AN ECONOMETRIC ANALYSIS OF THE PHILIPPINES' MARKETS FOR COCONUT PRODUCTS

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CHAPTER I

INTRODUCTION

International trade has a great impact on the Philippine economy. As a developing country, the Philippines must obtain needed capital goods from other countries while it supplies them with agricultural products and, to a limited extent, manufactured goods. During the last two decades, the emphasis has been on the expansion and diversification of export products to minimize the trade gap.

Coconut products have greatly contributed to the lessening of the trade gap between the Philippines and its trading partners during the aforementioned period. International trade in coconuts comprises a variety of products, the major ones being coconut oil, copra, desiccated coconut and copra meal. The description and/or properties of these products are discussed as follows.

Coconut oil (CNO) is obtained by running copra through expellers, although some local mills also use the solvent method to maximize oil yields. CNO is used as a raw material in the manufacture of cooking oil, shortening, margarine, soap, glycerin, detergent, coco-chemicals and a host of other products. Like most oils and fats, coconut oil, when further processed, has a high nutritional value for the human diet. The most outstanding characteristic of crude CNO, however, is its high saponification value which makes it one of the best oil-bearing materials for soap making. It also has a low average molecular weight in its fatty acids, essential in the synthetic detergent industry.

Due to its chemical composition, coconut oil has been used in a wide range of edible and industrial applications. In the edible market, coconut oil is refined for cooking or blended with other food products (e.g., cooking oil, margarine, salad oil, filled milk, baby foods, etc.). It competes in this market with other vegetable oils such as soybean, cottonseed and palm oil.

In addition, among the vegetable fats and oils, coconut oil is the most suitable for nonedible and industrial applications. The crude and cochin oil is broken down into its chemical components and used as feedstock in producing fatty alcohols, acids and methyl ester. In this market, coconut oil competes with natural gas liquids and some vegetable oils with industrial end-users.

Copra is a dried endosperm of a mature nut produced mainly as the basic raw material for the production of crude coconut oil (CNO). It is dried to obtain a maximum amount and quality of oil in the extraction process. The quality of copra depends upon a number of factors such as the maturity of the nut, the extent and conditions of drying, storage and handling conditions, and to some extent, the variety of the palm.

Commercially, high grade copra contains about six percent or less moisture, which usually translates to an oil yield of approximately 60 to 66 percent of the total weight of copra milled. The residue in the extraction, commonly called copra cake or copra meal, is used as fertilizer and as an ingredient in the manufacture of animal feeds.

Desiccated coconut (DCN) is a dried coconut meat hygienically prepared for use as a food additive. It is used in the preparation of various food products, especially in the confectionery, baking and frozen food industries. It competes with copra in the direct utilization of the fresh/matured nuts. Normally, the supply of DCN is dependent upon total coconut production or availability of matured nuts. Practically all the DCN produced locally is exported.

The Philippines is the major supplier of desiccated coconut (DCN) used in bakeries and by the confectionery industry. The country supplied more than half of the world's demand in 1982. Sri Lanka was a close second during the 1960's and early 1970's; however, it lost its market to the Philippines more recently. There are other countries producing desiccated coconut, mostly less developed countries, but their combined total production is minimal.

Copra meal is the residue from the mechanical or solvent extraction of CNO from copra. The composition of copra meal varies depending upon the method used in extracting the oil. It is utilized primarily as a livestock feed, either in its raw form or in combination with other meals. Copra meal production depends upon the amount of copra processed into coconut oil.

The expansion of livestock production and the feeding of heavier concentrate rations have been responsible for the rapid increase in the demand for oilseed meals (including copra meal). World consumption of oilseed meals has risen by 85 percent since 1955 to reach 50 million tons in the 1980's. Most of the increase has taken place in the developed countries and, more recently, in the U.S.S.R. and Eastern Europe.

Several coconut products contribute to the Philippine economy. Coconut oil is an important item in the country's international trade. During the past decade, coconut oil contributed substantial proportions to the Philippine export volume and foreign exchange earnings. The volume and value of coconut oil exports rose by an annual average rate of 8.3 and 11.9 percent, respectively, for the 1965 and 1983 periods.

In 1982, the bulk of coconut oil exports was absorbed by the United States (40.5 percent) and Europe (44.4 percent). The Soviet Union, People's Republic of China, and Japan also imported substantial amounts of coconut oil from the country in recent years (Table I).

TABLE I

PHILIPPINE COCONUT OIL EXPORT BY DESTINATION, 1975-1982[1]
(VOLUME IN M.T. OF 1000 KG)

Country or Region of Destination	Year							
	1975	1976	1977	1978	1979	1980	1981	1982
U.S.S.R.	7,225	58,418	56,025	29,000	66,269	91,497	52,000	84,981
Canada	4,548	14,229	20,349	15,442	11,755	8,194	7,366	4,826
United States	473,264	553,002	450,929	461,039	336,770	338,764	353,090	350,559
Central/Latin America & Caribbean	12,954	23,395	1,047	12,097	16	143	6,466	6,610
Europe	59,150	155,740	117,193	267,862	233,267	361,088	439,542	358,203
Asia[2]	9,481	13,405	31,748	136,865	37,174	17,829	71,642	27,095
Peoples Republic of China	17,780	10,160	12,395	15,240	19,609	28,448	25,076	17,780
Japan	21,253	22,151	19,375	22,411	38,537	26,318	29,001	16,159
Africa	----	1,016	2,661	----	----	----	----	----
Oceania	----	2,504	24,541	2,050	----	539	----	----
TOTAL	605,655	854,020	714,173	962,006	743,397	872,820	984,183	866,213

[1]Adapted from NEDA, NCSO, Foreign Trade Statistics of the Philippines, various issues.
[2]Excludes Peoples Republic of China.

In the copra industry, during the 15-year period beginning in 1970, copra supply had fluctuated greatly. The peak was 2.6 million metric tons in 1976, and the trough was 1.2 million metric tons in 1970. As presented in Table II, these fluctuations in copra supply can be attributed to a peak coconut production in 1976 at 2.7 million metric tons on copra basis and a low coconut harvest at 1.4 million metric tons in 1970.

The European market had always been the major buyer of Philippines copra, taking 45 percent and 83 percent of the volume of the country's total copra exports in 1968 and 1982, respectively. In absolute terms, however, Europe's imports declined at an average rate of 4.5 percent during the period (Table III).

The biggest consumers of desiccated coconut are the U.S., whose major supplier is the Philippines, and the Western European countries, where the market is shared by the Philippines and Sri Lanka.

In a review of the coconut industry by the NEDA, a shift in the market for desiccated coconut was noted in the 1960's, with the United States consuming half of the world's supply. The U.S. relinquished its position as a top consumer to the European countries in the 1970's. Consumption in Asia is growing rapidly, increasing to 9.9 percent of the total world imports of desiccated coconut in the 1970's from a low of 1.8 percent in the first half of the 1960's. The demand of the African countries has similarly advanced but at a slower rate, while that of Oceania is almost stable at about 6.0 percent of global consumption.

The coconut industry plays a significant role in national development. The industry directly or indirectly provides livelihood for roughly one-third of the country's total population (NEDA, 1984). In terms of contribution to domestic income, it placed fourth among the country's major crops in 1983, contributing

TABLE II

PHILIPPINE COPRA: 1969-1983 SUPPLY, DEMAND AND PRICES
(VOLUME IN THOUSAND METRIC TONS - IN COPRA TERMS)

Calendar Year	Total Production	Copra Supply	Demand		Prices (P/Kilo)	
			Domestic[1]	Foreign[2]	Domestic[3]	Foreign[4]
1969	1,260	1,157	604	553	0.67	0.67
1970	1,356	1,225	802	423	0.96	1.08
1971	1,756	1,619	909	710	0.88	1.07
1972	2,174	2,032	1,064	968	0.67	0.81
1973	1,871	1,720	992	728	1.83	1.52
1974	1,424	1,290	981	309	3.63	3.58
1975	2,199	2,053	1,220	833	1.47	1.69
1976	2,742	2,562	1,695	867	1.68	1.42
1977	2,440	2,248	1,688	560	2.56	2.55
1978	2,501	2,332	1,952	380	3.04	2.75
1979[r]	1,912	1,732	1,587[5]	145	4.06	4.53
1980[r]	2,076	1,860	1,737[5]	123	2.49	2.92
1981[r]	2,316	2,100	1,994[5]	106	2.30	2.44
1982[r]	2,192	1,974	1,782[5]	192	1.82	2.35
1983[r]	2,148	1,935	1,923[5]	12	3.41	2.79

[1]Includes exports of coconut oil and locally consumed manufactured oil.
[2]Total copra exported.
[3]12-month average of Manila copra buyers prices resecada basis.
[4]Export values in peso divided by the volume in kilograms.
[5]Includes the copra equivalent of coco methyl ester and coco fatty alcohol exports.

TABLE III

RP COCONUT PRODUCTS (COPRA EQUIVALENT)[1] EXPORT TO USA, EUROPE AND OTHER COUNTRIES, ANNUAL 1969-1983 (VOLUME IN THOUSAND M.T.)

Year	United States				Europe				Other Countries			
	Copra	Coconut Oil	Desiccated Coconut	Total	Copra	Coconut Oil	Desiccated Coconut	Total	Copra	Coconut Oil	Desiccated Coconut	Total
1969	262.56	305.52	48.23	616.31	247.27	36.85	5.85	289.96	43.66	2.46	8.54	54.66
1970	188.63	462.46	58.54	709.63	198.92	73.20	6.63	278.75	35.93	3.47	8.36	47.75
1971	183.35	471.29	65.61	720.25	461.95	174.14	14.94	651.03	65.23	8.10	10.93	84.26
1972	225.16	561.89	59.52	846.57	663.78	152.27	24.00	840.04	79.53	42.36	11.68	133.57
1973	195.26	432.78	57.42	685.46	400.54	141.99	22.87	565.41	132.17	116.52	14.86	263.55
1974	10.99	525.89	46.35	583.23	233.16	114.14	16.89	364.19	65.33	58.84	14.01	138.19
1975	--	742.18	51.13	793.31	743.17	88.40	9.99	341.56	89.44	123.62	18.74	231.80
1976	--	880.98	56.02	937.00	779.28	226.86	20.12	1,026.26	87.75	265.18	21.88	374.80
1977	--	773.63	53.41	827.04	473.09	268.01	42.51	783.60	86.80	233.98	22.83	343.61
1978	--	807.22	53.47	860.69	321.49	357.01	32.76	711.26	58.28	431.77	24.01	514.05
1979	--	598.63	52.39	651.02	131.50	375.13	26.93	553.56	13.35	307.90	21.16	342.40
1980	--	584.78	63.46	648.24	111.56	579.56	47.02	738.15	11.70	286.47	25.35	323.52
1981	--	583.38	61.01	644.38	99.64	732.08	45.55	877.27	6.75	345.85	29.08	381.67
1982	--	635.66	73.31*	708.96	159.04	587.23	39.26	785.53	32.74	283.37	25.32	341.43
1983	--	677.16	67.91*	745.07	2.00	670.38	38.67	711.05	10.32	270.99	24.78	306.10

Note: Extraction rate for oil is 62%, desiccated coconut is 83% prior to 1980. From 1980 onward, conversions used: Coconut oil 63%, desiccated coconut 64.68%. Discrepancy in the total is attributed to the rounding of monthly figures.

-- No shipment

[1]Excludes copra meal which is a by-product of coconut oil milling.

*U.S.A./Canada

Source: Trade and Markets Department, Philippine Coconut Authority.

4.9 percent to value added agriculture, fishing and forestry and 1.2 percent to gross domestic product (Table IV). In real terms, its support to the economy rose from $837 million in 1967 to $1,210 million in 1983 at an average annual rate of 2.2 percent.

The industry is also one of the principal foreign exchange earners, contributing an average of 24.5 percent and 36.4 percent to agricultural exports and total exports, respectively, from the 1960's to the 1980's (Tables V and VI). In 1983, whole earnings from most export commodities fell, while the value of coconut exports increased by 14.5 percent, to $680 million from $594 million the previous year. This figure gradually climbed to $727 million in 1984.

As an important agricultural activity, the coconut industry has been the subject of a number of government price intervention policies. These were most pronounced in the 1970's.

Most of the policies have been designed primarily to protect producers and consumers from instabilities in the coconut market. However, to achieve this end, the government involved itself deeply in the regulation and control of the industry starting in 1973. Since then, production, processing and marketing of the product have been closely monitored and controlled by the government.

Even with the many policies instituted by the government, price instability, both in the domestic and world markets, occurred and has been a major deterrent to the development of the industry (NEDA, 1984). In 1973, prices of copra and other coconut products reached peaks in the world market. Since then, prices have become unpredictable and volatile. This increase in price instability in Philippine coconut products and by-products might be associated with a number of shocks in the international agricultural markets. These include important importing country crop failures, foreign exchange controls, varying

TABLE IV

CONTRIBUTION OF THE COCONUT INDUSTRY TO THE ECONOMY, GROSS VALUE ADDED, 1967-1983

Year	Levels (at constant 1972 prices, million pesos)			Percent Share	
	A	B	C		
	GDP	GVA-Agriculture, Fishery & Forestry	GVA Coconut	C/A	C/B
1967	44,093	13,052	837	1.9	6.4
1968	56,544	13,981	772	1.7	5.5
1969	48,779	14,412	688	1.4	4.8
1970	51,014	14,734	781	1.5	5.3
1971	53,526	15,457	958	1.8	6.2
1972	56,075	16,040	1,155	2.1	7.2
1973	60,931	17,026	1,022	1.7	6.0
1974	64,139	17,465	764	1.2	4.4
1975	68,361	18,218	1,135	1.7	6.2
1976	72,962	19,671	1,437	2.0	7.3
1977	78,164	20,646	1,327	1.7	6.4
1978	22,637	21,620	1,330	1.6	6.2
1979	88,346	22,595	1,270	1.4	5.6
1980	92,706	23,732	1,313	1.4	5.5
1981	96,207	24,608	1,396	1.5	5.7
1982	99,999	25,378	1,306	1.3	5.1
1983	100,120	24,845	1,210	1.2	4.9

Source: National Accounts Staff - National Economic and Development Authority.

TABLE V

EXPORTS OF COCONUT PRODUCTS RELATIVE TO TOTAL EXPORTS, 1960-83

	Exports (in million U.S. dollars)			Percent Share Distribution		
Year	(A) Total Exports	(B) Agricultural Exports[1]	(C) Coconut Exports	B/A	C/A	C/B
1960	560	485	178	86.6	31.8	36.7
1961	500	427	123	85.4	24.6	28.8
1962	556	487	169	87.6	30.4	34.7
1963	727	641	246	88.2	33.8	38.4
1964	742	652	246	87.9	33.2	37.7
1965	768	666	270	86.7	35.2	40.5
1966	828	690	266	83.3	32.1	38.6
1967	821	652	216	79.4	26.3	33.1
1968	856	693	236	81.0	27.6	34.1
1969	855	643	163	75.2	19.1	25.3
1970	1,062	767	209	72.2	19.7	27.2
1971	1,136	817	254	71.9	22.4	31.1
1972	1,106	771	228	69.7	20.6	29.6
1973	1,886	1,236	372	65.5	19.7	30.1
1974	2,725	1,891	609	69.4	22.3	32.2
1975	2,294	1,534	467	66.9	20.4	30.4
1976	2,574	1,532	542	59.5	21.1	35.4
1977	3,151	1,858	763	59.0	24.2	41.1
1978	3,425	1,797	910	52.5	26.6	50.6
1979	4,601	2,304	1,029	50.1	22.4	44.7
1980	5,788	2,442	820	42.2	14.2	33.6
1981	5,722	2,281	755	39.9	13.2	33.1
1982	5,021	1,897	594	37.8	11.8	31.3
1983	5,005	1,732	680	34.6	11.3	39.3

[1]Major agricultural exports consist of coconut products, sugar and sugar products, forest products, fruits and vegetables, abaca products, tobacco products, marine products.

Sources: National Census and Statistics Office and Central Bank.

TABLE VI

VALUE CONTRIBUTION OF COCONUT PRODUCTS TO NATIONAL INCOME, PHILIPPINES, CY 1968-1983 (IN MILLION PESOS AT ANNUAL CURRENT PRICES)

	National Income (NI)		Agriculture Fishery & Forestry (AFF)		Merchandise Exports (ME)		Coconut Products Exports[1]			
Year	Pesos	%	Pesos	% of NI	Pesos	% of NI	Pesos	% of ME	% of AFF	% of NI
1968	25,063	100	8,592	34.28	3,342	13.33	920	27.53	10.71	3.67
1969	28,115	100	10,091	35.89	3,331	11.85	637	19.12	6.31	2.27
1970	32,947	100	11,951	36.27	6,259	19.00	1,248	19.94	10.44	3.79
1971	39,516	100	14,624	37.01	7,221	18.27	1,640	22.71	11.21	4.15
1972	45,321	100	16,531	36.54	7,374	16.30	1,540	20.88	9.32	3.40
1973	56,431	100	20,004	35.52	11,883	21.10	2,508	21.11	12.54	4.45
1974	80,789	100	19,386	36.37	18,305	22.66	4,111	22.46	13.99	5.09
1975	91,239	100	35,164	38.54	16,384	17.96	3,380	20.63	9.61	3.70
1976	106,330	100	37,341	35.12	18,593	17.49	3,976	21.38	10.65	3.74
1977	123,182	100	42,688	34.65	22,889	18.58	5,368	23.45	12.57	4.36
1978	145,567	100	47,070	32.33	24,954	17.14	6,701	26.85	14.24	4.60
1979	174,394	100	55,516	31.83	33,506	19.21	7,595	22.67	13.68	4.36
1980	214,619	100	61,757	28.78	42,709	19.90	6,158	14.42	9.97	2.87
1981[r]	246,354	100	69,391	28.17	44,378	18.01	5,940	13.39	8.56	2.41
1982[r]	272,272	100	76,181	27.98	42,136	15.48	5,074	12.04	6.66	1.86
1983[a]	303,249	100	82,084	27.07	53,842	17.76	7,557	14.04	9.21	2.49

[1]FOB Export Value (in US dollars) of Coconut Products converted into pesos using the US$:Peso currency conversion rates.

[r]Revised.

[a]Advance estimates.

Sources: Statistical Coordination Office; National Accounts Staff; National Economic and Development Authority; Central Bank of the Philippines.

degree of Philippine export controls, quasi-monopoly of milling, trading and import controls by the exporting countries.

Although the above mentioned problems have serious impacts on the Philippine coconut industry, little emphasis has been placed on the analysis of supply and demand in the empirical literature on international trade flows in the 1970's. Consequently, few estimates of import demand or export demand elasticities for coconut products are available. Previous studies inadequately accounted for the separate influences of exchange rates, home demand, export destination demands and trade policies both by the Philippines and the importing countries on coconut products and by-product.

Thus, the inability to distinguish among these separate influences leads to misunderstandings of the market forces which are responsible for the year-to-year changes in any country's exports and to the misconceptions in the formulation of trade policy. Hence, this study wishes to determine and identify factors affecting variations in exports of coconut products that would be of help in the formulation of policies in Philippine agriculture, especially the coconut industry.

Objectives and Scope of the Thesis

The general objective of the study is to analyze the effects of selected factors on the United States, West Germany and the Netherlands import demands for the different coconut products and by-product from the Philippines.

Specifically the objectives are:

1) To study the pattern and structure of international trade in coconut products.

2) To develop a theoretical framework and construct an empirical equation model describing the interrelationships which characterize the market for Philippine copra, coconut oil, copra meal and desiccated coconut.
3) To analyze the effect of variation in real income, domestic oil production, oilseed production, prices of other fats and oils, and the availability of other oil products and imports of fats and oils by the U.S., West Germany and the Netherlands on the quantity of Philippine coconut product exports to these countries.
4) To analyze and evaluate the effects of exchange rates on the quantity of Philippine coconut products commercial sales to the U.S., West Germany and the Netherlands.
5) To discuss some policy implications of protection on Philippine exports and recommend some strategies in improving the trade flows of the Philippine coconut products and by-product.

Organization of the Study

In order to show the relative importance of various countries in fats and oils production, the historical growth in copra production from 1970 to 1984 of major producing countries is discussed in Chapter II. The pattern and structure of trade in copra, coconut oil, copra meal and desiccated coconut of the Philippines are reviewed. Policies pursued by importing countries, such as the U.S., West Germany and the Netherlands, that influence trade in coconut products, as well as policies pursued by the Philippine government, especially in the 1970's, are also covered in this chapter.

The theoretical framework for analyzing the Philippine coconut market is discussed in Chapter III. Based on this framework, an economic model was developed which showed the price quantity relationships of the demand for four coconut products: copra, coconut oil, copra meal and desiccated coconut. To take into account the mutual interdependence between prices and quantities of the coconut products, import demand equations were constructed. Parameters of the demand equations were estimated using ordinary least squares. Production, trade patterns and review of policies in vegetable oils and oilseed are presented in Chapter IV.

The results of the statistical estimation which covered the period 1970-1982 are presented in Chapter V. The estimates obtained were used to compute elasticities of demand and as an analytical tool to study the impact of changes in some important pre-determined variables on the endogenous variables.

Finally, the summary, conclusions and limitations and suggestions for further research derived from this study are presented in Chapter VI.

CHAPTER II

REVIEW OF LITERATURE

Introduction

This chapter reviews previous studies of domestic demand, import demand, and export supplies of coconut products in the Philippines, the United States, and the European Economic Community. Philippine domestic policies, policies of its trading partners, demand formulations and related studies on the exchange rates are also reviewed. The focus is on the model, variable specification, method of estimation, interpretation and conclusions that are relevant for this study.

This chapter is divided into five sections. The first two sections include discussions of previous studies on domestic demand, import demand and export supply of coconut oil and copra in the Philippines and its trading partners. The third section includes discussions of previous import demands for desiccated coconut and copra meal. The analysis of the effects of Philippine domestic policies on the export of coconut products to its trading partners, exchange rate studies and some import demand derivations are discussed in section four. The final section summarizes the salient findings discussed in the first four sections. These findings are used to develop the empirical model in the following chapter.

Export Demand and Export Supply of Coconut Oil

The United States absorbs one-half of the Philippines coconut oil exports and, as such, strongly influences growth trends and prospects for the Philippine coconut industry. The Center for Research and Communication (CRC) in August 1983, postulated in its econometric model, that the volume of Philippine coconut oil exports is basically influenced by the growth of the Gross National Product (GNP) of the United States, movements of coconut oil prices, and the volume of coconut oil production in the country. The research indicated that positive growth in the economy of the United States could induce further expansion in Philippine coconut oil exports.

Librero, in a regional demand study, formulated the following equations for the U. S. coconut oil market:

$$QUO = -\alpha_0 - \alpha_1 PO/PSC - \alpha_2 QPU + \alpha_3 IU \qquad (2.1)$$

$$QUO = -\alpha_0 - \alpha_1 PO/PSC - \alpha_2 QPU + \alpha_3 IU + \alpha_4 DV \qquad (2.2)$$

where: QUO = quantity of coconut oil exports to the U.S.; PO = price of coconut oil; PSC = a weighted index of soybean and cottonseed oil; QPU = quantity of palm kernel oil imports; IU = U.S. real national income and DV = dummy variable.

The research indicated that the demand for coconut oil in the U.S. was price inelastic, with direct price elasticity estimates at the means ranging from -.297 to -.452. A positive relationship was obtained between the quantity of coconut oil and prices of soybean and cottonseed oils. Assuming other things equal, a 10 percent change in the price index of soybean and cottonseed oil would result in a three to four percent change in the same direction in the demand for coconut oil exports from the Philippines. The coefficient for the palm kernel oil imports was negative and almost one. The income coefficient was highly significant with elasticity estimates of 2.8 to 3.2, implying that income growth in the U.S. could have a significant effect on the coconut oil exports of the Philippines.

Nyberg, in his study of the Philippines coconut industry, formulated the following structural demand functions for the U.S. and Europe:

$$Q_U^L = f(P_U^C, I_U, P_U^S) \tag{2.3}$$

and

$$Q_E^L = f(P_E^C, I_E, P_E^G) \tag{2.4}$$

where: Q = quantity of Philippine exports in 1000 metric tons of oil equivalent; P = price in U.S. cents per kilogram; I = per capita income; C = coconut oil; S = soybeans; G = groundnuts; L = lauric oils; U = United States and E = Europe.

His findings indicated that for United States demand, lauric oils was highly price inelastic at -0.24. The income elasticity coefficient was +.522 which indicates that a one percent income change would result in a one-half percent change in demand for lauric oils. The price and income elasticity coefficients of the United States demand equations were of the expected signs and were significant.

Soybean oil utilization was included as a proxy in an attempt to obtain a measure of substitutability in the U.S. demand equation. Thus, the coefficient would be expected to be negative. However, the coefficient was +.327 and was significant. Consequently, soybean oil might be assumed to be complementary with lauric oils. However, he was doubtful of the result.

The coefficients for the European demand equation indicated a price elasticity of -.78, which was substantially less inelastic relative to the United States demand. The estimated income elasticity of +.14 was not statistically significant. However, the positive sign was assumed to be correct. The nonsignificance may be attributed to two opposing interactions of income and demand. Margarine may be an inferior good, and hence the coconut oil utilized in margarine may be negatively related to income.

In the case of the European market, two substitute oils were included in the demand functions. When soybean oil utilization was included, the coefficient obtained was -.008 and was of questionable significance. The negative sign was expected, indicating substitutability, but the low magnitude suggests low substitutability. The coefficient indicates that a one percent increase in the consumption of soybean oil would cause a reduction in lauric oil consumption of eight-thousandth of one percent.

The coefficient derived when groundnut oil utilization was assumed as a substitute oil was -.238. The negative sign indicates substitutability and the magnitude suggests it is more substitutable with lauric oils than soybean oil. Groundnut oil in Europe is used primarily in cooking and salad oils with a minor use in margarine.

Recent studies cited by NEDA revealed that the price responsiveness and stability of demand in the U.S. market for coconut oil compared with other sources of fats and oils differ vastly in terms of edible uses. The edible oil market is very responsive to long-term changes in the competitive prices of substitute oils. The inedible market for coconut oil is much more price inelastic than the edible market.

Domestic Demand for Coconut Oil and Copra

Contradictory results were obtained by previous studies on domestic demand for coconut oil. Nyberg (1968) obtained a negative but nonsignificant coconut oil price coefficient for domestic demand function when per capita copra consumption was used as the dependent variable. Librero used coconut oil consumption as the dependent variable. The estimated demand functions indicated negative and statistically significant coefficients with the implied elasticities ranging from -.302 to -.381. Further, a highly significant coefficient for real national income was obtained. The income elasticity at the means was just a little over unity which implies that a given percentage growth in real national income of the Philippines would result in the same percentage increase in the domestic demand of coconut oil for consumption.

Foreign Demand for Copra

The following equations were formulated by Librero for the import demand of copra by the U.S.:

$$QCU = \beta_0 - \beta_1 PC + \beta_2 PPK - \beta_3 QOU \tag{2.5}$$

$$QCU = \beta_0 - \beta_1 PC + \beta_2 PPK - \beta_3 QAOUS \tag{2.6}$$

where: QCU = quantity of copra imported by the U.S.; PC = price of copra; PPK = price of palm kernel oil; QOU = quantity of coconut oil import; QAOUS = net supply of alternative oils. Her analysis pointed out that copra imports of the U.S. were quite inelastic with price coefficients in an elasticity range of from -.338 to -.557.

The suggested cross price elasticity of palm kernel oil with respect to copra demand range from +.721 to +.838. This can be interpreted as a 10 dollar rise in its price would increase imports by 7.2 to 8.4 thousand metric tons. The quantity of coconut oil imported and net supply of alternative oils, which include vegetable oil production and total imports of oilseeds by the U.S., also had a significant influence on copra imports by the U.S.

In the case of the EEC study, the four equations were:

$$QCEC = \Psi_0 - \Psi_1 PC + \Psi_2 IEC - \Psi_3 QSFEC \qquad (2.7)$$

$$QCEC = \Psi_0 - \Psi_1 PC + \Psi_2 IEC - \Psi_3 PF \qquad (2.8)$$

$$QCEC = \Psi_0 - \Psi_1 PC + \Psi_2 LEC \qquad (2.9)$$

$$QCEC = \Psi_0 - \Psi_1 PC + \Psi_2 LEC - \Psi_3 PGM \qquad (2.10)$$

where: QCEC = copra imports by the EEC; PC = price of copra; IEC = weighted index of the real national income; QSFEC = sunflowerseed and oil imports; PF = producers' price of feedgrains in Italy; LEC = animal units in the EEC; PGM = wholesale price of groundnut meal in France.

The analysis indicated a statistically significant copra price coefficient and was negative; a highly significant and positive coefficient was obtained for the EEC income index. A significant substitute relationship occurred when sunflowerseed oil was regressed with copra. When livestock population and feedgrain prices were considered as important variables affecting copra demand, an expansion of one million livestock units in the EEC implied an increase of 14 to 24 thousand metric tons in the imports of copra from the Philippines. The coefficient of the price of feedgrains indicates a complementary relationship with copra in the feedgrain preparations. A negative and non-significant coefficient was obtained when the price of groundnut meal was added to copra demand function.

Copra exports to Canada and the non-EEC European countries were found to be elastic. The price elasticity estimates were -1.58 and -2.03.

The demand function estimated for Latin America, including Colombia and Venezuela, was negatively sloping and quite elastic. A price elasticity at the means of -1.72 was obtained. Further, for the same region, analysis resulted in a statistically significant coefficient for the palm kernel oil price. However, a nonsignificant coefficient was obtained when soybean price was included. The implied cross elasticity for this oil was +1.12. Sunflowerseed oil was found to compete with copra not only in the EEC but also in the other European countries.

Copra is considered as the second most important source of oil in Latin America next to soybean oil. When the latter oil price and soybean meal were included in the demand equation, the coefficients were both significant. However, the signs indicated that soybean oil was a substitute while soybean meal was a complement.

The growth of income in Canada and the other European countries was found to be a positive factor on the growth of copra exports. The income elasticity of demand was nearly equal to unity. However, in Latin America no meaningful results were obtained when an index of the real national income of the region was included.

Export Demand for Desiccated Coconut in the Philippines and Copra Meal Substitute in the U.S.

Desiccated coconut exports from the Philippines to the United States amounted to more than 90 percent yearly in the 1950's and in the 1960's. Recently, however, the U.S. relinquished its position to the European market as the major importer.

The following equations were considered by Librero (1972) in a regional demand study for desiccated coconut:

$$QDU = \alpha_0 - \alpha_1 PD - \alpha_2 PB + \alpha_3 CS + \alpha_4 EF \quad (2.11)$$

$$QDU = \alpha_0 - \alpha_1 PD - \alpha_2 PB + \alpha_3 CS + \alpha_4 NU \quad (2.12)$$

where: QDU = quantity of desiccated coconut imports by the U.S.; PD = export price of desiccated coconut; PB = index of prices of cereal and bakery products; CS = confectionery sales; EF = food expenditures; NU = U.S. population.

The price of desiccated coconut coefficients in the study were all significantly different from zero. The coefficient of desiccated coconut prices in the U.S. demand function was not significant.

In contrast with the U.S. demand function, West Germany, Australia, Canada and Japan demands for desiccated coconut were quite elastic. The result of analyses of two demand functions with different variables implied a price elasticity of demand of -7.395, which seems to be unreasonably high.

When a population variable was added to the fitted equation, a continued increase in the U.S. population would mean a rising demand for desiccated coconut. The income variable fitted in the demand equation for desiccated coconut showed an important positive growth.

Librero, in an effort to find out whether Ceylon's exports had some effect on Philippine desiccated coconut trade, found that an increase of 1,000 metric tons of export by Ceylon would produce a decline of 243 thousand metric tons in the Philippines' trade of the product outside the U.S.

When the price index of cereal and bakery products (PB) in the U.S. was fitted in the demand equations, the coefficients in both demand functions were negative and significant. Further, when food expenditures were included in the analysis, the PB coefficient implied a cross elasticity at the means of -3.49.

Confectionery sales appeared to have a significant effect on the import demand by the U.S. of desiccated coconut from the Philippines. Assuming that all other factors remain the same, a one billion dollar increase in confectionery sales would result in a rise of 44 to 54 thousand metric tons in desiccated coconut exports from the Philippines to the U.S.

In the absence of any study of the export of Philippine copra meal to its trading partners, a close substitute product, soybean meal, was reviewed in this study. Houck et. al. presented three equations that show the estimated relationship for U.S. soybean meal exports to the European Community. The variables with specified formulations are indicated below:

$$QMX = \beta_0 - \beta_1 PM/LM + \beta_2 PS + \beta_3 OM/L + \beta_4 L/F \qquad (2.13)$$

$$QMX = \beta_0 - \beta_1 PM/LM + \beta_2 PS + \beta_3 FOM/L \qquad (2.14)$$

$$QMX = \beta_0 - \beta_1 PM/LM + \beta_2 PS + \beta_3 OM/L - \beta_4 FM \qquad (2.15)$$

where: QMX = U.S. exports of soybean meal; PM/LM = price ratio of soybean meal to linseed meal; PS = U.S. farm price of soybeans; OM = estimated consumption of oilseed meal; F = grain fed to livestock; L = livestock units; FM = net imports of fishmeal; FOM = OM plus FM.

The findings indicated that effects of changes in livestock numbers varied widely among the estimated models. A one unit increase in livestock units corresponded with an increase of U.S. exports of soybean meal from 10 to 100 pounds annually. In most cases, the estimated effect was less than 50 pounds.

As a measure of feeding practices, the ratio of oilseed-meal consumption to livestock numbers was used in the reported equations. A one-kilogram average increase in the amount of oilseed meal fed per livestock unit resulted in an average increase of 25 to 30 short tons of U.S. soybean meal exports annually. When net fish meal imports were entered as a substitute for U.S. exports of soybean meal, the estimated substitute relationship was 10 pounds of fish meal imports for 8 pounds of U.S. soybean-meal exports.

To test whether whole soybeans were an alternative source of soybean meal to importers, the farm price of soybeans was included as an explanatory variable in one of the three equations formulated. The study indicated that a 10 percent increase in the farm price of soybeans in the U.S. corresponded with an estimated net increase of 50,000 to 75,000 short tons of exports of soybean meal to the EEC with everything held constant. Therefore, soybeans were a competitive product based on an increase in soybean price, associated with an increase in exports of soybean meal to the European Community.

Impacts of Philippine Domestic Policies on the Coconut Industry, Exchange Rates and Import Demand

As to the question of whether the price of coconut oil in the international market is being dictated by government policy or whether the country has always been a mere price taker in the world market, the Center for Research and Communication paper supports the argument that coconut oil price is not controlled or dictated by government policy. Based on the mathematical equations, their study pointed out that the international price of coconut oil is mainly influenced by the total world production volume of the oil and its substitutes.

A NEDA inter-agency committee conducted a study on the effectiveness of the policies and strategies to increase income potentials of coconut farmers and to maximize the foreign exchange earnings from the export of coconut products during the pre-levy period, levy period and the UNICOM period. Their research indicated that the influence of world prices of coconut oil on copra farmgate prices was weakest in the 1971-73 pre-levy period (range of R^2 = .648 to .810) and strongest during the 1980-84 UNICOM period (range of R^2 = .930 to .971).

In another study (NEDA, 1983) on National Protection Rate (NPR) and the Implicit Tariff rates (IT), a negative NPR for the entire 1967-83 period was obtained, implying the presence of implicit taxation policies which act as disincentives to producers. A positive NPR would imply the presence of subsidies as a result of government policies. In a similar manner, if IT rates were positive during the periods 1973-74, mid-1976 to mid-1977 and 1978, a penalty to the local buyers would be the result. A negative IT would indicate subsidy being accorded to the local buyers.

In summary, these results appear to indicate that government policies have had discouraging effects on farmers while at the same time providing protection to millers.

The unavailability of exchange rate studies on vegetable oils prompted the author to review other related research. The role of exchange rates in determining trade levels, prices and export market shares was discussed by Paarlberg et. al. in "Impacts of Policy in U.S. Agricultural Trade". Exchange rate functions were treated as relative prices between currencies of different countries. Further, it related prices for similar commodities among countries and prices for traded and nontraded goods within countries. Their changes would affect supply and demand for commodities in countries where the changes are transmitted to producers and consumers.

Nominal rates were defined as those quoted at banks and in newspapers for business transactions and travel. Nominal rates measure the purchasing power in one country with another country's currency. Real exchange rates adjust the nominal exchange rates by the relative inflation rates between the two countries or group of countries. Inflation rates measure the movement of the general price level in each country, and the real exchange rates measure the purchasing power in one country's currency with another country's goods.

The discussion below distinguishes nominal exchange rates from real exchange rates. The authors cited the case of the U.S. and Brazil. Real percentage change reflected exchange rate movements that have been adjusted for differences in inflation rates between the United States and its trading partners such as Brazil. The example that follows discusses the importance of the real exchange rates. From 1982 to 1983, the U.S. dollar appreciated by 320 percent against the Brazilian cruziero. This suggests that one U.S. dollar would buy more than three times as many Brazilian goods in

1983 as in 1982. However, Brazil's inflation rate in 1983 was 142 percent and that of the U.S. was 3 percent. Despite the 320 percent nominal appreciation and the rapid increase in prices of Brazil's goods because of inflation, one dollar could buy only 37 percent more of Brazil's goods instead of 320 percent as implied by the nominal appreciation of the dollar. The formula used to calculate real appreciation is:

$$\text{real appreciation} = \frac{\text{cruzieros per dollar 1983}}{\text{cruzieros per dollar 1982}} * \frac{\frac{\text{US CPI (1982)}}{\text{US CPI (1983)}}}{\frac{\text{Brazilian CPI (1983)}}{\text{Brazilian CPI (1982)}}} \quad (2.16)$$

The above illustration implies that a change in the real exchange rate can be caused by the changes in the nominal exchange rate, the U.S. inflation rate, and the Brazilian inflation rate. A nominal appreciation of the dollar translates into real appreciation if inflation is equal in both countries. If, however, a nominal appreciation simply reflects the differences in rates of inflation, the real exchange rate remains unchanged. In the analysis of the percent change in trade-weighted dollar for general and agricultural trade, a nominal appreciation was associated with real depreciation in 1974. This occurred because in 1974, the nominal appreciation was less than the difference between overseas and U.S.inflation (U.S. inflation was lower).

As part of the discussion of the implications for the agricultural industry, Paarlberg et. al. noted that several researchers measured the effects of exchange rate movements on U.S. agriculture. The results confirmed that the exchange rate was an important factor in determining prices, supplies and demands, but some disagreement persisted on the magnitude of the effects. The studies showed different effects among commodities, because of different own- and cross-price elasticities of supply and demand, and of foreign policies that insulate domestic prices.

Real exchange rate was considered as a variable in Japan's Import Demand Study for U.S. White Wheat by Gonarsyah. His study revealed a positive coefficient, but it was insignificant. The insignificance of this relationship may be due to the relatively high multicollinearity between exchange rate and per capita income (r = 0.88) and between this variable and Japanese domestic wheat production (r = 0.74). Considering the whole model to include real per capita income, price, domestic production and Australian White Wheat, the estimated exchange rate elasticity for U.S. white wheat exports to Japan was approximately -0.25.

In the case of Korean import demand function, the estimated real exchange rate coefficient had a negative sign as expected, but was insignificant. The insignificant result may be caused by the relatively high collinearity with per capita real income variable (r = 0.70). Considering the whole model specified, the estimated exchange rate elasticity for U.S. white wheat exports to Korea was - 0.09. This may be interpreted as the exchange rate elasticity of U.S. white wheat price in terms of won was approximately equal to one, reinforcing the contention that the intervention of the Korean government in importing wheat leads to low elasticity.

To evaluate the impact of devaluation, the implied changes in exchange rates on the quantity and price of U.S. white wheat exported to Japan and Korea were compared with those of other exogenous variables in the model. Gonarsyah considered the 1970-71 and 1971-72 period, and 1972-73 and 1973-74 period as representative before and after devaluation, respectively.

The results suggest that devaluation in the U.S. dollar had a limited impact on the quantity and price of U.S. white wheat exported to Japan and Korea in the 1971-72 and 1972-73 periods. The decline in wheat imports from Australia and P.L. 480 sales of white wheat explained much of the increase in these two countries' imports of U.S. white wheat in that period.

Campos (1980) considered the changes in the domestic wheat price due to devaluation of the dollar. Campos assumed that domestic wheat supply was affected by the level of U.S. exports and the expansion of unit wheat sales to foreign markets decreases the domestic availability in the short run. Further, if this continued, then the domestic wheat price would increase. Assuming further that if no stocks were released, then the mathematical expression for the percentage increase in the domestic wheat price due to one percent devaluation in the American exchange rate would be given by the following equation:

$$a = \frac{n_x^{IC}}{E_x^{US} + n_x^{IC}} \tag{2.17}$$

where:

a = elasticity of domestic wheat price with respect to exchange rate;

n_x^{IC} = estimated wheat import demand price elasticity, in the currency of the wheat importing country; and

E_x^{US} = estimated commercial wheat export supply price elasticity for the United States.

The study revealed a direct relationship between the foreign wheat import demand price elasticity and the increase in domestic wheat prices. An inverse relationship existed with the American commercial wheat export price elasticity. Given the estimated price elasticities for wheat exports and imports, devaluations in the American exchange rates resulted in relatively small increases in the domestic wheat price. Therefore, any expansion of American wheat exports due to the devaluation of the American exchange rate resulted in a positive, though moderate increase in the domestic price of wheat. From an economic point of view, the study indicated that the beneficiaries of the changes are the farmers, however, at a cost to the United States consumers.

Gonarsyah, in a study on the "Econometric Analysis of the U.S.-Japan-Korea Market for U.S. White Wheat," defined exchange rate elasticity of exports as:

$$E_x = N_x \bullet e_x \qquad (2.18)$$

which is equal to the product of the price elasticity of excess supply and the exchange rate elasticity of exporting country's price where:

$$e_x = \frac{dP_x}{d\int} \bullet \frac{\int}{P_x}$$

and

$$N_x = \frac{g}{P_x} \bullet \frac{P_x}{Q_x}$$

Note:

P_x = price of the commodity sold by exporters expressed in terms of their own currency;

S = prevailing exchange rate (units in importer's currency per unit of exporter's currency);

Q_x = $[Q^{TS} - Q^{ROW} - Q^{TA}] - Q^{DX} = g\,(P_x, \ldots)$

Q^{TS} = total supply (production plus carryover) of the product in the exporting country;

Q^{ROW} = the exporting country's commercial export to the rest of the world;

Q^{TA} = exporting country's total P.L. 480 sales;

Q^{DX} = domestic demand for the product in the exporting country.

By using techniques parallel to those for deriving E^X, he further defined the exchange rate elasticity of imports as:

$$E^M = N^M \bullet e^M \qquad (2.19)$$

which states that the exchange rate elasticity of imports is equivalent to the product of the price elasticity of import demand and the exchange rate of importing country's price.

Where:

$$N^M = \frac{f}{P^M} \bullet \frac{P^M}{Q^M}$$

and

$$Q^M = \frac{dP^M}{d\int} \bullet \frac{\int}{P^M}$$

Note:

P^M = the price of the imported commodities in the importer's own country's currency. In equation form:

$P^M = S\,(P^X + C^T) + T$

P^x & S = the same as defined above

C^T = transportation cost expressed in exporter's currency

T = represents a specific tariff imposed by the government of the importing country payable in its own currency

$Q^M = Q^D - (Q^S + Q^A) = f(P^M, \ldots)$

Q^D = domestic demand

Q^S = domestic supply

Q^A = quantity of P.L. 480 shipments to the country being studied

Import Demand for Different Commodities

Kost, in his article "Effects of an Exchange Rate Change on Agricultural Trade," defined the elasticity of the import demand elasticity in equation form as:

$$N^{ID} = \frac{n^D Q^D - n^S Q^S}{Q^D - D^S} \qquad (2.20)$$

The equation defined import demand elasticity as a function of domestic demand and supply elasticity and the relative importance of the trade sector in the economy (the details of the definition are discussed below).

Note:

Q^D = total demand curve = f1 (P) where $\frac{d[f1(P)]}{dP} < 0$ and

Q^S = domestic supply curve = f2 (P) where $\frac{d[f1(P)]}{dP} > 0$

The quantity of the commodity that will be demanded by the importing country from the exporting country is defined as:

$Q^{ID} = Q^D - Q^S = f1\ (P) - f2\ (P)$

nD = total demand elasticity = $\frac{d[f1(P)]}{dP} \bullet \frac{P}{Q^D}$

nS = domestic elasticity of supply = $\frac{d[f2(P)]}{dP} \bullet \frac{P}{Q^D}$

Similarly, the elasticity of the export supply curve is defined as:

$$n^{ES} = \frac{n^S Q^S - N^D Q^D}{Q^S - Q^D} \qquad (2.21)$$

In the equation, the elasticity of export supply appears as a function of the domestic supply elasticity, the demand elasticity and the relative importance of the trade sector in the economy.

Chapter Summary

The review of previous studies indicates that little or no concensus was reached with respect to the signs, as well as the magnitudes of the estimated demand and supply elasticities. This may be due to the differences in time preference, the model and the variable specification, and the method of estimation used in the researches reviewed.

Despite these differences in research findings, several conclusions can be derived from the preceding sections. First, most of the studies used the OLS technique in their estimations. In so doing, the results may, to some extent, suffer from simultaneous equations bias. Consequently, import demand and export supply elasticities may be underestimated. In addition, the OLS estimation has severe limitations when it comes to estimating the effect of changes in trade policy by other importing and/or exporting countries on the price and quantity of coconut products traded.

Second, the Philippine domestic demand, and the U.S. and European countries import demands for coconut products were found to show relatively little response to changes in its price. For European and U.S. markets, fluctuations in demand of coconut oil for edible purposes and its domestic production of oil may influence the price to a large extent. In the case of Europe and other countries, the respective intervention policy on imported vegetable oils was believed to be responsible for the small price response to changing demand condition. However, no evidence was found of prior attempts to incorporate the government intervention policy as one of the explanatory variables in estimating the import demand for coconut oil and other coconut by-products to these countries.

Third, the type of commodities employed as substitutes for coconut products and by-product in the demand specification vary from country to country. In the case of the United States, soybean, cottonseed, and groundnut oils have been employed as substitutes for coconut oil. In addition to soybean oil in the case of the EEC, palm kernel oil was considered as a substitute good for coconut oil. All the previous studies treat the price of substitute goods as exogenously determined in their model specifications.

Fourth, most of the studies indicate that income has a positive impact on coconut oil imports to the U.S., Europe and other countries, and has a negative impact on Philippine domestic consumption of copra and a positive impact on coconut oil. The response to changes in income, in the case of the U.S. and Europe may be clouded to some degree by the respective government policies. Changes in the Philippine domestic government policy, sich as a subsidy, may turn the income response from negative to positive.

Fifth, the tariff imposed by the government of the importing country, the shipping costs and export subsidy were considered to have significant effects on the quantity of coconut product and by-product exports. With respect to a tariff, no evidence was found of any attempts to incorporate it as one of the explanatory variables in the model specification.

Sixth, two versions of exchange rate specifications were found in studies of exports of wheat. One version employed by Campos treats exchange rates as wedges between price levels in the importing country's currency and prices in the exporting country's currency. The other version adapted by Gonarsyah treats the exchange rate as a separate explanatory variable. As a result, the two versions yielded different conclusions with respect to the role of the exchange rate as a determinant of the quantity and price of wheat trade.

CHAPTER III

METHODOLOGY

Introduction

In this chapter, an analytical framework in studying the import demand by the United States, West Germany, and the Netherlands for Philippine coconut products and by-product is presented. Key variables or factors relevant to the analysis of the import demand were identified in developing the framework. The discussion of the theoretical issues pertaining to these variables was considered.

The first section provides a conceptual framework in the analysis of the effects of changes of different factors in the import demand by the Philippines' trading partners on different coconut products and by-product. A theoretical model is specified in the second section. General economic models for the aforementioned Philippine commodities are presented. These models are the basis for the discussion of the empirical results in Chapter IV. A statistical framework for the whole study is presented in the last segment of the chapter.

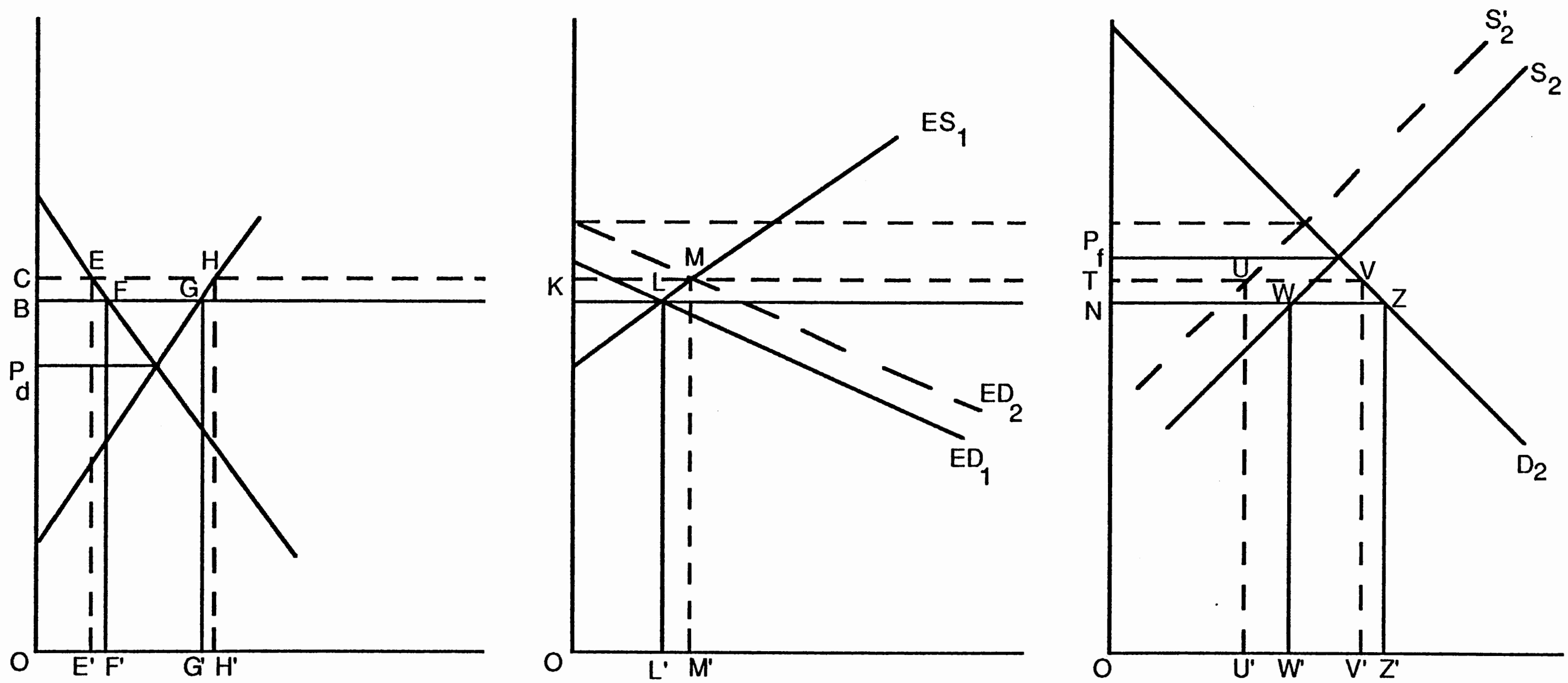
Conceptual Model

The conceptual model underlying this study is a partial equilibrium model which illustrates the effect of the different factors in the international market on prices in importing and exporting countries under varying degrees of price responsiveness of the participants in the world market. A one-commodity, two-country trading world is assumed initially in order to simplify the presentation of the theoretical framework. It is assumed that a single homogeneous commodity is produced and consumed under competitive conditions in both trading countries. Transportation costs are ignored at this point and, for simplicity, fixed exchange rates are assumed.

Figure 1 presents the theoretical framework in graphical terms. In 1(a) and 1(c), the domestic supply and demand curves (S_1) (D_1) of the exporting country and (S_2) (D_2), the supply and demand curves of the importing countries, are represented. The center panel, which represents the world market, contains the excess supply curve (ES_1) of country 1 and the excess demand curve (ED_1) of country 2. Under free trade, the market price is equalized in both trading countries at OB = OI = ON, and country 1 exports F'G' = O'L' = W'Z' to country 2.

Assuming an increase in the price of input in the importing country shifts its supply curve from S_2 to S'_2 and the excess demand curve from ED_2 to ED'_2, the equilibrium price in both countries rises to OC = OK = OT, and exports from country 1 to country 2 increase to E'H' = OM' = U'V'. Under free trade, shocks in the system such as short crop in the importing country are transmitted through the world market into the exporting country such that both countries share in the adjustment. The greater the slope of the domestic supply and/or demand relation in each region, the lesser the price adjustment necessary to clear the market in response to a shock, *ceteris paribus*. This is equivalent to saying that the more elastic the excess supply and excess demand relation, the larger is the quantity adjustment in the volume of trade and the smaller is the price adjustment in response to shock.

In cases when the importing country increases its production through price support or import subsidy, or increases production of substitutes for goods imported, S'_2 will shift to the right of S_2, thus resulting in a decrease in the



(1a)

Exporting Country

(1b)

World Market

(1c)

Importing Country

Figure 1. Trade Between Two Countries

quantity imported by country 2 and a lower export by country 1. This may hold through to other trading partners of the Philippines in the fats and oils industry.

In a related development, the exporting country can avoid sharing in the adjustment to shocks in the importing country and thereby stabilize its domestic price by cutting the link between the domestic and world market prices. This may be accomplished by means of a quantitative export restriction or an export tax. In Figure 1, country 1 can stabilize the domestic price at OB by limiting exports to FG = OL or by imposing an export tax of KI per unit. At level OL' of the exports, the world market price is bid to OK which is equal to OT in the importing country. This exceeds the equilibrium price under free trade, OB = OI. Since the exporting country refuses to share in the adjustment to the crop shortfall or decrease in production in the importing country, the price adjustment required to clear the world market is greater.

Figure 2 illustrates the impact of a devaluation in the domestic, Philippine peso (₱). D_d and S_d denote domestic supply and demand, respectively. For a given commodity, say coconut products, the foreign demand and supply schedules are indicated by D_f and S_f. With no trade, domestic equilibrium price is P_d while the equilibrium price in a foreign market is P_f. As prices increase above P_d, in the domestic market, production would exceed domestic consumption. The excess supply function (ES) as illustrated in (2b) is the supply function of exports to the world market. In the case of the importing country, a fall in the price below P_f causes consumption to exceed production. ED, the excess demand function in Figure (2b), depicts the demand function from the world market.

When trading between the Philippines and the importing countries takes place, disregarding trade barriers and transportation costs, the equilibrium price for the Philippines and the importing countries is P_p. The equilibrium level of

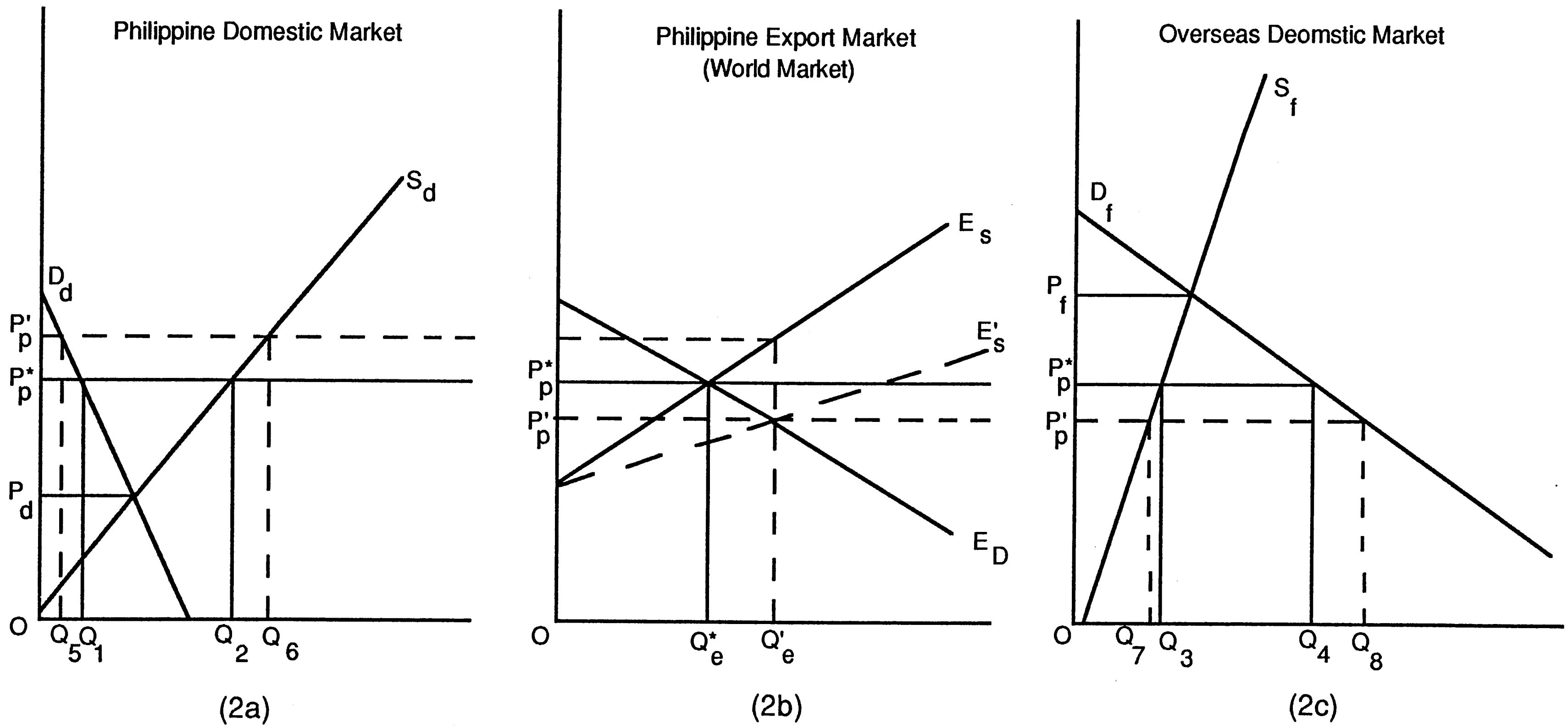


Figure 2. Impact of Devaluation in Philippine Peso (₱) on Export Trade of Agriculutral Commodities

Philippines' exports is Q^*_e. This is the same volume imported by the foreign importers. With the devaluation of the peso, the export supply schedule rotates to the right. Devaluations reduce the prices of goods and services produced in the devaluing country, in terms of foreign currency.

The shift in the supply schedule to the right causes the price of the coconut product in the importing country's currency to be cheaper than before the devaluation occurred. Hence, for a stated amount of Philippine products, foreign importers must sell lesser goods in their currency to buy the same amount of product in Philippine currency. The new equilibrium price is P'_p, which resulted in higher imports of Philippine goods Q'_e and the Philippine price is P'_p. The price of Philippine exports in foreign currency is given by P'_p. The lower foreign market price increases demand and decreases supply in the domestic market of the foreign country leading to an increase in imports overseas. An increase in the volume of trade increases the domestic price in the Philippines. This decreases the domestic consumption, but by less than the increase in exports. If changes in the exchange rate are transmitted to both producers and consumers, then the quantity traded would be altered. Where domestic demand is insignificant, volatility in exchange rates enhances producers' income instability.

If, for whatever reason, the government of the importing country imposed a quota restricting imports to the level received before the devaluation occurred at Q_3 - Q_4, the result would be different. The equilibrium price (in terms of the exporting country's currency) and quantity traded would still be the same as before, but the equilibrium price of the product paid by the importer in their own currency would be lower than the no-quota case at P^*_p. Since the equilibrium price in the importing country's market would still be at P_M, the price differential (P_p - P^*_p) can be interpreted as a windfall profit enjoyed by the importers of the product, assuming no other arrangements between the importer and their own government occur.

Theoretical Model

The import demand of a country or a region for a commodity can be thought of as a country's excess demand for the commodity. In this case, the import demand (Q_m) for a commodity is the difference between the domestic demand (Q_d) and the domestic supply (Q_s) of the commodity and can be expressed mathematically as:

$$Q_m = Q_d - Q_s \tag{3.1}$$

Thus, factors affecting import demand include factors affecting domestic demand as well as domestic supply.

According to the classical theory, a consumer allocates income among various commodities with the objective of maximizing a utility function subject to a budget constraint. Assuming free choice, the combination of commodities purchased can be derived as a function of the relative prices of the commodities and the amount of income available. Aggregating this behavioral equation, one can derive the total domestic demand (Q_d) for the commodity as a function of the commodity's own price (P_d), prices of substitute products (P_s), total income (Y), total population (N) in the country and other factors (Z), and can be expressed symbolically as:

$$Q_d = f(P_d, P_s, Y, N, Z) \tag{3.2}$$

Substituting equation (3.2) into equation (3.1), one can then derive the import demand for the commodity (Qm) as follows:

$$Q_m = f(P_d, P_s, Y, N, Z) - Q_s \tag{3.3}$$

Equation (3.3) can also be expressed in linear form in terms of per capita and real prices as:

$$\frac{Q_m}{N} = \alpha_0 - \alpha 1\frac{P_d}{I} + \alpha 2\frac{P_s}{I} + \alpha 3\frac{Y}{I \bullet N} \pm \alpha 4^Z - \alpha 5\frac{Q_s}{N} \tag{3.4}$$

where α's are parameters, the plus or minus sign indicates the direction of the effect of the variable in question on the quantity of import demand, and I represents the consumers price index. Equation (3.4) can be interpreted as the per capita import demand for a commodity $\frac{Q_m}{N}$ varies inversely with its own real price $(\frac{P_d}{I})$ and per capita domestic supply $(\frac{Q_s}{N})$ and varies directly with the real price of substitute products $(\frac{P_s}{I})$ and per capita real income $(\frac{Y}{I \bullet N})$. Other factors such as exchange rates and quantity of imports of other commodities may vary directly or indirectly depending on their specification. The effects on the changes of these factors on the import of Philippine coconut products and by-product by the U. S., West Germany and the Netherlands are presented graphically in Figures 1 and 2. The discussion thus far implicitly assumed that the commodity demanded by the consumer is the very same commodity demanded by the importer. Thus, the import demand relation ideally contains variables which reflect both demand and supply conditions in the importing country.

The basic demand equation investigated empirically in this study, with the major focus on country's imports of Philippine coconut oil, copra, copra meal, and desiccated coconut is presented in equation (3.4). The following were the assumptions considered: the import demand for coconut products and by-product generated by a deficit nation is equivalent to that faced by the Philippine exporters on a regular basis. For simplicity, the Philippine price of these products is the appropriate price affecting the import demand by its trading partners.

Countries included in this study which import Philippine coconut products and by-product do not grow coconut for export. However, they do produce commodities which are reasonably close substitutes for coconut oil, copra meal and desiccated coconut. The production of these goods are often protected by domestic agricultural and trade policy, especially among countries of the EEC. Moreover, these countries also import substitutes or complementary products from their trading partners. Lastly, the importers in these countries import coconut products and by-products from exporters of the other coconut producing nations.

Considering the aforementioned factors, the commercial import demand relationships for Philippine coconut products and by-product can be viewed as something of a residual demand after the internal production, competitive imports, and preferential trade relationships are taken into consideration.

Economic Model

For the three countries studied, the variations of the following general models were used as the basis for estimation and analysis:

For Coconut Oil Model:

$$QCO = f(PCOx, PCO, DPN, RNI, RER, Z) \quad (3.5)$$

where:

$QCO = \frac{QCOx}{N}$ = per capita import of commercial Philippine coconut oil by a given country = quantity of import of commercial Philippine coconut oil by a given country/population;

$PCOx$ = the price of commercial Philippine coconut oil in pesos;

$PCO = \frac{PCOPx}{MCPI}$ = real price of competing products = current price of competing products/consumers price index of the importing country;

$DPN = \frac{DPNx}{N}$ = per capita domestic production and net imports of other major fats and oils = actual domestic production and net imports of other major fats and oils, and oilseeds/population;

$RNI = \frac{Y}{MCPI \bullet N}$ = real national income in a country's currency = current national income in a country's currency/consumers price index of the importing country • population;

RER = MER/PER • PCPI/MCPI = real exchange rate = exchange rate of the importing country/Philippine exchange rate multiplied by the Philippine consumer price index/consumers price index of the importing country;

Z = other factors.

The Copra model:

$$QCPx = f(PCPx, PCO, DPN, RNI, RER, Z) \tag{3.6}$$

where:

QCPx = quantity of import of commercial Philippine copra by a given country;

PCPx = the price of Philippine copra in pesos per metric ton;

PCO = $\frac{PCOPx}{MCPI}$ = real price of competing products such as oilseeds = current price of competing products such as oilseeds/consumers price index of the importing country;

DPN = $\frac{DPNx}{N}$ = per capita domestic production and net imports of other oilseeds = domestic production and net import of other oilseeds/population;

RNI = $\frac{Y}{MCPI \bullet N}$ = real national income of the importing country = current national income of the importing country/consumer price index of the importing country • population;

RER = MER/PER • PCPI/MCPI = real exchange rate; = exchange rate of the importing country/Philippine exchange rate multiplied by the Philippine consumers price index/consumers price index of the importing country;

Z = other factors.

The Copra Meal Model:

$$QCMx = f(PCMx, SLI, LFP, PCO, OSM, RER, Z) \quad (3.7)$$

where:

QCMx = quantity of import of commercial Philippine copra meal by a given country;

PCMx = price of copra meal in pesos per metric ton;

SLI = the size and composition of the country's livestock inventory;

LFP = livestock feeding practices (specifically the level of high protein feed per livestock unit) ;

PCO = $\frac{PCOPx}{MCPI}$ = real price of competing products such as oilseed meals = current price of competing products such as oilseed meals/consumers price index of the importing country;

OSM = oilseed meal imports by a given country;

RER = MER/PER • PCPI/MCPI = real exchange rate = exchange rate of the importing country/Philippine exchange rate multiplied by the Philippine consumers price index/consumers price index of the importing country;

Z = other factors.

The Desiccated Coconut Model :

$$QDC = f(PDCx, PCBx, SCO, QNP, PCO, RER, Z) \qquad (3.8)$$

where:

QDC = $\frac{QDCNx}{N}$ = per capita import of commercial Philippine desiccated coconut by a given country = quantity of imports of commercial Philippine desiccated coconut by a given country/population;

PDCx = price of desiccated coconut in pesos per metric ton;

PCBx = price index of cereal and bakery products;

SCO = $\frac{SCOx}{N}$ = sales of confectioneries per capita; = sales of confectioneries in million dollars/population;

QNP = quantity of nut production by the importing country;

PCO = $\frac{PCOPx}{MCPI}$ = real price of competing products = current price of competing products/population;

RER = MER/PER • PCPI/MCPI = real exchange rate = exchange rate of the importing country/Philippine exchange rate multiplied by the Philippine consumers price index/consumers price index of the importing country;

Z = other factors.

Statistical Framework

Statistical estimates of the economic models used in this study were obtained by the ordinary least squares regression. Linear and logarithmic forms were investigated. For most relationships, linear equations in per capita bases were found to be superior. Other researchers who conducted studies of this nature utilized the linear first-difference models, however, this study opted to use it, after considering the argument by Foote (1960):

> From a statistical standpoint, first difference should be used in preference to actual data when the successive unexplained residuals from single-equation analyses based on actual data are almost perfectly serially correlated with a positive sign. A transformation to first differences will eliminate most of the serial correlation in the residual if the analysis is rerun in terms of the transformed variables. . . . If the serial correlation is less than 0.5 or negative, a conversion to first difference tends to make the degree of serial correlation in the residuals greater in the transformed than in the original analysis, and first difference should not be used.

All the reported equations have serial correlation of less than 0.5 or negative. The specific approaches explored for each commodity and each country are reported along with the estimates.

Each reported equation includes the regression coefficients and their t-values, and the coefficient of multiple determination (R^2). Overall, Durbin-Watson tests revealed no evidence of serial correlation in reported results. Several specifications were tested for each relationship. The reported variables included in the different equations generally had t-values equal to or greater than 1.0. Regression coefficients were not subjected to the standard tests of significance for acceptance or rejection because all the critical assumptions which underlie these tests were probably not valid for many of the equations reported. But the reported t-values were added to the analysis since they indicate the relative strength of independent variables in explaining variations in the dependent variable. Estimates were based on the sample of 13 observations. Such small samples and the relatively large number of variables present difficulties that might be recognized when utilizing the results.

This research is a systematic effort to examine the historical data so that relationships among economic variables hypothesized to be related to one another could be measured. The results of this nature of the study suggest that it may be useful in marketing and policy decision making even if they lack some desirable statistical properties.

For the different import demand analyses, other research results were also included in the discussion, in order to counter the claim by Learner and Stern (1970) and Houck (1972) that:

> It is altogether too common for researchers to report only their best results without indicating the trial and error process by which they were obtained. . . They further stated that when none of the experimentation is reported it becomes very difficult to assess the quality of the research effort in terms of its approach to the many important methodological issues we have discussed earlier. It is also the case that one researcher's experimental failures are of considerable importance in the design of research by others.

In this connection, a short section that describes the other results and alternative models which were examined is added to each country's import demand analysis.

Chapter Summary

The first section of this chapter dealt with a conceptual model which illustrated the effects of different factors in the international market on prices of a given commodity. A one-commodity, two-country trading model was used. It was assumed that a single homogeneous commodity was produced and consumed under competitive conditions, ignoring transportation costs. Another conceptual model was presented which illustrated the impact of devaluation in the Philippine peso on export trade of coconut products and by-product. Trade barriers and transportation costs were assumed to be constant.

A theoretical model was presented in the second section. Import demand of a given product was discussed, including factors that affect domestic demand as well as domestic supply of the importing country. The import demands for the coconut products and by-product were expressed in linear form in terms of per capita and real prices.

General models were presented in the third section for coconut oil, copra, desiccated coconut and copra meal. These were the bases for analyzing the import demand functions of the United States, West Germany and the Netherlands on coconut products and by-product. Statistical framework was presented in the last section. It discussed statistical methods and different test statistics used in the presentation of the results of the analysis.

CHAPTER IV

PRODUCTION, TRADE PATTERNS AND REVIEW OF POLICIES IN THE VEGETABLE OILS AND OILSEED INDUSTRY

Introduction

This chapter is divided into two sections: (1) a discussion of world production and exports of vegetable oils and fats of the major producing countries, including pattern and structure of trade of Philippine coconut products and by-product; and (2) a discussion of the international policies in importing countries and the domestic policies affecting the country's production and export of coconut products and by-product.

Production is discussed in terms of oil for oilseed (copra, nuts or kernels). For coconut products, most of the major producers include Asian countries (Philippines, Malaysia, Indonesia, Sri Lanka [Ceylon], and India), Mozambique and a group of small islands comprising the region of Oceania (Fiji, Papua New Guinea, Tonga, Vanuatu and French Solomon Islands). The flow of trade of Philippine products is discussed in detail. Other major producing countries were not included due to the absence of reliable information or data. Although some of these countries produce coconuts, some, if not all, of their output is consumed domestically. In fact some of them are net importers.

In international trade, the policies pursued by a country's trading partners determine the flow or pattern of trade. Consequently, the trade policies of importing countries such as the United States and the European Economic Community for coconut products are reviewed. Also reviewed are the domestic policies adopted by the Philippine government for coconut products and by-product.

Production, Pattern and Structure of Vegetable Oils and Oilseeds

Emphasis in this section will be placed on the relative importance of different vegetable oils and oilseeds in the oils and fats industry and on the growth and direction of exports in copra, coconut oil, desiccated coconut and copra meal. In addition, the position of coconut products in the world market and the Philippine situation in the world coconut industry is also discussed.

World Production of Oils and Fats

The combined world production of vegetable oils and animal/marine fats in 1984 came to 62.8 million metric tons, an increase of about 17 percent from the 1979 production level of 53.8 million metric tons (Table VII). Products of vegetable origin (that is soybeans, cotton, groundnut, sunflower, rapeseed, sesame, olive, coconut, oil palm, palm kernel, linseed, castor and tung oils) which aggregated 43.4 million metric tons accounted for over two-thirds (69.2 percent) of world production of fats and oils taken together. One-third or 19.3 million metric tons consisted of fats from land and sea animals (includes fish oil, lard, tallow, and greases).

The trend had been toward more production of oil from vegetable origins. From a 67.6 percent share in 1979, vegetable oils increased to 69.2 percent in

TABLE VII

MAJOR OILS AND FATS (OIL OR FAT EQUIVALENT): CALCULATED WORLD PRODUCTION, CROP YEAR 1979-1984 (IN THOUSAND METRIC TONS)

Commodity	1979	1980	1981	1982	1983	1984
Edible Vegetable Oil:						
Soybean	12048	13394	13135	13421	13703	13425
Cottonseed	2850	3044	3062	3289	3029	3387
Groundnut (Peanut)	2783	2588	2335	2918	2674	2285
Sunflower	4663	5036	5043	5426	6148	5791
Sesame	533	516	475	506	548	562
Rapeseed	3429	3537	4312	4810	5122	5341
Olive	1640	1788	1837	1643	1904	1669
Tung	100	97	102	98	104	95
Castor	354	365	322	318	335	390
Total	28400	30365	30623	32429	33567	33545
Palm Oils:						
Coconut	2614	2695	2808	2867	2686	2094
Palm Kernel	568	636	626	709	777	824
Palm	4015	4581	4858	5706	5334	6272
Total	7197	7912	8292	9282	8797	9190
Industrial Oils:						
Linseed	749	720	743	661	705	701
Total	749	720	743	661	705	701
Animal Fats:						
Butter	5696	5641	5619	5911	6387	6324
Tallow and greases	6112	6376	6302	6217	6407	6422
Lard	4423	4573	5000	4966	5089	5108
Total	16231	16590	16921	17094	17883	17854
Marine Oils:						
Fish (Inc. liver)	1197	1194	1075	1330	1157	1490
Total	1197	1194	1075	1330	1157	1490
GRAND TOTAL	53776	56781	57654	60796	62109	62780

Source: United Coconut Association of the Philippines.

1984 at an annual rate of 3.7 percent. Animal fats annual growth rate was at a slower pace of 2.5 percent.

Soybean oil was the major oil produced. In 1984 it was at 13.4 million metric tons and accounted for over one-fifth (21.4 percent) of world volume of oils and fats (UCAP, 1984).

Coconut oil output had its lowest output in 6 years at only 2.1 million metric tons in 1984, a registered decrease of 20 percent from 1979's production of 2.6 million metric tons (Table VIII). This was the biggest drop for coconut oil since 1979 and indicated the sharpest decline among the product categories for the current year. Trendwise, the average annual change for the past six years is a negative 3.8 percent.

As the volume of production of coconut oil fell, palm kernel oil, its lauric oil mate, continued to gain with a growth rate of 7.8 percent during the last six years. In real terms, however, the volume was still lower at 824 thousand metric tons in 1984, a lofty gain of 6 percent from the 1983 figure of 777 thousand metric tons. Thus, coconut oil still remained the dominant lauric oil, holding a share of 71.8 percent during the 1984 production year.

The increase in palm kernel output was mainly due to the gains achieved by palm oil considering that both products have a common tree base. In 1984, production totalled 6.3 million metric tons, a significant increase of 56.2 percent from 4.0 million metric tons in 1979. A second major source of vegetable oil, palm kernel oil shared 10 percent of the world's total oils and fats production. The growth rate for the last six years was the highest among the vegetable product categories at 9.7 percent.

Rapeseed showed a rapid growth during the last five years of 9.5 percent, a close second to palm oil, with a 1984 output of 5.3 million metric tons. It contributed 8.5 percent to global oils and fats supply. Sunflower oil production

TABLE VIII

MAJOR OILS AND FATS: PERCENTAGE SHARE OF WORLD PRODUCTION, 1974-1983[1,2] (IN 1000 METRIC TONS, OIL BASIS)

Commodity	1974	% Share	1979	% Share	1981	1982	1983[p]	% Share
Edible Vegetable Oils:								
Soybean	9542	23.25	11704	24.13	12796	13012	13500	23.42
Cottonseed	3168	7.72	2951	6.08	3220	3455	3336	5.79
Groundnut	3091	7.54	3303	6.81	2866	3709	3386	5.87
Sunflowerseed	4521	11.02	4674	9.64	4726	5094	5801	10.07
Rapeseed	2475	6.03	3662	7.55	4042	4614	5386	9.35
Olive	1526	3.72	1590	3.28	1921	1252	2196	3.81
Coconut	2235	5.45	2796	5.76	2902	2851	2576	4.47
Palm Kernel	488	1.19	634	1.31	578	698	752	1.30
Palm	2160	6.36	4267	8.80	5170	5969	5615	9.74
Total	29656	72.27	35581	73.36	38211	40654	42548	73.82
Industrial Oils:								
Linseed	755	1.84	736	1.52	714	714	870	
Total	755	1.84	736	1.52	714	714	870	
Marine Oils:								
Fish (Incl. liver)	1001	2.44	1193	2.46	1145	1300	1056	
Total	1001	2.44	1193	2.46	1145	1300	1056	
Animal Fats:								
Butter (Fat Content)	4502	10.97	4932	10.17	6074[3]	6392[3]	6895[3]	
Tallow and Greases	5121	12.48	6061	12.50	6269	6164	6266	
Total	9623	23.45	10993	22.66	12343	12556	13161	
Total (Fats & Oils)	41305	100.00	48503	100.00	52423	55423	57635	

[1]Crop year basis except for coconut, palm kernel, palm and fish oils which are calendar year basis.
[2]Calculated from assumed extraction rates, thus, represent potential rather than actual production.
[3]Product weight
[p]Preliminary
[e]Estimates

Source: United Coconut Association of the Philippines

was at 5.8 million metric tons, an increase of 24.2 percent from half a decade ago's output of 4.7 million metric tons.

Cottonseed's output volume of 3.4 million metric tons improved on production of five year's ago of 2.9 million metric tons or an increase of 18.8 percent, while groundnut at 2.9 million metric tons increased at a slower rate of four percent from 1979's level of 2.8 million metric tons. These oils shared 5.4 and 4.6 percent of the world's oils and fats total and ranked fifth and sixth, respectively, in the vegetable oils and fats industry. Coconut is the seventh and shared 4.9 percent, while its lauric partner palm kernel oil was ninth, accounting for 1.1 percent of the global share of vegetable oil production. The other vegetable oils, which aggregated 3.4 million metric tons, were olive oil, linseed oil, sesame oil, castor oil and tung oil.

The Philippines supplied 42.4 percent of the world coconut oil production in 1984, while Indonesia was second with a share of 20.1 percent. Other coconut oil producers are Sri Lanka, French Oceania, Fiji, Papua New Guinea, Malaysia and Mozambique, which accounted for 654 thousand metric tons in the 1984 production year, a decline of 7.0 percent in 1983's level of 703 thousand metric tons. Another lauric oil producer in the form of palm kernel oil was Malaysia which accounted for one half (50.3 percent) of its global production. Nigeria was a far second and contributed 8.6 percent. Palm oil production was led by Malaysia producing 54.3 percent of world output, followed by Indonesia with 17.3 percent. Other producers were the Ivory Coast, Colombia, Zaire, and Benin, although non-specified or unidentified countries contributed about 16 percent.

The United States is the number one producer of soybean oil with a total world production share of 37.2 percent. Western Europe and Brazil followed with shares of 17.7 and 17.3 percent, respectively. In cottonseed production, the People's Republic of China led the world with a share of 30 percent. The U.S.S.R. followed with a share of 18.9 percent. In addition to cottonseed, the P.R.O.C. is also one of the world's largest producers of groundnut oil, which along with India, had shares of 20.7 and 49.6 percent, respectively. Mainland China also produces rapeseed which together with West Europe, held respective shares of 28.3 and 25.0 percent, respectively. The world's largest producer of sunflower oil is the U.S.S.R. accounting for 29.5 percent of production in 1984. West Europe followed at 17.6 percent. Sesame oil is produced mainly in India and the P.R.O.C., accounting for shares of 37.7 percent and 15.5 percent; while olive oil comes largely from West Europe which contributed 78.5 percent of 1984 production.

World Exports of Oils and Fats

In 1984, the export shipment of edible vegetable oils, industrial oils and animal and marine fats amounted to 27.1 million metric tons (Table IX). Compared with the 1979 volume of 23.0 million metric tons, the 1984 was higher. Edible vegetable oils share was more than three fourths (78.3 percent) of the total world export, amounting to 15.0 million metric tons. This was higher than the share of 75.1 percent in total trade in 1979.

Soybean oil (including beans converted to oil) was the major traded oil with exports reaching 8.64 million metric tons, 13.2 percent greater than the 1979 level of 7.64 million metric tons. The current share of this oil to total world exports of oils and fats is 32.1 percent.

Palm oil was a far second at 4.7 million metric tons accounting for 17.4 percent of total global trade. Its share of the total world trade has improved during the five year period by only 13 percent.

TABLE IX

MAJOR OILS AND FATS (OIL OR FAT EQUIVALENT): TOTAL TRADE OF EXPORTING COUNTRIES, ANNUAL 1979-1984 (IN THOUSAND METRIC TONS)

Commodity	1979	1980	1981	1982	1983	1984
Edible Vegetable Oil:						
Soybean	7639	8179	8344	8862	8406	8644
Cottonseed	392	504	488	568	375	387
Groundnut (Peanut)	861	802	742	794	864	677
Sunflower	1540	1872	1990	2095	2275	2384
Sesame	242	229	260	247	286	265
Rapeseed	1544	1463	1778	1694	1848	2059
Olive	305	286	269	253	407	340
Tung	47	45	38	37	42	--
Castor	252	224	223	189	194	219
Total	12822	13604	14132	14739	14697	14976
Palm Oils:						
Coconut	1412	1511	1631	1595	1512	1164
Palm Kernel	441	497	485	560	606	619
Palm	2968	3779	3494	4193	4255	4688
Total	4821	5787	5610	6348	6373	6471
Industrial Oils:						
Linseed	501	522	546	431	515	498
Total	501	522	546	431	515	498
Animal Fats:						
Butter (Product Weight)	1099	1206	1255	1147	1031	1082
Tallow and greases	2384	2593	2631	2480	2537	2560
Whale and Sperm oil	11	9	6	6	4	--
Lard	592	564	559	502	505	521
Total	4086	4372	4451	4134	4077	4163
Marine Oils:						
Fish (Inc. Liver)	818	799	769	766	69	978
Total	818	799	769	766	69	978
GRAND TOTAL	23042	25084	25508	26418	25731	27086

Source: United Coconut Association of the Philippines.

The third largest exported oil, which shared 8.9 percent of total world trade, is the sunflowerseed (oil basis) and oil. The figure was at 2.4 million metric tons. Rapeseed and oil, with shipments totalling 2.1 million metric tons, was ranked fourth, which shows an increase of 33.0 percent from 1979's figure of 1.54 million metric tons.

Coconut oil, inclusive of copra converted to oil, was the fifth largest world export of vegetable oil with 1.16 million metric tons for a share of 4.3 percent. The year's trade reflected a drop of 17.6 percent from the 1979 volume of 1.51 million metric tons. Groundnut oil exports of 676,800 metric tons showed a decline of 21.3 percent from 860,500 metric tons traded in 1979. Other vegetable oils widely exported were palm kernel which went up by 40.4 percent, from 440.8 thousand metric tons traded in 1979; and cottonseed oil at 386.8 thousand metric tons, lower than the volume of 392.2 thousand metric tons exported in 1979, and a drop of about 1 percent. Vegetable oils which were exported in smaller quantities were olive oil, which increased by 11.3 percent from 1979 levels of 305.5 thousand metric tons; and sesameseed oil, which at 124.7 thousand metric tons was a decrease of 9.6 percent from 1979 levels.

As to the export of specific oils, the Philippines dominated the coconut oil trade. Of the total world shipments, 50.4 percent (equivalent to 586.1 thousand metric tons) came from the Philippines. The increase in exports of other countries did not offset the big drop of 42.5 percent in Philippine tonnage which pulled down world coconut oil exports to 1.16 million metric tons, a decrease of 17.6 percent from the 1979 volume.

The United States was the top exporter of soybean oil in the world, accounting for more than one half (52.5 percent). This is tantamount to 4.5 million metric tons of the 8.6 total world trade. Volumewise, this was largely made up of 77.7 percent of beans and the remainder in oil. The other voluminous traders, with a combined total of 2.22 million metric tons or a share of 25.7 percent of the world's total exports, were Brazil and Argentina. Bean exports accounted for 37.9 percent of their total shipments with the rest in oil. Argentina supplied more oil than Brazil while the latter shipped out more beans.

As to groundnut and oil, the United States traded the largest volume of nuts, amounting to 266.9 thousand metric tons or one-third of total nut trade and only 6.7 thousand metric tons of oil. Combining the nuts and oils trade using the 45.5 percent conversion rate, the U.S. trade of 125.1 thousand metric tons reflects the 18.5 percent of the world total trade in oil basis.

The other top traders of vegetable oils are the United States for sunflowerseed and oil which totalled 2.38 million metric tons; Canada, the unrivaled rapeseed and oil trader shipped out 791.5 thousand metric tons. Malaysia was the largest trader of palm oil and of palm kernel oil which amounted to 397.4 thousand metric tons.

Industrial oils principal exporters were basically unchanged. In 1984, for linseed and oil, Argentina was the top shipper and accounted for 208.3 thousand metric tons.

Coconut Oil Production

Several fats and oil substitutes compete with coconut oil. In particular, competition is stiff in the edible oil sector which includes soybean oil, palm oil, sunflower oil, and cottonseed oil. As shown in Table X, from 1968 to 1983, the share of soybean oil in world production of oil increased from 59.9 percent to 62.7 percent. Palm oil increased about 10 percentage points during the same period. The coconut oil share dropped by 50 percent, from a high of 24.4, to a

TABLE X

COMPARATIVE WORLD PRODUCTION OF SOYBEAN OIL PALM OIL, AND COCONUT OIL, 1968-1983, IN OIL BASIS (IN THOUSAND METRIC TONS)

Year	Total	Soybean[1] Oil	Percent[2] Share	Palm Oil	Percent Share	Coconut[3] Oil	Percent Share
1970	10004	6089	60.9	1743	17.4	2172	21.7
1971	10717	6266	58.5	1937	18.1	2514	23.4
1972	11870	6845	57.7	2146	18.1	2878	24.2
1973	12263	7588	61.9	2230	18.2	2445	19.9
1974	14389	9542	66.3	2610	18.1	2237	15.6
1975	14163	8325	58.8	2916	20.6	2922	20.6
1976	16569	10176	61.4	3078	18.6	3315	20.0
1977	15327	8325	57.7	3371	22.0	3118	20.3
1978	17871	10176	60.7	3713	20.8	3304	18.5
1979	18775	11704	62.3	4268	22.8	2803	14.9
1980[r]	22269	13249	59.5	4829	21.7	2656	11.9
1981[r]	20504	12802	62.4	5170	25.2	2893	14.1
1982[r]	21832	13117	60.1	6006	27.5	2854	13.1
1983[p]	21691	13695	62.7	5593	25.8	2657	12.2

[1]Estimated on the basis of average assumed extraction rates and crushing as indicated and therefore, represent potential rather than actual

[2]Includes unofficial estimates of refined and semi-refined palm oil which are not officially reported

[3]Estimated on the basis of commercial crop assuming average extraction rate of 64 percent

[r]Revised [p]Preliminary

Source: United Coconut Association of the Philippines.

12.2 percentage share. While these substitute commodities are generally cheaper than coconut oil, the lauric properties of Philippine coconut oil make it a better choice in several food applications.

Global production of coconut oil was almost constant at 2,672 thousand metric tons in 1972 and 2,686 thousand metric tons in 1983 (Table XI). The Philippines share in the coconut oil production almost doubled from 25 percent in 1972 to 49 percent in 1983. Indonesia, the second largest coconut oil producer increased its share by 20 percent from 467 thousand metric tons to 563 thousand metric tons. Other countries, on the other hand, either maintained their shares or completely suspended production of coconut oil, as was the case of the United States.

World Copra Production

World copra production increased by more than 34 percent from 1970 to 1982, with a peak of 5.05 million metric tons in 1976. In 1984, the volume of production declined by more than 22 percent from two years earlier (Table XII). This decline came from low production in the Asian coconut producing countries as a result of a drought in 1982. Philippines, the largest supplier of copra in the world market, had a peak production of 2.7 million metric tons in 1967. Production then declined in the 1980's. The other major producing countries; Indonesia, India, Sri Lanka, Malaysia, Thailand, Mexico and Papua New Guinea, either increased their production or maintained their position in copra production. Indonesia had its highest production of copra in 1982 of 1.20 million metric tons. Mexico, which produces more than 60 percent of the total American countries output, realized its peak production in 1971, registering 144

TABLE XI

COCONUT OIL: WORLD PRODUCTION BY MAJOR COUNTRIES, 1972-1983
(VOLUME IN THOUSAND METRIC TONS)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981[r]	1982[r]	1983[p]
France	36	31	30	36	47	38	38	37	35	12	--	--
Netherlands	37	64	67	93	93	41	43	36	38	--	--	--
United Kingdom	26	25	21	18	15	18	13	13	7	8	10	1
West Germany	261	184	45	254	338	223	132	42	35	50	100	35
Other EEC	--	--	10	26	54	36	35	33	19	10	17	10
Sweden	32	26	19	25	24	23	26	17	13	17	17	14
Other West Europe	102	81	28	36	45	34	32	25	27	26	30	16
West Europe, Total	494	411	220	488	616	413	319	203	174	123	174	76
U.S.A.	129	126	19	--	--	--	--	--	--	--	--	--
Indonesia	467	411	448	521	674	590	586	589	664	567	606	563
Japan	81	85	57	57	70	63	59	41	41	47	53	43
Philippines	661	602	630	783	1067	1000	1213	1092	1143	1375	1311	1305
Other Countries	840	705	680	770	727	659	711	689	673	696	726	699
TOTAL	2672	2340	2054	2619	3154	2725	2888	2614	2695	2808	2870	2686

[r]Revised
[p]Preliminary

Source: United Coconut Association of the Philippines

TABLE XII

COPRA: WORLD PRODUCTION BY MAJOR COUNTRIES, 1970-1984 (ANNUAL)
(1,000 METRIC TONS)

Country	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Philippines	1325	1625	2038	1739	1504	2020	2697	2400	2133	1910	2000	2090	1974	1935	1400
Indonesia	748	730	762	660	720	885	949	950	732	841	991	1048	1200	1070	800
India	362	350	355	355	350	314	320	320	367	370	378	376	385	350	385
Sri Lanka	208	231	295	95	109	203	151	160	132	166	126	123	170	138	100
Malaysia	203	194	183	163	157	183	166	151	189	224	231	208	206	208	212
Thailand	28	33	36	37	39	41	43	45	46	42	51	55	41	35	35
Other Asian Countries	34	36	34	36	36	37	35	36	51	52	53	71	74	77	78
Mozambique	60	62	54	63	63	63	83	85	65	65	68	68	68	67	65
Other African Countries	88	88	89	89	90	95	96	96	94	96	99	109	107	108	107
Mexico	144	152	150	145	147	145	135	135	161	130	120	150	147	143	120
Other American Countries	83	89	90	88	83	78	80	81	85	80	82	74	79	78	78
Papua New Guinea	129	142	136	140	140	135	132	132	146	160	140	150	148	134	140
Fiji	28	29	29	28	30	24	27	29	26	22	25	21	22	24	24
British Solomon Islands	25	26	21	16	20	25	24	24	28	34	30	34	32	28	35
Other Oceania Countries	102	108	91	87	98	120	116	121	138	147	158	137	125	118	124
TOTAL	3567	3895	4363	3741	3586	4368	5053	4065	4392	4340	4552	4713	4779	4512	3704

Source: FAO Production Yearbook, various issues.

thousand metric tons of copra. Papua New Guinea, the largest producer among Pacific countries or Oceania, accounted for 150 thousand metric tons in 1981.

In general, world copra output grow more rapidly in the latter part of the 1970's and early 1980's compared with the 1970-1975 and 1983-1984 periods. From the 1970 to 1982 period, production in most countries increased; however, during the 1983-84 production years, output declined, especially among the major producing countries. A decrease of more than 30 thousand metric tons of Philippine copra production was offset by an increase in Indonesia's output and other copra producing countries, thus world production was at its highest output in 1980.

Indonesia, considered as the second largest copra producer, showed a gain in output of about 60 percent in the 1970 to 1982 production period. This was in line with Librero's estimate of an annual growth rate of 7.5 percent. This improvement in production pattern was in contrast with a deterioration in output in the 1950's of three percent per year attributed to senility of trees, low producer prices, and other economic and political difficulties.

The third largest copra producing nation was India. The country's output grew at a modest average rate of about one percent during the last one and a half decades. Even with its higher ranking in copra production, exports were negligible because the commodity produced in the country was intended mainly for domestic consumption. In fact, its output was not even enough to satisfy local requirements since the country was a net importer (ECAFE, 1969). Approximately, one-fifth of the coconut oil produced in India was used for edible purposes. The rest was for soap making and other industrial uses (Librero, 1972).

Sri Lanka's coconut production is in smallholdings. ECAFE (1969) reported that "about 20,000 acres of these smallholdings constitute small gardens, each under one acre, and are generally located around dwelling houses. This smallness of the size of holdings generally renders difficult the application of fertilizers or of scientific cultivation methods. Such holdings are therefore maintained far below the required standard". Even in large holdings, according to studies conducted by the Coconut Rehabilitation Department of Sri Lanka, as much as 100,000 acres have never or rarely received artificial fertilizers. Among the smallholdings which comprise nearly three-fourths of the country's coconut lands, more than 500,000 acres have not used fertilizers at all. This lack of application of scientific cultivation methods and lack of adequate maintenance, particularly in the smallholdings, have contributed greatly to low levels of production in smallholdings. Even with the provision of assistance in replacing old plantations and distribution of fertilizers at subsidized prices, and the institution of the Coconut Rehabilitation scheme in the 1950's and 1960's, copra production from 1970 to 1984 declined by more than one percent.

In Malaysia, 85 percent of the total acreage under coconuts is made up of small holdings (farms of less than 100 acres). In the 1960's, its output declined, presumably due to aging palms, poor cultivation, and the attraction provided by the profitability of the other crops, particularly oil palms, pineapple, and bananas (Malaysia, 1968). The Replanting and Rehabilitation programs in Malaysia contributed to the recovery of the declining production in the 1970's and realized its highest output in 1980 of 231 thousand metric tons.

Mexico, the largest producer of copra in the American region, has continued with a modest increase in production after a dramatic increase in the 1960's. Although its production average was about 140 to 145 thousand metric tons, its output is used mainly for domestic consumption. Mozambique, which produced about 50 percent of the African region's output, has the bulk of its yearly production exported, and the major outlets are European countries. Papua New Guinea, which contributed on the average of 4 percent to world production, had its highest production level in 1979.

World Desiccated Coconut Production

Global production of desiccated coconut is increasing, but at a slow rate. Sri Lanka, which dominated the market and supplied half of the world consumption in the 1950's, reduced its market share to 24.3 percent in the late 1970's (Table XIII). During the last fifteen years, the Philippines produced an average of 60.4 percent of the total world supply and Sri Lanka produced 31.96 percent (NEDA, 1984). The other significant supplier of the product was Tonga, with contributions of usually less than one percent of world production. Other Asian countries, excluding the two largest exporters, increased their share of the desiccated coconut market. The most prominent was Indonesia.

World Production of Oilmeals

In 1984, the total world production of oilmeals was 99.3 million metric tons or an equivalent growth of about three percent in the last five years (Table XIV). As expected, soybean meal accounted for more than one-half of this total at 57.7 million metric tons. The second widely produced oilmeal was cottonseed meal, contributing 12.6 percent. This was followed by rapeseed meal with an 8.5 percent share, sunflower meal with 6.8 percent, fish meal with 5.6 percent and groundnut meal with 4.1 percent share of total production. The production of other oilseed meals (including copra meal) ranged between 705 thousand and 1,400 thousand metric tons.

TABLE XIII

DESICCATED COCONUT: WORLD PRODUCTION AND SHARE
OF MAJOR PRODUCING COUNTRIES, 1960-1977
(IN THOUSAND METRIC TONS)

Year	World Production (In Thousand MT)	Philippines	Sri Lanka	Tonga	New Guinea
1960	117.1	52.3	47.7	--	--
1961	109.3	55.0	44.9	--	--
1962	114.1	56.3	43.7	--	--
1963	119.9	58.7	41.0	0.3	--
1964	124.2	55.2	44.1	0.6	--
1965	127.6	57.9	41.4	0.7	--
1966	117.0	58.6	40.4	0.9	--
1967	110.8	55.2	42.5	2.3	--
1968	144.7	50.8	48.5	0.7	--
1969	107.4	48.4	48.2	1.0	2.4
1970	116.5	52.4	43.1	1.4	3.0
1971	134.9	56.3	40.3	0.7	2.7
1972	131.1	60.3	36.6	0.6	2.4
1973	123.0	64.2	31.7	1.1	3.0
1974	108.8	59.0	38.9	0.7	1.4
1975	118.2	56.1	43.2	0.7	--
1976	127.9	63.6	35.5	0.9	-
1977	130.2	75.7	24.3	--	--

Source: United Coconut Association of the Philippines and Tropical Products Institute, ODA

TABLE XIV

SELECTED OILMEALS: CALCULATED WORLD PRODUCTION ANNUAL, 1974-1984 (IN 1000 METRIC TONS)

Oilmeals	1984[p]	1983[r]	1982[r]	1981[r]	1980	1979	1978	1977	1976	1975	1974
Soybean Meal	57659	60185	59617	56919	58720	52602	52043	45022	45114	38302	39251
Cottonseed Meal	12531	10982	11580	10418	10328	9611	9846	9248	8616	9465	9702
Groundnut Meal	4101	3799	4141	3323	3674	3958	3628	3780	4331	3786	3503
Sunflower Meal	6790	7164	6349	5980	5915	5328	4975	4232	3912	4418	4807
Rapeseed Meal	8411	8050	7579	6704	5474	5316	4652	4260	4194	3935	3872
Sesame Meal	705	668	658	569	611	638	756	741	739	738	786
Copra Meal	1197	1541	1652	1633	1618	1477	1652	1609	1839	1529	1208
Palm Kernel Meal	1013	950	882	765	767	684	600	607	608	543	535
Linseed Meal[1]	1337	1344	1266	1400	1365	1420	1534	1339	1227	1194	1261
Fish Meal[2]	5579	5060	5211	4718	4643	4723	4582	4200	4717	4398	4331
Total	99323	99743	98935	92429	93115	85757	84268	75038	75297	68308	69256

[1]Excludes the meal equivalent of whole seeds consumed in mixed seeds
[2]Excluding whale meal where separable
[p]Preliminary
[r]Revised

Source of Basic Data: Oil World

Pattern and Structure of Trade In Coconut Products and By-Product

The relative shares of selected countries in the exports of coconut oil, copra, desiccated coconut and copra meal for the 15 year period 1970-1984 are presented in this section. The flow of trade of Philippine coconut products and by-product is also discussed.

World Coconut Oil Trade

World exports of coconut oil increased during the 1967 to 1983 period (Table XV). Also during the same period, an upward swing in trade was noted for Philippine products, from a share of 59 percent to 77 percent. Malaysia and Papua New Guinea increased their exports by 135 percent and 71 percent, respectively, while other predominant exporters like Mozambique, Sri Lanka, Fiji, French Oceania, and Indonesia experienced a decline in exports.

World Copra Trade

World copra exports declined during the past 15 years. The highest shipments were in 1972, in the amount 1,342 thousand metric tons and the lowest was in 1983 at 248 thousand metric tons (Table XVI) . The low level of trade was related to the poor production of copra in the 1980's when the coconut producing countries were recovering from the devastation of drought.

Philippine copra exports to the world markets advanced at a slow rate of 1.7 percent from 1965 to 1972 with sharp annual fluctuations (NEDA, 1984). From 1972 to 1983, copra shipped out from the country declined drastically at an average annual rate of 32.7 percent, from 968.4 thousand metric tons to 12 thousand metric tons. This decrease in shipments might be explained by the

TABLE XV

COCONUT OIL: TRADE OF EXPORTING COUNTRIES, 1967-83
(IN THOUSAND METRIC TONS)

Year	Philippines	Mozambique	Malaysia	Sri Lanka	Fiji	French Oceania	Papua New Guinea	Indonesia	Others	World
1967	233.4	8.9	28.0	67.8	14.4	--	24.6	3.0	9.2	389.3
1968	270.5	8.3	39.2	64.1	17.4	6.8	22.3	17.4	12.2	458.2
1969	213.8	8.2	25.6	56.1	17.3	11.2	22.1	4.2	12.0	370.5
1970	334.2	7.3	42.7	58.0	19.0	10.8	21.4	3.1	12.5	509.0
1971	405.2	6.8	39.0	69.3	16.9	8.1	27.8	0.8	14.2	588.1
1972	469.0	5.7	27.3	79.9	15.2	10.7	26.7	34.4	15.4	684.3
1973	428.5	9.6	32.1	18.4	18.3	11.4	28.7	16.5	11.5	575.0
1974	433.3	8.1	48.0	21.8	14.3	7.2	25.4	--	11.3	569.4
1975	591.6	7.2	39.8	54.5	16.1	11.3	28.2	26.7	7.1	782.5
1976	851.2	8.6	35.5	60.6	14.4	13.2	25.5	13.3	336.6	1358.9
1977	790.8	5.3	27.9	9.1	17.6	9.0	29.7	--	228.6	1118.0
1978	989.5	5.0	22.8	30.3	17.8	12.9	29.1	--	197.8	1305.2
1979	794.6	4.0	66.0	32.4	15.2	9.6	27.8	20.7	163.1	1133.4
1980	914.0	3.5	63.2	2.5	12.7	9.0	34.1	40.6	138.3	1217.9
1981[r]	1046.6	3.5	64.7	10.6	13.8	10.3	34.8	3.5	188.5	1367.5
1982[r]	948.8	4.2	59.4	38.9	14.9	11.0	37.6	--	188.2	1295.5
1983[p]	1019.7	2.5	65.8	30.7	11.5	11.0	41.9	--	141.0	1324.1

[r]Revised
[p]Preliminary
Source: United Coconut Association of the Philippines.

TABLE XVI

COPRA: TRADE OF EXPORTING COUNTRIES, 1967-1983
(IN THOUSAND METRIC TONS)

Year	Philippines	Mozambique	Malaysia	British Solomon Is.	Papua New Guinea	Vanuatu	Others	World
1967	765.7	42.9	12.0	24.8	74.0	42.4	255.1	1216.9
1968	657.0	46.8	18.9	17.5	95.1	34.3	377.4	1247.0
1969	556.6	46.8	19.0	23.8	85.5	37.0	313.3	1082.0
1970	428.6	41.1	15.7	21.4	87.5	31.2	286.5	912.0
1971	710.5	45.1	32.4	26.6	90.4	34.0	174.8	1113.8
1972	968.4	43.9	37.1	21.2	99.6	18.0	154.1	1342.3
1973	727.9	48.2	14.3	15.4	75.2	22.2	118.9	1022.1
1974	309.5	41.9	10.9	21.8	89.8	35.7	66.3	575.9
1975	832.6	30.5	30.6	27.5	91.7	27.0	109.4	1149.3
1976	867.0	41.1	39.7	23.0	85.7	34.2	98.3	1189.0
1977	559.9	36.5	38.0	26.9	87.7	43.9	82.5	875.4
1978	379.8	17.0	40.2	26.1	92.2	44.9	102.3	702.5
1979	144.9	19.0	31.8	34.4	90.9	39.8	78.3	439.1
1980	123.3	11.5	46.6	31.7	90.8	26.7	130.7	461.3
1981[r]	106.4	6.5	36.9	31.8	99.4	47.1	86.7	444.8
1982[r]	191.8	15.0	34.5	33.9	74.4	35.1	86.1	470.8
1983[p]	12.3	9.0	22.0	32.0	73.0	29.0	70.4	247.7

[r]Revised
[p]Preliminary
Source: United Coconut Association of the Philippines

government's conscious policy designed to phase out raw material exports in favor of processed products and supported by measures that included export and premium duties on copra, preferential treatment on processed and semiprocessed coconut products, and the suspension of copra exports.

Among the copra exporting countries, only Malaysia and the British Solomon Islands increased their exports (by 3.9 and 16 percent, respectively), during the 1967 to 1983 period. The other countries had already cut their supply to the international market. Mozambique's share in the world copra market declined by as much as 79 percent during the same period. Papua New Guinea in the Oceania increased or maintained its market share of copra, whereas Vanuatu experienced a 32 percent decline in its export to the world market.

World Desiccated Coconut Trade

The growth in imports of desiccated coconut just kept pace with its production. The average annual demand in the 1975 to 1979 period was 129.1 thousand metric tons, a one percent growth over the 1960 to 1984 annual average of 106.8 thousand metric tons (NEDA, 1984). A shift in the market was also noticeable in the 1960's, with the United States consuming half of the world's supply of desiccated coconut. The U.S. relinquished its position as a top consumer to the European countries in the 1970's (FAO, 1984). Meanwhile, it is interesting to note that consumption in Asia is grew rapidly, accounting for 9.9 percent of the total world imports of desiccated coconut in the 1970's, up from a low of 1.8 percent share in the first half of the 1960's. The consumption of the African countries similarly advanced but at a slower rate, while consumption in Oceania was almost stable at about 6.0 percent of the global consumption.

The two largest exporters of desiccated coconut were the Philippines and Sri Lanka with average shares of 60.4 and 32.0 percent, respectively, during the 1970-1984 period (Table XVII). Other exporters included Tonga, Oceania, and other Asian countries.

World Copra Meal Trade

The two largest suppliers of copra meal in the world market are the Philippines, which contributed on the average more than one-half (56.0 percent) and Indonesia, which accounted for about one-third (32.0 percent) during the 1970-1984 period (Table XVIII). Up to the early 1960's, Indonesia supplied about one-half of the world copra meal requirements; however, the decline in its copra production in the 1970's forced a deterioration in copra meal exports. In the latter part of 1970's and early 1980's, copra production and copra meal exports in this country improved.

Papua New Guinea held about one percent of the copra meal world market during the last five years, and Mozambique contributed less than one percent, and both countries shipped their product to the West European countries. Sri Lanka, the fifth largest copra producer, discontinued its exports of oilcake ("poonac") with a view of providing the entire quantity produced locally to feed the milk cattle of the country in the 1970's. During the 1980's, their exports of copra meal again resumed, but in negligible quantities.

Almost all the copra meal produced from crushing of copra in the Philippines during the last two decades has been exported. During the last five years, about 15 percent has been consumed locally. The copra meal exports of

TABLE XVII

DESICCATED COCONUT: WORLD EXPORT AND SHARE OF MAJOR EXPORTING COUNTRIES (1970-1984) (METRIC TONS)

Year	Philippines		Sri Lanka		Tonga		Oceania		Other Asian Countries		Other Countries		World Total	
	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent	Quantity	Percent
1970	60241	52.83	49118	43.08	1000	0.88	186	0.16	334	0.29	3148	2.76	114027	100.00
1971	75586	56.25	52986	39.43	101	0.76	167	0.12	365	0.27	4246	3.16	134365	100.00
1972	80410	58.37	49430	35.88	874	0.63	3465	2.52	346	0.25	3227	2.34	137752	100.00
1973	78049	62.92	37694	30.39	970	0.78	3730	3.01	358	0.29	3245	2.62	124046	100.00
1974	63909	57.26	42562	38.13	821	0.74	1628	1.46	602	0.54	2096	1.88	111618	100.00
1975	66245	50.2	59306	44.95	820	0.62	2352	1.78	1621	1.23	1597	1.21	131941	100.00
1976	81003	60.54	45988	34.37	82	0.61	2169	1.62	1353	1.01	2466	1.84	133799	100.00
1977	97952	71.48	30400	22.18	106	0.77	141	0.10	2387	1.74	5101	3.72	137043	100.00
1978	9083	66.43	40108	29.56	849	0.63	150	0.11	1102	0.81	2645	1.95	135685	100.00
1979	85814	63.75	41766	31.03	1083	0.80	458	0.34	2303	1.71	3193	2.37	134617	100.00
1980	87164	67.50	31423	24.33	680	0.53	724	0.56	4520	3.50	4630	3.59	129141	100.00
1981	86337	62.64	36899	26.77	1091	0.79	374	0.27	7169	5.20	5963	4.33	137833	100.00
1982	90251	61.01	41658	28.16	334	0.23	127	0.09	6694	4.53	8858	5.99	147922	100.00
1983	89362	59.43	41954	27.90	453	0.30	157	0.10	8805	5.86	9630	6.40	150361	100.00
1984	76618	55.94	31806	23.22	759	0.55	222	0.16	14616	10.67	12942	9.45	136963	100.00

Source: FAO Trade Yearbook, various issues

TABLE XVIII

COPRA MEAL: TRADE OF EXPORTING COUNTRIES ANNUAL 1970-1984 (IN THOUSAND METRIC TONS)

Year	Philippines	Indonesia	Papua New Guinea	Mozambique	Other Countries	Total
1970	243.88	207.90	11.18	5.22	101.52	569.70
1971	287.94	245.05	16.00	3.46	105.82	658.27
1972	322.13	284.66	15.04	3.85	111.81	737.49
1973	263.21	237.40	17.30	5.53	80.88	604.32
1974	270.69	276.02	15.00	6.00	63.32	631.03
1975	302.96	296.16	15.22	3.09	68.69	686.12
1976	497.64	392.80	16.00	12.44	92.26	1011.14
1977	420.00	335.73	14.95	1.40	71.44	843.52
1978	534.67	334.68	16.20	6.00	100.25	991.80
1979	548.30	316.98	16.70	5.00	123.15	1010.13
1980	545.19	394.30	17.12	4.50	95.38	1056.49
1981	620.36	321.84	11.68	3.40	63.15	1020.43
1982	588.57	350.26	11.32	2.10	99.42	1051.67
1983	616.10	304.87	17.78	1.00	78.10	1018.05
1984	364.41	200.00	16.00	--	79.05	659.46

Source: FAO Trade Yearbook, various issues the country followed an similar pattern to that for coconut oil. The amount traded increased dramatically in the latter part of the 1970's; however, a 19 percent decrease in exports took place in 1984 compared with the previous year. With the discontinuance of U.S. imports of Philippine copra meal, almost all of its exports went to the West European countries. Other larger livestock producing countries like Japan and other developed countries absorbed less than one percent of the country's copra meal export.

Philippine Coconut Oil Trade

Philippine coconut oil is exported in a significant volume to only two countries, the United States and Western Europe. The average shares are 58.50 and 26.16 percent, respectively, from 1967 to 1984 (Table XIX).

The unavailability of a complete data set on Philippine coconut oil exports by country of destination in 1984 other than the U.S. and Europe prompted the author to cite the volume of trade to other countries as reported by the United Coconut Association of the Philippines (UCAP), Annual Coconut Statistics. The United States accounted for 49.1 percent of total coconut oil exports from the Philippines, with a total volume of 228,069 metric tons. This was far below the previous year's tonnage of 426,612 metric tons and the lowest in 11 years. The value, however, rose by 19.4 percent which amounted to $269.69 million, the highest in five years. The drop in Western Europe's coconut oil imports from the Philippines of 55.1 percent was more dramatic, from 422,339 metric tons in 1983 to only 189,537 metric tons in the current year, the lowest volume in seven years. This was valued at $187.14 million. The Soviet Union absorbed 35,500 metric tons, a decrease of 47.3 percent from last year; the People's Republic of China bought 20,466 metric tons, an increase of 10 percent; Japan took in

TABLE XIX

PHILIPPINE COCONUT OIL: EXPORTS
BY DESTINATION, 1968 - 1983
(IN THOUSAND METRICTONS)

Year	U.S.A.	Europe	Others	Total
1968	235569	34957	--	270528
1969	189422	22847	1524	213793
1970	286724	45382	2149	334255
1971	292198	107970	5020	405188
1972	348373	94406	26266	469045
1973	268321	88034	72243	428598
1974	326052	70768	36482	433302
1975	460149	54809	76642	591600
1976	546207	140655	64410	851272
1977	479652	166164	145066	790882
1978	500478	221344	267694	989516
1979	371152	232583	190895	794630
1980	368409	365124	180475	914008
1981	367528	461210	217885	1046623
1982	400462	369957	178522	948942
1983	426611	422339	170726	1019676

Source: United Coconut Association of the Philippines

18,858 metric tons, a negative import of 55.7 percent; and other countries purchased 33,704 metric tons, a decrease of 20.0 percent from the previous year.

Philippine Copra Trade

The proportion of Philippine copra exports going to the United States' market declined in the early 1970's with imports discontinued just before the termination of the Laurel-Langley Agreement in 1975. The European market had always been the major buyer of copra, taking 47 percent and 83 percent of the volume of the country's total copra exports in 1968 and 1982, respectively (Table XX). In absolute terms, however, Europe's imports declined at a rate of 4.5 percent during the period. In 1983, its share was markedly reduced. Japanese imports of Philippine copra decreased from 112.0 thousand metric tons in 1967 to 64.7 thousand metric tons in 1983. The U.S.S.R. increased its volume of imports of the product from 3.0 thousand metric tons to 11.0 thousand metric tons during the same period. Regular outlets in South America are Venezuela and Colombia whose shares of imports have ranged from less than one percent to one and a half percent.

Philippine Desiccated Coconut Trade

For many years, Philippine desiccated coconut exports went primarily to the U.S. market. In 1970, the share was over three-fourths. During the past decade, however, desiccated coconut maintained a highly diversified market; far more diversified than the other traditional Philippine coconut products. According to the National Census and Statistics Office, desiccated coconut was shipped to over 50 countries in the last 10 years. However, the United States

TABLE XX

PHILIPPINE COPRA: EXPORTS BY DESTINATION, 1967-83
(IN THOUSAND METRIC TONS)

Year	West Europe	U.S.S.R.	U.S.A.	Japan	Others	Total
1967	710.6	3.0	276.2	112.1	164.1	1266.0
1968	602.6	5.2	291.8	126.1	245.3	1271.0
1969	611.9	4.0	272.2	108.8	151.1	1148.0
1970	449.9	1.0	187.6	126.9	148.6	914.0
1971	621.7	3.0	190.3	122.4	136.6	1074.0
1972	821.9	35.3	209.0	124.4	123.4	1314.0
1973	630.1	27.8	198.6	134.2	83.4	1074.1
1974	352.0	29.0	26.6	86.4	63.1	557.1
1975	815.7	29.0	--	89.9	107.2	1041.8
1976	961.2	9.8	--	110.9	138.4	1220.8
1977	669.5	19.9	--	97.8	138.9	926.1
1978	513.8	9.8	--	90.4	185.1	799.1
1979	299.3	10.3	0.4	55.7	94.5	460.2
1980	253.2	15.3	--	64.7	136.4	469.6
1981[r]	183.3	5.2	--	74.3	134.5	397.3
1982[r]	288.2	10.1	0.1	82.4	116.4	497.2
1983[p]	110.9	11.0	--	64.7	69.0	255.6

Source: United Coconut Association of the Philippines
[r]Revised
[p]Preliminary

and Western Europe still maintain their positions as the prime markets for desiccated coconut from the Philippines. From 1970 to 1984, these two countries imported an average of 56.48 and 26.08 percent, respectively, of Philippine exports (Table XXI). Europe had a record import volume of 30,415 metric tons in 1980. Most impressive, though, is the performance of other countries which took 20 percent of the country's desiccated coconut exports in 1980 to 1982, a remarkable improvement from the eight percent share these countries imported in the 1960's. UCAP (1985) cited the Philippine Coconut Authority (PCA) reports which indicated that the exports to the United States in 1984 were 33,969 metric tons ($47.15 million) and to the EEC and other Western European countries 19,408 metric tons ($27.07 million). The shares of these countries were 49.60 percent and 28.33 percent, respectively, of total volume to all markets. Countries of Asia and the Pacific took 9,266 metric tons or 13.53 percent, Canada 3,791 metric tons (5.54 percent), the Middle East 2,022 metric tons (2.95 percent), and Latin and Central America 28 metric tons (.05 percent). The Philippines' desiccated coconut industry over the years has established a more stable market compared to other coconut products.

Section Summary

The combined world production of vegetable oils and animal/marine fats in 1984 came to 62.78 million metric tons. Products of vegetable origin (soybean, cottonseed, groundnut, sunflower, rapeseed, sesame, olive, coconut, palm, palm kernel, linseed, castor and tung oils) accounted for over two-thirds (69.2 percent). Less than one-third consisted of fats from land and sea animals (including fish oil, lard, tallows and greases).

TABLE XXI

PHILIPPINE DESICCATED COCONUT: EXPORT BY DESTINATION, ANNUAL 1970-1984 (IN THOUSAND METRIC TONS)

	U.S.A.		Europe		Others		
Year	Quantity	Percent	Quantity	Percent	Quantity	Percent	Total
1970	48590	79.62	5501	9.01	6938	11.37	61028
1971	54456	71.73	12396	16.32	9071	11.95	75923
1972	49401	62.52	19918	25.21	9694	12.27	79013
1973	47662	60.35	18985	24.04	12333	15.62	78980
1974	38473	60.00	14018	21.86	11632	18.14	64123
1975	42441	64.03	8289	12.51	15550	23.46	66280
1976	46497	57.15	16700	20.53	18158	22.32	81354
1977	44333	44.98	35279	35.79	18951	19.23	98563
1978	44381	48.50	27193	29.72	19925	21.78	91499
1979	43486	52.14	22350	26.80	17561	21.06	83397
1980	41046	46.72	30415	34.62	16399	18.66	87860
1981	39459	44.98	29460	33.58	18806	21.44	87725
1982	47415*	53.17	25392	28.47	16375	18.36	89182
1983	43924*	51.70	25014	29.44	16026	18.86	84964
1984	33969	49.60	19408	28.34	15108	22.06	68485

* U.S.A. and Canada

Source: United Coconut Association of the Philippines.

Soybean oil was the major oil produced, which amounted to 13.42 million metric tons and accounted for over one-fifth (21.4 percent) of world volume of oils and fats. Coconut oil output for crop year 1984 was only 2.09 million metric tons. As the volume of production of coconut oil fell, palm kernel oil, its lauric mate, continued to gain with a growth rate of 7.84 percent or at 824 thousand metric tons. Palm kernel oil shared 10 percent of the total world's oils and fats production, which stands at 6.27 million metric tons.

Rapeseed output in 1984 was 5.34 million metric tons. Sunflower oil production was 5.79 million metric tons. Cottonseed's output volume was 3.39 million metric tons while groundnut volume was 2.89 million metric tons. The other vegetable oils which aggregated 3.42 million metric tons were olive oil, linseed oil, sesame oil, castor oil and tung oil.

The Philippines supplied 42.4 percent of the world coconut oil production in 1984. Indonesia was second with 20.1 percent. Other coconut oil producers were Sri Lanka, French Oceania, Fiji, Papua New Guinea, Malaysia, and Mozambique which accounted for 654 thousand metric tons.

Malaysia was the largest producer of palm kernel oil and accounted for more than one-half of global production. This was followed by Nigeria which had 8.6 percent of production. Palm oil production was largest in Malaysia which produced 54.3 percent of the world output. Indonesia followed with 17.3 percent.

The United States was the number one producer of soybean oil with 37.2 percent of the total world production. Western Europe and Brazil had shares of 17.7 and 17.3 percent, respectively. The People's Republic of China led the world in cottonseed production with a share of 30 percent, while the U.S.S.R. followed with a share of 18.9 percent. India was the world's largest producer of groundnut oils with a 49.6 percent share, followed by P.R.O.C. with a share of

20.7 percent. Mainland China and Western Europe produced rapeseed with world market shares of 28.3 and 25.0 percent, respectively. The U.S.S.R. was the world's largest producer of sunflower oil followed by Western Europe which accounted for 29.5 and 17.6 percent of the world market, respectively. Sesame oil was produced mainly in India and the P.R.O.C., accounting for shares of 37.7 percent and 15.5 percent, while olive oil came largely from Western Europe which contributed 78.5 percent of the 1984 annual production.

In 1984, the export shipment of edible vegetable oils, industrial oils, and animal marine fats amounted to 26.944 million metric tons. The edible vegetable oil share was more than three-fourths (78.3 percent). Soybean oil was the major traded oil with exports reaching 8.64 million metric tons, palm oil was a distant second at 4.69 million metric tons. The third largest exported oil was sunflowerseed which shared 8.9 percent of the total world trade. Rapeseed and oil shipments totalled 2.06 million metric tons. Coconut oil, inclusive of copra converted to oil, was the fifth largest with 1.16 million metric tons. Groundnut oil exports were 676.80 thousand metric tons. Other vegetable oils widely exported were palm kernel at 440.8 thousand metric tons; cottonseed oil at 386.8 thousand metric tons; olive oil at 345.22 thousand metric tons; and sesameseed oil at 134.7 thousand metric tons.

Philippines dominated the coconut oil trade, with total shipments in 1984 of 586.1 thousand metric tons, equivalent to 50.4 percent of the total world trade. The United States was the top exporter of soybean oil accounting for more than one-half (52.5 percent). The United States also traded the largest volume of groundnuts and oil, 266.9 thousand metric tons. The other top traders of vegetables are the United States for sunflowerseed and oil which totalled 2.83 million metric tons; Malaysia for palm oil and palm kernel oil which amounted to

397.4 thousand metric tons; and Argentina for linseed oils which amounted to 208.3 thousand metric tons.

Philippine coconut oil was exported mainly to two major markets, the United States and Western Europe with average shares of 58.20 and 26.16 percent, respectively for the period 1967 through 1984. In 1984, as cited by the United Coconut Association of the Philippines (UCAP), 49.1 percent of the total Philippine coconut oil exports went to the United States (equivalent to 228,069 metric tons). Other countries that received Philippine coconut oil were Western Europe with 189,537 metric tons, Soviet Union with 35,500 metric tons, People's Republic of China with 20,466 metric tons, Japan with 18,854 metric tons and other countries totalling 33,704 metric tons.

The European market had always been the major buyer of Philippine copra, taking 83 percent of the country's total copra exports in 1982. However, in 1983, its share was markedly reduced. Regular outlets in South America were Venezuela and Colombia whose shares have ranged from less than one percent to one and a half percent during the last two decades. Other outlets were the U.S.S.R., Japan and other Asian countries.

The country's primary outlet for desiccated coconut in the 1960's and the 1970's was the United States. However, during the past decade, desiccated coconut maintained a highly diversified market. The United States and Western Europe still maintained their positions as the prime markets for desiccated coconut from the Philippines, absorbing an average of 56.48 and 26.08 percent of the product from 1970 to 1984. Philippine Coconut Authority (PCA) reports indicated that the exports to the U.S. for Philippine desiccated coconut in 1984 were 33,969 metric tons, followed by Western European countries at 19,408 metric tons. Countries of Asia and the Pacific bought 9,266 metric tons, Canada

3,791 metric tons, Middle East 2,022 metric tons, and Latin and Central America 28 metric tons.

The two largest suppliers of copra meal in the world market are the Philippines which contributed on the average more than one-half (50.09 percent) and Indonesia which accounted for about one-third (32 percent) during the 1970-1984 period. Papua New Guinea held about one percent of the copra meal world market, and Mozambique less than one percent. Both countries shipped their produce to the Western European market. Almost all of the Philippine copra meal exports went to the Western European market. Japan and other developed countries absorbed less than one percent of the country's copra meal exports.

A Review of Domestic and International Policies Affecting Coconut Trade

Introduction

International trade and the marketing of coconut products are influenced not only by the Philippine domestic policies but also by its trading partners, particularly by the United States and the European countries. These policies may directly or indirectly affect the country's coconut products and by-product foreign trade. Policies for vegetable oilseeds and oils in the international market are pursued not only to encourage production of exports but also to restrict imports, thus, protect the domestic production of competitive commodities. Trade policies affecting product forms have important implications upon the exports of producing countries.

United States Policy

The majority of the coconut products entering the United States come from the Philippines. Philippine coconut products are treated or levied differently from those of other countries because of the trade agreement signed between the two countries.

Before World War II, free trade generally existed between the Philippines and the United States except for some products like sugar, cordage and coconut oil which were then subject to quantitative restrictions. For coconut oil, the quota was 200,000 long tons, and imports in excess of the quota were to pay the full tariff of two cents per pound, the rate levied under the U.S. Internal Revenue Act of 1934. The same act also imposed a five cent per pound tax on the processing of all types of crude oils of foreign origin, principally to protect domestically produced fats and oils (Librero, 1971).

The Bell Trade Act (PL 371-39th Congress) which governed the trade relationships from 1946 to 1955 between the Philippines and the United States was signed following the proclamation of Philippine independence in 1946. The bill provided for reciprocal free trade in many industrial and agricultural commodities between the two countries. The quota restrictions of 200,000 long tons for coconut oil as specified under the U. S. Internal Revenue Act of 1934 remained in effect. In 1948 the duty on coconut oil imports was reduced to one cent per pound, as specified in the General Agreement on Tariffs and Trade.

In 1954, Public Law 474 extended the duty free status of Philippine export products to January 1, 1956. A new accord, otherwise known as the Laurel-Langley Agreement was signed in 1955 which became effective January 1, 1956. The law modified the provisions of the original agreement, thus abolishing the absolute quota restrictions in coconut oil. Instead the product was subjected to a progressively declining duty-free quota which was equal to the absolute quota established in the 1946 agreement. Imports in excess of the quota were still dutiable at preferential rates of one cent per pound if entered on or before December 31, 1973.

The tax of three cents per pound upon the first processing of oil continued to be imposed but was suspended from October 1, 1957 to June 30,1960 (U.S. P.L. 85-235). The suspension was twice extended on a three-year basis; first from June 30, 1960 until June 30, 1963 (U.S. P.L. 86-432) and second, from June 30, 1963 to June 30, 1966 (U.S. P.L. 89-388). Finally, the tax was abolished on April 13, 1966 by P.L. 87-859. The suspension and eventual elimination of the processing tax came about because of the shift in the major use of coconut oil in the United States from food to industrial uses and the subsequent decline in competition between coconut oil and domestic vegetable oils.

All preferential tariff treatments for Philippine coconut oil terminated on January 1, 1974 after which all imports of coconut oil were subjected to full duty. Moreover, coconut oil could be imported from any source on a nondiscriminatory basis upon payment of the one cent per pound duty.

While copra had duty-free access in the American market, the three cents per pound processing tax imposed under the U.S. Internal Revenue Act of 1934 was associated with a corresponding 1.87 cents per pound duty on copra. Likewise, the additional duty of 2.0 cents per pound as prescribed in the U.S. Tariff Act of 1922, associated with a 1.25 cent per pound tax, resulted in a total tax of 3.12 cents per pound of copra. However, Philippine copra was subjected to only 1.87 cents per pound effective duty since the Philippine coconut oil was exempted from the additional two cents per pound tax. With the termination of the Laurel-Langley Agreement, copra was subjected to an effective duty of 1.25 cents per pound. However, this duty has not been operative since 1975.

Bilateral trade agreements specify that copra meal/cake could enter the U.S. market duty-free until 1974 after which it was subjected to a duty of 30 cents per pound. The United States does not really need to import copra meal/cake since it already has surplus of meal from its oilseed production, especially soybeans.

The U.S. imposed a duty of 2.0 cents per pound for desiccated coconut until 1922 with Ceylon as the sole supplier. However, with the passage of the Fardney-McCumber Tariff Act of 1922, the tariff for Ceylon products increased to 3.5 cents per pound which indirectly accorded protection to Philippines desiccated coconut which was subjected to only 2.0 cents per pound. With the higher tax on desiccated coconut from Ceylon, which was the sole supplier, exports of desiccated coconut from the Philippines expanded, and subsequently supplied practically all import requirements of the United States.

The European Economic Community Policy

Since West Germany and the Netherlands are members of the European Economic Community, the policies discussed in this section of the study were those set by the Community. The EEC formed the second largest fats and oils consuming area of the world. They consumed more than nine million tons of fats and oils in 1979-1980 for both edible and inedible purposes (Table XXII). Vegetable oils (other than olive oil) made up a growing proportion of total consumption of fats and oils and accounted for over 45 percent of total food and nonfood uses in 1979 and 1980. These two countries had been large importers and took about 40 percent of world fats and oils trade, while during the same

TABLE XXII

SUMMARY OF RECENT DEVELOPMENTS IN THE OILS, FATS AND OILMEALS SECTOR OF THE EEC (IN THOUSAND METRIC TONS)

	Calendar Years			
	1973-75 average	1976-78 average	1979	1980
Total Fats and Oils				
Production	4457	4693	4926	5464
Net Imports	4200	4138	4598	4104
Domestic Consumption	8652	8776	9530	9414
Butter (fat content)				
Production	1423	1546	1663	1646
Net Exports	15	69	323	399
Domestic Consumption	1438	1404	1400	1366
Other Animal Fats and Oils				
Production	1905	2061	2116	2170
Net Imports	815	688	936	676
Domestic Consumption	2746	2735	3070	2826

	July/June Years			
	1973/74-1974/75 average	1975/76-1977/78 average	1978/79	1979/80
Olive Oil				
Production	532	590	454	520
Net Imports	156	96	112	129
Domestic Consumption	680	656	646	648
Other Vegetable Oils and Fats				
Production	517	537	676	643
Net Imports	3287	3638	3744	4072
Domestic Consumption	3839	4193	4319	4536
Oilmeals				
Production	987	956	1165	1066
Net Imports	13210	16640	20315	22716
Domestic Consumption	14196	17578	21505	23662

Notes: Production refers to that from domestic raw materials only. Net imports calculated on the basis of gross trade, excluding intra-EEC trade; include, where applicable, production from imported raw materials; for total fats and oils, includes trade of prepared fats. Domestic consumption includes allowance for stock changes: covers both food and non-food use.

Sources: Statistical Office of the European Communities: bulletins on "Crop Production," "Animal Production" and "Supply Balance Sheets," various issues.

period, the net imports amounted to more than 4 million tons. The major suppliers for the EEC are the producing countries of Africa, the Caribbean and the Pacific Islands (ACP).

Before the common agricultural policies on fats and oils were established, the member countries imposed the tariff rates in the 1960-1970's as presented in Table XXIII. All of the six original member countries allowed free entry of copra except France which levied a three percent ad valorem tariff. Duties on coconut oil varied according to the purpose for which it was to be used; that is, industrial or edible, and according to whether it was in crude or refined form. West Germany and Italy further classified oils into whether they were fit or unfit for human consumption; otherwise, the tariff was 2 percent ad valorem. For oils coming from Greece and other non-EEC countries, there was a difference of as much as five percent in the tariff rates.

The common external tariff levied on crude oil for industrial purposes was five percent ad valorem, the same as the rate imposed by Benelux and was lower than those imposed by France, Italy and West Germany. Refined oil was subject to 8 percent, 3 percent higher than the old tariff rate by Benelux but lower than that of the other member countries. In general, the common external tariff for coconut oil used in industries was lower than the average of the tariffs of the six countries.

In the case of edible oils, the common external tariff was higher than the average for the other six countries. It was 20 percent for both crude and refined solid oils. For fluid oils the rate was 10 and 15 percent higher for crude and refined oils, respectively.

In the 1980's, imports of oilseeds, vegetable oils (excluding olive oils) and oilmeals were not subject to any quantitative restrictions. Imports of oilseeds and oilmeals were duty-free whereas vegetable oils were subject to tariffs

TABLE XXIII

TARIFFS ON COPRA AND COCONUT OIL BY THE EUROPEAN ECONOMIC COMMUNITY AND ITS MEMBER COUNTRIES

	Common	Benelux			France		Germany			Italy	
Product	External Tariff	Common Market[a]	Greece	Others	Common Market[a]	Others	Common Market[a]	Greece	Others	Common Market[a]	Others
					- per cent ad valorem -						
Copra	Free	Free	Free	Free	3.0	3.0	Free	Free	Free	Free	Free
Coconut Oil											
For technical or industrial purposes other than for the manufacture of foodstuffs											
Crude	5	2	5.0	5.0	6.0	9.0	Free-2.0[b]	1.5-6.5[b]	3-8[b]	4	7.0
Refined	8	2	5.0	5.0	6.3	12.0	3.5	8.0-11.5	8-13	4	8.4
Others											
Solids in immediate containers of a net capacity of 1 kgm. or less											
Crude	20	2	9.5	14.0	6.3	20.0	8.7	2.0	2.0	4	16.0
Refined	20	4	13.0	16.0	6.3	20.0	8.7	2.0	2.0	8	20.0
Solids, otherwise imported; or fluid											
Crude	10	2	6.5	8.0	6.0	12.0	2.0	6.5	8.0	4	10.0
Refined	15	4	11.5	13.0	6.3	16.2	3.5	11.5	13.0	4-8[b]	13-16.6[b]

[a]Including the Associated Overseas Territories

[b]A lower tariff applies for oils which are unfit for human consumption

Source: Commonwealth Economic Committee (London), Vegetable Oils and Oilseeds, a Review, No. 18 (1968), as cited by Librero, 1972.

(Table XXIV). The schedule of tariffs is bound under the General Agreement for Tariffs and Trade (GATT). The rates imposed tend to be higher for food than for industrial uses and increase with the degree of processing. The tariffs on crude and refined fats and oils range from 4 to 15 percent. However, there were higher rates for hydrogenated or hardened fats and oils (17 percent), for products in containers of 1 kilogram or less (20 percent) and for margarine and other prepared fats (25 percent).

The effective rate of protection for the crushing and processing industry appeared higher than was suggested by the nominal rates if account is taken of the value added in processing. However, it was also important to note that a considerable proportion of the EEC imports of vegetable oils were imported under the various preferential arrangements.

Regarding non-tariff measures (NTM's), EEC regulations provide for oilseed growers and oil processors to be protected from unfair competition by means of a compensatory levy. This may be imposed if imports from third countries are in such quantities and under such conditions that might seriously prejudice or threaten to prejudice the interest of the community. Other NTM's operating in the community's vegetable oils and oilmeals sector include the varying taxes applied to certain oils and fats by some member states. In France, there is a tax (of an ad valorem type) which was imposed on vegetable oils but not on butter. For oilmeals, different standards for maximum permitted levels of toxic substances in compound feeds (example aflatoxin) are applied by member states, although the EEC's directives are an attempt to harmonize the legislation in this area. Third country exporters to the community are also faced by a number of technical NTM's such as divergent national packaging and labelling regulations for processed vegetable oils and margarine.

TABLE XXIV

EEC-9 SUMMARY OF IMPORT DUTIES APPLICABLE IN 1982 UNDER CCT, GSP AND ACP[1]

	Conventional Rate of Duty Under GATT	GSP	ACP
	-------- % rates, ad valorem --------		
Vegetable oilseeds	0	0	0
Vegetable oils			
Crude, industrial	4-5	2.5	0
Refined, industrial	8	6.5	0
Crude, edible	6-10	4	0
Refined, edible	15[2]	12	0
Animal fats and oils	---------- subject to levy ----------		
Industrial	0	0	0
Edible	6-8	3-5	0
Butter	---------- subject to levy --------		
Lard	---------- subject to levy --------		
Fish oil	0	0	0
Animal or vegetable fats and oils (hydrogenated or hardened)	17[2]	11-16	0
Margarine	25	25	0
Other processed fats and oils products (fatty acids, fatty alcohols, glycerols, waxes, degras)	0.8	0.6	0
Oilmeals			
Vegetable oilmeals	0	0	0
Fishmeals	2	0	0

[1] CCT = the common customs tariff, GSP = the generalized system of preferences scheme and ACP = the scheme for African, Caribbean and Pacific countries.

[2] For these categories, the rate is higher at 20 percent for containers of 1kg or less: the relevant GSP rates are 18 percent for refined, edible oils and 16 percent for hydrogenated or hardened fats and oils.

Notes: For a full breakdown see: GATT rates, Official Journal of the European Communities, L 335, Regulation No. 3300/81, 23.11.81; GSP rates, Official Journal of the European Communities, L 365 Regulation No. 36003/81, 21.12.81.

The GSP rates shown are averages of the different rates on individual oils and do not take account of the fact that some oils (such as crude or refined groundnut oil) are not granted any reduction.

The EEC's Generalized System of Preferences (GSP) scheme, organized with the principles and objectives of UNCTAD's 1968 resolution, was established on July 1, 1971 and is revised annually. The GSP tariff concessions on oils and fats as summarized in Table XXIV have, over the years, been extended to cover more products and the depth of the concessions have been increased. For vegetable oilmeals, the import was duty-free. For vegetable oils, it ranged from 2.5 percent ad valorem to 12 percent. Again, edible oil had higher import duties than those for industrial use. Hydrogenated or hardened vegetable fats and oils were charged with 11 to 16 percent ad valorem tax. Not all tariff items had given concessions although, in contrast to other products covered by the GSP, no quotas or ceilings were imposed. Palm, palm kernel and coconut oils were the main products concerned; groundnut oils receive no GSP concessions, although the main developing countries supplying the EEC are ACP countries which obtain free entry under the Lomé convention.

Philippine Government Policies Affecting the Coconut Industry

Policies Prior to the 1970's

Postwar government attempts to influence or regulate the industry started in 1954 with the promulgation of Republic Act (RA) 1145 creating the Philippine Coconut Administration (PHILCOA). The agency was mandated to supervise the development of the coconut industry, promote effective merchandising of its products, improve tenancy relations between coconut farm owners and tenants and the living conditions of coconut workers, and encourage appropriate technology that would hasten the development of the industry. To carry out

PHILCOA's functions and responsibilities, a levy of 10 centavos per 100 kilograms (kgms) was imposed on desiccated coconut, coconut oil, and copra. This was paid for by desiccated coconut factories, oil millers, and exporters, dealers or producers, respectively. The collection proceeds went to the Coconut Development Fund.

To remedy the problems in the marketing of coconut products, specifically the low quality of copra and exploitation of farmers by middlemen, R. A. 1365 was passed on June 5, 1954. This legislation mandated the sale of copra on a "resicada" rather than on the usual "corriente basis."

The same act required the use of moisture meters for domestic purchases of copra on a resicada basis, thereby putting a premium on copra with low moisture content so as to provide incentives for the production of higher grade copra. PHILCOA supervises the use of moisture testers. To cover expenditures for such activities, a fee of five centavos per 100 kilogram of copra was levied on every first domestic purchase of such products.

R.A. 1369 was passed on June 18, 1955 promoting the industrialization of the coconut industry by appropriating ₱30 million from the proceeds of the sale of bonds issued under R.A. 1000 from any loan obtained by the government. The purpose of such financing was the establishment of coconut mills for the manufacture of coconut products and by-products.

For purposes of upgrading or improving the quality of copra for export, PHILCOA issued Administrative Order No.2, series of 1956. The order revised the rules and regulations for copra standards, inspection and grading, making it a requirement for all copra meant for export to be inspected and graded by the authorized agents of PHILCOA.

R.A. 2282 was enacted on June 19, 1959, establishing a Coconut Financing Fund which was to be used to grant loans to finance capital requirements of coconut cooperatives and the farmers. The financing requirement of ₱30 million was appropriated from either the sale of bonds or out of the National Treasury.

The passage of R.A. 4403 on June 19, 1965, further strengthened the government objective of encouraging the organization of farmers. The act encouraged coconut planters and processors to organize themselves into agro-industrial coconut cooperatives by granting the following privileges: (a) exemption from payment of documentary stamps and residence, banks and insurance, municipal, and city taxes for those with assets in excess of ₱500,000.00; (b) free representations in coconut litigations by government lawyers and (c) free use of government safes for depositing cash and papers.

Policies During the 1970's

The contribution of the coconut industry in the development of the Philippine economy was very significant in the 1970's despite some industry problems such as its highly competitive posture in the world fats and oil markets. The uncoordinated activities of various agencies in the coconut industry in the 1960's, inefficient farming methods, low productivity and unstable supply prompted the government to revitalize the industry by promoting the rapid integrated development of the industry and improving the incomes and welfare of coconut farmers. Thus, the policies in the 1970's account for more active government involvement in the development of the industry through the imposition of explicit taxes, from export taxes to domestic levies. These were considered in an effort to directly affect the pricing of coconut products or ensure reasonable farmgate prices.

Export Taxes

The devaluation of the peso in 1970 showed a shift from the policy of charging explicit taxes on exports. Republic Act (RA) 6125 taxed major exports which aimed largely to capture the windfall profits gained by the exporters. The assessment of taxes was based on free on board (f.o.b.) value of exports.

The same law set to lower the rate every year until its termination in 1974. However, Presidential Decree (PD) 230 made it a permanent policy of the government in 1973. The decree further fixed the rate of the tax at 6.0 percent for copra and 4.0 percent tax for coconut oil, desiccated coconut and copra meal.

Another purpose of the export taxes was to promote forward integration or domestic processing of copra and to make it available in the domestic market. Thus, in 1979 the rate of export tax for copra was increased to 7.5 percent. The tax on coconut processed product exports was lifted in 1980 due to low coconut product prices.

The COCOFUND Levy

Republic Act (RA) 6260 was passed in 1971 which fixed the levy collected from coconut producers for a period of 10 years beginning in 1972. Known as the Coconut Investment fund (COCOFUND) Law, this specific tax was fixed at the rate of ₱5.50 per metric ton (mt) of copra. The revenue derived from this levy was to be utilized to underwrite the Coconut Investment Company. The company was to become the instrument for the coconut producers to invest in the processing and the trading of their products. The ownership of the company could be established through which COCOFUND receipts were issued to coconut farmers upon payment of the levy during the first sale of their products.

Thus, the shares to the company were based on the receipts converted to stocks.

The COCOFUND levy was a very important policy in the 1970's because of its inception of vertical integration where farmers could go into the business of processing and trading their products. This could be carried out by the issuance of cocofund receipts. It helped shape the nature of the most important production levy in the history of the coconut industry, otherwise known as the CCSF levy.

The Coconut Consumers Stabilization Fund (CCSF) Levy

The CCSF levy was established by Presidential Decree 276 on August 20, 1973. The imposition of the levy was due to the abrupt increase of coconut prices in 1973. This price trend was accompanied by the increase in the cost of coconut production inputs, and this resulted in a significant rise in the prices of basic coco-based consumer products. In addition, the continuance in the setting of price ceilings by the government on coconut products led to the disappearance of coconut products from the market. The continued rise in input prices that is "by the day", producers realized heavy losses in supplying the product at controlled prices. To cope with the farmers' losses, the government subsidized their farm production activities with the funds coming from a new levy. P.D. 276 was enacted on August 10, 1973 for this purpose. It set the rate, which was initially at ₱150 per metric ton of copra, subject to change depending upon the funding requirements of the subsidy program. It further decreed that the rate was to be rescinded after one year or after the duration of the cooking oil crisis, whichever was earlier.

On April 18, 1974, P.D. 414 was issued to continue the levy thus voiding the provision of P.D. 276. The new decree specified additional uses of the levy to pay for about 90 percent of the premium duty and allocate some funds for investment by the Philippine Coconut Authority (PCA).

Also in 1974, an executive order was enacted to impose a premium duty on coconut product exports to capture the windfall gains made by the coconut exporters from favorable market situations. The duty assessment was based on the difference between the customs valuation of all exports and their respective base prices, as set by the National Economic and Development Authority (NEDA). The tax rates were 30 percent for copra and 20 percent for processed coconut products. The duty imposed on coconut products was lifted in 1980, at the same time the export tax was rescinded.

The issuance of P.D. 582 toward the end of 1974 was a bid to increase coconut productivity. The same decree launched the national program to replant the country's coconut hybrid. The Coconut Industry Development Fund (CIDF) was also created for this purpose and utilized the CCSF levy as an instrument to raise the revenue for this fund.

In 1975, thru P.D. 755, the Philippine Coconut Authority (PCA) was authorized to purchase the First United Bank on behalf of the coconut farmers. The capital or fund used in this venture was part of the fund allotted for investment under P.D. 414. This bank became known as the United Coconut Planters Bank (UCPB). The percent of equity held by the PCA in UCPB for the coconut farmers was 70 percent. In the distribution of equity to the coconut farmers, the PCA ruled that only those who owned COCOFUND receipts would be eligible to own shares of stocks in the bank. For every peso of COCOFUND receipts, the PCA gave to the owner three shares with a par value of ₱1.00 each.

The bank became the principal financial institution where coconut farmers could invest in the processing and trading of their products. This was in accordance with the vertical integration program of the government for the coconut industry as spelled out in the COCOFUND law (R.A. 6260) and in P.D. 232 in 1973. To give the program an additional fund, P.D. 1468, known as the Revised Coconut Industry Code, created the Coconut Industry Investment Fund (CIIF). The funds were to be taken from the proceeds of the CCSF levy. The management of the fund was to be handled by the UCPB.

By 1979, using the CIIF, UCPB had bought out almost two-thirds of the country's total rated milling capacity. The newly acquired mills were consolidated under the umbrella of UNICOM with government authorization and full support. This reorganization contrasts sharply with the hitherto history of the country's milling business. The events leading to this development can be partially attributed to some faulty planning on the part of the Board of Investment (BOI). Based on the misplaced optimism about future copra supply, the BOI continued in the second half of the 1970's to grant incentives to investors in coconut oil milling until the milling business became overcrowded (Clarete and Roumasset, 1987). The rated capacity exceeded the available supply by over a million tons. This situation led to tight competition for copra supply among its users. In 1979, when problems of short supply of copra continued some of the new mills closed down. Faced with this dilemma, the government decreed Letter of Instruction LOI (926) which resulted in mothballing of the undercapacity mills.

Coconut Development Project Fund

Following a sharp decline in the prices of copra, coconut oil, and their by-products, the collection of the CCSF levy was suspended on May 27, 1980 with the issuance of P.D. No. 1699. The decree also established the Coconut Development Project Fund (CDPF) which was to ensure the continuance of the viability of the development projects for the benefit of the coconut farmers. The collection of the levy, under its new name CDPF, was resumed 45 days later as provided for by the decree, at a rate of ₱60.00 per 100 kg. of copra used for domestic consumption and ₱80.00 per 100 kg. of copra for export.

Coconut Industry Development Fund

On September 9, 1981, the PCA issued Memorandum Circular No. 1 SSCF/CDPF Series of 1981 containing the implementing guidelines for the suspension of the coconut levies effective September 16, 1981. On October 2, 1981, the levy was again imposed with the issuance of P.D. 1941. The rate of the levy, under its new name -- the Coconut Industry Stabilization Fund (CISF) -- was set at ₱50.00 per 100 kg. of copra.

On January 16, 1982, the sliding scale formula of levy collection was adopted. The new scheme allowed a flexible rate on the CISF assessment which was determined by the PCA based on a fixed schedule. Once the average world market price of coconut oil for the preceding quarter fell below U.S. 20 cents per pound, no assessment would be collected by the PCA. When the world market price of coconut oil fell to about 17 cents per pound in August 1982, the President suspended levy collections and the PCA issued Memorandum Circular No. 003-CISF series of 1982 to this effect.

The UNICOM Policy-Farmers Cooperative Endeavor

In August 1979, the United Coconut Oil Mills (UNICOM) came into the picture with the announcement that it was buying five small oil mills in Mindanao, and that other private mills had agreed to cooperate with it. The purpose of mills had been justified for the purpose of obtaining the effective control by the farmers of the coconut industry. On September 3, 1979, Malacanang issued LOI No. 926, declaring as a national policy the rationalization of the coconut oil milling industry and directing UCPB to invest in a private corporation on a farmer's behalf for the buying, milling and marketing of copra and its by-products. Furthermore, it prohibited the establishment of new oil mills as well as the expansion of existing ones without the approval of the PCA. Thereafter, UCPB bought into UNICOM which by then was wholly owned by SOLCOM. In November 1979, UCPB bought the other major firms of the industry.

The UNICOM policy had two features: one was the concentration of coconut oil mills in a single private company; and the other was the restriction of the freedom of entry into the milling business. Thus, the UNICOM has not only become the largest seller of coconut oil but also the biggest copra buyer in the country. The overall policy, therefore, has the effect of restricting competition in both copra and coconut oil markets.

Policy Development with Regard to Desiccated Coconut

Unlike the copra and coconut oil industries, the desiccated coconut industry did not experience the same problems faced by the oil milling sector in the 1970's. Executive Order 826, was passed on August 28, 1982 prohibiting the establishment or operation of new desiccated coconut processing plants. This order was enacted as part of nationalizing the desiccated coconut industry. The number of existing plants was also reduced, further lowering the total production capacity. In order to avoid the problem of undercapacity operation of plants, Executive Order No. 854 was issued and paved the way for the acquisition and mothballing of several desiccated coconut plants for, and in behalf of, the desiccated coconut sector.

Quantitative Export Restrictions

Philippine Coconut Authority Administrative Order No.002 (Series of 1983) limited the coconut oil exportation of coconut oil mills which had operated at more than 65 percent of their annual rated capacity during 1980 to 1981. The quantitative export restrictions also applied to mills that had exported at least an average of 40,000 metric tons of coconut oil during the same period. Based on these criteria, only two companies, UNICOM and the Interco Group of Companies, were authorized to export coconut oil starting June 1983.

Effective September 11, 1982, Executive Order (EO) 828 banned copra exports for the sole purpose of ensuring the availability of copra to fill the requirements of the country's coconut oil mills as well as the diesel program. The banning of copra exports addressed the need to support industry priorities which emphasized the benefit of higher value added for exportables and strategic investments in the crushing capacities of oil mills. In addition, it was believed that Philippine exports of copra tended to work against its competitiveness in the world's oil market because it might support competing coconut oil milling capacities in other countries.

Section Summary and Conclusions

Countries included in this review adopted a variety of trade restrictions, from tariff to non-tariff measures. In the case of the United States, some of these were provided in the Phil-Am bilateral agreement. The provisions included some reciprocal free trade in many industrial and agricultural commodities between the two countries. Other laws even accorded some duty free status of Philippine export products. However, in later years some modifications were made on the provisions of the original agreements. After the termination of the Laurel-Langley agreement on January 1, 1974, all imports of coconut oil were subjected to full duty.

In the case of copra, while it had a duty-free access in the American market, the 3.0 cents per pound processing tax was imposed under the U.S. Revenue Act of 1932. This duty free status terminated after the expiration of the abovementioned agreement in 1974. However, this has not materialized because the U.S. stopped importing copra due to the oversupply of its domestic meals. Copra meal exports to the U.S. enjoy the same privilege as the copra sector. Sharing with Ceylon in supplying desiccated coconut to U.S. markets in the 1960's, the Philippine product was subjected to only 2.0 cents per pound tariff. In the 1970's when the U.S. increased the tariff charges on Ceylon's desiccated coconut product, the Philippines became the sole supplier to American confectionery and bakery industries.

The European Economic Community imposed different trade restrictions from those of the United States. Ad valorem tax charges on EEC imports on vegetable oils and fats differed by as much as 3.0 percent among members. The bases were according to the purpose for which the product would be used;

(industrial or edible) and form of product (crude or refined). Some members even classified it as fit or unfit for human consumption.

Some of the provisions of the EEC trade restrictions were relaxed in the 1980's when oilseeds, vegetable oils and oilmeals were not subjected to any quantitative restrictions. Oilseed and oilmeal imports were duty free, whereas vegetable oils were subjected to tariffs. The rates imposed by the member countries were bound under the General Agreement on Tariffs and Trade. The tariff on both crude and refined fats and oils ranged from 4 to 15 percent. The ad valorem tariff even increased to 17 percent for hydrogenated or hardened fats and oils, and 20 percent for products in containers of 1 kilogram or less.

Aside from tariffs, some member countries also imposed non-tariff measures (NTM's) including compensatory levy and varying taxes applied on certain fats and oils. The tariff charges on oilmeal imports by the community are based on different permitted levels of toxic substances in compound feeds (example aflatoxin). Other NTM's such as divergent national packaging and labelling regulations for vegetable oils and margarine were imposed on third-country exporters.

Aside from the conventional rate of duty under GATT, EEC charges on tariffs were also based on the Generalized Systems of Preferences (GSP) scheme. The principles and objectives of UNCTAD's 1968 resolutions were observed in this regard and have been revised annually. The GSP tariff concessions were lower than the rate imposed under GATT which ranged from 2.5 to 12 percent for vegetable oils and hardened or hydrogenated vegetable fats and oils which ranged from 11 to 16 percent ad valorem tax

Philippine domestic policies reviewed were those imposed in the last four decades. Government involvement in the coconut industry started in 1954 when the Philippine Coconut Authority (PHILCOA) was created to supervise the development of the coconut industry, promote effective merchandising of its products, and improve tenancy relations between coconut farm owners and tenants. To finance its operation, a levy of 10 centavos per 100 kilograms was imposed on desiccated coconut, coconut oil and copra.

The promotion of industrializing the coconut industry also commenced in the 1950's with the establishment of coconut mills for the manufacture of coconut products and by-products. In addition, some funds were also created to grant loans to finance capital requirements of coconut cooperatives and farmers. Some special privileges were also granted for coconut planters and processors to organize themselves into agro-industrial coconut cooperatives.

The policies in the 1970's accounted for more active government involvement through the imposition of explicit taxes, from export taxes to domestic levies. The imposition of export taxes started after the devaluation of the peso in 1970, aimed largely to capture the windfall profits gained by exporters. The purpose of the tax was to promote forward integration or the domestic processing of copra available in the domestic market.

In 1971, Republic Act (RA) 6260 was passed to collect coconut levy from coconut producers with the purpose of underwriting the Coconut Investment Company (CIC). The company became the instrument for the coconut producers to invest in the processing and trading of coconut products. The levy was a very important policy in the 1970's because of its inception of vertical integration where farmers can go into the business of processing and trading their products.

With another abrupt increase in prices of coconut products in 1973, another levy was established. This price increase trend, however, was accompanied by higher production cost and has resulted in heavy losses to farmers. At this point, the government came to the rescue by subsidizing farmers production activities with funds coming from the Coconut Consumers Stabilization Fund. In 1974, with the occurrence of another favorable market situation, an order was enacted imposing a premium duty on coconut product exports to capture the windfall gains by exporters. However, the duty charged was lifted in 1980 at the same time the export tax was rescinded.

In 1975, PCA was authorized to purchase a bank, which became the principal financial institution where coconut farmers could invest in the processing and trading of their products. As part of the vertical integration program of the industry, the levy was also utilized in launching the national program to replant the country's coconut farms with a coconut hybrid.

The desiccated coconut industry was not faced by as many problems as were faced in the copra and coconut oilmilling sectors. A number of executive orders were implemented prohibiting the establishment or operation of new desiccated coconut processing plants, and partly rationalizing the industry.

The following observations were made concerning the review of the U.S. and European Economic Community's policies: Barriers to trade especially in Europe and in the U.S. were operated in favor of both domestic production and processing vegetable oils and oilseeds. Variations in tariff charges on the different degree of processing is particularly concerned with the protection of domestic processing industries. However, in general, trade barriers are to some degree, a part of wider policy objectives of bringing living standards and income levels in the agricultural sector more in line with those of the rest of the economy.

For domestic policies, the following conclusions/recommendations may also be derived. The imposition of export taxes in 1970 was a temporary measure, however, they were made permanent by the New Tariff and Customs Code of 1973, presumably for revenue reasons. They were instituted to absorb the windfall gains to exporters from the peso devaluation. However, this tax is a disincentive that is inconsistent with the objective of promoting exports of coconut oil. In early 1986, the new government lowered the additional duty on copra. Also in the same year, the coconut group that made the study of the industry recommended that all export taxes should be eliminated.

With regards to the levy charged on coconut products, critics claim that the levy was an exclusive burden to the farmer, a further drag on his already weakened earnings.

The following are to be considered in the issue of the levy:

(1) Suspension of the Coconut Subsidy and Stabilization Program (CSSP) levy. The funds generated out of this should be reprogrammed.

(2) Suspension and review of the programs by the previous government for the coconut industry.

(3) The Coconut Consumers Stabilization Fund Levy may be reintroduced considering the following uses and under some restrictions: (a) the subsidy program and (b) the welfare program.

(4) Crop diversification should be seriously considered in the review of the programs.

In the case of the replanting program aimed at replacing old trees with precocious, high yielding varieties, before this will be pushed through or continued, the following actions must be given due consideration: (1) a thorough examination of the private and social profitability of replanting with hybrid coconut varieties; (2) removing the overemphasis on the MAWA variety, a cross between Malaysian Dwarf and West African Tall coconut varieties; (3) intensified research must be done to identify and evaluate promising new hybrid varieties, particularly those that will not be heavily dependent on chemical fertilizers and pesticides.

In the issue of market imperfections in the marketing systems for coconut oils and copra, some restructuring and redefinitions of directions are imperative. Some of the possible measures are: (1) extensive consideration of reviewing the free enterprise system; (2) a more extensive, fast and accurate information system particularly regarding price so that all market participants, especially the farmers can be aware of the development in the marketing systems; and (3) strict quality control at all levels in the marketing set-up so as to arrive at a more reasonable price for given commodities.

Copra export ban, was another short-run measure as planned; however, it was retained on the rationale of promoting the export of the high value added product, coconut oil. Banning copra exports resulted in the reduction of competition for copra supplies and gave UNICOM substantial control of the coconut oil milling industry. The result was lower farmgate prices. The ban thus imposed an explicit tax on the farmers and in effect, explicitly subsidized the milling sector at the expense of the farmers. The copra export ban was relaxed when the new government took control in early 1986.

CHAPTER V

IMPORT DEMAND FUNCTIONS

Introduction

In this chapter, the empirical results of estimating the proposed model of import demand and export supply of the Philippine coconut products and by-product to the United States, West Germany and the Netherlands are presented. As a general overview of the results, it is observed that some of the estimated models suffer from multicolinearity in various degrees. This multicolinearity problem was not corrected for the following reasons: (1) the estimated structural parameters are of interest in the study and (2) the only remedy for multicolinearity related to (1) is to increase the number of observations. Unfortunately, data limitations made this remedy impossible in this case. The estimated models presented in Tables XXV to XXXV are free from autocorrelation.

To facilitate the discussion, this chapter is divided into five sections. The first four sections include estimated import demands or export supply for Philippine coconut oil, copra, desiccated coconut, and copra meal. Within each section, the import demand functions for the United Sates, West Germany and the Netherlands are discussed separately. The final section is a summary of estimated results from the first four sections where different elasticities are discussed.

Import Demands

Import demand functions by the three countries included in this study for the Philippine coconut oil, copra, desiccated coconut and copra meal were estimated using a multiple regression analysis. The approach used in specifying the function was basically the same for each product and country. The quantity imported by the respective countries was used as a dependent variable and expressed as a function of the price of the product, price of related commodities, real income, real exchange rate and other determinants of demand. The prices of the products were wholesale prices in Philippine pesos and therefore were the same for all countries. Although quantities and prices may be simultaneously determined, the latter appeared in the equations as independent variables either in linear or ratio form, the ratio representing the price of a particular product relative to some substitute commodities. To make the analysis simple and similar for all countries, the ordinary least squares procedure was employed.

Demand for Coconut Oil

The market demand for coconut oil is a derived demand and is composed of several segments: (1) the demand for crude coconut oil by refineries which in turn supply manufacturers of margarine, shortening, and other oil-using foods and (2) the demand by soap and chemical manufacturers and other industrial users. The demand for coconut oil is closely related to population and income. Despite its importance, the pure effects of income on coconut oil demand are difficult to measure. This is because incomes have increased rather steadily in the coconut oil importing nations; hence income probably picks up the influence of numerous other factors associated with time. Other important factors that affect the quantity of oil demanded in the foreign market are the price of coconut oil and the price of substitute oils. Coconut and palm kernel oils have a high lauric acid content and are highly substitutable in many uses. Soybean and cottonseed oil are two of the most important oils in the world market.

In the international markets, major policy changes such as the devaluation of an exporter's currency would affect the flow of coconut oil. The devaluation of the Philippine peso played a significant role in the growth of coconut oil exports of the country. The increase of the peso value of the dollar provided higher earnings for the exports and therefore was a major factor in determining the quantity exported. To take into account the effect of this devaluation, an exchange rate variable was added to the equation.

The domestic demand for coconut oil in the Philippines is also a derived demand. The quantity of oil consumed was expressed jointly as a function of its price and three other variables, real national income, population and a dummy variable which represents the consumer subsidy.

United States

The per capita Philippine coconut oil imports by the United States were expressed as a function of the price of coconut oil in pesos, the price of cottonseed oils, real national income, real exchange rate and the U.S. oilseed production which included soybeans, groundnut (peanut), linseed, cottonseed, and sunflowerseed. In another formulation, cottonseed oil price was substituted by soybean oil and other vegetable oil net imports. Table XXV, shows that all the estimated coefficients for the U.S. import demand function for Philippine coconut oil have the expected sign. The cottonseed oil import price coefficients were of the expected signs and were statistically significant.

TABLE XXV

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COCONUT OIL IN THE UNITED STATES, 1970-1982

Variable	Model 1	Model 2	Model 3
PCPx (wholesale price of coconut oil in pesos)	-0.0002 (1.705)	-0.0001 (0.903)	-0.0001 (1.603)
USI (United States real national income)	1.130 (1.334)	1.07 (1.334)	0.847 (1.437)
RER (Real exchange rate)	-0.899 (2.130)	-1.075 (2.441)	-1.341 (2.443)
COI (cottonseed oil real wholesale price)	0.0047 (2.463)	0.004 (2.019)	
USO (United States oilseed production)		-2.826 (1.157)	-4.001 (2.017)
USS (Soybean oil real wholesale price)			0.101 (1.145)
VOI (Other vegetable oil net imports)			0.393 (1.449)
R^2	.530	.605	.753
D.W. Statistics	1.182	1.166	1.562
F-Statistics	2.256	2.149	3.053
C.V.	20.964	20.534	17.542

In model (1), the five independent variables explained 53 percent of the variation in the quantity of oil imports by the United States. Addition of the total domestic oilseed production increased the R^2 to .61, model (2). The addition of soybean oil price and other vegetable oil imports increased the R^2 to .75 in model (3).

The demand for coconut oil in the United States is price inelastic -- the direct price elasticity at the means ranged from -.21 to -.42. The price coefficient was also found to be significantly different from zero.

In the U.S., soybeans and cottonseed oil are the two most important vegetable oils. These two oils are products derived from the crushing of soybeans and cottonseeds. They are considered soft oils, even though they substitute for coconut oil in many uses. A positive relationship exists between their prices and the quantity of coconut oil demanded. Other things remaining the same, a 10 percent change in the price of cottonseed oil would result in a .04 percent change in the same direction in the demand for coconut oil imports from the Philippines. For soybean oil, a 10 percent change in its price would result in a one percent increase in U. S. imports of coconut oil.

The real national income coefficient was of the expected sign and significant. It implied an elasticity of from +1.44 to +1.94. The coefficient indicated that, as the income in the U.S. increased by 1 percent, the increase was expected to be about 1.5 to 2.0 percent on the import of the commodity.

The coefficients for the real exchange rate variable were of the expected signs and were significant. A devaluation of the peso by one percent would result in an increase in coconut oil imports by the U.S. of from .89 to 1.34 percent.

The U.S. annual production of oilseed was used as an explanatory variable for coconut oil imports from the Philippines. In general, production in the U.S. trended upward during the study period for sunflowerseed, groundnut, linseed, cottonseed, and soybeans, although dips were observed in some production years. The highest production of soybeans, sunflower and groundnuts was attained in 1979, cottonseed in 1981, and linseed in 1977 in a 13-year span of this study. The estimated relationship indicated a relatively high rate of substitution -- an increase of one metric ton of these oilseeds produced was associated with a change in the opposite direction on the average of 3.41 metric tons of Philippine coconut oil exports to the United States.

Other results. (1) In other research studies reviewed, the net national supply of oils which includes the net imports of other vegetable oils and their domestic production, significantly affected U.S. imports of coconut oil. However, when this variable was included in this study, a nonsignificant coefficient was obtained.

(2) Linseed, groundnut, and sunflower oil wholesale prices resulted in a positive coefficient; however, they did not affect the country's import of coconut oil.

West Germany

Only about 15 percent of Philippine coconut oil is imported by West Germany. Thus, it was not easy to identify the specific substitute oils. Since coconut oil, palm oil, and palm kernel oil belong to the same group (lauric oils), the latter two oils were used as independent variables in the estimates of import demand of coconut oil by this country. Import prices for these two vegetable oils were gathered from the FAO Trade Yearbook. Although prices at other

European ports for palm oil and palm kernel oils were available, the import prices of the said oils in West Germany were used in this study.

The quantity of coconut oil imported by West Germany was expressed as a function of the price of coconut oil in pesos per metric ton, the price of palm oil, real national income, domestic rapeseed production, real exchange rate and the real income per capita. In the second model, the price of palm kernel oil was used in lieu of palm oil. Since importers in West Germany have a choice of importing either copra or coconut oil, it was assumed that the price of copra might have an important effect on the quantity of coconut oil imported. However, when some equations were regressed, copra price did not give any significant effect on the West German imports of coconut oil.

In equations (1) and (2), the R^2 values ranged from .705 to .707. Both equations yielded correct signs for the coefficient of independent variables. The price coefficients of both import demand equations were negative but statistically insignificant. It implied an inelastic demand for Philippine coconut oil by this country.

Palm oil and palm kernel oil appeared to be complements for coconut oil. The cross price elasticity for palm kernel oil was -.78 and was less than unity (Table XXVI).

With respect to income, an increase of 1 percentage point in the income of West Germans would result in a 1,901 to 2,246 metric tons increase in coconut oil imports. The income elasticity of demand ranged from +1.20 to +1.42.

Supply of rapeseed produced by West Germany was used as an explanatory variable for coconut oil imports from the Philippines. Rapeseed production in West Germany trended upward during the 13-year period from 1970-1982. The coefficients of rapeseed production per capita for both equations were all negative and statistically significant. The estimated

TABLE XXVI

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COCONUT OIL IN WEST GERMANY, 1970-1982

Variable	Model 1	Model 2
PCOx (wholesale price of coconut oil in pesos)	-0.023 (0.480)	-0.022 (0.470)
WRI (West Germany real national income)	1901.104 (1.147)	2246.790 (1.458)
WRP (Rapeseed production)	-0.103 (1.799)	-0.088 (1.909)
RER (Real exchange rate)	-3402.819 (2.705)	-3267.511 (2.770)
POP (Palm oil wholesale price)	66.019 (0.979)	
PKP (Palm kernel oil wholesale price)		37.032 (1.005)
R^2	.705	.707
D.W. Statistics	1.970	1.859
F-Statistics	3.349	3.379
C.V.	44.151	44.009

relationship indicates that assuming other things constant, an increase in the production of rapeseed in this country by one hundred metric tons was associated with a decrease of 8 to 10 metric tons of coconut oil import.

Real exchange rate coefficients for West Germany import demand for coconut oil were all negative and statistically significant. The results implied that a decrease in the real exchange rate between the two countries by one percent would increase the amount of imports by West Germany by 2367 metric tons in model (2) to 3402 metric tons in model (1).

The Netherlands

In model (1), the six independent variables explained 89 percent of the variation in the quantity of Philippine coconut oil imports by the Netherlands. The addition of rapeseed production per capita increased the R^2 to .91. In both equations, the coefficients had the correct signs, except for the total import of other vegetable oils by the Netherlands. They were all significantly different from zero.

The estimated own-price elasticity estimates at the means ranged from -7.158 to -9.62 (Table XXVII). The price elasticity estimates are higher than the estimates obtained by Librero (1972) and other researchers.

The real income coefficients are highly significant and imply an elasticity of from +10.40 to +16.79. The results indicate that income growth in the Netherlands could have a significant effect on Philippine coconut oil imports by this country.

Models (1) and (2) show that as the price of copra increased, the quantity of coconut oil demanded also changed in the same direction. Other things

TABLE XXVII

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COCONUT OIL IN THE NETHERLANDS, 1970-1982

Variable	Model 1	Model 2
PCOx (wholesale price of coconut oil in pesos)	-11.396 (1.986)	-16.035 (2.620)
NRI (Netherlands real national income)	315589.03 (1.699)	509317.96 (2.370)
NVO (other vegetable oil import)	0.587 (2.680)	0.559 (2.780)
NRM (Real import price of rape and mustard oil)	2708.819 (1.924)	4501.592 (2.541)
NRP (Rapeseed production)		-2476.845 (1.473)
RER (Real exchange rate)	-6566.442 (2.132)	-10538.874 (2.702)
PCOx (Copra wholesale price)	11.799 (1.779)	15.529 (2.362)
R^2	.868	.908
D.W. Statistics	1.884	2.389
F-Statistics	6.60	7.071
C.V.	36.760	33.626

remaining the same, an increase of ₱100.00 in the copra price per ton would increase the demand for coconut oil by more than 11,800 metric tons.

With respect to rape and mustard seed oil, a 10 dollar rise in its real price would increase coconut oil imports of the Netherlands by 2709 to 4502 metric tons. The implied cross elasticity of coconut oil demand to this country was +2.80.

Philippine coconut oil is not a substitute for the fats and oils when other vegetable oils imported by the Netherlands were included in the model. If total supplies of these competitive oils increased by 100 metric tons, the estimates suggest that Philippine exports of coconut oil would increase by only 58 metric tons. Butter is the principal fat source, and traditional preferences for butter have been slow to change. Therefore, vegetable oils used for margarine are not pound-for-pound substitutes with butter. In addition, domestic and trade policies might serve to restrict coconut oil imports.

The annual average production of rapeseed by the Netherlands grew to about 35,000 metric tons in 1982, from slightly less than 20,000 metric tons in 1970. A change in the Netherlands rapeseed production of 100 metric tons was associated with about 248 metric tons change in the opposite direction in Philippine coconut oil imports by this country according to model (1).

Demand for Copra

The total demand for copra is the sum of the demand of importing countries and the demand of domestic processors for crushing. This in turn is derived from the meal and oil demand functions, hence the quantities of oil and meal are fixed by the amount of copra crushed.

Copra is a raw material used in the processing operation. Thus, the foreign demand for copra is derived from the demand for oil and meal using the products faced by foreign processors. With a 63.5 percent oil yield conversion, copra demand is dominated by the oil sector. The quantity demanded is influenced by the prices and supplies of competing oils and oilseeds. The oilseed production was entered in quantity terms. The use of oilseeds rather than either oil or meal captures the effect of competition from both oil and meal. It might be expected that trends in feeding practices and livestock production in the importing countries would affect the demand for copra. Livestock units appeared significant in the first few equations analyzed. And lastly, a nation which imports copra for nonfood use also must possess facilities for oilseed crushing and handling.

West Germany

Among European Economic Community members, domestic rapeseed, sunflowerseed and olive production supply only a small share of the region's needs for vegetable oil and meal. Imports of oilseeds, meal and oil make up the deficits, especially in West Germany. Vegetable oil surpluses during the last two decades dampened the growth of oilseed imports, stimulated meal imports, and led to increasing exports of edible oils. These conditions suggest that the demand for copra and other oilseeds presently depends more importantly on domestic meal demand than domestic oil demand.

In model (1), combined copra price, real national income soybean import price, and other oilseed imports by West Germany yielded an R^2 of .73. Substituting linseed import prices for soybean prices and adding the real exchange rate increased the R^2 to .75 (Model 2). Addition of domestic oilseed production to model (3) increased R^2 to .79.

Price of copra (PCOx), price of soybeans (WSP), and price of linseed showed strong relationships with the per capita copra imports of West Germany. The significance of the latter two oilseed prices underscores the importance of these two commodities in the import of copra. Other oilseeds, like sunflowerseed and rape and mustard seed were introduced in various combinations in preliminary analyses, but soybeans and linseed prices in models (1), (2), and (3) displayed significant regression coefficients. The implied price elasticity of demand for copra imports by West Germany from the three models evaluated in Table XXVIII, was -1.57.

The prices of soybeans (WSP) and linseed (WLI) were positively related to imports of copra by West Germany, as expected from a competitive product. An increase of one percent in the real import price of linseed would increase copra imports by West Germany by an estimated 175.9 to 227.5 metric tons. A one dollar rise in the price of soybeans (in real terms) was associated with 435 metric tons increase in the import of copra.

Changes in real income in West Germany (WRI) were highly associated with imports of copra. A one percent change in the real income of West Germany was associated with a change in the same direction on the average of 63,861 metric tons in copra imports. The income elasticity estimates of demand in West Germany ranged from +15.9 to +20.5. These estimates are higher than the +1.22 EEC income response for copra as reported by Librero.

The real exchange rate coefficients were found to be negative; however, their effects on West Germany's imports were weak as shown by the t-values. West Germany's oilseed production, which includes rapeseed, sunflowerseed

TABLE XXVIII

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COPRA IN WEST GERMANY, 1970-1982

Variable	Model 1	Model 2	Model 3
PCOx (wholesale price of copra in pesos)	-0.465 (2.693)	-0.532 (2.522)	-0.610 (2.719)
WRI (West Germany real national income)	54455.109 (2.186)	66888.506 (1.632)	70240.309 (1.711)
WSP (Soybean real price)	435.486 (2.101)		
WOI (West Germany other oilseed import)	-0.2207 (2.072)	-0.293 (1.864)	-0.345 (2.090)
RER (Real exchange rate)		-3555.507 (0.720)	-6995.230 (1.167)
WLI (Linseed real price)		175.934 (1.277)	227.520 (1.551)
WGO (West Germany oilseed production)			200.5197 (1.011)
R^2	.731	.753	.789
D.W. Statistics	2.424	2.285	2.502
F-Statistics	5.427	4.257	3.730
C.V.	57.619	59.042	58.950

and olive, was complementary with the country's import demand of copra; however, the t-values for the coefficient was small.

In addition to copra, West Germany also imports soybeans, linseed, rapeseed, sunflowerseed and other oilseeds for crushing purposes. The coefficient for other oilseed imports, when entered in the regression, was found to be negative and significant. It indicated that these oilseeds were substitutes for copra in the crushing processes for oil and copra meal. The relationship indicated that a one hundred metric ton increase in imports of other oilseeds by West Germany would result in a 22 to 35 metric ton decrease in its demand for copra.

Other results. (1) When net supply (oilseed import plus the oilseed domestic production of West Germany) was entered into the equation, a positive but insignificant coefficient was obtained.

(2) Palm nut kernel was shown to be a complement for copra in the West Germans' import demand. The cross price elasticity at the means was -2.14. The real exchange rate in the equation was also of the correct sign and significant, but copra price was of unexpected sign and insignificant. The real national income coefficient was negative and insignificant.

Copra has been the major export of the Philippines to West Germany; however, in the late 1970's and in the early 1980's the previous administration encouraged the domestic processing of copra. Thus, the trade of this product to West Germany reached almost nil in the mid-1980's. In addition, with the EEC policies of protecting the domestic production of oilseed in its member countries, more coconut oil was imported than copra.

Instead of per capita import of West Germany, a total quantity imported of the product by this country was used as a dependent variable. The following results were obtained in the analysis:

(1) Since importers can substitute coconut oil for copra it could be assumed that oil would have a significant influence on copra imports. With other factors and prices remaining unchanged, an increase in Philippine coconut oil imports by West Germany by 10,000 metric tons would mean a decline in the quantity of copra exports by 10,600 metric tons.

(2) Aside from copra, other oilseed imports by West Germany were also the source of their meal supply. In this formulation, assuming other things remain the same, a rise in imports of oilseeds by 1000 metric tons would mean a decrease of 210 metric ton in exports of copra to West Germany.

(3) West Germany's real GNP significantly affected its imports of copra from the Philippines. In addition, the price ratio of copra and sunflower oil also significantly influenced the import of Philippine copra by West Germany. Time trend tended to have a significant effect on the actual value of copra imports in this country; however, the coefficient was negative.

The Netherlands

Three models for the Netherlands' import demand for Philippine copra were estimated which contain the prices of other oilseeds such as Linseed, Rape and Mustard Seed, and Palm nuts and kernel as independent variables. Model (1) yielded an R^2 of .64 and correct signs for coefficients of all four independent variables. The copra wholesale price and the real exchange rate coefficients were negative and significant. The real national income and the linseed import price coefficients were positive and significant. When the real exchange rate and linseed import price variables in model (1) were replaced by rape and mustard seed import price and wholesale price of coconut oil, it yielded an R^2 of .66. Lastly, the replacement of these two independent variables with total imports of other oilseeds for crushing purposes and the import price of palm nuts and kernel increased the R^2 to .88 (Table XXIX).

The Philippine copra import demand by the Netherlands was quite elastic. The copra price coefficients implied an elasticity with a range of from -1.69 to -7.62. All factors remaining the same, a 10 percent decline in the price of copra would result in a 17 to 76 percent increase in the Netherlands' imports of copra from the Philippines.

With respect to linseed, a 10 dollar rise in its price would increase copra imports by 358.4 metric tons. The implied cross price elasticity of demand for copra was 3.81 at the means. The real national income for the Netherlands signified a positive and a very highly significant effect on its imports of Philippine copra. The increase of 10 percentage points in the real national income of the Netherlands would result in a 43 to 90 thousand metric ton increase in copra imports. The income elasticity of demand ranged from +4.75 to +9.90.

The real exchange rate coefficient significantly influenced the Netherlands' import demand of Philippine copra during the 13-year period covered in this study. A 10 percent real depreciation of the Philippine currency would correspond to over 10,000 metric ton increase in Netherlands copra imports

Rape and mustard seed indicated a complement relationship with copra as shown by its negative and significant coefficient. A $10 decrease in its price would result in an 8.8 thousand metric ton increase in imports of Philippine copra. The cross price elasticity of demand of Philippine copra was -9.77.

Model (2) shows that as the price of coconut oil increases, the quantity of copra demanded also changes in the same direction. Taking into account the *ceteris paribus* assumption, a one dollar increase in the coconut oil price would increase the demand for the Philippine copra by more than 34 metric tons.

TABLE XXIX

ESTIMATED IMPORT DEMAND OF PHILIPPINE COPRA BY THE NETHERLANDS, 1970-1982

Variable	Model 1	Model 2	Model 3
PCOx (wholesale price of copra in pesos)	-13.983 (3.074)	-62.986 (3.154)	-20.372 (3.638)
RNI (Real national income)	434761.230 (1.663)	905707.230 (2.280)	440286.450 (1.790)
RER (Real exchange rate)	-101676.870 (1.841)		
LIP (Linseed import price)	3584.182 (1.422)		
RMP (Rape and mustard import price)		-8802.591 (2.133)	
PCPx (Wholesale price of coconut oil)		34.690 (2.757)	
TIO (Total imports of other oilseeds)			1.215 (4.521)
PNK (Palm nut & kernel import price)			13673.328 (3.869)
R^2	.639	.660	.882
D.W. Statistics	3.540	3.873	14.985
F-Statistics	1.703	1.518	1.798
C.V.	53.196	51.667	30.382

In addition to its domestic oilseed production, the Netherlands also import other oilseeds in order to meet its national consumption of vegetable oil and meal. The total imports of oilseeds except copra significantly affected the national demand of Philippine copra. The duty free arrangement for oilseeds as accorded in the General Agreement on Tariff and Trade Code would result in movement in the same direction of other oilseed imports by the said country and for the Philippine copra. A one percentage point increase in the quantity of other oilseed imports would result in the same quantity of copra exports by the Philippines to the Netherlands.

The palm nuts and kernel import price coefficient was highly significant. From model (3), the cross price elasticity of this oilseed was +14.78. A 10 dollar increase in the price of palm nuts and kernels would lead to a 1,370 metric ton increase in Netherland imports of Philippine copra.

Other results. (1) Domestic rapeseed production affected the import demand of Philippine copra by the Netherlands. The increase in domestic rapeseed production by 1000 metric tons was accompanied by an 8.2 thousand metric ton decrease in imports of Philippine copra.

(2) Sunflowerseed and soybeans competed with copra in the Netherlands' market for oilseeds.

(3) When the net supply of alternative oils in the Netherlands, expressed in metric tons, was regressed with the Philippine copra imports by the said nation, a positive and nonsignificant coefficient was obtained. The net supply represents the sum of all oilseeds produced in the Netherlands, plus total imports of oilseeds and oils except copra and coconut oil minus exports and reexports.

Demand for Desiccated Coconut

Desiccated coconut in the Philippines is produced mainly for export. It is used in candies, cakes, cookies, and other bakery products and its demand is derived from the demand for these end products. The quantity of desiccated coconut imported by the importing countries was expressed as a function of its price, the price of bakery products, confectionery sales, exchange rates, nut production by importing countries and prices of substitute products. In the 1960's, 77 to 99 percent of Philippine desiccated coconut exports went to the U.S. market; however, in the late 1970's and 1980's, demand shifted to European markets, especially the EEC. In the case of the U.S. market, the two most important variables were the price of the bakery products in dollars per ton and confectionery sales expressed in million dollars.

United States

As stated in Chapter IV, the desiccated coconut produced in the Philippines was exported mainly to the U.S. market. In more than three decades, the U.S. absorbed over 75 percent of the Philippine exports of this product. Recently, however, other countries have received large shares. For example, the EEC now receives more than 40 percent of Philippine desiccated coconut exports.

The volume of desiccated coconut imported by the United States was regressed with the price of the product, price of cereal and bakery products, confectionery sales/consumption/price, cocoa consumption per capita, and the real national income. In model (1), the four independent variables explained 82 percent of the variation in aggregate U.S. imports for desiccated coconut and their coefficients were all significantly different from zero except the real national income. When confectionery price instead of sales and consumption, and the CPI for cereal and bakery products were added in model (3), the R^2 increased to .864.

The coefficients for the Price Index of Cereal and Bakery Products (CCB) were negative and all significant in models (2) and (3). The coefficient of CCB in model (2) implied a cross elasticity at the means of -1.00, whereas in model (3), the implied cross price elasticity was -1.37, which was slightly higher.

The confectionery sales variable in the second model appeared significant and had a positive coefficient. All other factors remaining the same, a one million increase in confectionery sales would result in a rise of 43 metric tons of desiccated coconut imported by the United States. Confectionery per capita consumption and price variables also yielded negative coefficients and were significant.

It was assumed that cocoa complements desiccated coconut in the preparation of cookies, cakes and confectioneries. The result of the study, however, did not confirm or agree with the assumption where the coefficient of the cocoa total use (COU) was negative and significant. An increase of American total per capita use of cocoa by 100 kilograms resulted in a response of 5 kilograms in the opposite direction of imports by the United States for Philippine desiccated coconut.

The coefficients for the wholesale price of desiccated coconut in Philippine peso in the three models were all negative and significant. The direct price elasticity range was from -.14 to -.16.

The income coefficients in the models as shown in Table XXX indicated different signs. The sign in the first model was positive and in the last two models was negative. However, all were nonsignificant coefficients.

TABLE XXX

ESTIMATED IMPORT DEMAND FOR PHILIPPINE DESICCATED COCONUT IN THE UNITED STATES, 1970-1982

Variable	Model 1	Model 2	Model 3
PDCx (wholesale price of desiccated coconut in pesos)	-0.0000054 (2.296)	-0.0000061 (1.996)	-0.0000067 (2.107)
USI (United States real national income)	1646.771 (0.805)	-598.84 (0.354)	-535.504 (0.319)
UCC (Confectionery consumption per capita)	0.0152 (2.503)		
UCT (Cocoa total use per capita)	-0.052 (1.428)	-0.046 (1.300)	-0.026 (0.802)
UCP (Confectionery real price)			0.00011 (2.183)
CCB (CPI for cereal and bakery products)		-0.0011 (2.749)	-0.0015 (2.602)
UCS (Confectionery sales)		0.000043 (2.160)	
R^2	.817	.852	.864
D.W. Statistics	1.798	1.857	2.249
F-Statistics	8.933	11.51	8.924
C.V.	6.941	6.245	6.389

Other results. (1) Brazil nuts, an ingredient used in making cakes, cookies and other candy products, were tested as a variable in the U.S. desiccated coconut import demand equation. The result of the analysis signified a positive coefficient; however, it did not prove to be a complementary commodity to Philippine desiccated coconut.

(2) In other formulations of the U.S. demand functions for desiccated coconut, real exchange rate was considered as an important variable in the model. The result of the analysis indicated a negative coefficient and was statistically significant. However, the price of desiccated coconut and real income were of expected signs but were not statistically significant in this equation. The import demand function estimated for the U.S. is given below:

$$\underset{}{QDC = 0.222} \; - \underset{(1.206)}{.0000042PDC} + \underset{(0.307)}{585.592RNI} + \underset{(1.502)}{.0011\,FIL} - \underset{(2.313)}{1548.247RER} \quad (5.1)$$

$R^2 = .807$

where; QDC, PDC, RNI = same definition as in Table XXX.

RER = real exchange rate

FIL = Filberts import price

Filberts nuts proved to be a substitute for desiccated coconut in the preparation of cakes, cookies and confectioneries in the United States. However, the substitution was weak, with a 10 percent increase in the price of filberts bringing only a .01 metric ton increase in desiccated coconut imports by the United States

West Germany

West Germany is the largest importer of desiccated coconut (DCN) among the EEC member countries. The average annual exports of Philippine desiccated coconut to this Western European country was 6,130 metric tons during the study period. West Germany's import demand was regressed with the product price, the country's national income, cereal import price, real exchange rate, Europe's hazelnut and chestnut production and the country's net imports of cocoa beans in all three models. The three equations yielded a good fit as indicated by an R^2 of .62, .71, and .72, respectively (Table XXXI).

Unlike the Netherlands' desiccated coconut import demand, West Germany's price coefficients were found to be positive and insignificant. This result was not expected.

In models (2) and (3), the income coefficients were found to be positive and significant. The income elasticity was high with means of from +6.07 to +6.16. An increase in West German consumers income of 1,000 deutsche mark would bring about an increase of 3.17 to 3.21 metric tons of desiccated coconut imports from the Philippines.

The index of prices of cereal and bakery products was included as an explanatory variable by Librero in her regional study of desiccated coconut imports by the United States. In this research, cereal import price was also regressed with West Germany's import demand. It yielded a negative and significant coefficient. A one percent increase in the price of cereal was associated with a 10.8 percent decrease in desiccated coconut imports by West Germany. The cross price elasticity was -2.04.

In model (1), the real exchange rate coefficient was negative and significant. When the real exchange rate between the two countries adjusted to

TABLE XXXI

ESTIMATED IMPORT DEMAND FOR PHILIPPINE DESICCATED COCONUT IN WEST GERMANY, 1970-1982

Variable	Model 1	Model 2	Model 3
PDCx (wholesale price of desiccated coconut in pesos)	-0.014 (2.601)	0.004 (0.673)	0.004 (0.704)
WGI (West Germany real national income)		3208.30 (2.414)	3167.625 (2.257)
CIP (Cereal import price)	(1.625)	-10.834	
RER (Real exchange rate)	-452.97 (1.421)		
HEP (Europe's hazelnut production)		-0.002 (2.476)	-0.002 (2.179)
CEP (Europe's chestnut production)	-0.018 (1.266)		
NMC (Net import of cocoa beans)			0.016 (0.358)
R^2	.621	.713	.718
D.W. Statistics	1.882	2.370	2.447
F-Statistics	3.274	7.457	5.083
C.V.	30.649	24.888	26.189

their consumer price indices decreased by one percentage point, there was a 452 metric ton increase in imports of desiccated coconut by West Germany. In other words, the devaluation of an exporting country's currency would bring about an increase in its exports to its trading partners.

Since West Germany imports most of its nut requirements from European countries, the region's hazelnut production was included as an independent variable in this country's import demand for desiccated coconut. Desiccated coconut and hazelnuts are inputs in the confectionery industry, thus it may be assumed that they may be substitutes. Europe's hazelnut production coefficient was found to be negative and significant. Other things remaining the same, a 1,000 metric ton increase in Europe's hazelnut production would bring about a two metric ton decrease in desiccated coconut imports by West Germany. Chestnut production in Europe also affected the import market for Philippine desiccated coconut in the region especially in West Germany. With an increase of 1,000 metric tons regional production, desiccated coconut imports would decrease by 18 metric tons. The net import of cocoa beans coefficient by West Germany was small and positive and did not significantly affect the country's Philippine desiccated coconut imports.

The Netherlands

In the Netherlands' import demand specification, the volume absorbed was regressed with the price of the product, real national income, the net imports of cocoa beans and Europe's almond production. Models (2) and (3) considered pistachios, total nut production by the region, and the real exchange rate. The rationale in including nuts as an explanatory variable for the country's import demand was that nuts are ingredients in the preparation of cakes, confectioneries and candies. Most of the nut imports by Netherlands come from Europe.

The price coefficients for Philippine desiccated coconut imports by the Netherlands were all negative and significant. The price coefficients were inelastic with means ranging from -.34 to -.75 (Table XXXII).

In the three models included in the analysis, income showed an important positive effect on the demand for desiccated coconut. The income coefficients were all highly significant with an elasticity of +4.39. This indicates that income growth in this country could have a significant effect on desiccated coconut imports from the Philippines. Other things remaining the same, a one million increase in the real income of consumers in the Netherlands would bring about a positive impact of 4.2 to 9.7 metric tons of desiccated coconut imports from the Philippines.

The cocoa bean, when processed, is an ingredient in the preparation of cakes, confectioneries and candies. As an independent variable in the import demand for Philippine desiccated coconut by the Netherlands, the coefficients for the net imports of cocoa beans were positive and significant. The coefficient indicates that a 100 metric ton increase in imports of cocoa beans by this nation would result in a rise of 6 metric tons of desiccated coconut imports from the Philippines.

Europe's production of pistachios significantly affected the Netherlands imports of Philippine desiccated coconut. An increase of 100 metric tons of Pistachios produced in this region would result in a 3 metric ton increase in the same direction for desiccated coconut. The result shows that desiccated coconut and pistachios do complement each other in the preparation of cakes, cookies and confectioneries. However, other nuts like almonds, hazelnuts, and chestnuts indicated positive but insignificant coefficients, and walnuts a

TABLE XXXII

ESTIMATED IMPORT DEMAND FOR PHILIPPINE DESICCATED COCONUT IN THE NETHERLANDS, 1970-1982

Variable	Model 1	Model 2	Model 3
PDCx (wholesale price of desiccated coconut in pesos)	-0.015 (1.377)	-0.035 (2.562)	-0.016 (1.514)
NCI (Netherlands real national income)	4205.094 (2.495)	9756.500 (3.395)	4812.723 (2.604)
NMC (Net imports of cocoa beans)	0.065 (2.233)		0.063 (2.269)
EAP (Europe's almond production)	0.0001 (0.593)		
EPP (Europe's pistachio production)		0.037 (1.542)	
ETP (Europe's total nut production)			0.0002 (0.831)
RER (Real exchange rate)		755.456 (1.103)	
R^2	.730	.755	.740
D.W. Statistics	2.574	2.195	2.788
F-Statistics	5.395	6.169	5.696
C.V.	18.144	17.26	17.786

negative and nonsignificant coefficient. These inconsistencies in the signs of coefficients for different nuts also resulted in an insignificant and positive coefficient in model (3) when aggregate nut production in Europe was considered. The real exchange rate coefficient indicated a positive and insignificant effect on Philippine desiccated coconut imports by the Netherlands.

Demand for Copra Meal

Copra meal produced in the Philippines was all sold in the foreign market in the 1960's. However, recently, about 15 percent of copra meal has been consumed within the country.

The export meal demand is derived from the demand for manufactured and farm mixed livestock feeds in the importing countries. Thus, the quantity exported was expressed jointly as a function of a meal price and the following exogenous variables: price of oilseed meals, livestock numbers, exchange rate, and price of copra. Livestock units in importing countries included cattle, hogs, and poultry which were combined into one unit based on the protein consumption of each type of animal. The price of soybean meal appeared as a deflator for price of copra meal as shown in the initial analyses. A dummy variable was included to find the effect of a levy on the amount of exports of copra meal in the demand equation. The domestic demand for copra meal is also derived from the demand for manufactured and farm mixed livestock feeds in the country. However, local demand was not included in the study because the time period (less than 10 years) was too short to warrant a useful analysis.

The principal use of both oilseeds to include copra and fish meals is in prepared livestock feeds. Demand, therefore, is greatest in developed countries where livestock populations are large and natural pasture is limited.

Although most developed countries produce some oilseeds or fish meals, the demand for meal exceeds local production, especially in European countries. Consequently, these countries rely on imports to meet their meal requirements.

West Germany

The EEC member countries, including West Germany, rely on imports from outside the region for almost all their meal requirements, of which more than one-half is soybean meal. Despite increased domestic output, indigenous production provided four percent of meal needs in 1970 and 10 percent in 1985.

Demand for meals will continue increasing as the demand for livestock products grows. Most of the increase is likely to be met by imports. Only if world oil demand increases more rapidly than presently expected or if EEC consumers begin to shift from butter to margarine, stimulating the demand for vegetable oils, will expanding meal requirements be filled by imported oilseeds.

Agricultural and trade policies of the European Economic Community affect oilseed markets in member countries. Price incentives encourage rapeseed and sunflowerseed production. Also, special regulations allow privileged treatment of imports from former African colonies, many of which produced oilseeds. Domestic and trade policies for wheat and feedgrains also affect meal demand. Some substitution between grains and meal is technically possible and can be economically feasible at appropriate price relationships. The latter depends to a large extent on policy decisions. Throughout the study period, oilseeds and oilmeals were imported duty free.

The quantity of copra imports by West Germany was included as an explanatory variable since copra is an alternative source of copra meal to importers. As expected for a competitive product, an increase in the quantity of copra imports was associated with an increase in exports of copra meal to West Germany. The magnitude was roughly as follows: a 1,000 metric ton import of copra corresponded with an estimated net increase in exports of copra meal to West Germany of 2,170 to 2,793 metric tons, with everything else held constant.

Oilseed meals are a major source of protein for animals while feedgrains are a source of carbohydrates. In this regard, it was hypothesized that the livestock population or total livestock units would be an important variable in the preparation of mixed feeds for animals. In equation (1), European corn production was included to reflect the expectation that feedgrains and copra meal would be complements in feed formulations. European corn production and total livestock units are reported in the various issues of the FAO Production Yearbook. Corn production in Europe increased during the study period, although in some years a decline occurred in its domestic supply.

Total animal units significantly affect imports of Philippine copra meal by West Germany. Together with copra imports, oilseed meal supply, and real exchange rate, animal units explained 66 percent of the variation in the quantity of copra meal imported from the Philippines. Total animal units of West Germany grew from 15.7 million in 1970 to 17.4 million in 1982, an increase of almost 1.8 million in 13 years. An expansion of 1,000 of these livestock units in this country was associated with an increase of 123 to 213 metric tons in the imports of copra meal from the Philippines (Table XXXIII).

Model (2) combined copra imports, other oilseed meal supply, exchange rate and corn production in Europe in another equation which yielded an R^2 of .69. The coefficient of the total corn produced in Europe was negative, indicating that it was a substitute in feed preparations; however, the coefficient was insignificant. When the price of sunflowerseed meal was substituted for

TABLE XXXIII

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COPRA MEAL IN WEST GERMANY, 1970-1982

Variable	Model 1	Model 2	Model 3
PCMx (wholesale price of copra meal in pesos)	23.076 (0.230)	35.111 (0.340)	116.900 (0.810)
TLU (Total animal units)	164.409 (1.563)	213.494 (1.751)	123.280 (1.067)
COI (Total copra import)	2.297 (2.172)	2.793 (2.277)	2.170 (2.01)
OMS (Other oilseed meal supply)	-0.036 (1.383)	-0.035 (1.317)	-0.029 (1.064)
RER (Real exchange rate)	-934539.94 (2.094)	-778934.47 (1.587)	-897290.15 (1.979)
ECP (Europe corn production)		-4.115 (0.850)	
SSM (Sunflowerseed meal import price)			-595.222 (0.914)
R^2	.657	.694	.699
D.W. Statistics	2.080	2.367	1.876
F-Statistics	2.677	2.262	2.317
C.V.	26.264	26.802	26.579

corn production, the demand function yielded a negative but insignificant coefficient.

West Germany also imported competing oilseed meals to meet its oilseed meal requirements for livestock. The other alternative oilseed meal supply included sunflowerseed meal, soybean meal and other oilseed meals. With price and other factors unchanged, a rise in the other oilseed meal imports by West Germany by 1,000 metric tons would mean a decline in the quantity of Philippine copra meal exports by 360 metric tons.

The effect of the devaluation of the Philippine peso on copra meal exports to West Germany was also estimated. A one percent decline in the real exchange rate, adjusted to 1980 prices, would result in an increase of 778 to 934 metric tons of copra meal imports. The change in the monetary policy in the Philippines was found to have an influence on aggregate exports of the Philippines and exert a significant effect on West Germany's demand.

The Philippine copra meal exports to West Germany were considered free entry. The copra price coefficients were found to be insignificant and did not influence the copra meal import demand by West Germany.

Other results. (1) When other equations were run and the price of soybean meal was included, a negative coefficient was obtained. However, a non-significant coefficient resulted. The same result was obtained with the linseed meal and rapeseed meal import prices. Groundnut meal variable coefficients varied from a non-significant to significant relationship. The sunflowerseed meal coefficient was of the expected sign and significantly affected the country's imports. Price and other factors remaining constant, a one dollar increase in the price of sunflowerseed meal would result in a 712 to 926 metric ton decrease in copra meal imports by West Germany.

(2) West Germany has a unique trading condition with their oilseed meals, because it has been an active traders in copra meal. This country imports copra meal and copra and exports copra meal. Hence, the demand for Philippine copra meal depends upon exports as well as domestic copra meal demand faced by the traders in West Germany. When Philippine copra meal exports to West Germany were regressed with West Germany's gross exports of oilseed meals, a nonsignificant result was obtained. This might be attributed to the fact that copra meal was only 10 percent of the total oilseed meal imports by West Germany.

The Netherlands

The quantity of Netherlands copra meal imports from the Philippines was converted to quantity per livestock unit, and was expressed as a function of the price of the copra meal, the total oilseed meal supply (except copra meal), the domestic production of feedgrains, and the real exchange rate. The four independent variables explained 59 percent of the variation in the per livestock unit imports of copra meal by the Netherlands, and their coefficients were all significantly different from zero. The three explanatory variables were of expected signs whereas a positive sign was obtained for the copra meal wholesale price. The inclusion of the rapeseed meal import price increased the R^2 to .68.

The result of the analysis conformed with the hypothesis that feedgrains and copra meal were complements in the preparation of mixed feeds for livestock. As shown in Table XXXIV, the total domestic production of the feedgrains coefficient was positive and highly significant. Assuming everything

TABLE XXXIV

ESTIMATED IMPORT DEMAND FOR PHILIPPINE COPRA MEAL BY THE NETHERLANDS, 1970-1982

Variable	Model 1	Model 2	Model 3
PCMx (wholesale price of copra meal)	0.082 (2.146)	0.098 (2.595)	0.076 (2.013)
TDF (Total domestic production of feedgrains)	4.891 (2.022)	6.042 (2.495)	4.802 (2.041)
OMS (Other oilseed meal supply)	-0.0049 (2.037)	-0.0060 (2.506)	-0.0048 (2.044)
RER (Real exchange rate)	-0.0356 (1.720)	-0.475 (2.234)	-0.318 (1.561)
SIP (Sunflowerseed meal import price)			-10.708 (1.211)
RSP (Rapeseed meal import price)		18.790 (1.414)	
R^2	.594	.684	.664
D.W. Statistics	2.922	3.029	2.767
F-Statistics	1.375	1.255	1.286
C.V.	36.014	32.958	35.011

else remains the same, a 1,000 metric ton increase in feedgrains production will increase imports of copra meal by the Netherlands by 5,000 metric tons.

The substitutability of copra with other oilseed meal imports by the Netherlands was estimated in this study. The coefficient for this variable was found to be negative and significant. The estimated relationship was a 100 metric ton increase in the imports by the Netherlands for other oilseed meals would result in a six metric ton decrease of Philippine copra meal destined to this market. Copra meal and other oilseed meals are not pound-for-pound substitutes in livestock rations because they differ in the amount and type of protein and in the amount of digestibility. Soybean meal contains 44 to 49 percent protein and with its well balanced amino acid profile, the protein of soybean meal is of better quality than other protein rich supplements of plant origin. Other oilseeds of higher protein content are largely made up of cottonseed meal, sunflowerseed meal, peanut meal and linseed meal.

The real exchange rate coefficient was of the expected sign and was significant. The estimated effect of this variable on the Netherlands' imports of Philippine copra meal was a one percent real depreciation of the Philippine currency corresponded to a one-half percent increase in the amount of copra meal directed to this Western European market.

Rapeseed meal, a by-product of crushed rapeseed beans, showed a substitute relationship with copra meal in the animal feed rations. A significant and positive coefficient was obtained when this independent variable was run with copra meal. Considering the *ceteris paribus* assumption, a one dollar rise in the price of this oilseed meal would result in an 18 metric ton increase in the import of copra meal by the Netherlands. However, sunflowerseed meal was found to be a complement for copra meal. The import price coefficient for this oilseed was negative and significant. The implied cross price elasticity was -.508.

Other results. (1) When import prices of different oilseed meals were entered as separate variables in preliminary analyses, positive relationships were established. However, the explanatory powers of the different variables were lower than those in Table XXXIV. These oilseed meals are soybean meal, groundnut meal, cottonseed meal, linseed meal and palm kernel meal.

(2) Preliminary analyses were also done using the actual quantity instead of quantity per livestock unit. The coefficients were found to be significant. However, unexpected signs were shown for the number of livestock animals, real exchange rate and copra meal prices.

(3) The price of copra was also included as an explanatory variable since copra is an alternative source of copra meal to importers. As expected for a competitive product, the increase in the price of copra was associated with an increase in exports of copra meal. The result of the study indicated a positive but nonsignificant coefficient.

Domestic Demand for Coconut Oil

As indicated in the review of literature, contradictory results were obtained by previous studies on domestic demand for coconut oil. A negative and nonsignificant price coefficient was obtained using the per capita copra consumption as the dependent variable in one study. In another study, however, a negative and statistically significant coefficient resulted when total coconut oil was considered as an explanatory variable. In this research, copra and coconut oil domestic consumption both expressed in total quantity and in per capita consumption resulted in a negative but statistically insignificant coefficient. The estimated domestic demand function is:

$$DODEx = -585.76 - .00089\ PHNI + 20.53\ PHPO \quad (5.2)$$
$$\qquad\qquad\qquad (1.91) \qquad\qquad (2.23)$$

$R^2 = .41$

D.W. = 2.13

where:

DODEx = quantity of coconut oil demanded in the Philippines

PHNI = national income at current prices in the Philippines

PHPO = population of the Philippines in millions

The coefficient for national income was negative and significant. The income elasticity at the means was -0.33, indicating a negative and a weak relationship between income and domestic demand for coconut oil. This relationship could be attributed to the tendency of the consumers to shift to vegetable oils, such as corn oil, with low cholesterol as income increases. This result is in line with the observations by the United Coconut Association of the Philippines (UCAP) (1984):

> Despite steady gains in national income since 1970, domestic consumption of edible coconut oil has shown annual fluctuations, seemingly indicating no relation between improved income levels and consumption. For the period 1970 through 1984, national income had grown to a total of ₱440 billion, with annual growth computed at 20.7 percent. Population, which was estimated at 53.3 million in 1984, had indicated an annual growth rate of 2.56 percent. As of 1984, the national per capita income is computed at ₱8,257 with annual growth at 16.1 percent. On the other hand, local consumption of edible oil fluctuated with the highest at 198 thousand tons in 1977 and the lowest in 1975 at 102.8 thousand tons (Appendix Table

XLVII). Per capita consumption hovered within a range of 1.94 kilos in 1984, the lowest in 15 years, to 4.44 kilos in 1977.

The population growth in the Philippines greatly affected the domestic demand of coconut oil. When the population variable was included in the analysis, a positive and significant coefficient was obtained. A one million increase in population in the Philippines would result in about a 20,000 kilogram increase in the domestic demand for coconut oil.

Other Results

(1) Time trend, which represented the changes in technology and taste and preference, was added to the above equation. A negative and nonsignificant coefficient was obtained.

(2) Semi-log analysis was considered using income, coconut oil price, population and time trend. The income variable negatively affected the domestic demand of coconut oil, and the domestic price coefficient was negative and significant. Population and time trend coefficients were found to be positive and significant. The economic significance of the result, however, was doubtful.

(3) When domestic per capita consumption was considered in the analysis, the results pointed out a positive and significant income coefficient. The price coefficient was negative and nonsignificant. The result of the analysis was not presented because of its high standard error.

(4) National expenditure instead of national income variable was run in another equation. A positive and significant coefficient was obtained. The current price coefficient was negative and nonsignificant. The high standard

error was the rationale for not including the coefficient in the presentation of the results.

(5) Some visual observations of the domestic data were: the domestic demand increased during the study period, reached a peak and averaged out after 1977, and the demand tended to decrease or level out after 1980.

Chapter Summary

Table XXXV presents a summary of price, income and cross price elasticities estimated from the coefficients of the United States, West Germany, and the Netherlands import demand functions. While the demand for coconut oil with respect to price in the United States and West Germany was highly inelastic, the Netherlands' import price elasticity was very elastic. This large difference in the elasticities could be explained by the concentration of Philippine coconut oil exports to the United States market, which imported virtually all of its supply from the Philippines. The Netherlands had other sources of the aforementioned products and imported some of its supplies from other coconut producing countries.

Income growth in both the United States and West Germany appeared to influence demand for coconut oil. These Philippines' trading partners import demands were highly elastic with respect to income. The increase in the real income in the Netherlands also significantly affected its import of coconut oil.

In the Netherlands, rape and mustard seed appeared to be substitutes for coconut oil. In West Germany palm kernel oil was a substitute and palm oil a complement to coconut oil.

Copra import price elasticities in West Germany and the Netherlands run from elastic to very elastic demands. Although copra enters the EEC duty free,

TABLE XXXV

SUMMARY OF PRICE, INCOME AND CROSS ELASTICITIES OBTAINED FROM U.S., WEST GERMANY AND THE NETHERLANDS IMPORT DEMAND FUNCTIONS

	With Respect to:						
			Cross Elasticity				
Product and Country	Own Price	Income	Linseed	Rape & Mustard Seed	Palm Oil	Palm Nuts and Kernel	Others
Coconut Oil							
United States	-0.21 to -0.42	+1.44 to +1.94					
West Germany	-0.28	+1.20 to +1.42			+0.24		Palm kernel oil = -0.78
Netherlands	-7.16 to -9.62	+10.40 to + 16.79		+2.80			
Copra							
West Germany	-1.57	+15.90 to +20.51				-2.14	
Netherlands	-1.69 to -7.62	+4.75 to 9.90	+3.81	-9.77		+14.78	
Desiccated Coconut							
United States	-0.14 to -0.16	-0.27 to -0.81[a]					
West Germany	-0.215 to -0.95[a]	+6.07 to + 6.16					cereal = -2.04
Netherlands	-0.34 to -0.75	+4.39					
Copra Meal							
West Germany	+0.13 to +0.64						sunflowerseed meal = -0.603
Netherlands							rapeseed meal = -0.508

[a]Price coefficient was found to be insignificant

both countries also import other oilseeds and copra from other oilseed producing countries. Most of these oilseeds not only compete with copra in the crushing industry but also in the oil and oilseed meal industries.

Copra trade to West Germany and the Netherlands was greatly affected by real income. The income elasticities for both countries were found to be highly elastic. This may be interpreted that the growth in income in these two countries would bring about a very large increase in their demand for copra, assuming other factors remain the same.

In the Netherlands both linseed and palm nuts and kernel substitute for copra. Rape and mustard seed have a very high cross price elasticity of -9.77.

The import price elasticity for desiccated coconut among the Philippines' trading partners -- the United States, West Germany, and the Netherlands -- was found to be inelastic. The result can be interpreted as a one percent decrease in the price of desiccated coconut will bring about only a .14 to .75 percent increase in their import of this confectionery input.

The income elasticities for West Germany and the Netherlands copra import demand were highly elastic. In the U.S., the income elasticity for desiccated coconut was very inelastic. This may be explained by the fact that although the income in the U.S. increased during the last decade, their consumption of desiccated coconut decreased and their consumption of nuts increased. Both desiccated coconut and nuts are inputs in the confectionery industry.

Copra meal wholesale prices did not influence the import demand by either West Germany or the Netherlands. Rapeseed meal, a by-product from crushed rapeseed beans produced domestically in Europe, significantly affected copra meal imports; however, the cross price elasticity was relatively low at -.508.

CHAPTER VI

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

The introduction in this study provided a brief description of the heavy reliance of Philippine coconut products and by-product on the export market which had been concentrated in the U.S. and in the EEC member countries. Lately, however, other developing countries such as Japan, the U.S.S.R., and Asian countries have increased their imports of these products. Developments in the economies of these countries may significantly affect the volume of Philippine coconut products and by-product exports. Very few studies have been done on the products market, especially for individual countries.

The objective of the study was to analyze the effect of selected factors on the import demand for Philippine coconut products and by-product by the U.S., West Germany and the Netherlands, the three leading and most consistent buyers of vegetable oil products and by-product on a commercial basis. By identifying the relevant factors in the three markets, the research was designed to be useful in policy and marketing decision-making.

Philippine coconut oil, copra, copra meal and desiccated coconut were considered separately. Each commodity market was divided into U.S., West Germany and Netherland import markets to permit more detailed analysis. This level of aggregation allows identification of some unique local demand relationships that were ambiguous in the regional demand analysis.

A conceptual model was developed that could portray the more relevant variables affecting the Philippine and foreign markets for coconut products and by-product. Given the resources and data available, 11 short-run empirical models for coconut products and by-product were estimated by fitting OLS equations using annual data for the period 1970-1982.

In the import demand analysis for the U.S., West Germany, and the Netherlands, it was assumed that import demand for coconut products and by-product was the difference between the quantities demanded of these products and the quantities supplied domestically at various prices. With this assumption, an import demand relation contains variables which reflect both demand and supply conditions in the importing country. The variables included for the different models in the study were prices of the products, price or quantities of available substitutes on both the demand and supply sides; consumers incomes; tastes and preferences; real exchange rates; and production technology. It was further assumed that the import demand for coconut products and by-product generated by importers in the deficit countries was equivalent to the demand faced by Philippine exporters.

A Review of Policies in the Vegetable Oil and Oilseed Industry

A wide variety of trade restrictions were imposed by the Philippines' trading partners during the last two decades. These included tariff and non-tariff measures. In the U.S., copra had a duty-free access to the U.S. The same privilege was also extended by the U.S. to copra meal, and Philippine desiccated coconut was subjected to only two cents per pound tariff. In the case of coconut oil, it was subjected to full duty starting January 1, 1974.

In the EEC, of which West Germany and the Netherlands are members, ad valorem taxes were charged on their imports of vegetable oils and fats. The charges were based on the purpose for which the product would be used; that is, industrial or edible, whether in crude or refined form, and fit or unfit for human consumption. The tariff rates imposed were bound under the General Agreement on Tariffs and Trade (GATT) as follows: 4 to 15 percent on both crude and refined fats and oils, 17 percent for hydrogenated or hardened fats and oils, and 20 percent for products in containers of 1 kilogram or less. In addition to tariff charges, some EEC member countries also imposed non-tariff measures such as compensatory levy, varying taxes applied on certain fats and oils, divergent national packaging and labelling regulations for vegetable oils and margarine. Aside from tariff rate charges based on the GATT, the Generalized System of Preferences (GSP) scheme was also observed by the EEC member countries. The GSP tariff rate concessions were 1.2 to 12 percent for vegetable oil and 11 to 16 percent ad valorem taxes for hardened or hydrogenated vegetable fats and oils.

Some Philippine domestic policies were also reviewed in this study. A levy of 10 centavos per 100 kilograms was imposed on desiccated coconut, coconut oil and copra meal to help finance the operation of the Philippine Coconut Authority (PHILCOA) in 1954. Coconut mills for the manufacture of coconut products and by-product were established in the 1950's. Funds were also created to grant loans to finance capital requirements of coconut cooperatives and farmers.

Government involvement in the coconut industry was more apparent in the 1970's with the imposition of explicit taxes, ranging from export taxes to domestic levies. The imposition of taxes commenced after the devaluation of the peso in 1970, capturing the windfall profits gained by the exporters. This was undertaken to promote forward integration or the domestic processing of copra available in the domestic market. Another coconut levy was collected from coconut producers in 1971, underwriting the Coconut Investment Company (CIC). Farmers could invest in this company in the processing and trading of coconut products. In 1973, another levy was collected as a result of an abrupt increase in prices of coconut products. The collection, however, was accompanied by higher production costs that resulted in heavy losses to farmers.

Given this dilemma, government rescue was apparent by subsidizing farmers production activity. A premium duty on coconut product exports was again imposed to capture the windfall gains by the exporters with the occurrence of another favorable market in 1974. The duty charged was abolished in 1980, and the export tax was rescinded. The Philippine Coconut Authority (PCA) was authorized in 1975 to purchase a bank, which became the principal financial institution where coconut farmers could invest in the processing and trading of their products. The national program to replant the country's coconut farms with a hybrid was also launched as part of the vertical integration program of the industry. The desiccated coconut sector of the industry was not greatly affected by problems of overcapacity of mills and undersupply of inputs because of timely prohibition of establishing or operation of new desiccated coconut processing plants.

Production, Structure and Trade Patterns for Oilseeds and Vegetable Oils

The 1984 combined world production of vegetable oils and animal/marine fats was 62.78 million metric tons. Products of vegetable origin accounted for over two-thirds (69.2 percent). Less than one-third (30.8 percent) consisted of fats from land and sea animals.

Soybean oil was the major oil produced in 1984 which amounted to 13.42 million metric tons. Lauric oils production were as follows: coconut oil at 2.09 million metric tons, palm kernel oil at 824 thousand metric tons and palm kernel oil at 6.27 million metric tons.

In 1984, rapeseed production was 5.34 million metric tons. Cottonseed's output volume was 3.387 million metric tons with groundnut at 2.88 million metric tons. The other vegetable oils produced, with a combined output of 3.42 million metric tons, were olive oil, linseed oil, sesame oil, castor oil, and tung oil.

The top producing countries of different vegetable oils in 1984 were: Philippines, for coconut oil; Malaysia, for palm oil and palm kernel oil; and the United States, for soybean oil. The other top producers were: People's Republic of China for cottonseed; India for groundnut and sesame oil; U.S.S.R. for sunflowerseed oil; and Europe for olive oil.

The total shipment of edible vegetable oils, industrial oils and animal and marine fats amounted to 26.94 million metric tons in 1984. Edible vegetable oil share was more than three fourths (78.3 percent). Soybean oil was the major traded oil followed by palm oil. The third largest exported oil was sunflowerseed oil and the fourth was rapeseed oil. Coconut oil inclusive of copra converted to oil was fifth, groundnut ranked as the sixth largest oil export. Other vegetable oils widely exported were palm kernel oil, olive oil and sesame oil.

Philippines dominated the coconut oil trade and the United States was the top exporter of soybean oil. The largest trader of groundnut and oil was the United States. The other top traders of vegetable oils were: United States for sunflowerseed oil; Canada for rapeseed; Malaysia for palm oil and palm kernel oil; and Argentina for linseed and oils.

Philippine coconut oil is exported mainly to two major markets, the United States and Western Europe with average shares of 58.20 and 26.16 percent, respectively, from 1967 to 1984. In 1984, as cited by the United Coconut Association of the Philippines (UCAP), 49.1 percent of the total Philippine coconut oil exports went to the United States. Other importers were Western Europe, the Soviet Union, People's Republic of China, Japan and other unspecified countries.

The European market had always been the major buyer of Philippine copra; however, its share was markedly reduced in 1983. Regular outlets in South America were Venezuela and Colombia. Other outlets were the U.S.S.R., Japan and other Asian and developing countries.

The United States and Western Europe still maintained positions as the prime markets for desiccated coconut from the Philippines. Countries of Asia and the Pacific, Canada, Middle East, Latin and Central America were the other importers of Philippine desiccated coconut.

The two largest suppliers of copra meal in the world market were the Philippines and Indonesia during the 1970-1984 period. Papua New Guinea shared about one percent of the copra meal world market, and Mozambique less than one percent. Almost all of the Philippine copra meal exports went to the Western European market. Japan and other developed countries absorbed less than one percent of the country's copra meal exports.

Results of Import Demand Analysis

The demands for coconut oil in the United States and West Germany were highly price inelastic. The direct price elasticity at the means were -21 to -.42 for the U.S. and -.28 for West Germany. In the Netherlands, the demand was highly price elastic with estimates ranging from -7.16 to -9.62. This inelasticity of the demand in the U.S. may be explained by the fact that most of the Philippines' coconut oil was exported to this country due to the preferential trade agreement signed between the two countries. The higher price elasticity of demand observed in the Netherlands could be attributed to the fact that this country has other sources of coconut oil. The country is also involved in the re-export of the commodity to other EEC member countries. In addition, coconut oil has to compete with other oilseeds and vegetable oil imports by the Netherlands.

The real income coefficients for the three countries included in this study were significant, with income elasticity greater than unity. A one percent growth in income would result in a 1.44 to 1.94 percent increase in the import demand for Philippine coconut oil in the U.S., a 1.20 to 1.42 percent increase in West Germany and a very large increase of 10.40 to 16.79 percent in the Netherlands.

Palm oil and palm kernel oil appeared to be substitutes for coconut oil in West Germany. The cross price elasticity of these two lauric oils was +.24 for the former oil and +.78 for the latter. Rape and mustard seed oil had a cross price elasticity of +2.80 for Netherlands' coconut oil imports from the Philippines.

The subsidy program among the EEC member countries for oilseed production significantly affected imports of Philippine coconut oil. The relationship indicated that a 1,000 metric ton increase in its domestic oilseed production would lead to a 248 metric ton decrease in imports of Philippine coconut oil into the Netherlands and an 8 to 10 metric ton decrease in West Germany's imports. Oilseed production in the United States could also contribute to the decrease in import of Philippine coconut oil. A 1,000 metric ton increase in U.S. domestic production of sunflowerseed, soybeans, linseed, groundnut and cottonseed would result in a 341 metric ton decrease in coconut oil imports.

The devaluation of the Philippine peso in the 1970's significantly influenced its exports of coconut oil to all trading partners except the Netherlands. The real exchange rate coefficients for the U.S. and West Germany were of expected signs and statistically significant. A one percent depreciation of the Philippine peso would lead to a .89 to 1.34 percent increase in imports of coconut oil by the United States. In West Germany, a one percent depreciation in the real exchange rate would lead to 2,367 to 3,402 metric tons increase in imports of Philippine coconut oil. In the case of the Netherlands, a positive and insignificant real exchange rate coefficient was obtained when this variable was included in the coconut oil import demand analysis.

In the copra import demand analysis, only two countries were included, West Germany and the Netherlands. The United States stopped importing copra in 1975 after the termination of the Laurel-Langley Agreement signed by the two countries. A negative and significant coefficient was obtained for the wholesale price in the West Germany import demand function. The price elasticity of demand at the means was -1.57. The import demand price elasticity for copra in the Netherlands was higher, ranging from -1.69 to -7.62. This implies that the Netherlands' importers responded more to changes in prices of copra than importers in West Germany.

The income elasticities of demand in both EEC countries were higher than estimates from previous studies by Librero and Nyberg. The Netherlands income elasticity ranged from 4.75 to 9.90. A one percent increase in income by consumers in the Netherlands would correspond to about a five to 10 percent rise in the demand of copra from the Philippines. West Germany's income demand elasticity ranged from +15.90 to +20.51.

Other oilseed imports by the two EEC countries varied from being substitutes to complements for copra. Both linseed and palm nuts and kernel were found to be substitutes for copra. The cross price elasticity of copra demand by West Germany was +3.81 and +14.78 for palm nuts and kernel. The rape and mustard seed variable was found to be a complement for copra imports by the Netherlands with a cross price elasticity of -9.77.

The real exchange rate coefficients for both countries were of expected signs, but were significant only for the Netherlands. In the Netherlands, a one percent real depreciation of the Philippine currency would correspond to almost a 1,000 metric ton increase in Netherland copra imports.

Domestic oilseed production, including rapeseed, sunflowerseed and olive, was indicated to be complementary with copra but not significant for West Germany's import of copra. On the other hand, the Netherlands' domestic rapeseed production significantly affected its import demand for copra. The coefficient indicated that a 1,000 metric ton growth in its production would be accompanied by a decrease of over 8,000 metric tons in imports of Philippine copra.

In addition to copra imports from the Philippines and domestic oilseed production, West Germany also imported other oilseeds to meet its annual national requirements. The regression coefficient for this variable was negative and significant. The substitution relationship indicated that a 100 metric ton import of these oilseeds would result in a 22 to 35 metric ton decrease in West Germany's copra imports. A different relationship resulted when oilseed production was regressed in the Netherlands' copra import demand. A one percentage point increase in the other oilseed imports would result in a little over a 1,000 metric ton rise in copra exports by the Philippines to the Netherlands.

The demand for desiccated coconut in the U.S. and in West Germany responded significantly to changes in prices; however, in the Netherlands, the wholesale price coefficient was positive and insignificant. The analysis pointed out inelastic demands which ranged from -.14 to -.16 for the U.S. and -.34 to -.75 for West Germany.

Variable signs were obtained when real national income was regressed with desiccated coconut imports of the United States. The income elasticities in West Germany and the Netherlands were highly elastic, where a one percent rise in income would result in average increases of +6.11 percent and +4.39 percent, respectively. In summary, consumers in the two countries responded significantly by changing imports of desiccated coconut in response to changes in incomes.

Price coefficients for Cereal and Bakery Products in the U.S. import demand function were all negative and significant. The cross price elasticity estimates for the two models were -1.00 and -1.37, respectively.

A significant and positive coefficient was obtained for confectionery sales when entered in the import demand equation for desiccated coconut in the United States. Everything remaining the same, a $1,000,000 increase in the sales of confectionery would result in a rise of 43 metric tons of desiccated coconut imports by the United States.

The relationship between cocoa and desiccated coconut imports by the United States indicated that the products were substitutes rather than complements. An increase in U.S. total use of cocoa by one metric ton would result in a 0.5 metric ton decrease in the import of Philippine desiccated coconut. In the Netherlands, assuming everything constant, a 1,000 metric ton increase in imports of cocoa by this nation would result in a rise of 60 metric tons of desiccated coconut imports from the Philippines. West Germany's net import of cocoa did not significantly affect its import of desiccated coconut.

Since most of the Netherlands' imports of nuts, an input for the confectionery industry, originated from Europe, a total regional production of pistachios was regressed with per capita imports of desiccated coconut, and the coefficient was found to be positive and significant. An increase of 1,000 metric tons of pistachios produced in Europe would result in a 30 ton increase in desiccated coconut imports by the Netherlands. The coefficients for the other nuts produced in the region were found to be positive and nonsignificant.

European production of both hazelnuts and chestnuts established a substitute relationship with the desiccated coconut imports by West Germany. Other things remaining the same, a 1,000 ton increase in Europe's hazelnut production would bring about a two metric ton decrease in the import of desiccated coconut by West Germany. A 1,000 ton increase in the production of chestnuts resulted in an 18 metric ton decline in West Germany's import of desiccated coconut.

The real exchange rate was considered as an important variable model for U.S. and West German import demand functions of desiccated coconut. Real exchange rate regression coefficients were negative and significant in both countries. In the United States, a one percent real depreciation of Philippine currency would result in a 1,548 metric ton increase in its import of desiccated coconut and a 452 metric ton increase in West Germany's import of the product considering the same percentage change in real exchange rate. Changes in the real exchange rate did not influence the Netherlands' trade of desiccated coconut from the Philippines.

The wholesale price coefficients for the Netherlands and West Germany's copra meal import demand function were found to be positive and insignificant. The study confirmed the assumption that feedgrains and copra meal would complement each other in animal feed formulations. When this explanatory variable was regressed with the import demand of copra meal by the Netherlands, a positive and highly significant coefficient was obtained. This relationship established that a 1,000 metric ton increase in the production of feedgrains by this country would result in the rise in imports of copra meal by an amount of 500 metric tons.

The substitutability between copra meal and other oilseed meal was found to be related in this study. For both countries, the coefficients of this independent variable were found to be negative and significant. The estimated relationship was a 1,000 metric ton increase in the imports of other oilseed meals would bring about a 60 metric ton decrease of copra meal shipped to the Netherlands and a decrease of 360 metric tons shipped to West Germany.

The real exchange rate coefficients for both countries were found to be of expected signs and significant. A one percent real depreciation of the Philippine currency would result in a one-half of one percent increase in the amount of copra meal destined to the Netherlands. West Germany's import would increase by as much as 778 to 934 metric tons of copra meal for a one percent real depreciation in the Philippine currency.

Rapeseed meal was found to be a substitute for copra meal in animal livestock feed rations. A significant and positive coefficient was obtained when this independent variable was regressed with copra meal. A one dollar rise in the price of rapeseed meal would result in a 18 metric ton increase in the import of copra meal by the Netherlands. Sunflowerseed meal, however, was found to be a complement for copra meal in the animal feed preparation with cross price elasticity of -508. In West Germany, a one dollar decrease in the price of this oilseed meal would result in a 712 to 926 metric ton increase in the import of copra meal.

The increased production of cattle, pigs, chicken and sheep in West Germany significantly affected its import of copra meal. The expansion of 1,000 livestock units in this country increased imports of copra meal from the Philippines by 123 to 213 metric tons.

Conclusions and Policy Implications

Several conclusions and policy implications can be drawn from this study. First, growth in income within the economies of the Philippine trading partners has a significant impact on imports of coconut products. In these countries, growth in income has been associated with an increase in vegetable oil consumption. However, further growth in income appears to be associated with a decrease in the per capita consumption of coconut products and by-product. This occurs as consumers further change their taste and preferences away from the oily or high calorie food products. A further reduction in the consumption of coconut products and by-product could also be attributed to some technical improvement in the processing of cooking oils. In Western Europe, salad and cooking oils have been important traditionally. But now fats and oils reach consumers in a variety of end products. For example, margarine was developed to imitate the qualities of butter.

In addition, considering the fact that an increase in real income has indicated some little effect on U.S. and Netherlands import demand of desiccated coconut and the relatively high per capita consumption of other nuts in the confectionery industry nowadays, implies the need to develop and promote the market in other countries in order to expand the coconut products markets.

Second, Philippine market development policies and its trading partners (especially the EEC), and fluctuations in the total quantity of oilseed production in the U.S. and in the EEC including the domestic subsidy significantly affected their exports of Philippine coconut products. This implies the need to simultaneously consider the Philippine coconut product market and oilseed markets of its trading partners.

Third, the self-sufficiency program and the EEC policy of subsidizing domestic oilseed production to meet its national consumption needs were significant factors in affecting imports of Philippine coconut products and by-product. These self-sufficiency programs affect the importation of coconut products and by-product through: (1) increase in rapeseed and sunflowerseed production in the EEC, and (2) intervening in the importation as well as the distribution of oilseeds and vegetable oils in the domestic market. This suggests the importance of specifying the food self-sufficiency program as one of the explanatory variables in the import demand model.

Limitations and Suggestions for Further Research

This research attempted to analyze and evaluate a short-run model of the Philippines, U.S., West Germany and the Netherlands markets for coconut products and by-product. In order to improve the representativeness and effectiveness of the model for policy analysis purposes, some further study is needed.

Giving due consideration to government programs in the coconut industry, one of the most important aspects is the specification of the behavioral equations for coconut products supply availability. By endogenizing supply, the model could give, among other things, a better idea about the relationships between several Philippine domestic policies related to the coconut industry and commercial sales of Philippine coconut products and by-product.

Income variables responded well in the different models and in the products included in this study. In this regard, disaggregation of domestic demand for coconut oil for industrial uses and for human consumption, copra for food consumption and demand for feed is recommended to clarify the income response of the model.

In order to evaluate the long-run effect of devaluation in the Philippine peso on coconut product exports, improved treatment of other competing oilseed prices is needed. The rationale will be that devaluation of the Philippine peso lowers the price of coconut products in terms of the importer's currency. The contention whether this lower price has an effect on the quantity of Philippine coconut products and by-product depends upon (1) whether the importing country has an import policy which maintains a quota for vegetable oils and oilseeds, especially the Western European countries where they are offering some concessions on their former colonies, and (2) whether the other exporters of these products will follow suit with the Philippine peso devaluation.

The inclusion of tariffs and other policy variables imposed by the importing country and the Philippine government on oilseeds and coconut products into the model is recommended. The objective or the purpose is to clarify or find out the role of price as well as exchange rate influences on Philippine coconut products and by-product exports. The modification in the different models, however, requires a lot of time and expensive research effort because detailed and more recent data are needed in the analysis.

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APPENDIXES

APPENDIX A

DEFINITION OF VARIABLES

AND SOURCES OF DATA

APPENDIX A

Definition of Variables and Sources of Data

The list of variables used in this study, their definitions and sources of data are stated below.

Quantity of Copra (QCPX), Coconut Oil (QCOx), Copra Meal (QCMx), and Desiccated Coconut (QDCx) exported by the Philippines. These coconut products and by-product quantities represent annual exports coming from the Philippines and are the sum of the amounts reported by exporters, by the Bureau of Customs as compiled by the National Census and Statistics Office (NCSO), National Economic Development Authority (NEDA), Manila. The data series used in this research were obtained from the Statistical Bulletin published quarterly by the Central Bank of the Philippines and in some other official documents. In the statistical analyses, these quantities were expressed in metric tons.

Prices of Copra (PCPx), Coconut Oil (PCOx), Copra Meal (PCMx), and Desiccated Coconut (PDCx). Yearly wholesale prices of copra, coconut oil, copra meal and desiccated coconut in the Philippines are available both in terms of Philippine pesos and United States dollars in the Central Bank of the Philippines' Statistical Bulletin; United Coconut Association of the Philippines (UCAP) Annual Coconut Statistics (various issues); and the National Census and Statistics Office (NCSO) of the National Economic Development Authority (NEDA). For this study, prices of coconut products and by-product were expressed in pesos per metric ton.

Prices of Vegetable Oils: Soybean Oil (PSO), Palm Kernel Oil (PPK), Palm Oil (PPO), Sunflower Oil (PSO), Linseed Oil (PLO), Groundnut Oil (PGO), Cottonseed Oil (PCO). The wholesale prices for soybean oil used in the analysis for U.S. import demand refer to crude oil, in tank cars, f.o.b. Decatur, Southeastern mills in the United States published in the U.S. Fats and Oils Statistics and the Fats and Oils Situation published five times a year by the U.S. Department of Agriculture, Economics Research Service. Soybean oil prices included in the analysis of import demand for copra and coconut oil by West Germany and the Netherlands were taken from various issues of the FAO Trade Yearbook. Cottonseed oil, Linseed oil, Sunflower oil, Groundnut oil, Palm oil, and Palm Kernel oil prices used in the analyses for West Germany and the Netherlands import demand were domestic import prices by the respective country. These data were taken from the various issues of the FAO Trade Yearbook.

Prices of Oilseeds: Soybean (POS), Linseed (POL), Sunflowerseed (POW), Palm Nuts (PON), Palm Kernel (POK), Olive (POO), Groundnut (POG). Prices of oilseeds such as soybeans, linseed, sunflower, palm nuts, palm kernels, olive and groundnut used in the analysis for copra import demand of West Germany and the Netherlands are import prices gathered from the FAO Trade Yearbook (various issues).

Prices of Oilseed Meal: Soybean Meal (PSM), Linseed Meal (PLM), Sunflowerseed Meal (PWM), Groundnut Meal (PGM), Rapeseed Meal (PRM), Palm Nuts and Kernel Meal (PPM), Cottonseed Meal (PCM). Oilseed meal prices considered in the analysis of copra meal import demand by West Germany and the Netherlands were domestic import prices by the said importers.

Livestock Units (LU). The annual data on livestock units was constructed to measure all oilseed meal consuming poultry and other livestock in one quantity or unit. Librero cited the U.S. Department of Agriculture's Statistical Bulletin No. 337, Livestock-Feed Relationships, 1909-1963 (November 1963) which divided livestock units into two major categories: animal units and livestock production units. The animal units are further subdivided into (1) grain consuming, (2) roughage consuming, (3) grain and roughage or all feed consuming, and (4) high protein feed consuming. The two sets of data on livestock production units were based on concentrates and on all feeds. One animal unit is defined as one milk cow or its equivalent as measured by average rate of feed consumption. Each kind of livestock or poultry is converted into the standard animal unit according to the proportion of its feed consumption based on the consumption of one milk cow, that is, the weight of each kind of livestock or poultry is the ratio of the amount of feed consumed by one milk cow. Since this research included copra meal as a product, the high protein consuming animal unit series was used. This series is a variation of the grain-consuming animal unit based on high protein feed consumed (oilseed meals, animal protein, and grain protein).

The weight of each kind of livestock utilized in the import demand analysis for West Germany and the Netherlands was based on the oilseed meal consumption developed by Elz in 1970 for the member countries of the European Economic Community. The weights are 1.00 for cattle, .4 for pigs, and .025 for chickens.

Livestock population data used in this study were obtained from the FAO Production Yearbook (various issues).

Quantity of Oilseed Production in the United States (QOPU). The U.S. Department of Agriculture's publication on Fats and Oils Situation (various issues) was the source of data on oilseed production including soybean, linseed and groundnut. The oilseed production was reported on a crop year basis covering the period October 1 to September 30.

Confectionery Sales (CSUS). Confectionery sales for the U.S. represent the sum of sales of confectioneries by manufacturer-retailers, and chocolate manufacturers making consumer-type confectionery bars, etc. They were estimates based on total sales reported by industries. The series for 1970-1982 was obtained from the U.S. Department of Commerce Business Statistics and the monthly Survey of Current Business. Confectionery sales were expressed in million dollars.

National Income for U.S. (NIUS), West Germany (NIWG), The Netherlands (NINE), and The Philippines (NIRP). The income variables used in this study were the real national income of countries importing coconut oil, copra, desiccated coconut, and copra meal from the Philippines. The estimates of the real national income for the three importers of coconut products and by-product were deflated by the respective country's Consumers Price Index (CPI) and population (N). The information for CPI and population for the U.S. was obtained from the Statistical Abstracts of the United States. Data on population and CPI for West Germany, the Netherlands and the Philippines were gathered from the International Financial Statistics (various issues) published by the International Monetary Fund (IMF). The national income data of the Philippines was collected from Annual Statistical Yearbook published by the National Census and Statistics Office (NCSO), National Economic Development Authority (NEDA), Manila. The formula for the computation of the real national income of the United States, West Germany and the Netherlands is presented below.

$$RNI = \frac{INI}{ICPI * ICN}$$

where:

RNI = real national income of the importing country

INI = importing country's national income

ICPI = importing country's consumers price index

ICN = importing country's population

Exchange Rate for West Germany (ERWG), The Netherlands (ERNE), The Philippines (ERRP). The exchange rates included in this research were the real exchange rates of importing countries for coconut oil, copra, desiccated coconut and copra meal. The series of this variable for three importers of Philippine products and by-product were estimated using the following steps: (1) the annual exchange rate of importing countries was divided by the Philippine exchange rate, (2) Philippine Consumers Price Index was divided by importer's Consumer Price Index and (3) the quotients for (1) and (2) were multiplied. The data on exchange rate and Consumer Price Index were obtained from the International Financial Statistics published by the International Monetary Fund. Information on Consumers Price Index was adjusted to 1980 prices. The real exchange rate formula is presented below:

$$RER = \frac{IER}{PER} * \frac{PCPI}{ICPI}$$

where:

RER = Real exchange rate

IER = Importing country's exchange rate

PER = Philippine exchange rate

PCPI = Philippine consumer price index

ICPI = Importing country's consumer price index

APPENDIX B

BASIC DATA USED IN THE STUDY

TABLE XXXVI

DATA SERIES FOR COCONUT OIL IMPORT DEMAND
FUNCTION FOR THE UNITED STATES, 1970-1982

Year	QUCO	USPO	USDI	IPCO	UNOI	UTOS	UWCO	UWLO	UWSO	USOO	USCPI
1970	280658	695.3	205.1	1630	181694	32861	295.42	242.51	577.61	264.55	47.1
1971	290645	742.8	207.7	1630	214854	33993	335.10	196.21	596.24	277.78	49.1
1972	238224	801.3	209.9	1200	320871	71097	253.53	202.82	692.24	233.69	50.8
1973	265697	901.7	211.9	2400	301258	44446	429.90	319.67	815.70	436.51	53.9
1974	291014	982.9	213.9	6280	354104	35361	839.95	978.84	950.18	789.25	59.8
1975	462405	1096.1	216.0	2770	576990	44567	559.65	881.84	1470.47	559.97	65.3
1976	543002	1194.4	218.0	2570	513404	37331	513.67	595.24	1108.91	414.46	69.1
1977	468754	1311.5	220.2	3940	399137	51274	540.13	584.22	1146.39	524.69	73.6
1978	488197	1474.0	222.6	4490	291127	54604	745.15	542.33	906.09	692.34	79.2
1979	367149	1650.2	225.1	6780	317795	67137	696.65	632.72	914.91	535.72	88.1
1980	359375	1828.9	227.7	4590	375662	51767	553.35	630.52	1025.14	500.44	100.0
1981	368413	2041.7	230.0	4010	287925	58538	531.31	694.45	1216.94	418.87	110.4
1982	368761	2180.5	232.3	3700	278859	66246	423.28	595.24	1598.34	370.37	117.1

TABLE XXXVII

DATA SERIES FOR COCONUT OIL IMPORT DEMAND FUNCTION FOR WEST GERMANY, 1970-1982[a]

Year	QWCO	WGPO	WGRP	WGNI	GTNS	GNOI	GTOI	WGER	WCPI	GSOO	GCOO	GOLO	GSUO	GRMO	GLIO	GPAO	GPKO	GCAO
1970	14720	60.65	185	610.8	867840	287212	713.15	3.6465	61.1	248.87	285.68	863.57	293.20	279.75	219.14	251.02	298.38	286.14
1971	11802	61.29	228	676.8	865490	350996	719.31	3.4820	64.4	306.59	366.71	866.75	370.27	313.64	199.08	264.03	326.23	330.29
1972	8600	61.67	249	740.4	962665	308243	617.79	3.1886	67.9	298.36	337.98	1053.95	339.04	268.77	195.26	229.22	258.84	442.96
1973	7838	61.97	222	824.4	1220157	381295	488.85	2.6726	72.6	380.41	372.70	1397.26	412.53	375.68	289.21	303.75	329.44	985.96
1974	12470	62.04	301	879.6	1346681	433541	585.62	2.5878	77.7	725.11	717.45	1809.92	866.78	692.39	1033.97	646.99	871.01	943.33
1975	5629	61.83	199	917.9	1375251	438549	597.84	2.6403	82.3	741.38	777.91	2001.49	776.16	634.80	768.14	506.86	525.02	639.71
1976	17035	61.51	222	999.5	1406807	438549	504.00	2.5180	85.5	463.34	585.69	1627.56	593.58	434.59	556.34	400.38	417.06	625.67
1977	17440	61.40	282	1066.4	1473678	423826	547.95	2.3222	88.6	578.16	634.72	1594.23	658.50	631.72	494.01	548.51	586.88	896.03
1978	33272	61.31	331	1148.8	1516476	353819	529.47	2.0086	91.0	625.26	696.71	2301.99	677.12	586.68	397.30	540.02	671.98	833.38
1979	23004	61.44	321	1245.7	1520126	359291	597.24	1.8329	94.8	692.82	773.58	2463.11	841.08	632.32	547.32	655.25	938.83	823.76
1980	32856	61.56	377	1311.5	1734129	291000	617.57	1.8177	100.0	617.74	703.88	2502.97	838.46	593.38	65.89	624.37	726.15	1027.19
1981	34150	61.67	363	1356.5	1609535	255969	538.68	2.2600	105.9	536.02	678.73	2109.57	705.55	517.10	611.51	590.51	589.23	926.07
1982	3823	61.64	535	1396.0	1632398	271452	515.10	2.4266	111.5	460.97	576.21	2136.93	3630.70	466.33	530.59	505.83	482.89	886.55

[a]For data on coconut oil price, see Table XXXVI.

TABLE XXXVIII

DATA SERIES FOR COCONUT OIL IMPORT DEMAND FUNCTION FOR THE NETHERLANDS, 1970-1982[a]

Year	QNCO	NEPO	NERP	NECI	NENI	NNOI	NTNS	NEER	NCPI	NSOO	NCOO	NOLO	NSUO	NRMO	NLIO	NPAO	NPKO	NCAO
1970	22083	13.03	22	167470	105.26	256542	366	3.6166	49.4	270.02	306.78	907.19	269.90	240.98	224.40	244.77	316.38	273.46
1971	56869	13.19	33	253784	118.80	472159	485	3.4945	53.1	305.25	371.60	903.47	335.44	299.43	207.02	246.96	329.51	338.49
1972	57339	13.33	41	374854	135.40	664729	682	3.2095	57.2	283.45	331.06	1082.55	318.31	237.39	207.76	209.22	248.87	383.78
1973	45077	13.44	41	264489	154.85	446551	463	2.7956	61.8	409.63	445.38	1369.84	387.34	406.69	385.58	265.28	372.41	900.54
1974	41088	13.54	45	149200	174.66	420262	437	2.6884	67.8	758.60	817.89	1819.23	748.89	727.80	880.64	575.38	876.96	911.20
1975	27738	13.65	37	554307	189.27	649480	663	2.5290	74.7	675.20	798.32	2354.90	797.56	598.30	729.83	462.90	507.73	664.74
1976	62040	13.77	34	561755	218.32	713777	727	2.6439	81.2	469.67	563.34	1169.18	625.68	431.26	554.79	386.26	382.73	614.70
1977	64927	13.85	30	459355	237.76	593077	605	2.4543	86.5	569.43	703.85	1691.03	651.18	544.40	484.24	397.03	585.31	869.30
1978	103533	13.94	23	216750	269.99	547249	556	2.1636	90.1	593.61	781.25	2076.70	688.55	538.13	405.08	548.72	622.43	903.72
1979	119264	14.03	18	86500	286.31	550943	558	2.0600	93.9	661.98	721.59	2499.37	807.03	663.15	596.80	632.15	946.97	918.18
1980	195634	14.14	29	88000	303.32	579075	590	1.9881	100.0	691.50	820.22	2648.95	710.44	589.35	686.97	586.93	719.15	1003.6
1981	213830	14.25	37	62626	316.03	576071	590	2.4952	106.7	572.14	489.84	1988.49	704.02	510.33	637.80	562.89	595.52	945.03
1982	57394	14.31	33	37728	329.43	474971	488	2.6702	113.0	484.12	625.13	2053.15	556.86	434.20	598.37	485.67	493.22	922.28

[a]For data on coconut oil price, see Table XXXVI.

TABLE XXXIX

DATA SERIES FOR COPRA IMPORT DEMAND FUNCTION FOR WEST GERMANY, 1970-1982[a]

Year	QWCP	WTLU	IPCP	WSIP	WWIP	WRMP	WPIP	WLIP	WTNS	WOSM	WNOO	WNOI
1970	20676	15679	1040	107.56	158.15	136.24	158.34	128.23	851	492628	779840	287212
1971	72593	15809	1030	124.51	198.36	144.44	148.14	120.50	957	518494	869490	350996
1972	126214	15305	800	128.52	171.45	143.69	111.78	119.21	974	569412	877655	308243
1973	96969	15519	1490	197.78	229.43	214.57	182.39	228.48	1189	722232	1104157	381925
1974	29000	15968	3603	245.67	350.76	345.10	405.01	452.63	1386	836140	1269681	433541
1975	44173	15949	1200	248.26	358.37	318.00	218.43	398.20	1367	774901	1290251	515350
1976	96346	15910	1410	220.14	307.68	273.33	198.32	335.16	1383	859258	1297807	438549
1977	55600	16067	2530	290.21	291.66	346.57	343.05	315.89	1456	922852	1346678	423826
1978	27000	16448	2720	251.53	292.58	405.80	336.76	245.55	1519	1038657	1392476	353819
1979	8000	16885	4500	275.30	346.20	341.73	427.97	306.83	1499	1015835	1375126	359291
1980	1500	16855	2900	285.59	337.20	392.04	408.89	319.94	1739	1303149	1594129	291000
1981	9500	16903	2430	295.61	363.84	422.72	295.08	360.29	1543	1147566	1403535	255969
1982	2000	16767	2360	253.55	378.23	424.77	280.00	309.11	1615	1137946	1409398	271452

[a]For data on population, national income and exchange rate see Table XXXVII.

TABLE XL

DATA SERIES FOR COPRA IMPORT DEMAND FUNCTION
FOR THE NETHERLANDS, 1970-1982

Year	QNCP	NTLU	NTRP	NTNI	NTNS	NCIO	NSIP	NWIP	NRMP	NPIP	NLIP
1970	161431	4806	22	356542	366	32327	109.40	146.27	133.03	160.90	118.92
1971	244648	4834	33	472159	485	83251	125.45	186.42	136.38	154.48	109.78
1972	361359	4839	44	664729	582	83940	130.55	180.68	154.85	121.43	126.48
1973	254967	5366	41	446551	463	65989	227.36	262.79	198.01	204.31	217.60
1974	143829	5577	45	420262	437	60149	249.45	418.85	305.44	410.44	482.49
1975	534352	5674	37	649480	663	40606	243.29	421.82	324.76	215.16	329.37
1976	541532	5746	34	713777	727	90821	213.75	325.10	260.48	182.76	208.64
1977	442816	5840	30	593077	606	95047	287.28	334.42	298.08	330.07	229.53
1978	208947	6107	23	547249	556	151563	252.81	338.43	399.47	322.77	224.37
1979	83386	6094	18	550943	558	174592	282.77	461.84	290.76	473.94	308.82
1980	84832	6534	29	579075	590	286391	284.58	323.44	306.07	327.52	312.22
1981	60371	6556	37	576071	590	313029	298.97	327.35	358.40	285.73	328.54
1982	36370	6592	33	474971	488	83727	249.12	407.23	390.97	270.73	310.09

[a]For data on population, national income and exchange rate see Table XXXVIII.

TABLE XLI

DATA SERIES FOR DESICCATED COCONUT IMPORT DEMAND FUNCTION FOR THE UNITED STATES, 1970-1982[a]

Year	QUDC	UCCB	USCS	USCP	UCDD	USCT	UBNP	UCNP	UCTP	UFNP	IDCP
1970	53661	108.9	1950	1069	4084	368774	459.13	564.31	189.33	684.50	1748.65
1971	47727	113.9	2014	1124	4059	374671	396.89	596.41	202.98	627.39	1824.67
1972	46558	114.7	2024	1149	4014	421392	498.43	606.04	303.42	583.05	15645.88
1973	46991	127.7	2186	1239	3948	405062	473.51	628.71	368.99	586.38	2778.33
1974	38002	166.1	2839	1673	3795	363785	590.18	856.00	363.67	611.55	6365.62
1975	42407	184.8	2898	1858	3600	323415	665.86	881.46	426.38	780.41	3334.03
1976	46213	180.6	2983	1852	3557	376939	563.15	867.40	252.09	710.91	3449.77
1977	44096	183.5	3563	2072	3762	340198	823.52	1220.73	357.89	718.37	6811.39
1978	44641	199.9	3940	2363	3818	350177	2369.18	3131.35	1202.41	1960.38	6667.82
1979	43641	220.1	4386	2571	3745	342658	2492.96	3072.39	947.26	2160.52	9180.76
1980	39879	246.4	4684	2961	2667	240198	1992.78	4115.49	1164.93	3776.78	9983.48
1981	38594	271.1	5171	3142	3715	386918	1729.81	5120.16	1657.82	3953.78	9307.98
1982	40236	283.4	5650	3280	3914	414134	1896.46	3795.97	1225.27	2433.30	6507.74

[a]For data on population, national income and exchange rate see Table XXXVI.

TABLE XLII

DATA SERIES FOR DESICCATED COCONUT MPORT DEMAND FUNCTION FOR WEST GERMANY, 1970-1982[a]

Year	QWDC	WNCI	WNCO	WICO	WNCP	WICP	WCOP	WSCC	AETP	PETP	HETP	CETP	WETP	TNEP
1970	1805	5052084	124628	304851	793	1176	811	5482	332089	3600	105575	292394	297002	1031660
1971	4182	6745622	144255	318322	849	1069	560	7208	354060	3600	116780	386950	315827	1022217
1972	6718	6629837	142271	333430	925	1162	629	7106	334818	3700	105564	249972	346778	1040832
1973	4383	5902878	151505	331132	1191	1471	868	6386	432488	2300	129245	215870	247554	1027457
1974	5958	517804	151886	317239	1616	1571	1306	987	419198	3630	124803	189055	277349	1014035
1975	2393	478093	160572	356511	1762	1442	1564	995	513308	2100	130217	186184	264374	1096183
1976	6746	602970	149078	372655	1690	2564	1504	1125	352400	2100	124636	169600	255907	904643
1977	10556	435898	150405	362507	1769	4899	2609	949	554875	1987	132585	176657	246303	1112407
1978	6974	444751	159500	380488	1845	3877	3811	985	351199	2713	138131	209830	241533	943643
1979	7186	326608	146643	442427	2165	3638	3648	916	430218	2573	156751	178200	244100	1011842
1980	8320	262044	164288	427282	2343	3722	3154	854	642939	3870	160214	155963	208293	1171279
1981	8645	250968	169817	426961	2194	2781	2029	848	499938	3110	138411	144613	274669	1060741
1982	5833	256522	193964	468834	2087	2923	1747	919	410266	4000	160732	153105	267067	955170

[a]For data on population, national income and exchange rate see Table XXXVII and for desiccated coconut price see Table XLI.

TABLE XLIII

DATA SERIES FOR DESICCATED COCONUT IMPORT DEMAND FUNCTION FOR THE NETHERLANDS, 1970-1982[a]

Year	QNDC	NNCI	NNCO	NICO	NCOP
1970	1714	3358346	115900	101043	771
1971	3033	3464118	119900	115309	612
1972	3204	3030302	122233	121253	597
1973	3129	3925916	118461	116926	821
1974	2258	443017	114320	111942	1473
1975	1836	368672	118467	133320	1537
1976	4007	360464	122796	141320	1535
1977	4550	335854	128651	99509	3046
1978	4185	343909	128486	116259	3825
1979	3656	346555	127614	131981	3670
1980	4780	358617	127609	130173	3054
1981	3834	341138	140196	143190	2022
1982	4823	371148	148302	134319	1852

[a]For data on population, national income and exchange rate see Table XXXVIII, for desiccated coconut price see Table XLI and for almond, pistachio, hazelnut, chestnut, and walnut production and total net production see Table XLII.

TABLE XLIV

DATA SERIES FOR COPRA MEAL IMPORT DEMAND FUNCTION FOR WEST GERMANY, 1970-1982[a]

Year	QWCMx	QECP	WTLU	TECP	WOMS	WSMP	WGMP	WCMP	WLMP	WWMP	WRMP	WPMP	ICMPx
1970	92416	41469	15679	14122	3167867	100.58	98.16	74.77	96.82	81.51	74.59	83.05	341.60
1971	112403	44886	15809	14008	4382264	106.84	99.84	78.40	95.97	85.13	72.26	89.52	353.10
1972	169067	45798	15305	16392	4421448	119.29	104.27	78.95	112.87	92.42	70.70	79.93	362.44
1973	133137	42739	15519	14483	4896785	213.05	218.75	135.12	208.33	186.43	150.01	121.98	585.50
1974	104225	46406	15968	13950	4049016	191.03	181.57	144.35	182.44	143.24	150.45	140.40	693.45
1975	175602	44879	15949	11463	4604199	168.39	151.21	136.02	169.57	137.33	138.59	133.32	787.27
1976	231615	49599	15910	15577	4916300	193.37	160.70	144.42	180.38	150.41	147.91	138.75	825.80
1977	154984	48422	16067	16172	5387554	235.18	229.11	184.62	207.05	174.43	170.02	163.67	1000.93
1978	129002	56808	16448	17391	6323768	213.76	206.28	160.19	190.72	157.33	161.88	144.10	978.25
1979	186831	52214	16885	16475	7071562	238.81	216.01	180.96	229.36	164.87	172.25	164.54	1141.68
1980	196779	54634	16855	17026	7422829	248.35	233.89	212.38	238.39	178.89	198.56	187.08	1115.52
1981	130638	60761	16903	18321	6303202	264.73	233.97	218.08	224.12	170.16	191.40	172.02	1029.73
1982	48411	56503	16767	18016	6913762	230.54	194.91	181.08	210.04	165.85	179.96	159.20	1040.34

[a]For data on population, national income and exchange rate see Table XXXVII.

TABLE XLV

DATA SERIES FOR COPRA MEAL IMPORT DEMAND FUNCTION
FOR THE NETHERLANDS, 1970-1982[a]

Year	QNCM	NTLU	NSMP	NGMP	NCMP	NLMP	NWMP	NRMP	NPMP	NFOP	NTOM
1970	75438	4806	98.92	93.79	77.44	95.08	81.18	67.30	69.05	555	555000
1971	153875	4834	103.75	97976	84.47	94.33	84.68	67.74	60.98	590	590000
1972	159087	4839	119.42	101.11	88.29	105.69	89.35	72.42	70.22	490	490000
1973	112591	5266	255.77	195.57	137.36	186.47	176.62	119.12	123.30	531	531000
1974	146255	5577	195.04	178.88	168.84	195.12	136.83	139.15	142.55	488	488000
1975	106089	5674	160.83	160.15	146.81	169.18	162.74	122.52	136.03	500	500000
1976	232017	5746	189.93	150.79	130.23	171.11	121.33	196.28	137.21	370	370000
1977	247080	5840	238.80	220.57	140.97	205.91	108.07	161.89	154.72	386	386000
1978	352587	6107	207.23	211.29	169.71	197.22	103.22	151.14	147.71	500	500000
1979	312254	6094	236.67	222.99	186.24	231.16	145.36	167.88	179.76	402	402000
1980	306318	6534	250.61	223.26	190.63	236.78	155.08	187.24	190.28	354	354000
1981	413914	6556	265.41	231.97	206.35	229.16	152.98	176.74	175.01	366	360000
1982	82940	6592	225.92	203.89	176.89	215.04	150.86	158.82	164.33	385	385000

[a]For copra meal price see Table XLIV; for national income, exchange rate and population see Table XXXVIII.

TABLE XLVI

DATA SERIES FOR COCONUT OIL DOMESTIC DEMAND FUNCTION FOR THE PHILIPPINES

Year	QDCOx	DPCO	RPNI	PNIC	RPPO	TITR
1970	167.40	1697	32947	41657	37.4	1
1971	162.44	1545	39516	43677	38.6	2
1972	194.06	1202	45321	45791	39.8	3
1973	197.78	3058	56431	49864	41.0	4
1974	183.52	6496	80789	52263	41.3	5
1975	178.56	2637	91239	55063	42.2	6
1976	216.38	2852	106330	59134	43.5	7
1977	270.32	3928	123182	63237	44.7	8
1978	236.22	4750	145567	66901	45.9	9
1979	202.12	6407	174394	70676	47.1	10
1980	191.58	4126	214619	74180	48.3	11
1981	218.86	3893	246354	77104	49.5	12
1982	168.02	3528	305268	79041	50.7	13
1983	252.00	6343	440085	79467	52.0	14

Note: QDCOx = Domestic demand of coconut oil
DPCO = Domestic coconut oil price, pesos per metric ton
RPNI = National income in million pesos (current price)
PNIC = National income in million pesos (constant price)
RPPO = Philippine population in millions
TITR = Time trend

APPENDIX C

DESCRIPTION OF VARIABLES USED IN THE STUDY

TABLE XLVII

DESCRIPTION OF DATA VARIABLES

Import Demand of Coconut Oil by the United States

QUCOx	=	United States coconut oil imports in metric tons
USPO	=	United States population in millions
USPI	=	United States disposable personal income at current prices
IPCOx	=	Coconut oil import price
UNOI	=	United States net oil imports (gross oil imports minus exports)
UTOS	=	United States total domestic oilseed production
UWCO	=	Cottonseed oil wholesale price in the United States
UWLO	=	Linseed oil wholesale price in the United States
UWSO	=	Safflower oil wholesale price in the United States
USOO	=	Soybean oil wholesale price in the United States
UCPI	=	United States consumer price index

Import Demand of Coconut Oil by West Germany

QWCOx	=	West Germany's coconut oil imports in metric tons
WGPO	=	Population in West Germany in millions
WGRP	=	Domestic rapeseed production of West Germany
WGNI	=	National Income in West Germany at market prices
GINS	=	West Germany's net oil supply (domestic production plus net imports of vegetable oilseeds and oils)
GNOI	=	Net oil imports of West Germany (gross vegetable oil import minus exports)
GTOI	=	Total oilseed imports by West Germany
WGER	=	West Germany's exchange rate
WCPI	=	Consumers price index in West Germany
GSOO	=	Import price of soybean oil in West Germany
GCOO	=	Import price of cottonseed oil in West Germany
GOLO	=	Import price of olive oil in West Germany
GSUO	=	Import price of sunflowerseed oil in West Germany
GRMO	=	Import price of rape and mustard seed in West Germany
GLIO	=	Import price of linseed oil in West Germany
GPAO	=	Import price of palm oil in West Germany
GPKO	=	Import price of palm kernel oil in West Germany
GCAO	=	Import price of castor oil in West Germany

Import Demand of Coconut Oil By the Netherlands

QNCOx	=	Coconut oil imports by the Netherlands in metric tons
NEPO	=	Netherlands population in millions
NERP	=	Netherlands domestic rapeseed production

TABLE XLVII (Continued)

NECI	=	Copra imports of the Netherlands in metric tons
NENI	=	Netherlands' national income at market price
NNOI	=	Netherlands' net oil imports (gross oil imports minus exports)
NTNS	=	Netherlands' net oil supply (domestic production plus net imports of vegetable oilseeds and oils)
NEER	=	Netherlands' exchange rate
NCPI	=	Netherlands' consumers price index
NSOO	=	Import price of soybean oil in the Netherlands
NCOO	=	Import price of cottonseed oil in the Netherlands
NOLO	=	Import price of olive oil in the Netherlands
NSUO	=	Import price of sunflower oil in the Netherlands
NRMO	=	Import price of rape and mustard oil in the Netherlands
NLIO	=	Import price of linseed oil in the Netherlands
NPAO	=	Import price of palm oil in the Netherlands
NPKO	=	Import price of palm kernel oil in the Netherlands
NCAO	=	Import price of castor oil in the Netherlands

Import Demand of Copra by West Germany

QWCPx	=	Copra imports by West Germany in metric tons
WTLU	=	Total livestock units in West Germany
IPCPx	=	Copra import price
WSIP	=	Import price of soybeans in West Germany
WWIP	=	Import price of sunflowerseed in West Germany
WPIP	=	Import price of palm nuts and kernel in West Germany
WRMP	=	Import price of rape and mustard seed in West Germany
WLIP	=	Import price of linseed in West Germany
WTNS	=	Total oil net supply of West Germany (Net imports of vegetable oilseeds and oils plus domestic production)
WOSM	=	Total oilseed imports in oil equivalent of West Germany
WNOO	=	Total net oil and oilseed imports in oil equivalent of West Germany
WNOI	=	Total net oil imports of West Germany

Import Demand of Copra by the Netherlands

QNCPx	=	Copra imports by the Netherlands in metric tons
NTLU	=	Total livestock units in the Netherlands
NTRP	=	Total domestic rapeseed production of the Netherlands
NTNI	=	Total net imports of oilseed in oil terms by the Netherlands
NTNS	=	Total net oil supply of the Netherlands (includes net imports of oilseeds and oils plus domestic rapeseed production)
NSIP	=	Import price of soybeans in the Netherlands
NWIP	=	Import price of sunflowerseed in the Netherlands
NRMP	=	Import price of rapeseed and mustard in the Netherlands

TABLE XLVII (Continued)

NPIP	=	Import price of palm nuts and kernel in the Netherlands
NLIP	=	Import price of linseed in the Netherlands

Import Demand of Desiccated Coconut by the United States

QUDCx	=	Desiccated coconut imports by the United States in metric tons
IDCP	=	Desiccated coconut import price
UCCB	=	Price index of cereal and bakery products in the United States
USCS	=	Confectionery sales in the United States in million dollars
USCP	=	Confectionery wholesale price per ton in the United States
UCDD	=	Confectionery domestic disappearance in the United States
USCT	=	Cocoa total use in the United States in metric tons
UBNP	=	Import price of Brazil nuts in the United States
UCNP	=	Import price of cashew nuts in the United States
UCTP	=	Import price of chestnuts in the United States
UFNP	=	Import price of filberts in the United States

Import Demand of Desiccated Coconut by West Germany

QWDCx	=	Desiccated coconut imports by West Germany in metric tons
WNCI	=	Net cereal imports by West Germany
WNCO	=	Net cocoa bean imports by West Germany
WICO	=	Net coffee imports by West Germany
WNCP	=	Import price of cereal in West Germany
WICP	=	Import price of coffee in West Germany
WCOP	=	Import price of cocoa beans in West Germany
WSCC	=	Net imports of cereals, coffee and cocoa beans
AETP	=	Almond production in Europe
PETP	=	Pistachio production in Europe
HETP	=	Hazelnut production in Europe
CETP	=	Chestnut production in Europe
WETP	=	Walnut production in Europe
TNEP	=	Total nut production in Europe

Import Demand of Desiccated Coconut by the Netherlands

QNDCx	=	Desiccated coconut imports by the Netherlands
NNCI	=	Net cereal imports by the Netherlands
NNCO	=	Net cocoa bean imports by the Netherlands
NICO	=	Net coffee imports by the Netherlands
NCOP	=	Import price of cocoa beans in the Netherlands

TABLE XLVII (Continued)

Import Demand of Copra Meal by West Germany

QWCMx	=	Copra meal imports by West Germany in metric tons
ICMPx	=	Copra meal import price
QECP	=	Europe corn production in thousand metric tons
TECP	=	EEC total corn production in thousand metric tons
WOMS	=	Total oilseed meal supply in West Germany
WSMP	=	Import price of soybean meal in West Germany
WGMP	=	Import price of groundnut meal in West Germany
WCMP	=	Import price of cottonseed meal in West Germany
WLMP	=	Import price of linseed meal in West Germany
WWMP	=	Import price of sunflowerseed meal in West Germany
WRMP	=	Import price of rapeseed meal in West Germany
WPMP	=	Import price of palm kernel meal in West Germany

Import Demand of Copra Meal by the Netherlands

QNCMx	=	Copra meal imports by the Netherlands in metric tons
NSMP	=	Import price of soybean meal in the Netherlands
NGMP	=	Import price of groundnut meal in the Netherlands
NCMP	=	Import price of cottonseed meal in the Netherlands
NLMP	=	Import price of linseed meal in the Netherlands
NWMP	=	Import price of sunflowerseed meal in the Netherlands
NRMP	=	Import price of rapeseed meal in the Netherlands
NPMP	=	Import price of palm kernel meal in the Netherlands
NFDP	=	Feedgrains production in the Netherlands
NTOM	=	Total oilseed meal supply in the Netherlands

VITA

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