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The International Cocoa Market and
The Demand for Cocoa in the E.C. Countries - Forecasts
and Policy Implications

*Der internationale Kakaomarkt und
eine Prognose der Nachfrage in den EG-Ländern*

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CONTENTS

	Page
Preface	5
Vorwort	6
<u>Part I</u> - THE INTERNATIONAL COCOA MARKET	7
1 INTRODUCTION	7
2 HISTORY OF COCOA TRADE	8
3 CULTIVATION AND PROCESSING OF COCOA	11
3.1 The cocoa plant	11
3.2 Botanical classification	11
3.3 Processing	12
4 PRODUCTION	15
5 EXPORT	20
6 IMPORT AND CONSUMPTION	22
7 PRICE SITUATION	28
8 TRADE	33
8.1 Stock exchange	33
8.2 Trade regulations	33
8.3 International organizations	35
9 CONCLUSION	36
SCHLUSSFOLGERUNGEN	37
10 LITERATURE	39
11 APPENDIX	41
<u>Part II</u> - THE DEMAND FOR COCOA IN THE E.C.COUNTRIES - FORECASTS AND POLICY IMPLICATIONS	43
1 INTRODUCTION	43

	Page
2 METHODOLOGY	45
2.1 Estimation of consumer demand	45
2.2 Forecasts	46
3 DATA	48
3.1 Sources and transformations	48
3.2 Cross-country comparison	49
4 RESULTS AND DISCUSSION	51
4.1 Elasticities of demand	51
4.2 Forecasts for 1995	53
5 CONCLUSIONS AND RECOMMENDATIONS	55
6 SUMMARY	57
ZUSAMMENFASSUNG	57
7 LITERATURE	58
8 APPENDIX	60

Preface

The theme of the present study trespasses somewhat the ground treated by the previous ones published in this series - it goes beyond the Austrian border and puts its focus on a tropical product. But it is certainly within the realm of the Federal Institute of Agricultural Economics to study problems of world agriculture, and at times already problems in developing countries have been dealt with.

A major contribution to developing countries is certainly the education and training of their personnel, particularly in agriculture. Adhering to the aims of the North-South dialogue, the Federal Institute of Agricultural Economics agreed to pass on its know-how and research tools to post-graduate students within the limits of time constraints and for the sake of scientific work. Mr. *Adusei Jumah* graduated from the Agriculture Faculty of the University of Kumasi, Ghana, and was awarded a research assistantship for one year to carry out this study from the *Austrian Federal Ministry for Science and Research* and the *Federal Ministry of Foreign Affairs* out of funds allocated toward assistance to developing countries. For this we express our thanks. Without this financial contribution this inquiry into the international market for the most important export product of Ghana's agriculture would not have been possible.

At the Federal Institute of Agricultural Economics Mr. *K.M.Ortner* provided instruction in methodology, the conceptual framework and counsel throughout the analysis which is gratefully acknowledged. We hope that not only the concrete results of the study before us are of use to the further development of Ghana's agriculture but even more so will be - once he is back in his homeland - the knowledge and skills Mr. Jumah acquired here.

Part II of the present study was originally published by the *Quarterly Journal of International Agriculture* (Berlin), Volume 25 (1986), No.4, and its editor has kindly given permission for a reprint in this series.

Vienna, November 1986

Hans Alfons, director

Vorwort

Die vorliegende Arbeit fällt thematisch etwas aus dem Rahmen der bisherigen Publikationen dieser Schriftenreihe - sie geht über die Grenzen Österreichs hinaus und befaßt sich mit einem tropischen Produkt. Es gehört aber durchaus zu den Aufgaben der Bundesanstalt für Agrarwirtschaft, sich mit Fragen der Weltlandwirtschaft auseinanderzusetzen, und es wurden schon bisher vereinzelt Probleme in Entwicklungsländern behandelt.

Eine wesentliche Hilfe für Entwicklungsländer ist sicher die Verbesserung der Ausbildung ihrer Fachkräfte, besonders jener der Landwirtschaft. Im Sinne des Nord-Süd-Dialoges hat sich die Bundesanstalt für Agrarwirtschaft bereit erklärt, ihre Kenntnisse und wissenschaftlichen Methoden an Post-Graduate-Studenten im Rahmen der zur Verfügung stehenden Zeit in Form von wissenschaftlichen Arbeiten weiterzugeben. Herr Adusei Jumah ist Absolvent der landwirtschaftlichen Fakultät der Universität Kumasi, Ghana, und erhielt vom Österreichischen Bundesministerium für Wissenschaft und Forschung bzw. Bundesministerium für Auswärtige Angelegenheiten ein einjähriges Forschungsstipendium aus Entwicklungshilfemitteln zur Durchführung dieser Arbeit, wofür an dieser Stelle gedankt sei. Ohne diese finanzielle Hilfe wäre die Untersuchung des internationalen Marktes des für Ghana's Landwirtschaft wichtigsten Exportproduktes nicht möglich gewesen.

An der Bundesanstalt für Agrarwirtschaft hat Herr Dipl.-Ing.K.M.Ortner die Einführung in die Methodik, die Erstellung des Konzeptes und die beratende Betreuung bei der Durchführung der Untersuchung in dankenswerter Weise übernommen. Es ist zu hoffen, daß nicht nur das vorliegende konkrete Ergebnis der Untersuchung eine Hilfe in der weiteren Entwicklung der Landwirtschaft Ghana's darstellt, sondern noch viel mehr die von Herrn Jumah hier erworbenen Kenntnisse und Fähigkeiten, wenn er in sein Heimatland zurückgekehrt sein wird.

Der zweite Teil der vorliegenden Publikation wurde erstmals im Quarterly Journal of International Agriculture, Berlin, Heft 4/1986 veröffentlicht, und die Redaktion hat freundlicherweise einem Abdruck in unserer Schriftenreihe zugestimmt.

Wien, im November 1986

Dipl.-Ing.Hans Alfons

Part I - THE INTERNATIONAL COCOA MARKET

1 INTRODUCTION

Cocoa plays an important role in international agricultural trade. YOUNG (1984) in a tribute to LINNAEUS for giving cocoa its present name Theobroma, wrote: "Long before your time the beans of that equatorial tree nourished imagination and body. Today, they nourish a multibillion-dollar industry as well."

A look at the history of cocoa trade to date reveals that YOUNG is not far from the truth. Cocoa has turned from a ritual beverage of Mesoamerican (Central America) royalty, a form of money, to an internationally traded commodity.

Cocoa provides the mainstay of the economies of most countries which produce this crop. For example, data provided by TOLLEY and GWYER (1967) indicated that 85 percent of Ghana's total exports was in cocoa. In 1978 it accounted for 42 percent of the value of Cameroon's main export and 65 percent in Ghana (PIPER 1980). Ghana still depends heavily on her cocoa industry.

In the developed countries, cocoa is an important ingredient in many food products, a distinctive flavour and the basis of an industry which provides sophisticated jobs.

The economic importance of cocoa has given rise to strong activity in many disciplines of development and research, especially in agronomy. Social scientists, particularly historians and anthropologists also have been much concerned with the role of cocoa in the socio-economic lives of some cocoa producers (E.g. MAI, 1933). Numerous works about diverse problems related to cocoa exist today.

The general objective of the study is to examine the history of cocoa trade and to analyse the dynamics of the international cocoa market from 1950 to 1983. The study embraces cocoa production and export, import and consumption, the price situation and trends as well as trade and trade regulations. It also includes information about the cultivation and processing of the crop to help understand the nature and workings of the market.

2 HISTORY OF COCOA TRADE

Cocoa is said to have originated in the Amazon or Orinoco basin about 4,000 years ago (YOUNG 1984). The crop probably found its way northwards to Central America where the Mayas and then the Azteks lived through wars. Cultivation and the uses of cocoa were developed by the Mayas and Azteks a long time before the Europeans arrived in the New World. Cocoa beans were used as a form of currency and as a prestigious aromatic drink.

Christopher Columbus was the first European to come across cocoa when he landed in what is present day Nicaragua on his fourth voyage to the New World in 1502 (PIPER 1980). However, he showed no interest in the crop. Two decades later, Henan Cortés, another Spaniard, very much impressed by the royalty which the Azteks associated with "xocoatl" (the drink prepared from cocoa beans) and the importance of cocoa beans as a form of money, helped to spread this outstanding tropical crop to the Carribean and Africa and brought the first cocoa bean to Europe in 1528.

In 1605, Charles de L'ECLUSE (Clusius) for the first time documented cocoa in botanical literature under the name *Cacao fructus*. Later, LINNAEUS (1737) introduced cocoa to his classification and gave it a new name, *Theobroma* ("food for the gods").

In the 17th century, cocoa became known throughout Europe. Chocolate made its début in the court of Paris in 1615, when Louis of France got married to Ann of Austria (PIPER). The use of cocoa in confectionaries was also spreading and by the middle of 1670 London coffee shops were serving "Spanish" chocolate cakes. However, it was not until 1704, when Frederick I of Prussia imposed a tax on chocolate imports, that cocoa became a commodity. With chocolate gaining such reputation, other Europeans set up their own plantations. The English, Dutch and French established plantations in their colonies (Trinidad, Santo Domingo, Java, Ceylon, etc.). The Spanish also established more plantations, notably in the Philippines (see BARTH 1945).

Cocoa went back to the New World after it had become very popular in Europe, and in 1765 a chocolate factory was established in Massachusetts Bay Colony (YOUNG). Europe's first chocolate factory was established later, in 1780, in

Barcelona, Spain - the cocoa industry had begun (PIPER). Up to this time, the Spanish-speaking world was still in control of the cocoa and chocolate trade.

The 19th century saw a great leap in the cocoa industry. In 1828, Conrad van Houten, a Dutch chemist, isolated cocoa butter and made chocolate powder (YOUNG). Solid chocolate appeared later in 1847 (YOUNG) when I.S.Fry and Sons, an English firm now merged with Cadbury, added cocoa butter and sugar to a paste of ground beans. The Swiss were also progressively becoming important. Daniel Peter, a Swiss, launched the first milk chocolate on the market in 1875 (YOUNG). In 1876 he held a patent for the manufacturing of this product (PRETSCHER 1979). Another Swiss, Rudolf Lindt, in 1879, discovered that the stirring and treating of molten chocolate for some days has a decisive effect on the quality and taste of chocolate (FINCKE 1965). This technique is employed extensively by the chocolate industry.

One important factor for the rise in the demand for cocoa in the second half of the 19th century was the advent of the industrial revolution. More efficient processing machines made chocolate production cheaper than hand-made chocolates. Smaller hand-made chocolate factories merged into larger mechanically operated ones, reaping the advantages of economies of scale. For example in England the firm Tuke which produced hand-made chocolates from 1785 to 1860 went industrial and became H.I.Rowntree and Co.Ltd. which until today is a giant chocolate producer of England (FINCKE). Similar trends took place in Switzerland, Germany and the U.S.A.

Another factor which contributed to the rise in the consumption of cocoa was the improved transportation system in the 19th century (PRETSCHER 1979). With the help of railway and steamer, bulk transportation became possible and led to lower prices of cocoa products for consumers and, consequently, to a rise in the demand for these commodities.

The combined effect of processing and transportation was a rise in demand which the original cocoa producers could not satisfy. For this reason, the colonizers (English, French, Germans, etc.) stepped up cocoa production in their colonies (Ghana, Nigeria, Cameroon, Ivory Coast, etc.). The British were particularly favoured because their West African colonies (Gold Coast and Nigeria) offered ideal climatic conditions for cocoa production. However, unlike the large-scale plantation

"system" in Central and South America, cocoa production in West Africa was accomplished by the private small-scale indigenous farmers.

Private cocoa purchasing organizations (Cadbury and Fry, United African Company, etc.) were established in the British colonies and offered competitive prices. The competing demand and the ensuing market prices offered by the purchasing agents caused a boost in cocoa production in the colonies. Cocoa farming became a profitable enterprise relative to other farming activities and, since access to the land was easy, more people entered into its production. Ever since, the West African region is holding a dominant position in world cocoa production.

3 CULTIVATION AND PROCESSING OF COCOA

3.1 The cocoa plant

The cocoa tree thrives only 20 degrees above and below the equator in moist tropical climates. The tree requires an average annual temperature of at least 22°C and an annual rainfall of 150 cm. The tree has a diameter of about 25 cm, is of light and porous wood and can attain a height of 10 to 15 m. For easy harvesting, however, the height is controlled between 6 and 8 m.

Its flowers which are red, grow in cultures and are formed all over the stem. The fruits are also formed all over the stem on strong branches. Out of the 10,000 to 50,000 flowers which are formed per tree per year only about 20 to 50 fruits develop. The fruits can be formed any time of the year and take about 20 to 22 weeks to grow and an additional 2 to 4 weeks to ripen.

The fruits are initially green and become yellow, sometimes with red stripes or spots. Some varieties are crimson-red when they ripen. The fruit is about 10 to 25 cm long, 5 to 10 cm at the greatest diameter and weighs between 300 to 500 g. The shell is also about 15 to 20 cm thick. Each fruit contains about 25 to 60 white to bluish tonsil-like seeds. Usually each tree produces about 2 kg of seeds per year. However, at bumper harvests 10 to 12 kg can be obtained.

Cocoa is mainly grown out of the seed between maize and banana or plantain crops. The plantain and banana plants later provide shade for the cocoa. Cocoa grows well under the shade of other trees and it is not unusual to find cocoa plantations with shade trees.

Under good cultural practices there are about 400 trees to a hectare of land. Good plantings yield 600 to 900 kg of beans per harvest per hectare and at times up to 1,200. The cocoa tree takes about 3 years to fruit. However, through research, varieties which take 18 months (Ghana) to fruit have been developed.

3.2 Botanical classification

Cocoa belongs to the genus *Theobroma* and family Sterculiaceae. The present universally used name Cacao is, however, derived directly from the Nahuatl "cacahuatl" or "cacahoatl" (see CUATRECASAS 1964).

Theobroma has about 20 varieties and sub-varieties (see WURZIGER 1985). However, 4 varieties are of great importance: Theobroma Cacao Liné in Venezuela and Ceylon, Theobroma sphaerocarpa Chevalier of San Thome, Theobroma pentagona Bernoulli in Guatemala and Mexico and Theobroma leucocarpa Bernoulli in the West Indies and West Africa.

In general, these varieties have been divided into 3 main groups: Criollo, Forastero and the Trinitario groups, respectively. The Criollo group used to be grown in Mexico, Central America and Venezuela. Its beans are white and fleshy. The pods which tend to be elongated with a sharp point and deep ridges, are red or green before they ripen. The criollo is prone to diseases, its yield is low and its cultivation is dying out. It accounts for about 10 percent or less of world output of cocoa beans.

Forastero originated from the Amazon. Cocoa of West Africa, Brazil, Ecuador and most cultivars of central and southern America belong to this group. Forastero cocoa accounts for more than 80 percent of world output of cocoa (PIPER 1980). Forastero is characterized by fairly flat beans that are violet when fresh. Its pods are variable in shape (oval, with few or no ridges), are mostly green but yellow when ripe and has a thick and woody cortex. The most common cultivars are the Amelonado of West Africa, the "common" cocoa of Brazil and the "cocoa nacional" or Arriba of Ecuador.

The Trinitario group is a hybrid of the Criollo and Forastero and accounts for about 15 percent of world cocoa production. Trinitario is found mainly in countries where Criollo used to dominate (Mexico, Central America, the Caribbean, Columbia, Venezuela and Ecuador).

3.3 Processing

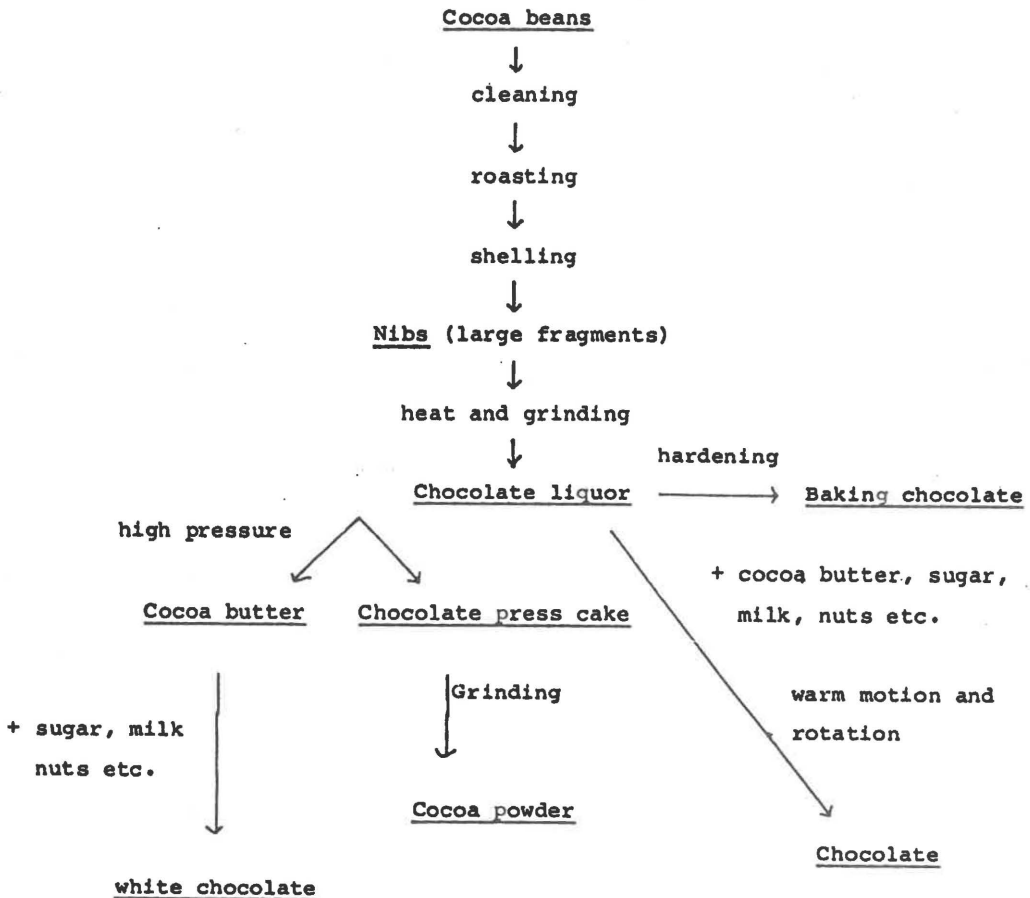
The cocoa fruits ripen throughout the year. There are two main harvesting seasons: The "main crop" season which is from October to March and the "mid crop" season which is from March to October. Only ripe fruits are harvested. The ripeness of the fruits can be determined by the color. When fully ripe, most fruits are yellow. Overripe fruits are dark yellow to orange.

In Ghana about 80 percent of the fruits are harvested in the "main crop" season (see PRETSCHER 1981). This is because in Ghana, October to March is the dry season which offers the best conditions for the drying of cocoa. In Brazil, however, the harvest is equally distributed between the two seasons.

The fruits are harvested with a cutlass. For fruits which are very high up the tree, a long pole with a scythe attached to it is used. The fruits are split open and the beans are removed with the fingers and put into containers.

The fresh beans are poured on plantain leaves, heaped and then covered for 6 to 8 days. This process is known as "heap" fermentation. In certain areas (Ghana), the "Tray Method" is used (see WURZIGER). In the "Tray Method", the cocoa is fermented in trays instead of on plantain or banana leaves. The fermentation is to give the cocoa its characteristic flavour.

The fermented cocoa beans contain about 60 % water. In order for the beans to store well, the water content must be lower than 8 %. The drying is gradual, occurs under temperatures of between 30°C to 40°C and lasts 7 days or more. The cocoa beans are usually dried on mats and are covered at night and during rainfall.



The dried beans are cleaned and shelled. Then they are shattered into large fragments (nibs) and subjected to heat and grinding pressure to produce chocolate liquor, which is a thick, dark paste. The chocolate liquor forms the base for all chocolate and cocoa products.

When hardened, chocolate liquor becomes baking chocolate. If chocolate liquor is further subjected to high pressure, cocoa butter (amber liquid) could be extracted and the residual, chocolate press cake, becomes cocoa powder when ground. If chocolate liquor is blended with cocoa butter, sugar, milk and some other ingredients, solid chocolate is obtained. If only cocoa butter but no chocolate liquor is used in the process, white chocolate is obtained.

4 PRODUCTION

The production of cocoa is geographically heavily localized (see Appendix 1). Important producing areas are the tropical zones of North, Central and South America (Latin America), West Africa, South East Asia and Oceania. Of the over 50 countries which produce this crop, 15 produce it in substantial quantities, accounting for about 95 percent of total world production. Five countries - Ivory Coast (400,000 tonnes in 1983), Brazil (346,000), Ghana (160,000), Nigeria (150,000) and Cameroon (90,000) - together accounted for about 75 percent of the world production in 1983.

TABLE 1: Production of cocoa beans in regions 1950-1983
(in 1,000 tonnes)

	World	West Africa*	Latin America	Asia and Oceania
1950	780	453	262	8
1955	835	489	295	12
1960	1,200	804	320	19
1965	1,218	791	326	30
1970	1,461	988	352	42
1971	1,592	1,075	389	45
1972	1,450	949	382	48
1973	1,354	877	369	44
1974	1,504	955	433	55
1975	1,550	917	510	61
1976	1,373	801	455	63
1977	1,490	881	496	39
1978	1,482	848	513	67
1979	1,621	952	534	76
1980	1,687	937	553	98
1981	1,726	1,003	565	94
1982	1,589	803	625	102
1983	1,557	800	580	102

* West Africa: Cameroon, Ghana, Ivory Coast and Nigeria

Source: FAO Production Year Books. 1950-1983.

From 1950 to 1983, the world's cocoa production increased from 780,000 to 1,557,000 tonnes (see table 1); that represents an increase of 99.6 percent, or a compound growth rate of 2.1 percent per year. The rate of growth was highest from 1957 to 1963 (7.9 percent) resulting from a marked expansion of cocoa production in West Africa where a large-scale capsid pest control program was introduced and new plantings made during the previous five to twelve years came into bearing (see FAO 1969). World cocoa production shot up from 770,000 in 1957 to 1,220,000 tonnes in 1963.

West Africa, including Ivory Coast as the world's leading producer of cocoa, is the most important cocoa producing area. Ivory Coast alone accounted for 26 percent of the global cocoa production in 1983 (see table 3) and together with Cameroon, Ghana and Nigeria, produced 51.4 percent of global output in the same year. The output of cocoa in West Africa (Cameroon, Ghana, the Ivory Coast and Nigeria) rose 76.6 percent or 1.7 percent annually from 1950 to 1983. Since a record harvest in 1971 when West Africa accounted for about 67.5 percent of the global cocoa output, it has contributed a decreasing fraction to the world cocoa production (see table 2). In 1975 it still accounted for 59.2 percent of the world's output of cocoa but in 1982 her share was down to 50.5 percent. Other West African producers are Liberia, Sierra Leone, Togo and the islands of Principé and Sao Tomé. These countries together accounted for only 5 percent of the total production of the four main West African producers in 1983.

Production in West Africa is characterized by private smallholdings. However, some large state owned cocoa plantations can also be found in Ivory Coast. West African countries produce mainly for export and, with the exception of oil rich Nigeria, the economies of these countries (and in particular Ghana and Cameroon) depend heavily on this crop.

Latin America, where the cocoa crop originates, is now the world's second largest cocoa producing region. Her production from 1950 to 1983, however, showed a higher rate of growth than the one prevailing in West Africa: During this period, Latin America's cocoa production increased by 121 percent (2.4 percent annually). In 1983, her production amounted to about 580,000 tonnes and contributed 37.2 percent to the global output of cocoa (see table 2).

Brazil, the giant in the region and the world's no.2 after Ivory Coast has almost invariably produced more than 50 per-

cent of Latin America's annual cocoa output. In 1983 Brazil accounted for 22.2 percent of the total world cocoa production. Unlike West Africa, cocoa in Latin America is mainly a product of large-scale plantations. Brazilian cocoa growers use more advanced farming techniques and as such the yield per tree is considerably higher in Brazil than in West Africa. For example, in 1983 the yield per ha in Ghana and the Ivory Coast were 160 kg and 481 kg respectively while in Brazil it was 644 kg (FAO 1983). Other important Latin American producers are Columbia (55,000 tonnes in 1983), Dominican Republic (45,000 tonnes), Ecuador (55,000 tonnes) and Mexico (43,000 tonnes). Venezuela (14,000 tonnes) which by 1810 was producing over half of the world's cocoa beans (PIPER), accounted for only 0.01 percent in 1983.

TABLE 2: Regional share in the production of cocoa beans 1950-1983 (in percent).

	West Africa*	Latin America	Asia and Oceania
1950	55.8	33.6	1.0
1955	58.6	35.3	1.4
1960	67.0	26.7	1.6
1965	65.0	26.8	2.5
1970	67.6	24.1	2.9
1971	67.5	24.4	2.8
1972	65.3	26.3	3.3
1973	64.8	27.2	3.2
1974	63.5	28.8	3.7
1975	59.2	32.9	3.9
1976	58.3	33.1	4.6
1977	59.1	33.3	2.6
1978	57.2	34.6	4.5
1979	58.7	32.9	4.7
1980	55.5	32.8	5.8
1981	58.1	32.7	5.4
1982	50.5	39.3	6.4
1983	51.4	37.2	6.5

* West Africa: Cameroon, Ghana, Ivory Coast and Nigeria.

Among the three cocoa producing regions, production increased most rapidly in Asia and Oceania from 1950 to 1983, starting from a mere 8,000 tonnes in 1950. With an increase of 1,175 percent (i.e. 8 percent annually), cocoa output in this region rose to 102,000 tonnes in 1983 and thus accounted for 6.5 percent of the total production in this year. Important producers are Malaysia (55,000 tonnes in 1983), Papua New Guinea (31,000 tonnes), Indonesia (15,000 tonnes), Philippines (5,000 tonnes) and Sri Lanka (3,000 tonnes) (see table 3).

The production of cocoa fluctuates according to the amount and pattern of rainfall it get's, diseases, pests and bush fires, husbandry methods and the number of trees coming to maturity. Other factors such as favourable economic conditions, remunerative prices to farmers and quality of infrastructure also have a considerable effect on cocoa production. For example, Ghana used to be the world's leading producer of cocoa up to 1976 but has since dropped to third position due to deteriorating economic conditions and inadequate price incentives for cocoa farmers. The good roads and a dependable currency of Ivory Coast have contributed a great deal in making it the world's leading producer. A substantial quantity of Ghana's annual cocoa harvest is smuggled into Ivory Coast where higher prices are obtained (see chapter 7). This is also contributing to Ivory Coast's current position.

The performance of the cocoa industry depends significantly on labour availability. Ghana's "Aliens' Compliance Order" of 1970 by which most farm labourers were required to leave the country was another factor which caused its cocoa industry to decline. In the case of Nigeria, the oil boom and consequent influx of people into the cities and oil fields attracted also investment resources to the oil and industrial sectors away from cocoa and other export crops, resulting in its fall from second to fourth position among the world's cocoa producing countries.

In the 1980's we experienced in general a downward trend in global cocoa production. It declined by 7.9 percent in 1982 following record harvests in the two preceding years, to 1.59 million tonnes, a level already achieved in 1975 (see table 1). A further decline of two percent occurred in 1983 due to unfavorable weather and bush fires, particularly in West Africa. In Ghana the effect of negative profitability to produce food crops other than cocoa added to the decline in its cocoa production.

According to an FAO forecast, however, production is expected to increase slightly in the 1984/85 season as a result of recent investment in new plantings and replantings, particularly in Brazil, Ivory Coast and Malaysia. Increases in production may be expected in Nigeria as economic conditions improve and in Ghana as the re-organization of the Cocoa Marketing Board takes effect (see FAO, 1983-84).

5 EXPORT

A high proportion of the world's total output of cocoa is exported in the form of beans. In 1983 1.2 million tonnes of cocoa beans were exported at a value of US\$ 2,051 million. The exported quantity comprised 80.9 percent of the global production of cocoa beans in that year.

The four main producers of West Africa combined exported 787,387 tonnes of cocoa beans for US\$ 1,182 million in 1983. The quantity exported made up some 98.4 percent of their total production and 62.5 percent of total world exports of cocoa beans in that year. Ivory Coast exported 90 percent of her output and had a share of 28.6 percent in total world exports of cocoa beans.

In 1982 and 1983 Ghana and Nigeria exported more cocoa beans than they produced, depleting stocks in order to make up for their low levels of production in these years. Ghana exported 239,931 tonnes valued at US\$ 383 million and 177,335 tonnes valued at US\$ 260 million in 1982 and 1983, respectively. Its exports contributed 19.3 percent and 14.1 percent, respectively, of the global export of cocoa beans. Cameroon exported 89 percent of her output for US\$ 132 million whilst Nigeria exported 170,000 tonnes for US\$ 260 million in 1983.

Latin America, on the other hand, exported only 39 percent of her total cocoa production in the form of beans in 1983. This region exported 226,343 tonnes valued at US\$ 454 million. Brazil, the second largest producer of cocoa beans in 1983, was the 4th largest exporter after Ivory Coast, Ghana and Nigeria, exporting 44 percent of her output for US\$ 320 million in that year.

The Asian and Oceanian producers exported 102,704 tonnes at a value of US\$ 161 million. With the exception of Papua New Guinea and Sri Lanka all producing countries in that region exported more than they produced in 1983. But cocoa beans are not only exported by producers: Other countries import, store and re-export them. In 1983, for example, Europe and the U.S.A. exported 56,521 and 16,270 tonnes respectively. Singapore, Australia and Hongkong also sold cocoa abroad, although they do not produce it.

The export of cocoa is vital to most of its producers as a means to earn much-needed foreign exchange. The value of cocoa exports increased by 2.8 percent in 1983 over 1982. It failed, however, to compensate the decline of 10.6 percent in the previous year. Nonetheless some countries, in particular Brazil, Nigeria, almost all cocoa producing countries of Asia and Oceania and a few Latin American cocoa producers were able to increase their export values from 1981 to 1983.

6 IMPORTS AND CONSUMPTION

Import statistics reveal that the import of cocoa beans, just like its production, is geographically localised and concentrated in the Northern Hemisphere (see Appendix 1). On top of the list of importers on a regional basis is Western Europe which absorbs about half of the world's imports of cocoa beans and acquired 51 percent of them in 1983 (see table 3). With an increase in its membership, the E.C. is the biggest importer now and accounts for almost all of Western Europe's share of cocoa imports. Excluding Portugal and Spain, the E.C. accounted for about 50 percent of the total world imports of cocoa beans in 1977 but its share dropped to 44 percent in 1983.

Eastern Europe has become increasingly important in the cocoa bean trade with its share increasing from 7 percent in 1961 to 23 percent in 1976. In 1983, however, this region accounted for 18.7 percent. North America, which had a record import share of 36 percent in 1961, accounted for only 18.5 percent in 1983 (see table 3a).

On a country by country basis, the U.S.A. is the largest importer of cocoa beans in the world, with a share of 17.3 percent in 1983 (see table 3b). Next is Netherland with 14.8 percent (of gross imports), followed by Western Germany with 13.7 percent and the U.S.S.R. with 12.9 percent. The U.K. and France lag significantly behind with 5.3 and 4.6 percent, respectively. Singapore increased her imports at an annual rate of 9.4 percent from 1975 (4,132 tonnes) to 1983 (41,705 tonnes) and accounted for 3.3 percent of total imports of cocoa in the latter year. Spain and Italy accounted for 3.1 and 2.8 percent, respectively.

The amount of cocoa beans imported depends on the preferences of a population, its size, welfare and trade links, and is subject to such factors as the price of cocoa, the price of complements (e.i. sugar, drymilk), substitutes and capital (interest rates), the volume of accumulated stocks and climatic conditions. In periods of high interest rates, importers are unwilling to hold stocks in exchange for money: Accumulated stocks are drawn down and the import of cocoa beans decreases. Similarly, import demand decreases with a drop in chocolate sales due to hot weather.

Import figures of cocoa beans do not always represent final consumption. Some of the beans imported are shipped elsewhere in the form of grindings, chocolate products or again in the

TABLE 3a: Import of cocoa beans 1975-1983 by regions (in tonnes)

	1975	1976	1977	1978	1979	1980	1981	1982	1983
World	1,191,948	1,160,587	1,000,974	1,086,901	1,040,227	1,091,664	1,242,217	1,251,369	1,256,473
Western Europe	563,568	565,198	561,221	589,609	569,301	615,565	663,936	720,939	648,388
E. Europe + U.S.S.R.	247,694	251,527	186,085	225,765	178,547	162,266	263,750	213,363	233,042
North America	279,589	255,800	175,373	201,628	212,245	224,957	199,108	177,815	235,233

Source: FAO Trade Year Books, 1975-1983

TABLE 3b: Import of cocoa beans 1975-1983 by countries (in tonnes)

	1975	1976	1977	1978	1979	1980	1981	1982	1983
World	1,191,948	1,160,587	1,000,974	1,086,901	1,040,227	1,091,664	1,242,217	1,251,369	1,256,473
Australia	18,519	12,180	15,418	12,460	11,411	10,406	10,784	8,943	8,006
Austria	11,941	11,577	9,583	9,377	8,737	9,529	11,136	12,477	10,503
Belgium-Lux	16,296	16,584	15,675	16,787	17,485	23,520	28,510	29,256	31,310
France	38,212	43,066	42,180	47,807	56,583	56,913	57,633	60,212	57,766
F.R.Germany	160,699	149,660	150,534	159,637	148,091	165,848	171,796	196,412	172,558
Italy	29,136	35,396	26,366	30,082	33,637	33,748	35,142	39,216	36,424
Japan	29,326	33,226	30,083	21,638	23,064	22,755	31,656	36,370	34,891
Netherlands	124,190	129,104	145,230	150,429	143,443	146,796	170,084	184,872	186,436
Singapore	4,132	3,227	2,575	5,447	8,635	14,429	24,124	37,615	41,705
Spain	44,932	33,657	34,522	32,667	35,890	35,274	40,096	32,187	38,492
Switzerland	13,925	14,756	15,370	16,487	13,591	17,412	20,011	18,475	19,797
U.K.	75,926	88,344	79,874	87,956	72,126	87,480	94,159	112,157	66,147
U.S.A.	236,765	239,152	174,899	213,059	167,877	150,865	248,890	197,333	217,119
U.S.S.R.	155,777	133,932	72,966	103,113	126,260	126,844	121,139	115,459	162,279

Source: FAO Trade Year Books, 1975-1983

form of beans. For example, the Netherlands imports about 15 percent of the world's cocoa beans but retains about half of this share for local consumption.

Consumption of cocoa per head is highest in Switzerland where people consumed 3.6 kg in 1983 (see table 4) on average. The fact is not particularly surprising as three of the world's chocolate giants (Nestlé, Lindt & Sprüngli, Suchard-Tobler) are located in that country. Austria comes next with 3.2 kg, followed by Belgium, Norway and West Germany with 2.9 kg each, France (2.2 kg) and the U.K. (2.1 kg). The U.S.A. registered 1.8 kg whilst Japan and the U.S.S.R. registered 0.7 kg and 0.6 kg, respectively.

Among producers, Latin Americans are, unlike their West African counterparts, important consumers. Columbia, which is an important producer of cocoa, even imports to supplement its local production. With a per capita consumption of 1.3 kg, Columbia registered the highest figure among producing countries in 1980. Mexico also consumes more than half of what it produces. The four leading West African producers consumed merely 0.1 kg per cap. in 1980 (PIPER).

Intermediate cocoa products or grindings (cocoa butter, powder and liquor) are becoming increasingly important in the world cocoa trade. In 1983 the total output of grindings reached a record level of 1.64 million tonnes (see table 5), and exceeded the output of cocoa beans for the first time in six years. Brazil, the largest producer of grindings in 1983, accounted for some 12 percent of the total world output in that year. The U.S.A., which until 1983 was the largest producer, came next to Brazil with a share of 11.8 percent and the U.S.S.R.'s 8.5 percent.

The percentage contribution of cocoa producing countries to the world's output of grindings rose from 15 percent in 1950-1952 to 30 percent in 1966 (see FAO 1969). In 1983 they still produced a share of 30 percent.

Which country imports from which country depends on the commercial ties, mostly emanating from colonial relationships, existing between the importing and the producing country as well as the type of chocolate the importing country produces. The U.K. and France import cocoa mainly from their former colonies in West Africa. Swiss chocolates are made from a mixture of beans from many origins which are carefully blended. In contrast, the Spanish produce chocolate with a quite different taste and use mostly Brazilian beans.

TABLE 4: Per caput consumption of cocoa 1975-1983 by countries in kilograms

	1975	1976	1977	1978	1979	1980	1981	1982	1983
Australia	1.3	1.3	1.3	1.4	1.3	1.3	1.4	1.5	1.5
Austria	2.3	2.6	2.9	3.0	3.1	3.3	2.9	2.9	3.2
Belgium	3.1	3.6	3.0	3.1	2.7	2.9	2.9	3.0	2.9
Canada	1.5	1.7	1.5	1.4	1.4	1.3	1.6	1.7	1.9
Denmark	1.7	2.1	1.9	2.0	1.9	1.9	2.0	2.0	1.9
France	1.8	1.9	1.9	1.9	2.0	2.1	2.2	2.1	2.2
F.R.Germany	2.6	2.5	2.6	2.5	2.7	3.0	2.9	2.9	2.9
Italy	0.6	0.7	0.5	0.6	0.6	0.7	0.7	0.7	0.8
Japan	0.6	0.6	0.5	0.4	0.5	0.5	0.7	0.7	0.7
Netherlands	2.7	2.4	2.7	-	-	-	-	-	-
Norway	2.2	2.4	2.1	2.7	2.6	2.7	2.8	2.8	2.9
Sweden	1.7	1.9	1.8	1.9	2.0	2.0	1.7	1.8	1.7
Switzerland	3.4	3.3	3.6	3.5	3.6	3.8	3.7	3.5	3.6
U.K.	1.8	1.9	1.7	1.7	1.8	1.6	1.7	2.0	2.1
U.S.A.	1.5	1.7	1.7	1.6	1.5	1.4	1.7	1.6	1.8
U.S.S.R.	0.7	0.7	0.4	0.4	0.5	0.5	0.5	0.5	0.6

Source: Gill & Duffus Cocoa Market Report, March 1985

TABLE 5: Share in the production of grindings 1950-1983 in percentage

	1946-55*	1956-65*	1966-75*	1976-81*	1982	1983
France	7	6	3	3	3	3
F.R.Germany	6	12	10	11	11	11
Netherlands	7	9	8	9	9	10
U.K.	16	9	6	5	5	5
Total Western Europe	45	46	38	37	39	38
U.S.S.R.	2	4	8	8	8	8
Total Eastern Europe	3	8	15	14	13	14
U.S.A.	34	24	19	12	11	12
Brazil	-	-	-	-	11	12
Ivory Coast	-	-	-	-	4	4
Total producing countries	11	16	21	31	30	30
Total rest of the world	7	6	7	6	7	6
World total	100	100	100	100	100	100
Thousand tonnes	(720)	(1,025)	(1,439)	(1,488)	(1,608)	1,649

* Average.

Source: Gill & Duffus Cocoa Market Report, March 1985

7 PRICE SITUATION

The most appropriate indicator which affords a survey of cocoa prices is the 'Spot-Price Ghana' in London. This price is quoted ex-store and indicates the purchase price of a tonne of cocoa beans, promptly delivered in London, including storage and handling costs as well as interest on capital.

But cocoa beans are hardly bought on the spot. Buyers usually cover their annual requirements with producers in advance. By the existence of futures markets, cocoa can be traded in advance for delivery in up to one and a half years. Due to this, import prices usually deviate from 'spot' prices (see table 6), and the time lag between movements of these prices is about one year.

Cocoa producing countries have been critically affected by characteristic variations in the production, consumption and real prices of cocoa. Studies conducted by the WORLD BANK (1980) revealed that between 1955-1978 cocoa prices changed by 26.5 percent per year on average, second only to sugar prices which varied 37.4 percent from year to year.

Since the Second World War production and prices of cocoa have been moving in cycles. The fifties saw a period of relatively high prices with a decline towards the end up to 1965 (see table 7). Lower production between 1965-1969 caused prices to rise in that period, only to fall afterwards trough 1972 with a rise in production.

Between 1970-1978 the average annual percentage change in cocoa prices was 37 percent. There was a price increase of 117 percent in 1973 over the preceding year when the price shot up from £270 to £585 per tonne. By 1977, the price had risen five-fold to £2,944 per tonne. Observations made by the FAO (1977 and 1978) revealed that the sudden price increase of 94 percent from 1975 to 1976 was a result of the tight supply situation caused by a combined effect of the reduced output in 1976 and the sustained high level of output of grindings. The further price increase of 110 percent in 1977 over the previous year was a consequence of acute shortage of readily available cocoa by mid 1977. Then a declining trend set in and prevailed into the eighties until a minimum of £1,033 per tonne in 1982 was reached. The price rose again to £2,070 per tonne in 1984 to complete the cycle.

TABLE 6: Cocoa prices in the U.K. (in Pound Sterling)

Year	Spot Price Ghana, London per metric ton ex store (Average Prices)	U.K. Unit Import Value, Cocoa Beans per metric ton cif.
1940	34	32
1945	44	36
1950	205	202
1951	281	281
1952	297	257
1953	283	242
1954	460	368
1955	297	327
1956	218	225
1957	243	203
1958	347	312
1959	281	288
1960	222	230
1961	177	180
1962	167	168
1963	205	173
1964	188	189
1965	138	149
1966	193	139
1967	238	203
1968	320	235
1969	415	320
1970	306	339
1971	232	272
1972	270	238
1973	585	395
1974	990	633
1975	723	673
1976	1,399	855
1977	2,944	1,757
1978	2,006	1,927
1979	1,727	1,781
1980	1,270	1,342
1981	1,127	1,034
1982	1,033	1,066
1983	1,502	1,171
1984	2,070	1,666

Source: Gill & Duffus Cocoa Market Report.
No.317 March 1985.

Looking at the producer prices in some cocoa producing countries (see table 7a) it appears that in Brazil producer prices follow world market prices and fluctuate accordingly. In West Africa, on the other hand, producer prices do not usually fluctuate with world market prices but increase with them, the increases being rather small as compared to those in the world market. For example, the 'Spot-price Ghana, London' in 1977 increased by 110 percent over the previous year's price. The increases of the producer prices in Cameroun, Ghana, Ivory Coast and Nigeria were 27 percent, 60 percent, 13 percent and 14 percent, respectively. The differences accrue to the respective governments which use them partly to cover marketing costs (see chapter 8).

TABLE 7a: Cocoa producer prices in selected countries
(in Pound Sterling per metric ton)*

Year	Ghana	Nigeria	Ivory Coast	Cameroon	Brazil	London
1971	117	179	126	129	118	232
1972	103	188	135	143	153	270
1973	134	211	170	170	335	585
1974	181	320	224	190	494	990
1975	225	463	368	258	444	723
1976	324	588	410	317	810	1,399
1977	519	669	462	403	1,754	2,944
1978	611	845	577	538	1,282	2,006
1979	571	861	583	594	1,019	1,727
1980	625	957	610	596	696	1,270
1981	956	1,044	544	550	694	1,127
1982	2,493	1,104	522	548	607	1,033
1983	3,440	1,253	585	623	925	1,502

* converted by the official rate of exchange

Source: Gill & Duffus Cocoa Market Report.

No.317 March 1985.

It is difficult to establish which country offers the highest price to farmers. National currencies are frequently over-valued and thus, by the use of official exchange rates, one does not obtain national prices in international currencies which are exactly comparable. For example, in table 7a prices

are higher in Ghana than the Ivory Coast from 1977 through the eighties. Farmers in Ghana, however, smuggle cocoa into Ivory Coast where higher prices (at the unofficial rate) are obtained. In Ghana the 1982 and 1983 producer prices in Pound Sterling at the official rate are even higher than the world market price. This is because the official exchange rates in these years were levied with taxes of over 400 percent. This led to a spectacular rise in the producer prices of cocoa in the national currency.

Prices in national currency are given in table 7b. Since 1980 they seem to be stable in the Ivory Coast and Cameroon due to the stability of the CFA franc. In Ghana and Brazil the prevailing high prices of the late seventies through the eighties are a result of the continuous annual devaluation of the national currencies.

The world cocoa market's main feature is instability. Brief supply shortages cause rising prices, and these are followed by longer periods of oversupply and falling prices (see LA FLEUR/JONES 1984). Almost all cocoa producing countries are developing countries which depend heavily on the export of this crop for their foreign exchange earnings. The fluctuation of production and prices causes variations in their foreign exchange earnings and these can adversely affect their development programmes as well as seriously impair the welfare of farmers and other citizens.

TABLE 7b: Cocoa producer prices in selected countries
(in national currency)

Year	Ghana	Nigeria	Ivory Coast	Cameroon	Brazil
1971	8.00	310.00	85	87	22.80
1972	9.17	310.00	85	90	34.04
1973	10.50	340.00	93	93	75.41
1974	13.25	470.83	126	107	117.65
1975	15.67	632.50	175	123	120.07
1976	18.33	660.00	177	137	234.26
1977	28.33	752.50	198	173	649.38
1978	53.33	1,030.00	250	233	666.93
1979	100.00	1,100.00	263	268	874.15
1980	120.00	1,216.67	300	293	1,280.89
1981	160.00	1,300.00	300	303	1,965.00
1982	360.00	1,300.00	300	315	2,859.00
1983	540.00	1,375.00	338	360	12,152.00
1984	762.50	1,425.00	356	380	---

--- Unavailable

Notes:

1. Ghana: The national currency price is expressed in cedis per headload. Prior to June 1977 a headload was 60 lb; the equivalent of 27.2 kg; since that time a headload has been 30 kg (66 lb). For the 1984 mid crop and the 1984/85 main crop the price is 900 cedis per headload.
2. Nigeria: The national currency price is expressed in naira per metric ton. For the 1984/85 season the price was 1,500 naira per metric ton.
3. Ivory Coast and Cameroon: The national currency price is expressed in CFA francs per kilo. For the 1984/85 season the price for the Ivory Coast is 375 francs per kilo.
4. Brazil: The national currency price is expressed in cruzeiros per arroba. One arroba is equivalent to 15 kg. There is no guaranteed farmer price in Brazil and the series quoted in this table is based on reported internal prices.

Source: Gill & Duffus Cocoa Market Report.
No.317 March 1985.

8 TRADE

8.1 Stock exchange

The international cocoa market is the connecting link between cocoa producers and consumers. This market has two trade centres, London and New York, whose stock exchange play the main role in the market. Stock exchange markets in Amsterdam, Hamburg and Paris also play a role in cocoa trade but are of local importance only. The daily quotes on the stock exchange are the basis for the pricing of cocoa beans and its grindings.

Two types of cocoa trade are discernable on the stock exchange markets: Effective trade, which is the exchange of cocoa beans and grindings for money, and Commodity Stock Exchange which deals with futures contracts for delivery of cocoa beans or grindings at some future date.

The two trade centres in London and New York are in constant communication (through telephone or telex) with the various cocoa marketing agencies in the producing countries. In this way, the marketing agencies are well informed about the market (price) situation. These agencies handle the purchase of cocoa on the farms in the producing regions and its transport to the ports for export. In Ghana, for example, the Cocoa Marketing Board - a state owned organisation - performs these tasks whereas in Brazil they are accomplished by private licensed purchasers.

Cocoa is mostly offered according to various shipping periods. A shipping period is the time within which the cocoa must be shipped. For West African cocoa, a shipping period is usually three months. Thus a trader would buy a certain quantity f.i. of Ghana main crop 1981 from the Ghana Cocoa Marketing Board, with a November-January shipping period, including cost, insurance and freight (cif), for delivery at a European port. Cocoa from West Africa is bought only under cif conditions because these countries usually use their own shipping lines and insurances. On the contrary, Brazilian cocoa is mostly shipped under free on board (fob) conditions.

8.2 Trade regulations

To ensure uniformity and standards on the international cocoa market, the Cocoa Association of London (CAL) was established in 1926. This organization is responsible for the regulation

of contracts, quality control and the settling of disputes between contract parties at the Board of Arbitration. CAL has also issued seven different types of contracts which define shipping and paying modalities (PRETSCHER 1981). All cocoa business transactions are undertaken using these contracts except those with America which are performed under different regulations.

All cocoa offered in the world market is labelled according to standard criteria - normally a name and a specification of quality. The name usually refers to the country of origin, say, Ghana, or the port of embarkment, say, Abidjan. On quality one differentiates three grades: First grade cocoa is usually labelled "good fermented" or "superior". The second grade is known as "fair fermented" or "good fair" cocoa, and third grade cocoa is referred to as "fair" cocoa - see PRETSCHER (1981) for details. Prices for cocoa are usually set using the superior grade as a basis. Allowances are then made for the other grades.

In some countries further qualifications specify the origin of cocoa from "larger" plantations or from smaller holdings (the former is of better grade in most cases). Sometimes the name of the trader or his brand name is used in addition to the quality description. Also of great importance in the specification is the harvest period. According to this, one differentiates between the "main crop" (which has better quality) and the "mid crop". A full quality description therefore may be "Nigeria good fermented main crop" or "Abidjan fair fermented main crop".

On the world cocoa market two types of cocoa, Fancy and Commercial, are available. These two categories normally coincide with the Criollo and Forastero varieties, respectively. Commercial cocoa is more spicy and sour and is the basis of most cocoa products. Fancy cocoa is, on the contrary, mild and is used mostly by chocolate producers to improve their products through its pleasant aroma. Only a few luxury cocoa products are refined with Fancy cocoa or completely produced from it. The recipes for such products are protected secretaries (PRETSCHER 1979).

Cocoa from the following countries is termed Fancy cocoa: Dominica, Ecuador, Grenada, Indonesia, Jamaica, Madagascar, Panama, St. Vincent, Santa Lucia, Sri Lanka, Surinam, Trinidad, Tobago, Venezuela and West Samoa. Cocoa from other countries (West Africa, Brazil etc.) is termed Commercial cocoa and accounts for about 90 percent of the world production.

8.3 International Organizations

There are international organizations charged with the responsibility to coordinate the affairs of the world cocoa trade and thus, to pursue particular policies. Three of such organizations are the International Cocoa Organization (ICCO), the International Cocoa and Chocolate Office (OICC) and the International Cocoa Trade Federation (ICTF).

The International Cocoa Organization (ICCO) with its headquarters in London was formed in 1973 under the International Cocoa Agreement of 1972 to administer the provisions of this agreement and to supervise its operation. The organization comprises the International Cocoa Council (ICC) and its subsidiary bodies. The Council consists of representatives from member states and a secretariat which was instituted by the council to provide facilities for its work. Membership of this organization consists of 20 exporting countries which account for over 72 percent of world exports of cocoa beans or its products, and 23 importing countries which represent 67 percent of world imports of cocoa. The U.S.A. is not a member of this organization.

The International Cocoa and Chocolate Office (OICC) has its headquarters in Brussels and was established in 1930 to encourage scientific research towards the development of the cocoa and chocolate industries and to protect its interests. The original membership comprised nine countries of western Europe. Current membership comprises national associations of 24 countries.

The International Cocoa Trade Federation (ICTF) has its headquarters in New York and controls all national cocoa trade associations in Europe and North America.

9 CONCLUSION

For farmers and other citizens in the cocoa producing countries it is essential to expand cocoa trade in order to improve their quality of life and standard of living. If the law of comparative advantage holds, national policies with the aim to specialize in cocoa production and processing would seem to benefit overall economic development in those countries. A strategy to induce investment in cocoa processing industries (forward linkage) and in fertilizer, seed, pesticide and agricultural machinery industries (backward linkage) was thus considered advisable (see SNODGRASS and WALLACE). The performance of this proposition, however, has been rather poor if we look at the economies of developing agricultural exporting countries. Ghana, Ivory Coast and Cameroon have been exporting cocoa for a long time, but the envisaged expansionary effects have not materialized.

One reason for this is that - except for the oil producing developing countries and a handful of newly industrialized countries such as Brazil - the demand for cocoa and its products occurs predominantly in the "Northern Hemisphere". The world's cocoa crop is ground and manufactured into chocolate and other products in the importing countries, mainly industrialized countries. Penetration of those markets with processed cocoa products from developing nations is difficult. The lack of access is a significant disincentive to investment capital in the cocoa producing countries. Furthermore, the recession in the "West" has lowered commodity prices considerably over the last few years, resulting in the loss of several millions of Dollars in export revenue for cocoa producing countries.

Cocoa, like many other agricultural commodities, faces competition from other products. An estimated 150 to 250 thousand tonnes of substitutes are presently being used in cocoa products (ICCO, 1977). At the moment, however, a really effective substitute for chocolate or cocoa does not exist (see LA FLEUR and JONES 1984).

The International Cocoa Agreement created in 1973 to help even out prices between agreed minimum and maximum levels has also remained ineffective since its inception. Further research about what can be done to achieve its goals and what policies will benefit producers is badly needed as a prerequisite for appropriate actions.

Cocoa remains and is going to remain, for a considerable period of time, the mainstay of the developing countries which produce this crop. The performance of the cocoa producing sector will depend on the development of demand for cocoa and its products and on the policies pursued in the market for these goods.

SCHLUSSFOLGERUNGEN

Für die Landwirte und auch die übrigen Bürger der kakaoerzeugenden Staaten ist die Ausweitung des Handels von Kakao eine wesentliche Grundlage zur Verbesserung ihrer Lebensqualität und ihres Lebensstandards. Wenn das Gesetz der naturgegebenen Vorteile zutrifft, müßten Maßnahmen, die das Ziel einer Spezialisierung auf die Kakaoerzeugung und -verarbeitung verfolgen, für die allgemeine wirtschaftliche Entwicklung in diesen Ländern von Nutzen sein. Eine Strategie mit dem Ziel, Investitionen in der kakaoverarbeitenden Industrie sowie in der Dünger-, Saatgut-, Pflanzenschutz- und landwirtschaftlichen Maschinenindustrie (Vor- und Rückverknüpfung) zu induzieren, wurde daher für sinnvoll gehalten (SNODGRASS/WALLACE). Der tatsächliche Erfolg dieser Vorstellungen blieb jedoch weit hinter den Erwartungen zurück, wie am Beispiel der Entwicklungsländer, die Agrarprodukte exportieren, zu sehen ist. Ghana, Elfenbeinküste und Kamerun exportieren schon lange Kakao, ohne daß die erhofften Wachstumswirkungen eingetreten wären.

Ein Grund für diesen Umstand ist, daß die Nachfrage nach Kakao und seinen Folgeprodukten hauptsächlich in der nördlichen Hemisphäre auftritt. Ausgenommen sind nur die ölerzeugenden Entwicklungsländer und eine handvoll von neu industrialisierten Ländern wie Brasilien. Die Weltermte von Kakao wird in den importierenden, meist industrialisierten Staaten gemahlen und zu Schokolade und anderen Produkten weiterverarbeitet. Die Durchdringung dieser Märkte mit Kakaoprodukten aus Entwicklungsländern ist schwierig. Der mangelnde Zugang ist ein wesentlicher Grund für die mangelnde Investitionsbereitschaft in den kakaoerzeugenden Ländern. Darüber hinaus hat die Rezession im "Westen" zu einem beträchtlichen Rückgang der Güterpreise in den letzten Jahren geführt, wodurch die kakaoerzeugenden Länder mehrere Millionen Dollar an Exporterlös einbüßten.

Wie andere Agrarprodukte auch, steht Kakao im Wettbewerb mit anderen Produkten. Es wird geschätzt, daß gegenwärtig 150 bis

250 Tausend Tonnen Kakao durch andere Produkte ersetzt werden (ICCO). Trotzdem gibt es bis jetzt noch kein wirklich vollwertiges Substitut für Kakao (LA FLEUR/JONES).

Das Internationale Kakaoübereinkommen, gegründet 1973 zum Zweck der Eingrenzung von Preisschwankungen zwischen ausgehandelten Höchst- und Tiefstpreisen, blieb ebenfalls unwirksam seit seiner Einführung. Weitere Forschung zur Aufklärung dessen, was getan werden kann, um seine Ziele zu erreichen, und welche Maßnahmen den Produzenten nützen, wird als Vorbedingung zur Einführung entsprechender Maßnahmen dringend benötigt.

Kakao ist ein Grundpfeiler für Entwicklungsländer, die diese Pflanze erzeugen, und wird es für beträchtliche Zeit auch bleiben. Das Wohlergehen des kakaoerzeugenden Sektors wird davon abhängen, wie sich die Nachfrage nach Kakao und seinen Verarbeitungsprodukten entwickelt und welche Maßnahmen auf dem Markt für diese Güter ergriffen werden.

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Figure 1: Production and Consumption (net import) of Cocoa Beans in 1971/72

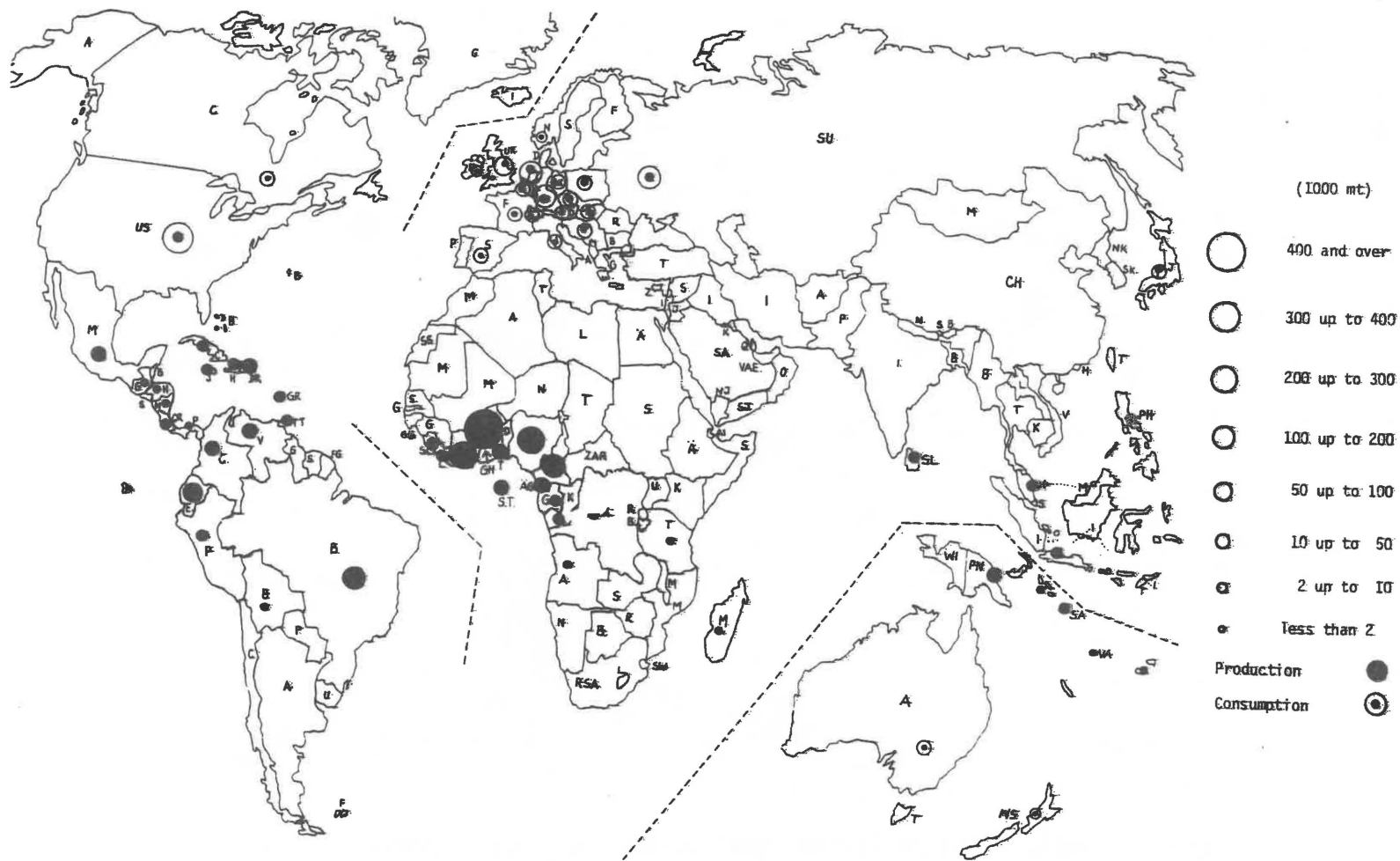


Figure 2: Production and Consumption (net import) of Cocoa Beans in 1983



Part II - THE DEMAND FOR COCOA IN THE E.C.COUNTRIES - FORECASTS AND POLICY IMPLICATIONS

1 INTRODUCTION

Cocoa is one of the most important products in international agricultural trade. It ends up mainly as chocolate. Intermediate products (grindings) are cocoa butter, cocoa liquor, cocoa paste and cocoa powder. To developing countries, the main producers, the importance of cocoa stems out of the fact that it is a major source of income for a considerable proportion of the agricultural population and it also serves as an important export crop. In the developed countries cocoa is an important food item and cocoa processing and trade also provides jobs in these countries.

For the cocoa producing countries it would be essential to expand cocoa trade in order to increase the economic strength and welfare of farmers and other citizens. In accordance with the law of comparative advantage, national policies specializing in cocoa production and processing would seem to be beneficial to overall economic development in those countries (SNODGRASS/WALLACE). However, most of the world cocoa crop is shipped in the form of beans and is ground and manufactured into chocolate and other products in importing countries, mainly developed countries in the Northern hemisphere. The recession in the industrialised countries has lowered commodity prices considerably over the past few years, costing cocoa producing countries several millions of dollars in export income.

The EC plays a significant role in various ways in the world cocoa trade. Firstly, as the world's leading importer (accounting for about 45 % of the world's total import in 1983) and then as an important market center. The removal of trade barriers within the EC through the community's directive on cocoa and chocolate products as well as joint regulations have also given cocoa an important part in the community's trade (COQUIN). In the drive for increased earnings of developing countries from cocoa production, processing and distribution, therefore, knowledge of the demand situation for cocoa in the EC is essential.

The objectives of this study are to

1. examine the impact of price, income and time on the demand for cocoa beans in EC-countries.

2. forecast the demand for cocoa in the EC in 1995.
3. determine how much supply must change in order to achieve a certain increase in revenues in the producing countries.

At a time when a New International Cocoa Agreement (February 1986) calls for supplementation of the buffer stock policy by a system of national export quotas, the results of these assessments should be beneficial to cocoa producing countries in that they show the scope for further development of the industry and the effectiveness of supply management policies to producers.

While former analyses were mainly concerned with world demand as a whole, the present paper focusses on the demand for cocoa in individual countries of the EC, and these may be considered as a sample from the countries of the world. Its purpose is to obtain quantitative estimates about the interdependency between demand, prices and supply. The results on elasticities, in particular price elasticities with their high relevance to supply management policies, will be compared to those derived from previous studies on the world as a whole or different countries. They will be used to forecast the demand and explore the scope of policies designed to exploit the market to the benefit of producers.

2 METHODOLOGY

2.1 Estimation of consumer demand

The theory of consumer behavior holds that consumption of a commodity depends on prices, income and preferences of the consumer. This relationship was represented by the log linear model implying constant elasticities over time. This model can be extended by the inclusion of a time trend representing changing preferences and a lagged dependent variable which allows for partial adjustment of actual toward desired consumption, giving rise to the notion of short and long run elasticities of demand and mean lag, i.e. the time it takes to bridge half the gap between actual and desired demand. For countries which were not originally members of the EC, a dummy variable was included to account for the effect of non-membership in the EC on cocoa consumption.

Cocoa, like many other agricultural commodities, is competing strongly with other products. As a beverage, it faces competition from coffee and tea. As a raw material for the production of chocolate, its fat component can be substituted with palm oil, shea butter and other vegetable fats. However, these substitution effects had to be disregarded for the sake of simplicity and because of lack of data. The prices of milk and sugar were excluded from the equations because these commodities are, according to WEIMER, both complements and substitutes for cocoa, i.e. they are used in both cocoa products and goods that compete with cocoa products in such a way that their price favours neither of the two. The price of coffee was also excluded from the equations. Substitution effects are expected to be low because coffee is consumed mainly by the adult population whereas cocoa is preferred by the young.

Thus, in the simplest model, the quantity of cocoa consumed per capita was assumed to be a function of its price (r) and the average income (z) of a consumer. If consumers take time to adjust their consumption to the level desired at current prices and income, the quantity of cocoa consumed is a function of current price, current income and the quantity consumed in the previous year, (q_{t-1}). Although it may be true that consumers adjust their consumption according to the rule of habit formation, acquiring a taste for cocoa products with the level of their previous consumption, a more direct cause of changing consumption may be gradual changes in tastes, production technology and distribution. These factors comprise an

independent source of change that can be represented by a time trend in the model:

$$(1) \quad \ln q_t = a + b \ln r_t + c \ln z_t + \lambda \ln q_{t-1} + d t$$

where $t = 1$ for 1961, 23 for 1983.

Unfortunately, the movement of income over time is highly correlated with that of trend, and thus there are two variables with roughly the same serial pattern in equation (1) which makes it difficult to discern their respective effects statistically. Estimated coefficients for this equation are therefore not too reliable and should be compared to results from three alternative model specifications in which the trend effects will be attributed to changes in income (i.e. $d = 0$) and/or habit formation will be excluded ($\lambda = 0$).

Membership of the EC affects cocoa consumption due to the existence of the Common Agricultural Policy (CAP). For countries which joined the EC later than in 1961, a dummy (0,1-)variable was added to the equations above. Its coefficient captures the difference in per capita cocoa consumption before and after the country became a member of the EC.

2.2 Forecasts

In order to forecast demand, predictions of the independent variables which appear in demand equation (1) are required. These predictions are based on the assumption that past developments prevail into the future and that the relationship between the variables as represented by the original regression model also prevails.

In this study, the independent variables in the demand equations are the price of cocoa and the per capita incomes in the individual countries of the E.C. Since the aim of the study is to estimate the demand for cocoa at different prices in the E.C. in 1995, forecasts of the population of its member countries are also required. As far as the price of cocoa beans is concerned, we will assume that it can take two values in the long run: a) that of 1983 (low price scenario, see table A1) and b) twice the 1983 level by an appropriate manipulation of supply (high price). Because supply and demand must equal in the long run, the forecasts of demand in the E.C. in 1995 are also forecasts of the supply which bring about these particular prices in the marketplace.

Prediction of per capita income is difficult because it can rise substantially (as happened until the mid-seventies) but it also can stagnate (as it did more or less thereafter). To shed light on this uncertainty, we will again assume two scenarios of low and high income growth.

To arrive at low per capita income (L) we assume that it will continue to grow until 1995 at about the same rate as it did from 1970 to 1982. High per capita incomes (H) would be obtained at about twice this growth rate (see table A2).

Four forecasts of p.c.consumption are then obtained for each country using the following price and income variables:

- 1) low price, low income (LL)
- 2) low price, high income (LH)
- 3) high price, low income (HL)
- 4) high price, high income (HH)

But we are only interested in the effect of a variation in price. Thus, consumption at low and high price is given at average income, i.e., at the averages of forecasts 1 and 2 and 3 and 4, respectively.

Total consumption depends on per capita consumption and population. The latter is assumed to follow the trend which prevailed from 1961 to 1983 but emphasising developments after 1970 (see results in table A3). In case there are alternative demand equations for any country, the one reported first (in table 3) will be used to calculate p.c.consumption in 1995.

3 DATA

3.1 Sources and transformations

The sources of data are given in table 1. The quantity of cocoa consumed is defined to be import minus export. It includes changes in stocks and - since production in these countries is zero - might be termed "national disappearance".

TABLE 1: Data Base

Period:	1961-1983
Cocoa Price:	Spot-Price Ghana, London (US-Dollar/ 100 pounds): W
Cocoa consumption:	Net import (mt): N
Income:	Private consumption (10 ⁹ National Curren- cies): Y (Ireland: 10 ⁶ Pounds)
Exchange rate:	National Currency/US-Dollar: E (UK: US-Dollar/Pound Sterling, (Ireland: US-Dollar/Irish Pound)
Population (10 ⁶):	B
Consumer Price Index (1980=100):	M
Real price of cocoa ($W \times E \times 100/M$):	R
Real income per capita ($Y \times 100/M/B$):	Z
Cocoa consumption per capita ($N/B \times 1000$):	Q

Sources: a) International Financial Statistics, IMF Year Book, 1984

b) FAO Trade Year Books 1961-1983

The cocoa price Ghana at the London Commodity exchange was considered to be representative for the trade with the EC and was transformed via the exchange rate into the price of cocoa in national currency. This price is a component in the cost of consumption goods containing cocoa and is likely to affect the pricing of these consumption goods sooner or later.

The prices of milk and sugar were excluded from the equations because these commodities are, according to WEIMER, both complements and substitutes for cocoa, i.e. they are used in both cocoa products and goods that compete with cocoa products in such a way that their price favors neither of the two. The price of coffee was also excluded from the equations. Substitution effects are expected to be low because coffee is consumed mainly by the adult population whereas cocoa is preferred by the young.

prices and income were adjusted for the effect of inflation by dividing them with the consumer price index of the respective country, yielding "relative or real price". Private consumption expenditures were adjusted similarly to calculate "real income". In the following, the adjective "real" will be omitted.

Data for Belgium includes Luxemburg, i.e. net import figures for Luxemburg were added and the populations of the two countries were combined.

3.2 Cross-country comparison

Figures for per capita consumption of cocoa beans (see table 2) indicate that Holland is the largest consumer with 10.4 kg in 1983, followed by Belgium with 3.05 kg and West Germany with 2.78 kg. Denmark was the smallest consumer with 0.44 kg per capita. Italy and Greece come close to this value. The figure for Holland, however, does not represent its true consumption of cocoa. Holland imports beans and re-exports cocoa mainly in the form of grindings. Actual consumption per head is therefore lower than indicated by net import data.

TABLE 2: Consumption of cocoa beans in member countries of the EC in kg/capita.

Country	1975	1976	1977	1978	1979	1980	1981	1982	1983
West Germany	2.60	2.42	2.45	2.60	2.39	2.67	2.75	3.15	2.78
Netherlands	8.68	8.92	9.29	9.22	9.10	9.03	9.84	10.83	10.40
France	0.72	0.80	0.77	0.85	0.96	0.90	0.96	1.03	1.01
Italy	0.52	0.64	0.47	0.53	0.58	0.59	0.61	0.70	0.63
U.K.	1.31	1.45	1.27	1.41	1.45	1.31	1.51	1.87	1.02
Denmark	0.65	0.68	0.55	0.46	0.47	0.46	0.53	0.50	0.44
Ireland	2.36	2.43	1.64	1.89	1.71	1.53	1.22	1.79	1.54
Greece	0.53	0.53	0.45	0.47	0.57	0.56	0.43	0.52	0.48
Belgium	1.58	1.58	1.49	1.60	1.66	2.27	2.79	2.83	3.05

Also from table 2 it appears that per capita consumption is decreasing in Denmark and Ireland, increasing in Belgium and Italy and almost stable in the other member countries of the E.C. In addition, yearly fluctuations in consumption are pronounced, in particular in the United Kingdom and Ireland, but this is again due to the fact that net import was used as a proxy for consumption and changes in stocks were disregarded.

It is not clear from table 2 what causes the level of cocoa bean consumption in various countries and its pattern of change. However, one significant development is that some countries who already specialized in the processing of cocoa beans (i.e. Netherlands and Belgium) are increasing their market share while others with a low position in the market (like Denmark and Greece) are losing further.

Nonetheless, some of the differences may also be attributed to changes in prices and the level of income. Data on these variables are given in table A5 and show that the average expenditure share for cocoa beans is about 0.1 %.

4 RESULTS AND DISCUSSION

4.1 Elasticities of demand

For reasons which have been discussed at length in the relevant literature, econometric analysis has its limitations in measuring the effects of relevant variables on consumer demand. These limitations were also reflected in the results of the estimation of our demand equations. Depending on which of the four equations was used, greatly diverging price and income elasticities were obtained. In some cases price elasticities were even positive. The statistical significance of estimated coefficients was not always satisfactory. In table 3 only results with negative price elasticities and only - at the most - the two "best" equations for each country are recorded.

On the basis of the results given in table 3, the (long run) price elasticities obtained are in a range between -0.06 (Ireland) and -0.60 (France). Studies conducted by AKIYAMA and DUNCAN attributed the cyclical behaviour of the world price of cocoa partly to low price elasticities.

Income elasticities were particularly difficult to measure because of the high correlation between income and trend (see above). In equation (1) positive reactions of demand to the trend were generally associated with negative income elasticities, and vice versa. In the specifications where income effects include trend effects, income elasticities had a positive sign except for Ireland. In general, the demand for cocoa beans was found to be income inelastic, with elasticities ranging between 0.21 and 0.30 for the three most important consumers in the EC (West Germany, Netherlands, U.K.) (see table 3). Because income and trend are highly correlated, it was difficult to discern their respective effects. So f.i., the high responses of cocoa bean consumption p.c. on changes in income as found in Italy and Denmark are offset by decreases of 6 % p.a. which are due to other factors. In Ireland, even rising income worked in favor of decreasing cocoa bean consumption.

Results obtained by BEHRMAN, VITON and GOREUX showed that the demand for cocoa is price and income inelastic in all major markets. However, large income elasticities of 1.18 and 1.38 were obtained by ADAMS/BEHRMAN for the centrally-planned and developing nations, respectively. Also, OKORIE/BLANDFORD ob-

TABLE 3: Short run (S.R.) and long run (L.R.) price and income elasticities of demand for cocoa in the member countries of the European Community.

Country	constant	price elasticity		income elasticity		Trend	Adjustment coefficient (λ)	R^2	Durbin Watson's Statistic
		S.R.	L.R.	S.R.	L.R.				
West Germany	-0.576	-0.099	-0.178	0.168	0.301	0.036	0.528	0.441	2.00
	2.782	-0.084	-0.084	-0.799	-0.799				
Netherlands	1.200	-0.083	-0.184	0.118	0.260	0.029	0.542	0.548	1.47
	3.530	-0.028	-0.028	-0.641	-0.641				
France	0.175	-0.085	-0.599	0.102	0.720		0.881	0.795	1.47
Italy	-8.123	-0.209	-0.209	1.369	1.369	-0.060	0.370	0.652	1.95
	2.151	-0.163	-0.258	-0.664	-0.105				
U.K.	0.715	-0.065	-0.065	0.210	0.210	-0.016	0.164	0.164	2.20
	1.241	-0.070	-0.070	-0.693	-0.693				
Denmark ¹⁾	-4.955	-0.313	-0.313	2.024	2.024	-0.059	0.536	0.894	1.79
	3.917	-0.243	-0.524	-0.695	-1.295				
Ireland	6.66	-0.031	-0.061	-0.839	-1.667		0.497	0.590	2.15
Greece ²⁾	-1.062	-0.285	-0.343	0.599	0.720		0.168	0.659	2.23
Belgium	-1.079	-0.355	-0.543	0.849	1.298	0.020	0.346	0.633	1.64
	1.670	-0.452	-0.452	0.456	0.456				

Effect of EC-Membership: 1) -21.6 %

2) -23.1 % (S.R.), -38.6 % (L.R.)

tained an income elasticity of 1.92 for the U.S.S.R but as SINGH/DE URIES/HULLEY/YEUNG observed that the centrally-planned economies consume only 15 % of world cocoa beans and products, we may conclude with LA FLEUR/JONES that the effect of income induced consumption increases of these countries, relative to world cocoa consumption, is small.

A look at table 5 also reveals that Denmark and Italy accounted for 0.5 % and 7 %, respectively, of total EC consumption from 1981-1983. The impact on total EC cocoa consumption of changes in incomes of these two countries is therefore insignificant.

EC membership in the case of Greece reduced cocoa bean consumption by more than a third in the long run. This might be due to the introduction of the Common Agricultural Policy (CAP) which brought to bear competition from other countries' processors who are providing services that could be produced by Greek processors in their absence.

4.2 Forecasts for 1995

As stated earlier, forecasts of cocoa consumption in the EC are based on the "best" equation for each country. Even if problems of reliability of these coefficients remain, it seems useful to estimate at least the orders of magnitude involved. Table 4 gives the forecasts of cocoa consumption in the E.C. countries in 1995 at 1983 and twice these prices. The corresponding consumption for the E.C. as a whole is 592,000 and 406,000 metric tons, compared to 542,000 in 1983.

Assuming the EC price elasticities of demand for cocoa are representative for the world as a whole, world consumption in 1995 would be 1,366,126 metric tons at 1983 prices and 937,104 metric tons at twice these prices. This would amount to 3.07 and 4.20 billion US Dollars, respectively, in revenue to the suppliers.

Since price is the result of interaction between supply and demand, restricting supply drives prices and revenue up. In fact, if it were possible to restrict supply and satisfy 31.4 % less demand - as in the example above, revenue of suppliers would increase by 36.8 %. A restriction of supply by 1 metric ton would increase revenue by 2,634 US-\$ on average.

TABLE 4: Forecast of consumption of cocoa in member countries of the European Community in 1995 at high and low prices, in MT.

Country	1981-1983	1995 ¹	
	Average consumption 1981-83	Consumption (MT) at low prices	Consumption (MT) at high prices
West Germany	178,127	184,252	163,429
Netherlands	148,164	164,064	143,888
France	54,337	68,900	44,376
Italy	36,920	61,710	53,317
U.K.	81,993	68,592	65,710
Denmark	2,521	1,649	1,308
Ireland	5,237	5,539	5,351
Greece	4,689	5,621	4,432
Belgium	29,531	35,490	24,150
Total (EC)	541,519	591,817	405,961
Total (world)	1,250,020	1,366,126 ²	937,104 ²

¹ Low price is 1983 price, high price is twice the 1983 price. Income is given in table A2.

² Assuming the EC share in world consumption stays constant.

5 CONCLUSIONS AND RECOMMENDATIONS

The importance of the European Community on the world cocoa market is undisputable. In 1983 the EC accounted for about 44 percent of world cocoa imports and with the recent entry of Spain and Portugal into its membership, total EC cocoa consumption is likely to increase. Analysis of demand for cocoa in the EC thus affords analysis of world cocoa demand.

The world cocoa economy is characterized by supply variability and price fluctuations. This market instability has severe and sometimes sudden economic, social and political consequences, especially in the producing countries. Some of them depend heavily on export earnings for cocoa beans which enable them to pay for their imports. Two things might be advantageous to them: A dampening of price fluctuations and supply variability and an overall increase in revenues. The latter hinges on the demand for cocoa products in the future and the ability of suppliers to exploit the demand to their benefit at the cost of consumers.

The study revealed that suppliers could increase their revenues by adjusting output in such a way as to obtain high prices. This would require the formation of a cartel by producers and the allocation of production or export quotas to its members. It also would involve a transfer of economic surplus from consumers who might be willing to dispense of it, f.i. in exchange for higher security of prices and supply.

These problems were at issue in the February 1986 Geneva negotiations on a new International Cocoa Agreement. A system of export quotas and buffer stocks failed to be implemented because the largest producer (Ivory Coast) and the largest importer (the U.S.A.) rejected the proposal. Clearly, market regulatory mechanisms such as an export quota system are by no means insusceptible to external forces. For instance, unfavourable weather conditions in major producing countries will render producers unable to meet their export quotas and incidences of unstable currencies will disort indicator prices. Problems of "free riders" and of split markets are also inevitable. But they could be minimized by convincing all major producers and consumers that an agreement will be beneficial to them.

A system of price ranges could be introduced to allow for quota adjustments for the different types of cocoa - thus

making room for flexibility in the system as it operates in the International Coffee Agreement (see I.C.O.). But buffer stocks will still be necessary to even out supply over years where producers are unable to procure their whole entitlements and also to swallow the surplus of bumper harvests. The International Coffee Agreement also faces these challenges. In it, provision is made for quotas to be suspended and reintroduced depending on price levels as an alternative to stock policy.

Production can also be curbed by land restriction programs. Producers as a whole would gain by the ensuing reduction in production but the gain should compensate those who restrict production. One way to accomplish this is to collect part of the price increase for distribution to farmers who participate in the program. The areas set aside under this program could be used for the production of food crops to improve the malnutrition problems. These are, according to PINSTRUP-ANDERSEN, caused partly by inadequate intake of calories and are imminent in most developing countries which export agricultural goods.

The low price elasticities obtained for cocoa suggest high loss of revenue in the case of a bumper crop and thus a high vulnerability of exporting countries. This calls for the implementation of the level of prices along the lines as outlined above (see also TOMÉK/ROBINSON) and which in turn depends on a growing interdependence of producers and consumers.

6 SUMMARY

A considerable proportion of the world supply of cocoa beans is traded at the London Stock Exchange. The leading importer of cocoa is the European Community with a market share of roughly 50 %. The supply originates predominantly in Latin America and in West Africa where some countries depend heavily on cocoa for export revenues. The aim of this study was to explore how demand in the E.C. reacts to price changes and how this relationship may be used to further the revenue of producers.

On average in the E.C., a price increase of 1 % reduces cocoa consumption by 0.31 %. At prices of 1983, cocoa consumption is forecast to increase by 0.69 % annually due to rising income, changes in preferences and other factors. If producers were able to freeze supply at the 1981-1983 level, this would result in an annual price increase of 1.9 % (above inflation) in the London exchange market, assuming that the E.C. is representative of the world.

ZUSAMMENFASSUNG

Ein großer Teil des gesamten Angebotes an Kakaobohnen auf dem Weltmarkt wird an der Londoner Börse gehandelt. Die Europäische Gemeinschaft ist mit einem Marktanteil von ca. 50 % der führende Importeur von Kakao. Das Angebot stammt überwiegend aus Lateinamerika und Westafrika, wo einige Länder in hohem Maß auf den Kakaoexport zur Gewinnung von Deviseneinnahmen angewiesen sind. Das Ziel dieser Studie war, festzustellen, wie die Nachfrage in der EG auf Preisänderungen des Kakao reagiert und wie diese Beziehung zur Erhöhung des Erlöses der Produzenten genutzt werden kann.

Im Durchschnitt der EG vermindert eine Preiserhöhung der Kakaobohnen um 1 % die Nachfrage um 0,31 %. Würden die Preise von 1983 bestehen bleiben, dann würde die Nachfrage nach Kakao infolge steigender Einkommen und sich ändernder Ernährungsgewohnheiten um jährlich 0,69 % zunehmen. Würde es aber den Produzenten gelingen, das Angebot auf dem Niveau von 1981-1983 einzufrieren, dann hätte dies einen jährlichen Preisanstieg von 1,9 % (über die Inflation hinaus) an der Londoner Börse zur Folge, wenn man annimmt, daß die Nachfrage in der EG für die Weltnachfrage repräsentativ ist.

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8 APPENDIX

TABLE A1: Price of cocoa in member countries of the European Community in 1983.

Country	Price ¹ (in national currency/100 pounds)		national currency
	1961-1983	1983	
West Germany	223.65	224.46	Deutsche Mark
Netherlands	264.80	249.61	Guilders
France	266.59	774.49	Francs
Italy	954.82 ²	843.22 ³	100 Lira
U.K.	56.08	52.46	Pound Sterling
Denmark	718.81	706.70 ³	Kroner
Ireland	304.17 ²	86.22	Pounds
Greece	4,580	4,931	Drachmas
Belgium	3,749	3,375 ³	Francs

¹ Spot price Ghana, London, times exchange rate, deflated by Consumer Price Index (1980=100)

² Mean of 1961-1982

³ 1982

TABLE A2: Per capita incomes of member countries of the European Community in 1961, 1970 and 1982, in 1980 prices¹.

Country	1961	1970	1981-1983 average	Index 1995 (1970=100)	
				low	high
West Germany	6.954	9.959	13.178	145	180
Netherlands	6.747	10.231	13.843	150	185
France	15.686	23.274	33.335	160	200
Italy	1,705	2,709.68	3,829.3	160	200
U.K.	1.768	2.086	2.504	130	150
Denmark	28.209	35.318	40.918	130	150
Ireland	1,010.34	1,360.81	1,686.9	130	155
Greece	49.522	89.455	113.251	140	165
Belgium	116.425	156.603	218.686	155	190

¹ deflated by the consumer price indices of the respective countries, in 1,000 national currencies (Ireland in nat. curr.)

TABLE A3: Population of member countries of the EC in 1961, 1970, 1983 and 1995¹.

Country	1961	1970	1983	1995	
					1970=100
West Germany	56.18	60.71	61.40	63.10	104
Netherlands	11.64	13.03	14.36	15.64	120
France	46.16	50.77	54.44	58.39	115
Italy	49.90	53.66	57.52	61.71	115
U.K.	52.81	55.42	56.34	57.64	104
Denmark	4.61	4.93	5.11	5.23	106
Ireland	2.82	2.95	3.42	3.69	125
Greece	8.4	8.79	9.89	10.81	123
Belgium	9.50	10.00	10.23	10.50	105

¹ The 1995 values are estimated, assuming the index given above.

TABLE A4: Forecast of per capita consumption of cocoa in 1995 for member countries of the European Community, in kg. p.c.

Country	Observed consumption in 1983	Scenario ¹			
		LL	LH	HL	HH
West Germany	2.78	2.81	3.02	2.44	2.73
Netherlands	10.40	10.20	10.78	8.90	9.50
France	1.01	1.05	1.23	0.69	0.82
Italy	0.63	0.84	1.15	0.73	1.00
U.K.	1.02	1.12	1.26	1.06	1.21
Denmark	0.44	0.27	0.36	0.21	0.29
Ireland	1.54	1.72	1.29	1.66	1.24
Greece	0.48	0.49	0.55	0.39	0.44
Belgium	3.05	2.91	3.85	1.99	2.61

¹ L ... low, H ... high.

First character refers to price, second to income.

TABLE A5: E.C. member countries' per capita consumption, price, income and expenditure share of cocoa beans in 1982*.

Country	Price	Con- sumption kg	Expen- diture on cocoa	Income	Expen- diture share (%)
West Germany	4.07	3.15	12.80	13,041	0.10
Netherlands	4.44	10.83	48.08	13,738	0.40
France	9.75	1.03	10.09	33,566	0.03
Italy	1,854.6	0.69	1,292.29	3,879,305	0.03
U.K.	0.88	1.87	1.64	2,485	0.07
Denmark	12.74	0.50	6.41	40,922	0.02
Ireland	0.92	1.79	1.66	1,638,603	0.10
Greece	83.47	0.52	43.40	114,279	0.04
Belgium	33.75	2.83	210.35	21,977	0.10

* in national currencies.