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FEASIBILITY OF CUT FLOWER EXPORTS

by
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FEASIBILITY OF CUT FLOWER EXPORTS

Introduction

The West European trade in cut flowers is part of a world-wide network in which supplying (export) countries are linked with consuming (importing) countries in an interdependent system. Changes in supply or demand conditions in any country in the system affects all market participants through changes in equilibrium market prices. The high value of flowers per unit weight makes air transport feasible world-wide and puts any potential supplying country in reach of any market. The principle supplying countries for world markets are the Netherlands, Italy, columbia, Kenya, Israel and Spain. Of these countries, the Netherlands, Israel and Columbia ship substantial quantities to the U.S. and all of Europe. The U.S. is an integral part of the world market as an important importer.

An adequate evaluation of potential entry of Egypt into the EEC market would require simultaneous consideration of the supply and demand for cut flowers in each participating country within an integrated trading framework. Such an evaluation is beyond the reach of research resources available for the present study.

The objectives of the present study are as follows:

(1) To present data on imports of cut flowers in the major West European importing countries.

(2) To estimate price responsiveness to changes in supply in West Germany of carnations, roses and chrysanthemums.

(3) To describe production conditions in some of the major supplying countries, namely Columbia and Kenya.

and (4) To describe the production and exporting sectors for cut flowers in Egypt.

Western European Markets

Egypt's best potential for exporting cut flowers is in the November through May period when fuel costs are high in competing northern countries. Prices are higher during that period and lower in the summer when production becomes possible at more northern latitudes. However, some countries (Columbia) export to Europe the year round.

The important importing countries of Europe are given in Table 1:

Table 1: Trends in imports of cut flowers in European Countries 1970-1978.

Year	Annual Imports (metric tons)					
	Germany	France	Austria	Sweden	Switzerland	U.K.
1970	41,678	1,106	1,106	1,306	3,702	1,333
1975	104,994	4,592	2,331	1,897	5,632	2,078
1976	107,300	6,369	2,781	2,331	6,006	2,270
1977	110,650	6,910	3,436	2,395	6.412	2,581
1978	123,251	9,696	3,860	2,638	7,250	5,125
1980	--	13,591	--	--	--	8,759

Source: Institut for Gartenbauokonamie der Technischen Universitat Hannover, European Horticultural Statistics-Non-edibles Hannover, Germany, 1977.

Germany is by far the largest importer of cut flowers, but other countries are increasing rapidly. France is increasing rapidly because of a change

from being a net exporter to net importer.[1] Per capita consumption in England is small,[2] but can be expected to grow.

The three major flowers imported are carnations, roses and chrysanthemums. Tables 2-5 indicate imports of these three flowers by West Germany, France, USA, and the U.K. by supplying country. West Germany imports more carnations than roses or chrysanthemums. The carnations come primarily from the Netherlands, Israel, Columbia, Kenya, and Italy. The U.K. also imports principally carnations from Israel, Columbia, Italy and Kenya.

Western European countries also produce significant quantities of flowers, mostly in the warmer months. Imports are heavier in the winter months, when local flowers must come from heated greenhouses. The Netherlands, West Germany, France and Italy are large flower producers. The area in each country dedicated to cut flowers under glass is given in Table 6.

Imports Into West Germany

West Germany is by far the largest importer of cut flowers in Europe, importing over 26,000 m.t. of carnations, 12,000 m.t. of roses and 6 m.t. of chrysanthemums during the November through May period (1980-81). The Netherlands is the principal supplier of chrysanthemums. (See Table 2.) About half of the carnations (and a small part of the roses) are imported to the Netherlands from Israel and re-exported.

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[1] However, of the 13,591 tons imported in 1980, only 2,402 tons were roses, carnations and chrysanthemums. Evidently a large variety of other flowers are also popular in France. Carnations come from Israel, Kenya and Italy. Chrysanthemums come form the Netherlands and roses from the Netherlands and Israel.

[2] U.N., A Survey of the Market for Floricultural Products in Western Europe Prepared for ESCAP Countries, 1979.

Table 2: W. German imports of carnations, roses and chrysanthemums by supplying countries, 1980-81[1] (metric tons)

Carnations

Supplying Country	Nov. 80	Dec. 80	Jan. 81	Feb. 81	Mar. 81	Apr. 81	May 81	TOTAL
Netherlands	615	1,247	837	747	1,030	1,505	1,182	7,163
Columbia	531	671	730	561	517	464	400	3,874
Kenya	482	733	469	561	623	716	--	3,584
Israel	164	539	561	697	824	736	719	4,240
Italy	273	807	508	874	1,085	1,242	1,239	6,028
Spain	31	44	20	30	72	86	58	341
Others	79	121	121	151	210	144	151	977
TOTAL:	2,175	4,162	3,246	3,621	4,361	4,893	3,749	26,207

W. German Imports of Roses, by Supplying Countries, 1981 (metric tons)

Netherlands	988	1,597	1,038	1,010	1,368	1,875	1,820	9,696
Israel	305	434	328	323	308	308	127	2,133
Spain	59	64	13	5	63	95	69	368
Canary Is.	35	32	24	21	31	27	36	206
Italy	8	100	4	22	16	20	24	194
S. Africa	28	6	11	1	3	--	--	49
Columbia	1	5	12	4	19	--	--	41
Brazil	28	18	5	15	34	--	--	100
Others	18	4	1	1	6	4	7	41
TOTAL:	1,434	2,260	1,436	1,402	1,848	2,329	2,083	12,792

[1] Assumes 25,000 roses and chrysanthemums and 26,000 carnations per metric ton.

Table 2: (continued)

Supplying Country	Nov. 80	Dec. 80	Jan. 81	Feb. 81	Mar. 81	Apr. 81	May 81	TOTAL 81
W. German Imports of Chrysanthemums, by Supplying Countries, 1981 (metric tons)								
Netherlands	627	1,062	796	740	660	1,115	1,051	6,051
Italy	--	7	11	5	1	1	--	25
Spain	--	8	4	6	4	5	6	33
Israel	--	8	23	19	6	--	--	56
Others	--	--	--	3	2	1	--	6
TOTAL:	627	1,085	834	773	673	1,122	1,057	6,172

Source: Statistiches Bundesamt, Wiesbaden, W. Germany, various issues.

Table 3: U.K. Imports of Carnations, Roses and Chrysanthemums, by Supplying Countries, 1979-80. (tonnes)

	Nov. 1979	Dec. 1979	Jan. 1980	Feb. 1980	Mar. 1980	Apr. 1980	May 1980	TOTAL
Israel	128	181	184	205	309	428	174	1,609
Columbia	150	180	151	161	212	165	107	1,126
Italy	42	57	14	46	105	45	99	408
Kenya	19	20	17	30	43	22	8	159
Others	39	11	12	16	15	12	28	133
TOTAL:	378	449	378	458	684	672	416	3,435
U.K. Imports of Roses by Supplying Countries, 1979-80 (tonnes)								
Israel	51	54	50	55	114	93	19	436
Netherlands	12	8	6	12	9	4	7	58
Columbia	3	2	--	1	3	--	--	9
Canary Is.	1	1	1	1	4	2	1	11
TOTAL:	67	65	57	69	130	99	27	514
U.K. Imports of Chrysanthemums by Supplying Countries, 1979-80 (tonnes)								
Israel	--	10	71	85	81	22	--	269
Netherlands	125	118	41	42	97	75	68	566
Columbia	--	--	4	17	18	2	--	41
Canary Is.	17	13	4	9	4	5	--	52
Others	4	20	5	4	10	2	3	48
TOTAL:	146	161	125	157	210	106	71	976

Source: Customs and Excise Tabulation Sheets, Ministry of Agriculture, Food and Fisheries, London.

Table 4: France Imports of Carnations, Roses and Chrysanthemums by Supplying Countries, 1981

	Jan. 81	Feb. 81	March 81	Apr. 81	May 81	June 81	Nov. 81	TOTAL 81
Carnations								
			(Metric tons)					
Israel	23.4	13.6	28.2	21.8	16.4	--	5.1	108.5
Netherlands	11.7	5.7	19.4	8.3	8.9	19.4	8.3	81.7
Kenya	30.1	18.4	25.4	8.7	2.4	--	8.4	93.4
Italy	3.9	4.1	12.5	9.0	13.1	9.4	9.9	61.9
Columbia	3.5	1.5	2.2	.3	1.1	5.8	5.2	19.6
Spain	3.8	7.4	15.3	8.6	10.1	.6	13.6	59.4
Others	1.5	--			3.3	--		4.8
TOTAL:	77.9	50.7	103.0	56.7	55.3	35.2	50.6	429.3
France Imports of Roses by Supplying Countries, 1981								
			(Metric tons)					
Israel	13.5	14.2	11.3	14.5	9.2	.4	8.7	71.8
Netherlands	13.4	25.3	21.9	38.9	49.6	37.0	36.1	222.2
Morocco	12.2	13.4	4.5	6.3	2.9	3.4	7.6	50.3
Spain	1.2	1.4	1.1	.6	.6		2.5	7.4
Canary Is.	3.1	2.8	6.1	16.4	27.2	2.4	5.3	63.3
Italy	--	--	--	8.6	3.5	1.0		13.1
Others	2.0	1.2	1.6	1.0	.2			6.0
TOTAL:	45.4	61.0	46.6	86.3	96.0	46.1	61.1	434.1
France Imports of Chrysanthemums by Supplying Countries, 1981								
			(Metric tons)					
Netherlands	58.7	34.5	63.9	50.5	52.1	45.3	60.7	362.7
Italy	5.6	1.4	2.4	1.4	3.7	--	3.3	17.8
Spain	.8	--	--	1.5	2.7	--	6.8	11.8
Israel	.5	2.0	1.3	--	--	--	--	3.8
TOTAL:	65.6	37.9	67.6	53.4	58.5	45.3	70.8	399.1

Source: Ministerre de l'Agriculture

Table 5 : Import of Carnations into U.S., by Source, 1980 (Metric tons)

	Jan. 1980	Feb. 1980	Mar. 1980	Apr. 1980	May 1980	Nov. 1980	Dec. 1980	TOTAL 1980
Columbia	886	1,253	1,534	1,370	1,602	1,586	1,514	9,745
Mexico	27	39	71	50	42	36	40	305
Others	88	18	2	3	14	10	4	139
TOTAL:	1,001	1,310	1,607	1,423	1,658	1,632	1,558	10,189

Source: USDA, Marketing Calfironia Ornamental Crops, 1980.

Table 6 : Area of Cut Flowers Under Glass in European Countries

	Carnations	Roses	Chrysanthemums Small	Chrysanthemums Large	All Flowers	Year
			(Hectares)			
Germany	210	270	188	242	1,403	1975[b]
France	520	671	204		3,582	1975[b]
Italy	889	372	84		1,931	1975[b]
Netherlands	443	123	503		2,352	1979[a]
U.K.	68	36	13		344	1979[b]
Denmark	72	369	412		1,542	1975[b]

Sources:

[a] Landbouw-economisch institut, Tuinbouwcijfers 1980, The Hague.

[b] Institut for Gartenbauokonomic der Technischan Universitat Hannover, European Horticulture Statistics, Volume 25, 1977.

Other important suppliers of carnations to W. Germany and Italy, Israel, Kenya, and Columbia. Columbia ships the year around, while the other three countries reduce shipments in the summer months.

Germany imports slightly more than 6,000 m.t. of chrysanthemums duirng the November-May period, which represents less reliance on foreign suppliers for chrysanthemums than for the other flowers. This is because Germany has a larger area of greenhouse area devoted to chrysanthemum (Table 7). This is favorable to Egypt's export potential, since there

Table 7: Area of Cut Flowers Under Glass in West Germany (hectares)

	Carnations	Roses	Chrysanthemums
1975	210	270	430
1978	161	251	426
1979	117	234	338

Source: ZMP Bilanz, Bonn, Germany.

presently are no important tropical countries supplying the German chrysanthemum market. The major competitors are Germany herself and the Netherlands, both suffering from high fuel and labor costs with heated greenhouse production.

Supplying Countries

Columbia:[3]

There are three production areas in Columbia:

(1) Bogota, at 8,000 feet elevation and temperatures in the high 50's, produces roses and carnations.

[3] Source: Carol Morgan, "Flowers from Columbia," Agribusiness Worldwide, (Inter Continental Publications, Inc: Westport, Connecticut) April 1982.

(2) Medellin, at 5,000 feet and temperatures in the high 60's produces chrysanthemums, carnations, and statice.

(3) Cali, at 4,000 feet, with temperatures in the mid 70's produces pompom chyrsanthemums and statice.

The area around Bogota has 120 firms with 1,000 hectares of flowers. Only 23 percent of the firms have more than 5 hectares. Most firms grow only one type of flower.

Labor requirements average 11 workers per hectare and constitute about 50 percent of total costs. Wages are $150 per month in salary and another 150 in benefits. No heat is required in greenhouses.

Total costs are $80,000 per hectare for carnations. Observors feel that labor costs have risen to a level that makes it difficult to maintain Columbia's role as a world supplier. The rapid expansion of Columbia's production seems to be leveling off.

Kenya:[4]

In Kenya production is largely carried on by large farms (corporate) with additional small farmers on contract. Production is located within 80 miles of Nairobi. Much of it is open air production, but some is produced under plastic-covered shade houses. Production is located at 5,000 feet altitude with a 23-26 ^{o}C daytime temperature and a 12-14 ^{o}C nighttime temperature.

Yields of large flowering carnations are around 200-300 flowers per square meter, with a plant density of 46 plants per square meter, yielding about four to six flowers per plant.

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[4] Source: Dieter M. Hormann, Export Oriented Horticulture in Developing Countries--Kenya, Institut fur Gartenbauokonomie der Universitat Hannover, April 1981.

Aside from three large farms, production is by small holders of .5 to 2 hectares, most of whom produce vegetables as well. Many of the outgrowers are located up to 10 kilometers from the plant, and carry their flowers by hand or on bicycle to the plant.

The three large producers have considerable investment in cold storage and modern packing plants, and a closed cold chain is maintained throughout loading at the Nairobi airport.

Transportation

Most of the flowers arriving in Europe from Spain and Italy have the advantages of road transportation. Flowers arriving from other countries go by air. Some typical air freight rates for flowers are given in Table 8. Distances are given in Table 9.

Estimation of Demand Parameters

Previous Research

Drs. Kleyn and Tap[5] estimated price-qunatity equations for Dutch flower auctions using monthly data from 1969-1977, and found price elasticities ranging from -2.9 to -10.0 for standard carnations, -1.1 to -6.25 for spray chrysanthemum, and -1.3 to -3.4 for large-bloom roses. Since auctions represent a residual market for supplies from many countries which are re-exported to other countries, the auction price-quantity functions do not accurately represent demand conditions in any particular country or region. An important segment of the flower trade by-passes the auction and goes directly from exporter to importer.

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[5] Kleyn and Tap, Landbouw-Economisch Institut, The Hague.

Table 8: 1982 IATA Transport Rates for Cut Flowers, per kg.[a]

Sources	Destinations					
	Miami	Montreal	Paris	NYC	London	W. Berlin
	(dollars per kg.)					
Bogota	.87	1.45	3.68	--	--	--
Tel Aviv		3.55	1.40	3.29	1.61	1.59
Amsterdam				1.96	.75	
Mexico		.91			3.41	
Madrid		1.56		1.58	.79	.77

Source: KLM rate schedule.

[a] Assumes 100 kg. minimum shipment.

Table 9: Mileage Transportation Chart
Airways Mileage

	Frankfurt	London	Paris	New York	Miami
			(miles)		
Bogota	5,651	5,283	5,372	2,487	1,513
Luxemburg			180		
Amsterdam	228	230		3,639	
Rome	598	892	688		
Canary Is.		1,796	1,728		
Rabat			1,126		
Tel Avia	1,836	2,222	2,044	5,672	
Madrid	884	765	649	3,588	
Nairobi	3,925	4,239	4,032		
Athens	1,123		289		
Lima				3,651	2,626
Guatemala				2,064	1,022
Paris	289	209			
Sofia	868				
Johanesburg	5,400				
Buckarest	903				

Seasonal fluctuation in supplies moving through auctions tends to be greater than variation in volume moving through the direct-sale segment of the market. However, both auction prices and direct-sale prices move together, due to competitive market forces. Volume changes that are larger than corresponding price changes tend to make estimated price-quantity relations in auction markets more elastic than estimated demand functions in specific countries. Consequently, the Kleyn and Tap estimates of price elasticity may tend to be on the high side. It must be remembered, however, that they were interested only in price flexibility in auction market--not demand parameters in any individual country.

Paqoulatos[6] estimated the demand for carnations, standard chrysanthemums pompom chrysanthemums for the U.S. using annual data from 1961 to 1978. He obtained a price elasticity of -3.55 for carnations. Results for the other two flowers were not statistically acceptable.

Demand Model for West Germany

The import demands for caranations, roses and chrysanthemums in West Germany for the months November through May were estimated by the equation:

$$\log PRICE = a - b_1 \log QUANT + b_2 DUDEC + b_3 DUNOV$$

where PRICE = price per kg., deflated by CPI

QUANT = imports in hundred metric tons

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[6] Paqoulatos, Emilio, "International and Interregional Competition in the U.S. and Florida Cut Flower Markets." Institute of Food and Agricultural Sciences, University of Florida, August 1980.

DUDEC = dummy intercept variable for December

DUNOV = dummy intercept for November

Income was included in the initial formulation but was omitted because of statistical insignificance. Dummy intercept variables were included for November and December for carnations and roses because import demand is greater for December and lower for November than the other months. It was not possible to seasonally shift the function for chrysanthemums because of insufficient number of observations.

Data for carnations and roses included the period 1970 to 1981, but data for chrysanthemums was not published until 1980, so the analysis for chrysanthemums covered only 1980 and 1981.

Resulting estimates are given in Table 10. Data used in the analysis are given in Appendix Tables 1-3.

Table 10: Estimated Demand Parameters for Cut Flowers in West Germany.

Flower	Intercept	QUANT	DUDEC	DUNOV	R^2
Carnations	3.504	-0.457 (12.01)	0.165 (4.22)	-.185 (4.58)	.72
Roses	3.260	-0.440 (12.69)	.097 (2.48)	-.149 (-3.95)	.71
Chrysanthemums	2.239	-.370 (2.75)	--	--	.41

* Numbers in parentheses are t-ratios.

Coefficients were all significant at the 95 percent level and signs were appropriate. Price elasticities were -2.2, -2.3 and -2.7 for carnations, roses and chrysanthemums repsectively. Price elasticities were not as high as many of the Kleyn-Tap estimates for the reasons

discussed above. However, elasticities are high enough to allow Egypt to export significant quantities without causing severe price effects.

Cut Flower Production and Marketing in Egypt

Cut flower production is a small industry in Egypt, with about 10 principal producers. The larger producers sell flowers both for domestic consumption and for export. The gladiolus is the principal flower exported, but some carnations, roses, tuber roses and bird-of-paradise are also exported. The gladiolus is increasing in importance relative to the other flowers. About 411 tons of gladioli were exported in 1980, with most of the sales going to Lebanon (56 percent of the total) and Russia (16 percent of total). Lebanese importers re-sell to other Arabian countries. Minor quantities are sold to Western European markets, primarily through the Alsmeer auction in the Netherlands. Only grades #1 and #2 are sent to Europe, with the lower qualities going to Arabian countries and into domestic channels. European markets prefer colored varieties, while domestic markets prefer white, a factor not conducive to complimentarity between the two markets.

While some of the larger producers export their own flowers and establish their own overseas contacts, the smaller producers sell through some 49 exporters. The exporters are not specialized in flowers, but handle vegetables and other products as well. All flowers are flown from Cairo airport, at a cost of 330-400 L.E. per ton to Europe.

There are three public-sector organizations associated with the cut flower exporting industry.

(1) Public Union of Producers and Exporters of Horticultural Products. This organization is supposed to serve many functions

in support of the industry, but at present only helps with importing gladioli from Holland.

(2) Public Agency for Controlling Imports and Exports. This organization sets minimum prices for each quality of flower exported. Minimum prices are set at the beginning of the season and remain unchanged during the whole season. The organization also controls the quality of flowers exported.

(3) Center for Developing Exports. This organization has the function of doing research on export markets.

In addition to private exporters El Nil Company also exports flowers for the smaller producers. Previously El Nil produced and exported flowers from their own farms, but they no longer have the farms. The government is now starting a flower farm on new lands in Ismailia, and it is intended that El Nil company will serve as exporting agency.

Most of the flower production in Egypt is open air, although there is some production under plastic. Actual production cost data are very difficult to find and are fragmentary. The Department of Horticulture at Zagazig University has estimated the costs of production as follows:

Open-air Roses: 5,000 L.E. per feddan. Assumed 8,000 bushes per feddan. Each bush gives 10 flowers for export or 100 flowers for local production. Cost of root stock is 120 L.E. per 1,000 plants. Cost of cutting and packaging flowers is about 1,200 L.E. per feddan.

Gladioli: 7,000 L.E. per feddan, assuming 40,000 plants per feddan. The corms cost 4,000 L.E. or 10 piasters each.

Carnations: 6,000 L.E. per feddan, assuming 60,000 plants per feddan.

Cultivation and field operations cost about 3,000 L.E. per feddan.

Bird of Paradise: 8,000 L.E. per feddan, assuming 8,000 plants per feddan. Each plant yields 10 flowers.

The cartons for all types of flowers are the standard 115 x 40 x 20 cm. in size and cost 3.05 L.E. each, which is about .6 p. per flower for roses, and 1.53 p. per gladiolus.

Some of the problems perceived by producers and exporters are the following:

(1) Help is needed to establish contacts in outside markets.

(2) Flexibility to use airlines other than Egypt Air is needed to obtain better shipping availability and possibly lower handling and shipping costs.

(3) Exporters would like to exchange currency at the same rate as other "encouraged" industries rather than the lower official rate.

(4) Producers would like to import production equipment free of tariff.

(5) Minimum prices set by the Public Agency for Controlling impose added restrictions on the flexibility of business operations.

Appendix Table 1: Data on Carnations Used in the Demand Analysis.

Quantity of Carnations Imported Into West Germany (100 kg.)

Year	Jan.	Feb.	Mar.	Apr.	May	Nov.	Dec.
1970	--	--	--	--	--	12,697	15,559
1971	12,172	14,018	12,935	16,618	17,689	13,039	17,186
1972	14,704	16,349	20,708	19,323	21,648	18,676	20,603
1973	17,019	17,822	22,619	18,468	25,870	24,131	18,193
1974	18,101	23.066	16,520	30,200	29,313	20,295	26,134
1975	12,177	42,234	27,393	31,099	35,883	12,804	33,949
1976	21,355	28,107	33,359	31,343	32,367	25,665	28,776
1977	19,724	29,022	32,063	17,650	34,104	20,664	37,443
1978	22,411	38,517	44,801	41,379	38,099	30,280	31,831
1979	25,288	29,649	42,350	46,389	37,142	23,646	37,342
1980*	32,442	40,668	43,147	50,420	47,328	21,755	41,620
1981*	32,459	36,215	43,606	48,933	37,487	38,585	--

Value of Carnations Imported (1,000 DM)

1970	--	--	--	--	--	11,767	19,585
1971	15,387	14,724	14,708	16,581	16,786	12,327	23,209
1972	16,584	17,828	17,569	15,769	21,619	16,900	23,893
1973	18,671	19,364	21,309	18,060	27,616	21,290	23,551
1974	21,082	23,882	15,181	24,394	26,381	22,211	32,422
1975	13,086	40,727	30,521	29,057	35,086	12,353	39,746
1976	23,652	27,866	34,167	28,468	31,067	22,949	30,413
1977	21,765	35,867	30,837	20,176	39,116	19,015	41,221
1978	25,475	37,487	40,304	33,205	35,320	26,194	32,820
1979	24,110	27,479	40,327	39,603	35,357	20,284	37,688
1980	29,160	43,111	35,997	42,617	38,990	18,147	35,809
1981	28,155	33,423	35,903	40,030	38,266	28,645	--

Average Price of Carnations Imported (DM per kg.)

1970	--	--	--	--	--	9.27	12.59
1971	12.64	10.50	11.37	9.98	9.49	9.45	13.50
1972	11.28	10.90	8.49	8.16	9.99	9.05	11.60
1973	10.97	10.87	9.42	9.78	10.67	8.86	12.95
1974	11.65	10.35	9.19	8.08	9.00	10.94	12.41
1975	10.75	9.64	11.14	9.34	9.78	9.65	11.71
1976	11.08	9.91	10.24	9.08	9.60	8.94	10.57
1977	11.03	12.36	9.62	11.43	11.47	9.20	11.01
1978	11.37	9.73	9.00	8.02	9.27	8.65	10.31
1979	9.53	9.27	9.52	8.54	9.52	8.58	10.09
1980*	11.12	10.60	9.34	8.45	8.24	8.34	8.60
1981*	8.67	9.23	8.23	8.18	10.21	7.42	

Source: Statistisches Bundesant, Bonn, Germany.

* Quantities for 1980 and 1981 are published in terms of number of stems, whereas previously the unit was 100 kg. Number of stems was divided by 2,600 to obtain units of 100 kg., since it was assumed that 26,000 carnations make up a ton.

Appendix Table 2: Data on Roses Used in the Demand Estimation

Quantity Imported (100 kg.)

Year	Jan.	Feb.	March	April	May	Nov.	Dec.
1970						7,101	6,494
1971	4,925	4,720	6,956	7,798	7,062	6,881	8,990
1972	5,875	7,163	9,284	10,937	11,363	9,339	9,575
1973	7,987	7,993	10,654	9,745	12,586	16,982	9,012
1974	12,157	11,104	13,095	13,695	17,112	13,206	10,491
1975	7,220	17,164	12,370	14.885	23,834	7,848	19,227
1976	10,787	13,629	14,641	15,581	20,569	14,044	14,767
1977	9,668	13,118	14,921	13,381	19,941	12,792	19,316
1978	8,222	15,691	19,828	17,520	17,883	18,869	15,110
1979	13,802	14,892	18,620	23,211	17,498	15,261	18,383
1980*	13,455	18,129	17,809	26,299	20,976	12,575	19,821
1981*	12,598	12,302	16,208	20,433	18,276	18,886	--

Value of Roses Imported (1,000 DM)

1970						8,729	9,677
1971	7,065	7,067	8,927	9,502	8,376	7,152	12,571
1972	7,366	9,893	9,214	9,801	13,023	9,407	12,068
1973	9,313	10,230	10,482	9,982	12,871	15,212	10,762
1974	13,601	10,511	13,324	13,051	14,556	14,140	11,266
1975	8,420	19,360	15,590	15,356	26,878	7,630	21,011
1976	13,784	18,641	17,228	15,166	21,909	14,136	17,316
1977	11,208	18,854	16,509	16,563	23,980	13,563	24,717
1978	10,943	20,025	26,216	18,097	19,641	17,967	19,203
1979	15,506	17,794	21,591	23,072	19,822	14,064	22,687
1980	18,507	22,582	17,348	23,038	22,470	12,100	24,571
1981	16,088	16,325	19,997	24,406	23,398	20,898	--

Price

1970	--	--	--	--	--	12.29	14.80
1971	14.35	14.97	12.83	12.19	11.86	10.39	13.98
1972	12.54	13.81	9.92	8.96	11.46	10.07	12.60
1973	11.66	12.80	9.84	10.24	10.23	8.96	11.94
1974	11.19	9.47	10.17	9.53	8.51	10.71	10.74
1975	11.66	11.28	12.25	10.32	11.28	9.72	10.93
1976	12.78	13.68	11.77	9.73	10.65	10.07	11.73
1977	11.59	14.37	11.06	12.38	12.03	10.60	12.79
1978	13.31	12.76	13.22	10.33	10.98	9.52	12.71
1979	11.23	11.95	11.60	9.94	11.33	9.22	12.34
1980*	13.75	12.46	9.74	8.76	10.71	9.62	12.40
1981*	12.77	13.27	12.34	11.94	12.80	11.07	--

Appendix Table 3: Data on Chrysanthemums Used in Demand Analysis

Quantity, Value and Price of Chrysanthemums Imported into West Germany, by Month, 1980-81

	Quantity (1,000 stems)	Value (1,000 DM)	Price (DM per 10 Stems)
Jan. 1980	8,872	6,388	7.20
Feb.	12,388	9,702	7.83
Mar.	12,605	6,982	5.54
Apr.	27,806	12,506	4.50
May	29,823	13,943	4.67
June	14,603	7,329	5.02
July	18,916	6,468	3.42
Aug.	23,025	8,323	3.61
Sept.	25,397	5,948	2.34
Oct.	21,413	8,933	4.17
Nov.	15,686	5,877	3.75
Dec.	27,155	10,878	4.00
Jan. 1981	20,855	11,369	5.45
Feb.	19,315	8,475	4.39
Mar.	16,825	9,842	5.85
Apr.	28,046	15,160	5.41
May	26,426	16,038	6.07
June	12,697	5,800	4.57
July	21,160	9,604	4.54
Aug.	20,735	6,610	3.19
Sept.	21,415	8,281	3.87
Oct.	23,666	10,079	4.26
Nov.	34,191	13,947	4.08