, there are no reasonable alternative quarantine treatments for those fruit and vegetables impacted by the EDB ban with the exception of methyl bromide in some instances. There are a number of possible treatments being tested, e.g. irradiation and hot or cold treatments, but none can be put on line immediately.

Gamma radiation appears to have the most potential for solving the postharvest problems faced by these countries and of meeting U.S. import restrictions for fresh fruit and vegetables. This treatment, while providing the quarantine treatment necessary, is fraught with potential problems.

First, the Food and Drug Administration has not issued a final decision on irradiation and until such time, very little can or will be done to develop this alternative. Second, the time lag between approval/implementation and finished facility is expected to be two years. Thirdly, the cost of construction and operating an irradiation facility is high. Lastly, but nonetheless important, what are the sociological implications of this alternative?

The development of alternative postharvest quarantine technologies along with the necessary facilities will require extensive research and information. The recommendations set forth by the U.S. AID fact-finding team have been used to develop additional scopes of work which address these issues.

### Scope of Work

This study addresses a recommendation in the report by Cavin, et al, 1984 concerning current and planned production of fruit and vegetables. This information is a necessary item in the planning process for determining the feasibility of and locations for quarantine treatment facilities within the CBI area.

The purpose of this study was to:

1. Identify production and export crop potential from eight major selected countries.
2. Identify specific quarantine requirements in each of the selected countries for treatment of identified crops exported to the U.S.
3. Obtain a 10-year production and export history of selected exportable crops from the identified CBI countries.
4. Develop a five- and ten-year projection for anticipated exports of selected perishable crops from CBI countries.

A survey instrument was developed by the Department of Agricultural Economics, University of Idaho to address the above items. Peace Corps volunteers in the eight selected countries, i.e. Barbados, Belize, Costa Rica, Dominican Republic, Guatemala, Haiti, Honduras and Jamaica, were chosen to complete the survey instrument. After a briefing on the procedures for filling out the survey, the volunteers arranged meetings with ministry, agency, cooperatives and export groups to gather all available data pertaining to this issue.

### Data Collection

The collection of data for this study necessitated using a number of different sources. The survey instrument assisted the Peace Corps volunteers in determining what information was relevant and provided a format for orderly reporting.

Section 1 of the survey asks for historical data on acreage, production, amount exported and type of export packaging used for those crops impacted by the EDB ban or treated with methyl bromide. Section 2 asks for the planned future production of these impacted crops through 1990. Section 3 deals with fumigation in-country while Section 4 asks for information on plans and projections for any new fruit or vegetable crops the country might be studying.

The current list of fresh fruit and vegetable crops which require postharvest fumigation by EDB or methyl bromide (MB) is presented in Appendix I. This list is compiled by country followed by the complete list of admissible fresh fruit and vegetables according to U.S.D.A. - APHIS, P.P.Q's January, 1984 regulations.

### Findings

The data collected by the Peace Corps volunteers (PCV's) provide the best in-country estimates of production and export of impacted fresh fruit and vegetables available. The PCV's interviewed Ministry of Agriculture personnel, banks, private firms, fruit and vegetable cooperatives, export groups, U.S. AID rural development personnel, FAS agricultural attaches, and U.S. Embassy personnel.

The following Tables 1-5 present the data collected from these sources. As the tables show, very little statistical information is available from the countries regarding fresh fruit and vegetable production. The crops are not the primary commodities from the areas and any interest in them is fairly new. In addition, there are no regulated crop reporting services set up in the individual countries.

Secondary sources of information on the level of production for the commodities were checked. The Food and Agricultural Organization's 1983 production yearbook, FAO Statistics Series #47 contains production figures for some of the affected fruit and vegetables. These figures are shown in Tables 6-11.

Projections of future production and export levels have not been attempted for these fruit and vegetables by any of the countries. Most of the projections that are available have been done by private firms working within the countries. Appendix II shows the letters that contain the thoughts and projections of some companies concerning the future production and export level of some of the impacted commodities.

United States import figures for fresh fruit and vegetables are the most reliable source of information for the CBI area. They do show the amount of domestic production that is moved into the export sector. Trade data collected by the United Nations shows the U.S.'s portion of imports from this area. Table 12 shows that U.S. imports for tropical products is growing in most cases. The USDA/ERS/International Economics Division has compiled information on imports of fruit and vegetables under Plant Quarantine Regulations for a number of years. A seven-year summary of this information (1977-1983) is presented in Table 13.

JAMAICA - Table 1A. Historical production of fresh fruit and vegetables requiring EDB quarantine treatment for U.S. entry.

Commodity	Year	Area	Production (short tons)	Amount Exported (lb)	Export Packaging
Yam	1983	No data	143,999	10,343,320	Cardboard boxes
	1982	No data	128,999	7,905,354	
	1981	No data	150,114	5,441,928	
	1980	No data	146,490	5,461,739	
	1979	No data	173,250	4,980,197	
	1978	No data	180,533	3,743,589	
	1977	No data	151,532	No data	
	1976	No data	131,810	before	
	1975	No data	135,511	1978	
	1974	No data	174,794		
Mango	1983	No data	No data	735,501	
	1982	No data	No data	788,705	
	1981	No data	No data	526,996	
	1980	No data	No data	594,274	
	1979	No data	No data	371,691	
	1978	No data	No data	255,394	
Okra	1983	No data	1,697	33,294	
	1982	No data	1,680	No data	
	1981	No data	1,450	No data	
	1980	No data	1,233	No data	
	1979	No data	1,108	No data	
	1978	No data	1,101	No data	
	1977	No data	1,172	No data	
	1976	No data	1,100	No data	
	1975	No data	1,258	No data	
	1974	No data	1,034	No data	

Source: Jamaican Ministry of Agriculture Data Collection and Statistics Section, Hope Office, KGN.

JAMAICA - Table 1B. Projected production of fresh fruit and vegetables currently requiring EDB quarantine treatment.

Commodity	Year	Area	Production
Yam	-	NO PROJECTIONS AVAILABLE	
Mango*	1984	160 acres	112,246 boxes
	1985		
	1986		
	1987		
	1988		
	1989		
	1990	400-500 acres	448,984 boxes
Okra	-	NO PROJECTIONS AVAILABLE	

\*57 trees per acre, 160 mangoes per tree, 13 mangoes per box - Estimated by Richard Rogers of Agro 21, Kingston, Jamaica.

JAMAICA - Table 1C. Fumigation in-country

<u>Address of Chamber</u>	<u>Certified?</u>
Norman Manley Airport, Kingston, Jamaica	Proposed functioning date October, 1984. Will be U.S.D.A. certified

No other functioning fumigation chambers.

JAMAICA - Table 1D. Potential fruit and vegetable production

<u>Commodity</u>	<u>Area</u>	<u>Current Production</u>
Papaya	No data	1,821 short tons, 1983
Pumpkin	No data	35,795 short tons, 1983
Sweet peppers	No data	1,417 short tons, 1983
Tomato	No data	21,122 short tons, 1983
Avocados	No data	Exported 143,997 lbs, 1983

Government plans to increase exports of winter vegetables to North America but no solid statistical estimates are available.

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BELIZE - Table 2A. Historical production of fresh fruit and vegetables requiring EDB quarantine treatment for U.S. entry.

Commodity	Year	Area (acres)	Production (lb)	Amount Exported (lb)	Export Packaging
Yam	-	None produced for export.		No production figures available.	
Mango	1983	1,100		1,693,000	In 12- pound cardboard boxes
	1982	1,100		0	
	1981	1,100		0	
	1980	1,100		2,320,000	
	1979	1,100		0	
	1978	1,100		1,232,000	
	1977	1,100		4,250	
	1976	1,100			
	1975	1,100			
	1974	1,100			
Orange	1983	No data	67,500,000	None as fresh fruit to U.S. markets. Small quantities to Guatemala and neighboring Central American countries	
	1982	No data	148,500,000		
	1981	No data	95,600,000		
	1980	No data	99,800,000		
	1979	No data	51,100,000		
	1978	No data	61,700,000		
	1977	No data	57,000,000		
	1976	No data	72,200,000		
	1975	No data	81,500,000		
	1974	No data	No data		
Tangerine	-	None produced for export.		No production figures available.	

BELIZE - Table 2A, Continued

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Commodity Export	Year	Area	Production	Amount	
		(acres)	(lb)	Exported (lb)	Packaging
Grape- fruit	1983	No data	14,240,000	None as fresh fruit to the U.S.	
	1982	No data	56,200,000		
	1981	No data	46,900,000		
	1980	No data	32,600,000		
	1979	No data	15,000,000		
	1978	No data	24,100,000		
	1977	No data	19,000,000		
	1976	No data	32,600,000		
	1975	No data	42,500,000		
	1974	No data	No data		

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BELIZE - Table 2B. Projected production of fresh fruit and vegetables currently requiring EDB quarantine treatment.

Commodity	Year	Area (acres)	Production (lb)
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Yam - No projections available

Mango*	1984	1,200	1,320,000
	1985	1,400	2,500,000
	1986	1,400	2,500,000
	1987	1,400	2,500,000
	1988	1,400	2,500,000
	1989	1,400	2,500,000
	1990	3,000	6,000,000

\*Expansion hinges on resolution of fumigation dilemma, adequate control of anthracnose disease, and absence of hurricane activity in the area.

Orange	1984	approx. 9,000	104,000,000
	1985		
	1986	Projected acreage increases of 10% per year	
	1987		
	1988		
	1989		
	1990		

Tangerine - No data available

Grapefruit	1984	approx. 3,000	18,400,000
	1985		
	1986	Acreages will remain stable or decline slightly	
	1987	due to low prices and poor market demand for	
	1988	grapefruit (products).	
	1989		
	1990		

BELIZE - Table 2C. Fumigation in country

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Commodity	Year	Quantity	Type of Fumigant
Mango	1984	1,320,000 lbs.	EDB
	1983	1,693,000 lbs.	EDB
	1982	0	
	1981	0	
	1980	2,320,000 lbs.	EDB

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Address of Chamber:	Certified?
Belize International Airport	Yes
Belize City	
Belize, Central America	

Chamber operated by Dr. McCleary, Tropical Produce Co., Gaboureal Lane, Belize City, Belize, Central America. It is used solely for the fumigation of mangoes produced for export to the U.S. market.

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BELIZE - Table 2D. Potential fruit and vegetable production.

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Data of this kind are difficult to obtain and mostly speculative in nature. A number of crops have been exported to U.S. markets in the past (e.g., cantaloupe, okra, cucumber, tomato, and green pepper). Whether these will be exported in the future depends primarily on market economics and the development of contacts with reputable distributors to the U.S.

Agriculture department officials, agricultural cooperatives, and private individuals consider the following crops to have export potential:

1. plantain
2. pineapple
3. guava
4. avocádo
5. papaya
6. cashew (nut)
7. macadamia (nut)

Bananas are currently produced on a commercial basis and shipped to the United Kingdom.

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DOMINICAN REPUBLIC - Table 3A. Historical production of fresh fruit and vegetables requiring EDB quarantine treatment for U.S. entry.

Commodity	Year	Area	Production (MT)	Amount Exported (MT)	Export Packaging
Yam	1983		57,000	29,316	Sacks
	1982		56,000	31,121	Sacks
	1981		56,000	31,705	Sacks
	1980		53,000	26,433	Sacks
Mango	1983			358	
	1982			256	
	1981			220	
	1980			136	
Okra	1983	253,851		254	
	1982			341	
	1981			413	
	1980			129	

DOMINICAN REPUBLIC - Table 3B. Projected production of fresh fruit and vegetables currently requiring EDB quarantine treatment.

Commodity	Year	Area	Production
Yam	1984		65,000 MT
	1985		70,000 MT
Mango	No projections available		

DOMINICAN REPUBLIC - Table 3C. Fumigation in country

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Year	Commodity	Quantity	Type of Fumigant
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No information provided

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DOMINICAN REPUBLIC - Table 3D. Potential fruit and vegetable production

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Commodity	Area	Current Production
Passion fruit	156 acres	
Mango (new varieties)	233 acres	
Zapote	4000 trees	

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COSTA RICA - Table 4A. Historical production of fresh fruit and vegetables requiring EDB quarantine treatment for U.S. entry.

Commodity	Year	Area(ha)	Production (MT)	U.S. Imports (MT)	Export Packaging
Yam	1984	60	90	No data available	50 lb. boxes
Mango	1984	1,934			Box
	1983	934	5,417		
	1982				
	1981				
	1980				
	1979	110			
Orange	1983	2,392*	114,607,000	1	
	1982		units	2.5	
	*Other trees not as orchards - 263,188				
Tangerine	No data available. Tangerines available for local consumption in limited quantities.				
Papaya	1984	360	14,342 <sup>1</sup>		
	1983	467	23,350	21*	
	1982			5	
	1981			2	
	1980			0	
	1979	160		0	
	1978			0	
	1977			0	
	1976			0	
	1975			3	
	1974			0	

<sup>1</sup> 30-60 MT/ha.

\* Ministry of Agriculture statistic, includes all exports of papaya.

COSTA RICA - Table 4A, continued.

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Commodity	Year	Area	Production	U.S. Imports	Export Packaging
Grapefruit	1983			Data not	
	1982			available	
	1981	Grapefruit is not widely		0	
	1980	available commercially in		0	
	1979	Costa Rica.		0	
	1978			0	
	1977			0	
	1976			0	
	1975			1 MT	
	1974			0	

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COSTA RICA - Table 4B. Projected production of fresh fruit and vegetables currently requiring EDB quarantine treatment.

Commodity	Year	Area	Production
Chestnut	No data available.		
Yam	Depending upon foreign demand, yam production will increase or decrease. Coopetalamanca, R.L. hopes to find buyers and export larger quantities in the future, since local demand is saturated.		
Mango	By 1990, mango production should be at least double the 1983 figure, or 10,834 MT.		
Orange	1984	18,000 ha.	
	1985		
	1986		
	1987		
	1988		
	1989		
	1990		
Tangerine	No data available. Production should increase marginally in coming years.		
Papaya	1984		454 MT (Hawaiian variety for export)
	1985		
	1986		
	1987		
	1988		
	1989		
	1990		4, 545 MT*
Grapefruit	No data available.		

\*Provided EDB alternative is available. See enclosed PINDECO (Del Monte) visit report. (Appendix II)

COSTA RICA - Table 4C. Fumigation in country

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Year	Commodity	Quantity	Type of Fumigant
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None done in Costa Rica.

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COSTA RICA - Table 4D. Potential fruit and vegetable production

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Commodity	Area	Current Production
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Okra 1984 - 20 MT exported

The following are being produced in significant quantities. Various groups are looking into the export potential of these crops. Some are currently being exported:

- Pejibaye
  - Ugly fruit
  - Persian limes
  - Sapote
  - Melons
  - Cassava (manioc)
  - Plantains
  - Cauliflower
  - Broccoli
  - Cabbage
  - Beans (green)
  - Cardomom
  - Luffa
  - Winged beans
  - Dasheens
  - Cashew fruit
  - Guava
  - Macadamia
  - Herbs, spices
-

GUATEMALA - Table 5A. Historical production of fresh fruit and vegetables requiring EDB quarantine treatment for U.S. entry.

Commodity	Year	Area	Production (kg)	Amount Exported (kg)	Export Packaging
Yam	-	No data available			
Mango	1983			3,252.68	
	1982			198.01	
	1981			1,288.57	
	1980			2,100.47	
Orange	1983			17,557.02	
	1982			44,301.35	
	1981			8,405.29	
	1980			7,633.48	
	1979	4,693 Mz.*	979,502.91	2,544.231	
Tangerine	1983			24.34	
	1982			1,592.72	
	1981			1,146.09	
Papaya	1983			1,838.41	
	1982			874.68	
	1981			1,418.38	
	1980			591.84	
	1979	156 acres	23,285.00		
Grapefruit	1983				
	1982				
	1981			46.07	
	1980			702.88	

GUATEMALA - Table 5B. Projected production

Commodity	Year	Area	Production
Chestnut		No data available	

Table 6. Root and tuber production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados	10	14	9	10F <sup>1</sup>
Belize	15	17	17	18
Costa Rica	36	45	46	47 F
Dominican Republic	365	262	261	270
Guatemala	53	68F	58 F	59 F
Haiti	705	668 F	691 F	702 F
Honduras	19	17	18 F	18 F
Jamaica	206	198	221 F	227 F

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table 7. Orange production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados				
Belize	37	42*	37*	44*
Costa Rica	68	75 F <sup>1</sup>	76 F	77 F
Dominican Republic	67	71	72 F	72 F
Guatemala				
Haiti	27	29 F	30 F	30 F
Honduras	26	27 F	28 F	28 F
Jamaica	40	43	33*	33*

\* - Unofficial figure.

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table 8. Tangerine production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados				
Belize				
Costa Rica				
Dominican Republic				
Guatemala				
Haiti	9	9 F <sup>1</sup>	9 F	9 F
Honduras				
Jamaica	5	9	4*	9*

\* - Unofficial figure.

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table 9. Mango production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados				
Belize				
Costa Rica				
Dominican Republic	163	176	180 F <sup>1</sup>	180 F
Guatemala				
Haiti	290	326	330	335 F
Honduras	12	13 F	13 F	13 F
Jamaica	3	4 F	4 F	4 F

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table 10. Grapefruit production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados				
Belize	18	16*	22*	27*
Costa Rica				
Dominican Republic	2	3 F <sup>1</sup>	3 F	3 F
Guatemala				
Haiti	9	11 F	11 F	11 F
Honduras				
Jamaica	30	28	25*	24*

\* - Unofficial figure.

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table 11. Papaya production by country - 1,000 Metric Tons

Country	1974-76	1980	1981	1982
Barbados				
Belize				
Costa Rica	3	3 F <sup>1</sup>	3 F	3 F
Dominican Republic	8	6	9 F	9 F
Guatemala				
Haiti				
Honduras				
Jamaica	2	3 F	3 F	3 F

<sup>1</sup> F - FAO estimate.

Source: FAO Production Yearbook, 1982. Statistics Series No. 47.

Table. 12. Distribution of United States Imports of Horticultural and Tropical Products by Processing Stage and Major Markets (1977-1983) (In Percentages)

Country	1977	1978	1979	1980	1981	1982	1983	Growth Rate
Barbados	.68	.64	.28	.14	.10	.11	.18	-20
Belize	.10	.25	.19	.47	.29	.27	.21	+13
Jamaica	.11	.07	.14	.35	.04	.12	.35	+21
Haiti	.40	.32	.22	.25	.14	.40	.43	+1
Honduras	2.02	3.38	3.33	3.16	3.50	3.79	3.47	+9
Costa Rica	2.82	2.68	3.11	2.62	2.86	3.51	3.75	+5
Guatemala	4.31	3.64	4.02	3.87	3.21	3.34	3.82	-2
Dom. Rep.	6.11	4.55	5.05	4.77	6.07	4.4	4.84	-4

Source: United Nations Calendar Year Trade Data

Table 13. U.S. Imports of Fresh Fruit and Vegetables Under Quarantine Treatment by EDB or MB, 1977-1983 (In kilograms)

Commodity	1977	1978	1979	1980	1981	1982	1983
<u>Grapefruit</u>							
Barbados							
Belize							
Costa Rica							
Dom. Rep.						704	3072
Guatamala							
Haiti							
Honduras						23	
Jamaica							
<u>Oranges</u>							
Barbados							
Belize							
Costa Rica						21,047	475
Dom. Rep.	50,448	38,566		31,830	151,236	161,340	329,365
Guatamala							
Haiti							
Honduras							141,974
Jamaica				21,772		71	91
<u>Mangoes</u>							
Barbados	1,848						
Belize	461,927	506,115		513,477	4,432		748,531
Costa Rica					5,668		5,381
Dom. Rep.	68,787	11,759		24,139	96,197	89,621	55,823
Guatamala				59,376			9,754
Haiti	1,336,366	2,3300,718		4,210,462	5,370,020	7,196,306	5,499,126
Honduras				13,356			
Jamaica	231,499	9,381		16,106	7,138	92,638	9,002

Table 13, continued.

Commodity	1977	1978	1979	1980	1981	1982	1983
<u>Okra</u>							
Barbados		409					
Belize		16,976					2,222
Costa Rica							
Dom. Rep.	816	110,187		141,212	199,221	191,117	561,646
Guatamala	395,585	456,711		200,868	440,119	455,261	449,915
Haiti						1,630	
Honduras				68		7,090	1,045
Jamaica						1,630	270
<u>Papayas</u>							
Barbados							
Belize							
Costa Rica	60,245	2,483					20,452
Dom. Rep.	18,866	18,576		3,571	27,014	26,447	62,290
Guatamala					6,381	68	100,545
Haiti							
Honduras							
Jamaica							2,173
<u>Yams</u>							
Barbados				37,157	116,484		
Belize							
Costa Rica						11,143	78,905
Dom. Rep.	385,553	886,661		59,172	300,352	110,216	352,206
Guatamala							
Haiti	7,200	2,407		6,940		780	4,510
Honduras							
Jamaica	110,377	450,717		1,667,036	1,842,589	3,526,141	5,198,348

Source: U.S. Imports of Fruit and Vegetables Under Plant Quarantine Regulations, Fiscal Years 1977-83, United States Department of Agriculture, Economic Research Service, International Economics Division.

### Summary and Conclusions

The identification of fresh fruit and vegetables from the Caribbean Initiative Basin area, specifically, Barbados, Belize, Costa Rica, Dominican Republic, Guatemala, Haiti, Honduras and Jamaica, that require(d) quarantine treatment with ethylene dibromide or methyl bromide along with production and export data for these crops was the major emphasis of this study.

The USDA/APHIS/Plant Protection and Quarantine regulates the importation of fresh fruit and vegetables into the United States. Based on their January, 1984, list of admissible fresh fruit and vegetables, mangoes, citrus (grapefruit, oranges, tangerines), yams, okra and papayas are the only crops grown in these countries which require quarantine treatment.

The September 1, 1984, ban on EDB as a postharvest fumigant for fresh fruit and vegetables has caused an impact on the CBI countries ability to export these commodities to the United States. At this time, there is an interim acceptable residue level for EDB of 30 parts per billion for mangoes. According to F. Rodriguez, Caribbean Area Director, USDA/PPQ, Dominican Republic, this level is so low that it will be extremely hard to meet. For the other impacted crops there is no readily available alternative.

New fruit and vegetable crops coming on line from these countries because of the CBI will also be impacted if they are a host to any of the pests which require quarantine treatment. Interest was expressed in each of the countries visited concerning possible agricultural programs to initiate alternative fruit and vegetable crops; such as soursop, anona, carambola, etc. Although the interest is there, no estimates of planned production have been made.

Currently, there are three countries which have USDA/PPQ certified fumigation chambers: Jamaica, Haiti, Belize. Jamaica's chamber was scheduled to come on line October of 1984 according to Ralph H. Iwamoto, Junior, USDA/APHIS, PPQ. Due to the EDB ban though, only those crops treated with methyl bromide (MB) will be handled by this facility. The chambers in Belize (1) and Haiti (7) were used for fumigating mangoes.

Fumigation chambers were being constructed in Dominican Republic and Costa Rica with plans for chambers in Honduras and Guatemala. These plans and construction are on hold until some decision is reached on the EDB question.

Historical production and export figures for fresh fruit and vegetables requiring quarantine treatment from the study countries are lacking. Limited data about particular crops was available from these countries and is presented in this paper. Generally though, very little statistical data has been compiled on fresh fruit and vegetable production.

The need for reliable production and export data concerning fresh fruit and vegetables impacted by the EDB ban is important for planning purposes related to locating possible quarantine treatment facilities.

"Irradiation is considered the best alternative to the widespread use of EDB for insect disinfestation in certain agricultural commodities," Outlook, 1984. Although this alternative has a number of benefits the costs of building and operating such a facility require that large volumes of product be processed to be economically feasible. Therefore, in the case of the CBI countries, where the use of chemical fumigation has been banned, the cost/benefit ration of irradiation will have to be very carefully evaluated.

There is tremendous interest in the CBI countries to increase their fresh fruit and vegetable production for export to the United States. In addition, they perceive a large untapped market for non-traditional fruits and winter vegetables.

The Inter-American Institute for Cooperation on Agriculture is the best source of information on trade data, marketing and transportation for the CBI countries. Sources for production and export data concerning fresh fruit and vegetables just are not there. Until a crop reporting service is established in these countries that is non-political, reliable data will not be available.

Projections of planned production for the impacted crops have not been made. Government projections were not available in most cases, although Agro 21, Kingston, Jamaica has made a number of acreage projections. The private sector-Pindeco (Del Monte), Costa Caribe, and Tropical Fruit Co.-has offered estimates on the affect the EDB ban has and will have on their operations.

Estimates of future production and/or exports utilizing linear estimation were attempted based on the data available from the study countries.

The historical production or export data presented in tables 1A - 5A for the impacted crops were the basis of the estimations.

A two-variable linear estimation model was used - where Y was the year and X was the production or export value corresponding to the year. With the two-variable statistical data put into the model, an estimated X (production/export) value was calculated for 1990 and 1995.

Estimates were made on crops where either production or export data were collected. The reliability of these estimates should be viewed with caution, due to the lack of data points and the variability of the data.

Tables 14 - 17 present the estimates for those fresh fruit and vegetable crops for which limited historical data was available. The reliability of these estimates is questionable, but looking at the correlation coefficient gives an indication of how well the data fit a linear estimation model. If the correlation coefficient (R) is close to 1 or -1 then the data fit better than if the R value is close to 0.

Table 14. Estimated production using linear estimation techniques for fresh fruit and vegetables requiring quarantine treatment, 1990 and 1995.

<u>JAMAICA</u>				
Yam				
Year	Production	R	Exported	R
1990	128,610 short tons	-.25	19,345,440 lbs	.93
1995	250,485 short tons		26,204,783 lbs	.93
Mango				
Year	Production	R	Exported	R
1990			1,671,027 lbs	.93
1995			2,263,447 lbs	.93
Okra				
Year	Production	R	Exported	R
1990	2,409 short tons	.82		
1995	2,898 short tons			

Table 15. Estimated production using linear estimation techniques for fresh fruit and vegetables requiring quarantine treatment, 1990 and 1995.

BELIZE

Mango

Year	Production	R	Exported	R
1990			6,000,000 lbs	.88
1995			10,015,959 lbs	.88

Table 16. Estimated production using linear estimation techniques for fresh fruit and vegetables requiring quarantine treatment, 1990 and 1995.

DOMINICAN REPUBLIC

Yam

Year	Production	R	Exported	R
1990	68.25 tons		65,155 lb	.44
1995	75.75	.89	86	.44

Mango

Year	Production	R	Exported	R
1990			857 MT	.98
1995			1,218 MT	

Okra

Year	Production	R	Exported	R
1990			2,798 MT	.32
1995			4,278 MT	.32

Table 17. Estimated production using linear estimation techniques for fresh fruit and vegetables requiring quarantine treatment, 1990 and 1995.

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**GUATEMALA**

**Mango**

Year	Production	R	Exported	R
1990			9,919 Kg	.73
1995			14,365 Kg	.73

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**Orange**

Year	Production	R	Exported	R
1990			166,158 Kg	.63
1995			249,530 Kg	.63

---

**Papaya**

Year	Production	R	Exported	R
1990			6,126 Kg	.74
1995			9,000 Kg	.74

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References

Cavin, George, William Bolton and Joseph Cummings. 1984 Report of U.S. AID Fact Finding Team on Ethylene Dibromide Quarantine Program Uses on Tropical Fruits in Caribbean Basin Initiative Countries.

Irradiation of food: what it means for the produce industry. Outlook. May-June 1984.

**A P P E N D I C E S**

Appendix I.

Fresh fruit and vegetables requiring treatment by ethylene dibromide (EDB) or methyl bromide (MB).

Country	Commodity	Treatment
Costa Rica	Yam	319.56-2M
	Grapefruit	319.56-2d or 2p
	Mango	319.56-2i
	Orange	319.56-2d or 2p
	Papaya	Section T102(e) of PPQ Treatment Manual
	Tangerine	319.56-2d or 2p
Belize	Yam	319.56-2M
	Grapefruit	319.56-2d or 2p
	Mango	319.56-2i
	Orange	319.56-2d or 2p
	Tangerine	319.56-2d or 2p
Barbados	Yam	319.56-2M
	Mango	319.56-2i
	Okra	319.56-2t
Dominican Republic	Yam	319.56-2M
	Grapes	
	Mango	319.56-2i
	Okra	319.56-2t
Guatemala	Chestnut	319.56-2b
	Yam	319.56-2M
	Grapefruit	319.56-2d or 2p
	Mango	319.56-2i
	Orange	319.56-2d or 2p
	Papaya	Section T102(e) of PPQ Treatment Manual
	Plum	319.56-2d or 2r or 2j
Tangerine	319.56-2d or 2p	

(Continued)

Appendix I. continued.

Country	Commodity	Treatment
Haiti	Apricot	319.56-2d
	Chestnut	319.56-2b
	Yam	319.56-2M
	Mango	319.56-2i
	Pomegranate	319.56-2d
	Okra	319.56-2t
Honduras	Yam	319.56-2M
	Grapefruit	319.56-2d or 2p
	Mango	319.56-2i
	Orange	319.56-2d or 2p
	Papaya	Section T102(e) of PPQ Treatment Manual
	Tangerine	319.56-2d or 2p
Jamaica	Chestnut	319.56-2b
	Yam	319.56-2M
	Mango	319.56-2i
	Okra	319.56-2t

LIST OF ADMISSIBLE FRUITS AND VEGETABLES FROM COSTA RICA

- A. The following items are admissible from all countries including Costa Rica into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands) without a USDA import permit.

Cannonball fruit  
Coconut (without husk or without "milk")  
Cyperus corm  
Lily bulb, edible  
Maguey  
Mushroom (fresh)  
Peanut (raw)  
St. Johnsbread  
Tamarind bean pod  
Truffle (fresh)  
Waterchestnut  
Walnut

In addition to the above items, other food materials including such items as dried beans and peas (except Vicia faba, Lens spp. and Lathyrus spp.), dried seeds, dried bamboo leaves, dried herbs, and similar commodities are admissible for food purposes and may be imported without permit from all sources into any port subject to inspection on arrival. Dried nuts without fleshy or leathery husk (except acorns, chestnuts, coconuts and macadamia nuts) are enterable for food purposes without permit at all ports, subject to inspection.

- B. The following items are admissible from Costa Rica with a USDA import permit issued in advance of shipment. Permits are only issued to importers and brokers residing in the United States.

1. Admissible into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands):

Items listed in paragraph A and:

Allium	Cucurbit**	Piper nigrum
Arrowroot	Culantro	(fresh peppercorn)
Asparagus	Dasheen	Radish (no tops)
Ayala	Durian	<u>Rubus</u> spp.
Banana (no permit required)	Ginger root	Rutabaga
Beet	Lettuce	Salsify
<u>Brassica oleracea</u>	Lime (sour)	Spinach
Carrot	Okra	Strawberry
Cassava	Palm heart	Swiss chard
Celery	Parsnip	Thyme
Chestnut (treatment required see 319.56-2b)	Pea	Turnip
Corn, green	Pineapple (except Hawaii)	Watercress
		Yam (treatment re- quired see 319.56-2m)

2. Admissible into North Atlantic ports - (Atlantic ports north of and including Baltimore; ports on the Great Lakes and the St. Lawrence Seaway; Canadian border ports east of and including North Dakota; Washington, DC (including Dulles) for air shipments):

Items listed in paragraph A & B-1 and:

Artichoke (Globe and Jerusalem)	Lemon
Bean, Lima	Mango (treatment required see 319.56-2i)
Cacao bean pod	Orange (treatment required see 319.56-2d or 2p)
Chickpea	Papaya (treatment required see Section T102(e) of the PPQ Treatment Manual)
Ethrog (treatment required see 319.56-2d or 2r)	Pigeon pea
Cucurbit	Tangerine (treatment required see 319.56-2d or 2p)
Grapefruit (treatment required see 319.56-2d or 2p)	Tomato*
Husk or mil tomato	

3. Admissible into South Atlantic Gulf ports - (Atlantic ports south of Baltimore; Gulf ports; Puerto Rico, and the Virgin Islands)

Items listed in paragraph A & B-1 and:

Artichoke (Jerusalem)  
Chayote

4. Admissible into North Pacific ports - (North Pacific ports do not include California).

Items listed in paragraph A & B-1 and:

Artichoke (Jerusalem)  
Cucurbit  
Tomato

5. Admissible into the U.S. Virgin Islands.

Items listed in paragraph A, B-1, B-3 and:

Chickpea

6. Admissible into Puerto Rico.

Items listed in paragraph A, B-1, B-3 and:

Chickpea

\* Movement through SAC ports, under Customs Bond, for PPQ clearance at NA ports authorized IF in closed van containers or on pallets completely enclosed by cardboard or plastic cover.

\*\* Commercial shipments only.

Frozen fruits and vegetables: Freezing is an acceptable treatment for most fruits and vegetables. The treatment involves an initial quickfreezing at sub-zero temperatures with subsequent storage and handling at not higher than 20°F at the time of arrival.

11-5-82

LIST OF ADMISSIBLE FRUITS AND VEGETABLES FROM BELIZE  
(Formerly British Honduras)

- A. The following items are admissible from all countries including Belize into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands) without a USDA import permit.

Cannonball fruit  
Coconut (without husk or without "milk")  
Cyperus corm  
Lily bulb, edible  
Maguey  
Mushroom (fresh)  
Peanut (raw)  
St. Johnsbread  
Tamarind bean pod  
Truffle (fresh)  
Waterchestnut  
Waternut

In addition to the above items, other food materials including such items as dried beans and peas (except Vicia faba, Lens spp. and Lathyrus spp.), dried seeds, dried bamboo leaves, dried herbs, and similar commodities are admissible for food purposes and may be imported without permit from all sources into any port subject to inspection on arrival. Dried nuts without fleshy or leathery husk (except acorns, chestnuts, coconuts and macadamia nuts) are enterable for food purposes without permit at all ports, subject to inspection.

- B. The following items are admissible from Belize with a USDA import permit issued in advance of shipment. Permits are only issued to importers and brokers residing in the United States.

1. Admissible into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands):

Acrocomia	Cucurbit	Pineapple (except Hawaii)
Allium	Dasheen	Radish (no tops)
Arrowroot	Durian	Roselle
Asparagus	Eggplant	<u>Rubus</u> spp.
Astrocaryum	Ginger root	Rutabaga
Ayale	Husk or mil tomato	Salsify
Banana (no permit required)	Lemon	Spinach
Beet	Lettuce	Strawberry
<u>Brassica oleracea</u>	Lime (sour)	Swiss chard
Breadfruit	Mangosteen	Thyme
Carrot	Marang	Tomato
Cassava	Okra	Turnip
Celery	Pacaya	Watercress
Ceriman	Palm heart	Yam (treatment required)
Chestnut (treatment required see 319.56-2b)	Papaya (except Hawaii)	
Chinese cabbage	Parsley	
<u>Cichorium</u>	Pea	
Corn, green	Pepper	

2. Admissible into North Atlantic ports - (Atlantic ports north of and including Baltimore; ports on the Great Lakes and the St. Lawrence Seaway; Canadian border ports east of and including North Dakota; Washington, DC (including Dulles) for air shipments):

Items listed in paragraph A & B-1 and:

Artichoke (Globe & Jerusalem)  
 Bean, pod or shelled  
 Cacao bean pod  
 Cactus fruit  
 Carambola  
 Culantro  
 Ethrog  
 Grapefruit (treatment required see 319.56-2d or 2p)  
 Mango (treatment required see 319.56-2i)  
 Orange (treatment required see 319.56-2d or 2p)  
 Pigeon pea  
 Sorrell  
 Tangerine (treatment required see 319.56-2d or 2p)

3. Admissible into South Atlantic Gulf ports - (Atlantic ports south of Baltimore; Gulf ports; Puerto Rico, and the Virgin Islands) and North Pacific ports - (Pacific ports north of California, including Alaska, Canadian border ports west of and including Montana, but not Hawaii).

Items listed in paragraph A & B-1 and:

Artichoke (Jerusalem and Globe)  
 Cacao bean pod  
 Culantro

Frozen fruits and vegetables: Freezing is an acceptable treatment for most fruits and vegetables. The treatment involves an initial quick-freezing at sub-zero temperatures with subsequent storage and handling at not higher than 20°F at the time of arrival.

LIST OF ADMISSIBLE FRUITS AND VEGETABLES FROM GUATEMALA

- A. The following items are admissible from all countries including Guatemala into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands) without a USDA import permit.

Cannonball fruit  
Coconut (without husk or without "milk")  
Cyperus corm  
Lily bulb, edible  
Maguey  
Mushroom (fresh)  
Peanut (raw)  
St. Johnsbread  
Tamarind bean pod  
Truffle (fresh)  
Waterchestnut  
Walnut

In addition to the above items, other food materials including such items as dried beans and peas (except Vicia faba, Lens spp. and Lathyrus spp.), dried seeds, dried bamboo leaves, dried herbs, and similar commodities are admissible for food purposes and may be imported without permit from all sources into any port subject to inspection on arrival. Dried nuts without fleshy or leathery husk (except acorns, chestnuts, coconuts and macadamia nuts) are enterable for food purposes without permit at all ports, subject to inspection.

- B. The following items are admissible from Guatemala with a USDA import permit issued in advance of shipment. Permits are only issued to importers and brokers residing in the United States.

1. Admissible into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands):

Items listed in paragraph A and:

Acrocomia	Dasheen
Allium	Durian
Arrowroot	Ginger root
Asparagus	Lettuce
Astrocaryum	Lime (sour)
Ayale	Marang
Banana (no permit required)	Okra
Bean, string (treatment required see Section T104 (a)(1) of the PPQ Treatment Manual)	Palm heart
Beet	Parsley
Brassica oleracea	Pea
Carrot	Pineapple (except Hawaii)
Cassava	Radish (no tops)
Celery	Roselle
Chestnut (treatment required see 319.56-2h)	<u>Rubus</u> spp.
Corn, green	Rutabaga
Cucurbit (commercial shipments only)	Salsify
	Spinach
	Strawberry
	Swiss chard

(cont'd)

Thyme  
Turnip  
Watercress  
Waterlily root  
Yam (treatment required see 319.56-2m)

2. Admissible into North Atlantic ports - (Atlantic ports north of and including Baltimore; ports on the Great Lakes and the St. Lawrence Seaway; Canadian border ports east of and including North Dakota; Washington, DC (including Dulles) for air shipments):

Items listed in paragraph A & B-1 and:

Artichoke (Globe & Jerusalem)	Orange (treatment required see 319.56-2d or 2p)
Cacao bean pod	Papaya (treatment required see section T102(e) of the PPQ Treatment Manual)
Curcubit	Pigeon pea
Ethrog (treatment required see 319.56-2d or 2p)	Plum (treatment required see 319.56-2d or 2r)
Grapefruit (treatment required see 319.56-2d or 2p)	Sorrel
Husk or mil tomato	Tangerine (treatment required see 319.56-2d or 2p)
Lemon	Tomato*
Mango (treatment required see 319.56-2i)	
Naranjilla	

3. Admissible into South Atlantic Gulf ports - (Atlantic ports south of Baltimore; Gulf ports; Puerto Rico, and the Virgin Islands)

Items listed in paragraph A & B-1 and:

Artichoke (Jerusalem)  
Chayote

4. Admissible into North Pacific ports - (North Pacific ports do not include California).

Items listed in paragraph A & B-1 and:

Artichoke (Jerusalem)  
Cucurbit  
Tomato

\*Movement through SAG ports, under Customs Bond, for PPQ Clearance at NA ports authorized IF in closed van containers or on pallets completely enclosed by cardboard or plastic cover.

Frozen fruits and vegetables: Freezing is an acceptable treatment for most fruits and vegetables. The treatment involves an initial quickfreezing at sub-zero temperatures with subsequent storage and handling at not higher than 20°F at the time of arrival.

LIST OF ADMISSIBLE FRUITS AND VEGETABLES FROM HONDURAS

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- A. The following items are admissible from all countries including Honduras into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands) without a USDA import permit.

Cannonball fruit  
 Coconut (without husk or without "milk")  
 Cyperus corm  
 Lily bulb, edible  
 Maguey  
 Mushroom (fresh)  
 Peanut (raw)  
 St. Johnsbread  
 Tamarind bean pod  
 Truffle (fresh)  
 Waterchestnut  
 Waternut

In addition to the above items, other food materials including such items as dried beans and peas (except Vicia faba, Lens spp. and Lathyrus spp.), dried seeds, dried bamboo leaves, dried herbs, and similar commodities are admissible for food purposes and may be imported without permit from all sources into any port subject to inspection on arrival. Dried nuts without fleshy or leathery husk (except acorns, chestnuts, coconuts and macadamia nuts) are enterable for food purposes without permit at all ports, subject to inspection.

- B. The following items are admissible from Honduras with a USDA import permit issued in advance of shipment. Permits are only issued to importers and brokers residing in the United States.

- 1. Admissible into the entire United States (includes Continental United States, Guam, Alaska, Hawaii, Puerto Rico, and the Virgin Islands):

Items listed in paragraph A and:

Acrocomia	Lettuce
Allium	Lime (sour)
Arrowroot	Marang
Artocarpus	Okra
Asparagus	Palm heart
Astrocaryum	Pea
Ayale	Pineapple (except Hawaii)
Banana (no permit required)	Roselle
Beet	<u>Rubus spp.</u>
Brassica oleracea	Rutabaga
Carrot	Salsify
Celery	Spinach
Chestnut (treatment required see 319.56-2b)	Strawberry
Corn, green	Swiss chard
Cucurbit (commercial shipments only)	Thyme
Dasheen	Turnip
Durian	Watercress
Ginger root	Yam (treatment required see 319.56-2(m)).

HONDURAS

Reproduced at U.S. GOVERNMENT EXPENSE

- 2. Admissible into North Atlantic ports - (Atlantic ports north of and including Baltimore; ports on the Great Lakes and the St. Lawrence Seaway; Canadian border ports east of and including North Dakota; Washington, DC (including Dulles) for air shipments):

Items listed in paragraph A & B-1 and:

- |  |  |
|--|--|
| Artichoke (Globe and Jerusalem)                          | Orange (treatment required see 319.56-2(d) or 2(p)).                         |
| Cacao bean pod   | Papaya (treatment required see Section T102(e) of the PPQ Treatment Manual). |
| Chickpea   | Pigeon pea   |
| Cucurbit   | Sorrel   |
| Ethrog (treatment required see 319.56-2(d) or 2(p)).     | Tangerine (treatment required see 319.56-2(d) or 2(p)).                      |
| Grapefruit (treatment required see 319.56-2(d) or 2(p)). | Tomato*  |
| Husk or mil tomato                                       |  |
| Lemon  |  |
| Mango (treatment required see 319.56-2(i)).              |  |

- 3. Admissible into South Atlantic Gulf ports - (Atlantic ports south of Baltimore; Gulf ports; Puerto Rico, and the Virgin Islands)

Items listed in paragraph A & B-1 and:

- Artichoke (Jerusalem)
- Chayote

- 4. Admissible into North Pacific ports - (North Pacific ports do not include California).

Items listed in paragraph A & B-1 and:

- Artichoke (Jerusalem)
- Cucurbits
- Tomato

- 5. Admissible into Puerto Rico and the Virgin Islands:

Items listed in paragraph A, B-1 & B-3 and:

- Chickpea

\*Movement through South Atlantic Gulf ports, under Customs Bond, for PPQ clearance at North Atlantic ports authorized IF in closed van containers or on pallets completely enclosed by cardboard or plastic cover.

Frozen fruits and vegetables: Freezing is an acceptable treatment for most fruits and vegetables. The treatment involves an initial quickfreezing at sub-zero temperatures with subsequent storage and handling at not higher than 20°F at the time of arrival.

Fruits and Vegetables Approved for Entry from Jamaica

Admissible at all  $\frac{1}{2}$  ports subject to permit issued in advance of shipment:

Allium	Cinnamomum leaves	Parsley
Arrowhead	Corn, green	Parsnip
Arrowroot	Cucurbit	Pepper
Asparagus	Culantro	Pineapple
Banana (no permit required)	Dasheen	(except Hawaii)
Basil leaves	Dill	Radish
Beet	Durian	Rhubarb
<u>Brassica oleracea</u>	Eggplant	Rutabaga
Breadfruit	Ginger root	Spinach
Calathea	Lemon	Strawberry
Canna(edulis)	Lettuce	Swiss chard
Carrot	Lime (sour)	Thyme
Cassava	Mangosteen	Tomato
Celery	Marjoram	Turnip
Chestnut $\frac{5}{}$	Mint	Watercress
Chrysanthemum greens	Oregano	Waterlily root
Cichorium	Palm heart	Yam bean root
	Papaya	Yam $\frac{2}{}$
	(except Hawaii)	

Admissible at all  $\frac{1}{2}$  ports; no permits required:

Cannonball fruit	Mushroom (fresh or dried)	Tamarind bean pod
Cyperus corn	Peanut (raw or roasted)	Truffle (fresh or dried)
Lily bulb, edible	St. Johnsbread	Waterchestnut
Maguey		Walnut

Coconut without husk or without milk (water)

In addition to the foregoing, most other agricultural products for food purposes, such as nuts, dried beans and peas, seeds, dried bamboo leaves, dried herbs, and similar commodities may be imported without permit.

Admissible at North Atlantic ports  $\frac{1}{2}$  subject to permit issued in advance of shipment: (North Atlantic ports include Atlantic ports north of and including Baltimore; ports on the Great Lakes and St. Lawrence Seaway; Canadian border ports east of and including North Dakota; and Washington, D.C., for air shipments.)

Artichoke (globe and Jerusalem)	Dasheen greens	Olra
Avocado	Genip	Pea
Bean, pod or shelled	Kudzu	Pigeon pea
Cacao bean pod	Litchi	Pinguin
Cactus fruit	Longan	Pokeweed greens
Citrus	Mango $\frac{2}{}$	Roselle
		Sorrel
		Topopo

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JAMAICA

Admissible at South Atlantic and Gulf ports <sup>1/</sup> :

Artichoke (Globe and Jerusalem)	Cacao bean pod Citrus	Kudzu Okra <sup>4/</sup>
Avocado	Genip	Pea

Admissible at North Pacific ports <sup>1/</sup> : (North Pacific ports do not include California.)

Artichoke (Globe and Jerusalem)	Cacao bean pod Cactus fruit	Kudzu Pea
Avocado	Citrus	

Admissible at Puerto Rico and U.S. Virgin Islands ports with exceptions as noted:

Apio  
 Avocado: Approved from all of West Indies, into Virgin Islands.  
 Bean, pod or shelled  
 Beet  
 Carrot  
 Culantro  
 Genip or quenepa (Melicocca bijura)  
 Leren (Calathea)  
 Mango: Approved for entry into the Virgin Islands only.  
 Okra: Approved for entry into the Virgin Islands only.  
 Origanum, Majorana hortensis (sweet majoram)  
 Pea  
 Pigeon pea  
 Sapote (Calocarpum sapota): Approved for entry into Virgin Islands only.  
 Sweetpotato: Enterable from all of West Indies into U.S. Virgin Islands without treatment. Enterable from Dominican Republic into Puerto Rico without treatment; however, T104 required when imported into Puerto Rico from other West Indies sources.  
 Thyme  
 Topepo  
 Yam - (treatment required for Puerto Rico)

Frozen fruits and vegetables: Freezing is an acceptable treatment for most fruits and vegetables. The treatment involves an initial quickfreezing at subzero temperatures with subsequent storage and handling at not high than 20° F. (See Section 319.56-2c of the Quarantine.) Permits are required.

<sup>1/</sup> Ports where Agricultural Quarantine Inspectors are located.  
<sup>2/</sup> See 319.56-2m.                      <sup>4/</sup> See 319.56-2t.  
<sup>3/</sup> See 319.56-2i.                      <sup>5/</sup> See 319.56-2b

Appendix II.

Report on Visit to PINDECO - Sr. Valentir Quiros

PINDECO (Del Monte) - The company has already been adversely affected by the ban on the fumigant EDB. EDB was used as a soil fumigant on the company's pineapple fields, but use was discontinued several months ago, when the possible hazards of this chemical were first made public. According to Mr. Quiros, this has significantly raised the cost of pineapple production.

More importantly though, has been the revision of the company's plans to begin producing papaya on a large scale. PINDECO had hoped to export 1,000,000 boxes (10 lbs. each) of papaya to the United States per year. due to the EDB ban, the scale of the firm's papaya project has been greatly reduced. Sr. Quiros said that perhaps 100,000 boxes of papaya per year could be exported to Europe. PINDECO has conducted numerous tests on papaya. None of these tests, which involved hundreds of papayas, has shown the presence of mediterranean or anastrepha fruit fly.

The company has been experimenting with hot water treatments on papaya with good results. And the company's branch in Hawaii has also been experimenting with alternative treatments, such as hot water. However, a treatment approved for Hawaii may not be approved for Costa Rica, despite the absence of the fruit flies in papaya from here.

The company's plans to commercialize mangoes in the U.S. has also been affected. Last year the firm began to buy mangoes from local producers and to export them to European markets with the intention of selling mangoes to the U.S. in the future. Due to the EDB ban, the company has had to reassess its plans and curtail its mango exports. This will affect the local producers of mangoes more than the PINDECO company, since the firm itself is not involved in the production of mango, but only the commercialization of this tropical fruit.



1 Sept - 84

# Effect of EDB Elimination on Exports

Without alternatives, eliminating EDB will halt exports - or stop export development - from Guatemala the following. We consider only export quality fruit that could be packed and shipped with existing financing and air/sea schedules.

mango - 7,000 tons from 3,500 acres, now

tomato - had 400 acres in 74-75 for export; could be 2,000 acres or 20,000 tons.

papaya - not developed, but could have 500 acres = 1,500 tons to export within 3 years

orange - 400 acres Valencia, 1,200 tons

Bruce C. Michener

*Bruce C. Michener*  
marketing

**COSTA CARIBE, S.A.**

AVENIDA REFORMA 8 60, ZONA 9, OFICINA 1104, TORRE I, GUATEMALA, CENTRO AMERICA  
TELEFONOS 311471, 319067, 325506, 325507. TELEX 5115 INVERK GU

42 1. BELOW ARE RESPONSES TO ITEMS IN PARA. 2 OF REF. E.  
43 -

44 --- GENERAL ---

45 2. POST ASSESSMENT OF IMPACT: THE IMMEDIATE IMPACT  
46 OF A BAN ON THE USE OF EDF TO FUMIGATE FRESH FRUIT WOULD  
47 BE RELATIVELY SMALL IN DOLLAR-TERMS. OF FRUITS  
48 EXPORTED FROM JAMAICA TO THE U.S., ONLY MANGOES REQUIRE  
49 TREATMENT. JAMAICA SHIPPED LESS THAN TEN THOUSAND  
50 KILOS OF MANGOES TO THE U.S. IN 1983. JAMAICA'S EARNINGS  
51 FROM FRESH FRUIT EXPORTS ARE ON THE ORDER OF SIX TO SEVEN  
52 PERCENT OF TOTAL EXPORT EARNINGS FROM AGRICULTURAL  
53 PRODUCTS AND REPRESENT LESS THAN .05 PERCENT OF GDP.  
54 THE SMALL SIZE OF THESE EXPORTS, HOWEVER, REFLECT IN  
55 GOOD PART THE DETERIORATED STATE OF ORCHARD AGRICULTURE.  
56 THERE IS GOOD GROWTH POTENTIAL FOR PRODUCTION OF FRESH  
57 FRUIT. NEW PROGRAMS -- AGRO-21 AND CEI -- WHICH WILL  
58 HELP REHABILITATE ORCHARDS HAVE JUST BEEN PUT IN PLACE.  
59 SUCH PROGRAMS WILL INCREASE PRODUCTION SIGNIFICANTLY AND  
60 ARE IMPORTANT TO JAMAICA'S EFFORT TO DIVERSIFY EXPORT  
EARNINGS TO ACHIEVE SUSTAINABLE ECONOMIC GROWTH. AS

LONG AS U.S. REGULATIONS DO NOT REQUIRE TREATMENT OF JAMAICAN CITRUS AND PAPAYA IMPORTS, THE IMPACT ON AN EDB BAN WILL BE NEGLIGIBLE FOR THESE FRUITS. HOWEVER, FOR MANGOES THE CONSEQUENCES OF A BAN COULD BE GRAVE. JAMAICAN MANGOES ARE FUMIGATED IN THE UNITED STATES. SHOULD A SUBSTITUTE FOR EDB BE UNAVAILABLE AT U.S. FUMIGATION STATIONS WHERE THE MANGOES ARE IMPORTED (NORTH ATLANTIC PORTS) THESE IMPORTS WOULD BE ELIMINATED. ALSO, SEE REF B.

--- EDB USAGE ---

3. JAMAICA DOES NOT FUMIGATE ITS EXPORTS OF FRESH FRUIT TO THE UNITED STATES. INFORMATION OBTAINED SUBSEQUENT TO REF B INDICATES THAT USDA REGULATIONS DO NOT REQUIRE FUMIGATION AT ANY PORT OF ENTRANCE FOR CITRUS AND PAPAYA IMPORTS FROM JAMAICA INTO THE U.S. THEREFORE, THE PROBLEM CENTERS ON MANGOES WHICH ARE FUMIGATED AT STATIONS IN THE U.S. USING EDB. POST UNDERSTANDS THAT THERE ARE NO SUBSTITUTES FOR THE USE OF EDB IN FUMIGATING MANGOES.

--- PLANNED EXPANSION UNDER CBI ---

4. EXPANSION TARGETS TO BE ACHIEVED FOUR YEARS AS FOLLOWS:

ITEM	CURRENT ACREAGE	EXPANSION	TOTAL
(A) CITRUS	35,000	6,000	41,000
(B) PAPAYA	300	3,000	3,300
(C) MANGO (PURE STAND)	100	3,000	3,100

THESE TARGETS ARE AN INTEGRAL PART OF JAMAICA'S AGRO-21 PROGRAM WHICH IS BEING ASSISTED BY AID AND OTHER DONORS TO REVITALIZE AGRICULTURE AS A MAJOR FOREIGN EXCHANGE EARNER AND SOURCE OF EMPLOYMENT. THESE PLANS, ALTHOUGH NASCENT, ARE TO MOVE ALONG SWIFTLY. FOR EXAMPLE, 1,000 ACRES OF MANGOES ARE TO BE PUT IN THIS YEAR AND THE GOJ HAS JUST RECEIVED J\$9.5 MILLION IN EEC AID FOR A CITRUS DEVELOPMENT PROJECT TO ASSIST UP TO 300 FARMERS TO REHABILITATE ABOUT 4,000 ACRES OF CITRUS ORCHARDS. PLANS ANTICIPATE TAKING ADVANTAGE OF INCREASED PRODUCTION AND IMPROVED ACCESS UNDER CEI TO INCREASE U.S. SALES (MANGOES) AND DEVELOPMENT OF NEW MARKETS FOR CERTAIN CITRUS FRUITS NOT NOW EXPORTED TO THE U.S.

5. QUANTITY OF EXPORTS - 1982:

	---QUANTITY---		---AMOUNT---	
	THOUS. KILOS	PCT. DISTR.	THOUS. J\$'S	PCT. DISTR.
A. CITRUS				
UNITED KINGDOM	997.2	37.9	1,002.8	42.2
NETHERLANDS	498.5	19.9	463.6	19.5
BARBADOS	481.5	18.2	443.7	18.7
USA (UGLI FRUIT)	329.3	14.8	254.6	10.7
OTHER	267.8	10.2	208.9	8.8

CANADA	123.9	35.3	161.3	29.2
BERMUDA	121.8	34.7	271.1	44.1
UNITED KINGDOM	74.7	21.3	75.6	13.7
UNITED STATES	24.1	6.9	29.0	5.3
CAYMAN ISLANDS	6.4	1.5	14.6	2.6
- TOTAL	350.9	100.0	551.6	100.0

C. 1982 DATA FOR PAPAYA WERE NOT PUBLISHED SEPARATELY.

UNPUBLISHED 1983 DATA SUPPLIED BY THE MINISTRY OF AGRICULTURE INDICATE THAT TOTAL PRODUCTION OF MANGOES WAS 325.0 THOUSAND KILOS, 9.4 THOUSAND KILOS OR 2.9 PERCENT WENT TO THE UNITED STATES. NEARLY ALL OF THIS AMOUNT WAS SHIPPED IN JUNK. PAPAYA PRODUCTION FOR 1983 WAS 11,634 LBS NONE OF WHICH WAS SENT TO THE U.S. DATA FOR 1983 ARE NOT AVAILABLE FOR CITRUS. COMBINED EARNINGS FROM TOTAL EXPORTS OF CITRUS, MANGOES AND PAPAYA FOR 1982 WAS ON THE ORDER OF 0.05 PERCENT OF GDP.

6. FRUIT FLY INFESTATION: CARIBBEAN FRUIT FLY OR ANASTROPHA SPECIES.

7. MODE OF TRANSPORT TO U.S.: AIR

8. FUMIGATION: FUMIGATION OF MANGOES IS CARRIED OUT IN U.S. SEE PARA. 3.

9. TOLERANCE LEVEL: NONE.

10. ALTERNATIVES TO EDE: SEE PARAS. 3 AND 11.

11. QUARANTINE METHODS AND ALTERNATIVES: AS EXPLAINED ABOVE JAMAICA HAS NO QUARANTINE METHODS AND COULD NOT EASILY AFFORD TO IMPLEMENT ANY. JAMAICA'S EFFORTS TO EXPAND EXPORTS IN THE U.S. MARKET ARE STILL IN THE BEGINNING STAGE; THE EXISTING MARKET IS SMALL, AND AN EDE BAN WOULD AFFECT ONLY MANGOES. THUS INITIAL EARNINGS FROM EXPORTS OF FRESH FRUITS TO THE U.S. COULD NOT BE EXPECTED TO COVER ADDITIONAL COSTS OF IMPLEMENTING QUARANTINE PROGRAMS. ALSO THE GOJ MUST KEEP TO TIGHT DOMESTIC AND FOREIGN EXCHANGE BUDGETS AS IT PURSUES AN IMPORT SUBSTITUTION POLICY. HOWEVER, WITH CMI AND A NUMBER OF DONOR PROGRAMS NOW IN PLACE, THERE EXIST UNIQUE AND SIGNIFICANT OPPORTUNITIES FOR JAMAICA TO RESCUE ITS ORCHARD AGRICULTURE FROM THE COLLAPSE IT HAS SUFFERED FOR THE LAST DECADE.

12. PESTICIDE QUARANTINE RESEARCH PROGRAM: JAMAICA HAD SUCH A PROGRAM IN THE EARLY 1970'S BUT HAD TO TERMINATE IT IN 1975 DUE TO LACK OF FUNDS. THE PROGRAM CARRIED OUT POPULATION, BIOLOGICAL AND ECOLOGICAL STUDIES ON THE CARIBBEAN FRUIT FLY.

13. ASSISTANCE NEEDED TO CARRY OUT A PROGRAM: MINISTRY OF AGRICULTURE OFFICIALS WOULD LIKE TO REINSTITUTE A PESTICIDE QUARANTINE RESEARCH PROGRAM. THEY ARE PARTICULARLY INTERESTED IN RESEARCH ON THE FRUIT FLY AND SCREW WORM. THEY STILL HAVE THE OLD FACILITIES BUT THEY WOULD HAVE TO BE UPGRADED. GOJ AGRICULTURAL

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OFFICIALS WOULD LIKE ASSISTANCE WITH THIS UPGRADING,  
AND IN ESTABLISHING A STERILIZATION PROGRAM SIMILAR  
TO MEXICO'S WHICH USES GAMMA RADIATION. ASSISTANCE  
WOULD INCLUDE FINANCIAL AND TECHNICAL SUPPORT (ONE OR  
TWO PEOPLE) AND THE PERMANENT STATIONING OF A FULL-TIME  
USDA INSPECTOR IN JAMAICA.

14. ACTION REQUESTED: ADVISE IF A BAN ON EDR WILL  
IMPACT USDA NON-REQUIREMENT OF FUMIGATION FOR CITRUS  
AND PAPAYA OR IF THERE ARE ANY PLANS TO CHANGE THIS  
REGULATION.

List of people and agencies contacted.

Jamaica

- 1) Ralph Iwamoto, Jr. Fumigation and Certification Specialist, USDA/APHIS/PPQ
- 2) Dr. Jayasingh Ministry of Agriculture, Marketing and Credit Division
- 3) Richard Rogers Director of Agro Business Processing
- 4) Richard J. Mangrich Assistant Agricultural Development Officer, US AID

Belize

- 1) Fred Mangum Deputy Director, Planning and Analysis Staff, USDA/FAS
- 2) Charles Jenkins Agriculture Development Officer, US AID/Belize
- 3) Carlos Santos Belize Government, Planning Unit, Belmopan

Guatemala

- 1) George Like Office of Rural Development, US AID
- 2) Ingeniero Schell Banco de Guatemala, Dept. de Investigaciones Agropecuarias e Industriales
- 3) Ingeniero Benitey Jefe de Sanidad Vegetal
- 4) Ing. Ron Estrada Comision Moscamed
- 5) Ing. J.F. Avila Comision de Exportacion del Fruta No Tradicionales
- 6) Lic. M. Von-Hequen Secretaria de Planificacion Economica
- 7) Robert Anlauf and Jorge Aquirre American Embassy, Guatemala

Costa Rica

- 1) Max Bowser United States Embassy in Costa Rica Agricultural Attache of the USDA Sub-Director of the Agency for International Development
- 2) Ministry of Agriculture (MAG) Office of Agricultural Marketing Information Office of Economic Statistics Vegetable Sanitation Department
- 3) Chamber of Agriculture
- 4) Executive Secretariat of the Agricultural and Renewable Resources Planification Department (SEPSA)
- 5) Agro-Industry Development Corporation (DAISA)
- 6) Costa Rican Promotion Center for Exportation (CENPRO)
- 7) Costa Rican Development Corporation (CODESA)
- 8) Pineapple Development Corporation (PINDECO). Subsidiary of Del Monte
- 9) Cooperative Marketing Agency of Costa Rica (ENCOOPER)
- 10) Central Bank of Costa Rica Department of Statistics Bank Library
- 11) Agricultural Census Bureau
- 12) Talamanca Agricultural Cooperative

Dominican Republic

- 1) U.S. Embassy
- 2) Cedopec
- 3) Ferdando Rodriguez Caribbean Area Director, USDA/APHIS/PPQ

Washington D.C.

- 1) Jim Sayre International Economist, Trade and Economic Information Division, USDA/FAS
- 2) Doug Edwards Agricultural Market Service, USDA