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**AGRICULTURAL DEVELOPMENT SYSTEMS
EGYPT PROJECT**

UNIVERSITY OF CALIFORNIA, DAVIS

**THE DEMAND FOR FRESH WINTER TOMATOES IN W. GERMANY
FRANCE, AND THE UNITED KINGDOM**

by

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July, 1981

**Agricultural Development Systems:
Egypt Project
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The Demand for Winter Tomatoes in the EEC

Objectives

West Germany, France, and the U.K. are the three large importers of fresh winter tomatoes in the EEC and Western Europe. These three countries have large populations (see Appendix Table 1), minimal local production in the cold season, and high per capita incomes, a combination of factors which leads to significant imports. Other EEC countries such as Denmark, Belgium, Luxembourg, Italy and the Netherlands have sufficient local production to nearly meet consumption requirements. This study focuses on estimating demand functions for fresh tomatoes at the wholesale level in West Germany, France and U.K.

The objective is to estimate price and income elasticities for purposes of demand projection and estimation of the possible effects of increases in market supplies on equilibrium prices. The winter season is defined as December through March. Since demand parameters may vary during this season, attention is given to estimating monthly demand functions for each of the three countries.

The Market Model

In order to obtain appropriate formulations of statistical demand models, it is first necessary to postulate the demand and supply forces operating in the EEC market, so that statistical models may properly reflect the workings of the market.

The principal sources of winter tomatoes vary somewhat during the season. Morocco and the Canary Islands supply tomatoes principally from open field production during the entire December through March season. Spain has traditionally supplied tomatoes principally until January or February, although in

recent years production has been extended through March and April, due to expanded production under plastic in Aquilas and Almeria.^{1/} Minor quantities are supplied by Egypt, Israel, Bulgaria and several other countries. The Netherlands produces greenhouse tomatoes beginning in March in rather small amounts, but expanding significantly in April. Greenhouse tomatoes are of higher quality than open field tomatoes and command a much higher price early in the season. The price differential between greenhouse and open-field tomatoes decreases in May and later months as local supplies become plentiful. Greenhouse tomatoes may substitute imperfectly for tomatoes produced in the open air (as concerning consumer preferences).

Factors Affecting Quantities Supplied:

(1) Weather in Supplying Countries: Supplies from Morocco, Spain and the Canaries are stochastically affected by weather factors such as abnormally cold temperatures during critical growing periods, by high winds and disease problems, all of which affect yields (after some biologically-determined time lag).

(2) Marketing Controls: Supplies in all three countries are under the control of central marketing boards which set monthly and weekly quotas for all shippers and divert export supplies to domestic markets to avoid temporary low prices in EEC markets.^{2/}

Once supplies arrive in importing countries the market is cleared by competitive market forces and prices arrive at equilibrium levels according to

^{1/} See unpublished paper by R. Simmons, "Production of Winter Tomatoes in Mainland Spain," mimeo., 18 p.

^{2/} During April EEC imports cannot enter at less than a fixed minimum price without penalty to the export countries. Central marketing boards in export countries attempt to maintain prices above this minimum in April. They also voluntarily attempt to maintain a "satisfactory" price in other months.

the quantities delivered. Allocation of supplies among importing countries to equalize net producer prices in all countries is fairly efficient, if not always optimal. There is little or no product differentiation according to source. Tomatoes of similar qualities receive similar prices irrespective of the identity of the supplying country.

(3) Changing Currency Exchange Rates: Changing exchange rates among foreign currencies can also affect the supplies from exporting countries. From the standpoint of producers in Spain and Morocco the upward valuation of the Deutschmark made the German markets more attractive, since the price of tomatoes in Germany translates to more Spanish pesetas and Moroccan dirhams per kilogram for the producer. Upward valuations of currencies in consuming countries or devaluation in producing countries tend to stimulate trade, both within and between seasons.

Factors Affecting Consumption:

The quantities consumers will purchase at varying prices are affected principally by income and temperature. According to vegetable distributors and trade journals abnormally cold temperatures in consuming areas in any period tends to depress consumption of fresh tomatoes. Also, demands for tomatoes seem to expand in March and April as temperatures increase, possibly because of increased tendencies to consume salads in place of hot foods. In addition to pure temperature effects, tastes of consumers may cause demands in the different months to vary.

Quantities and prices of substitute vegetables could also affect tomato consumption, although the effects of related commodities has traditionally been difficult to measure due to the large number of possibly related commodities and the relative unimportance of each individually.

Summary of Supply-Demand Factors:

The previous description of equilibrium market forces implies that quantities and prices of tomatoes are, to a certain extent, jointly determined. A simultaneous equation system would seem to be a reasonable model for estimation, should

the appropriate data be available. Data availability is not uniform from country to country, however, so the statistical models have to be varied somewhat among the three countries.

A problem of specifying quality and type of tomato exists in some months. The analysis is directed toward estimating the market potential for open air field tomatoes such as might be produced in Egypt. It is assumed that the quality of Egyptian tomatoes would be equal to those produced in Spain, Morocco, and the Canary Islands, which are essentially similar in all three supplying regions and generally characteristic of all open field tomatoes.^{1/}

Economic Model:

The postulation that prices and quantities are, at least in part, jointly determined suggests the specification of a statistical model that allows simultaneity in price and quantity determination. Quantities imported would be related to price and to such predetermined variables as the currency exchange rate between the importing country and the exporting country (or the exchange rate of the importing country of International Monetary Fund SDR's, if more than one major supplying country is involved), and weather factors in the principal exporting country (primarily monthly average temperature). Local production is believed to be less than 5 percent of total imports and was ignored in the analysis.

Prices are jointly determined with imports and are also dependent on such predetermined variables as real per-capita income and temperatures in the consuming centers. Variation in quality also has considerable effect on price but cannot be included because such information is not recorded.

^{1/} Quality of tomatoes from Morocco, Spain, and the Canary Islands are also affected by factors other than exposure to weather such as by long travel times and technologies in packing and selection.

In general terms the structural form of the statistical model would be as follows:

IMPORT: PRICE, EXCHR, TEMPE

PRICE: IMPORT, INCOME, TEMPI

where

IMPORT = total quantity imported in month j, in thousand metric tons

PRICE = average price per 6 kg. package, in currency of importing country, deflated by CPI

EXCHR = exchange rate between importing country's currency and exporting country's currency

TEMPE = mean monthly temperature in supplying country, lagged one month

INCOME = gross domestic product, deflated by CPI

TEMPI = mean monthly temperature in importing country.

A two-stage least squares estimation procedure is used to estimate demand parameters.¹ In the first stage a reduced form equation is used which regresses imports on all of the predetermined variables in the model, and monthly dummy intercept variables to account for supply variation during the season. The second stage estimates a structural demand equation which regresses price on predicted imports, income, temperature in the importing country and monthly dummy intercept and slope variables to allow the slope and/or price elasticities of the demand equation to vary by month.

¹ OLS procedures will not produce statistically consistent parameters in Equation (2) since the variable IMPORT is not uncorrelated with the error term in that equation.

RESULTS FOR WEST GERMANY

Import data for West Germany reflect very large increases in imports over the 1965-80 period of analysis, probably due partly to the very large growth in per capita income (see Appendix Tables 1 and 2). The significant upward valuation of the Deutschmark in relation to the International Monetary Fund SDR stimulated imports from Spain and Morocco. Results of the two-stage least squares analysis for West Germany are as follows:

First Stage:

$$R^2 = .90 \quad \text{IMPORTS} = 32.4393 + .0035 \text{ TEMPI} - 6.2614 \text{ EXCHR} - .0288 \text{ INCOME} + .0404 \text{ TEMPE}$$

$$\quad \quad \quad \quad \quad \quad (.08) \quad \quad \quad (-7.37) \quad \quad \quad (-.64) \quad \quad \quad (.25)$$

$$\quad \quad \quad - 1.2728 \text{ DI}_{\text{JAN}} - 2.4754 \text{ DI}_{\text{FEB}} - .7757 \text{ DI}_{\text{MAR}}$$

$$\quad \quad \quad \quad \quad (-1.92) \quad \quad \quad (-3.58) \quad \quad \quad (-1.17)$$

Second Stage:

$$R^2 = .53 \quad \text{PRICE} = 3.1419 - .3334 \widehat{\text{IMPORTS}} + .0792 \text{ TEMPI} + .1076 \text{ INC} + .6035 \text{ DI}_{\text{JAN}}$$

$$\quad \quad \quad \quad \quad (2.23) \quad \quad \quad (1.74) \quad \quad \quad (2.76)$$

$$\quad \quad \quad + .8210 \text{ DI}_{\text{FEB}} + .7532 \text{ DI}_{\text{MAR}} - .0354 \text{ DS}_{\text{JAN}} - .0838 \text{ DS}_{\text{FEB}} + .649 \text{ DS}_{\text{MAR}}$$

Numbers in parentheses below the coefficients are the t-ratios. Exchange rates are very significant in explaining variations in quantities imported.

In the demand equation imports, income and temperature are significant at the 90 percent level or better.

In order to compare the estimated coefficients of the demand equation of the 2SLS model with an OLS model the results of the OLS model are presented below,

$$R^2 = .55 \quad \text{PRICE} = 2.7010 - .3126 \text{ IMPORT} + .0795 \text{ TEMPI} + .1112 \text{ INC} + .6541 \text{ DI}_{\text{JAN}}$$

$$\quad \quad \quad \quad \quad (2.5) \quad \quad \quad (1.8) \quad \quad \quad (3.5)$$

$$\quad \quad \quad + 1.2676 \text{ DI}_{\text{FEB}} + 1.5763 \text{ DI}_{\text{MAR}} - .0382 \text{ DS}_{\text{JAN}} - .1328 \text{ DS}_{\text{FEB}} + .0847 \text{ DS}_{\text{MAR}}$$

The coefficients of the import variable for the various months were not significantly different between the two-stage estimation procedure and the OLS procedure, as indicated in Table 1.

Table 1: Comparison of coefficients for the import variable for 2SLS and OLS for Germany

Month	Estimation Procedure	
	2SLS	OLS
Dec.	-.3334	-.3126
Jan.	-.3688	-.3508
Feb.	-.4172	-.4454
Mar.	-.1685	-.2279

RESULTS FOR FRANCE

A complete price series for the 1966-80 period for France was available only for tomatoes at the retail level in Parisian markets. Monthly average prices at the wholesale level were available only for the period 1974-80. Consequently, the estimation procedure involved the use of retail prices in the demand function with a later conversion to the wholesale level with the aid of an equation for estimating the wholesale-retail margin.

In the reduced form equation relating total imports to the predetermined variables in the model for France, the monthly mean temperature (lagged one month) in Agadir, Morocco was included, as was the temperature in Alicante, Spain. For much of the period Morocco was the principal supplier of France, and temperature variation in Morocco is substantial. Supplies from Morocco are often affected by cold temperatures in producing areas, and such temperature variations appear to

affect supplies with a one-month lag. Also in the first-stage equation two exchange rate variables were defined: (1) the official exchange rate between the Spanish peseta and the French franc, and (2) the French franc divided by the SDR. Moroccan currency has traditionally been tied to the French franc so variation in the franc-dirham rate is minimal and was not included.

The 2SLS results are as follows:

First Stage:

$$R^2 .67 \quad \text{IMPORT} = 17.2673 + .3427 \text{ INC} - .1632 \text{ TEMPI} - .2574 \text{ EXCH}_1 - 4.6863 \text{ EXCH}_2 \\ + .2045 \text{ TEMPE}_1 + .5354 \text{ TEMPE}_2 - 3.2418 \text{ DI}_{\text{JAN}} - 4.2647 \text{ DI}_{\text{FEB}} \\ (.54) \quad (1.52) \\ + .8339 \text{ DI}_{\text{MAR}}$$

where

INC = French gross domestic product divided by the wholesale price index

TEMP = monthly average temperature in Paris, degrees Fahrenheit

EXCH₁ = peseta per French franc

EXCH₂ = French franc per SDR

TEMPE₁ = mean monthly temperature in Agadir, Morocco (lagged one month), degrees F

TEMPE₂ = mean monthly temperature in Alicante, Spain (lagged one month), degrees F.

The structural demand equation, derived in the second stage is as follows:

$$R^2 .50 \quad \text{PRIC} = 1.6212 - .0932 \text{ IMPORT} + .0307 \text{ TEMP} + .0287 \text{ INC} - .0774 \text{ DI}_{\text{JAN}} \\ (.159) \quad (1.59) \quad (2.09) \\ + .3336 \text{ DI}_{\text{FEB}} + 1.0962 \text{ DI}_{\text{MAR}} - .0293 \text{ DS}_{\text{JAN}} - .0362 \text{ DS}_{\text{FEB}} - .0404 \text{ DS}_{\text{MAR}}$$

Income is significant at the 95 percent level and imports and temperature are significant at about the 88 percent level. An ordinary least squares demand equation using the same variables as the structural demand equation in the second stage of the 2SLS model was estimated for purposes of comparison. Results of the OLS equation is as follows:

$$R^2 = .69 \quad \text{PRICE} = 1.1925 - \underset{(-2.26)}{-.0683} \text{IMPORT} + \underset{(5.0295)}{.0290} \text{INC} + \underset{(1.88)}{.0303} \text{TEMP} \\ + .6979 \text{DI}_{\text{JAN}} + .8333 \text{DI}_{\text{FEB}} + 1.4614 \text{DI}_{\text{MAR}} - .0683 \text{DS}_{\text{JAN}} - .0677 \text{DS}_{\text{FEB}} \\ - .0622 \text{DS}_{\text{MAR}}$$

A comparison of the estimated coefficients of the IMPORT variable using the OLS and the 2SLS procedures is given below.

Table 2: Comparison of results of OLS and 2SLS for France

Month	Procedure	
	2SLS	OLS
Dec.	-.0932	-.0683
Jan.	-.1225	-.1366
Feb.	-.1294	-.1360
Mar.	-.1336	-.1305

The 2SLS estimates are comparable with the OLS estimates in each month.

In order to establish a relationship between retail and wholesale prices in France for use in converting the demand function to the wholesale level, the following equation was estimated:

$$R^2 = .51 \quad \text{MARG} = -.8522 + \underset{(4.64)}{.3386} \text{PRIC}_R - \underset{(.16)}{.0029} \text{IMPORT} + \underset{(1.37)}{.00734} \text{CPI}$$

where

MARG = retail price minus wholesale price

PRIC_R = retail price in francs per kg.

IMPORT = quantity imported

CPI = consumer price index

A total of 40 observations were available. In this equation the change in wholesale-retail margin seems to be 33.9 percent of the retail price. No other variable is significant statistically. A simple average of the wholesale-retail margin as a percentage of the retail price for each month was calculated. There were only slight differences between months, averaging about 30-35 percent of the retail price. It was concluded that an estimate of a retail-wholesale margin of 34 percent of the retail price was sufficiently realistic to use to convert the demand equation to the wholesale level. Conversion to the wholesale level is accomplished by multiplying the net price-quantity relation by 0.66.

UNITED KINGDOM

Results for the U.K. were not as good as for the other two countries because (1) monthly data on imports were available only for 1971-80, a period of only 10 years, (2) real income did not change significantly during the period of analysis, and (3) there was less variation in measured prices and imports in the U.K. than for the other two countries.

The U.K. is supplied principally by the Canary Islands during this period. with mainland Spain supplying substantial quantities in December and January. The Channel Islands have produced significant quantities of glasshouse tomatoes in December in recent years. Price quotations for these tomatoes are not available for the entire period. December was omitted from the analysis because of data problems.

The price variable for January-March was defined as the weighted average of the monthly average prices in Spain and the Canary Islands.

It was not possible to do a two-stage-least squares analysis for the U.K. Predictions of imports were so unreliable that their use in the second stage gave unsatisfactory results. The following OLS formulation was used to estimate the structural demand equation.

$$R^2 = .52 \quad \text{PRIC} = .0372 - .0428 \text{ IMPORT} + .0375 \text{ TEMPI} + .0635 \text{ INC} - .3653 \text{ DIFEB} \\ \quad \quad \quad \quad (.60) \quad \quad \quad (1.18) \quad \quad \quad (1.48) \\ \quad \quad \quad \quad + .3135 \text{ DIMAR} + .0276 \text{ DSFEB} + .0069 \text{ DSMAR}$$

All of the estimated parameters have the correct signs. Explained variance in the dependent variable is low, however, and minor modifications in specification caused rather large differences in results. Lack of robustness in the U.K. estimates tends to prevent heavy reliance on elasticity estimates.

Summary of Results

Table 3 below summarizes the results for the three countries by substituting the average income and temperature effects into the equation and presenting the net effect between price and imports. In the case of France the equation is also multiplied by 0.66 to convert it to the wholesale level.

Table 3: Summary of Demand Equations for the Three Countries

Month	Country	Regression Equation	Estimate of Price elast.
Dec.	W. Germany	$P = 12.5470 - .3334Q$	3.5
	France	$P = 4.9943 - .0932Q$	2.1

Jan.	W. Germany	$P = 12.9232 - .3688Q$	2.5
	France	$P = 5.0543 - .1225Q$	2.0
	U.K.	$P = 2.5852 - .0428Q$	2.8
Feb.	W. Germany	$P = 13.3878 - .4172Q$	2.4
	France	$P = 5.3754 - .1294Q$	1.6
	U.K.	$P = 2.2369 - .0152Q$	10.6
Mar.	W. Germany	$P = 13.6891 - .1685Q$	7.3
	France	$P = 6.2654 - .1336Q$	1.7
	U.K.	$P = 3.0062 - .0359$	4.4

The price elasticity of demand is calculated at the mean price and mean quantity point on the monthly demand functions. Price elasticities seem to center mostly on the -1.5 to -2.5 range, which is in conformity with previous studies.¹

Standardizing and Aggregating Demand Functions

The estimated demand functions can be placed at current levels by adjusting the intercepts by multiplying by current levels of real income and the CPI. At the same time the demand functions can be standardized in a particular currency by multiplying the intercepts and slopes by the appropriate exchange rates. In Table 4 below the demand functions are expressed in dollar terms and placed at December, 1979 levels.

Table 4: Estimated Demand Functions for W. Germany, France and U.K., by months.

Month	Country	Demand Function
December	W. Germany	\$ 9.09 - .1347Q
	France	\$ 8.67 - .0628Q
	U.K.	-----
January	W. Germany	\$ 9.33 - .1490Q
	France	\$ 8.76 - .0825Q
	U.K.	\$ 9.33 - .0856Q
February	W. Germany	\$ 9.63 - .1686Q
	France	\$ 9.27 - .0872Q
	U.K.	\$ 8.08 - .0304Q
March	W. Germany	\$ 9.82 - .0681Q
	France	\$ 10.66 - .0900Q
	U.K.	\$ 10.86 - .0718Q

Note: Exchange rates used per dollar were .4041 marks, .1701 Francs and 2.0 pounds. Q represents thousand metric tons.

^{1/} Unpublished studies by Landbouw-Economisch Instituut Den Haag, The Hague, Netherlands.

The demand functions can be aggregated over countries and/or over months by solving each individually with Q as the dependent variable and then adding. The aggregated functions can then be rearranged with P dependent for use in predicting aggregated price effects with various levels of increased market supplies. Aggregating over countries gives the following monthly functions:

$$\text{December}^{1/}: P = \$ 8.98 - .0285Q$$

$$\text{January: } P = \$ 9.10 - .0328Q$$

$$\text{February: } P = \$ 8.53 - .0199Q$$

$$\text{March: } P = \$ 10.42 - .0252Q$$

Thus an increase in supply of 10,000 metric tons each month would reduce the price by \$.29 in December, \$.33 in January, \$.20 in February and \$.25 in March. An increase of 10,000 metric tons per month would be a supply increase in the range of 15-20 percent. In this way it can be postulated that Egypt could export 10,000 metric tons in each of these four months and expect to decrease the equilibrium market price on the average of about 25-35 U.S. cents per 6 kilogram box, assuming other factors remained constant. Effects of various other hypothetical supply adjustments could be analyzed in the same manner with those demand equations.

Conclusions of Study

Price elasticities for fresh tomatoes in W. Germany, France and U.K. are, in general, elastic, ranging for the most part between -1.5 and -2.5. Income elasticities are 1.8 for France, +1.5 for U.K. and +2.0 for W. Germany.²

^{1/} For the U.K. the January function was used.

^{2/} The income elasticities are calculated by using the formula

$$\eta_I = \frac{\partial Q}{\partial I} \cdot \frac{\bar{I}}{Q} = \frac{\partial Q}{\partial P} \cdot \frac{\partial P}{\partial I} \cdot \frac{\bar{I}}{Q},$$

where $\frac{\partial Q}{\partial P} = \frac{1}{\frac{\partial P}{\partial Q}}$

These results are favorable for the feasibility of Egyptian exports, since increased supplies do not appear to have a large negative impact on price. Percentage increases in quantities supplied are much larger than their resulting percentage decreases in price. Also, high income elasticities cause favorable demand responses to increases in income. Although the demands for fresh tomatoes in the EEC appears favorable to increased Egyptian imports, it must, of course, be assumed that Egyptian exports would be equal in quality to supplies from Morocco, Spain and the Canary Islands. It also assumes that supply sources from Egypt would be sufficiently steady and reliable to develop and maintain the necessary market contacts and channels of distribution.

Recommendations for Further Study

The price elastic nature of the demands for fresh winter tomatoes in the three principal countries of the EEC and the relatively high income elasticities are favorable but not sufficient conditions for the feasibility of exporting Egyptian tomatoes. In order to actually implement such a program, it is necessary to develop and improve the tomato production and marketing facilities in Egypt. The necessary infra-structure in Egypt, such as packing plants, refrigerated transports, supplies of containers and other materials required, the coordination of marketing activities, and the extension of information on required standards and technologies must be developed.

It is probably not feasible from an administrative point of view to develop such an integrated marketing system solely for purposes of exports to the EEC. A coordinated program to develop both domestic and export activities simultaneously would probably prove to be more economical. It is believed that the development of an efficient production-marketing system would provide substantial benefits to the domestic markets as well, since it has already been determined

that up to 40 percent of the tomatoes produced in Egypt for domestic consumption are wasted due to spoilage. Also, exports to the Near East countries, with their expanding populations and incomes, may also prove economical.

Consequently, this study proposes a further program of research on the domestic tomato (and other vegetables) production-marketing activities in Egypt for the purposes of answering the following questions:

1. Would it be economical to construct packing stations at suitable locations near production areas to provide simple but suitable grading facilities and to provide standard containers for the produce?
2. Would these packing stations provide facilities for post-harvest cooling? Transportation? Mechanical sizers? Palletization equipment?
3. What length of season and percent of capacity would be required for economical operation?
4. Would cooperatives be a suitable organizational apparatus for accomplishing this?
5. Could buyers be located at the packing stations and/or the city markets to coordinate efficient movement to consuming centers?
6. What potential is there for expanding exports to Near East countries? Would such exports be complementary to domestic markets and to EEC exports in terms of seasonal supplies and prices?

In conclusion, the present study of EEC demands addresses one aspect of a multi-faceted problem of overall industry feasibility. It is necessary to address these other questions before a complete answer can be obtained, and additional research is necessary to successfully implement such a development activity, should it appear feasible.

Appendix Table 1: Imports of Tomatoes into West Germany, by months, by Country of Origin, 1965-80

	Spain	Canary	Morocco	Netherlands	Others	Total	
	(metric tons)						
1965	Jan.	2,203	1,518	78	16	28	3,843
	Feb.	2,148	1,743	5	13	10	3,920
	Mar.	2,773	2,392	15	35	--	5,215
	Apr.	2,466	3,461	7	2,825	153	8,913
	May	1,303	2,157	2,182	25,729	555	31,925
	June	1,125	246	3,247	42,414	3,466	50,498
	July	187	6	--	37,174	16,172	53,534
	Aug.	--	--	--	36,293	8,523	44,816
	Sept.	255	--	--	16,312	1,743	18,309
	Oct.	3,486	12	1	8,924	1,542	13,964
	Nov.	5,854	211	1	2,796	2,743	11,605
	Dec.	4,634	1,700	32	295	336	6,996
1966	Jan.	2,579	3,552	24	--	28	6,200
	Feb.	1,071	3,437	53	--	48	4,609
	Mar.	1,647	4,897	15	--	89	6,688
	Apr.	1,104	4,127	41	2,245	459	7,975
	May	461	1,138	1,242	20,817	1,254	24,911
	June	751	60	192	39,294	5,702	46,017
	July	15	2	104	40,962	19,735	60,817
	Aug.	--	--	--	31,775	5,689	37,464
	Sept.	205	--	--	16,526	1,274	18,006
	Oct.	2,250	1	2	8,879	1,856	12,988
	Nov.	2,697	270	40	1,999	2,613	7,619
	Dec.	2,519	1,431	551	143	677	5,320
1967	Jan.	2,038	2,883	194	--	277	5,392
	Feb.	330	3,928	--	--	142	4,400
	Mar.	--	6,402	3	164	306	6,875
	Apr.	1	4,672	119	5,804	941	11,537
	May	279	886	614	30,141	3,553	35,473
	June	783	166	150	43,129	7,486	51,715
	July	249	--	6	45,390	14,528	60,172
	Aug.	6	1	--	31,678	8,598	40,283
	Sept.	19	--	--	16,387	1,395	17,800
	Oct.	3,436	43	--	11,343	3,459	18,281
	Nov.	4,007	379	149	2,844	4,067	11,445
	Dec.	1,677	1,892	268	227	756	4,820

Appendix Table 1: (continued)

		Spain	Canary	Morocco	Netherlands	Others	Total
		(metric tons)					
1968	Jan.	1,625	3,632	38	--	234	5,529
	Feb.	68	4,163	17	--	250	4,497
	Mar.	--	5,237	9	306	322	5,875
	Apr.	--	4,328	1	8,608	1,211	14,147
	May	--	992	18	34,591	4,424	40,025
	June	173	70	175	38,088	11,907	50,412
	July	85	--	--	39,315	13,916	53,316
	Aug.	--	--	--	32,443	5,401	37,844
	Sept.	40	--	--	15,857	923	16,820
	Oct.	4,871	35	--	10,457	2,226	17,590
	Nov.	5,124	867	11	2,399	3,180	11,582
	Dec.	1,639	1,847	196	88	1,554	5,324
1969	Jan.	2,300	4,086	573	--	509	7,468
	Feb.	358	4,066	209	--	327	4,961
	Mar.	25	5,797	240	329	655	7,046
	Apr.	14	1,992	221	7,013	1,032	10,271
	May	17	145	539	26,217	4,408	31,325
	June	121	--	28	40,801	7,218	48,168
	July	33	--	--	48,206	16,543	64,782
	Aug.	--	--	--	34,825	7,122	41,948
	Sept.	66	66	--	21,861	1,505	23,431
	Oct.	4,296	4,296	6	12,082	2,316	18,700
	Nov.	6,814	655	184	3,141	3,063	13,857
	Dec.	2,413	3,080	745	112	1,271	7,622
1970	Jan.	1,470	3,044	197	--	303	5,014
	Feb.	209	3,442	30	--	198	3,879
	Mar.	41	3,960	51	480	483	5,016
	Apr.	6	2,038	129	12,766	1,851	16,789
	May	12	75	485	29,373	6,768	36,711
	June	37	3	88	49,643	8,764	58,536
	July	57	4	--	52,148	10,824	63,032
	Aug.	--	--	--	31,802	5,902	37,704
	Sept.	449	--	--	20,645	1,952	23,046
	Oct.	3,649	34	--	13,958	3,093	20,831
	Nov.	4,787	353	109	4,273	7,795	17,318
	Dec.	4,504	1,852	773	114	1,810	9,052

Appendix Table 1: Population of EEC countries, 1977

<u>Country</u>	<u>Population (000)</u>
Germany	61,400
France	53,078
U.K.	55,919
Italy	56,472
Netherlands	12,856
Belguim	9,830
Denmark	5,088
Ireland	3,192
Luxembourg	355

Source: Eurostat: Basic Statistics
of the Community, 1979.
Brussels

Appendix Table 2: Imports of Tomatoes into West Germany, by months, by Country of Origin, 1965-80

	Spain	Canary	Morocco	Netherlands	Others	Total	
	(metric tons)						
1965	Jan.	2,203	1,518	78	16	28	3,843
	Feb.	2,148	1,743	5	13	10	3,920
	Mar.	2,773	2,392	15	35	--	5,215
	Apr.	2,466	3,461	7	2,825	153	8,913
	May	1,303	2,157	2,182	25,729	555	31,925
	June	1,125	246	3,247	42,414	3,466	50,498
	July	187	6	--	37,174	16,172	53,534
	Aug.	--	--	--	36,293	8,523	44,816
	Sept.	255	--	--	16,312	1,743	18,309
	Oct.	3,486	12	1	8,924	1,542	13,964
	Nov.	5,854	211	1	2,796	2,743	11,605
	Dec.	4,634	1,700	32	295	336	6,996
1966	Jan.	2,579	3,552	24	--	28	6,200
	Feb.	1,071	3,437	53	--	48	4,609
	Mar.	1,647	4,897	15	--	89	6,688
	Apr.	1,104	4,127	41	2,245	459	7,975
	May	461	1,138	1,242	20,817	1,254	24,911
	June	751	60	192	39,294	5,702	46,017
	July	15	2	104	40,962	19,735	60,817
	Aug.	--	--	--	31,775	5,689	37,464
	Sept.	205	--	--	16,526	1,274	18,006
	Oct.	2,250	1	2	8,879	1,856	12,988
	Nov.	2,697	270	40	1,999	2,613	7,619
	Dec.	2,519	1,431	551	143	677	5,320
1967	Jan.	2,038	2,883	194	--	277	5,392
	Feb.	330	3,928	--	--	142	4,400
	Mar.	--	6,402	3	164	306	6,875
	Apr.	1	4,672	119	5,804	941	11,537
	May	279	886	614	30,141	3,553	35,473
	June	783	166	150	43,129	7,486	51,715
	July	249	--	6	45,390	14,528	60,172
	Aug.	6	1	--	31,678	8,598	40,283
	Sept.	19	--	--	16,387	1,395	17,800
	Oct.	3,436	43	--	11,343	3,459	18,281
	Nov.	4,007	379	149	2,844	4,067	11,445
	Dec.	1,677	1,892	268	227	756	4,820

Appendix Table 2: (continued)

		Spain	Canary	Morocco	Netherlands	Others	Total
		(metric tons)					
1968	Jan.	1,625	3,632	38	--	234	5,529
	Feb.	68	4,163	17	--	250	4,497
	Mar.	--	5,237	9	306	322	5,875
	Apr.	--	4,328	1	8,608	1,211	14,147
	May	--	992	18	34,591	4,424	40,025
	June	173	70	175	38,088	11,907	50,412
	July	85	--	--	39,315	13,916	53,316
	Aug.	--	--	--	32,443	5,401	37,844
	Sept.	40	--	--	15,857	923	16,820
	Oct.	4,871	35	--	10,457	2,226	17,590
	Nov.	5,124	867	11	2,399	3,180	11,582
	Dec.	1,639	1,847	196	88	1,554	5,324
1969	Jan.	2,300	4,086	573	--	509	7,468
	Feb.	358	4,066	209	--	327	4,961
	Mar.	25	5,797	240	329	655	7,046
	Apr.	14	1,992	221	7,013	1,032	10,271
	May	17	145	539	26,217	4,408	31,325
	June	121	--	28	40,801	7,218	48,168
	July	33	--	--	48,206	16,543	64,782
	Aug.	--	--	--	34,825	7,122	41,948
	Sept.	66	66	--	21,861	1,505	23,431
	Oct.	4,296	4,296	6	12,082	2,316	18,700
	Nov.	6,814	655	184	3,141	3,063	13,857
	Dec.	2,413	3,080	745	112	1,271	7,622
1970	Jan.	1,470	3,044	197	--	303	5,014
	Feb.	209	3,442	30	--	198	3,879
	Mar.	41	3,960	51	480	483	5,016
	Apr.	6	2,038	129	12,766	1,851	16,789
	May	12	75	485	29,373	6,768	36,711
	June	37	3	88	49,643	8,764	58,536
	July	57	4	--	52,148	10,824	63,032
	Aug.	--	--	--	31,802	5,902	37,704
	Sept.	449	--	--	20,645	1,952	23,046
	Oct.	3,649	34	--	13,958	3,093	20,831
	Nov.	4,787	353	109	4,273	7,795	17,318
	Dec.	4,504	1,852	773	114	1,810	9,052

Appendix Table 2: (continued)

	Spain	Canary	Morocco	Netherlands	Others	Total	
	(metric tons)						
1971	Jan.	823	3,810	581	--	157	5,371
	Feb.	264	4,883	94	--	353	5,594
	Mar.	54	6,190	130	1,106	744	8,224
	Apr.	3	1,645	182	14,160	2,159	18,148
	May	17	27	25	29,404	8,685	38,158
	June	20	--	1	49,139	11,579	60,740
	July	13	--	--	45,589	11,484	57,086
	Aug.	4	--	--	28,093	5,533	33,629
	Sept.	574	--	--	18,741	3,745	23,060
	Oct.	4,364	9	--	13,634	5,190	23,197
	Nov.	2,851	234	107	3,918	8,079	15,188
	Dec.	3,277	1,132	591	244	3,531	8,774
1972	Jan.	2,786	3,325	149	18	252	6,531
	Feb.	362	5,004	151	51	284	5,852
	Mar.	7	4,694	129	941	1,004	6,776
	Apr.	9	2,548	101	13,717	2,283	18,658
	May	55	1	35	36,035	9,759	45,885
	June	2	--	--	44,838	11,417	56,257
	July	39	--	--	43,851	14,698	58,588
	Aug.	9	--	--	34,378	7,275	41,662
	Sept.	247	--	--	19,607	2,506	22,360
	Oct.	5,169	6	--	13,873	6,119	25,160
	Nov.	5,315	809	122	4,324	6,369	16,939
	Dec.	3,776	2,483	1,323	232	2,194	10,008
1973	Jan.	1,678	4,293	2,271	174	347	8,764
	Feb.	235	6,098	857	202	492	7,884
	Mar.	28	4,701	1,087	1,257	666	7,739
	Apr.	2	413	725	11,332	2,505	14,976
	May	--	--	105	39,356	2,616	46,731
	June	57	--	5	46,467	6,078	52,607
	July	180	--	--	51,884	11,460	63,525
	Aug.	--	--	--	33,242	5,984	39,226
	Sept.	84	--	--	20,730	2,449	23,263
	Oct.	4,067	18	--	10,460	6,442	20,987
	Nov.	2,661	668	1,310	2,204	10,669	17,512
	Dec.	1,489	2,205	2,535	144	2,067	8,440

Appendix Table 2: (continued)

	Spain	Canary	Morocco	Netherlands	Others	Total	
	(metric tons)						
1974	Jan.	1,819	4,701	2,657	71	544	9,792
	Feb.	298	5,765	1,700	155	342	8,260
	Mar.	9	5,946	1,861	2,092	461	10,369
	Apr.	42	733	1,480	15,837	2,556	20,648
	May	36	16	532	42,082	7,110	49,760
	June	20	--	884	44,178	5,077	50,160
	July	79	--	32	48,859	10,103	59,073
	Aug.	2	--	1	40,888	7,680	48,570
	Sept.	462	--	1	22,966	3,437	26,866
	Oct.	3,609	68	1	12,670	6,951	23,299
	Nov.	2,144	611	544	2,992	7,878	14,189
	Dec.	2,638	2,639	3,602	134	1,900	10,914
1975	Jan.	1,864	5,204	5,040	136	516	12,760
	Feb.	194	6,295	3,438	153	371	10,451
	Mar.	28	5,786	5,013	2,503	277	13,606
	Apr.	15	2,121	4,524	15,098	2,005	23,762
	May	12	124	2,715	28,566	5,546	36,963
	June	90	--	1,234	39,396	7,272	47,993
	July	5	--	23	46,082	15,427	61,536
	Aug.	--	--	--	30,263	6,999	37,262
	Sept.	302	--	--	22,497	5,210	28,009
	Oct.	6,686	92	--	8,916	6,947	22,640
	Nov.	6,456	954	1,905	2,524	4,597	16,435
	Dec.	4,358	2,848	2,607	230	1,000	11,043
1976	Jan.	2,345	4,317	5,429	98	409	12,598
	Feb.	214	5,639	4,877	134	223	11,087
	Mar.	95	4,644	3,023	1,603	293	9,658
	Apr.	18	347	2,797	18,143	1,232	22,537
	May	11	1	1,929	36,998	5,794	44,733
	June	62	--	1,165	48,375	7,158	56,761
	July	175	--	--	43,382	19,405	62,962
	Aug.	19	--	--	23,048	10,595	33,663
	Sept.	1,024	--	--	19,477	2,634	23,135
	Oct.	9,029	--	--	14,812	3,982	27,823
	Nov.	6,461	1,101	681	3,392	3,998	15,624
	Dec.	5,001	2,672	6,262	262	1,028	15,224

Appendix Table 2: (continued)

	Spain	Canary	Morocco	Netherlands	Others	Total	
	(metric tons)						
1977	Jan.	1,849	3,883	6,224	77	75	12,107
	Feb.	184	6,766	4,220	206	525	11,901
	Mar.	20	9,768	1,128	1,615	514	13,045
	Apr.	12	1,159	2,676	16,857	2,149	22,583
	May	31	4	3,841	34,106	6,729	44,711
	June	92	--	399	44,822	10,470	55,783
	July	7	--	--	41,994	15,376	57,376
	Aug.	1	--	--	30,261	9,993	40,255
	Sept.	1,026	--	--	20,087	3,358	24,471
	Oct.	9,511	100	--	13,886	2,618	26,115
	Nov.	7,794	1,877	1,926	4,625	2,182	18,404
	Dec.	3,407	2,985	5,853	363	1,060	13,668
1978	Jan.	2,407	4,582	6,086	116	216	13,406
	Feb.	557	6,641	3,345	190	413	11,145
	Mar.	224	8,054	4,033	1,682	768	14,761
	Apr.	103	1,956	1,502	14,471	1,779	19,811
	May	71	61	3,085	33,721	3,732	40,669
	June	620	--	137	48,389	7,582	56,728
	July	35	--	--	43,144	12,652	55,831
	Aug.	--	--	--	35,526	11,606	47,132
	Sept.	805	--	--	24,228	4,624	29,657
	Oct.	10,457	38	--	16,286	5,005	31,786
	Nov.	8,259	793	3,211	4,112	2,983	19,359
	Dec.	4,673	3,541	5,272	177	901	14,564
1979	Jan.	3,716	5,414	5,928	83	462	15,602
	Feb.	1,457	7,498	4,160	242	646	14,004
	Mar.	401	7,781	5,673	2,074	798	16,727
	Apr.	113	3,409	2,708	13,075	1,823	21,129
	May	188	252	3,689	36,907	5,705	46,742
	June	750	--	--	48,746	10,200	59,696
	July	33	--	--	44,103	14,185	58,322
	Aug.	--	--	--	36,367	6,017	42,384
	Sept.	39	--	--	21,186	3,534	24,617
	Oct.	7,226	196	--	14,731	5,298	27,452
	Nov.	7,895	2,623	3,625	4,578	2,947	21,669
	Dec.	5,344	2,866	7,375	495	526	16,606

		Spain	Canary	Morocco	Netherlands	Others	Total
		(metric tons)					
1980	Jan.	4,140	5,132	3,816	107	73	13,385
	Feb.	2,392	6,013	4,129	179	134	13,267
	Mar.	2,728	5,907	3,464	1,515	558	14,697
	Apr.	566	3,592	4,208	12,004	787	21,436

Source: Zentral Markt-und Preisberichtstelle für Erzeugnisse der Land-Forst-und Ernährungswirtschaft GmbH, ZMP Bilanz: Gemüse, Bonn, Germany, various issues.

Appendix Table 3: Monthly Data Used in Analysis for West Germany

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average Price (DM/6 kg.)	Consumer Price Index (1970 = 100)	National Income (10 Billion DM)	Deflated Price (DM/6 kg.)	Deflated Income (10 Billion DM)	Exchange Rate (DM ÷ SDR)	Monthly Average Temperature (F°)
Jan.	1966	5.56	89.1	36.9	6.24	41.43	4.00
	1967	8.22	91.3	37.4	9.00	40.93	3.98
	1968	9.49	92.8	42.6	10.23	45.93	4.00
	1969	9.62	95.3	47.3	10.09	49.60	4.00
	1970	8.49	98.6	52.5	8.61	53.30	3.69
	1971	11.45	101.9	61.8	11.24	60.67	3.65
	1972	12.05	108.3	67.5	11.13	62.33	3.55
	1973	10.83	115.5	75.3	9.38	65.23	3.48
	1974	13.20	123.7	80.2	10.67	64.87	3.26
	1975	13.98	131.3	83.3	10.65	63.47	2.95
	1976	13.78	138.2	91.2	9.97	65.97	3.07
	1977	12.42	143.8	97.4	8.64	67.77	2.75
	1978	13.39	148.4	103.6	9.02	69.83	2.56
	1979	11.06	152.7	112.3	7.24	73.53	2.38
	1980	15.42	159.8	122.9	9.65	76.93	2.32
Feb.	1966	6.00	89.8	36.9	6.68	41.13	4.01
	1967	11.52	91.3	37.6	12.62	40.93	3.98
	1968	8.93	92.8	42.6	9.62	45.93	4.00
	1969	9.84	95.3	47.3	10.33	49.60	4.00
	1970	11.83	98.6	52.5	12.00	53.30	3.69
	1971	11.45	102.8	61.2	11.14	59.53	3.65
	1972	11.38	108.7	67.5	10.47	62.10	3.55
	1973	10.37	116.2	75.4	8.92	64.87	3.48
	1974	13.83	124.8	80.2	11.08	64.30	3.26
	1975	13.24	132.0	83.3	10.03	63.13	2.95
	1976	13.28	139.2	91.2	9.54	65.50	3.07
	1977	13.43	144.7	97.5	9.28	67.37	2.75
	1978	13.28	149.2	103.6	8.90	69.47	2.56
	1979	13.04	153.6	112.3	8.49	73.10	2.38
	1980	15.87	161.4	122.9	9.83	76.17	2.32

Appendix Table 3 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Average Price (DM/6 kg.)	Consumer Price Index (1970 = 100)	National Income (10 Billion DM)	Deflated Price (DM/6 kg.)	Deflated Income (10 Billion DM)	Exchange Rate (DM ÷ SDR)	Monthly Average Temperature (F°)
		89.8		--	--		
1966		91.3	37.4	11.63	40.93	3.98	43.74
1967	10.44	92.8	42.6	11.71	45.93	4.00	41.90
1968	10.87	96.1	47.3	8.62	49.17	4.00	38.70
1969	8.28	99.5	53.2	12.05	53.50	3.69	37.74
1970	11.99	103.6	61.2	12.33	59.07	3.65	36.68
1971	12.77	109.2		--	--	--	--
Mar. 1972	--	116.9	75.4	13.04	64.47	3.48	41.99
1973	15.24	125.2	80.2	11.51	64.07	3.26	45.30
1974	14.41	132.6	83.3	11.71	62.83	2.95	40.82
1975	15.53	139.7	91.2	14.24	65.27	3.07	38.62
1976	19.89	145.2	97.5	11.98	67.13	2.75	45.93
1977	17.39	149.7	103.6	13.45	69.23	2.56	41.15
1978	20.13	154.7	112.3	10.26	72.60	2.38	42.80
1979	15.87	162.4	122.9	13.38	75.70	2.32	41.54
1980	21.73						
		90.5	39.6	--	43.77		51.26
1966	--	92.0	39.2	--	42.63		47.44
1967	--	92.8	43.4	--	46.73		50.58
1968	--	96.1	49.2	12.42	51.23	4.00	47.46
1969	11.94	99.5	56.2	9.60	56.53	3.69	45.10
1970	9.55	104.1	62.8	--	60.30		51.24
1971	--	109.5	67.7	--	61.87		48.38
Apr. 1972	--	117.8	76.5	14.80	64.97	3.48	44.98
1973	17.43	125.9	81.7	15.23	64.87	3.26	50.92
1974	19.17	133.6	84.8	9.20	63.50	2.95	47.89
1975	12.29	140.6	93.0	15.88	66.13	3.07	48.11
1976	22.33	145.9	98.8	10.79	67.70	2.75	45.30
1977	15.74	150.1	106.2	11.66	70.73	2.56	48.34
1978	17.50	155.5	115.3	10.69	74.13	2.38	46.36
1979	16.62	163.4	126.1	11.83	77.20	2.32	47.66
1980	19.33						

Appendix Table 3: (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	Average Price (DM/6 kg.)	Consumer Price Index (1970 = 100)	National Income (10 Billion DM)	Deflated Price (DM/6 kg.)	Deflated Income (10 Billion DM)	Exchange Rate (DM ÷ SDR)	Monthly Average Temperature (F ^o)	
	1965	6.23	89.1	40.9	6.99	45.90	4.00	39.20
	1966	10.44	91.3	43.2	11.43	47.30	4.00	37.85
	1967	8.54	91.3	44.6	9.36	48.83	4.00	33.44
	1968	8.42	94.5	45.8	8.91	48.47	--	30.85
	1969	7.97	97.8	52.6	8.15	53.83	4.00	26.53
	1970	7.97	100.8	59.1	7.91	58.60	3.69	33.78
	1971	12.34	107.1	64.9	11.52	60.60	3.65	38.95
Dec.	1972	9.90	114.1	71.9	8.68	63.00	3.55	32.92
	1973	11.07	122.9	79.4	9.01	64.60	3.48	33.66
	1974	12.65	130.1	83.8	9.72	64.43	3.26	42.65
	1975	13.33	137.1	89.0	9.72	64.90	2.95	48.11
	1976	14.58	142.5	96.5	10.23	67.70	3.07	31.78
	1977	13.97	147.5	102.7	9.47	69.63	2.75	36.50
	1978	13.79	151.2	110.5	9.12	73.07	2.56	35.87
	1979	12.59	159.0	119.8	7.92	75.33	2.38	41.43

Sources:

Column (1): Zentrale Markt-und Preisberichtsstelle für Erzeugnisse der Land-Forst-und Ernährungswirtschaft GmbH, ZMP Bilanz: Gemüse, Bonn, Germany, various issues for December and January a simple average of weekly prices of tomatoes from Spain and the Canary Islands was used. For February and March only the price of Canary tomatoes was used.

Column (2): United Nations, International Monetary Statistics, various issues.

Column (3): United Nations, International Monetary Statistics, various issues.

Column (4): Column (1) divided by Column (2).

Appendix Table 3: (continued)

Column (5): Column (3) divided by Column (2).

Column (6): United Nations, International Monetary Statistics, various issues.

Column (7): Deutscher Wetterdienst, Agrarmeteorologische Beratungs-und Forschungsstelle, Bonn, Germany.
Mean monthly temperature in Frankfurt, German.

Appendix Table 4: Monthly Data Used in Analysis for France

		Retail Price of Tomatoes (francs/ kg.)	Quantity Imported (000 M.T.)	Consumer Price Index (1970= 100)	GNP (Billion francs)	Deflated Price (francs/ kg.)	Deflated GNP (10 billion francs)	Tem- perature in Paris (°F)	Exchange Rate	Tem- perature in Morocco (°Cent.)
1966	Jan.	2.22	12.8	81.5	439.0	2.72	53.87	36.14	12.2	12.8
	Feb.	2.80	9.2	81.5	439.0	3.43	53.87	48.20	12.2	14.3
	Mar.	3.05	15.1	82.1	439.0	3.71	53.48	46.04	12.2	16.1
	Apr.	3.19	23.9	82.1	439.0	3.88	53.48	53.78	12.2	17.1
	Dec.	2.89	13.4	83.9	439.0	3.44	52.33	44.06	12.1	14.8
1967	Jan.	2.63	11.3	83.9	474.4	3.13	56.55	40.28	12.1	13.1
	Feb.	4.22	4.9	83.9	474.4	5.03	56.55	44.78	12.1	12.9
	Mar.	3.66	10.3	84.5	474.4	4.33	56.10	48.20	12.1	14.8
	Apr.	3.39	19.5	83.9	474.4	4.04	56.55	49.82	12.2	17.6
	Dec.	2.36	14.6	86.4	474.4	2.73	54.92	39.56	14.2	16.7
1968	Jan.	3.05	10.8	87.6	515.3	3.48	58.82	40.10	14.2	12.0
	Feb.	3.25	8.2	87.6	515.3	3.71	58.82	39.92	14.2	12.2
	Mar.	3.69	9.1	87.6	515.3	4.21	58.82	46.76	14.2	12.0
	Apr.	5.05	10.7	88.4	515.3	5.71	58.28	52.16	14.1	13.4
	Dec.	3.02	13.2	91.4	515.3	3.30	56.37	36.50	14.1	19.1
1969	Jan.	3.09	13.7	92.2	587.1	3.35	63.68	42.98	14.1	13.7
	Feb.	3.19	10.2	92.2	587.1	3.46	63.68	37.94	14.1	15.7
	Mar.	3.34	16.6	93.0	587.1	3.59	63.14	45.68	14.1	16.1
	Apr.	3.69	26.3	93.7	587.1	3.94	62.66	51.62	14.1	16.0
	Dec.	2.80	14.1	96.8	587.1	2.89	60.66	34.88	12.6	18.6

Appendix Table 4: (continued)

		Retail Price of Tomatoes (francs/ kg.)	Quantity Imported (000 M.T.)	Consumer Price Index (1970= 100)	GNP (Billion francs)	Deflated Price (francs/ kg.)	Deflated Income (10 billion francs)	Tem- perature in Paris (OF)	Exchange Rate	Tem- perature in Morocco (°Cent.)
1970	Jan.	3.15	11.7	97.5	655.7	3.23	67.25	40.82	12.6	12.6
	Feb.	4.13	6.7	97.5	655.7	4.23	67.25	41.36	12.6	15.1
	Mar.	4.90	10.1	98.3	655.7	4.98	66.70	41.18	12.6	15.3
	Apr.	3.98	22.9	99.1	655.7	4.02	66.16	47.84	12.6	15.7
	Dec.	2.73	18.1	101.7	655.7	2.68	64.47	38.12	12.6	18.9
1971	Jan.	3.50	11.0	102.3	733.3	3.42	71.68	39.56	12.6	14.6
	Feb.	3.34	12.8	102.9	733.3	3.24	71.26	42.08	12.6	14.2
	Mar.	3.72	19.2	103.3	733.3	3.60	70.98	41.18	12.6	15.1
	Apr.	5.51	19.1	103.9	733.3	5.30	70.57	53.78	12.6	14.8
	Dec.	4.47	10.4	107.8	733.3	4.15	68.02	43.52	12.6	18.1
1972	Jan.	5.13	5.9	108.1	823.2	4.74	76.15	38.66	12.6	12.7
	Feb.	5.02	11.4	108.7	823.2	4.62	75.73	43.52	12.9	13.0
	Mar.	5.77	12.5	109.3	823.2	5.28	75.31	50.18	12.9	--
	Apr.	4.31	21.4	109.7	823.2	3.93	75.04	50.54	12.9	--
	Dec.	3.71	20.2	115.5	823.2	3.21	71.27	41.54	12.7	12.7
1973	Jan.	3.34	14.2	115.5	934.4	2.89	80.90	39.02	12.7	12.7
	Feb.	3.68	18.3	115.8	934.4	3.18	80.69	39.92	12.7	12.7
	Mar.	3.73	25.0	116.4	934.4	3.20	80.28	46.04	12.8	--
	Apr.	5.89	21.8	117.2	934.4	5.02	79.73	48.74	12.8	12.8
	Dec.	3.68	15.1	125.3	934.4	2.94	74.57	40.64	13.4	--

Appendix Table 4: (continued)

		Retail Price of Tomatoes (francs/ kg.)	Quantity Imported (000 M.T.)	Consumer Price Index (1970= 100)	GNP (Billion francs)	Deflated Price (francs/ kg.)	Deflated Income (10 billion francs)	Tem- perature in Paris (°F)	Exchange Rate	Tem- perature in Morocco (°Cent.)
1974	Jan.	5.31	14.8	127.4	1,070.3	4.17	84.01	45.50	12.1	--
	Feb.	4.22	16.1	129.7	1,070.3	3.25	82.52	43.34	12.1	--
	Mar.	4.57	17.5	130.6	1,070.3	3.50	81.95	46.94	12.2	--
	Apr.	8.21	19.1	132.7	1,070.3	6.19	80.66	52.70	12.3	--
	Dec.	5.08	17.1	144.3	1,070.3	3.52	74.17	47.30	12.1	--
1975	Jan.	5.49	16.2	145.9	1,212.7	3.76	83.12	45.86	12.6	12.6
	Feb.	6.14	12.9	147.0	1,212.7	4.18	82.49	44.42	13.3	--
	Mar.	6.31	19.3	148.2	1,212.7	4.26	81.83	42.98	13.4	13.4
	Apr.	6.18	22.9	149.5	1,212.7	4.13	81.11	50.90	13.5	13.5
	Dec.	4.99	21.7	158.2	1,212.7	3.15	76.65	38.48	13.2	13.2
1976	Jan.	5.73	16.6	159.9	1,398.2	3.58	87.44	42.08	13.3	13.3
	Feb.	6.02	12.4	161.0	1,398.2	3.69	86.84	41.90	13.4	--
	Mar.	6.67	16.5	162.4	1,398.2	3.90	86.09	44.42	14.3	14.3
	Apr.	9.03	21.2	163.8	1,398.2	5.08	85.36	50.90	14.3	14.3
	Dec.	6.42	22.3	173.8	1,398.2	3.73	80.45	37.94	13.8	13.8
1977	Jan.	5.10	18.7	174.3	1,568.2	2.92	89.97	40.28	13.7	13.7
	Feb.	6.47	14.4	175.5	1,568.2	3.69	89.35	45.50	13.7	13.7
	Mar.	6.91	21.2	177.1	1,568.2	3.90	88.55	49.64	13.8	13.8
	Apr.	9.12	19.2	179.4	1,568.2	5.08	87.41	49.10	14.0	14.0
	Dec.	7.06	17.3	189.4	1,568.2	3.73	82.80	44.06	17.2	17.2

Appendix Table 4: (continued)

	Retail Price of Tomatoes (francs/kg.)	Quantity Imported (000 M.T.)	Consumer Price Index (1970=100)	GNP (Billion francs)	Deflated Price (francs/kg.)	Deflated Income (10 billion francs)	Temperature in Paris (°F)	Exchange Rate	Temperature in Morocco (°Cent.)
1978	Jan.	6.30	16.4	198.2	1,779.3	3.18	89.77	17.2	--
	Feb.	7.98	15.1	191.7	1,779.3	4.16	92.81	17.4	17.4
	Mar.	6.62	27.0	193.4	1,779.3	3.42	92.00	17.5	17.5
	Apr.	9.66	16.5	195.4	1,779.3	4.94	91.06	17.5	17.5
	Dec.	6.90	21.3	207.8	1,779.3	3.32	85.62	16.7	16.7
1979	Jan.	6.24	20.5	209.6	1,943.6	2.98	92.73	16.8	--
	Feb.	7.00	22.3	211.1	1,943.6	3.31	95.87	15.9	15.9
	Mar.	7.53	23.3	212.9	1,943.6	3.54	95.04	15.9	--
	Apr.	9.74	22.4	215.1	1,943.6	4.53	93.15	15.9	--
	Dec.	6.16	--	232.2	1,943.6	--	--	--	--

Source: Column (1): Ministère de l'Agriculture, Bullentin de Statistique Agricole, Paris, various issues.
 Column (2): Ministère de l'Agriculture, Bullentin de Statistique Agricole, Paris, various issues.
 Column (3): United Nations, International Financial Statistics, various issues.
 Column (4): United Nations, International Financial Statistics, various issues.
 Column (5): Column (1) ÷ Column (3)
 Column (6): Column (4) ÷ Column (3)
 Column (7): Ministère des Travaux Publics, des Transports et du Tourisme.
 Column (8): United Nations, International Financial Statistics, various issues, Exchange rate is pesetas per franc.

Appendix Table 5: U.K. Imports and Local Production of Tomatoes by Months, By Exporting Country

		Channel Islands	Local Heated	Imports				Total
				Canary Islands	Spain	Netherlands	Others	
		(thousand metric tons)						
1971	Jan.	--	--	12.055	2.122	0.159	0.175	14.512
	Feb.	--	--	11.045	1.488	0.381	0.157	13.071
	Mar.	0.160	0.361	18.762	0.072	0.290	0.134	19.779
	Apr.	2.739	1.683	14.617	0.068	2.310	0.130	21.548
	Dec.	0.021	--	7.627	6.709	0.228	1.328	15.911
1972	Jan.	--	--	10.898	6.040	0.594	0.116	17.647
	Feb.	0.003	--	11.464	1.312	0.305	0.180	13.264
	Mar.	0.090	0.059	14.512	0.072	0.373	0.244	15.351
	Apr.	2.599	1.189	13.265	0.080	3.633	0.277	21.044
	Dec.	0.003	--	8.660	6.199	0.454	0.598	15.914
1973	Jan.	0.073	--	15.042	2.973	0.685	0.273	19.045
	Feb.	--	--	13.448	0.553	0.569	0.112	14.681
	Mar.	0.009	0.276	18.923	0.041	0.344	0.259	19.853
	Apr.	3.482	1.794	6.334	0.004	1.827	0.634	14.075
	Dec.	0.039	--	8.609	5.706	0.204	1.331	15.889
1974	Jan.	0.001	--	13.459	2.770	0.133	0.649	17.012
	Feb.	0.016	--	14.406	0.450	0.140	0.293	15.306
	Mar.	1.037	0.071	14.031	0.159	0.366	0.235	15.899
	Apr.	5.352	2.128	11.218	0.256	1.232	0.634	20.817
	Dec.	0.041	--	8.228	6.410	0.457	1.122	16.258
1975	Jan.	--	--	15.011	2.745	0.345	0.512	18.613
	Feb.	0.002	--	12.697	0.534	0.187	0.316	13.727
	Mar.	0.007	0.355	10.191	0.346	3.613	0.571	15.083
	Apr.	1.620	3.555	8.941	0.076	4.125	0.390	18.317
	Dec.	2.893	--	8.882	7.916	0.096	0.535	20.323
1976	Jan.	0.707	--	13.572	3.218	0.094	0.483	18.074
	Feb.	0.007	--	13.672	1.019	0.014	0.203	14.915
	Mar.	0.006	0.169	14.841	0.253	0.210	0.116	15.595
	Apr.	0.297	2.553	10.170	0.301	2.803	0.288	16.412
	Dec.	2.772	--	10.715	6.601	0.268	0.780	21.136

Appendix Table 5: (continued)

		Channel Islands	Local Heated	Imports				Total
				Canary Islands	Spain	Netherlands	Others	
		(thousand metric tons)						
1977	Jan.	0.213	--	14.307	2.270	0.048	0.692	17.530
	Feb.	0.043	--	15.283	0.464	0.033	0.241	16.065
	Mar.	0.009	0.481	16.178	0.336	0.238	0.245	17.488
	Apr.	0.270	3.692	9.255	0.205	0.890	0.092	14.404
	Dec.	4.509	--	9.913	4.522	0.397	0.319	19.659
1978	Jan.	0.223	--	14.339	4.784	1.161	0.594	21.101
	Feb.	0.117	--	15.969	0.395	0.526	0.713	17.720
	Mar.	0.524	0.841	18.201	0.086	0.160	0.288	20.101
	Apr.	1.298	4.207	6.562	0.082	2.080	0.185	14.414
	Dec.	2.632	--	10.401	5.945	0.811	0.810	20.599
1979	Jan.	0.862	--	11.352	3.794	2.711	0.041	18.760
	Feb.	0.011	--	12.217	0.531	0.116	0.175	13.051
	Mar.	0.103	1.287	14.500	0.037	0.251	0.017	16.195
	Apr.	0.227	3.354	12.698	0.076	1.989	0.108	18.452
	Dec.	2.718	--	11.052	6.076	0.593	0.730	21.169
1980	Jan.	0.398	--	12.864	3.484	0.699	0.496	17.941
	Feb.	0.020	--	15.107	1.457	3.464	0.364	20.412
	Mar.	0.048	1.188	17.084	0.903	0.101	0.206	19.529
	Apr.	0.515	5.049	12.169	0.266	4.867	0.157	23.023
	Dec.							

Appendix Table 6: Monthly Data Used In Analysis for the U.K.

	(1)	(2)	(3)	(4)	(5)	(6)	
Year	Average Price (lbs./6kgs.)	Consumer Price Index (1975 = 100)	Deflated Price (lbs./6kgs.)	Income (billion lbs.)	Deflated Income (billions lbs.)	Temperature (°F)	
1971	Jan.	1.43	57.1	2.59	12.80	22.42	40.19
	Feb.	1.36	57.1	2.38	12.80	22.42	40.46
	Mar.	1.60	59.1	2.71	13.97	23.64	41.18
	Apr.	1.36	59.1	2.30	13.97	23.64	46.13
	Dec.	1.44	60.7	2.37	15.32	25.42	43.61
1972	Jan.	1.32	61.7	2.14	14.28	23.14	38.93
	Feb.	1.46	61.7	2.37	14.28	23.14	39.83
	Mar.	2.44	62.8	3.89	15.44	24.59	43.61
	Apr.	1.29	62.8	2.05	15.44	24.59	47.12
	Dec.	1.65	65.4	2.52	17.09	26.13	42.35
1973	Jan.	1.39	66.6	2.09	16.72	25.10	40.19
	Feb.	1.89	66.6	2.84	16.72	25.10	39.92
	Mar.	2.19	68.7	3.19	17.21	25.05	43.34
	Apr.	2.40	68.7	3.49	17.21	25.05	45.14
	Dec.	1.88	72.1	2.57	19.15	26.56	40.91
1974	Jan.	1.64	75.1	2.18	17.33	23.08	43.07
	Feb.	2.40	75.1	3.20	17.33	23.08	42.26
	Mar.	2.18	79.7	2.74	19.86	24.92	42.35
	Apr.	2.80	79.7	3.51	19.86	24.92	46.40
	Dec.	2.00	85.3	2.34	23.09	27.07	46.40

Appendix Table 6: (continued)

Year	Month	(1) Average Price (lbs./6kgs.)	(2) Consumer Price Index (1975 = 100)	(3) Deflated Price (lbs./6kgs.)	(4) Income (billion lbs.)	(5) Deflated Income (billion lbs.)	(6) Temperature (°F)
1975	Jan.	2.25	90.4	2.49	22.70	25.11	44.24
	Feb.	2.37	90.4	2.62	22.70	25.11	40.73
	Mar.	2.72	99.0	2.75	24.96	25.89	41.09
	Apr.	2.31	99.0	2.33	24.96	25.89	47.03
	Dec.	2.46	106.9	2.30	29.43	27.53	41.63
1976	Jan.	2.54	110.8	2.29	28.41	25.64	42.53
	Feb.	2.23	110.8	2.01	28.41	25.64	40.37
	Mar.	3.38	114.9	2.94	29.03	26.27	41.00
	Apr.	3.39	114.9	2.95	29.03	25.27	46.58
	Dec.	3.17	123.0	2.58	31.74	25.80	36.59
1977	Jan.	2.62	129.2	2.03	29.07	22.50	37.58
	Feb.	3.13	129.2	2.42	29.07	22.50	41.54
	Mar.	3.01	134.9	2.23	29.50	21.87	44.87
	Apr.	3.07	134.9	2.28	29.50	21.87	45.23
	Dec.	3.76	139.0	2.70	33.71	24.25	43.34
1978	Jan.	3.05	141.4	2.15	31.19	22.06	38.39
	Feb.	2.78	141.4	1.97	31.19	22.06	36.95
	Mar.	3.92	145.3	2.70	31.89	21.95	44.33
	Apr.	3.88	145.3	2.67	31.89	21.95	43.79
	Dec.	4.04	150.3	2.69	34.27	22.80	40.10

Appendix Table 6: (continued)

Year	Month	(1) Average Price (lbs./kgs.)	(2) Consumer Price Index (1975 = 100)	(3) Deflated Price (lbs./kgs.)	(4) Income (billion lbs.)	(5) Deflated Income (billion lbs.)	(6) Temperature (°F)
1979	Jan.	3.24	155.0	2.09	31.36	20.53	32.90
	Feb.	2.94	155.0	1.90	31.36	20.23	34.79
	Mar.	3.84	160.7	2.39	32.80	20.41	40.82
	Apr.	3.60	160.7	2.24	32.80	20.41	46.04
	Dec.	4.29	176.2	2.43	35.65	20.23	42.71
1980	Jan.	3.57	180.6	1.98	37.15	20.57	36.77
	Feb.	4.16	180.6	2.30	37.15	20.57	42.62
	Mar.	4.38	180.6	2.42	37.15	20.57	41.00
	Apr.	3.64	180.6	2.02	37.15	20.57	47.66

Sources:

Column (1): Ministry of Agriculture, Fisheries and Food, Agricultural Market Report (Horticulture Supplement), Fruits and Vegetables, Wholesale Price Report, weekly, London, various issues.

Column (2): United Nations, International Financial Statistics, various issues.

Column (3): Column (1) ÷ Column (2).

Column (4): United Nations, International Financial Statistics, various issues.

Column (5): Column (4) ÷ Column (2).

Column (6): Meteorological Office, London.

