Table B-3 Trends in Area under Cultivation, Production and Unit Yield in Mexico

	1971	1972	1973	1974	1975
Area (ha)	17,693	17,231	18,030	18,532	12,000
Yield (ton/ha)	9.900	12.008	11.812	11.666	12.100
Production (ton)	175,155	206,913	212,982	216,195	145,200
Exports (ton)	92,514	84,352	87,295	93,020	74,223
Exports/Production (%)	52.8	40.8	41.0	43.0	51.1
Domestic consump. (ton)	82,641	122,561	125,687	123,175	70,977
Consumption (kg per capita)	1.654	2.369	2.346	2.220	1.235

Source: SAG-DGEA, Consumos Aparentes

Table B-4 Trends in Main Melon Producing States of Brazil

(million fruits)

Main producing states	1975	1976	1977	1978	1979	1980
Pernambuco	2.1	4.1	3.8	10.3	7.8	12.9
Bahia	0.1	0.1	0.6	0.8	5.8	6.3
São Paulo	2.9	3.1	3.3	1.9	4.5	4.7
Pará	1.0	1.1	1.4	3.5	3.8	4.5
Rio Grande Do Sul	3.1	3.5	5.0	4.5	2.9	2.9
Rio Grande Do Norte	0.2	0.2	0.2	0.2	1.1	4.1
Others	1.3	0.6	0.8	0.8	1.9	2.5
Total	0.7	12.7	15.1	22.0	27.8	37.9
Area (1,000 ha)	4.1	5.9	4.3	4.3	5.2	5.7
Trends in Unit Yield (fruits/ha)						
Pernambuco	4,557	6,512	6,466	9,854	8,694	9,547
Bahia	1,176	1,155	4,286	3,762	6,981	7,180
São Paulo	4,111	4,682	5,744	8,572	11,532	6,607
Pará	3,279	3,221	3,350	9,355	5,014	8,985
Rio Grande Do Sul	2,782	2,904	3,024	2,891	2,384	2,419
Rio Grande Do Norte	1,328	1,279	1,314	1,521	7,082	11,480

Source: IBGE

Table B-5 Melon: Production in Brazil (1980)

Order	State	Area (ha)	Output (1,000 fruits)	Unit yield (fruits/ha)	(%)
1	Pernambuco	1,356	12,946	9,547	34.15
2	Bahia	872	6,261	7,180	16.52
3	São Paulo	369	4,652	12,607	12.27
4	Pará	499	4,484	8,985	11.83
5	Rio Grande do Sul	1,199	2,901	2,419	7.65
6	Rio Grande Do Norte	358	4,112	11,486	10.85
7	Minas Gerais	163	1,548	9,496	4.08
8	Amazonas	160	416	2,600	1.10
9	Maranhão	270	114	422	0.30
10	Parana	29	64	2,206	0.17
11	Espirito Santo	21	191	9,095	0.50
12	Rio de Janeiro	45	54	1,200	0.14
13	Goias	35	60	1,714	0.16
14	Piaui	228	36	157	0.09
15	Santa Catarina	40	32	800	0.08
16	Mato Grosso Do Sul	20	25	1,250	0.07
17	Ceará	7	14	2,000	0.04
	Total	5,671	37,910	6,684	100.00

Source: IBGE

4. Trends in Japan

According to the data of the Statistics and Information Department of the Ministry of Agriculture, Forestry and Fisheries, melons produced in Japan are classified into two categories: those produced in hothouses, and those produced in the open. These categories are comprised of the following species, but only high-class melons have been cultivated since 1977.

	1965 - 1976	1977 - 1980
Melons in the open	Prince Melon Oriental Melon	Melons other than Earl's Favorite
Melons in hothouses	Melons other than the above	Earl's Favorite

As shown in Tables B-6 and B-7, the considerable increase in production of high-class melons since 1977 reflects the consumers strong demand for high-class melons.

Table B-6 Melons: Cultivated Area, Production (grown in the open) in Japan

(ha, tons)

	Area	Production		Area	Production
1965	7,600	95,300	1973	12,700	225,900
1966	8,190	108,100	1974	11,800	211,500
1967	8,690	125,400	1975	11,500	216,000
1968	8,910	137,900	1976	11,500	213,700
1969	9,650	148,800	1977	12,200	247,600
1970	11,000	172,500	1978	12,700	265,700
1971	11,900	201,400	1979	12,800	266,400
1972	12,500	222,500	1980	13,100	263,900

Source: Statistics and Information Department, Ministry of Agriculture, Forestry and Fisheries, Statistical Yearbook

Table B-7 Melons: Planted Area, Production (hothouse fruit) in Japan

(ha, tons)

	Area	Production		Area	Production
1965	597	11,600	1973	736	22,600
1966	682	14,200	1974	809	24,500
1967	818	18,400	1975	862	26,300
1968	908	20,800	1976	867	26,700
1969	964	23,200	1977	979	29,900
1970	581	17,700	1978	1,070	32,900
1971	623	19,200	1979	1,170	36,100
1972	647	20,100	1980	1,210	34,900

Source: Same as Table B-6

C. TRENDS IN TRADE

Since no overall data on the world trade in melons are available, trends in exports or imports are discussed on the basis of partial data only.

I. Export Trends

1. Spain

According to FAO data, Spain is the world's third largest producer, exporting melons to the countries shown in the following table. The proportion of exports in total world production is about 8%, and the exports to the United Kingdom account for 50 - 60% of the total Spanish exports.

Table C-1 Exports by Country of Destination

(1,000 tons)

	1978	1979	1980
Belgium	0.7	1.4	1.6
France	3.0	4.1	0.9
Germany, FR	7.6	9.5	18.7
Netherlands	5.4	6.7	8.2
UK	28.9	36.4	34.2
Sweden	1.6	1.9	1.6
Other countries	2.5	2.0	2.5
Total	49.7	62.0	67.7
Exports/all production (FAO)	7.7%	8.2%	8.2%
All production	641.0	757.0	825.0

Source: Commonwealth Secretariat Publications

2. Brazil

Melon exports from Brazil in 1981 are shown in Table C-2. Since the further the commodity is transported, the more the FOB price has to be lowered, and the fall in producers' income will discourage them to export.

Table C-2 Melon Exports by Country of Destination (1981)

	Export (tons)	FOB price average (US$/kg)	Value (US$1,000)
Argentina	1,932.4	0.75	1,445.1
UK	503.0	0.62	313.5
Germany, FR	82.0	0.75	61.7
Netherlands	349.0	0.65	225.8
Canada	22.1	0.52	11.5
Other countries (7)	106.5	-	62.9
Total	2,995.0	0.71	2,120.5
Export Ports			
Uruguaiana (RS)	1,931.3	0.75	1,444.3
Fortaleza (Ceara)	755.9	0.66	496.5
Others	307.8	-	179.7

Source: CACEX

II. Import Trends

1. The United States

The United States is the world's second largest melon producer, and annually exports 50,000-60,000 tons to Canada. It has also imported around 200,000 tons since 1978, as shown in the following table.

Table C-3 U.S. Melon Imports

(tons)

1968	81,926	1973	163,819	1978	201,372
1969	115,859	1974	173,718	1979	213,785
1970	138,685	1975	139,898	1980	190,895
1971	146,928	1976	164,405		
1972	154,381	1977	178,823		

Source: USDA

2. The United Kingdom

Looking at the data for 1980 (the only data available), it is noteworthy that the United Kingdom imports melons from such a distant region as Colombia, as well as importing from the neighboring countries.

Table C-4 Melon Imports into the United Kingdom (1980)

(1,000 tons)

Colombia	Netherlands	Greece	Italy	Spain	Israel	Other countries	Total
1.4	2.0	3.6	1.7	42.3	7.3	5.4	63.7

Source: Commonwealth Secretariat Publications

3. Canada

Of Canada's melon imports, 80-90% come from the United States.

Table C-5 Canadian Melon Imports

(tons)

	1979	1980	1981
Mexico	6,386	8,957	5,855
USA	48,164	53,829	63,979
Other countries	176	302	368
Total	54,726	63,088	70,202

Source: Commonwealth Secretariat Publications

4. Brazil

Although Brazil exports melons, she also imports a small quantity.

Brazilian Musk Melon Imports (1980)

Imports (tons)	265.0
Average unit price of imports (US$/kg)	0.27
Import sum (FOB US$1,000)	71.3

5. Japan

As shown in Table C-6 of Japan's melon imports, a major proportion of imports are from the United States, followed by Mexico, both of which are a considerable distance from Japan (Melons were not treated as an independent item by Japanese Customs until 1976).

Table C-6 Japanese Melon Imports (including Oriental melons)

		USA	Mexico	New Zealand	Bahamas	New Caledonia	Cook Is.	Iran	Total
1976	(kg)	1,680,717	353,936	1,063	-	-	-	-	2,035,716
	(¥1,000)	301,358	124,854	872	-	-	-	-	427,084
1977	(kg)	1,846,329	553,186	22,929	-	3,854	186	90	2,426,574
	(¥1,000)	344,335	173,483	16,126	-	2,131	136	167	536,378
1978	(kg)	4,206,840	1,002,917	73,558	1,002	1,200	-	-	5,285,517
	(¥1,000)	569,028	260,412	48,830	327	657	-	-	879,254
1979	(kg)	3,874,455	1,104,020	39,220	-	-	-	-	5,017,695
	(¥1,000)	635,221	328,899	23,770	-	-	-	-	987,890
1980	(kg)	4,225,196	858,635	88,622	-	-	-	-	5,172,453
	(¥1,000)	744,227	309,959	63,034	-	-	-	-	1,117,220
1981	(kg)	1,362,599	1,091,184	132,144	-	-	-	-	2,585,927
	(¥1,000)	301,811	351,899	98,659	-	-	-	-	752,369

Source: Ministry of Finance, Government of Japan

Tables C-7 and C-8 show the amount of melons imported by air into Japan. Since imports by air have changed little despite the increase in total imports, the need for them appears to be supported by a constant demand. Looked at on a seasonal basis, they are mainly imported from January to March.

Table C-7 Comparison of Japanese Imports by Sea and by Air

(kg)

	1976	1977	1978	1979	1980	1981
By air	161,473	164,460	132,349	181,682	168,278	168,110
(%)	(7.93)	(6.78)	(2.50)	(3.62)	(3.25)	(6.50)
By sea	1,874,243	2,262,114	5,153,168	4,836,013	4,175,000	2,417,817*
Total	2,035,716	2,426,574	5,285,517	5,017,695	5,172,453	2,585,927

* Decrease due Medfly epidemic in the United States

Table C-8 Melons Appearing on the Japanese Market by Air

(kg)

	1976	1977	1978	1979	1980	1981
January	27,816	15,710	12,796	15,068	80,353	37,484
February	13,909	8,825	65,457	47,719	60,347	74,023
March	37,326	20,984	19,497	39,202	17,362	50,823
April	29,634	5,122	6,248	45,757	1,312	679
May	5,044	7,164	2,887	123	507	1,872
June	7,986	16,546	970	11,745	569	311
July	2,620	12,814	10,146	7,078	2,332	1,452
August	18,636	33,924	6,059	8,767	1,524	1,466
September	2,888	6,248	1,687	2,996	3,077	-
October	2,891	13,823	164	1,339	697	-
November	8,513	16,516	65	627	173	-
December	4,210	6,784	6,373	1,261	25	-
Total	161,473	164,460	132,349	181,682	168,278	168,110

Source: Japan Fresh Fruit and Vegetable Imports Managerial Association

D. CONSUMPTION TRENDS

Concerning trends in melon consumption, the only data available is that on US consumption per capita available as shown in Table D-1.

Table D-1 Cantaloup Melon per Capita Consumption in USA

(lb)

	Water-melon	Cantaloup melon	Cantaloup/ total (%)	Total
1966	14.8	7.3	33.0	22.1
1967	14.2	8.1	36.3	22.3
1968	14.4	8.6	37.4	23.0
1969	13.8	9.1	39.7	22.9
1970	14.4	8.9	39.2	23.3
1971	14.1	8.5	37.6	22.6
1972	13.2	8.7	39.7	21.9
1973	13.8	8.0	36.7	21.8
1974	11.9	7.0	37.0	18.9
1975	12.2	6.9	36.1	19.1
1976	13.5	7.0	34.1	20.5
1977	13.5	7.7	36.3	21.2
1978	13.2	9.1	40.8	22.3
1979	12.5	8.9	41.6	21.4
1980	11.4	7.2	38.7	18.6

Source: USDA

According to the above table, the consumption of watermelon tended to decline, and that of cantaloup melon leveled off. Total consumption is, at present, steady.

E. CONCLUDING REMARKS

In regard to future world demand for melons judged from the very limited data available, anxieties about the long-term maintenance of quality seem to be gradually being eliminated by the developments in transport technology. Many developed countries cannot always adequately meet their domestic demand by domestic production (e.g., the United Kingdom and Canada, and occasionally the United States). If the problem of transportation costs can be solved, there would seem to be a possibility of further increases in exports by developing new varieties of melons which suit the tastes of consumers or by improving the quality of existing varieties.

Appendix Table 1 Melon (including Cantaloupes): Area, Yield and Production in the World

		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
World	(A)	321	311	309	310	347	327	323	328	320	322	328	437	437	454	482	486	481
	(B)	12,647	12,256	13,053	12,004	12,375	12,538	12,733	13,238	13,358	13,496	13,575	13,016	12,969	12,910	13,476	13,427	13,781
	(C)	3,931	3,783	4,044	4,164	4,051	4,048	4,179	4,404	4,281	4,344	4,450	5,628	5,669	5,864	6,502	6,522	6,625
Developed	(A)	145	154	142	171	167	170	164	167	165	149	150	158	154	164	168	167	168
	(B)	13,144	12,699	14,657	12,501	13,113	13,113	13,598	14,314	14,151	14,265	14,551	14,812	14,495	14,154	14,693	14,964	15,315
	(C)	1,909	1,955	2,075	2,133	2,187	2,223	2,226	2,385	2,341	2,129	2,182	2,334	2,227	2,325	2,475	2,497	2,566
N. America	(A)	49	46	48	51	56	50	45	44	43	33	35	36	38	46	45	42	43
	(B)	12,119	11,893	13,367	13,320	12,721	13,894	14,416	15,582	14,412	16,234	15,547	15,561	15,761	16,447	15,713	16,236	18,059
	(C)	589	544	642	678	711	692	650	693	625	541	538	561	607	748	712	684	771
W. Europe	(A)	81	92	77	103	94	101	100	102	103	96	95	107	99	102	106	107	106
	(B)	13,638	12,752	15,142	11,373	12,685	12,042	12,410	12,881	13,042	12,809	13,396	13,863	13,122	12,131	13,207	13,551	13,344
	(C)	1,107	1,172	1,162	1,174	1,187	1,222	1,236	1,318	1,337	1,229	1,275	1,478	1,305	1,243	1,395	1,447	1,421
Oceania	(A)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	(B)	10,385	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	8,667	4,222	4,000
	(C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Dev.	(A)	15	16	17	16	17	18	19	20	20	20	20	15	16	16	17	16	18
	(B)	13,777	14,680	16,145	17,043	16,771	16,943	17,892	18,870	19,401	17,999	18,308	19,812	20,121	20,548	21,061	20,459	20,437
	(C)	212	238	270	281	288	309	340	374	379	358	368	255	315	334	367	366	374
Developing	(A)	139	126	145	151	136	134	143	143	133	154	158	183	189	153	210	211	203
	(B)	13,084	12,384	11,910	12,147	12,222	12,408	12,162	12,601	13,001	12,753	12,697	10,815	10,880	10,967	11,153	10,848	11,362
	(C)	1,817	1,566	1,723	1,834	1,667	1,661	1,735	1,804	1,736	1,958	2,010	1,575	2,059	2,118	2,347	2,286	2,312
Africa	(A)	10	9	10	11	9	9	9	9	10	10	10	14	16	17	19	21	21
	(B)	17,746	9,479	13,375	14,571	12,903	15,280	17,766	17,386	17,455	18,229	18,299	11,263	11,211	11,468	12,368	11,128	11,407
	(C)	177	186	130	153	120	142	167	164	166	175	178	212	200	198	235	235	244
Latin America	(A)	44	38	42	40	40	39	42	42	45	43	46	43	45	46	55	60	54
	(B)	13,025	13,000	12,101	12,321	11,128	11,414	10,905	11,688	11,585	11,699	11,731	9,633	5,556	10,053	12,811	11,194	12,833
	(C)	567	499	511	493	444	448	461	496	525	508	535	479	503	524	699	671	695
Middle East	(A)	72	65	78	85	71	68	74	76	62	83	84	108	111	112	114	109	110
	(B)	12,593	12,342	11,440	11,541	12,402	12,419	11,866	12,344	13,367	12,655	12,802	9,633	5,556	10,093	9,476	9,877	10,005
	(C)	903	804	857	986	884	846	881	933	834	1,045	1,000	1,037	1,102	1,127	1,080	1,080	1,098

Appendix Table 1 (cont'd.)

		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Far East	(A)	14	14	14	15	16	17	17	16	16	18	19	18	18	19	23	20	18
	(B)	12,441	12,776	12,928	13,427	13,759	13,079	13,518	13,439	13,944	12,830	11,667	13,411	13,547	14,118	14,519	14,747	15,110
	(C)	170	177	186	202	219	225	225	211	210	230	217	246	255	269	333	301	275
Centrally Planned	(A)	27	28	24	25	24	19	22	23	22	19	20	92	94	97	104	108	110
	(B)	7,675	9,268	10,427	7,802	8,121	8,427	9,986	9,397	9,480	13,457	13,204	14,304	14,678	14,676	16,214	16,081	15,927
	(C)	205	262	245	197	197	164	218	216	204	257	259	1,315	1,382	1,421	1,680	1,739	1,747
Asia CPE	(A)	3	4	5	5	5	5	5	5	6	6	6	78	80	82	89	95	96
	(B)	10,119	8,823	9,144	10,809	11,496	11,364	10,982	10,784	9,872	17,299	16,684	15,480	15,507	15,518	16,988	16,929	16,725
	(C)	29	39	50	54	53	58	53	49	56	95	95	1,201	1,239	1,268	1,503	1,600	1,606
Europe USSR	(A)	24	24	18	20	20	14	17	18	16	14	14	15	14	15	15	14	14
	(B)	7,384	9,351	10,678	7,065	7,333	7,381	9,703	9,057	9,339	11,900	11,777	8,063	10,040	10,120	11,682	10,202	10,322
	(C)	176	222	156	144	144	106	165	167	148	162	164	118	143	153	176	139	141

Note : (A) Area harvested; 1,000 ha
(B) Yield; kg/ha
(C) Production; 1,000 MT

Source: FAO, Production Yearbook

Appendix Table 2 Commercial Melon (Honeydew) Crop: Area, Yield, Production Value per Hundredweight in the USA

	1966	1967	1968	1969	1970	1971	1972	1973
Area for harvest (acres)	9,100	11,300	10,300	13,800	13,200	12,300	13,200	14,000
Yield per acre (cwt) *	134	140	134	143	146	166	175	175
Production (1,000 cwt)	1,216	1,577	1,379	1,971	1,931	2,039	2,307	2,453
Value **								
- per cwt (US$)	6.63	5.82	6.71	5.86	5.66	6.23	6.24	7.47
- total (US$1,000)	8,062	9,186	9,249	11,544	10,936	12,712	14,390	18,324

	1974	1975	1976	1977	1978	1979	1980
Area for harvest (acres)	12,400	12,570	13,950	15,480	18,520	20,500	17,700
Yield per acre (cwt) *	176	191	168	167	184	170	180
Production (1,000 cwt)	2,185	2,395	2,346	2,591	3,413	3,477	3,180
Value **							
- per cwt (US$)	8.23	9.31	10.60	9.87	9.62	10.90	13.50
- total (US$1,000)	17,993	22,286	24,916	25,561	32,846	37,761	42,864

* cwt = 100 lbs
** Price and value on FOB basis

Source: USDA

Appendix Table 3 Melons: Volume of Imports and Wholesale Price at Tokyo Central Market

(A: kg; B: ¥1,000; C: ¥/kg)

		1973	1974	1975	1976	1977	1978	1979	1980	1981
Earl's melon										
New Zealand	A	-	600	-	-	-	195	349	42	621
	B	-	427	-	-	-	130	419	27	788
	C	-	711	-	-	-	667	1,200	155	1,269
USA	A	203,099	353,933	3,525	-	-	-	-	-	-
	B	43,821	125,344	876	-	-	-	-	-	-
	C	216	354	249						
Mexico	A	450	11,002	-	-	-	-	-	-	-
	B	156	5,563	-	-	-	-	-	-	-
	C	347	506							
Ecuador	A	-	1,080	-	-	-	-	-	-	-
	B	-	113	-	-	-	-	-	-	-
	C	-	105	-	-	-	-	-	-	-
Honeydew melon										
USA	A	-	-	209,907	257,149	110,183	178,414	690,063	539,185	421,168
	B	-	-	80,018	78,670	41,646	45,356	145,150	140,151	137,172
	C	-	-	381	306	378	254	210	260	326
New Zealand	A	-	-	-	1,545	28,755	6,345	-	470	240
	B	-	-	-	514	7,220	2,101	-	173	131
	C	-	-	-	333	251	331	-	367	546
Mexico	A	-	-	7,861	11,256	12,192	73,469	58,694	57,701	80,520
	B	-	-	3,393	4,374	4,495	23,003	23,026	27,222	38,606
	C	-	-	432	389	369	313	392	472	479
Philippines	A						350	60	240	-
	B	-	-				123	28	128	-
	C	-	-				352	465	533	-

Appendix Table 3 (cont'd.)

(A: kg; B: ¥1,000; C: ¥/kg)

		1973	1974	1975	1976	1977	1978	1979	1980	1981
(Honeydew melon)										
Honduras	A	-							260	-
	B								61	
	C	-	-						233	-
Taiwan	A				110	-	-	130	-	-
	B				30			78	-	-
	C				268			600		
Prince melon										
USA	A					125	150	-	1,477	13,260
	B					100	75	-	1,314	10,695
	C					800	500	-	889	307
New Zealand	A					19,612	82,223	4,940	24,709	48,278
	B					6,905	38,296	3,517	17,633	34,155
	C					352	466	712	714	707
Philippines	A							30	350	-
	B							21	274	-
	C							700	783	
Taiwan	A					2,380	-	-	-	-
	B					456	-	-	-	-
	C					192				
Kozak melon										
New Zealand	A				271	-	466	-	1,470	25
	B				131		301		500	28
	C				483		646		340	1,120

Appendix Table 3 (cont'd.)

(A: kg; B: ¥1,000; C: ¥/kg)

		1973	1974	1975	1976	1977	1978	1979	1980	1981
(Kozak melon)										
Mexico	A							155		
	B							130		
	C							837		
Other melons										
USA	A	354,486	107,027	5,473	5,383	5,678	37,845	8,220	2,535	-
	B	91,089	30,781	1,634	2,225	1,529	7,932	2,592	585	-
	C	257	288	298	413	269	210	315	231	-
Mexico	A	24	71,743	3,732	415	750	1,178	-	-	185
	B	14	20,841	929	140	125	328			143
	C	563	290	249	338	167	278			774
New Zealand	A	500	48	95	20	-	81	-	3,305	1,961
	B	400	31	77	6		63		1,861	1,700
	C	800	650	805	300		778		563	868
Melons total										
USA	A	557,585	460,960	218,905	262,532	115,986	216,409	698,283	543,197	434,428
	B	134,910	156,125	82,528	80,895	43,275	53,363	147,742	142,050	147,867
	C	242	339	377	308	373	247	212	262	340
New Zealand	A	500	648	95	1,836	48,367	89,310	5,289	29,996	51,125
	B	400	458	77	651	14,125	40,891	3,936	20,194	36,802
	C	800	707	805	355	292	458	744	673	720
Ecuador	A	-	1,080	-	-	-	-	-	-	-
	B	-	113	-	-	-	-	-	-	-
	C	-	105	-	-	-	-	-	-	-

Appendix Table 3 (cont'd.)

(A: kg; B: ¥1,000; C: ¥/kg)

		1973	1974	1975	1976	1977	1978	1979	1980	1981
(Melons total)										
Mexico	A	474	82,745	11,593	11,671	12,942	74,647	58,849	57,701	80,705
	B	170	26,404	4,322	4,514	4,620	23,331	23,156	27,222	38,749
	C	358	319	373	387	357	313	393	472	480
Philippines	A						350	90	590	-
	B						123	49	402	-
	C						352	543	682	-
Honduras	A								260	-
	B								61	-
	C								233	-
Taiwan	A				110	2,380		130	-	-
	B				30	456	-	78	-	-
	C				268	192	-	600	-	-
Total	A	558,559	545,433	230,593	276,149	179,675	380,716	762,641	631,744	566,258
	B	135,480	183,100	86,927	86,090	62,476	117,708	174,961	89,929	223,418
	C	243	336	377	312	348	309	229	301	395

Source: Tokyo Central Wholesale Market Yearbook

[8-2-2] PAPAYA

A. INTRODUCTION

Papaya, which were originally produced in tropical America, are today cultivated as a common tropical fruit in orchards and family gardens in all parts of the world.

Papayas are usually classified by shape and quality; and varieties include Washington, Ranchi, Ceylon, Bhopal and Honeydew. In recent years, varieties such as Betty (Florida), Solo, Blue Stem and Red Panama (Hawaiian), have been bred all over the world.

For the optimum cultivation of papaya the temperature in winter should be over 16°C and under 38°C in summer; the crop should not be affected by either strong wind or rain; and the soil should be relatively heavy, well-drained, should contain organic substances, and its layer should be thick. The plant normally bears fruit year after planting, and continue to do so for 7-8 years, although good fruit is harvested only in the first 3-4 years (or 4-5 years in the case of well-controlled cultivation). In commercial ventures, the land is often dug up and replanted after 5 or 6 years. The latex contains papain (a proteinase) which is used in drugs, while the seeds can be used as a spice. Carpain, found in the seeds and leaves is used as a substitute for digitalis in cardiac stimulation.

There is little data available for an investigation of world trends in papaya production. This seems to be because papayas as goods maintain their quality for only a short time, are expensive to transport, and therefore, are unfamiliar as international goods. Accordingly, the following discussion is based on very limited data.

B. PRODUCTION TRENDS

According to Appendix Table 1 (taken from FAO data), Brazil, with a total output of 380,000 tons in 1981, is the largest producer out of the thirty-one countries producing papaya. The other main producers are Mexico (322,000 tons), Indonesia (277,000 tons) and India (270,000 tons). Despite the increases in production in most producing countries, some countries suffered a decline. For example, in Ecuador, production fell from 77,000 tons in 1974 to 21,000 tons in 1981; in Colombia from 46,000 tons in 1975 to 27,000 tons in 1981, and in Peru from 60,000 tons in 1974 to 47,000 tons in 1981.

1. The United States

As shown in Appendix Table 2, the area under cultivation in Hawaii increased by 3.5 times from 600 acres (about 243 ha) in 1966 to 1,950 acres (about 789 ha) in 1980. The unit yield was 8.4-14.1 tons/acre (20.6-34.6 tons/ha), and the average for the fifteen years was 11.5 tons/acre (28.2 tons/ha). Production peaked at 29,000 tons in 1978. In production, 80-90% is consumed directly, and the rest is processed. The price was US¢ 7-9 per pound between 1966 and 1970 (excluding 1969), but from 1971, rose into double figures at about ¢12-14. It soared to ¢23.2 in 1979 but fell to ¢20.4 in 1980. As a result, the total sales reached US$9.979 million.

2. Mexico

Data on Mexico are shown in Table B-1. The area under cultivation was about 6,000 ha in 1971, and expanded to 1.7 times in 1974. The unit yield, however, decreased each year by about 25% - from about 24 tons/ha in 1971 to about 18 tons/ha in 1975. The total production did not increase from the level of 144,359 tons in 1971 as much as cultivated area increased. That is, the proportion of production in 1975 to that in 1971 was about 124% while the proportion of cultivated area in 1975 to that in 1971 was about 164%. This naturally reflected a fall in unit yield. Nearly 100% of the papaya produced is consumed domestically.

Table B-1 Area, Yield, Production of Papaya in Mexico

	1971	1972	1973	1974	1975
Area harvested (ha)	6,079	8,635	9,222	10,345	10,000
Yield (kg/ha)	23,776	19,560	19,954	17,014	17,850
Production (tons)	144,359	168,907	184,024	176,012	178,500
Domestic consumption (tons)	144,344	168,897	183,993	175,960	178,455
Per capita consumption (kg)	2.89	3.27	3.43	3.17	3.10

Source: SAG-DGEA, Consumos Aparentes

3. Australia

The situation of papaya production in Australia is shown in Table B-2. The area under cultivation is not known, but the unit yield is higher than in Mexico and the United States.

Table B-2 Yield of Papaya

	1973	1974	1975	1976	1977
Area harvested (tons/ha)	39,500	31,700	28,500	30,700	39,800
Production (tons)	3,522	2,467	2,376	2,711	2,868

4. Taiwan

Papaya cultivation in Taiwan is shown in Table B-3. Cultivated area was expanded from 1,014 ha in 1967 to about 2,000 ha in the 1970-1973 period, but decreased after that. In 1979, it recovered to 2,000 ha, when production reached a peak of 64,000 tons.

Table B-3 Area, Yield, Production of Papaya in Taiwan

	1967	1968	1969	1970	1971	1972	1973
Area harvested (ha)	1,014	1,099	1,084	935	928	915	1,071
Yield (kg/ha)	-	-	-	20,322	22,911	20,891	25,850
Production (tons)	16,648	18,632	19,381	19,001	21,261	19,115	27,685

	1974	1975	1976	1977	1978	1979
Area harvested (ha)	1,192	1,259	1,106	1,081	1,183	2,098
Yield (kg/ha)	34,895	27,347	29,407	17,530	22,034	30,263
Production (tons)	41,595	34,430	32,513	18,950	26,066	64,493

Source: Taiwan AGR, Yearbook

5. Brazil

Trends in papaya production in Brazil are shown in Table B-4. The area under cultivation expanded year by year and more than doubled from 5,600 ha in 1975 to 11,950 ha in 1980. Among the main producing states, Sao Paulo accounts for around 50% of total production, with Rio de Janeiro the second largest. As shown in Table B-5, in Para yields are 3-4 times higher than in other states.

Table B-4 Trends in Production of Papaya in Brazil

(million fruits)

Main producing states	1975	1976	1977	1978	1979	1980
São Paulo	33.0	50.5	71.9	80.8	126.3	135.0
Pará	0.6	0.6	9.9	36.8	50.2	82.1
Rio De Janeiro	29.0	32.4	30.3	35.9	21.6	16.2
Bahia	2.5	2.6	3.6	3.6	7.7	15.5
Parana	0.8	0.9	3.8	4.3	5.7	4.8
Other	15.2	16.6	17.4	21.8	25.1	31.1
Total	81.1	103.6	136.9	183.2	236.6	284.7
Area (1,000 ha)	5.6	6.3	8.0	9.2	10.4	12.0

Source: IBGE

Table B-5 Unit Yield of Papaya by Main Producing States in Brazil

(fruits/ha)

Main producing states	1975	1976	1977	1978	1979	1980
São Paulo	16,522	20,453	17,177	19,677	24,005	25,237
Pará	8,869	8,869	32,421	68,328	56,882	55,931
Rio De Janeiro	14,733	14,585	14,947	14,317	10,215	6,578
Bahia	14,297	12,397	15,113	15,502	18,234	21,651
Parana	18,555	12,428	34,252	22,421	23,126	21,522

Source: IBGE

Table B-6 shows the producing states, area under cultivation, production and unit yield in 1980.

Table B-6 Producing States, Area under Cultivation, Production and Unit Yield (1980)

Order	State	Area (ha)	Production (1,000 fruits)	Unit yield (fruits/ha)	(%)
1	São Paulo	5,351	135,044	25,237	47.4
2	Pará	1,467	82,052	55,931	28.8
3	Rio De Janeiro	2,458	16,169	6,578	5.7
4	Bahia	715	15,481	21,651	5.4
5	Parana	224	4,821	21,522	1.7
6	Espirito Santo	252	6,275	24,900	2.2
7	Minas Gerais	389	4,542	11,676	1.6
8	Rio Grande Do Sul	300	4,894	16,313	1.7
9	Pernambuco	159	2,990	18,805	1.1
10	Amazonas	94	4,218	44,872	1.5
11	Ceará	97	1,679	17,309	0.6
12	Rondonia	81	679	8,382	(2.3)
13	Sergipe	33	1,100	33,333	
14	Mato Grosso do Sul	42	671	15,976	
15	Brasilia (D.F.)	30	510	17,000	
16	Paraiba	77	890	11,558	
17	Roraima	7	410	58,571	
18	Goias	62	745	12,016	
19	Rio Grande Do Norte	58	810	13,965	
20	Acre	29	415	14,310	
21	Piaui	14	148	10,571	
22	Maranhão	14	141	10,071	
	Total	11,953	284,684	23,816	100.0

Source: IBGE

The species of papaya which now appear on the market are those found locally and the Hawaiian variety. These are shown by producing region and shipment quantity in Table B-7.

Table B-7 CEAGESP Main Shipping Places and Quantity of Papaya (1980)

(Native species)

Area	State	Quantity (31 kg/carton) (1,000 cartons)	(%)
Serra do Japoticabal	SP	579.8	39.5
Noroeste de Araçatube	"	331.9	22.6
Media Araraquarense	"	112.9	7.7
Alta Araraquarense	"	106.9	7.3
São José dos Trarados	"	87.3	6.0
Other		249.8	16.9
Total		1,468.6	100.0

(Hawaiian species)

Area	State	Quantity (6 kg/carton) (1,000 cartons)	(%)
Bragantina	PA	3,441.5	71.6
Estremo Sul da Bahia	BA	477.9	10.0
Salgado	PA	291.3	6.1
Other		594.6	12.3
Total		4,805.3	100.0

Source: CEAGESP, Boletin Anual

The appearance of native and Hawaiian species of papaya in the Brazilian market (CEAGESP) is presented in Table B-8 and Fig. B-1. According to these data, the number of native species has fallen since June, 1979, whereas the number of Hawaiian species increased rapidly.

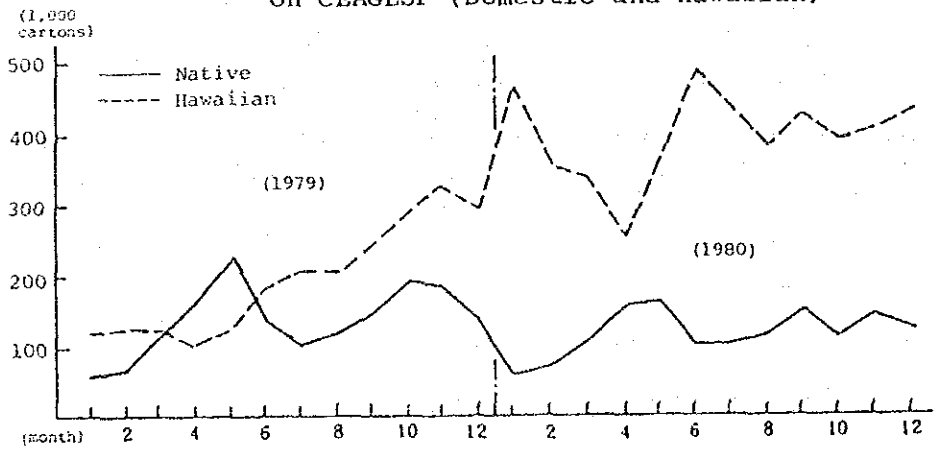
Table B-8 Papaya: Trends in Number of Species on CEAGESP (Domestic and Hawaiian)

(1,000 cartons)

Month	Native species (31 kg/carton)					Amazonas (Hawaiian) (6 kg/carton)		
	1976	1977	1978	1979	1980	1978	1979	1980
1	11.6	126.0	96.5	60.2	70.2	72.7	121.1	474.0
2	8.1	101.5	86.6	71.6	77.5	111.8	124.9	362.1
3	16.7	155.1	120.4	112.2	109.5	98.2	123.0	341.4
4	82.7	189.6	160.5	160.5	160.9	75.2	100.8	263.3
5	108.3	175.1	206.8	222.9	164.0	153.7	124.2	370.6
6	74.9	133.0	125.1	132.1	107.8	146.3	183.1	487.4
7	62.5	130.0	78.7	103.8	104.9	136.8	214.2	444.2
8	64.6	125.1	69.7	122.8	120.6	140.9	212.0	378.7
9	84.1	152.3	103.4	149.5	153.0	155.8	246.2	429.8
10	123.2	158.4	103.3	197.6	119.5	125.6	296.6	399.1
11	184.4	146.8	125.6	180.3	148.8	148.7	336.2	418.0
12	202.4	170.9	86.7	137.1	131.8	154.0	298.3	436.8
Total	1,023.5	1,763.8	1,363.2	1,650.6	1,468.6	1,519.8	2,380.7	4,805.3

Source: DESE-CEAGESP

Fig. B-1 Papaya: Trends in Number of Species on CEAGESP (Domestic and Hawaiian)



Source: DESE-CEAGESP

Comparing the price per kg of native species with that of Hawaiian species in the market as shown in Table B-9 and Fig. B-2, the latter was higher by a factor of about 4.6 in 1978 and 1979, and higher by a factor of about 3.8 in 1980. Trends in the monthly prices of each species show

that the native species are inexpensive in April, May and June; but their prices begin to rise on average every October, being most expensive during January, February and March. Hawaiian species are inexpensive in May, June and July, but expensive on averge from August to April.

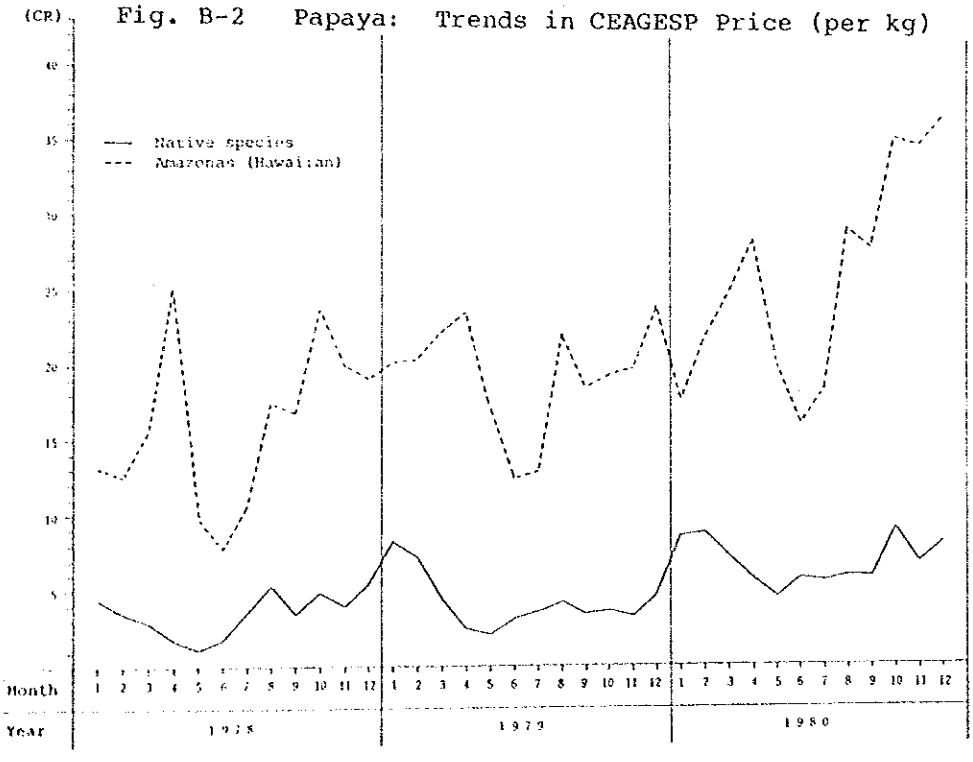
Table B-9 Papaya: Trends in CEAGESP Price

(CR/carton)

Month	Native species (31kg per C/T)						Amazonas (Hawaiian) (6kg per C/T)					
	1978		1979		1980		1978		1979		1980	
	per kg		per kg		per kg		per kg		per kg		per kg	
1	135.82	4.38	255.38	8.24	267.74	8.64	78.48	13.08	121.24	20.21	105.72	17.60
2	104.13	3.36	225.54	7.28	273.36	8.82	75.43	12.57	122.23	20.37	130.35	21.73
3	90.02	2.90	140.46	4.53	223.06	7.20	93.41	15.57	133.10	22.18	148.78	24.80
4	56.30	1.82	80.20	2.59	176.41	5.69	152.09	25.35	141.50	23.58	168.33	28.06
5	37.82	1.22	64.33	2.08	139.16	4.49	59.95	9.99	102.85	17.14	120.52	20.09
6	59.95	1.93	94.51	3.05	177.26	5.72	46.71	7.79	75.10	12.52	96.13	16.02
7	111.41	3.59	112.98	3.64	173.86	5.61	69.69	11.62	77.95	12.99	110.69	18.45
8	164.61	5.31	126.66	4.09	183.89	5.93	104.99	17.50	131.95	21.99	174.80	29.13
9	107.83	3.48	107.77	3.48	180.39	5.82	100.60	16.77	111.60	18.60	166.92	27.82
10	152.74	4.93	112.23	3.62	283.65	9.15	142.89	23.82	115.84	19.31	210.72	35.12
11	123.85	4.00	100.28	3.23	212.33	6.85	122.61	20.44	118.33	19.72	207.79	34.63
12	170.59	5.50	151.39	4.88	250.59	8.08	114.58	19.10	142.72	23.79	218.44	36.41
Annual average	98.90	3.53	115.95	4.22	203.35	6.83	95.17	16.13	113.60	19.36	153.46	25.82

Source: DESE-CEAGESP
Japan International Cooperation Agency, Actual Production and Distribution in the Agriculture, Dairy and Forestry Industries in Brazil, 1970-1980, December 1981

Fig. B-2 Papaya: Trends in CEAGESP Price (per kg)



Source: Table B-9

The price the producer receives in Brazil is shown in Table B-10. Clearly, the price is highest in summer, the best season for papaya.

Table B-10 Papaya: Price Received by Producers (Sao Paulo State)

(CR/big carton)

Month	1979	1980	Month	1979	1980
1	126.79	105.98	7	56.13	71.76
2	141.38	125.67	8	65.49	81.87
3	82.21	114.28	9	55.78	73.01
4	52.58	71.87	10	54.32	97.96
5	33.04	54.47	11	48.38	75.71
6	45.04	69.32	12	77.98	82.70

Source: IEA

C. TRENDS IN TRADE

As previously stated, because there is little data on trade in papaya or the international market, it is very difficult to assess international trends in future exports and imports.

In the case of Japan, papaya were classified together with other fruit until 1974, when they began to be categorized separately in the import statistics of the Ministry of Finance. Trends in Japanese imports of papaya after 1974 are shown in Table C-1.

Table C-1 Papaya: Japanese Imports

(tons)

	USA	Total		USA	Taiwan	Total		USA	Total
1974	1,110	1,110	1977	586	-	586	1980	2,538	2,538
1975	1,300	1,300	1978	2,524	-	2,524	1981	3,267	3,267
1976	1,613	1,613	1979	2,359	0.25	2,360			

Source: Ministry of Finance, Customs Statistics

According to the above statistics the import prices of papaya are as follows:

1979	CIF	¥422.91/kg
1980	"	¥488.62 "
1981	"	¥504.75 "

Source: Ministry of Finance, Customs Statistics

D. CONCLUDING REMARKS

It is very difficult in the case of papaya, again, to fully grasp and forecast the trends in papaya demand in a situation where very little data exists, but with respect to per capita consumption of fruit in the United States, data is available (See Appendix Table 3). According to this data, the consumption of citrus fruits has risen very slowly although the consumption of fresh fruits in general has grown steadily. The consumption of non-citrus fruits has also grown steadily. The consumption of papaya included in the "other fruits" category has not shown any increase. Considering that papaya consumption is dull in the United States, which is the biggest consumer of fruit in the world, it may be difficult to expect any rapid increases in demand for papaya. The biggest problems to be overcome are those of maintaining the quality, and keeping prices low despite high transportation costs.

Appendix Table 1 Papaya: Production by Selected Countries

(1,000 tons)

	1965	1971	1974	1975	1976	1977	1978	1979	1980	1981
Africa	39	200	56	223	226	210	226	224	217	221
Guinea-Bissau	1	1	2	2	2	2	2	2	2	2
Mozambique	19	30	34	35	36	36	36	38	38	38
S. Africa	19	21	20	21	20	2	24	25	22	22
Zaire		148	-	165	168	170	164	159	155	159
North and Central America	148	208	248	301	363	436	440	441	443	425
Costa Rica	2	3	3	3	3	3	3	3	3	3
Cuba	31	19	38	50	43	45	53	23	38	38
Dominican RP	5	7	8	8	8	9	9	9	6	9
Jamaica	33	25	37	37	34	34	25	35	36	3
Mexico	67	130	140	162	224	282	285	326	309	322
Peurto Rico	2	2	5	5	5	5	5	5	5	5
Virgin Is. UK	8	10	17	18	23	29	29	19	22	-
El Salvador		2	-	-	-	-	2	2	2	2
USA		10	-	18	23	29	29	19	22	43
South America	291	301	327	333	327	395	570	541	558	541
Argentina		1	1	1	2	1	2	1	2	2
Bolivia	4	5	7	7	7	7	8	5	5	5
Brazil	98	108	112	114	120	205	366	355	360	380
Ecuador	123	50	77	30	21	22	21	17	20	21
Paraguay	9	10	11	12	12	12	13	13	14	14
Peru	30	56	60	62	65	66	66	43	45	47
Venezuela	27	31	59	60	60	31	36	42	47	45
Chile		1	-	1	1	1	-	-	-	-
Colombia		39	-	46	39	50	58	65	65	27
Asia	272	471	300	315	565	595	608	688	668	689
China	11	20	42	34	33	9	26	63	54	50
India	205	220	200	221	225	250	250	250	265	270
Melaysia	3	4	5	5	6	6	6	6	6	6
Philippines	52	55	53	55	78	56	86	85	52	65
Bangladesh		22	-	-	-	20	20	20	21	21
Indonesia		150	-	-	223	244	220	264	270	277
Oceania	16	17	16	16	17	17	17	17	18	18
Australia	6	5	2	2	3	3	3	3	4	4
Fiji	2	2	3	3	3	3	3	3	3	3
Samoa	8	10	11	11	11	11	11	11	11	11
World	765	1,197	947	1,188	1,498	1,653	1,861	1,911	1,904	1,894

Source: FAO, Production Yearbook

Appendix Table 2 Papaya: Area, Yield, Production and Value, United States (Hawaii)

		1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Area harvested	(acres)	600	760	830	850	1,040	970	985	1,430	1,690	1,840	1,930	2,155	2,190	2,210	1,950
Yield per harvested acre	(1,000 pounds)	31.1	30.1	28.4	22.6	24.0	21.4	26.1	23.0	22.0	21.7	25.9	29.5	29.2	18.6	25.1
	(ton)	14.1	13.7	12.9	10.3	10.9	9.7	11.8	10.4	10.0	9.8	11.7	13.4	13.2	8.4	11.4
Production	(1,000 pounds)	18,680	22,845	23,550	19,235	24,960	20,725	25,735	32,824	37,224	39,890	50,037	63,548	64,000	41,015	48,916
	(1,000 tons)	8.5	10.4	10.7	8.7	11.3	9.4	11.7	14.9	16.9	18.1	22.7	28.8	29.0	18.6	22.2
Fresh	(1,000 pounds)	15,225	19,393	20,085	16,337	23,938	19,172	21,959	28,848	34,529	34,952	43,588	53,987	54,624	36,446	45,360
	(1,000 tons)	6.9	8.8	9.1	7.4	10.9	8.7	10.0	13.1	15.7	15.9	19.8	24.5	24.8	16.5	20.6
Processed	(1,000 pounds)	3,455	3,452	3,465	2,898	1,022	1,553	3,776	3,976	2,695	4,944	6,449	9,561	9,376	4,569	3,556
	(1,000 tons)	1.6	1.6	1.6	1.3	0.5	0.7	1.7	1.8	1.2	2.2	2.9	4.3	4.3	2.1	1.6
Price per pound	(cents)	7.1	7.4	9.6	12.4	9.8	13.2	13.3	12.7	13.1	14.2	12.3	11.9	13.0	23.2	20.4
Value	(US$1,000)	1,326	1,691	2,261	2,386	2,436	2,736	3,423	4,180	4,871	5,668	6,134	7,565	8,320	9,515	9,979

Source: USDA

Appendix Table 3 Papaya and Pineapple: Fresh Fruit Consumption per Capita in the United States

(kg)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Main fresh fruits	36.9	37.1	37.2	35.7	36.1	36.9	36.7	35.2	34.8	36.0	38.3	39.3	37.8	37.8	38.4
Citrus fruits	13.3	13.3	14.4	12.0	12.9	13.1	13.3	12.5	12.5	12.6	13.5	13.3	12.1	12.3	13.5
Non-citrus	23.7	23.9	22.8	23.7	23.2	23.9	23.5	22.6	22.3	23.5	24.8	25.9	25.7	25.5	27.1
Papaya	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pineapple	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6

[8-2-3] CASHEW NUTS

A. INTRODUCTION

Cashew nuts, like mangos, are a species of Anacardiaceae. They were originally found in Brazil, and naturally grow in dense clumps in the lowlands and delta district of the Amazon. They are evergreen trees growing to 12-15 m in height, with unusual fruit having a seed (drupe) hanging from the top of the fruit. The kernel in the drupe is a nut, with a comma-like shape 3 cm long. Since roasted nuts are richer in flavor and better in quality than walnuts, they are called the "king" of nuts. They have always been well-known as grain nuts eaten after a meal in tropical areas, and in modern times, they are used as confectionery and as appetisers with beer in most western countries. As a result, their consumption has gradually been increasing. The juice is used in concentrated form, and oil (Oleo de Casca) is obtained from the shell.

Although cashew nuts were first grown in Brazil, they were taken to and cultivated in Goa in India in the seventeenth century. From there, they spread through East Asia centering around the south-east coastal zone of India. Today, cashew nuts can be found in Chittagong, the Andaman Islands, Northern Kuantan on the Malay Peninsula, Penang and in East Africa. They are also cultivated in tropical areas as the Philippines, Hawaii and South America.

The seeds of the cashew sprout usually 8-10 days after being sown, and under good conditions, they grow quickly and even an eighteen-month-old sapling may flower. It usually takes, however, 5-6 years for the cashew plant to be of commercial quality. In India, it usually flowers in March, and the best time for harvesting is from June to August. The average harvest of cashew is 9 kg per ripe tree, 45 kg per big tree or more in some cases. Approximately 25% of the harvest is nuts.

B. PRODUCTION TRENDS

According to FAO data, the production of the main cashew nut producing countries of the world (16 countries) was 370,000 tons on average in the 1961-1965 period, reached a peak of 648,000 tons in 1974, but slumped to 453,000 tons (or 70% of the 1974 total) in 1981 (see Appendix Table 1).

Let us look at the trends in production in the main producing countries.

Table B-1 shows trends in the proportion of world production of the five largest producers.

Table B-1 Trends in Production of the Five Largest Producers

(tons,%)

	1961/65 average		1970		1975		1981	
		Share		Share		Share		Share
India	145,200	39.1	207,000	37.9	141,000	27.6	190,000	41.8
Brazil	11,742	3.2	20,309	3.7	37,000	7.2	85,000	18.7
Mozambique	131,200	35.4	184,000	33.7	180,000	35.2	75,000	16.5
Tanzania	63,400	17.1	117,000	21.4	121,704	23.8	72,280	15.9
Kenya	7,080	1.9	10,000	1.8	16,400	3.2	15,000	3.3
Others	12,376	3.3	58,106	1.5	15,069	3.0	17,060	3.8
Total	370,998	100	546,415	100	511,173	100	454,340	100

Source: FAO

1. India

India is presently the world's largest producer of cashew nuts. Annual production amounted to 230,000 tons for each the years 1973 and 1974, accounting for 35-37% of total world production. From Table B-2, it can be seen that the production in India generally tends to recover, though such recent production as 165,000 tons in 1981 and 172,000 tons in 1982 does not come up to the past record. India is not only one of the main exporting countries of cashew nuts but also a major importer. India also exports processed cashew nuts originally imported from East African countries. In recent years, however, India's supply of raw cashew nuts has been reduced substantially, due to exporters such as Kenya, Madagascar and Tanzania vigorously

establishing or expanding existing processing plants in order to increase their potential for processing and exporting cashew nuts themselves. To overcome this supply shortage, India has instituted various plans to increase production. This planning has been realized in such states as Andhra Pradesh, Karnataka, Kerala, Goa and Orissa. Some of these are receiving cooperation from the World Bank. If the plans are successful, production can be expected to reach 180,000 tons in 1986 and 300,000 tons in 1990. The sixth five-year plan (1980/81 - 1984/85) includes the sum of US$62.5 million, composed of $48 million from the World Bank, and $14.5 million from the Indian Government, funds necessary for the expansion of cashew producing areas and the improvement of productivity.

According to Table B-2, showing the annual supply and distribution in India, the proportion of imports in the annual supply volume has declined gradually in recent years (For the period 1976-82, the import share were respectively 27%, 29%, 13%, 15%, 10%, 14% and 4%).

Table B-2 Cashew Nuts: Supply and Distribution* in India

(tons)

	1976	1977	1978	1979	1980	1981	1982**
Beginning stocks	50,000	60,000	27,000	46,800	46,800	25,900	63,400
Production	147,000	150,000	130,000	150,000	141,000	165,000	172,000
Imports	74,500	64,000	23,000	34,200	20,700	31,300	10,000
Total supply	271,500	220,000	180,000	231,000	209,300	222,200	245,400
Domestic consumption	27,200	30,000	35,000	35,000	36,000	41,000	48,000
Export	238,300	163,000	98,200	149,200	147,400	117,800	155,000
Ending stock	6,000	27,000	46,800	46,800	25,900	63,400	42,400
Total distribution	271,500	220,000	180,000	231,000	209,300	222,200	245,400

* Raw nut basis: one ton of packed kernel equals 4.26 tons of raw nuts.
** 1982: Preliminary

Source: USDA

2. Brazil

Cashew nut production in Brazil increased from 20,000 tons in 1970 to 30,000 tons in 1972, soared to 77,000 tons in 1978 and Brazil became the world's second largest producer with 85,000 tons in 1981.

In Brazil, cashew nuts, which are known as caju, were first commercially cultivated thirty years ago. One company has had a virtual monopoly on cultivation over the years, but other companies have rapidly increased their production in recent years under the encouragement of the North-east Brazil Development Agency (SUDENE) which has provided, as loans, 75% of the investment funds required for new cashew planting. This government assistance was spurred by the rapid increase in the demand on the international market. Since rainfall at harvesting time influences quality, cashew nuts are one of the few crops suitable for cultivation in the semiarid northeast region.

Let us look more closely at trends in production based on data published by IBGE (Institute of Brazilian Geographical Statistics).

Concerning the trends in the 1975-1979 period, the production figure of 4,661 million fruits in 1975 was almost doubled in 1978, but decreased by 63% in 1979. The area under cultivation expanded by 67% from 110,000 ha in 1975 to about 184,000 ha in 1980. As for state production, the state of Ceara accounts for 60-70% of the national total.

The unit yields of the main producing states vary from state to state with Paraiba State having the largest unit yield. In Ceara State, cashew cultivation is a key industry second only to that of lobster, though cashews are cultivated in the low lands which have an annual rainfall of only 700 mm.

Data on the production by state in 1980 are given in Table B-5 for reference.

Table B-3 Cashew: Trends in Production

(million fruits)

Main producing states	1975	1976	1977	1978	1979	1980
Ceará	2,724	4,494	4,373	6,500	3,867	3,972
Rio Grande Do Norte	642	440	919	1,463	587	1,199
Piaui	178	168	409	446	551	618
Bahia	224	230	237	336	333	342
Pernambuco	508	530	478	167	224	185
Paraiba	181	176	159	186	187	189
Others	204	170	138	106	110	96
Total	4,661	6,208	6,713	9,204	5,859	6,601
Area (1,000 ha)	110	123	135	154	169	184

Source: IBGE

Table B-4 Cashew: Unit Yields in Main Producing States

(fruits/ha)

Producing state	1975	1976	1977	1978	1979	1980
Ceará	43,732	62,106	48,409	77,315	41,498	37,183
Rio Grande Do Norte	35,769	22,670	31,332	33,755	12,792	25,930
Piaui	24,370	17,984	38,950	41,340	40,866	39,675
Bahia	43,015	43,572	44,566	47,515	47,276	49,680
Pernambuco	57,256	58,561	53,281	44,352	61,425	53,349
Paraiba	61,238	60,400	57,939	69,164	69,143	71,079

Source: IBGE

Table B-5 Cashew: Production in 1980

		Area (ha)	Production (1,000 fruits)	Yield (fruits/ha)	(%)
1	Ceará	106,815	3,971,750	37,183	60.2
2	Rio Grande Do Norte	46,242	1,199,060	25,930	18.2
3	Piaui	15,575	617,939	39,675	9.3
4	Bahia	6,876	341,603	49,680	5.2
5	Pernambuco	3,463	184,749	53,349	2.8
6	Paraiba	2,657	188,859	71,079	2.9
7	Alagoas	1,527	54,335	35,582	0.8
8	Rio de Janeiro	535	19,000	35,514	0.3
9	Maranhão	228	13,117	57,530	0.2
10	Pará	52	3,125	60,096	
11	Minas Gerais	41	2,246	54,780	
12	Amazonas	34	685	20,147	
13	Mato Grosso Do Sul	25	830	33,200	
14	Brasilia (D.F.)	24	940	39,166	(0.1)
15	Acre	21	230	10,952	
16	São Paulo	19	1,070	56,315	
17	Mato Grosso do Norte	14	980	70,000	
18	Espirito Santo	3	20	6,666	
	Total	184,151	6,600,538	35,843	

Source: IBGE

3. Mozambique

Mozambique is the third largest cashew producer in the world. According to FAO data, it accounted for 63% of the total production in Africa in 1965. Production reached a peak of 213,400 tons (or 56%) in 1974, but dropped to 75,000 tons (44%) in 1981.

USDA reports that the Mozambique Government effected various types of reform for the development of cultivation technology in the cashew nut industry. The following measures were also adopted.

a. The "Socialist Sundays" system in which pupils cooperate in the harvesting.

b. Establishment of domestic markets.

c. Increase in funds for purchasing barter goods to exchange with collectors after the collectors have received the cashew harvest.

d. An advertising compaign aimed at showing the people the importance of cashew production.

Despite these efforts at increasing production, the following obstacles remain.

a. The quantity of barter goods to exchange with fruit collectors and fruit pickers is small.

b. The rate of increase in general consumer prices is faster than the rate of increase of the purchasing price of raw nuts which is determined by the Government.

c. The poor quality of roads and railways lowers the efficiency of crop transportation.

d. Cashew nuts are consumed or stored as a substitute for peanuts, which traditionally are an important food in many parts of Mozambique.

e. The relation between the construction of new villages and the improvement in harvests has not been successfully managed thus far.

In addition, numerous hurricanes and droughts have seriously damaged crops.

There are fourteen processing plants in Mozambique, of which eight are state-run and the remainder are owned by private enterprise. The annual processing capacity for all the plants combined is about 140,000 tons. However, the production in these plants fell by 50% in the 1979-1980 period when raw nuts were not imported (There were 40,000 tons of imports from Tanzania in the 1978-1978 period).

4. Tanzania

Tanzania is the fourth largest producer in the world. The production expanded from 63,400 tons in 1965 to the peak of 150,000 tons in 1972, but diminished to 72,280 tons in 1981. According to the survey of USDA, the following are the causes for the decrease in production in the 1979-1981 period: a. low price received by the producer; b. the increase in diseases, such as those caused by pests; c. inefficient management of trees; and d. cold-weather damage at the anthesis. In Tanzania, the Cashew Nut Authority (CATA) is the sole buyer, producer and exporter of cashew nuts. It is very difficult to calculate total cultivation area, but CATA estimated it at about 370,000 ha in 1978. The increase in processing plants is being promoted in different regions, and the shift in exports from raw nuts to kernel nuts is now happening.

5. Kenya

Kenya is the fifth largest producer in the world. The production soared from 7,080 tons in 1965 to a peak of 36,000 tons in 1978 accounting for 21% of the total production in Africa. In 1981, however, the output was 15,000 tons, accounting for no more than about 9%.

The Government, too, has made strenuous efforts to increase production, especially with the opening of the Kilifi cashew nut plant with an annual processing capacity of 12,000 tons. Beginning operations in 1976, it was built with the cooperation and financial assistance of the Government. If the production rises, the Government intends to provide loans for the construction of a second plant in Kilifi or Kwale.

C. TRENDS IN TRADE

There is little data on trends in cashew nut trade, but some trends in the main exporting and importing countries will be considered below.

The main exporting countries of cashew kernels are shown in Table C-1. India exported 84% of the total world exports (52,000 tons) in 1973, but the figure fell to 46% (14,000 tons) in 1978. This is due to certain countries, namely, Kenya, Tanzania, Madagascar and other East African countries, which had previously supplied raw nuts to India, deciding to develop domestic processing for the purposes of export.

Table C-1 Exports of Main Cashew Kernel Exporting Countries

(tons)

	1973	1974	1975	1976	1977	1978
Brazil	5,980	7,622	1,421	9,265	7,306	11,193
India	52,293	65,025	53,600	51,565	40,300	14,052
Kenya	227	96	170	1,316	3,046	1,679
Tanzania	3,710	4,042	4,000	6,084	3,890	3,635
Total	62,210	76,785	69,191	68,527	54,542	30,559

Source: USDA

I. Export Trends

Trends in the main producing countries of India and Brazil are considered here.

1. India (see Appendix Table 2)

India is the biggest producer and exporter in the world. Accordingly, it trades with over twenty-three countries as shown in Appendix Table 2. The largest importers of Indian cashew nuts are the USSR and the United States, with the former accounting for 30-38%, and the latter 24-35% in the given years. Japan is the third biggest customer for Indian cashew nuts, with its proportion of exports from 10% in 1976 to 15% in 1978.

According to the USDA survey, the exports of cashew kernels totalled 37,000 tons in 1979 (US$130 million) and about 36,000 tons in 1980 (US$124 million). Nearly 52% of the total exports (or 22,780 tons) in 1980 was purchased by the USSR. Exports to the United States substantially decreased from about 13,000 tons in 1979 to about 6,000 tons in 1980.

Table C-2 The Eight Main Importers of Indian Cashew Nuts (kernels)

(tons, %)

	1973		1976		1978	
USSR	19,959	38.2	15,721	30.5	5,269	37.5
USA	18,453	35.3	17,496	33.9	3,411	24.3
Japan	3,229	6.1	5,177	10.0	2,103	15.0
Netherlands	811	1.6	1,652	3.2	804	5.7
Kuwait	194	0.4	597	1.2	373	2.7
Australia	1,154	2.2	2,274	4.4	333	2.3
Germany, FR	898	1.7	998	1.9	320	2.3
UK	1,211	2.3	882	1.7	294	2.1
Others	6,384	12.2	6,768	22.2	1,145	8.1
Total	52,293	100	51,565	100	14,052	100

Source: USDA

2. Brazil

Brazil exports cashew kernels to over fourteen countries as shown in Table C-3, but 70-80% of this total goes to the United States. The latest data show that the level of exports in 1981 were the highest ever, reaching 15,000 tons.

According to statistics of CACEX (Brazilian Export Agency), exports are steadily increasing year by year, as shown in Table C-4.

The share of the United States in the total of Brazilian exports fell from 82.9% in 1976 to 73.8% in 1981.

The biggest competitor Brazil faces as a supplier to the United States is Mozambique, although its exports to the United States have recently decreased, slumping by a half, from 17,000 tons in 1974 to 8,540 tons in 1980.

Table C-3 Cashew Nuts (Kernels) Exports from Brazil

(tons)

	1977	1978	1979	1980	1981
Argentina	235	499	700	186	554
Australia	132	370	112	304	733
Belgium-Luxemburg	78	139	118	53	71
Canada	104	22	289	310	565
France	95	11	35	82	243
Germany, FR	157	104	90	194	149
Lebanon	130	222	362	388	121
Mexico	164	274	368	331	628
Netherlands	92	147	475	232	439
South Africa	-	40	203	254	259
UK	213	73	307	248	430
USA	5,675	8,935	8,371	8,891	10,639
Uruguay	36	34	37	38	42
Venezuela	92	182	172	20	113
Others	103	141	259	179	542
Total	7,306	11,193	11,898	11,710	15,528

Source: CACEX

Table C-4 Trends in Cashew Nut Exports by Country

(US$ million, FOB)

	1976	1977	1978	1979	1980
USA	14.50	18.5	26.5	27.5	51.0
Lebanon	0.03	0.6	0.9	1.5	2.7
Others	3.00	4.7	6.3	9.3	15.4
Total	17.50	23.8	33.7	38.3	69.1

Source: CACEX

Table C-5 Cashew Nut Exports in 1980

	Weight (ton)	Average unit price (US$/kg)	Total (US$1,000)
USA	10,769.9	4.74	50,999.2
Lebanon	483.0	5.50	2,654.7
Australia	496.9	5.22	2,596.1
Mexico	409.0	5.61	2,294.4
Canada	377.6	4.95	1,870.2
S. Africa	322.3	4.66	1,502.0
Netherlands	292.8	4.23	1,238.6
UK	281.6	3.58	1,008.1
W. Germany	250.6	4.01	1,004.9
Others	817.0	-	3,955.1
Total	14,500.6	4.96	69,123.3

Source: CACEX

3. Tanzania

According to USDA data on trends in cashew nut exports in Tanzania, the exports of raw nut decreased sharply from 112,900 tons in 1972 to 20,700 tons in 1980 as shown in the following table. Exports of kernels, however, increased annually from 2,900 tons in 1972 to about 6,000 tons in 1976. After that, however, they decreased to 3,400 tons in 1980. The total of both raw nut and kernel exports declined from 125,500 tons in 1972 to about 36,000 tons in 1980.

Table C-6 Total Cashew Nut Exports: Tanzania

(tons)

	Raw nuts	Kernels	Total * Raw nut equivalent
1972	112,924	2,901	125,537
1973	109,915	3,710	126,045
1974	113,891	4,060	131,543
1975	97,328	4,000	114,719
1976	66,380	6,084	92,832
1977	74,759	3,890	91,672
1978	44,200	3,635	60,004
1979	39,594	3,871	56,429
1980	20,737	3,463	35,974

* One metric ton of raw cashew nuts is equivalent to 230 kg of cashew nut kernels.

Source: USDA

4. Kenya

Trends in the exports from Kenya are shown in the following table based on USDA data. The export of raw nuts have been fluctuating greatly year by year, which was about 10,000 tons in 1979, but slumped to 1,000 tons in 1980.

Table C-7 Total Cashew Nuts Exports: Kenya

(tons)

	Raw nuts	Kernels	Total * Raw nut equivalent
1978	73	2,693	11,789
1979	10,740	3,063	24,064
1980	1,000	2,000	9,700

* 1 metric ton of raw cashew nuts is equivalent to 230 kg of cashew nut kernels.

Source: USDA

II. Trends in Imports

There are two types of cashew nut imports. The first type is that in which importing countries consume the nuts domestically and the other is the type common to India even though it is the largest producer, where it imports a large quantity of unshelled cashew nuts, processes and then exports them.

1. India

India previously imported cashew nuts for processing and re-export. As already mentioned in the section on production, East African countries from which India bought cashew nuts are now promoting the conversion of their own raw nuts for export by processing them in their own plants. As a result, imports decreased yearly from the peak of about 160,000 tons in 1974 to about 20,000 tons in 1980.

Table C-8 Cashew Nuts (Raw) Imports into India

(tons)

	1973	1974	1975	1976	1977	1978	1979	1980
Dahomey	-	-	1,502	-	-	-	-	-
Ivory Coast	976	-	-	-	-	-	-	-
Kenya	19,758	15,027	20,864	7,006	1,103	-	-	6,032
Madagascar	937	627	346	-	-	893	370	590
Other African countries	38,687	74,939	41,765	14,930	-	-	-	-
Tanzania	89,891	69,765	72,719	53,186	55,196	22,116	33,833	14,060
Total	150,249	160,358	137,196	75,122	56,299	23,009	34,203	20,682

Source: USDA

2. Canada

In Canada, imports have been falling gradually from a high of 6,703 tons in 1973 (except to a slight rise in 1976). India was the largest supplier, with 62% or 4,143 tons in 1973, but the share decreased annually to be only 14% or 554 tons in 1978.

Table C-9 Cashew Nuts (Kernels) Imports into Canada

(tons)

	1973	1974	1975	1976	1977	1978
Brazil	59	58	293	199	340	328
China	-	3	679	475	413	627
India	4,143	3,720	2,052	4,434	1,547	554
Kenya	-	5	-	86	306	87
Mozambique	1,962	1,078	715	309	467	1,361
Tanzania	161	369	695	446	174	27
USA	378	613	408	432	1,008	903
Other	-	79	5	202	220	190
Total	6,703	5,925	4,847	6,583	4,475	4,077

Source: USDA

3. The United States

The United States, the largest importer, imported 6% of cashew nuts produced in the world in 1974, about 7% in 1977 when the world production was low, and 6% in 1981, but in general, the level of imports decreased. As shown in the following Table, Brazil, India and Mozambique are its three main suppliers, with a total of 80-85% of total imports. Of interest in the data is the rise in the share of Brazil and the fall of India and Mozambique.

Table C-10 Cashew Nuts (Kernels) Imports into USA

(tons)

	1974	1975	1976	1977	1978	1979	1980	1981
Brazil	5,512	8,927	7,862	5,624	8,638	8,589	10,544	11,020
Canada	1,334	804	698	177	159	118	47	56
China	1	448	2,048	1,397	1,804	1,395	84	51
Taiwan	-	2	71	26	56	25	5	
Hong Kong	-	-	75	48	5	37	3	
India	14,686	17,128	21,760	10,858	5,445	12,548	7,728	4,024
Kenya	27	194	682	702	487	469	619	259
Laos	-	16	70	57	-	-	-	
Mozambique	17,033	14,607	14,115	13,871	12,469	8,587	8,540	9,306
S. Africa	24	156	187	109	90	92	107	233
Tanzania	679	562	1,439	1,766	1,788	1,705	1,635	2,123
Other	194	207	274	8	161	313	266	529
Total	39,490	43,051	49,257	34,643	31,102	33,878	29,578	27,601
World production	648,082	511,173	402,922	514,575	408,911	417,931	408,191	454,340

Source: USDA

4. Japan

Trends in the import of cashew nuts into Japan are shown in Appendix Table 3. The imports peaked in 1976 with 6,559 tons, but slumped to 2,198 tons in 1981.

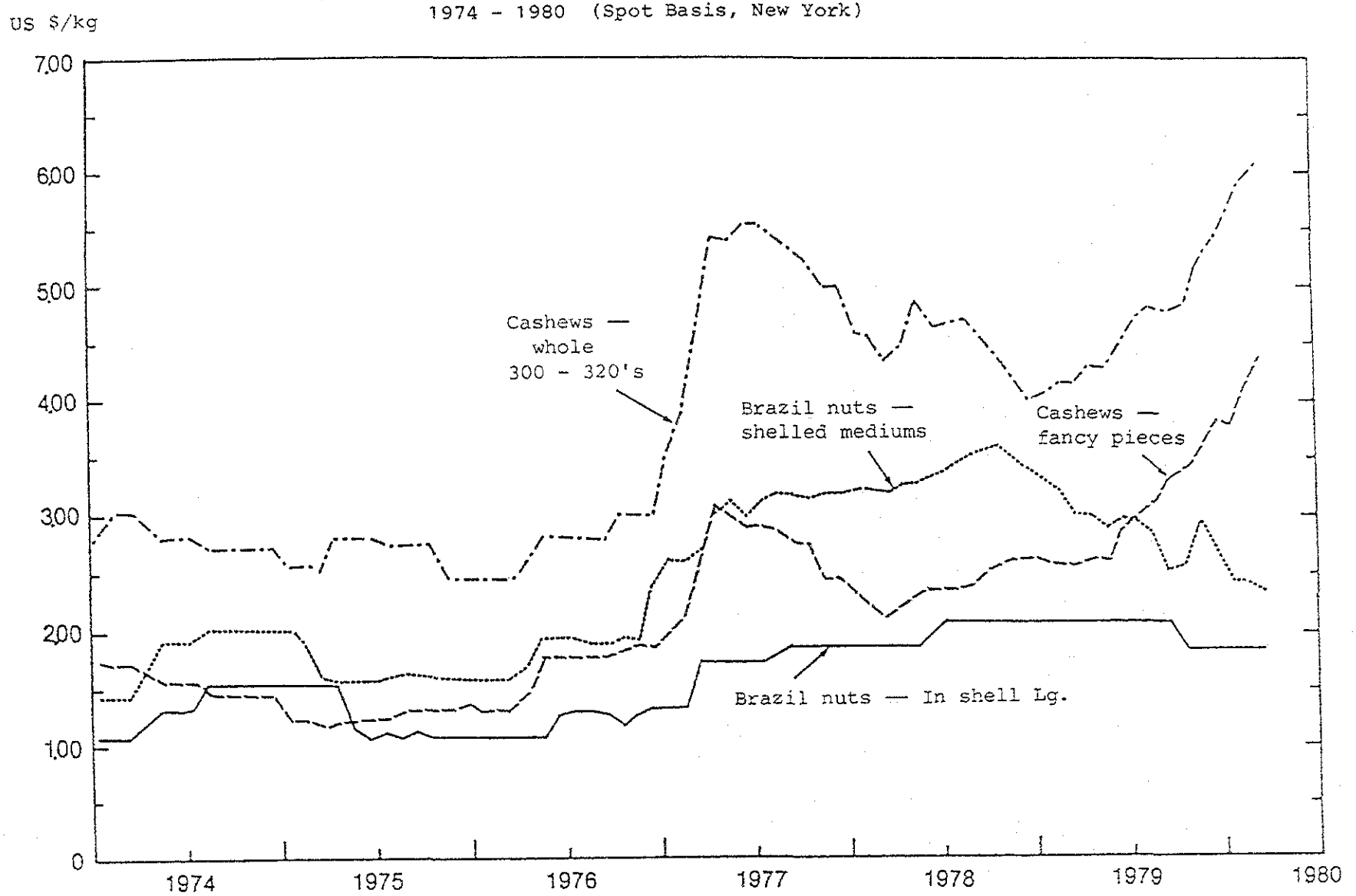
Its suppliers now number 15, but India's overwhelming share has dropped and the broadening of supply sources has been remarkable.

D. CONSUMPTION TRENDS

Trends in consumption largely depend on movements in price (see Fig. D-1). The international market for cashew nuts improved rapidly from the latter half of 1976. Appendix Table 4, showing details by item and month, illustrates this improvement. This may be due to the large decreases in supply from the African countries (see the Section of Production Trends). The annual world production level of 600,000 - 650,000 tons fell sharply to about 60%, or 400,000 tons, in 1976.

Let us look at trends in per capita consumption of nuts in the main consuming countries (Appendix Table 5). A common tendency can be observed throughout. The decrease in consumption, which began worldwide in 1977, seems to be strongly connected to the soaring of the international price of cashew nuts. Among the different types of nuts, almond nuts have steadily increased in consumption per capita, a tendency which has remained unchanged in 1977 and 1978. It may be considered that consumption will tend to steadily increase in circumstances of stable supply and price.

Fig. D-1 Selected Monthly Prices: Brazil and Cashew Nuts
1974 - 1980 (Spot Basis, New York)



Source: Appendix Table 4

E. CONCLUDING REMARKS

Sufficient data are lacking for projections of cashew nut demand, and the market situation in only a few countries (the United States, Canada and Japan) is known. Accordingly, it is difficult to accurately assess the situation. At present, the USSR imports a considerable amount of Indian cashew nuts, but the future is uncertain. Moreover, it is believed that China is actively importing from African countries. Therefore, only a few comments will be made about future prospects.

The first point to be made is the relation between output and price (Fig. D-1). The annual production was 630,000-640,000 tons in the period 1972-1974. During this period, the price was low, but production declined to about 510,000 tons in 1975, to about 400,000 tons in 1976 when the price began to rise, and reached a peak in 1977. Since then, it has remained high, because it has been difficult to establish quickly systems that guarantee production increases. In view of the above movements of price and supply, the world demand can be estimated at about 650,000 tons for the forthcoming several years. The necessity of securing stable production levels in line with current demand can also be understood in terms of the relation between per capita consumption of cashew nuts and the per capita consumption of similar nuts.

Although all nuts have uses depending on their characteristics, at the same time, because many nuts have the same uses in common, one can be replaced by another if their prices are not too dissimilar. From this point of view, it is important to stabilize the international market price by establishing a stable system of cashew nut supply as well as developing new uses for the cashew nuts in order to increase their consumption.

Appendix Table 1 Cashew Nuts: Production by Country

(MT)

	1961-65 average	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Africa	206,720	313,000	339,000	366,476	358,084	382,920	324,954	212,750	318,248	173,278	149,563	154,965	170,745
Angola	1,040	-	-	-	1,400	1,400	1,400	1,400	1,500	1,200	1,200	1,200	1,200
Benin		-	-	-	-	-	-	-	-	-	150	110	115
Guinea-Bissau	2,000	-	-	2,500	2,500	2,500	3,000	3,000	2,500	3,000	3,000	3,000	3,000
Ivory Coast		-	-	-	-	-	450	350	500	500	550	600	650
Kenya	7,080	10,000	15,000	11,976	15,184	15,970	16,400	28,000	35,000	36,000	18,250	15,000	15,000
Madagascar	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	3,200	3,300	3,400	3,500
Mozambique	131,200	184,000	202,000	200,000	202,000	213,400	180,000	95,000	180,000	61,000	66,000	71,000	75,000
Tanzania	63,400	117,000	120,000	150,000	135,000	147,650	121,704	83,000	96,748	68,478	57,073	60,655	72,280
North and Central America	781	815	820	840	845	800	810	825	855	2,897	3,073	3,080	3,085
Dominican RP	781	815	820	840	845	800	810	820	850	850	860	870	880
El Salvador		-	-	-	-	-	-	-	-	2,042	2,208	2,208	2,200
Guadeloupe		-	-	-	-	-	-	5	5	5	5	2	5
South America	11,742	20,309	20,000	35,000	36,936	28,365	37,000	36,804	39,586	77,000	80,000	65,000	85,000
Brazil	11,742	20,309	20,000	35,000	36,936	28,365	37,000	36,804	39,586	77,000	80,000	65,000	85,000
Asia	151,755	212,291	222,890	232,225	234,179	235,997	148,409	152,543	155,636	155,636	185,295	185,146	195,510
India	145,200	207,000	217,000	227,000	230,000	230,000	141,000	147,000	150,000	150,000	180,000	180,000	190,000
Malaysia	200	-	200	200	200	600	600	600	600	600	610	640	660
Philippines	5,948	5,014	5,380	4,746	3,700	4,900	6,376	4,448	4,742	4,235	3,800	3,680	4,000
Sri Lanka	407	277	310	279	279	497	433	495	544	801	885	826	850
Total	370,998	546,415	582,710	634,541	630,044	648,082	511,173	402,922	514,575	408,911	417,931	408,191	454,340

Source: FAO, Production Yearbook

Appendix Table 2 Cashew Nuts (kernels): Exports from India

(MT)

	1973	1974	1975	1976	1977	1978	1979	1980
USA	18,453	10,720	22,192	17,496	7,388	3,411	12,949	5,948
Europe	4,893	4,835	4,708	4,862	2,283	1,668	-	-
Belgium -Luxemburg	170	151	133	172	82	4	-	-
Czechoslovakia	648	502	116	16	233	68	-	-
France	72	279	439	256	154	119	-	-
German DR	568	588	266	657	-	-	-	-
Germany, FR	898	663	888	998	422	320	-	-
Italy	139	23	29	25	5	15	-	-
Netherlands	811	1,336	1,491	1,652	992	804	-	-
Romania	125	75	219	-	-	-	-	-
Switzerland	93	93	108	124	86	9	-	-
UK	1,211	1,004	898	882	275	294	-	-
Other	158	121	121	80	34	35	-	-
Other countries	28,947	49,470	26,740	29,207	30,629	8,973	-	-
Australia	1,154	2,143	2,206	2,274	1,780	333	-	-
Bahrain	81	82	232	192	231	89	-	-
Canada	2,974	3,448	3,528	3,423	977	279	-	-
Hong Kong	551	896	614	736	595	95	-	-
Iran	64	125	226	243	103	9	-	-
Japan	3,229	1,809	3,862	5,177	3,167	2,103	-	-
Kuwait	194	289	452	597	480	373	-	-
Lebanon	228	160	121	5	56	89	-	-
New Zealand	33	269	278	187	16	74	-	-
Saudi Arabia	22	36	99	19	91	19	-	-
Singapore	389	349	455	448	249	158	-	-
USSR	19,959	39,712	14,436	15,721	22,590	5,269	-	22,780
Other	69	152	231	185	294	83	-	-
Total	52,293	65,025	53,640	51,565	40,300	14,052	37,287	36,856

Notes : 1) Year beginning April 1
2) 1978 data does not reflect a full year.

Source: FAS, USDA

Appendix Table 3 Cashew Nuts: Imports into Japan

(A: kg; B: ¥1,000; C: US$1,000)

		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
India	(A)	513,839*	455,705*	411,646*	389,482	501,926	778,159	1,133,368	1,907,122	2,941,697	1,856,058	3,343,517	5,478,443	3,383,723	3,026,866	4,140,182	2,085,188	874,668
	(B)	216,218*	202,700*	182,834*	189,209	259,272	440,950	618,403	940,124	1,521,506	1,338,912	2,516,883	4,052,666	3,830,011	2,655,394	3,571,756	2,562,458	1,354,382
	(C)	601	563	508	526	720	1,225	1,763	3,052	5,576	4,595	8,475	13,645	14,158	12,516	16,425	11,246	6,158
Tanzania	(A)	-	9,539	29,483	80,790	108,623	170,448	191,346	60,975	56,849	69,396	401,848	237,881	61,211	138,190	37,417	90,715	371,241
	(B)	-	3,209	11,514	26,691	43,990	69,602	59,426	6,627	15,987	29,024	204,372	82,389	79,503	98,723	28,649	92,411	513,376
	(C)		9	32	74	122	193	169	22	59	100	688	277	294	465	132	406	2,334
Brazil	(A)					998	1,994		6,810			4,536				2,312	106,471	267,008
	(B)					513	1,304		3,592			1,408				1,665	115,335	372,138
	(C)					2	4		12			5				8	506	1,692
Indonesia	(A)		126,267	142,156	6,071			2,320			5,920			330	32,217	11,111	233,640	175,500
	(B)		5,924	5,452	1,486			415			4,695			448	42,299	5,468	244,807	227,442
	(C)		17	15	4			1			16			2	199	25	1,075	1,034
Mozambique	(A)		6,804	51,074	30,817	256,660	359,717	408,720	395,517	290,434	399,113	439,643	342,157	189,290	111,119	6,167	-	150,109
	(B)		2,285	14,196	14,175	93,032	139,123	138,663	115,169	93,075	182,526	160,090	121,728	113,640	77,139	3,739	-	218,728
	(C)		6	39	39	258	386	395	374	341	626	539	410	420	364	17		995
Kenya	(A)				6,804								11,339	326,330	229,994	50,254	166,572	139,427
	(B)				2,863								5,620	278,707	157,501	33,567	182,366	184,392
	(C)				8								19	1,030	742	154	800	838
China	(A)	113									300	121,189	475,235	672,143	346,044	294,360	95,674	137,831
	(B)	43									224	79,185	250,883	645,577	295,243	216,131	106,712	191,111
	(C)	0									1	267	845	2,386	1,392	994	468	869
Sri Lanka	(A)		2,722											442			8,036	72,108
	(B)		393											472			8,358	104,044
	(C)		1											2			37	473
Thailand	(A)																	10,206
	(B)																	14,848
	(C)																	68
Hong Kong	(A)		64						144	113	226	12,246	13,902	113		453		
	(B)		0						0	107	233	9,445	8,860	159		499		
	(C)									0	1	32	30	1		2		
Malaysia	(A)														306	5,442		
	(B)														260	2,972		
	(C)														1	14		
Philippines	(A)			9,072*														
	(B)			1,141*														
	(C)			3														
Yemen	(A)			1,134*														
	(B)			542*														
	(C)			2														
S. Africa	(A)			13,199*														
	(B)			6,327														
	(C)			18														
USA	(A)									234								
	(B)									164								
	(C)									1								
Total	(A)	513,952	601,287	657,764	513,964	868,207	1,310,318	1,735,754	2,370,650	3,289,327	2,331,013	4,322,979	6,558,957	4,633,582	3,884,736	4,547,698	2,786,296	2,198,098
	(B)	216,261	214,575	222,006	234,424	396,807	650,979	816,907	1,065,656	1,630,839	1,555,614	2,971,383	4,522,146	4,948,517	3,326,559	3,864,446	3,312,447	3,180,461
	(C)	601	596	617	651	1,102	1,808	2,328	3,460	5,977	5,339	10,006	15,226	18,293	15,679	17,771	14,538	14,461

* Include Brazil nuts.

Source: Ministry of Finance, Government of Japan

Appendix Table 4 Selected Monthly Cashew Prices
Calendar Years 1975 through 1979

(US $/kg)

Year and Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1975													
Whole 320 1/	2.43	2.47	2.54	2.54	2.64	2.60	2.50	2.46	2.44	2.37	2.30	2.30	2.46
Whole 300-320 2/	2.58	2.58	2.54	2.80	2.80	2.80	2.76	2.76	2.76	2.76	2.47	2.47	2.67
Large white pieces 1/	1.67	1.70	1.71	1.70	1.71	1.68	1.62	---	---	---	---	---	1.68
Fancy pieces 2/	1.24	1.24	1.19	1.21	1.24	1.24	1.26	1.30	1.30	1.30	1.32	1.37	1.27
1976													
Whole 320 1/	2.32	2.47	2.44	2.60	2.62	2.61	2.77	2.85	2.84	2.83	2.99	3.13	2.71
Whole 300-320 2/	2.47	2.47	2.47	2.56	2.88	2.88	2.88	2.88	2.88	3.06	3.06	3.09	2.80
Large white pieces 1/	---	---	---	---	---	---	---	---	1.54	1.46	1.49	1.55	1.51
Fancy pieces 2/	1.34	1.34	1.34	1.48	1.79	1.79	1.79	1.79	1.79	1.81	1.87	1.87	1.67
1977													
Whole 320 1/	3.32	3.64	4.34	5.05	5.07	5.25	5.29	5.05	4.99	4.90	4.69	4.35	4.66
Whole 300-320 2/	3.57	3.88	4.56	5.45	5.42	5.56	5.56	5.45	5.36	5.25	5.09	5.07	5.02
Large white pieces 1/	1.65	1.73	2.28	2.71	2.75	2.75	2.75	2.57	2.52	2.50	2.28	2.20	2.39
Fancy pieces 2/	1.98	2.16	2.60	3.06	3.00	2.91	2.91	2.89	2.78	2.78	2.49	2.49	2.67
1978													
Whole 320 1/	4.38	4.18	4.03	4.09	4.33	4.58	4.58	4.44	4.36	4.36	3.88	3.79	4.25
Whole 300-320 2/	4.67	4.56	4.35	4.50	4.86	4.67	4.69	4.74	---	4.43	4.24	4.09	4.53
Large white pieces 1/	2.24	2.14	2.06	3.10	2.53	2.11	2.17	2.20	2.21	2.24	2.24	2.40	2.30
Fancy pieces 2/	2.32	2.26	2.13	2.25	2.34	2.36	2.36	2.36	---	2.58	2.62	2.63	2.38
1979													
Whole 320 1/	3.79	3.86	3.93	4.00	3.92	4.03	4.40	4.35	4.38	4.51	5.11	5.18	4.29
Whole 300-320 2/	4.08	4.17	4.19	4.30	4.30	4.54	4.74	4.83	4.78	4.85	5.18	5.40	4.61
Large white pieces 1/	2.47	2.36	2.37	2.41	2.40	2.46	2.63	2.72	2.73	2.76	3.21	3.41	2.66
Fancy pieces 2/	2.62	2.58	2.58	2.62	2.62	2.87	3.02	3.11	3.33	3.42	3.57	3.86	3.02

---Denotes not available, unknown, or not applicable.

1/ C&F, U.K. 2/ Spot, New York.

SOURCES: U.K. Publications, Ltd., The Public Ledger (London), weekly editions, and the New York Journal of Commerce, weekly editions.

Commodity Programs, FAS, USDA

Appendix Table 5 Estimated per Capita Imports of Nuts in Selected Countries

(kg)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Almonds, shelled											
Canada	0.077	0.075	0.071	0.076	0.095	0.112	0.071	0.086	0.143	0.153	0.169
France	0.258	0.258	0.225	0.250	0.263	0.234	0.194	0.228	0.270	0.299	0.298
Germany, FR	0.421	0.345	0.321	0.376	0.393	0.363	0.334	0.377	0.459	0.493	0.540
Japan *	-	-	-	-	0.062	0.074	0.057	0.047	0.078	0.093	0.102
Netherlands	0.284	0.260	0.284	0.258	0.274	0.236	0.227	0.252	0.308	0.327	0.370
Sweden	0.618	0.562	0.512	0.496	0.473	0.427	0.392	0.465	0.469	0.528	0.495
Switzerland	0.674	0.682	0.668	0.723	0.655	0.694	0.555	0.654	0.686	0.769	-
Brazil nuts, shelled											
Canada	0.031	0.028	0.038	0.028	0.040	0.043	0.022	0.037	0.039	0.037	0.030
France	0.003	0.004	0.004	0.007	0.005	0.004	0.006	0.005	0.006	0.004	0.005
Germany, FR	0.089 *	0.083	0.095	0.098	0.099	0.101	0.047	0.096	0.053	0.043	0.045
Japan *	-	-	-	-	-	-	-	-	-	-	-
Netherlands	0.022 *	0.016	0.029	0.023	0.034	0.039	0.020	0.039	0.048	0.031	0.035
Sweden	0.057 *	0.057	0.052	0.043	0.047	0.035	0.027	0.022	0.035	0.034	0.025
Switzerland	-	-	-	-	-	-	-	-	-	-	-
Cashews, shelled											
Canada	0.110	0.124	0.131	0.231	0.351	0.303	0.264	0.212	0.284	0.191	0.172
France	-	0.012	0.016	0.019	0.020	0.022	0.012	0.016	0.019	0.014	0.014
Germany, FR	0.020	0.024	0.030	0.034	0.040	0.048	0.036	0.044	0.048	0.042	0.036
Japan *	0.005	0.008	0.013	0.016	0.022	0.030	0.021	0.038	0.058	0.041	0.034
Netherlands	0.062	0.074	0.089	0.127	0.157	0.195	0.180	0.234	0.232	0.202	0.212
Sweden	0.022	0.020	0.029	0.027	0.036	0.031	0.033	0.026	0.024	0.020	0.014
Switzerland	-	-	-	-	-	-	-	-	-	-	-
Chestnuts, shelled											
Canada	-	-	-	-	-	-	-	-	-	-	-
France	0.157	0.179	0.155	0.160	0.189	0.139	0.093	0.094	0.099	0.150	0.221
Germany, FR	-	-	-	-	-	-	-	-	-	-	-
Japan *	-	-	-	-	-	-	-	-	-	-	-
Netherlands	0.018	0.011	0.012	0.012	0.014	0.022	0.012	0.018	0.017	0.020	0.017
Sweden	-	-	-	-	-	-	-	-	-	-	-
Switzerland	0.658	0.653	0.615	0.632	0.639	0.542	0.554	0.619	0.619	0.596	-

Appendix Table 5 (cont'd.)

(kg)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Filberts, shelled											
Canada	0.022	0.031	0.026	0.028	0.036	0.053	0.037	0.025	0.028	0.050	0.039
France	0.138	0.142	0.134	0.150	0.169	0.188	0.181	0.203	0.239	0.275	0.259
Germany, FR	0.570	0.578	0.590	0.646	0.713	0.764	0.739	0.743	0.840	0.939	0.980
Japan *	-	-	-	0.003	0.002	0.003	0.001	0.001	0.001	0.003	0.002
Netherlands	0.146	0.221	0.204	0.254	0.257	0.295	0.288	0.328	0.379	0.397	0.382
Sweden	0.310	0.329	0.298	0.317	0.353	0.408	0.394	0.424	0.456	0.477	0.434
Switzerland	1.220 *	1.360	1.170	1.270	1.430	1.460	1.520	1.360	1.420	1.750	1.480
Walnuts, in-shell											
Canada	0.058	0.048	0.065	0.090	0.071	0.066	0.074	0.083	0.108	0.088	0.076
France	0.044	0.025	0.014	0.218	0.072	0.076	0.035	0.029	0.112	0.175	0.108
Germany, FR	0.285	0.247	0.232	0.226	0.220	0.272	0.236	0.283	0.256	0.247	0.289
Japan *	-	-	-	-	-	-	-	-	-	-	-
Netherlands	0.060	0.068	0.073	0.097	0.114	0.085	0.079	0.159	0.160	0.138	0.152
Sweden	0.060	0.068	0.050	0.045	0.055	0.047	0.044	0.043	0.048	0.048	0.042
Switzerland	0.160 *	0.152	0.195	0.232	0.225	0.204	0.242	0.231	0.303	0.227	0.239
Walnuts, shelled											
Canada	0.163	0.205	0.178	0.171	0.166	0.180	0.162	0.137	0.162	0.192	0.149
France	0.003	0.005	0.005	0.008	0.014	0.018	0.010	0.029	0.037	0.024	0.029
Germany, FR	0.009	0.008	0.008	0.010	0.009	0.010	0.010	0.012	0.013	0.012	0.010
Japan *	0.005 **	0.006	0.004	0.006	0.007	0.009	0.011	0.006	0.011	0.012	0.012
Netherlands	0.015	0.016	0.017	0.021	0.020	0.019	0.025	0.016	0.028	0.027	0.032
Sweden	0.009	0.009	0.008	0.007	0.010	0.011	0.008	0.009	0.009	0.008	0.008
Switzerland	-	-	-	-	-	-	-	-	-	-	-

* Not separately classified (combined in-shell and shelled).
** Mostly shelled, but may include small amounts of in-shell.

Source: FAS, USDA

[8-2-4] PINEAPPLE JUICE

A. INTRODUCTION

Pineapples, from which pineapple juice is obtained, were originally produced in tropical areas, especially Central America and northern Brazil. They are today produced all over the world, and according to FAO data, the world production stood at 3.26 million tons in 1965, and after that increased annually to 4.154 million tons in 1970, 5.357 million tons in 1975, and up to 8.866 million tons in 1981 (Appendix Table 1).

I. Varieties

1. Smooth Cayenne

Smooth Cayenne was developed in Cayenne, the capital of French Guiana, from the ordinary thorned pineapple. It is today cultivated in all parts of the world, and is the most common species found in Hawaii.

It has large roots, no thorns on its leaves and bears fruit about 1.4 - 3.5 kg in weight. Since its flesh is yellow and rich in juice, is very sweet and has little fiber, it is the best of all pineapples.

2. Sarawak

This is a strain of Smooth Cayenne found in Borneo that adapted over the years to the high temperature and humidity of the lowlands. The characteristics of Sarawak are almost the same as those of Smooth Cayenne. Since it is hardier, it is less likely to be affected by unfavorable natural conditions, and has many slips able to be used for propagation.

3. Yellow Mauritius

This is produced to be eaten raw in Taiwan, Malaysia and Java. It is hardy, and has shorter darker color (purple-red) leaves with more thorns than other varieties. The fruit is small and at most weighs 1.5 kg. The bright yellow pulp has few fibers, is very sweet and is excellent when eaten raw.

4. Ripley Queen

This is cultivated in the West Indies and Sri Lanka. It has no thorns on its leaves, and possesses a strong flavor, although it is small. The bright yellow pulp does not spoil during transportation and is suitable for canning.

5. Red Spanish

This is cultivated in large quantities in the West Indies. It has thorns on its leaves, and the pulp is white, but very sweet and very suitable for eating raw.

Besides these varieties, there is Sugar-Loaf, Ruby, Egyptian Queen, Bracomorensis and Abbaka, all of which have been grown for many years. Moreover, there is Amarillo, a well-known Brazilian variety, and Cabezona, is a well-known Puerto Rican variety.

II. Land Suitable for Cultivation

Pineapples grow well in regions having an annual average temperature of 24-27°C. Although they grow well in dry climates, a minimum annual rainfall of 1,300mm is necessary. If the area is well drained, however, they grow well even in a climate with high temperatures and humidity. However, if there is too much sun or wind, or the soil is dry and sandy, covering is required. The virgin soil of jungles can produce high yields and sweet fruit. An acid soil of pH 5-6 is ideal for cultivation.

B. PRODUCTION TRENDS

World-wide data on the production of pineapple juice are poor. Only the data of USDA is available, and this discussion will be based on these figures. The production of the main countries will be discussed on a country-by-country basis.

In the production of single strength (not concentrated) juice, the United States ranks first in the world, producing 107,957 tons in 1976 with annual increases to 123,572 tons in 1980 (about a 14% increase). The Philippines is the second largest producer, showing a rise from 38,584 tons in 1977 to 41,500 tons in 1981 (7.6% increase). The Ivory Coast produced 16,000 tons in 1980. Mexico's production has also been increasing steadily, peaking at 11,750 tons in 1980. Production in Australia fell by 20% from 1976 to 1977, but after that produced around 10,000 tons annually, with 10,206 tons in 1980. Production levels in Malaysia have fluctuated strongly but reached 2,189 tons in 1980.

Table B-1 Production of Pineapple Juice, Single-strength

(tons)

	USA	Philippines	Ivory Coast	Mexico	Australia	Malaysia
1976	107,957	-	15,673	8,870	14,003	1,492
1977	110,849	38,584	13,622	9,850	11,063	2,005
1978	115,861	27,010	18,000	11,950	10,920	2,121
1979	115,861	31,872	15,600	12,300	10,757	1,227
1980	123,572	41,500	16,000	11,750	10,206	2,189
1981	122,000	40,000	15,000	11,000	10,000	3,000
1982	115,000	40,000	15,000	7,000	10,000	3,000

Note : 1982: Forecast

Source: USDA

Regarding concentrated juice, Thailand produced only 2,500 tons in 1976, but on increasing production by 8.5 times, to 21,500 tons, in 1980 was the world's largest producer. The Philippines maintained its stable production levels with 20,000 tons in 1980. South Africa showed an overall decline from its previous annual average of 10,000 tons to produce only 6,835 tons in 1980. In the United States, also, production has been falling with only 4,145 tons produced in 1980.

Table B-2 Production of Pineapple Juice, Concentrate *

(tons)

	Thailand	Philippines	South Africa **	USA
1976	2,500	-	9,997	6,169
1977	2,500	21,220	10,075	5,205
1978	4,700	21,257	10,623	5,109
1979	12,500	21,880	7,833	5,398
1980	21,500	20,000	6,835	4,145
1981	11,000	17,000	3,000	4,000
1982 ***	11,000	20,000	3,000	4,000

* Mostly 60 degrees brix.
** Includes some single-strength juice.
*** Forecast

Source: USDA

Trends in the production of pineapple juice among the main producers are discussed below.

1. The Philippines

The area under cultivation was about 40,000 ha in 1980, (an increase of 7% over the previous year), of which 60% is on Mindanao, where three major pineapple processing plants are located, viz., Dole Philippines Inc. (Dole), Philippine Packing Corporation (Del Monte), Crown Fruits and Canning Corporation (CFCC). Two companies, Del Monte and Dole own about 80% of the land under cultivation and account for about 90% of raw pineapple production. In general, 40% of the raw pineapples are canned, a further 40% is converted into concentrated juice or processed and canned with other tropical fruits such as pineapple, banana, papaya and cherry. The remainder is used to satisfy domestic demand, with the balance being exported. There are four canning companies in the Philippines, whose total capacity is 400,000 tons annually, of which 93% is produced by two companies - Dole and Del Monte (see Tables B-1 and B-2 for trends in pineapple juice production).

2. Ivory Coast

Pineapples are produced in the south-eastern forest zone within 75 miles of the capital and the area under cultivation has increased in the past few years to 12,000 ha in 1980. Half the quantity of raw pineapples produced is processed and the rest is consumed domestically. Twenty percent of the area under cultivation specially for processing is owned by the canning companies, and the remainder is made up of small plantations of 2-3 ha.

The canning companies are:

a. SALCI (Private company)
Twenty percent of the raw pineapples are canned by individual plantations. Canned pineapples are produced for domestic consumption and export.

b. SAFCO (Private company)
Eighty percent of the raw pineapples are canned by individual plantations. Canned pineapples are produced only for domestic consumption.

c. Nouvelle SIACA
The base of its production is in Bonoua, and it purchases all of its raw pineapples from the SACABO Cooperative. Canned pineapples are produced for export to Europe.

The Government spent US$6 million to protect the pineapple industry rise in production costs in 1979 (see Table B-1 for trends in pineapple juice production).

3. Mexico

The area under pineapple cultivation in Mexico decreased by 1% from 1979 to 14,800 ha in 1980. There are four large-scale canning operations as well as other smaller ones. Three of the large-scale plants are in Mexico City and the other one is in Queretaro. Cofrinsa, the largest plant, accounting for 25% of total production in Mexico, contracts with small farms to purchase raw pineapples. The total of processed products produced in this plant accounts for 50% of the total production in Mexico. The major proportion of these products are exported and around 10% is consumed domestically. Two thirds of the total exports of processed pineapple goes to the United States. In Mexico, canning plants do not own or directly manage plantations (see Table B-1 for trends in pineapple juice production).

4. Australia

Queensland is the major producing area of pineapples in Australia, although small quantities are cultivated in the northern and western regions. The area under cultivation has expanded over the years due to the large demand for raw and processed pineapples, and high market prices. The cultivated area expanded from 6,001 ha in 1978 to 6,450 ha in 1980. Of this, the harvested area was 4,150 ha. The only company which can process pineapples in Australia is the Golden Circle Cannery located in Brisbane. It was due to the popularity of orange juice that the production, which stood at 14,000 tons in 1976, gradually declined in the following four years (see Table B-1 for trends in pineapple juice production).

5. Malaysia

Pineapple cultivation in Malaysia is concentrated in Johore State, where there are many small farms (about 3,000). Three long-established private canning companies own plantations which range in size from 600 to 2,800 ha. The problem of labor shortage has existed since the middle 1960s and more recently has become serious as many laborers turn to more highly paid jobs in factories and construction sites in Singapore. The area under cultivation decreased from 19,000 ha in 1979 to 10,400 ha in 1980.

In 1980, four companies set up new independent plants (The Pineapple Cannery of Malaysia Sdn., Lee Pineapple Company Sdn., United Malayan Pineapple Growers and Canners Private Limited, and Lam Huat Hun Kee Pineapple Company Limited) (see Table B-1 for trends in pineapple juice production).

6. Thailand

The area under pineapple cultivation in Thailand was 35,140 ha in 1967, about 63,000 ha in 1970, and reached 300,000 ha in 1980. About 10% comprises areas as large as 1,000 - 1,500 ha which have direct connections with processing plants. Other areas are composed of small farms (about 35,000) of 8-11 ha on average.

There are forty canning plants, of which nine are large-scale plants producing two-thirds of the volume of processed pineapples.

Table B-3 Fresh Pineapple Crop: Area, Yield, Production in Thailand

	Area planted (ha)	Yield (MT/ha)	Production of non-processed pineapple (MT)
1967	35,140	5.18	182,023
1968	42,252	4.37	184,753
1969	45,978	4.22	193,991
1970	63,062	3.85	242,489
1971	43,060	2.90	124,826
1972	87,251	3.65	318,789
1973	102,958	4.70	483,493
1974	148,837	5.40	803,720
1975	184,040	6.26	1,151,865
1976	220,000	5.89	1,295,850
1977	245,000	6.12	1,499,400
1978	275,000	5.60	1,540,000
1979	280,000	4.90	1,372,000
1980 *	300,000	5.60	1,680,000
1981 **	300,000	6.00	1,800,000

* Preliminary
** Forecast

Source: USDA

7. Taiwan

The area under pineapple cultivation in Taiwan was 16,434 ha in 1969, but began to decrease rapidly in 1976 and fell to 8,763 ha in 1980. Today, 42% of plantations are located in central Taiwan, 40% in the northern regions and 18% in eastern regions. Trends are shown in Table B-4.

8. Brazil

According to FAO data (shown in Appendix Table 1), Brazil was the world's third highest producer of raw pineapples in 1981, with an output of 625,000 tons.

The export of pineapple juice of 1981 was about 4,000 tons and the export value (FOB) was 4,420,000 US dollars. It is worth noting that the export volume is still very small compared with the production volume of raw pineapples.

Table B-4 Fresh Pineapple Crop: Area, Yield, Production in Taiwan

	Area planted (ha)	Yield (kg/ha)	Production of non-processed pineapple (MT)
1969	16,434	26,111	325,009
1970	16,797	26,510	338,000
1971	17,000	27,438	358,529
1972	16,094	25,471	334,384
1973	15,828	25,208	327,982
1974	16,778	23,192	307,851
1975	16,391	26,251	318,978
1976	13,728	28,727	278,830
1977	12,020	29,868	282,193
1978	11,556	21,602	249,627
1979	8,889	33,202	186,467
1980	8,763	31,121	228,804

Source: Taiwan AGR Yearbook

Table B-5 Brazil: Pineapple Juice Exports in 1981

	Quantity (1,000 tons)	Average unit price (US$/kg)	Amount (US$1,000)
Netherlands	1.4	1.1	1,555.6
UK	1.1	1.3	1,477.7
Argentina	0.5	1.1	564.5
Germany, FR	0.2	1.1	223.4
Chile	0.3	1.4	410.6
Other	0.5	-	188.2
Total	3.9	1.1	4,420.0

Source: CACEX

9. Japan

Japanese pineapples are produced in Okinawa. The area under cultivation and the production levels are shown in the following table.

The total cultivated area has tended to decrease over the years, but began to increase again in 1980.

Table B-6 Okinawa: Area under Pineapple Cultivation and Production of Pineapples

(area: ha; production; tons)

	Area under cultivation	Production		Area under cultivation	Production
1965	4,655	67,111	1976	2,960	59,100
1971	5,115	70,800	1977	2,800	37,100
1972	4,445	59,600	1978	2,830	45,300
1973	4,390	85,100	1979	3,000	52,900
1974	4,610	77,000	1980	3,200	56,200
1975	3,600	64,500	1981	3,330	58,100

Source: Ministry of Agriculture, Forestry and Fisheries, Government of Japan

C. TRENDS IN TRADE

Discussion is based only on FAO and USDA data because of the lack of other reliable data.

I. Trends in Exports

Since the FAO data has no figures for certain years in the Table showing the exports of the nineteen pineapple producers (see Appendix), it is impossible to make comparisons of world trade on a yearly basis. In considering exports by each country, USDA data has been used.

1. The United States

As shown in Appendix Table 2, the United States' exports of pineapple juice was 16,091 tons in 1970, but decreased annually thereafter, slumping to a four-figure quantity in the three years after 1975. Exports in 1981 were lower than those in 1970. The price was around US$400 per ton in four years - 1975, 1976, 1978 and 1979 - but dropped to US$378 per ton in 1981. According to USDA data (Table C-1), the total exports of juice (other than concentrated), tended to decrease annually from a level of 3.851 million gallons in 1971, although they improved later in the decade to rise to a level of 2.865 million gallons in 1980. Canada was the biggest customer, accounting for 57% of the total exports of the United States in 1980.

According to the USDA data shown in Table C-2, the exports of concentrated juice reached 482,000 gallons in 1971, dropped dramatically in 1976, but began to recover in 1978, reaching 885,000 gallons in 1980. The major customers for concentrated juice were France, Saudi Arabia and Jamaica with imports of 189,000, 171,000 and 100,000 gallons, respectively, in 1980.

2. The Philippines

The Philippines is now the world's biggest pineapple juice exporter. It exported 23,083 tons in 1970, and maintained an annual level of 20,000 tons thereafter, recording a high of 38,000 tons in

Table C-1 United States Exports of Pineapple Juice, Not Concentrated
Calendar Years

(1,000 gallons)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
North America										
Canada	1,599	1,456	1,805	1,454	840	636	1,304	1,494	966	1,626
Mexico	6	2	5	7	3	1	14	4	2	1
Total	1,605	1,438	1,810	1,461	843	637	1,498	1,498	968	1,627
Central America										
Belize	0	0	0	0	1	1	2	0	0	3
Honduras	0	0	0	0	0	0	0	0	5	6
Panama	5	6	1	0	9	11	54	3	3	0
Other	0	0	2	2	0	0	2	1	1	0
Total	5	6	2	3	10	12	59	4	9	9
Caribbean										
Bahamas	82	74	74	68	45	26	30	50	33	21
Barbados	14	9	14	3	9	5	3	5	1	2
Bermuda	24	10	12	8	34	47	21	51	54	51
Cayman Is.	0	0	0	0	0	1	4	16	15	8
Franch W. Indies	1	0	1	0	1	1	2	2	2	15
Jamaica	0	0	0	0	0	65	0	25	0	16
Jamaica	17	27	12	22	29	0	0	0	9	9
LW & WW Is.	12	17	26	13	8	7	23	32	46	52
Nethl. Antilles	77	78	67	86	50	60	69	75	71	100
Trinidad Tobago	4	2	51	0	0	9	15	7	15	15
Other	0	0	0	0	0	1	0	0	0	4
Total	230	216	257	193	160	212	147	263	237	245
South America										
Colombia	2	1	2	2	1	8	2	0	11	17
Surinam	7	14	5	1	1	5	10	4	18	8
Other	2	3	4	1	1	0	0	0	0	0
Total	11	18	11	4	3	5	19	5	29	25
European Community										
Belgium-Luxemburg	187	42	65	15	7	8	7	1	1	0
Denmark	5	11	5	3	13	32	2	12	0	9
France	348	446	326	206	141	227	64	6	0	0
Germany, FR	106	46	56	35	27	26	55	2	2	8
Ireland	0	7	9	0	0	9	0	0	0	0
Italy	75	29	27	9	12	5	4	14	1	146
Netherlands	78	61	36	31	17	7	11	6	4	9
UK	51	1	6	11	2	8	8	1	2	4
Total	848	642	524	311	215	314	143	42	18	167
Other Western Europe										
Austria	34	32	30	4	1	1	8	8	0	0
Iceland	2	5	8	2	4	5	0	5	2	3
Norway	6	4	7	1	2	2	2	2	3	2
Spain	1	35	24	21	8	17	4	3	0	0
Sweden	30	14	13	27	4	7	18	10	27	10
Switzerland	9	5	21	9	0	0	0	0	1	0
Other	5	4	1	0	1	0	1	0	0	0
Total	46	79	91	63	21	33	16	19	32	29
Middle East										
Bahrain	2	2	1	6	1	1	12	2	21	12
Israel	2	3	5	0	0	0	0	0	0	0
Jordan	0	1	0	0	0	0	0	0	7	26
Kuwait	21	15	7	11	6	15	14	19	12	38
Lebanon	62	14	26	8	24	0	28	12	18	9
Oman	0	9	0	0	8	2	1	3	7	12
Saudi Arabia	2	9	68	55	50	73	83	123	262	365
United Arab Emirat	0	6	8	49	7	33	25	70	55	84
Other	4	5	3	0	2	1	0	6	8	5
Total	93	55	119	122	91	124	163	234	342	542

Table C-1 (cont'd.)

(1,000 gallons)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Far East										
Hong Kong	7	8	4	4	1	1	1	2	2	8
Indonesia	0	1	7	10	3	51	9	12	12	14
Japan	4	2	15	61	3	2	10	13	6	4
Korea, Rep. of	26	10	17	15	7	7	6	27	36	76
Nansei Is.	15	4	0	0	0	0	0	0	0	0
Singapore	12	12	13	15	6	7	11	10	19	15
Other	5	1	1	1	1	1	1	1	0	2
Total	69	30	54	105	21	69	34	65	66	112
Africa										
Canary Is.	4	7	3	0	0	3	0	0	0	0
Egypt	0	0	0	0	0	1	0	0	1	6
Liberia	8	9	13	3	4	3	1	0	1	7
Libya	14	33	6	2	1	1	5	24	56	3
Morocco	9	15	13	2	0	0	0	3	0	0
Nigeria	10	3	1	1	1	5	0	2	0	0
Other	2	0	2	3	1	0	0	3	2	0
Total	47	67	38	10	7	14	6	32	60	9
Australia and Pacific										
FR Pacific Is.	58	118	112	119	56	33	38	40	22	29
New Zealand-W. Sar.	5	0	0	9	8	0	8	8	8	0
T Ter Pacific Is	0	1	2	0	1	3	1	1	4	44
Other	3	5	6	4	4	1	0	0	1	0
Total	67	123	120	123	64	67	64	42	27	73
World Total	3,851	2,694	3,027	2,394	1,445	1,436	1,947	2,204	1,818	2,865

Note : Total may not add due to rounding.

Source: USDA

Table C-2 United States Exports of Pineapple Juice, Concentrated
Calendar Years

(1,000 gallons)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
North America										
Canada	32	60	30	51	23	13	9	272	71	2
Other	2	0	1	1	0	0	0	0	0	0
Total	64	60	61	52	23	13	9	272	71	2
Central America										
Belize	0	0	0	0	0	0	0	5	0	0
Panama	20	0	2	0	0	0	2	0	0	0
Other	0	0	0	0	0	0	3	0	1	3
Total	20	1	2	0	0	0	5	6	1	4
Caribbean										
Bahamas	1	0	6	3	14	12	2	14	3	6
Barbados	0	0	0	0	0	0	5	0	0	2
Bermuda	9	36	4	0	3	0	1	3	3	0
Jamaica	0	0	0	0	0	25	55	74	0	100
Jamaica	9	15	35	7	44	0	0	0	0	0
LW & WW Is.	1	1	0	1	0	4	0	10	31	2
Nethl. Antilles	3	0	1	2	1	0	0	26	36	8
Trinidad Tobago	13	25	6	0	1	1	16	11	0	0
Other	0	0	0	0	0	0	4	2	4	1
Total	36	78	52	13	63	42	84	140	77	119
South America										
Colombia	0	0	0	0	0	0	0	0	0	41
Other	0	0	0	0	0	0	3	3	0	4
Total	0	0	0	0	0	0	3	3	0	45
European Community										
Belgium-Luxemburg	26	34	17	7	3	0	0	10	26	35
France	126	139	266	220	156	9	36	140	165	189
Germany, FR	56	38	4	3	0	0	2	18	48	71
Netherlands	30	30	1	3	0	0	0	0	82	89
Other	3	5	0	0	1	0	0	0	0	0
Total	241	246	288	233	160	9	38	168	321	385
Other Western Europe										
Austria	27	0	0	0	0	0	0	0	0	0
Spain	7	10	0	0	0	6	0	0	0	0
Switzerland	71	4	9	0	0	0	0	0	0	0
Other	1	0	0	0	0	0	1	0	1	0
Total	106	14	9	0	0	6	1	0	1	0
Middle East										
Israel	0	0	0	0	0	0	0	0	0	8
Lebanon	23	37	42	88	11	0	0	0	1	0
Saudi Arabia	2	2	4	1	3	11	39	11	59	171
United Arab Emirat	0	0	0	0	1	0	1	0	9	51
Other	0	0	0	1	0	1	3	4	11	3
Total	25	40	46	90	14	11	44	14	80	233
Far East										
Japan	0	0	1	0	0	5	1	0	3	18
Korea, Rep. of	0	0	0	0	0	2	7	1	0	0
Philippines	0	0	0	0	0	0	0	0	6	0
Other	0	5	0	1	1	1	3	0	0	0
Total	0	5	1	1	1	7	10	0	9	18
Africa										
Nigeria	0	1	0	0	0	0	0	0	0	22
Other	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	0	23
Australia and Pacific										
Australia	10	7	5	5	0	4	4	5	3	53
Other	10	1	1	0	0	2	0	0	1	5
Total	20	8	5	5	0	5	5	5	4	57
World Total	482	451	435	394	262	94	198	608	565	885

* Beginning 1978 data are in single - strength - equivalent gallon.
Note : Totals may not add due to rounding.

Source: USDA

1977. Although production dropped to 23,000 tons in 1978, it recovered to 37,000 tons in the following year and reached 39,700 tons in 1981. The export price per ton is cheaper by about 12% than that of the United States. According to the USDA data shown in Table C-3, the major consumers of concentrated juice were the United States and the Netherlands. In 1980, total exports were 18,298 tons, of which 76% (13,851 tons) were to the United States, and 10% (1,884 tons) to the Netherlands.

Table C-3 Pineapple Juice, Concentrated: Exports from the Philippines

(tons)

Country of destination	1974	1975	1976	1977	1978	1979	1980
USA	8,198	9,060	10,212	11,987	9,325	17,130	13,851
Other countries							
Belgium-Lusemburg	55	56	270	292	274	582	288
Canada	341	123	216	149	200	260	202
France	-	226	99	380	278	858	439
Germany, FR	122	258	705	349	694	521	290
Italy	220	-	-	-	48	-	-
Korea, Rep. of	28	-	-	3	510	382	-
Lebanon	314	253	-	-	100	112	222
Netherlands	659	674	1,870	1,086	553	1,394	1,884
Spain	105	-	240	200	217	184	461
UK	85	206	230	241	271	350	252
Other	73	43	53	161	50	22	409
Total	2,002	1,839	3,683	2,861	3,465	4,665	4,447
Grand Total	10,200	10,899	13,895	14,848	12,790	21,795	18,298

Source: USDA

As shown in Table C-4, the exports of juice (other than concentrated) rose from 13,364 tons in 1974 to a peak of 25,088 tons in 1980 although the interim period showed fluctations. The major consumer is Canada, accounting for 3,900 tons, or 16% of total exports, in 1980. The United Kingdom is the biggest consumer after Canada, and a large quantity of juice is also exported to Japan.

Table C-4 Pineapple Juice, Not Concentrated: Exports from the Philippines

(tons)

Country of destination	1974	1975	1976	1977	1978	1979	1980
USA	3,686	8,437	919	18,389	5,866	7,639	17,092
Europe							
Belgium-Luxemburg	180	1	11	12	4	16	-
Denmark	73	390	21	10	1	-	-
Germany, FR	108	154	48	27	14	33	-
Italy	219	77	71	140	93	94	-
Netherlands	640	548	36	59	4	13	-
Norway	373	18	60	34	15	1	-
Spain	94	36	53	186	1	75	189
Sweden	242	276	128	110	32	36	-
UK	2,858	2,612	2,123	1,384	507	795	1,405
Other	53	18	57	51	-	9	-
Total	4,840	4,130	2,608	2,013	671	1,072	1,594
Other countries							
Canada	4,052	4,259	3,575	2,354	3,298	5,909	3,900
Hong Kong	381	258	206	242	155	174	302
Japan	70	191	290	223	794	346	1,143
Saudi arabia	189	327	-	-	-	109	-
Singapore	79	77	68	87	28	32	-
Other	67	275	116	71	32	34	1,057
Total	4,838	5,387	4,225	2,977	4,304	6,604	6,402
Grand Total	13,364	17,954	7,752	23,379	10,844	15,315	25,088

Source: USDA

3. Thailand

Thailand exported 21,126 tons of pineapple juice in 1980, following the Philippines as a major supplier (see Appendix Table 2). Exports rose rapidly from the level of 1,019 tons in 1974, a trend which is reflected in the expansion of the area under cultivation (Table B-3). This increase in cultivated land has caused problems of overproduction in the past two years, resulting in the suspension of operations of some processing plants. As shown in Table C-5, the United States is Thailand's biggest customer, receiving 79%, or 16,661 tons, of the total exports in 1980. The second largest consumer is Spain with 1,656 tons in 1980.

Table C-5 Pineapple Juice, Exports from Thailand *

(tons)

Country of destination	1974	1975	1976	1977	1978	1979	1980
USA	427	2,240	1,515	1,389	3,036	9,329	16,661
Other countries							
Bahrain	69	14	186	90	266	18	23
Canada	-	358	-	-	-	218	550
Chile	-	-	-	100	110	-	-
Germany, FR	27	138	333	11	7	509	357
Iran	-	-	-	-	346	-	-
Korea, Rep. of	-	-	-	53	35	191	216
Lebanon	-	1	-	47	317	763	369
Netherlands	460	27	122	360	28	449	521
Saudi Arabia	-	3	27	139	193	100	161
Spain	7	7	50	-	50	150	1,656
UK	-	-	-	62	53	294	150
Other	29	84	68	158	99	202	462
Total	592	632	786	1,020	1,504	2,894	4,465
Grand Total	1,019	2,872	2,301	2,409	4,540	12,223	21,126

* Mostly concentrated juice

Source: USDA

4. Ivory Coast

Ivory Coast is now the fourth largest exporter of pineapple juice (after the United States, which is third). Trends in the exports of pineapple juice show that exports declined from a peak of 17,660 tons in 1973, but recovered to the level of 10,000 tons in 1981. As shown in Table C-6, the largest customer is France (accounting for 70-80% of the total exports), followed by the United Kingdom.

II. Trends in Imports (See Appendix Table 3)

The major importer of pineapple juice is the United States. Canada ranks second, followed by the United Kingdom, France, the Netherlands and the Federal Republic of Germany. Trends in imports by country are considered below.

Table C-6 Pineapple Juice, Exports from the Ivory Coast

(tons)

Country of destination	1974	1975	1976	1977	1978	1979	1980
USA	169	80	-	-	-	-	101
Other countries							
Belgium-Luxemburg	186	90	127	-	-	-	-
Cameroon	128	80	-	-	103	-	-
France	12,903	8,613	10,021	9,554	5,427	1,580	4865
Germany, FR	404	165	-	-	-	-	-
Mali	120	83	-	117	193	-	-
Mauritania	161	165	104	89	-	-	-
Morocco	111	98	-	-	-	-	-
Netherlands	179	60	-	-	-	-	-
Niger	44	38	-	82	185	133	220
Senegal	481	574	840	503	307	270	300
Spain	-	-	-	333	-	-	-
UK	212	-	-	479	-	-	1,023
Upper Volta	38	58	-	115	-	-	122
Other	414	224	949	423	1,830	809	292
Total	15,381	10,248	12,041	11,695	8,045	2,792	6,822
Grand Total	15,550	10,328	12,041	11,695	8,045	2,792	6,923

Source: USDA

Table C-7 United States Imports of Concentrated Pineapple Juice
Calendar Years 1)

(1,000 gallons)

COUNTRY	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
NORTH AMERICA										
MEXICO	0	0	80	158	143	0	0	2,267	3,013	3,047
TOTAL	0	0	80	158	143	0	0	2,267	3,013	3,047
CENTRAL AMERICA										
HONDURAS	0	0	0	0	0	0	0	0	225	1,081
TOTAL	0	0	0	0	0	0	0	0	225	1,081
CARIBBEAN										
DOMINICAN REPUBLIC	16	0	0	40	0	0	0	0	0	0
FRENCH WEST INDIES	0	0	0	0	0	0	0	0	16	0
TOTAL	16	0	0	40	0	0	0	0	16	0
SOUTH AMERICA										
VENEZUELA	36	59	73	127	61	0	45	7	0	0
OTHER	0	0	0	2	0	0	0	1	0	0
TOTAL	36	59	73	130	61	0	45	8	0	0
OTHER WESTERN EUROPE										
OTHER	0	0	0	0	0	0	0	0	0	2
TOTAL	0	0	0	0	0	0	0	0	0	2
FAR EAST										
CHINA (TAIWAN)	0	0	0	0	716	680	0	0	0	1
HONG KONG	0	0	0	886	1,949	154	0	51	0	0
INDIA	0	0	0	0	0	0	0	0	66	0
PHILIPPINES	11,765	10,393	9,848	8,124	8,597	12,238	15,057	14,740	15,670	15,765
THAILAND	0	0	0	0	518	1,107	1,982	4,140	8,720	10,575
OTHER	0	0	0	0	0	0	0	0	0	0
TOTAL	11,765	10,393	9,848	9,010	11,780	14,179	17,039	18,931	24,457	26,341
AFRICA										
IVORY COAST	0	0	0	0	0	0	0	0	0	34
OTHER	0	0	0	0	0	0	0	0	0	4
TOTAL	0	0	0	0	0	0	0	0	0	39
WORLD TOTAL	11,817	10,452	10,001	9,338	11,984	14,179	17,085	21,206	27,710	30,508

NOTE: TOTALS MAY NOT ADD DUE TO ROUNDING.

1/ Single strength equivalent gallons.

Table C-8 United States Imports of Pineapple Juice (not concentrated)
Calendar Years

(1,000 gallons)

COUNTRY	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
NORTH AMERICA										
MEXICO	0	0	0	1	0	0	8	22	114	9
TOTAL	0	0	0	1	0	0	8	22	114	9
CARIBBEAN										
OTHER	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0
SOUTH AMERICA										
BRAZIL	0	0	0	0	0	6	0	0	0	0
OTHER	0	0	0	0	0	0	0	2	0	0
TOTAL	0	0	0	0	0	6	0	2	0	0
EUROPEAN COMMUNITY										
OTHER	0	0	0	0	0	0	0	0	4	0
TOTAL	0	0	0	0	0	0	0	0	4	0
USSR AND EAST EUROPE										
OTHER	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0
FAR EAST										
PHILIPPINES	1,255	227	101	0	2,002	427	4,208	3,122	6,163	9,257
THAILAND	0	0	0	0	201	0	100	282	0	0
OTHER	0	0	0	0	4	0	0	0	0	0
TOTAL	1,255	227	101	0	2,207	427	4,307	3,405	6,163	9,257
AFRICA										
IVORY COAST	0	0	0	0	0	0	0	23	0	0
TOTAL	0	0	0	0	0	0	0	23	0	0
WORLD TOTAL	1,255	227	101	1	2,207	432	4,316	3,451	6,282	9,266

NOTE: TOTALS MAY NOT ADD DUE TO ROUNDING.

1. The United States

According to FAO data, the United States' imports were 55,105 tons in 1970, decreased until 1975, but recovered after that to record 159,900 tons in 1981 (see Appendix Table 3).

According to USDA data, the total imports of concentrated juice (Table C-7) were 11.817 million gallons (single strength equivalent) in 1971 and increased annually to 30.508 million gallons (single strength equivalent) in 1980. About 50% of the imports came from the Philippines and 35% from Thailand in 1980.

As shown in Table C-8, not concentrated juice is imported from the Philippines.

2. Canada

As already stated, Canada is the second largest consumer of pineapple juice. Imports fluctuated from the level of 9,830 tons in 1970, but on the whole tended to rise and reached 16,300 tons in 1981. Canada's major suppliers are shown in Table C-9. Approximately 50% of imports come from the United States and approximately 50% from the Philippines.

Table C-9 Pineapple Juice, Not Concentrated: Imports into Canada

(tons)

	1975	1976	1977	1978	1979	1980
Philippines	6,611	5,217	5,590	6,587	8,819	8,050
Thailand	216	-	-	-	201	26
USA	2,484	3,050	4,286	5,971	5,696	8,094
Other	102	-	-	-	24	128
Total	9,413	8,267	9,876	12,558	14,740	16,298

Source: USDA

3. The United Kingdom

Imports of pineapple juice into the United Kingdom were 12.631 million litters in 1970, and later fluctuated between 10 and 14

million litters. As shown in Table C-10, in 1980, South Africa accounted for 36% of British imports, and the Philippines and the Netherlands accounted for 13%.

Table C-10 Pineapple Juice (not concentrated) Imports into the UK

(1,000 kl)

	1975	1976	1977	1978	1979	1980
USA	379	-	-	-	-	-
Australia	-	-	265	5	208	-
Brazil	-	-	-	-	-	595
France	11	-	12	303	127	-
Italy	-	-	-	259	168	-
Ivory Coast	-	-	488	628	383	1,710
Kenya	-	-	474	894	511	-
Mozambique	-	-	148	24	-	-
Netherlands	189	-	220	188	739	1,844
Philippines	1,469	2,361	1,735	823	603	1,858
S. Africa	5,769	6,125	5,881	6,592	1,975	4,945
Spain	4	-	201	10	-	-
Swaziland	-	-	157	366	332	-
Other	310	1,276	41	77	316	2,765
Total	8,131	9,762	9,622	10,169	5,362	13,717

Source: USDA

4. France

French imports of pineapple juice reached 14,954 tons in 1976, but decreased after that, falling to 9,555 tons in 1980. As shown in Table C-11, the Ivory Coast accounted for 80% of French imports in 1973, but the proportion fell annually to about 60% in 1980. The second biggest supplier to France is the Philippines.

5. The Federal Republic of Germany

The Federal Republic of Germany imported 1,545 tons of pineapple juice in 1970, but the volume began to decline after it peaked in 1972, falling to 578 tons in 1978. In 1980, however, the Federal Republic of Germany began to increase imports and imported 2,014 tons in 1981. As shown in Table C-12, Brazil accounted for about 30% (587 tons) of West German imports.

Table C-11 Pineapple Juice Imports into France

(tons)

	1975	1976	1977	1978	1979	1980
USA	1,732	1,529	891	416	665	256
Belgium-Luxemburg	70	58	100	158	329	240
Brazil	170	2	12	70	139	278
Guinea	-	146	-	198	-	11
Haiti	88	114	15	24	-	-
Italy	-	258	223	306	450	469
Ivory Coast	8,772	9,777	8,812	6,298	7,251	5,521
Kenya	14	26	62	32	30	387
Martinique	1,097	1,026	451	264	291	92
Philippines	64	1,441	1,215	1,573	1,881	1,709
S. Africa	324	438	158	463	208	444
Other	111	144	194	258	158	148
Total	12,442	14,954	12,133	10,060	11,402	9,555

Source: USDA

Table C-12 Pineapple Juice (not concentrated) Imports into the Federal Republic of Germany

(tons)

	1975	1976	1977	1978	1979	1980
USA	143	135	84	86	139	68
Brazil	-	-	-	-	111	587
Kenya	-	-	36	-	102	364
Netherlands	302	348	90	42	64	95
Philippines	145	384	254	207	187	348
S. Africa	-	-	-	-	101	-
Swaziland	-	282	208	114	95	195
Other	195	58	77	129	188	357
Total	785	1,207	749	578	987	2,014

Source: USDA

6. The Netherlands

The Netherlands began to import pineapple juice in 1975 at a low level of 65 tons, but the imports soared to 1,472 tons in 1979, and 2,331 tons in 1980. As shown in Table C-13, the Netherlands imported almost the same quantity of pineapple juice from Brazil as it did from Kenya in 1980 (approx. 600 tons).

Table C-13 Pineapple Juice (not concentrated) Imports into the Netherlands

(tons)

	1975	1976	1977	1978	1979	1980
Brazil	-	-	-	202	594	628
Kenya	-	82	186	-	154	631
Mexico	-	-	-	-	261	222
Philippines	-	275	202	133	143	420
S. Africa	-	-	-	-	32	138
Venezuela	-	-	21	206	64	-
Other	65	86	144	157	224	292
Total	65	443	553	698	1,472	2,331

Source: USDA

7. Belgium - Luxemburg

The pineapple juice imports of these countries were 1,253 tons in 1970, and decreased for some time after that, falling to the level of 300 tons in 1974 and 1975, but gradually recovered to rise above 1,200 tons in 1981. As shown in Table C-14, the Netherlands and the Philippines supply almost the same quantity of pineapple juice.

8. Japan

According to customs statistics of the Japanese Ministry of Finance (Appendix Table 4), Japan's imports of pineapple juice, in 1965 and 1966, came mainly from the United States, but in 1967, Philippine pineapple juice began to be imported. It is now Japan's major supplier, having increased its share of imports year by year.

Table C-14 Pineapple Juice (not concentrated) Imports into Belgium-Luxemburg

(tons)

	1975	1976	1977	1978	1979	1980
Germany, FR	2	63	9	42	102	234
Netherlands	73	168	157	228	215	364
Philippines	48	285	222	160	352	366
S. Africa	93	91	32	31	55	35
Swaziland	39	130	106	66	62	-
Other	111	197	80	118	116	210
Total	366	934	606	645	902	1,209

Source: USDA

D. TRENDS IN CONSUMPTION AND CONCLUDING REMARKS

Data that allows for a discussion of trends in the consumption of juice is available only from the United States. Although, it is doubtful whether the trends in the United States consumption can be extrapolated to other countries, the data may throw some light on the subject.

As shown in Table D-1, the total consumption of fruit juice was 6.5 kg in 1965, and showed a tendency to increase, reaching a level of 11 kg in 1979 (an index of 169 with 1965 as the base year, at 100).

On the other hand, the consumption [1] of 100% juice of pineapple was 0.8 kg in 1965 and fell to 0.6 kg in 1979, with an index of 75. Concentrated pineapple juice consumption was 0.5 kg in 1965 and increased to 0.7 kg in 1979, with an index of 140. The total pineapple juice consumption was 1.3 kg in 1965 and 1.3 kg in 1979. It can thus be seen that the consumption of pineapple juice did not change substantially.

1) Statistical figures in this paragraph are those of "production base".

Table D-1 Comparison of Juice Consumption per Capita in USA *

(kg)

	Total of all juice	Pineapple juice 100% juice	Pineapple juice Conc. juice	Pineapple juice Total		Total of all juice	Pineapple juice 100% juice	Pineapple juice Conc. juice	Pineapple juice Total
1965	6.5	0.8	0.5	1.3	1973	10.1	0.9	0.6	1.5
1966	7.4	0.9	0.8	1.7	1974	8.9	0.5	0.5	1.0
1967	7.6	0.8	0.4	1.2	1975	10.1	0.5	0.5	1.0
1968	7.4	1.0	0.7	1.7	1976	9.9	0.5	0.4	0.9
1969	9.6	0.7	0.8	1.5	1977	9.1	0.6	0.5	1.1
1970	9.5	0.7	0.6	1.3	1978	10.8	0.6	0.6	1.2
1971	9.8	0.7	0.5	1.2	1979	11.0	0.6	0.7	1.3
1972	9.3	0.8	0.5	1.3					

* Production base

Source: USDA

It is difficult to estimate the pineapple juice demand in 1990 and 2000, because suitable data are not available apart from the figures mentioned above. Judging from trends in exports and imports, however, it seems that the consumption has potential to expand, but there are problems of how to avoid cost rises.

Juice is today produced from various fruits, and can be sold as a mixture of juices, in an unmixed form, thick or thin, depending on taste. In order for pineapple juice to compete with other juices, further research on such matters as flavor and price is required, and the potential for increases in the consumption of mixed juice also deserves consideration.

Appendix Table 1 Pineapple (Raw): Production by Selected Countries

(1,000 tons)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
USA	852	855	884	834	783	813	817	820	735	635	617	617	626	635	618	596	590
Philippines	176	188	208	226	238	233	282	250	338	402	360	420	427	500	605	1,281	1,200
Thailand	301	295	188	200	200	210	210	210	483	500	500	1,250	1,250	1,250	1,372	1,680	1,800
Ivory Coast	44	61	84	89	90	111	139	197	199	228	233	272	250	300	315	330	350
S. Africa	135	140	143	132	123	123	125	130	174	193	184	182	182	185	203	222	225
Mexico	235	231	251	242	275	308	340	340	268	241	262	442	437	300	550	583	568
Brazil	292	295	337	338	789	424	385	400	488	500	515	525	551	569	580	566	625
India						98	100	95	98	100	102	110	110	112	500	549	593
Malaysia	315	317	344	324	329	353	332	330	298	302	245	194	194	197	193	185	207
Australia	96	118	133	121	103	141	152	139	129	110	97	112	102	110	123	120	122
Kenya	26	30	35	35	29	47	35	39	48	45	73	100	110	110	140	145	150
Cook Is.						-	-	-	-	2	2	3	1	2	1	2	2
World total	3,260	3,379	3,534	3,465	3,546	4,154	4,251	4,335	4,664	5,250	5,357	6,607	6,724	6,836	7,504	8,628	8,866
Developed countries	951	976	1,021	959	890	1,145	1,175	1,176	1,125	1,017	977	971	959	980	998	995	998
N. America	852	855	884	834	783	813	817	820	735	635	617	617	626	635	618	596	590
W. Europe	3	3	4	4	4	2	2	2	2	2	2	2	-	1	2	1	1
Oceania	96	118	133	121	103	141	152	139	129	110	97	112	102	110	123	120	122
Others	-	-	-	-	-	189	204	215	259	270	261	241	231	234	256	278	283
Developing countries	2,309	2,400	2,513	2,506	2,656	2,671	2,718	2,789	3,211	3,361	3,477	4,753	4,847	4,896	5,913	6,998	7,213
Africa	292	322	359	357	345	346	368	429	484	541	550	842	831	892	935	972	1,017
Latin America	779	777	837	823	899	1,195	1,190	1,234	1,271	1,300	1,492	1,566	1,671	1,576	1,759	1,825	1,885
Mid. East	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	5	5
Far East	1,238	1,301	1,317	1,326	1,412	1,130	1,160	1,126	1,444	1,500	1,415	2,323	2,325	2,407	3,197	4,180	4,290
Others	-	-	-	-	-	-	-	-	8	15	16	17	16	17	17	18	18
Asian CPE	-	-	-	-	-	330	359	370	328	872	904	883	918	961	593	634	653
Total -Developed countries	-	-	-	-	-	-	-	-	-	-	-	971	959	980	998	995	998
-Developing countries	-	-	-	-	-	-	-	-	-	-	-	5,636	5,765	5,657	6,506	7,632	7,868

Source: FAO

Appendix Table 2 Pineapple Juice: Exports by Selected Countries

(exports: tons; unit value: US$/ton; export value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
USA												
Export	16,091	14,223	12,671	13,913	11,227	6,883	6,478	8,591	11,434	9,772	15,606	15,600
Unit value	196	225	222	235	294	416	457	390	407	470	377	378
Export value	3,157	3,195	2,818	3,276	3,298	2,865	2,961	3,348	4,655	4,592	5,880	5,900
Philippines												
Export	23,083	26,582	20,858	20,421	23,564	28,853	21,647	38,227	23,635	37,110	38,400	39,700
Unit value	183	182	156	154	174	190	266	216	286	342	339	335
Export value	4,227	4,837	3,247	3,135	4,096	5,496	5,767	8,240	6,766	12,702	13,000	13,300
UK												
Export	-	-	-	-	-	-	211	145	235	109	303	-
Unit value	-	-	-	-	-	-	498	579	532	872	1,353	-
Export value	-	-	-	-	-	-	105	84	125	95	410	-
Thailand												
Export	-	-	-	-	1,019	2,872	2,301	2,409	4,540	12,223	21,126	-
Unit value	-	-	-	-	-	-	411	395	480	551	568	-
Export value	-	-	-	-	-	-	946	951	2,178	6,734	12,000	-
Ivory Coast												
Export	12,456	13,318	13,054	17,660	15,551	10,340	12,071	11,798	8,045	9,922	10,000	10,900
Unit value	187	175	176	207	197	233	225	259	307	334	380	367
Export value	2,333	2,337	2,299	3,658	3,059	2,413	2,718	3,060	2,470	3,315	3,800	4,000
S. Africa												
Export	6,900	8,051	8,823	8,495	7,664	7,033	7,903	7,367	9,617	7,273	5,340	7,348
Unit value	159	169	153	230	289	322	198	398	371	629	655	626
Export value	1,099	1,359	1,353	1,958	2,217	2,268	1,568	2,929	3,570	4,576	3,500	4,600
Mexico												
Export	563	800	402	392	442	474	192	347	4,410	3,742	4,800	4,800
Unit value	204	233	219	349	407	441	828	487	834	726	833	833
Export value	115	186	88	137	180	209	159	169	3,677	2,717	4,000	4,000

Appendix Table 2 (cont'd.)

(exports: tons; unit value: US$/ton; export value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Netherlands												
Export	-	-	-	-	-	-	-	844	827	2,059	3,321	-
Unit value	-	-	-	-	-	-	-	963	1,114	1,290	1,409	-
Export value	-	-	-	-	-	-	-	813	921	2,657	4,679	-
Brazil												
Export	179	328	300	598	1,152	518	472	-	896	1,443	3,210	-
Unit value	335	345	333	324	454	539	750	-	981	938	1,172	-
Export value	60	113	100	194	523	279	354	-	879	1,354	3,761	-
India												
Export	-	-	-	-	1,511	-	-	2,570	-	-	-	-
Unit value	-	-	-	-	574	-	-	422	-	-	-	-
Export value	-	-	-	-	867	-	-	1,084	-	-	-	-
Malaysia												
Export	1,818	1,502	1,954	1,745	1,425	962	952	1,199	1,594	625	2,214	2,300
Unit value	182	191	208	247	319	350	324	397	438	480	497	478
Export value	331	287	407	431	455	337	308	476	698	300	1,100	1,100
Australia												
Export	-	-	1,363	1,070	1,015	580	581	1,030	1,262	1,060	2,120	-
Unit value	-	-	127	170	224	357	347	251	239	349	308	-
Export value	-	-	173	182	227	207	295	259	302	370	652	-
Kenya												
Export	-	-	-	689	-	346	754	1,968	2,004	1,846	1,955	-
Unit value	-	-	-	179	-	384	504	444	436	602	767	-
Export value	-	-	-	123	-	133	380	873	874	1,112	1,500	-
Singapore												
Export	2,096	1,327	1,105	1,299	1,049	505	981	1,241	1,716	451	1,829	1,800
Unit value	180	179	205	236	337	372	335	403	464	576	510	522
Export value	377	238	226	307	354	188	329	500	797	260	932	940
Belgium-Luxemburg												
Export	76	137	261	176	125	58	386	281	643	652	966	990
Unit value	1,118	774	-	227	264	310	526	676	742	770	816	-
Export value	85	106	-	40	33	18	203	190	477	502	788	-

Appendix Table 2 (cont'd.)

(exports: tons; unit value: US$/ton; export value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Cook Is.												
Export	-	520	800	350	400	450	350	250	500	600	700	-
Unit value	-	238	245	291	375	407	466	512	420	497	551	-
Export value	-	124	196	102	150	183	163	128	210	298	386	-
Germany, FR												
Export	181	222	268	293	196	151	311	259	276	315	458	490
Unit value	536	374	272	399	617	457	762	722	870	1,235	1,271	1,204
Export value	97	83	73	117	121	69	237	187	240	389	582	590
Other												
Export	16,091	14,223	12,671	14,009	11,237	6,889	7,546	9,867	13,305	11,107	16,064	15,600
Unit value	196	225	222	236	294	417	450	394	410	471	391	378
Export value	3,157	3,195	2,818	3,300	3,304	2,872	3,398	3,883	5,455	5,235	6,283	5,900
Total												
Export	63,443	67,010	61,859	67,197	66,350	60,031	56,928	79,802	73,505	90,537	112,806	83,928
Unit value	187	192	178	204	235	244	297	299	403	471	509	410
Export value	11,881	12,865	10,980	13,684	15,586	14,672	16,930	23,823	29,639	42,616	57,373	34,430

Source: FAO, Trade Yearbook

Appendix Table 3 Pineapple Juice: Imports by Selected Countries

(exports: tons; unit value: US$/ton; import value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
USA												
Import	55,105	51,988	43,982	39,962	37,036	56,139	57,802	84,661	105,965	131,622	158,890	159,900
Unit value	62	64	60	59	69	76	86	115	133	148	166	165
Import value	3,416	3,321	2,655	2,339	2,562	4,282	4,958	9,742	14,057	19,468	26,328	26,400
Canada												
Import	9,830	7,414	9,328	10,621	9,836	9,413	8,267	9,876	12,558	14,740	16,298	16,300
Unit value	139	182	172	170	188	208	204	211	228	254	250	258
Import value	1,368	1,347	1,602	1,804	1,854	1,961	1,684	2,082	2,861	3,748	4,081	4,200
UK												
Import	12,631	13,433	11,979	15,061	14,981	10,143	10,021	10,977	11,000	11,770	14,552	-
Unit value	162	173	175	203	244	261	295	355	402	537	724	-
Import value	2,047	2,320	2,102	3,050	3,662	2,646	2,960	3,900	4,426	6,326	10,539	-
France												
Import	-	-	-	-	-	-	14,990	12,201	10,058	11,410	9,556	-
Unit value	-	-	-	-	-	-	372	404	510	609	744	-
Import value	-	-	-	-	-	-	5,583	4,935	5,126	6,947	7,113	-
Netherlands												
Import	-	-	-	-	-	-	-	553	698	1,472	2,331	-
Unit value	-	-	-	-	-	-	-	819	1,060	1,118	1,211	-
Import value	-	-	-	-	-	-	-	453	740	1,646	1,823	-
Germany, FR												
Import	1,545	1,630	2,568	1,920	1,014	785	1,207	749	577	987	2,034	2,100
Unit value	270	298	349	388	524	660	621	685	844	1,109	1,293	1,286
Import value	417	485	897	744	531	518	750	513	487	1,095	2,629	2,700
Singapore												
Import	2,193	1,605	1,572	1,281	1,209	484	814	1,074	1,269	654	2,006	2,000
Unit value	192	192	192	240	316	395	344	415	479	456	491	500
Import value	420	308	302	307	382	191	280	446	608	298	985	1,000

Appendix Table 3 (cont'd.)

(exports: tons; unit value: US$/ton; import value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Belgium-Luxemburg												
Import	1,253	1,607	1,374	1,122	389	366	934	606	645	902	1,209	1,200
Unit value	311	309	282	224	254	270	610	627	888	900	1,048	1,083
Import value	390	497	387	251	99	99	570	380	573	812	1,267	1,300
Italy												
Import	-	-	-	-	-	-	581	519	599	780	1,139	-
Unit value	-	-	-	-	-	-	315	464	482	668	842	-
Import value	-	-	-	-	-	-	183	241	289	521	959	-
Yugoslavia												
Import	-	-	-	-	-	-	-	-	770	553	839	-
Unit value	-	-	-	-	-	-	-	-	558	725	611	-
Import value	-	-	-	-	-	-	-	-	430	401	513	-
French Polynesia												
Import	-	-	-	-	-	-	-	-	661	459	-	-
Unit value	-	-	-	-	-	-	-	-	575	573	-	-
Import value	-	-	-	-	-	-	-	-	380	263	-	-
Sweden												
Import	-	-	-	-	-	-	751	468	395	435	442	-
Unit value	-	-	-	-	-	-	497	299	549	598	586	-
Import value	-	-	-	-	-	-	373	140	217	260	259	-
Norway												
Import	-	-	-	2,591	2,858	1,284	159	126	101	249	328	-
Unit value	-	-	-	635	726	1,072	528	429	535	1,072	1,363	-
Import value	-	-	-	1,644	2,076	1,377	84	54	54	267	447	-
Korea, Rep. of												
Import	-	-	-	-	-	-	-	60	161	137	264	-
Unit value	-	-	-	-	-	-	-	517	671	664	814	-
Import value	-	-	-	-	-	-	-	31	108	91	215	-
Papua New Guinea												
Import	-	413	330	306	317	335	253	250	250	255	255	260
Unit value	-	240	252	281	331	388	415	440	464	486	510	535
Import value	-	99	83	86	105	130	105	110	116	124	130	139

Appendix Table 3 (cont'd.)

(exports: tons; unit value: US$/ton; import value: US$1,000)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Denmark												
Import	-	-	-	135	212	147	237	223	283	280	213	-
Unit value	-	-	-	356	500	585	734	883	972	1,250	1,385	-
Import value	-	-	-	48	106	86	174	197	275	350	295	-
New Zealand												
Import	95	100	118	120	167	209	118	99	136	210	141	-
Unit value	232	300	237	233	293	450	492	444	566	438	454	-
Import value	22	30	28	28	49	94	58	44	77	92	64	-
Malaysia												
Import	-	-	-	-	-	-	-	-	258	105	-	-
Unit value	-	-	-	-	-	-	-	-	593	533	-	-
Import value	-	-	-	-	-	-	-	-	153	56	-	-
Other												
Import	25	19	24	21	85	58	9	931	1,089	915	250	3
Unit value	240	263	292	333	329	379	667	40	192	769	92	667
Import value	6	5	7	7	28	22	6	37	209	704	23	2
Total												
Import	82,677	78,209	71,275	73,140	68,104	79,363	96,143	123,373	147,473	177,935	210,747	181,763
Unit value	98	108	113	141	168	144	185	189	211	244	278	197
Import value	8,086	8,412	8,063	10,308	11,454	11,406	17,768	23,305	31,186	43,469	58,670	35,741

Source: FAO, Trade Yearbook

Appendix Table 4 Pineapple Juice: Imports into Japan

(A: l; B: ¥1,000, CIF)

		1965	1966	1967	1968	1969	1970	1971	1972
Philippines	A			111,931	143,686	149,738	365,107	323,216	326,962
	B			7,061	9,039	9,427	28,284	20,321	18,631
USA	A	236,829	201,656	218,537	130,167	129,101	95,938	8,232	16,320
	B	17,821	14,592	18,223	8,870	10,238	7,211	599	1,093
China	A								
	B								
S. Africa	A			4,061		3,624			
	B			308		288			
Ryukyu	A	320,863	953,553	1,105,833	1,201,694	2,379,649	3,175,099	2,807,370	513,924
	B	97,501	57,865	88,012	80,225	165,591	206,023	188,939	30,004
Total	A	557,692	1,155,209	1,440,362	1,475,547	2,662,112	3,636,144	3,138,818	857,206
	B	115,322	72,457	113,604	98,134	185,544	241,518	209,859	49,728

		1973	1974	1975	1976	1977	1978	1979	1980	1981
Philippines	A	185,402	61,072	181,290	218,807	225,304	210,103	265,504	304,975	271,074
	B	10,135	4,697	15,689	23,300	23,322	17,704	27,320	34,860	29,057
USA	A	6,778	268,387	1,175	10,575	46,967		14,100	14,655	31,641
	B	451	18,739	143	1,262	5,258		2,308	2,314	5,125
China	A					1,918				
	B					199				
S. Africa	A									
	B									
Ryukyu	A									
	B									
Total	A	192,180	329,459	182,465	229,382	274,189	210,103	279,604	319,630	302,715
	B	10,586	23,436	15,832	24,562	28,779	17,704	29,628	37,174	34,182

Source: Ministry of Finance, Gov. of Japan

[8-2-5] PASSIONFRUIT JUICE

A. INTRODUCTION

The passionfruit is a climbing fruit plant of the Passifloraceae family. The translucent jelly part of the fruit, with an unusual sweetness similar to honey, is used to produce passionfruit juice with a typical tropical flavor. Originally found in southern Brazil, the fruit has been cultivated for a long time in Australia, and is today cultivated all over the world. There is also large-scale cultivation in Hawaii. Other areas of cultivation are Sri Lanka, Taiwan, South Africa, Kenya and the North Island of New Zealand.

I. Characteristics

The passionfruit is a perennial herbaceous climbing plant with a hollow stem that is polygonal early in its life, and becomes rounder in cross-section later. The fruit is round or oval and 4-6 cm in diameter, covered with a 3 mm-thick skin. On the inside of the skin grows a white pith 6 mm in thickness. The inside of the fruit has an orange semi-transparent jelly-like flesh which covers the seeds. This flesh is full of a very acidic juice which has a good flavor.

II. Cultivation

The passionfruit grows well in sub-tropical climates, and at high altitudes in tropical zones, where it is sometimes found in its natural state. The soil should ideally be able to retain moisture and be rich in humus and lime. Propagation is achieved by planting seeds or cuttings. In Hawaii, the harvest of the Flavicarpa Deneger variety is 34 tons per ha, and that of Passiflora edulis Sims is 20% less than that of Deneger.

III. Varieties

Passionfruit can be classified by variety as shown in Table A-1, but the two varieties below are most often cultivated, and have the following characteristics:

	(A) P. edulis Sims	(B) P. edulis F. flavicarpa Deneger
Juice	Bright yellow-red, with strong smell	More yellow, with weaker smell than (A)
Fruit	Yellow skin with purple	Yellow skin without purple
Appearance	No purplish red dots	Purplish red dots on leaf petiole and vine
Flowering time	Dawn to noon	Noon to 8 p.m.
Usage	For juice	Eaten raw

B. TRENDS IN PRODUCTION

There is little data on trends in the production of passionfruit, but current world production is estimated at 20,000-30,000 tons.

1. Australia

Table B-1 Passionfruit: Area under Cultivation and Production Levels

	1972/73	1973/74	1974/75	1975/76	1976/77
Area harvested (ha)	397	368	374	346	302
Production (tons)	2,365	2,787	3,483	3,654	3,129

Source: Jacqueline Mott, Ministry of Overseas Development

Table A-1 Classification of Passionfruit

Portuguese	English	Scientific Name	Physical characteristics			
			Color	Shape	Long diameter (cm)	Weight (g)
Maracuja roxo	Purple passion fruit or purple granadilla	P. edulis Sims.	Purple	Ovoid	4-5	30-45
Maracuja Smarelo	Yellow passion fruit or lilikoi	P. edulis f. flavicarpa Deneger	Canary yellow	Ovoid	5-9	45-75
Maracuja assu	Giant granadilla	P. quad-rangularis L.	Pale green	Ovoid, Oblong or elliptical	20-25	2,000
Granadilha	Sweet granadilla or water-lemon	P. ligularis Juss	Dull orange or with white spots	Oval, oblong	8	4,000
	Bell-apple, sweet cup or "Pomed"	P. laurifolia L.	Yellow-orange	Ellipsoidal or ovoid	5-8	-
	West Indian sweet calabash	P. maliformis L.	Dull yellowish	Roundish	4.5	-
Maracuja vormelho	Red-fruited passion vine	P. foetida L.	Red	Roundish	2.5	-
Maracuja de flores blancas	White flowered passion vine	P. alba Link e Otto	Yellowish	Ovoid	3.2	-
	Inkberry	P. suberosa	Purple	Oval		
	Maypop	P. incarnata L.	Yellow	Oval	5	-
Maracuja banana	Banana passion fruit	P. caerulea L. P. (Tacsonia) mollis sima Bailey	Orange	Ovoid	2.5-3.2	-

Source: C.T.Pijadunior, A Cultura do Maracuja

In Australia, the southern coastal zone is the main producing area for passionfruit. It is said that Australia began cultivation earlier than Hawaii, and has a larger area under cultivation than Hawaii. There are two varieties cultivated (P. edulis Sims and P. edulis f. flavicarpa Deneger), and most of these are consumed raw. Although Australia is one of the main producers, it is also an importer because of its high domestic consumption.

2. Brazil

There are no accurate statistics on the production of passionfruit in Brazil, but the production was estimated at about 7,100 tons in 1970. The main producing areas are in five states: northern Para, Bahia, Pernambuco, north-eastern Alagoas and southern Sao Paulo. The cycle of passionfruit cultivation is 3-4 years. Since the passionfruit is a short-life plant (on a commercial basis: 3-4 years), there are fluctuations in production levels from year to year.

C. TRENDS IN TRADE

There are very few statistics on the world trade of passionfruit juice. Only data on Brazil are referred to here.

From Tables C-1, C-2 and C-3, the following comments can be made concerning trends in exports from Brazil.

I. Exports by Year

It is noticeable that exports fluctuate largely from year to year. In the seven-year period shown in these tables, there is a low of 15 tons and a high of 887 tons.

II. Exports by Destination

Netherlands is Brazil's largest customer, consuming 72% of Brazilian exports in 1977. The Federal Republic of Germany is second with 20% in 1977.

III. Trends in Export Price

The export price has recently tended to increase, having reached a level of US$2.84 per kg (FOB) in 1977.

Table C-1 Passionfruit Juice Exports by Country of Destination

(kg)

	1971	1972	1973	1974	1975	1976	1977
Saudi Arabia					16,800		
Argentina					1,930		
Germany, FR	2,153	253,020	60,800	55,000	133,005		65,008
Australia		896	15,000	25,940	35,070		
Belgium-Luxemburg			600	52,000			
Bolivia		616	224		20	510	85
Canada			5,478	1,150		950	
Kuwait				1,630			
USA	180	240	99,130	298,108	122,235	3,744	4,320
France	1,058	200			569	4,296	1,980
Haiti					136		
Israel					5,000		
Japan				73,523	1,008	18,015	
Lebanon				852			
Netherlands			69,200	360,720	79,200	221,830	243,500
Paraguay		16,506	438	1,636	468	498	330
Portugal				1,000			960
Sweden	11,148	54,800	104,459	15,000	10,000		
Switzerland			60,000				
S. Africa			118,400				
Mozambique						16,997	
Italy							20,000
Total	14,539	326,278	533,729	886,559	405,441	226,840	336,183

Source: CACEX-Banco Do Brasil

Tsble C-2 Passionfruit Juice Exports and their Value by Year

	Quantity (kg)	Value of exports (US$)	Average export price (US$/kg)
1971	14,539	10,855	0.75
1972	326,278	212,977	0.65
1973	533,729	567,200	1.06
1974	886,559	694,455	0.78
1975	405,441	455,905	1.13
1976	266,840	549,589	2.06
1977	336,183	955,033	2.84

Source: CACEX - Banco do Brasil 71/77

Table C-3 Passionfruit Juice Exports by Shipping Port

(kg)

	1971	1972	1973	1974	1975	1976	1977
Gujaramirim-RO	-	-	-	-	20	118	55
Belem-PA	-	-	-	2,000	1,008	43,035	96,510
Fortaleza-CE	-	-	-	1,630	1,384	-	20,480
Cabedelo-PA	1,058	-	30,000	-	-	2,496	1,536
Recife-PE	180	240	30,720	2,440	3,165	1,248	3,744
Salvador-BA	953	192,000	72,658	437,770	209,870	142,140	-
Bela Vista-MT	-	-	84	-	-	-	-
Corumba-MT	-	616	224	-	-	392	30
Rio de Janeiro-RJ	-	-	-	-	-	16,997	-
pontapora-MT	-	896	354	941	384	498	-
Santos-SP	12,348	132,526	381,289	441,083	172,726	59,916	213,498
Foz de Iguacu-PR	-	-	-	695	84	-	330
Rio Grande-RS	-	-	18,400	-	16,800	-	-
Total	14,539	326,278	533,729	886,559	405,441	266,840	336,183

Source: CACEX - Banco do Brasil 71/77

IV. Exports by Shipping Port

Salvador - BA and Santos - SP are typical export ports. In 1977, however, there were no exports out of Salvador, but those from Belem nearly doubled over the previous year, making it the second largest port for exports. Exports by year and port, as a whole, fluctuate considerably, suggesting the instability of production in each region.

D. CONCLUDING REMARKS

It is difficult to estimate world demand from the above data. It seems, however, that passionfruit juice is not yet well-known in many developed countries. Its potential may be realized by attracting consumers through advertising.

However, stable production is also required. This is because the large fluctuations in exports from year to year seem to be mainly due to fluctuations in production.

[8] - Appendix: Export of Fruits from Israel, Morocco, Mexico and South Africa

Table 1 Israel: Export of Fruits

($1,000)

Fruits	1980	1981
Date	2,598	2,839
Banana	193	985
Fresh avocado	28,115	31,167
Mango	419	667
Persimmon	231	289
Fresh shamouti orange	101,837	120,324
Fresh late orange	45,688	40,756
Fresh navel orange	4,263	5,398
Fresh grapefruit	63,026	59,164
Fresh lemon	9,792	12,022
Fresh citrus	192	754
Dried citrus fruit	28	20
Fresh or dried nut	2,479	846
Fresh grape	4,040	2,672
Fresh peach	417	445
Strawberry	8,800	8,619
Watermelon	7,051	6,443
Canteloup & Honeydew melon	15,458	13,143
Pomegranate	353	539
Total of the above	294,980	307,092
Other fruits (Fresh and preserved)	8,127	11,647
Grand total	303,107	318,739

Source: Israel Central Statistics Bureau

Table 2 Morocco: Export of Fruits

Fruits	(Dirhams) 1980
Banana	26,165
Avocado	878,347
Chestnut	9,875
Mango	29,626
Orange	489,144,016
Clementine	367,730,495
Lemon	491,908
Grapefruit	1,467,387
Apricot	38,248
Peach	481,507
Strawberry	147,439
Melon	581,150
Citrus	1,183,559,276
Total	2,044,585,439

Source: Royaume du Moroc Ministeic des Finances, Office des Changes

Table 3 Mexico: Export of Fruits

(US$)

Fruits	1977	1978	1979	1980	1981
Banana, fresh	512,136	595,845	863,988	651,297	393,226
Pineapple, fresh	1,461,236	2,207,659	2,548,861	2,265,754	1,989,520
Mango	1,262,948	1,932,680	2,087,024	2,345,695	2,777,807
Coconut, shelled	39,497	62,527	80,332	27,965	141,555
Coconut, dry-crushed	0	27,407	628,642	876,298	245,514
Avocado	30,633	177,538	123,429	1,095,679	713,683
Orange	2,097,421	1,899,169	4,515,577	1,930,279	1,288,809
Mandarin orange	1,342,058	3,644,860	4,259,944	4,026,935	4,969,805
Mexican lemon	286,048	606,706	1,090,693	1,392,065	1,536,564
Grapefruit	1,016,304	3,030,133	4,949,087	3,687,004	1,272,256
Grape, fresh	944,246	1,018,831	1,293,571	1,171,694	1,070,285
Grape, dry	859,123	3,636,702	3,928,608	4,777,419	1,737,904
Walnut, shelled	138,955	218,177	0	12,843	4,820
Walnut, not shelled	124,694	133,025	1,515	0	3,744
Apple	70	108,828	5,959	10,512	2,564
Pear	0	1,514	255	1,083	0
Peach	30,417	62,740	2,224	327	0
Strawberry, fresh	4,646,057	9,248,220	8,806,299	3,901,589	1,654,658
Melon	9,277,687	8,563,355	44,598,066	60,885,866	50,152,913
Watermelon	4,000,805	3,937,487	13,782,202	18,177,921	12,856,206
Tamarind	1,426	720	2,560	10,458	23,704
Papaya	14,383	5,855	5,471	7,678	28,814
Bananapuree, freezed	0	560,447	371,732	842,808	526,335
Pineapple, processed	1,060,977	1,271,713	1,376,911	1,787,994	1,888,308
Subtotal	29,147,121	42,952,138	95,322,880	109,887,163	85,278,994
Others	4,756,167	7,051,503	4,208,218	4,869,228	4,734,297
Total	33,903,288	50,003,641	99,531,098	114,756,391	90,013,291

Table 4 South Africa: Export of Fruits

(FOB Rand)

Fruits	1979	1980	1981	1982 (Jan.-Aug.)
Banana, fresh	4,315	27,825	1,052	-
Pineapple, fresh	1,269,716	1,117,223	989,647	913,003
Avocado	7,116,388	9,469,815	8,256,608	11,248,412
Mango	1,290,603	972,901	484,811	118,655
Orange	105,686,071	91,164,068	108,564,568	55,512,588
Tangerine or Mandarine & Clementine	70,282	58,628	29,934	-
Grapefruit	28,071,801	24,083,973	18,696,416	13,777,408
Lemon	-	8,335,304	9,834,398	8,030,615
Other citrus fruit	8,723,335	181,533	428,596	294,632
Fig, fresh	210	238	-	-
Grape, fresh	40,956,391	37,707,692	36,679,992	49,567,563
Apple	58,352,777	63,682,237	70,833,031	110,255,196
Pear & Quince	17,648,786	18,199,065	23,714,830	23,743,265
Plum	3,466,632	5,541,178	5,171,147	9,076,458
Prune	2,385	3,716	8,632	-
Peach	886,415	1,262,831	503,537	775,453
Apricot	123,119	320,822	182,144	187,716
Cherry	160,866	100,874	182,318	-
Other stone fruit	21,613	4,914	1,891	-
Strawberry	413,954	313,230	31,681	-
Other berries	19,858	7,305	252	-
Sweetmelon	866,370	1,428,946	1,227,952	1,087,975
Litchi	565,780	915,396	672,683	480,487
Papino	43,437	16,348	8,576	-
Total	275,761,104	264,916,062	286,504,696	285,069,426

Source: Commission for Customs & Exercise of the Republic of South Africa, Foreign Trade Statistics — Import and Export

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