THE COCOA INDUSTRY IN GHANA AND THE IVORY COAST: A COMPARATIVE STUDY OF GOVERNMENT AGRICULTURAL POLICIES AND THEIR IMPACT

HAYFORD OFORI-ATTAH

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TO THE

MEMORY OF

AKUA POMAA

MY BELOVED SISTER

WHO DIED IN THE MIDDLE OF MY PH.D STUDY

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ABSTRACT.

The cocoa industry has been the economic pillar of Ghana and the Ivory Coast for over three-quarters of a century. Both countries have depended on the industry for the bulk of the wherewithal required for economic development.

In Ghana, the industry has however, since the beginning of the 1970s, shown clear signs of decline in terms of output. Cocoa output in Ghana has slumped from 538,000 tonnes in 1965 to 175,000 tonnes in 1985. In the Ivory Coast, cocoa output has on the contrary, risen from 148,000 tonnes in 1965 to 565,000 tonnes in 1985. Ghana is currently trailing behind Ivory Coast and Brazil in cocoa beans production.

The objective of the study has been to identify the causes of the decline and growth of the cocoa industry in Ghana and the Ivory Coast respectively through an in-depth study of government agricultural policies. The rationale behind the comparative study is to bring out the strengths and weaknesses in the agricultural policies of the two countries so that Ghana can sift out the good policies that have aided the Ivory Coast cocoa industry to flourish and use them to revamp its floundering cocoa industry.

The study employs multiple regression, cost-benefit and domestic resource costs techniques to analyse government agricultural policies and to assess the relative profitability ofcocoa production.

The study has revealed that the major explanatory factor for the current state of the industry in both countries is the producer price policy of the governments of the two countries. While producer prices are not favourable in Ghana, they tend tobe relatively high in the Ivory Coast. The poor producer price policy of the government of Ghana has led to a shift of resources from the cocoa industry to other more lucrative ventures such as food-cropping and commerce.

Other factors that have been discovered through the study to account for the decline of cocoa output in Ghana include inefficient marketing system, lack of farm inputs and poor implementation of cocoa rehabilitation projects. The results of the comparative advantage analysis suggest that there is the need for Ghana to embark on a policy of agricultural diversification. Besides cocoa, a cash crop whose development is worth encouraging by the government of Ghana is the oil palm.

Based on the experience of the Ivory Coast, a number of recommendations have been suggested in the concluding chapter for adoption by the government of Ghana. These policy recommendations include a yearly upward adjustment of the cocoa producer price to a level that will leave the cocoa farmer with an appreciable profit margin, the privatization of the cocoa marketing board, a regular and an adequate supply of farm inputs and an efficient implementation of cocoa rehabilitation projects.

PART I

PREFACE.

CHAPTER 1.

INTRODUCTION.

1.1 Objective of Study.

The cocoa industry has been the economic mainstay of Ghana and the Ivory Coast for several decades. Both countries have depended on the industry for the bulk of the financial support required for economic development. Specifically, the industry has contributed immensely towards the Gross Domestic Product(GDP) and the government tax revenue of each country; it has also offered employment to many people living in the rural areas of the southern sectors of both countries. [1]

Recent output figures however, show that in Ghana the torch of the cocoa industry is gradually dying out while in the Ivory Coast, the flame is rather gleaming brightly. In the case of Ghana, cocoa output has slumped from as high as 538,000 tonnes in 1965 [2] to as low as 175,000 tonnes in 1985[3] - a fall of about 67%. For the same period, cocoa output in the Ivory Coast has risen from 148,000 tonnes [4] to 565,000 tonnes [5] - an increase of 281%. It is of no surprise then that Ivory Coast has since 1978 become the leading producer of cocoa in the world -a position Ghana had

held since 1911. Currently, Ghana is trailing behind Ivory Coast and Brazil in cocoa beans production.

One wonders why the cocoa industry is faring pretty badly in Ghana but flourishing in the Ivory Coast since the two countries share a common border and possess the same climatic and ecological factors conducive to cocoa cultivation. Institutionally, Ghana and the Ivory Coast are not very much different. They are both predominantly agricultural countries. There is a little mechanisation of agriculture; peasant farmers use simple tools like cutlass, hoe and axe to perform all the work on their farms. Tree crops are grown in the forest area in the south while grains are largely cultivated in the northern savanna belt. The bulk of the cash crops produced in the two countries for export is grown by individual peasant farmers.

Given these similarities, one would expect the performance of the cocoa industry in Ghana and the Ivory Coast to be slightly different if not the same, but this has not been the case. It is the search for an explanation to this apparent paradox which has motivated this study.

A considerable amount of research has been done separately on the cocoa industry in Ghana and the Ivory Coast. A few of such researchers who have worked on the Ghanaian cocoa industry are Bateman, Ady and Nyanteng. [6] Researchers who have studied the cocoa industry in the Ivory Coast include Bene-Hoane, Elliot and Hecht. [7] There is an agreement among these researchers that the fundamental factors that have led

to the decline of the cocoa industry in Ghana are the old age of both cocoa trees and farmers, diseases and pests, lack of farm inputs and low cocoa producer price. Factors cited to explain the rapid growth of the Ivorian cocoa industry are the relatively high producer price of cocoa, availability of farm inputs and extensive government rehabilitation projects.

We believe that the root cause of the current state of the cocoa industry in the two countries lies intrinsically in government agricultural policies. Government agricultural policies have acted in concert to cause the decline and the rise respectively in cocoa output in Ghana and the Ivory Coast since it is these policies which induce farmers to either stay in or opt out of the cocoa industry. The objective of the study is therefore to do an in depth study of government agricultural policies in Ghana and the Ivory Coast in relation to the cocoa industry with the view to establishing the factors that are responsible for the present state of the cocoa industry in the two countries.

1.2 Organisation of Study and Methodology.

Our investigation begins with the study of public investment in agriculture. The proportion of Development Plan expenditure that goes into agriculture in the two countries is studied. This enables us to measure the

priority the governments ofGhana and the Ivory Coast attach to agriculture. This is followed by a study of the marketing systems of both countries. While Ghana uses a marketing board to purchase and market abroad its cocoa, the Ivory Coast relies on private buyers and sellers for marketing its cocoa output - the activities of these buyers and sellers are monitored by a stabilisation fund. The pricing policies of the different marketing systems and how they have affected the attitude of farmers towards investment in cocoa farming are examined. We have used the Coppock Index and the Variance ratio to measure the extent to which the two marketing systems have succeeded in stabilising cocoa producer prices. These indices which reinforce each other, permit us to identify the more efficient of the two marketing systems. Government policies on the supply of farm inputs and the rehabilitation of cocoa farms are studied in succession. In the case of Ghana, an evaluation of the Ashanti Cocoa Project has been done as a case study. [e]

In Part III of the study, the effect of the government agricultural policies on the cocoa industry is evaluated. This is done through an examination of the trends in cocoa output and the spatial change in cocoa production. The study recognises cocoa smuggling as a likely outcome of the disparities in cocoa producer prices in Ghana and the Ivory Coast. The factors promoting this illegal trade in cocoa are identified. By means of a multiple regression analysis,

the supply functions of cocoa in the Ivory Coast and three border regions of Ghana are estimated and from the results, we have estimated the magnitude of cocoa smuggling which in most cases, has been guessed by researchers. The regression results are equally useful to policy-makers in the area of cocoa-farm rehabilitation since they facilitate the identification of the variables that require priority attention.

In Part IV, the world market demand for cocoa is studied. Again, a multiple regression analysis is used to estimate the world market demand for cocoa. The results are employed to analyse the price elasticity of world demand for cocoa. Information on demand conditions on the world market is crucial to the governments of Ghana and the Ivory Coast so that they can plan cocoa output within the limitations of world market conditions. In the wake of this, we have analysed the comparative advantage of cocoa production. Cost-benefit analysis and Domestic Resource Costs (DRC) have been employed to measure respectively the private and social profitability of cocoa production and the social opportunity costof cocoa production in Ghana and the Ivory Coast. The rationale of this exercise is to permit the governments of Ghana and the Ivory Coast to weigh the profitability of cocoa against rival cash crops with the view to find out whether there is a case for agricultural diversification.

We note that some of the research done on the Ghana cocoa industry, for example, that done by Bateman, Ady and Atta

employ statistical methods to assess the weight of the various variables that explain cocoa supply; the majority however, just catalogue the factors. The latter approach makes it difficult to gauge the weight of each of the factors. This limits the extent to which one can go in offering suggestions to the government on the sort of attention that has to be given to the various factors to turn the industry round. Against this background, the study relies heavily on statistical methods in analysing the supply and demand conditions of the cocoa industry in Ghana, the Ivory Coast and on the world market. This aspect of the study together with its comparative nature and broad scope, makes it different from any of the previous works done on the cocoa industry in Ghana and Ivory Coast.

Findings of the study are summarised in Part V. Recommendations made in this section to the Ghana government are based essentially on the policies that have accounted for the sharp growth of the cocoa industry in the Ivory Coast. These include better farmer remuneration, supply of adequate farm inputs, competitive marketing system and efficient implementation of cocoa rehabilitation projects. The study ends with an epilogue which forecasts the future of the Ghanaian cocoa industry given that cocoa farmers were sufficiently rewarded.

1.3 An Overview of the Cocoa Industry.

1.3.1 The Cocoa Tree and its Cultivation.

The original habitat of the cocoa tree (Theobroma Cacao) can be traced to Central and South America where it has been cultivated for well over thousand years (Lass & Wood, 1985, p. 4). In the nineteenth century, it was introduced from Brazil to Sao Tome from where it was sent to Fernando Po. Towards the close of the century, the cocoa tree was eventually brought to the African mainland from Fernando Po.

Theobroma Cacao thrives in the forest vegetation, generally within 15 degrees of the Equator. It requires a well-distributed rainfall, ranging between 40 and 70 inches annually with a relatively uniform temperature. In its natural forest environment, the cocoa tree may grow to a height of 30-40 feet but in commercial cultivation, it is generally pruned to 15-25feet. A cocoa tree of bearing-age has a diameter of between 3 and 6 inches.

Broadly, there are two types of cocoa tree - Criollo and Forastero. A cross-product of the two has given a third variety called the Trinitario. The Criollo tree which has red pods usually lacks vigour and is very susceptible to diseases. The Forastero tree, on the other hand, is vigorous and yields green pods. Most of the cocoa grown in West Africa are of the Forastero type. Within the second category, there are also two sub-classes of cocoa - the Amelonado and the Amazonian. The latter yields more and has

a shorter gestation period than the former. A cross between the two results in an even more vigorous variety which has the potential yield of about twice the production capacity of Amazon cocoa and about three times that of Amelonado (GCMB, 1977, p.p. 11-12).

In West Africa, cocoa is largely planted by individual farmers, about 80% of whom are males. The farmer demarcates part of the land he intends cultivating in the first year. The size of the land developed in the first year depends very much on the available labour and capital. The average size of a cocoa farmis about 5 acres (a little over 2 hectares). The undergrowth is then cleared manually with a cutlass (matchet). The young trees are cut down and chopped into pieces with a cutlass while the big ones are felled with an axe and the branches are equally cut up to obtain a compact and an unbroken spread of weeded vegetation on the land - this ensures an excellent burning of the vegetation.

The plot is left for about two weeks to allow the leaves and the branches to dry up. Fire is then set into it. A couple of days later, the farmer clears away all the unburnt vegetation from the plot and waits for the start of the rains. The ashes of the burnt vegetation contain some compound of potassium so when the rain falls on the land, the dissolved ashes percolate into the soil to provide it with an additional fertility. [9]

Cocoa beans are planted either directly or sometimes the beans are nursed and later, the seedlings are transplanted.

Farmers who grow the cocoa beans occasionally use a stake instead of a cutlass. The stake has the advantage of concealing the holes which contain the cocoa beans from birds such as crows which feed on the beans. Similarly, the roots of the cocoa seedlings are protected from termites and rodents by planting them in polythene bags.

Cocoa farmers are encouraged to plant their cocoa seedlings inlines since this facilitates maintenance work on the farms. However, this method calls for extra work since the entire farm has to be pegged before the commencement of the planting.

The cocoa farm is usually inter-cropped with food crops such as plantain, cocoyams and cassava to provide shade to the young cocoa plants. With time, other plants are raised to provide a continued shade to the cocoa trees after the food crops have been harvested. Lass and Wood observe that it is important for the young cocoa tree to be provided with an adequate shade because the cocoa leaves show a decline in photosynthetic rate when exposed to light intensities greater than 25-30% full sunlight. [10] They further cite other advantages of shading which include the reduction of air temperature and the restriction ofair movement; these combine to prevent excessive moisture stress in the young cocoa tree. Accordingly, they advise that shading should be decreased when the cocoa trees grow older and their canopies are sufficiently developed to provide self-shading and later on, mutual shading.

Depending on the type, the cocoa tree carries fruit in the third to the fifth year after planting. [11] The Amelonado has the longest gestation period with hybrid varieties having a minimum pod-bearing period of three years. The cocoa pod develop out of flowers which are formed on the trunk and on the main branches. It takes about five months for the pods to reach full development. At the early stages, the pods resemble an okra(Hibiscus esculentus) in size, shape and colour but when they are fully matured, they look like a pawpaw (Carica papaya) or a yellow water-melon (Citrullus Vulgaris), anywhere from 5 to 8 inches long and from 3 to 5 inches in diameter at the centre. In colour, the ripe pods range from orange-yellow to dark red-purple shades. The outer husk is hard with corrugated curvature while the inside part, which stores the cocoa beans, is tender, white and spongy. Each pod normally contains 30-40 beans.

Harvesting is done twice a year - the main crop from September to March and the mid-crop from April to August. The stalk of the pod is separated from the branch with a sharp r-shaped knife which is either attached to the end of a long raffia palm branch or an iron-rod. The pods are split open with a medium-sized matchet and the beans scooped with the fingers from the placenta into baskets. [12] This work is usually done communally, with the men doing the pod-splitting while the women and the children take out the beans from the open pods. The beans are then fermented on

banana or plantain leaves for about six days. Fermentation of the beans gives the cocoa its chocolate flavour. On the sixth day, the beans are conveyed to the house in baskets and sun-dried on mats [13] supported by a bamboo platform for twelve to sixteen days.

The dried cocoa beans cannot be consumed in that state; they have to be processed into cocoa butter or cocoa powder which isused to manufacture products such as chocolates, chocolate milk, confectioners' coatings, cakes and ice cream. Owing to the direct inedibility of the cocoa beans, the farmer often does not have a strong bargaining power when it comes to deciding the price of his produce. He sells his dried cocoa beans to a marketing board at a fixed price determined by the government.

1.3.2 The Role of the Cocoa Industry in the Economy of Ghana and the Ivory Coast.

The development of most countries and in particular, of most less developed countries, has hinged very much on the economic spillovers of agricultural development, especially, in the field of cash crops. Economic historians generally agree that an increase in agricultural productivity constitutes one of the major prerequisites of modern industrialisation (Eicher & Witt, 1964, p. 8). Gerschenkron (1966, p. 49) has observed that industrialisation in England was materially aided by the growth of productivity in

agriculture that occurred during the eighteenth century. And according to Rosario Romeo, [14] a sizeable part of the economic infrastructure for the start of industrial development in Italy emanated from agriculture.

Kuznets (1964) classifies the contributions of agriculture into four - factor, foreign exchange, product and market contributions. Under factor contribution, the agricultural sector releases its surplus capital and labour to the non-agricultural sector. The former is particularly true in most less developed countries where the government heavily taxes the agricultural sector to finance development in other sectors of the economy. The export of agricultural products constitutes an invaluable source of foreign exchange earnings for all agriculture-biased economies. The product contribution role of agriculture covers the supply of food and the provision of raw materials to feed the agro-based industries. Kuznets further notes that the agricultural sector acts as a source of income for the rural population thereby creating a market for the products of domestic as well as foreign industries.

In Ghana and the Ivory Coast, the bulk of the contribution which agriculture churns out to the economy comes from the cocoa industry. [15] Broadly, the role of agriculture in the economic development of the two countries should be seen largely in the contribution it makes to the Gross Domestic Product (GDP) through the generation of foreign exchange earnings; the creation of economic linkages with the other

sectors of the economy; and the provision of employment opportunities. [16] These contributions are examined below with special reference to the cocoa industry.

1.3.2.1 The Cocoa Industry's Contribution to the GDP.

The bulk of the contribution of agriculture to the GDP of any less developed country can be measured by the amount of foreign exchange earnings that accrues to the economy through the export of products from the agricultural sector.

In Ghana, the agricultural sector has from 1970 to 1981, contributed an average of 21.5% to the GDP. The cocoa industry alone accounted for an average of 12.5% of the GDP during this period (World Bank, 1984, p. 83). From Table 1.1, the cocoa sector's share in the total foreign exchange earnings of Ghana from 1974 to 1983 averaged 52.4%. In addition, the cocoa industry contributes an average of 42% of government tax revenue as shown in Table 1.2.

TABLE 1.1: GHANA: SHARE OF COCOA INDUSTRY IN TOTAL EXPORTS (¢m).

YEAR	TOTAL EXPORTS	COCOA EXPORTS	% SHARE OF COCOA EXPORTS
1974	839.6	466.4	56
1975	929.4	551.4	59
1976	952.1	515.5	54
1977	1,105.8	679.7	61
1978	1,580.6	988.0	63
1979	2,736.9	1,846.3	67
1980	3,458.0	1,942.2	56
1981	2,924.0	1,091.3	37
1982	2,402.0	1,053.3	44
1983	6,999.0	1,895.7	27

SOURCE: Various issues of International Financial Statistics.

TABLE 1.2: GHANA: COCOA INDUSTRY'S CONTRIBUTION TO GOVERNMENT TAX REVENUE (¢m)

YEAR	TOTAL TAX REVENUE	EXPORT AND LOCAL DUTY ON COCOA	COCOA DUTY AS % OF TOTAL TAX REVENUE
1970	252.2	115.8	45.9
1971	373.9	196.8	52.6
1972	259.9	122.4	47.1
1973	263.8	96.4	36.5
1974	347.9	111.3	32.0
1975	569.3	284.2	49.9
1976	555.3	181.9	32.8
1977	798.4	276.8	34.7
1978	922.5	287.2	31.1
1979	1,862.9	1,085.3	58.3
1980	2,435.5	1,492.7	61.3
1981	2,256.9	560.3	24.8

SOURCE: World Bank, 1983, p.p. 148-149.

In the case of the Ivory Coast, the agricultural sector contributed an average of 32.5% of the GDP from 1960 to 1975 (World Bank, 1978, p.p. 322-323). The primary sector is responsible for some 85% of the value of total exports. The value of exports by product from 1974 to 1984 has been presented in Table 1.3. Over this period, the cocoa industry's yearly contribution to total export earnings averaged 24%; in 1984, the cocoa industry's share in the Ivorian exports was as much as 33%.

TABLE 1.3: VALUE OF IVORIAN EXPORTS BY PRODUCT

(Billions of Francs).

YEAR	COFFEE	COCOA*	WOOD	OTHERS	TOTAL
1974	63.78	62.31 (21)	51.57	114.11	291.77
1975	61.70	47.64 (19)	34.82	110.41	254.57
1976	132.76	71.40 (18)	62.36	125.98	392.50
1977	198.62	98.82 (19)	67.59	164.18	529.21
1978	131.14	160.91 (31)	52.88	179.45	524.38
1979	166.54	116.23 (22)	67.59	184.49	534.85
1980	136.12	167.60 (25)	100.17	260.03	663.92
1981	121.10	199.92 (29)	73.68	294.80	689.30
1982	162.26	163.22 (22)	69.32	352.65	747.45
1983	159.47	162.73 (20)	75.54	399.03	796.77
1984	183.38	396.61 (33)	78.86	525.49	1,184.34

*Figures in brackets represent percentage share of cocoa's contribution to total Ivorian export earnings.

SOURCE: Various issues of International Financial Statistics.

1.3.2.2 Creation of Economic Linkages.

The cocoa industry has the potential to create both backward and forward linkages with the other sectors of the economy. These linkages offer employment opportunities, andfor that matter, incomes to a fair proportion of the labour force in both the rural and urban areas of Ghana and the Ivory Coast.

Backward Linkages.

The cocoa sector forms a domestic market for the products of most of the local industries. In Ghana, and the Ivory Coast, the major inputs employed by cocoa farmers are matchets, insecticides, spraying machines, sacks, baskets and fertilisers. [17] Demand for these inputs by the cocoa farmers has led to the establishment of matchet, fibre bag, basket and fertiliser industries in the two countries. In Ghana, there are the Tema Crocodile Matchets, Bibiani Matchets and the Addai Cutlass Factories which produce matchets for cocoa farmers. There is also a branch of Imperial Chemical Industries (ICI) at Tema which turns out insecticides for use in spraying the cocoa farms. Cottage industries which produce baskets abound in all thecocoa growing areas in Ghana. The Fibre Bag Factory inKumasi

manufactures bags primarily for the cocoa industry. Similar industries exist in the Ivory Coast which produce items such as insecticides, fertilisers, matchets and bags for the cocoa industry. In both countries, spraying machines are however, imported. The Ivory Coast also imports a considerable proportion of its fertiliser requirements to supplement the superphosphates, ammonium sulphate and compounds (NPK) it produces locally from its fertiliser complex which started production in 1971 with a total capacity of 61,000 tonnes (UNO, 1971, p. 247).

Forward Linkages.

The Ghanaian and the Ivorian cocoa industries have equally promoted the setting up of a few import-substitution industries.[16] In Ghana, there are three factories which process cocoa beans into cocoa butter, cocoa paste, cocoa powder, cocoa liquor and cocoa cake. These factories with a total installed capacity of approximately 100,000 tonnes (CBS, 1981, p.54), are the Cocoa Products Factory and the West African Mills Limited, at

Takoradi and the Cocoa Products Factory at Tema. The West African Mills Limited was built in 1949 and the two others were set up in 1964. Cocoa butter produced by the factories is said to be the most expensive of all vegetable oils and commands a price more than twice that of cocoa beans on the

world market. [19] Between them, these industries contribute about 8% of Ghana's foreign exchange earnings (World Bank, 1984, p. 119). [20]

The Ivory Coast also possesses three conversion factories with about the same installed capacity as the Ghanaian cocoa processing factories, all sited in Abidjan. The first of these factories, the SACO was set up in 1964 and has a capacity for 40,000 tonnes of cocoa. The two others are the API which can process 30,000 tonnes and the PROCAI plant which has a planned

TABLE 1.4: EXPORTS OF COCOA BEANS AND COCOA PRODUCTS (¢'000).

YEAR	COCOA BEANS	COCOA BUTTER	COCOA PASTE	COCOA CAKE
1970	300,399	27,252	39	-
1971	209,171	24,310	3,491	2,657
1972	289,058	29,024	2,650	7,258
1973	344,833	44,215	4,175	3,825
1974	439,135	62,959	7,323	3,323
1975	551,427	74,358	8,041	3,166
1976	515,503	64,518	7,439	5,675
1977	679,686	82,174	20,954	14,461
1978	988,044	74,553	27,680	19,454
1979	1,846,269	129,304	40,989	12,921
1980	1,942,211	192,211	24,564	13,903
1981	1,091,258	79,701	6,193	6,732
1982	1,061,468	62,081	90	3,065

SOURCE: World Bank, 1983, p.p. 116-117.

capacity of 30,000 tonnes (Bory, p. 33). Together, the cocoa processing industries in the Ivory Coast account for about 4% ofthe earnings from foreign trade (World Bank, 1978, p. p. 338-339).

1.3.2.3 The Cocoa Industry and Employment.

In the Ivory Coast, agriculture still employs nearly 80% of the population (Africa Guide, 1983, p. 201). Over 70% of this fraction is taken up by the cocoa and coffee industries. A significant proportion of the agricultural labour in the Ivory Coast is undertaken by foreigners. In 1975, migrant workers formed 30% of the agricultural labour force of about 2.4 million. This represented 52% of migrant labour force in the country. Some of the alien agricultural workers possess their own cocoa and coffee farms. [21]

In Ghana, it has been estimated [22] that the agricultural sector employs about 53% of the country's labour force (Africa Guide, 1983, p. 18). Unlike the Ivory Coast, the majority of the workers in the agricultural sector are Ghanaians. According to the 1960 population census, there were 166,450 foreign nationals working in the agricultural sector before the implementation of the Alien Compliance Order in 1969. After 1969, the alien employment in agriculture fell to 130,839(Ewusi, 1978, p. 49).

The presence of large numbers of immigrants in the Ivorian agricultural sector is explained by a combination of factors. First, the harsh conditions of the Sahara Desert have since the early part of the twentieth century, compelled a large number of people mostly from Burkina Faso and Mali to migrate to the southern agricultural countries such as Ghana and the Ivory Coast in search of employment. With the enforcement of the Alien Compliance Order by the government of Ghana in 1969, the Ivory Coast remained virtually the only economic haven south-west of the Sahara Desert apart from Nigeria, where immigrants could go in search of jobs. As Table 1.5 shows, theannual growth rate of the Ivory Coast population increased at a fast rate from 2.9% in 1965 to 6.0% in 1975.

The Ivorian immigration laws also favoured the inflow of foreigners since it was the policy of the government to encourage migrant workers to settle in the country to assist in its economic development (World Bank, 1978, p. 4). This policy was necessitated by the shortage of indigenous labour. In 1975 there were 1.43 million foreign nationals in the Ivory Coast, of which 726,000 were from Burkina Faso, 349,000 were Mali nationals and 106,000 were Guineans (Zachariah and Conde, 1981, p. 6). [23]

TABLE 1.5: THE IVORY COAST: POPULATION GROWTH, 1920-75.

YEAR	ANNUAL GROWTH RATE (%)	POPULATION ('000)
1920	1,825	-
1930	2,075	1.3
1940	2,350	1.2
1950	2,775	1.7
1960	3,460	2.2
1965	4,000	2.9
1970	5,000	4.5
1975	6,770	6.0

TABLE 1.6: FOREIGN NATIONALS IN THE IVORY COAST

(CIRCA 1975).

COUNTRY OF NATIONALITY	NUMBER
Burkina Faso	726,200
Mali	348,500
Guinea	105,800
Nigeria	49,600
Ghana	42,500
Senegal	19,200
Togo	12,100
Liberia	3,400
Sierra Leone	1,100
Gambia	100
Other	117,400
TOTAL	1,425,900

SOURCE: Zachariah and Conde, 1981, p. 35.

Another explanatory factor can be found in the attitude of the Ivorian labour force towards government wage policies. The Ivorian government has cheapened agricultural labour as an incentive to peasant farmers. The World Bank has observed that between 1970 and 1974, agricultural minimum wages rose by 20% to CFAF25 an hour and non-agricultural minimum wages increased by 58% to CFAF92 an hour. [24] Owing to this, many indigenous Ivorians find the agricultural wage unattractive. Consequently, a number of employment opportunities have been created in the agricultural sector and these have attracted foreign labour who, by contrast, accept the low wages willingly. [25]

Footnotes to Chapter 1.

1. See section 1.3.2 below for a full discussion of the various contributions the cocoa industry has made to the economy of Ghana and the Ivory Coast.

2. See World Bank, 1983, p. 45.

3. See Gill & Duffus, April 1987, p. 8.

4. See Gill & Duffus, April 1981, p. 6.

5. See Gill & Duffus, April 1987, p. 8.

6. See bibliography.

7. See bibliography.

8. The Ashanti Cocoa Project is the second major cocoa rehabilitation project launched by the Government of Ghana. See Chapter 5 for a detailed discussion.

9. See Hartley (1970), pp. 340-6 for other advantages of burning the vegetation on a plot to be tilled.

10. See Lass & Wood, 1985, p. 18.

11. This assumes ideal climatic and environmental conditions.

12. The baskets are either made from the bark of palm branches or rattan cane.

13. The mats are woven out of the bark of raffia palm branches. The flat threads used as the warp are obtained from a kind of forest lianas.

14. See Gerschenkron, A (1966), p. 107.

15. In the case of Ivory Coast, cocoa ranks with coffee.

16. Another area the cocoa industry has contributed equally well in both countries is in the field of infrastructure -especially, the construction of feeder roads, educational institutions and hospitals; see Ofori-Attah, 1985, p.p. 16-20.

17. Fertilisers are used mainly by the Ivorian cocoa farmers.

18. These industries were originally meant to produce for the domestic market but the trade statistics of both Ghana and the Ivory Coast show that a substantial fraction of the output of such import-substitution industries is exported. See Table 1.4 for example.

19. See GCMB, 1977, p. 53.

20. See also Table 1.4 for the yearly contributions made by the three factories to the Ghana export earnings.

21. See Hecht, 1983, p. 33.

22. This estimation was made in 1980.

23. See Table 1.6 for other details.

24. See World Bank, 1978. p. 40.

25. See Campbell, 1978, p. 10

PART II

IDENTIFICATION OF CAUSES OF CURRENT STATE OF THE COCOA INDUSTRY IN GHANA AND THE IVORY COAST: A STUDY OF GOVERNMENT POLICIES AFFECTING THE COCOA INDUSTRY.

CHAPTER 2.

PUBLIC INVESTMENT IN AGRICULTURE.

Introduction.

Economic planning has become a common tool by which the governments of Ghana and the Ivory Coast allocate scarce resources among various sectors of the economy in an attempt to speed up the rate of economic growth in their respective countries.

Despite the differences in government priorities and choice of policies in Ghana and the Ivory Coast, both countries have laid much emphasis on agriculture in all their development plans. The need in agriculture has often been expressed in terms of increase and diversification of agricultural output, the achievement of self-sufficiency in food supply and the raising of rural incomes and living standards.

This chapter examines the development plans of Ghana andthe Ivory Coast to assess the importance the governments of the two countries attach to agriculture. The examination is done through a comparison of the percentage of total public investment devoted to the agricultural sector under the national development plans of both countries. This kind of

comparison might seem to be inappropriate since we are dealing with countries where the level of private participation in economic investment is different. While in the Ivory Coast, the private sector's involvement in project investment is high - averaging 44.6% of gross investment between 1960 and 1975, [1] in Ghana, the private-sector investment has often been small. [2] Killick, for example, notes that a high degree of state participation in economic activities in Ghana prevailed during and after Nkrumah's reign. [3] However, the study is centred ontree crops of which almost all the growers in both countries are private farmers. In a situation like this, it is the quantity and quality of the supporting services provided by the government through its development plan, which make the major difference in the productivity of farmers in Ghana and the Ivory Coast. It is upon this basis that we use the percentage of total public investment to assess how much priority is given to agriculture by the respective governments.

2.1 Agricultural Investment in Ghana.

2.1.1. Agricultural Planning Under the Colonial Government.

Even though before independence, agriculture constituted the economic pillar of Ghana's economic development, [4] the

British colonial government did not give it much attention as revealed by the post-war report of the Watson Commission.[5]

TABLE 2.1: GOVERNMENT EXPENDITURE ON AGRICULTURE, 1900-1949 (£1000) 5 - YEAR AVERAGES.

PERIOD	TOTAL EXPENDITURE	EXPENDITURE ON AGRICULTURE	AGRICULTURE AS % OF TOTAL EXPENDITURE
1900-4	878.4	3	0.34
1905-9	628.8	7	1.11
1910-14	1,093.6	17	1.55
1915-19	1,262.2	33	2.61
1920-24	3,986.0	78	1.96
1925-29	4,330.8	124	2.86
1930-34	2,569.6	123	4.79
1935-39	3,072.2	162	5.27
1940-44	4,090.8	270	6.60
1945-49	9,573.2	694	7.25

SOURCE: Kay, 1972, pp. 362-366.

Within the first twenty years of the twentieth century, the government spent an average of £15,000 yearly on agriculture -this represented about 1.6% of government total annual expenditure.[6] In 1919, Sir Gorden Guggisberg published an outline of a ten-year programme for economic development in the 1920s (Omaboe, 1966, p. 440). Table 2.2 shows the actual expenditure by sector of the Guggisberg plan during the 10-year period.[7]

As the percentage distribution of expenditure shows, the emphasis during the ten-year period was on the development of infrastructure; the agricultural sector received only 1.2% of the total capital expenditure made under the plan. However, government expenditure on agriculture rose to 6.7% annually during the two decades after the end of the 10-year plan - the average yearly expenditure on agriculture in the period was £312,250. ⊕

TABLE 2.2 EXPENDITURE UNDER THE 10-YEAR DEVELOPMENT PROGRAMME, 1920-30 (£'000).

SECTOR	EXPENDITURE	% OF TOTAL
Agriculture	151	1.20
Public buildings	1,512	11.97
Town improvements	465	3.68
Roads	1,223	9.69
Railways	5,821	46.10
Ports and harbours	2,264	17.93
Posts and telegraphs	276	2.19
Electricity	188	1.49
Water supplies	204	1.62
Takoradi townships	189	1.50
Maps and surveys	178	1.41
Miscellaneous	156	1.24
TOTAL	12,627	100.00

SOURCE: Kay, 1972, p. 323.

One would have expected that after spending the bulk of investment expenditure under the first development plan on infrastructural development, the colonial government would

have shifted development emphasis from infrastructure to agriculture under the second development plan but again, the expenditure made in the 1951 plan on agriculture was not at all substantial. Even though, the second guiding principle of theplan had explicitly stated that 'pride of place was to be given to economic and productive services, ' with particular attention to agriculture in its widest sense' (Krassowski, p. 16), the government spent only 5.2% of its total expenditure between 1951 and 1957 on agriculture (See Table 2.3). [10]

Indeed the high population growth rate of 3.2% between 1931 and 1948 [11] should have convinced the planners to allocate a higher share of the public

TABLE 2.3: EXPENDITURE BY SECTOR UNDER THE SECOND 10-YEAR PLAN, 1951-1960 (£'000)*

SECTOR	1951-7	1957-9
Agriculture, forestry and fishing	4,842(5.17)	2,226(5.21)
Industry and mining	3,091(3.30)	3,456(8.09)
Social Services	28,494(30.42)	9,982(23.36)
Infrastructure	43,910(46.87)	22,055(51.61)
Other	13,346(14.25)	5,018(11.74)
TOTAL	93,683(100.00)	42,737(100.00)

* Figures enclosed in brackets represent percentage of total expenditure for the various sectors.

SOURCE: Kay, 1972, p. 322.

expenditure to agricultural development. By 1950, an

appreciable foundation had already been laid in terms of transportation, pre-university education, health services and manpower development especially by the Guggisberg administration (Killick, 1966, pp. 440-41). There was therefore the need to plan for a modest improvement and expansion of the existing infrastructure and public services capable of supporting the productive services of the country at the time. This would have released extra investible capital for agricultural development in the area of food crop cultivation and the checking of the spread of swollen shoot which in the early 1950s was menacing the cocoa industry (Killick, 1966, p. 246).

2.1.2 Agricultural Planning Under Nkrumah.

The Plan had operated for only eighteen months when the prime minister designate, Dr. Kwame Nkrumah, managed to persuade the government to change the implementation period from ten to five years. Accordingly, he revised the Plan in 1955 to cover projects which had originally been included in an outline form. Despite the reaffirmation of the importance of the agricultural sector in the economy by Dr. Kwame Nkrumah, the period covered by the revised plan saw an overall government expenditure of £2,226,000 on agriculture - just 5.2% of total government expenditure (see Table 2.3).

Again the greater part of the public expenditure was devoted to infrastructure and social services. The plan was

designed to develop a good infrastructural base that would launch the country into industrialisation. Most of the industries to be built were agro-based. Therefore, while developing the supportive infrastructural facilities, there was also at the same time, the need to make provision in the Plan for agricultural raw materials to be produced locally. This mistake made at the very onset of development planning, has adversely affected the performance of the Ghanaian industries. Take for example, the Mango Processing Factory which was built at Wenchi with a plant capacity exceeding the total world market demand for processed mango [12] - no provision whatsoever was made for the establishment of mango plantations instead the factory was made to feed on fruits from a few wildly grown mango trees scattered in the vicinity. It is of little wonder then, thatal most all the industries in Ghana still depend heavily on foreign raw materials and components.

Table 2.4 shows some of the agro-based industries in the country which continue to rely very much on the foreign market for the bulk of their basic raw material needs.

TABLE 2.4: AGRO-BASED INDUSTRIES: AVERAGE PERCENTAGE OF MATERIALS OF FOREIGN ORIGIN TO TOTAL MATERIAL CONSUMED 1975-1977.

INDUSTRY	% SHARE OF IMPORTS
Food	54.2
Tobacco manufacture	63.2
Garments	41.7
Manufacture of textiles	84.5
Tanneries and leather finishing	68.8
Manufacture of rubber products	53.6
Manufacture of dairy products	90.2
Manufacture of grain mill products	87.5
Soft drinks and carbonated water industries	74.0
Knitting mills	94.7
Manufacture of carpets and rugs	84.9
Manufacture of containers, boxes of paper and paperboard	97.3

SOURCE: Central Bureau of Statistics, Industrial Statistics (1975-1977), pp. 37-38.

TABLE 2.5: MANUFACTURING INDUSTRIES: ESTIMATED AVERAGE RATE OF CAPACITY UTILISATION (1980-83).

SUB-SECTOR	CAPACITY UTILISATION (%)
Textiles	16.5
Garment	24.6
Metals	37.5
Electricals	28.1
Plastics	24.4
Tobacco and beverages	44.6
Food processing	24.8
Leather	22.7
Pharmaceuticals	22.2
Cosmetics	14.5
Paper and printing	28.6
Non-metallic mineral manufactures	22.7
Chemicals	20.0
Rubber	21.4
Wood Processing	26.2

SOURCE: CBS, Quarterly Digest of Statistics, June 1984, p. 9.

Owing to the poor foreign exchange position of the country, [13] most of the Ghanaian industries (as typified by Table 2.5) produce at a capacity utilisation ranging between 15 and 45%.

Nkrumah launched his first post-independence plan in March 1959; this was a 5-year Plan. Agriculture received the lowest allocation of all public expenditures even though the planners, as usual, had minced no words about the importance they attached to agriculture, particularly, food crops (See Table 2.6).

TABLE 2.6: PUBLIC EXPENDITURE UNDER THE 5-YEAR PLAN(£'000).

SECTOR	EXPENDITURE	%
Agriculture, forestry and fishing	10,617	5.73
Industry and mining	27,454	14.81
Infrastructure	48,584	26.20
Social services	47,686	25.72
Miscellaneous*	51,066	27.54
TOTAL	185.407	100.00

* This included expenditure on the Volta Dam (£20,453,000).

SOURCE: Kay, 1972, p. 322.

The 5-Year Plan was abandoned in the autumn of 1961 after Nkrumah had paid a visit to the Soviet Union. Nkrumah was so impressed by the on-going Russian 7-Year Plan which laid much emphasis on heavy industrialisation that on his return

to Ghana, he dismissed the 5-Year Plan as a `collection of puny projects'. In the wake of this, a 7-Year Plan was prepared and put into action in 1964. This time agriculture received a relatively higher share of 15% of the total public investment inthe proposals but the implementation figure was, again, cut down by 5% (See Table 2.7).

TABLE 2.7: FORECAST AND ACTUAL DISTRIBUTION OF PUBLIC INVESTMENT UNDER THE 7-YEAR PLAN.

SECTOR	PROPOSED INVESTMENT		ACTUAL INVESTMENT
	£m	%	%
Agriculture	10.3	15	10
Manufacturing and Mining	16.5	24	26
Infrastructure and public services	18.6	27	41
Education	9.6	14	5
Health, social services and housing	9.5	14	7
General government	3.5	5	12
TOTAL	68.0	100	100

SOURCE Krassowski, pp. 63 & 160.

One possible explanation for the cut in agricultural investment was the belief of Dr. Kwame Nkrumah, that agriculture was an inferiorform of activity. To him,

industrialisation constituted the major source of Ghana's economic development. Nkrumah stated that:[14]

> industry rather than agriculture is the means by which rapid improvement in Africa's living standards is possible... The world's economic development... shows that it is only with advanced industrialisation that it has been possible to raise the nutritional level of the people by raising their levels of income.

From Table 2.7, the allocation to the industrial sector was accordingly, raised by 2% during the implementation of the Plan.

A second reason could be found in the large increase in the allocation to infrastructure and public services from 27% to 41%. The government deliberately shifted funds from the allocations for agriculture and other sectors to make possible the construction of a grandiose conference hall and the provision of other expensive foreign products for the 1965 Organisation of African Unity (O.A.U.) Conference in Accra.[15]

A detailed study of the allocation for agriculture further reveals that as much as 90% of the vote for the sector during the period 1962 to 1965, was used to run the State farms. Nkrumah believed that rapid expansion in agricultural output[16] could only be realised through mechanisation. Consequently, anumber of state farms were established[17] and the government committed a fair share of its public investment between 1962 and 1965 to the operations of the state farms.

In spite of the facilities [18] enjoyed by the State farms, their performance was far below expectation. [19] In 1965, a Ministry of Agriculture report stated: [20]

> The aim to increase production substantially was not achieved in the first years. In spite of large investments and extensive acres acquired and cleared, the state farms together cultivated only 1.2% in 1964 and 1.4% in 1965 of the area under crop. Moreover, their contribution to production is less than a half percent because many of the new plantations of rubber, oil palms and coconut have not yet come into bearing and also huge areas planted with annuals such as rice were never harvested... It is very strange that the peasant farmers with 3.5 acres per farmer cultivate more area per head than thlarge scale farms with 2.8 acres per worker in spite of the heavy outfit of the stations equipped with tractors and all other types of machinery.

The 7-Year Plan, like its predecessors, had a short life-span and was discarded after the 1966 military coup which ousted Nkrumah from power.

2.1.3 Agricultural Planning After Nkrumah.

In 1968, the military government published a 2-year plan which was primarily geared towards development and stabilisation of the stagnant economy. During the two-year period, that is, 1969 and 1970, the agricultural sector was earmarked to obtain 12% of the total public investment each year but as is evident from Table 2.8, the government actually spent a yearly average of 6.7% of its total expenditure on agriculture.

TABLE 2.8: RECURRENT AND DEVELOPMENT EXPENDITURES ON AGRICULTURE (¢m)

YEAR	TOTAL EXPENDITURE	EXPENDITURE ON AGRICULTURE	EXPENDITURE ON AGRICULTURE AS % OF TOTAL EXPENDITURE
1969	370.3	25.6	6.9
1970	439.2	28.5	6.5
1971	451.4	30.4	7.2
1972	496.4	33.5	7.1
1973	523.0	39.2	7.2
1974	727.4	41.6	5.7
1975	1,085.3	76.2	7.0
1976	1,438.3	106.9	7.4
1977	1,945.2	192.2	9.9
1978	3,017.6	426.4	14.1
1979	4,094.3	475.9	11.6
1980	4,671.5	571.1	12.2
1981	7,719.3	941.6	12.2

SOURCE: World Bank, 1983, pp. 156-7.

This deviation from the plan could be attributed to the fact that the military government which directed the plan, handed overpower to a civilian regime which had its own priorities. Moreover, the civilian government came in at a time when world market cocoa prices were in decline and also debt repayment and foreign exchange crises had become a permanent feature of the Ghanaian economy [21]. These unfavourable external factors, for example, made it difficult for the government to finance agricultural projects which required

high import content.

The government of Dr. K. A. Busia designed a plan for the year 1970/71. Government expenditure in agriculture under the one-year plan was not any better than the previous plan since the actual allocation went up by only 0.2%. The Busia administration began work on a more comprehensive plan to succeed the one-year plan but was aborted by the 1972 military take over (Killick, 1980, p.144).

The National Redemption Council (NCR) launched the next 5year plan to cover the period 1975/76 to 1979/80. The plan proposed an allocation of 26% of the total government investment to agriculture. Incidentally, this handsome amount allocated to agriculture turned out to be mere paper work because the actual implementation of the plan never took place until 1977 by which time the financial estimates in the plan had been rendered inadequate by the rapid increase in the rate of inflation - 40% in 1976 [22] (Pickett, 1976, p.17). Two years later, the government was toppled and the plan was, as usual, abandoned. From Table 2.8, the actual public expenditure on agriculture from 1972 to 1979 averaged 8.8% of the total government expenditure. The situation improved slightly in the next two years; agricultural investment rose from 11.6% in 1979 to 12.2%in 1981.

2.2 The Ivory Coast: Government Expenditure on Agriculture

Like Ghana, the predominant economic activity in the Ivory Coast prior to independence was agriculture. Cocoa and coffee were the dominant export crops grown in the country. Thecolonial French administration had in the 1940s, conducted research into cocoa and coffee cultivation and encouraged the production of both crops to ensure continuity of exports of such raw materials to France for processing. Public investment in transport infrastructure was stepped up in the south of the country to stimulate agricultural production. Efforts of government in this direction appeared to have yielded good dividends since the outputs of the two major export crops, cocoa and coffee respectively increased steadily from 61,690 tons and 54, 190 tons in 1950 to 88,470 tons and 153,800 tons in 1961.Exports of logs also rose from 106,000 tons in 1950 to 760,000tons during the same period (World Bank, 1978, pp 14-15).

On the attainment of independence in 1960, the government of Houphouet-Boigny with the assistance of French experts, designed a 10-year plan which was scheduled to run from 1960-1970. The plan regarded agricultural diversification as an essential requirement for raising the standards of living and making the country less dependent on traditional exports. The effort to diversify the Ivorian agriculture was to be concentrated on a few major products: oil palm, cotton, rubber and pineappleas alternative export crops,

while at the same time acting asraw materials to feed domestic industries; rice was to becultivated locally on a large scale to curtail imports and sugarwas to be produced to satisfy domestic requirements.

In order to achieve the diversification programme, the government established a number of autonomous agencies each of which was responsible for the development and the overall maintenance of one or more crops. Such organisations trained farmers and supervisors and supplied peasant farmers with inputs such as improved seeds and plants, insecticides and fertilisers. The SATMACI (Societe d'Assistance Technique pour La Modernisation Agricole de la Cote d'Ivoire) for example, is responsible for coffee and cocoa as well as rice programmes.

Under the 10-year plan, 11.9% of the total government expenditure was devoted to agricultural development from 1960-66 (See Table 2.9). The government, after operating the plan for the first six years, saw the need to redirect investment and to some extent, correct the overall distribution of resources for the remaining four years of the plan period. Consequently, a transitional plan was introduced to cover the period 1967 to 1970. As shown in the table, the expenditure on agriculture under the revised plan increased to 25.8%.

The next Ivorian development plan was for the period 1971 to 1975. This plan was said to be more detailed than its predecessor. The plan proposed to allocate 37% of public

investment to agriculture but during the

TABLE 2.9 GOVERNMENT EXPENDITURE BY SECTOR UNDER THE 10 YEAR PLAN AT 1965 CONSTANT PRICES(CFAF billions)

SECTOR	1960-66(*1)	1967-70(*2)
Agriculture		
Economic	11.1 (11.9)	33.7 (25.8)
Infrastructure(*3)	42.9 (46.0)	59.1 (45.3)
Education	8.1 (8.7)	8.5 (6.5)
Health	1.9 (2.0)	3.8 (2.9)
Administration	16.7 (17.9)	10.5 (8.0)
Other	12.5 (13.4)	17.9 (13.7)
Total	93.2 (100.0)	130.5 (100.0)

(*1) At 1965 constant prices

(*2) At current prices. Figures in brackets are percentages.

(*3) Economic infrastructure under the revised plan (1967-70) included items such as Ports and Waterways (CFAF 9.5 billion), and Electricity (CFAF 16.4 billion).

SOURCE: IMF, 1970, pp.251-254.

implementation, this figure was cut to 32% (See Table 2.10). It is on record that plan targets for commercial crops under this plan were more or less, reached or exceeded in 1975. Coffee, cocoa, copra, rubber and oil palm reached 90% of their targets; bananas, 85%, and pineapples, 125% (World Bank, 1978, pp.32-33).

TABLE 2.10 FORECAST AND ACTUAL ALLOCATION OF PUBLIC INVESTMENT UNDER THE 5-YEAR PLAN, 1971-75(%)

SECTOR	FORECAST	ACTUAL
Agriculture	37	32
Communications and energy	32	37
Urban development, health and welfare	17	16
Education and culture	9	8
General government	5	7
Total	100	100

Source: World Bank, 1978, p.30

The Ivorian government further demonstrated its concern for the development of the agricultural sector by allocating as much as 36% of the total public investment to agriculture in the succeeding plan covering the period 1976 to 1980 [23]. The percentage distribution of public investment under the plan is presented in Table 2.11.

TABLE 2.11 PERCENTAGE ALLOCATION OF PUBLIC INVESTMENT UNDER THE 5-YEAR PLAN, 1976-1980

SECTOR	FORECAST
Agriculture	36
Communications and energy	36
Urban development, health and welfare	15
Education and culture	6
General government	7
Total	100

Source: World Bank, 1978, p30

2.3 Comparative Analysis of Agricultural Investment in Ghana and the Ivory Coast

In general, the governments of Ghana and the Ivory Coast recognize the important role agriculture plays in the economic development of their countries and the impression is often created that agriculture is given the `pride of place' in the allocation of government investment expenditure. The foregoing analysis brings into the limelight two observations about the actual place of agriculture in the two countries.

The first observation is about the degree of priority each government attaches to the agricultural sector as shown by the percentage distribution of public expenditure under the various development plans studied. The Ghanaian government has in all its plans, allocated just a meagre percentage of its total public expenditure to meet the needs of the agricultural sector. The position of agricultural investment in the Ivory Coast is rather the direct opposite of what obtains in Ghana. For example, from 1960 to 1980, the Ghanaian agricultural sector received an average of 8.9% of the total government expenditure while during the same period, the Ivorian agricultural share of total government expenditure averaged 26%. Prior to the 1960s, agricultural investment constituted only 6% of the Ghanaian total public expenditure. In the periods 1959 - 1964 and 1964 -1971, Ghana spent respectively 0.38% and 0.18% of its GDP

onagricultural investment. The corresponding figures for the Ivory Coast in the periods 1960-66 and 1967-70 were 0.77% and 2.44% [24].

The implication of the low expenditure allocation to agriculturein Ghana is that the sector is always deficient in the supply of agricultural inputs and supporting services such as access roads, trucks for carting farm produce, potable water and credit facilities.[25] This situation inevitably has an adverse effect on the performance of Ghanaian farmers.

The second observation is about the different political atmospheres within which the development plans have operated. While the Ghanaian economy has been plagued with a chain of military coups since 1966, the Ivory Coast economy has enjoyed a tremendous amount of political stability ever since independence - this has no doubt, facilitated the effective implementation of the Ivorian development plans (Amin, 1973, pp. 64-65). Purely because of political reasons, each of the Ghanaian plans was abandoned in course of the implementation period and replaced with a new one. Pickett has observed that:[26]

> although a number of medium to long-term plans were prepared in the period 1957 to 1975, none were implemented.

Unlike Ghana, all but one of the Ivory Coast plans considered were carried through; the revision that was made

in 1967 in the 10-year plan was meant to redistribute resources for effective utilisation.

In conclusion, we note that owing to low priority attached to agriculture by the government and the chronic political-instability, the Ghanaian agricultural sector suffers from inadequate provision of farm inputs and infrastructural facilities; these in themselves, hinder agricultural growth.

Footnotes to Chapter 2.

1. See World Bank, 1978, p. 67.

2. Of course, Dr. Nkrumah once said: "we would be hampering our advance to socialism if we were to encourage the growth of Ghanaian private capitalism in our midst." See Killick, 1980, p. 37.

3. See Killick, 1980, p. 313.

4. Between 1950 and 1953 for example, the cocoa sector alone accounted for 56% of Ghana's total exports and 45% of the total public revenue. During the same period, it contributed just under 1/5 of total GDP and provided the main form of employment for about 1/5 of the country's work force (Krassowski, p.6). See also section 1.3.2 above.).

5. The Watson Commission was appointed by the Colonial government to enquire into and report on the underlying causes of the 1948 disturbances in the country. See Kay, 1972, pp. 234-6 for a discussion on the neglect of agriculture by the government. See also Table 2.1 for government expenditure on agriculture from 1900 to 1949.

6. Calculated from Table 2.1.

7. The programme incorporates the annual budgets.

8. Calculated from Table 2.1.

9. These included agriculture, industry, electricity and water.

10. See the concluding chapter for a recommended share of public investment that should be devoted to agriculture.

11. See Kay, 1972, p. 311.

12. See Killick, 1980, p. 229.

13. This is partly attributable to the fact that Ghana's economy is pivoted on fluctuating incomes from agricultural exports and partly to rampant mismanagement of public funds by top government officials.

14. See Nkrumah, 1965, pp. 7 and 11.

15. The construction of the OAU Conference hall ("Job 600") cost the nation over $30 million in 1965. See Le Vine, 1975, pp. 102-103 and Killick, 1980, p. 106.

16. The SFC did not establish cocoa plantations; cash crops grown were rubber and oil palm.

17. By 1965, 1,205 state farms had been established and were controlled by the State Farms Corporation, the United Ghana Farmers' League and other organisations. 870 of the farms were administered by the UGFCC, 123 by the State Farms Corporation, 47 by the agricultural wing of the Workers' Brigade, 37 by the Young Farmers' League, and the remaining 128 were run by institutions such as the Volta River Resettlement Unit, the Universities, missions, prisons and the Academy of Sciences. See Due, pp. 643-46.

18. The farms were serviced with 40 tractors, 1087 tillers and cultivators, 32 combine harvesters, 20 corn-husking machines, 7 lorries and 95 trailers. In addition, the organisations that ran the farms possessed many of the professional officers of the Ministry of Agriculture and at the same time, they received favourable treatment in terms of financial support, the allocation of import licences and the provision of technical assistance. See Killick, 1980, p. 193.

19. See Appendix 2.1 for a discussion of the political motive which prompted the government to pump funds into the state farms between 1962 and 1965 and why the exercise was a failure.

20. See Due, 1969, p. 645.

21. See Marshall, 1976, pp. 56-57.

22. In 1977, the rate of inflation in the country shot up to 116% and was 73% in 1978 (Central Bureau of Statistics [CBS], 1981, p. 166).

23. See section 2.3 for a comparison of public expenditure on agriculture as a percentage of GDP in both countries.

24. These percentages were calculated from UNO, Statistical Yearbook (several issues).

25 See Chapter 4 for a detailed discussion of supply of farm inputs in Ghana

26. See Pickett, 1976, p. 11

CHAPTER 3

INTERNAL MARKETING OF COCOA

Introduction

As we noted from the introductory chapter [1], cocoa farmers do not have a strong bargaining power in influencing cocoa producer price because cocoa beans, unlike food crops, cannot be consumed directly. How much the farmers receive for their cocoa depends therefore, on the prevailing buying system; prices tend to be high when cocoa is purchased by several buyers, that is where there is competition among the buyers.

Broadly, two buying systems have been practised in Ghana and the Ivory Coast. Before the advent of marketing boards[2], the buying system that existed in the cocoa industry was oligopsony. Cocoa was predominantly bought by foreign merchants. At the beginning of the cocoa year, a producer price ceiling was set by the oligopsonists. Because of the competition among the buyers, producer prices were generally high [3]. After the second World War, the oligopsony was replaced by a monopsony in Ghana with the establishment of a marketing board. In the Ivory Coast, the old marketing system was retained but this time the activities of the buyers were closely supervised by a Stabilisation fund. Under both systems, a fixed and uniform cocoa producer

price was announced by the government through the board or the fund at the inception of each cocoa season.

This chapter examines the producer price policies under the oligopsony and monopsony market types and their individual impact on the cocoa industry. Later in the chapter, we compare the two marketing systems, the GCMB (Ghana) and the CAISTAB (Ivory Coast) to find out the more efficient of the two.

3.1 Producer Price Policy Under The Oligopsony Market

Introduction

The supply response of cocoa farmers is assumed to be influenced to a very large extent by the producer price of cocoa [4]. In the short run, a favourable producer price generally influences farmers to harvest all their crop for sale and in the long run, farmers are more likely to be induced to take a good care of their old farms and cultivate new cocoa farms. Several researchers such as Bateman, Nyanteng, the World Bank, Bene-Hoane, Hecht and Elliot have consistently referred to the producer price of cocoa as being the major explanatory factor for the decline and growth respectively, of the cocoa industry in Ghana and the Ivory Coast. Our own estimation of the cocoa supply functions for Ghana and the Ivory Coast, using the available data on the quantifiable factors mentioned above [5], lends

support to the important role cocoa producer prices play in determining the quantity of cocoa produced and sold in Ghana and the Ivory Coast [6].

TABLE 3.1 GHANA AND THE IVORY COAST: COCOA SUPPLY EQUATIONS

$$CQGH_t = 13.814518 + 0.183836COCPG_t - 0.307051COCPV_t \quad \ldots (1)$$

(12.179) (2.083) (-2.811)

F = 11.68172

$\bar{R}^2$ = 0.52928

D-W = 1.36531

$$CQIV_t = 11.807681 + 0.490546COCPV_t - 0.540618COCPG_t \quad \ldots (2)$$

(12.141) (2.875) (-6.629)

F = 41.00753

$\bar{R}^2$ = 0.80811

D-W = 0.83308

$$CQGH_t = 13.886777 + 0.260055COCPG_t - 0.284677COCPV_t$$

(11.393) (2.873) (-2.756)

$$-0.080511GIS_t + 0.092323GR_t \quad \ldots (3)$$

(-2.203) (0.724)

F = 8.32577

$\bar{R}^2$ = 0.60665

D-W = 1.70260

$$CQIV_t = -10.091058 + 1.368495LACV_t - 0.161327COCPV_t$$

$$(-4.151) \qquad (7.455) \qquad (-2.460)$$

$$+0.616543COFPV_t - 0.135459COCPG_t \qquad \ldots(4)$$

$$(2.357) \qquad (-1.237)$$

$$F = 95.93588$$

$$\bar{R}^2 = 0.95235$$

$$D\text{-}W = 2.28184$$

The regression results of our supply equations appear in Table 3.1 above. We regressed cocoa output in Ghana, CQGH and the Ivory Coast, CQIV, first of all, on 'own' and 'neighbour' cocoa producer prices (COCPG for Ghana and COCPV for the Ivory Coast) and later, we introduced other independent variables like the supply of insecticides in Ghana, GIS, rainfall in the cocoa growing areas of Ghana, GR, land under cocoa cultivation in the Ivory Coast, LACV and the producer price of coffee in the Ivory Coast, COFPV.[7]

In equation 3, the producer price of cocoa in Ghana and the Ivory Coast are the most significant explanatory variables of cocoa supply in Ghana [8]. In the case of the Ivory Coast, the important factors that control the supply of cocoa are land under cocoa, cocoa producer price and the producer price of coffee [9]. Equations 1 and 2 describe an inverse relationship between cocoa supply in one ,country and the producer price of cocoa in the neighbouring country. This means that a higher cocoa producer price in one

country, all things being equal, will lead to a leakage of cocoa from the neighbouring country where producer price is low [10].

Having shown the importance of cocoa producer price in the determination of cocoa output, we now discuss the producer price policies in Ghana and the Ivory Coast under the different marketing systems to assess the extent they have contributed to the current state of the cocoa industry in the two countries.

3.1.1 Ghana: 1908-1947

In Ghana, market forces have hardly been allowed to dictate the producer prices of cocoa. Ever since the beginning of the cocoa industry, prices paid to farmers have been determined by either the government, a group of foreign merchants or a parastatal organisation.

Before 1908, cocoa marketing was largely controlled by the colonial government. The industry was then in its infancy and was confined to the Akwapim district. The few farmers who invested in cocoa farming were expected to convey their wet cocoa beans to Aburi which was then the seat of government, for sale to the governor. The governor used his own discretion to decide the price to be paid to cocoa farmers, making allowance for freight and other charges (La Anyane, 1963). Half of the price fixed by the governor was paid to the cocoa farmer on the spot; the balance was then

worked out in relation to sale price in the United Kingdom and given to the cocoa farmer (Hill, 1956, p. 104).

Even though this system ensured that cocoa farmers received a fair share of the cocoa proceeds from the foreign market, farmers were often subjected to long waiting before they could receive full payment of their cocoa sales. This was because most of the transactions and communications between the governor and the metropolitan government at the time, were effected by sea-link which sometimes took a couple of months to complete (van der Laan, 1987, p. 8).

The expansion in cocoa exports in 1908 to 13,000 tons heralded the era of commercial cocoa marketing in the Gold Coast (Ghana). From this time up to 1937, cocoa marketing and pricing became the prerogative of expatriate firms.

The foreign firms operated through two types of middlemen-brokers and factors. The brokers were paid a commission to purchase cocoa on behalf of the expatriate firms [11]. The functions of the factors began from the stores of the brokers. They were salaried workers employed by the expatriate firms to carry out such duties as cocoa grading, transferring of cocoa beans into export bags, and the delivery of cocoa to the shipping stores of the firms (Kotey and Gyekye, p. 4).

The practice of buying cocoa through intermediaries meant that prices at which cocoa was bought in any season were not uniform in the cocoa growing areas.

TABLE 3.2 COCOA PRODUCER PRICES AND WORLD MARKET COCOA PRICES (1920-1938) £/TON

YEAR	COCOA OUTPUT ('000 TON)	WORLD MARKET PRICE(1)	PRODUCER PRICE(2)	(2)AS%OF(1)
1920	147	81	76	94
1921	118	36	21	58
1922	165	37	23	62
1923	198	33	26	79
1924	204	33	23	70
1925	213	37	33	89
1926	210	40	29	73
1927	242	56	46	82
1928	210	50	47	94
1929	246	41	34	83
1930	236	37	35	95
1931	227	23	17	74
1932	215	24	16	67
1933	260	21	15	71
1934	224	18	11	61
1935	280	19	13	68
1936	290	25	15	60
1937	305	42	38	90
1938	244	25	17	68

Sources: Hill, 1956, pp 132-133 and Kay, 1972, pp. 334-337.

But because of the competition among the buying firms and the choice cocoa farmers had regarding who to sell to, producer prices were generally high. As Table 3.2 shows, the proportion of the world market price of cocoa that went to cocoa farmers from 1920 to 1938 ranged between 58% and 98%. Howard records that the profit rates of the merchant firms from the mid - 1920s to 1937, ranged between -1% and 12% (Howard, 1978, p. 109).

On the whole, the pricing system under the foreign oligopsonists promoted the growth of the industry [12], especially, from 1919 onwards. Cocoa output rose from 71,000 tons in 1918 to 150,000 tons in 1919 and thereafter, output

rose steadily to 305,000 tons in 1937. One of the reasons which made it possible for the foreign oligopsonists to offer attractive producer prices to the cocoa farmers was the prevailing low

TABLE 3.3 EXPORT DUTY ON COCOA, 1915 - 1960*

YEAR	WORLD MARKET PRICE £/TON	EXPORT DUTY £/TON	EXPORT DUTY AS % OF WORLD MARKET PRICE.
1915-19	42	1.6	3.8
1920-24	44	3.2	7.3
1925-29	45	1.2	2.7
1930-34	24	1.2	5.0
1935-39	24	1.2	5.0
1940-44	19	2.2	11.6
1945-49	98	3.1	3.2
1950-54**	269	73.7	27.4
1955	318	139.8	44.0
1956	218	59.1	27.0
1957	196	48.1	24.5
1958	316	135.9	43.0
1959	275	95.8	34.8
1960	219	59.7	27.3

* There was no duty on cocoa export in 1915; this year has been included just to make the 5-year averages uniform.

** World market prices started shooting up shortly after the World War II. The price more than doubled itself in 1947 and in 1950, the price of cocoa per ton was more than double the 1947 figure of £100.

Source: Calculated from tables in Kay, 1972, pp. 334-337 and 359

duties imposed on cocoa exports by the government as evidenced in Table 3.3. Prior to 1916, no duty was levied on cocoa exports (Kay, 1972, p. 108). From October 1916, when cocoa export duty was introduced to 1949, export duty on cocoa averaged 5.5% [13] of the average world market cocoa price; the corresponding proportion for the period 1950 to 1960 was 30.7% [14].

Occasionally, however, the firms could agree among themselves to purchase cocoa below the ceiling producer price especially in the world depression years from 1929 to 1936 . The depression inevitably affected the world cocoa market. Cocoa price on the world market fell from £50 per ton in 1928 to £41 in 1929 and by 1934, it had dropped to £18 per ton. Just around the same time, the price war among the foreign oligopsonists had reached alarming proportions (Kay, 1972, p. 252). The merchants discovered that any vigorous marketing competition in a period of falling world market prices could jeopardise their chances of gaining from the cocoa trade. Consequently, by the beginning of the 1931 cocoa season, they colluded to forestall any competition that could cause the producer price of cocoa spiralling (Beckman, 1976, p. 41). As seen from Table 3.2, the percentage share of the cocoa income that went to cocoa farmers gradually fell from 95% in 1930 to 60% in 1936.

The downward trend in producer prices brought cocoa farmers together and in the 1937 cocoa season, they decided to withhold their cocoa from sale. Owing to the cocoa hold-up in the Gold Coast, world cocoa exports fell from 720,000 tonnes in 1936 to 655,000 tonnes in 1937 '". Since Ghana's share of world-cocoa production at the time was quite substantial, the partial withdrawal of Ghana's cocoa from the world market might have pushed up the world market price of cocoa from £25 per ton in 1936 to £42 per ton in 1937. Producer price rose correspondingly to £38 per ton in 1937.

The cocoa hold-up lasted from October 1937 to April 28, 1938. Table 3.4 summarises the effects of the hold-up on cocoa exports in the 1937/38 cocoa season.

TABLE 3.4 MONTHLY EXPORTS OF COCOA DURING THE HOLD-UP (TONS)

MONTH	1936/7	1937/38
October	24,500	9,900
November	33,000	13,700
December	46,000	11,600
January	34,400	5,600
February	38,900	3,300
March	36,800	4,500
April	32,100	3,500

Source: La Anyane, 1963, p. 108

Farmers were advised by their local chiefs to boycott certain European goods and refrain from selling their cocoa (Beckman, 1976, p. 41). Some cocoa farmers even went to the extent of burning their cocoa beans (Kotey and Gyekye, 1974, p. 9). As shown in the table, the total cocoa exports from October 1937 to April 1938 constituted only 21% of the quantity exported during the same period in the previous cocoa season.

On March 23, 1938, an arbitration team was sent from the United Kingdom to negotiate a truce. As a follow-up, the Nowell Commission was set up in the same year to investigate the activities of the thirteen European firms which purchased cocoa in the country. The Commission recommended a number of essential features which an alternative marketing

system should possess, the most important being the maintenance of free competition in the purchase of the cocoa crop.

The recommendations of the Nowell Commission could not be implemented before the outbreak of the second World War. The war disrupted the Atlantic shipping; some of the more important markets in which West African cocoa had normally been resold became inaccessible (Kay, 1972, p.268). The cocoa merchants were, therefore, willing to buy only the quantity for which they could obtain a ready market.

To prevent the situation where some farmers could not find buyers for their produce, the metropolitan government in 1939 intervened to purchase cocoa from the colonies -thus the British government became the monopoly buyer of West African cocoa (Beckman, p. 41). The West African Cocoa Control Board (later, renamed the West African Produce Control Board) was subsequently established by the British government to undertake cocoa marketing in West Africa. The merchants were this time, engaged as agents who bought cocoa for the British government (Kotey and Gyekye, 1974, p. 11). In the United Kingdom, part of the West African cocoa was resold to the local chocolate firms and the rest went to other cocoa consuming countries such as the United States (Kay, 1972, p. 270).

During this period, cocoa producer prices were fixed by the Produce Board and for the ten-year period, farmers received on average, 45% of the world market cocoa price [16]. Fitch

and Oppenheimer (1966, p. 44) allege that a large part of the profits accumulated by the Produce Board was sent off to London where it was held as sterling balances; these balances which in 1945 stood at £670 million were generally invested in long-term British government securities. The gradual decline of cocoa output from 305,000 tonnes in 1937 to 195,000 tonnes in 1947 was a reflection of cocoa farmers response to the low producer prices which prevailed from the second half of the 1930s through to 1947.

TABLE 3.5 COCOA PRODUCER PRICES AND WORLD MARKET COCOA PRICES (1938-47)

YEAR	COCOA OUTPUT ('000 tons)	WORLD MARKET PRICE (1) £/ton	PRODUCER PRICE (2) £/ton	(2)AS % OF (1)
1938	244	25	17	68
1939	303	24	13	54
1940	246	34	16	47
1941	241	44	13	30
1942	255	44	15	34
1943	210	44	13	30
1944	199	44	13	30
1945	233	44	22	50
1946	212	47	27	57
1947	195	100	50	50

Source: Gill and Duffus, April 1981, pp 4-5 and 50-56

3.1.2 Ivory Coast: 1905-1954

In the Ivory Coast, prices paid to cocoa farmers have been controlled almost from the outset by either the French colonial government or the Ivory Coast Stabilization Fund. The major difference is that at all times, the Ivorian

government has encouraged private participation in cocoa marketing.

The introduction of cocoa to the Aboisso region of the Ivory Coast in 1888 did not receive an enthusiastic welcome from the indigenous population because the industry in its early stages did not offer adequate incentives to the few who embraced it (Hopkins, 1973, p.129). It was Governor Angoulvant, who later, made an effort to persuade the locals to take up cocoa farming (Hopkins, 1973, p. 219).

The French colonial government bought all the cocoa produced in the colony [17], as much as 70% were exported to the mother country [18] and the rest were resold to other consuming countries. By 1905, the first major export of 2,000 tons of cocoa beans had been made, the bulk of it going to France. During this period, the government paid a uniform price to the producers. Elliot has observed that the prices given to cocoa farmers in 1927 and 1928 were quite favourable and they induced farmers to increase their holdings [19]. The period of high prices was followed immediately by the Great Depression of 1929 and as a result of the slump in World prices, producer prices of cocoa in the Ivory Coast also declined quite considerably.

The instability in world trade during the second World War dealt another blow to cocoa prices in the Ivory Coast [20]. The war made it impossible for the French Colonies to either export their products or import food and manufactured goods[21].

The world market contracted and this meant that cocoa

farmers in the colonies could not sell all their produce. Under the circumstances, farmers neither found any motivation to properly maintain their old farms nor to commit new plots into cocoa cultivation. Consequently, by 1943, output of cocoa in the Ivory Coast had fallen to only 543 tons from the 1939 figure of 55,000tons [22].

During the war, the government adopted some discriminatory measures in the marketing of cocoa which, further discouraged the natives from expanding their cocoa farms. Cocoa supplied by the European farmers was bought at 4.50F per kilo while that of the Africans attracted a price of 2.60F per kilo (Elliot, p. 252). Campbell offers a vivid account of what was happening in the Ivory Coast at the time: [23].

> By 1943 African planters had been debarred from any recruited labour, which from then on was reserved exclusively for work on European plantations. In some cases Africans were even removed from their own plantations to be recruited for European enterprises. Other administrative and commercial policies worked, if not explicitly to discourage African planters, at least to privilege the Europeans. The latter, for example, succeeded in securing higher prices than the African planters, through the collaboration of the administration with the trading companies.

TABLE 3.6 IVORY COAST: COCOA OUTPUT AND PRODUCER PRICES

YEAR	COCOA OUTPUT ('000 tonnes)	PRODUCER PRICE (CFAF/kg)
1951	57	60
1952	45	72
1953	61	68
1954	57	90
1955	79	72
1956	71	58
1957	72	55
1958	46	68
1959	56	80
1960	62	89
1961	94	89
1962	82	64
1963	103	64
1964	99	70
1965	148	70
1966	113	57
1967	150	70
1968	147	70
1969	145	70
1970	181	80
1971	180	85
1972	226	85
1973	181	85
1974	209	110
1975	242	175
1976	231	175
1977	230	180
1978	304	250
1979	312	250
1980	379	300
1981	403	300
1982	465	300
1983	360	350
1984	411	350
1985	565	375

Source: Gill and Duffus, Cocoa Statistics (several issues) and Cocoa Market Report (several issues), Elliot, 1974, p. 253 and de Wilde, 1984, p. 94

In defence of these obnoxious policies the president of the Chamber of Agriculture was alleged to have said: [24]

> We do not have the same needs, you Africans do not goon holiday in France and you do not eat bread but yams.

According to Elliot, these discriminatory measures led to the formation of the Syndicat Agricole African(SAA) in 1944. SAA fought for equal prices for the African cocoa farmers. It succeeded in 1946 to persuade the colonial administration to end the forced labour recruitment among the natives and to offer better incentives to all cocoa farmers irrespective of racial status. There was a systematic rise in cocoa producer prices from the end of the war through to 1954.

3.1.3 Summary

We note in conclusion that under the oligopsony system in Ghana and the Ivory Coast, producer prices were in most cases determined by the colonial government. In the case of Ghana, there was a brief period between the inception of the cocoa industry and the outbreak of the second world war when cocoa prices were decided by the foreign merchants. Owing to the competition among the cocoa buyers, prices offered to cocoa farmers were on the whole, very high. Export duty on cocoa was low throughout this period. With the exception of the war years, cocoa prices in Ghana and the Ivory Coast were generally favourable and this led to an expansion of the industry in both countries.

3.2 Producer Price Policy Under the Cocoa Marketing Board Monopsony (GHANA) and the Stabilization Fund (Ivory Coast)

3.2.1 The Ghana Cocoa Marketing Board, [26] GCMB

At the end of the second World War, the British government decided to create in each colonial territory a permanent organisation to continue the process of controlled marketing of cocoa. The Ghana Cocoa Marketing Board, GCMB was accordingly set up by Ordinance No. 16 of 1947 with the initial working capital of £2.2 million, being Ghana's share of the net profits of the WAPCB (Kotey and Gyekye 1974, p. 13). The prime object of the Board was to protect cocoa farmers from the "excessive" price fluctuation of cocoa on the world market [26].

We realise from Table 3.7 that during the first decade of the operation of the GCMB, the yearly producer price paid to Ghanaian cocoa farmers averaged 47.9% of the world market price of cocoa. From 1958 to 1980, the figure went down to 39.7% and in particular, in 1977, the prevailing producer price of cocoa was only 17% of the world market price of cocoa. Because of the small proportion of the cocoa earning that went to farmers, by the close of the 1964/65 cocoa season, the GCMB had accumulated large surpluses amounting to £60.6million.

The government weilded political control over the Board and

took the lion's share of cocoa income to finance development projects. As Table 3.8 shows, a substantial part of the cocoa income went into the payment of export duties. Export tax averaged 4.4% of the export price annually from 1948 to 1950 but the tax margin shot up to an average of 33.7% a year, from 1951 to 1961.

Apart from these high taxes, cocoa farmers were sometimes called upon to make direct contributions from their cocoa income towards the running of the Convention People's Party (CCP) as well as financing development projects. For instance, in 1959, the cocoa producer price was deliberately reduced from 72 to 60 shillings per load of 60lb in order to raise funds to support the 5-year Development Plan (Beckman, P. 202).

A study of cocoa output figures in the 1960s shows that output rose to an all time high in 1965 against the background of low producer prices [27]. This paradox is explained by the long gestation period characteristic of the cocoa tree. We noted in the introductory chapter that the cocoa tree has a gestation period ranging between 3 and 5 years; the cocoa tree reaches its peak yield from fifteen years onwards [28]. Hence, the increase in cocoa output in the 1960s was induced by the favourable producer prices that prevailed between 1951 and 1958 [29].

TABLE 3.7 COCOA PRODUCER PRICES AND WORLD MARKET COCOA PRICES (1947-1980), £/TON

YEAR	COCOA OUTPUT ('000 TONNES)	WORLD MARKET PRICE (1)	PRODUCER PRICE (2)	(2) AS % OF (1)
1947	195	100	50	50
1948	211	219	73	53
1949	282	187	119	64
1950	252	205	83	40
1951	266	281	129	46
1952	214	297	147	49
1953	251	283	128	45
1954	214	460	132	29
1955	224	297	141	47
1956	241	218	147	67
1957	268	243	138	57
1958	210	347	132	38
1959	259	281	118	42
1960	322	222	110	50
1961	440	177	110	62
1962	417	167	110	66
1963	429	205	108	53
1964	443	188	99	53
1965	566	138	91	66
1966	417	193	76	39
1967	382	238	85	36
1968	422	320	101	32
1969	339	415	114	27
1970	416	306	120	39
1971	392	232	117	50
1972	464	270	103	38
1973	418	585	136	23
1974	350	990	181	18
1975	377	723	226	31
1976	397	1,399	327	23
1977	320	2,944	486	17
1978	268	2,006	550	27
1979	250	1,727	568	33
1980	285	1,270	616	49

SOURCE: Gill and Duffus, April, 1981, pp. 4-5 and 50-56.

TABLE 3.8 EXPORT DUTY PAID BY THE GCMB (£G MILLION)

YEAR	TOTAL COCOA EARNINGS (1)	EXPORT DUTY (2)	(2) AS % OF (1)
1947/48	41.5	0.4	1.0
1948/49	37.5	1.7	4.5
1949/50	45.1	3.5	7.8
1950/51	70.3	13.4	19.1
1951/52	51.6	14.7	28.5
1952/53	57.1	16.0	28.0
1953/54	74.7	34.0	45.5
1954/55	77.5	38.4	49.5
1955/56	52.3	14.6	27.9
1956/57	50.7	12.0	23.7
1957/58	62.9	26.3	41.8
1958/59	70.9	26.2	37.0
1959/60	69.9	26.3	37.6
1960/61	71.6	24.7	34.5
1961/62	69.0	27.4	39.7
1962/63	69.1	27.6	39.9
1963/64	76.9	21.8	28.3
1964/65	71.2	17.8	25.0

SOURCE; Beckman, pp. 279-281.

With the exception of the years 1971 and 1972, the nominal producer prices of cocoa were adjusted upwards yearly from 1967 onwards. The irony however, was that the increases usually occurred at times when either the domestic currency had been devalued or the rate of inflation in the economy was high. For example, in 1967 when the producer price was raised from NC4.50 to NC6.50 per load of 60lb, the cedi had on the 8th of July, 1967 been devalued by as much as 30%. The devaluation coupled with the military government's stringent import control measures, led to shortages of consumer goods in the ensuing years and this increased the prices of the few commodities in the system to the point

that farmers could hardly buy anything with their cocoa incomes [30]. Again, the gains from the increases in producer prices in the 1970s were equally eroded by devaluations in 1971 and 1978.

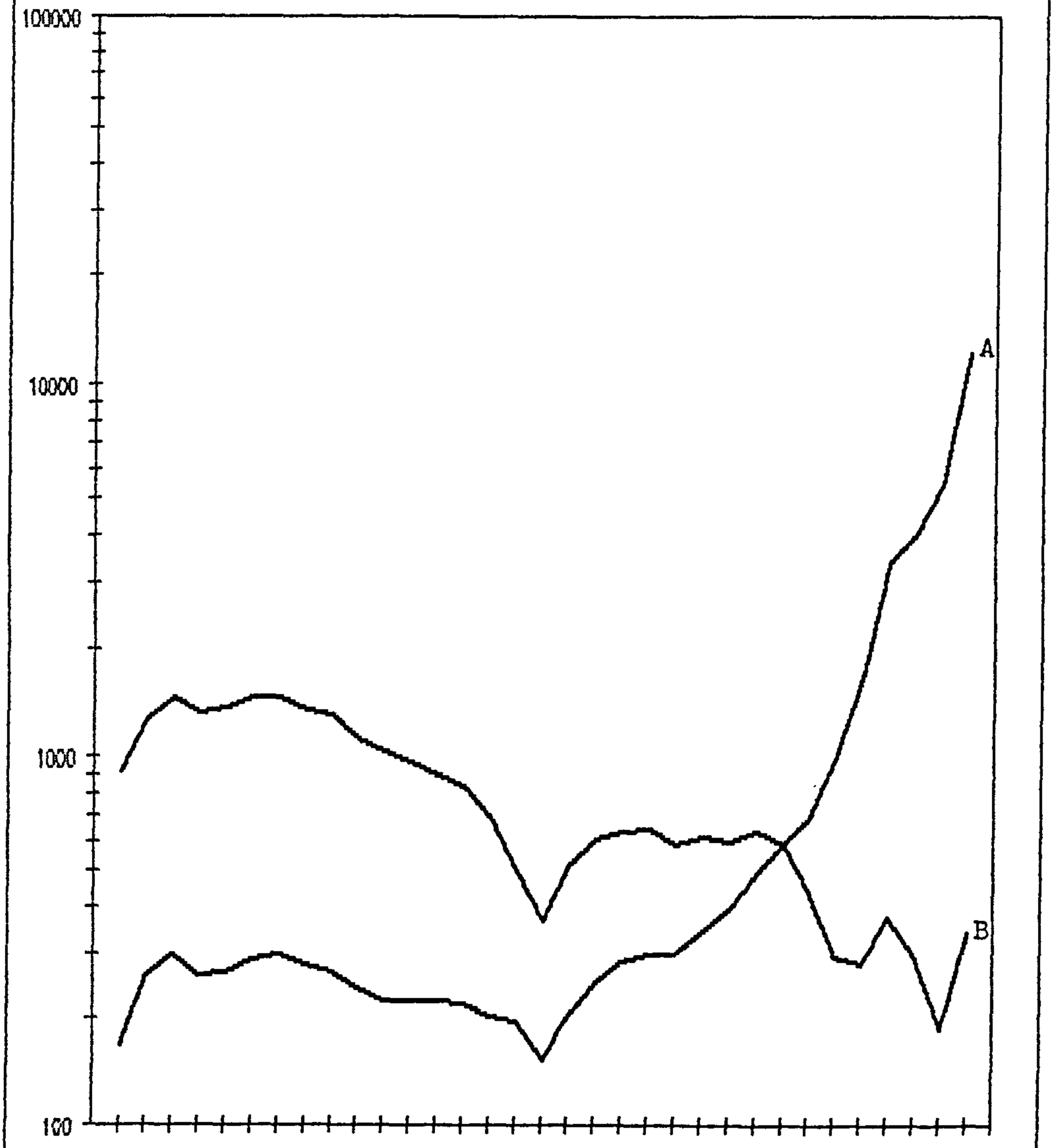
An examination of the trend of the real producer prices of cocoa will give a better representation of cocoa farmers purchasing power.

Figure 3.1 shows the trend of the real and nominal cocoa producer prices from 1950 to 1982 [31]. The former graph records a sharp rise in the real producer prices of cocoa from 1950 to 1952. The following year saw an abrupt fall in the real producer price. This was due to a 13% fall in the nominal producer price of cocoa in 1953. In 1954, there was a healthy recovery in the world market price of cocoa - an increase of 63% over the previous year's price. The producer price of cocoa in Ghana was accordingly raised and this explains the upward swing in the real producer price of cocoa from 1953 to 1956. Thereafter, there was a persistent downward trend for ten successive years, from ¢1,434 per tonne in 1956 to ¢365 per tonne in 1966 (1975 cedis). The next four years witnessed a gradual rise in the real producer prices of cocoa. This was followed by a 4-year period of consistent fluctuations in the real producer price of cocoa. The years from 1974 to 1978 again saw a continuous decline in real producer prices (See Table 3.9).

The continuous decline in the real producer price of cocoa during this period could not have been attributed to

Figure 3.1

GHANA: NOMINAL & REAL PRODUCER PRICES OF COCOA
(Cedis [¢] Tonne)



line A: Nominal Producer Price

line B: Real producer Price (1975 Prices)

declining world market prices because the world market price of cocoa per tonne fluctuated around a mean of £216 which was not so much different from the average world market price of £238 per tonne for the decade preceding 1956 during which the real producer price of cocoa in Ghana went up persistently.

TABLE 3.9 GHANA: NOMINAL AND REAL PRODUCER PRICE OF COCOA (CEDIS/TONNE)

YEAR	NOMINAL PRICE	REAL PRICE (1975=100)
1950	166	917
1951	258	1,240
1952	294	1,434
1953	256	1,300
1954	264	1,347
1955	282	1,432
1956	294	1,434
1957	276	1,333
1958	264	1,275
1959	236	1,108
1960	220	1,023
1961	220	965
1962	220	884
1963	216	834
1964	198	678
1965	182	493
1966	152	365
1967	198	513
1968	247	595
1969	279	626
1970	294	640
1971	293	582
1972	338	610
1973	387	593
1974	487	632
1975	577	577
1976	679	435
1977	976	289
1978	1,599	273
1979	3,314	367
1980	3,941	291
1981	5,333	182
1982	12,000	333

SOURCE: World Bank, 1983, p. 44.

In 1978, Ghana was beaten to the second position by the Ivory Coast in world cocoa beans production. In its bid to revive the industry, the government in 1979, increased the nominal producer price of cocoa. The succeeding years saw similar increases in the nominal producer price of cocoa. But the rate of inflation in the economy was so high that these upward adjustments of the nominal producer price of cocoa were able to raise the real producer price of cocoa only in 1979 and 1982 [32]. The overall picture has therefore been one of decline in the real producer prices of cocoa from 1956 to 1982.

3.2.2 Ivory Coast: Caisse de Stabilisation et de Soutien des Prix des Productions Agricoles (CAISTAB) - The Stabilisation Fund

The dramatic change in the world market price of cocoa from 1952 to 1953 [33] convinced the French colonial government to set up an institution which would protect the cocoa and coffee growers against future sporadic world market price fluctuations. Therefore, in 1955, the government set up a Stabilisation Fund [34] in the Ivory Coast to liaise between producers and buyers of cocoa forthe common benefit of both the seller and the buyer. The primary objectives of the Fund were to stabilise the prices of certain products, chiefly, prices of cocoa and coffee, and to facilitate the sale of commodities abroad[35].

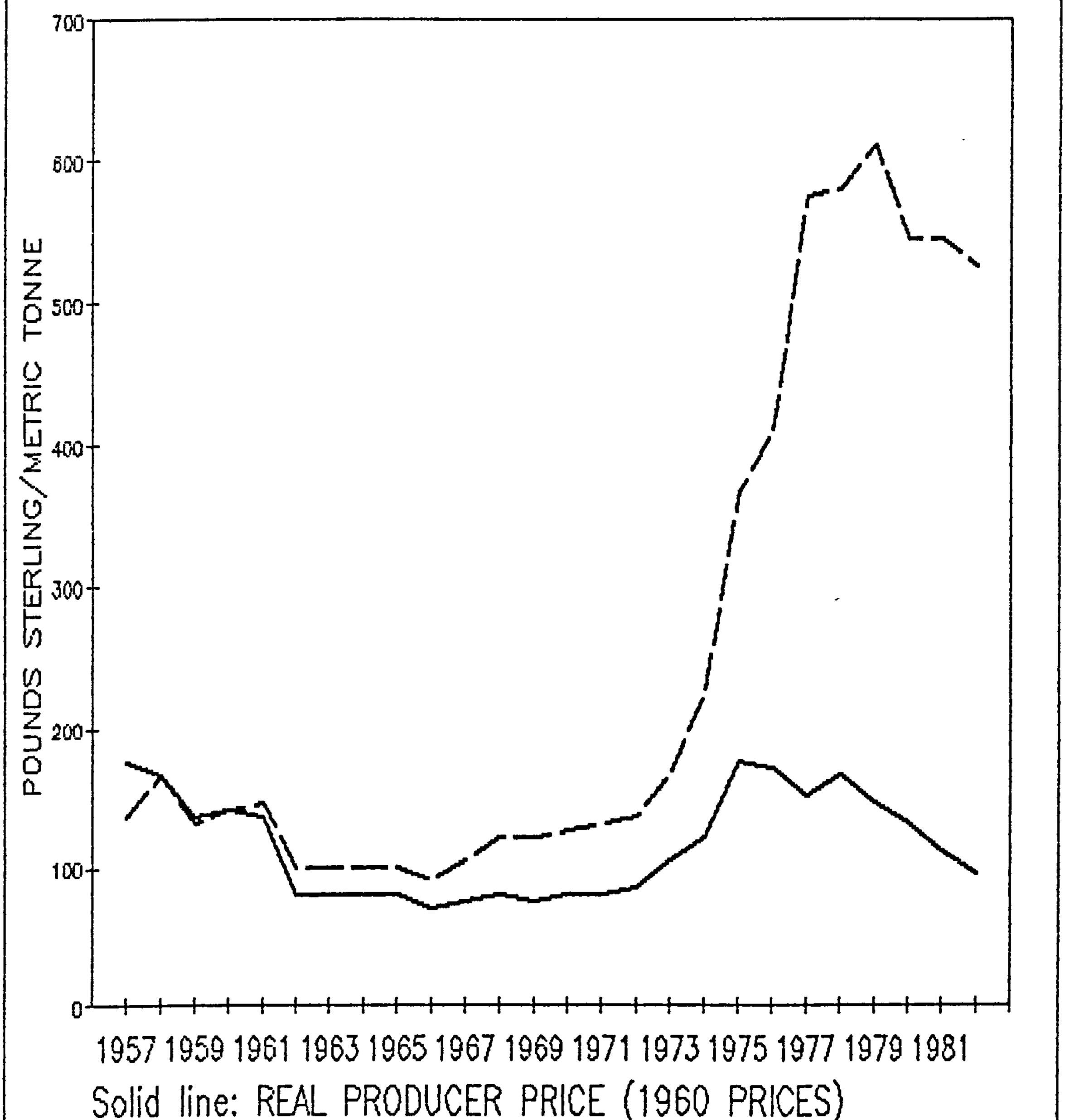
During the first two years of the operation of the fund, cocoa producer prices declined from CFAF 72 per kilo in 1955 to CFAF 55 per kilo in 1957 (Kotey, et al, (eds), p.253). Thereafter, the nominal price of cocoa in the Ivory Coast rose steadily to almost CFAF 90 by the beginning of 1960 [36].

Figure 3.2 has been graphed from Table 3.10 to show the trend of both the nominal and real producer prices of cocoa in the Ivory Coast from 1957 to 1982. For ten years running, beginning 1957, the real producer price of cocoa fell from £177.5 to £72.0 per tonne. There was a similar fall in cocoa prices on the world market in the same period, for example, in 1965, the world market price of cocoa fell as much as 43% of the price in 1957. Producer prices in the Ivory Coast were stabilised around a mean value of £120 per tonne from 1957 to 1966 - this meant cocoa farmers' earnings represented on average, 55% of the world market price during the period.

From 1967 to 1980, the world market price of cocoa fell on six occasions even though it rose from £238 in 1967 to as high as £2,944 per tonne in 1977 before it dropped to the 1980 price of £1,270 per tonne. However, in the Ivory Coast, the period from 1966 to 1976 witnessed a continuous rise in the real producer price of cocoa after which it went down by about 12% of the previous year's figure and then rose to almost the same level as in 1975; from 1978 onwards, the real producer

FIGURE 3.2

IVORY COAST: NOMINAL & REAL PRODUCER PRICES OF COCOA (Pounds Sterling/metric tonne)



Solid line: REAL PRODUCER PRICE (1960 PRICES)

Broken Line: NOMINAL PRODUCER PRICE

TABLE 3.10 COCOA PRODUCER PRICES AND CONSUMER PRICE INDICES OF GHANA AND THE IVORY COAST

YEAR	PRICE INDEX (1960=100)		PRODUCER PRICE NOMINAL		PRODUCER PRICE REAL		WORLD MARKET
	A	B	C	D	E	F	PRICE
1957	96.3	76.6	138	136	143.3	177.5	243.3
1958	96.3	93.8	132	159	137.1	169.5	346.9
1959	99.1	99.5	118	131	119.1	131.7	281.0
1960	100.0	100.0	110	138	110.0	138.0	222.3
1961	106.0	102.9	110	138	103.8	134.1	177.1
1962	115.8	109.8	110	102	95.0	92.9	167.4
1963	120.5	110.0	108	102	89.6	92.7	204.9
1964	135.8	112.0	99	102	72.9	91.1	187.7
1965	171.6	114.4	91	102	53.0	89.2	138.4
1966	194.0	119.4	76	86	39.2	72.0	193.2
1967	179.1	121.9	85	104	47.5	85.3	238.0
1968	193.5	128.7	101	118	52.2	91.7	320.0
1969	207.4	132.7	114	117	55.0	88.2	415.5
1970	213.5	142.6	120	124	56.0	87.0	305.5
1971	234.0	144.8	117	126	50.0	87.0	232.4
1972	257.7	147.6	103	135	40.0	91.5	270.5
1973	303.3	158.5	134	170	44.2	107.3	585.4
1974	358.1	185.6	181	224	50.5	120.7	990.1
1975	465.1	212.1	225	368	48.4	173.5	722.7
1976	726.0	237.2	324	410	44.6	172.8	1,399.4
1977	1,571.2	302.6	319	462	33.0	152.7	2,943.9
1978	2,720.0	341.9	611	577	22.5	168.8	2,005.6
1979	4,200.0	398.6	571	583	13.6	146.3	1,727.5
1980	6,304.2	457.1	625	610	9.9	133.5	1,270.4
1981	13,647.9	497.3	956	544	7.0	109.4	1,127.0
1982	17,742.3	533.9	2,495	521	14.1	97.6	1,033.0

A = GHANA 1
B = IVORY COAST 2
C = GHANA 3
D = IVORY COAST 3
E = GHANA
F = IVORY COAST

SOURCES:
1. World Bank, 1983, p. 44
2. IMF, International Financial Statistics, Vol. 37, 1984 and World Bank, 1978, pp. 324-325
3. Gill and Duffus, April 1981, and Oct. 1985.
4. Prices are in pounds per tonne.

price of cocoa began to fall.

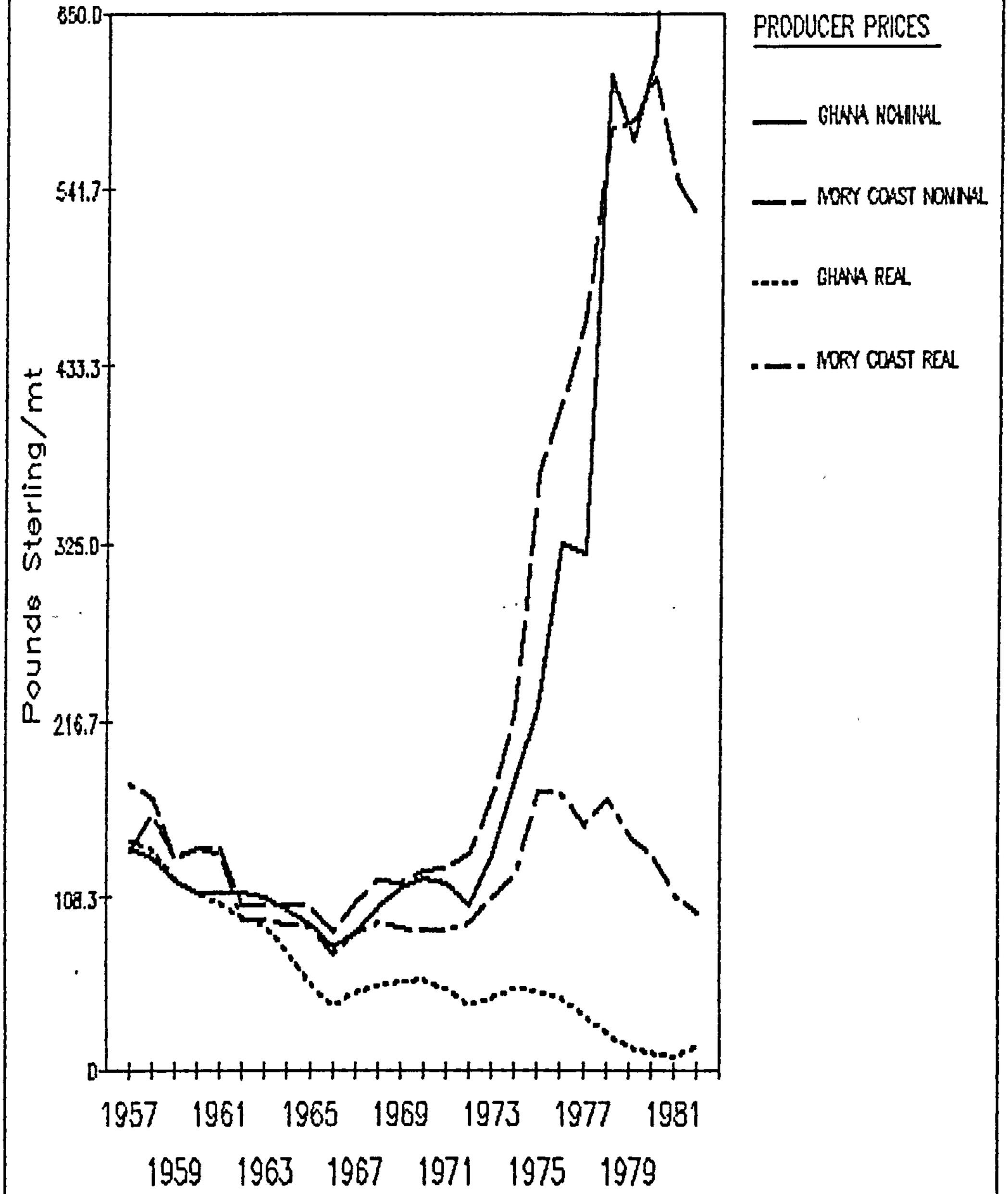
3.3 Comparison of Producer Price Policy Under GCMB (Ghana) and CAISTAB (Ivory Coast)

It comes out of the above analysis that the nominal producer prices for cocoa ever since the establishment of the GCMB and the Stabilisation Fund respectively in Ghana and the Ivory Coast have remained far below world market levels averaging respectively 29.3% and 40% of world market prices [37]. Also from Figure 3.3, it is evident that for most part of the post-independence era, the proportion of the world market price of cocoa paid to the Ivory Coast cocoa farmers has been higher than that paid to their Ghanaian counterparts [38].

An even wider gap emerges when the real producer prices paid to farmers in Ghana and the Ivory Coast are compared[39]. While real producer prices in Ghana fell continuously from 1957 to 1980, in the Ivory Coast, the downward trend in the real producer prices from 1957 ceased in 1966 and then rose persistently for a decade with the second drop starting in 1978.

Figure 3.3

NOMINAL AND REAL REAL PRODUCER PRICES OF COCOA IN GHANA AND THE IVORY COAST (Pounds Sterling/Metric Tonne)



3.3.1 Change in Nominal Producer Price Compared With Change In Price Level

We compare the rates at which nominal producer prices and inflation have been increasing in the two countries. The purpose of this exercise is to help us obtain an idea of the real worth of cocoa farmers' income. In equations 5 and 6 below, we have regressed nominal cocoa producer prices (GHCP for Ghana and ICCP for the Ivory Coast) on time trend (t) to estimate the rate of growth of cocoa producer prices in each country. Similarly, in equations7 and 8 we have estimated the rate of growth of inflation in the two countries by regressing consumer price index series (GHRI for Ghana and ICRI for the Ivory Coast) on time trend [40]. The Least-squares estimation results are reproduced below:

(a) Rate of increase in cocoa producer prices (1960-1979)

$$GHCP = 4.3563 + 0.0696t \quad \ldots(5)$$

$$ICCP = 4.2848 + 0.0905t \quad \ldots(6)$$

(b) Rate of inflation

$$GHRI = 2.7268 + 0.1524t \quad \ldots(7)$$

$$ICRI = 4.4304 + 0.0653t \quad \ldots(8)$$

From these equations, the rates of increase in cocoa producer prices per year for the two decades beginning 1960 in Ghana and the Ivory Coast were 6.9% and 9.05% respectively. During the same period, inflation grew at the rate of 15.24% in Ghana and 6.53% in the Ivory Coast. This means that the incomes of cocoa farmers in Ghana during the period increased yearly at a rate which was less than half the rate at which inflation was increasing. On the other hand, in the Ivory Coast, the incomes of cocoa producers for the same period increased annually at a rate which was about 39% higher than the rate of growth of inflation. [41]

3.3.2 Cocoa Producer Price and Prices of Competing Crops

Table 3.11 shows the price indices of cocoa and competitive crops in Ghana. While the producer price of cocoa went up twenty-two times from the base year index, there were respectively 63, 55, 56, and 65 times rises in the prices of maize, cassava, plantian and cocoyam - the major food crops grown in the cocoa zone. The price index of palm oil which is the next most important cash crop after cocoa in Ghana went up 51 times.

TABLE 3.11 COCOA AND FOOD PRICE INDICES (1963 = 100)

YEAR	COCOA	MAIZE	CASSAVA	PLANTAIN	COCOYAM	PALM OIL
1963	100	100	100	100	100	100
1964	100	127	104	77	100	98
1965	66	164	178	126	168	140
1966	90	167	158	123	173	145
1967	108	93	118	100	148	145
1968	117	150	124	123	167	152
1969	133	220	159	118	169	149
1970	133	177	155	146	201	144
1971	133	181	203	215	271	163
1972	167	261	239	195	294	215
1973	200	279	244	290	395	289
1974	250	304	288	295	457	334
1975	267	378	441	379	548	471
1976	333	862	938	722	1,045	690
1977	607	1,799	2,378	2,303	2,725	1,210
1978	1,215	1,835	2,216	3,574	3,277	2,810
1979	1,822	2,602	2,584	3,823	4,055	3,468
1980	2,186	6,275	5,535	5,610	6,519	5,120

SOURCE: World Bank, 1983, p. 4

The relative profitability of cocoa was measured against that of other competitive crops by the author for the crop year 1983 [42]. The returns per man-day from cocoa, cassava, plantain and maize were calculated at a discount rate of 10% - the results obtained have been reproduced in Table 3.12. While all the other crops examined carried positive net returns per man-day, the net returns per man-day of cocoa turned out to be negative.

TABLE 3.12 RETURNS PER MAN-DAY FROM COCOA AND SELECTED COMPETITIVE CROPS IN GHANA (1983)

CROP	PRODUCTIVE YEARS*	MAN-DAYS	NPV OF RETURNS AT 10% DISCOUNT RATE (¢)	NET RETURNS MAN-DAY(¢)
Maize	40	32	14,771.18	461.60
Cassava	40	38	13,949.17	367.08
Plantain	40	44	12,691.74	288.45
Cocoa	40	72	-65.27	-0.91

* For the economic life of cocoa, plantain and cassava can be cultivated in 10- and 20- year cyles respectively while maize can be grown and harvested yearly provided there is an availability of land to enable plots to be changed at the end of each year.

SOURCE: Ofori-Attah, 1985, p. 29

As the foregoing analysis shows, the real producer prices of cocoa in Ghana have persistently declined for many years. Contrary, the prices of the inputs used by the cocoa farmer have steadily gone up and this has made the establishment and maintenance of a cocoa farm very expensive. This explains the negative net returns per man-day of cocoa in 1983. There was a little improvement in the relative profitability of cocoa in 1985. In that year, it cost on average ¢19,067 to establish and maintain an acre of hybrid cocoa farm [43] and at the 1985 cocoa producer price of ¢1,698 per 30kg [44], the value of yield from an acre of a hybrid cocoa farm was ¢19,295. This left a profit margin of only ¢227 to the cocoa farmer.

A high proportion of the Ghanaian cocoa trees are currently aged over 30 years [45]. According to Masefield (1948, p. 387), the yield of cocoa is highest for trees of 15 to 25 years old and at 25 - 45 years, yield remains fairly steady, but cost of production still rises. Therefore, applying

Masefield's observation to the Ghanaian cocoa industry, we end up with the conclusion that from the small margin between the average production costs of an acre of cocoa farm and the value of yield, most Ghanaian cocoa farmers today spend much money on the maintenance of their farms aged over 25 years but receive a remuneration which fails to commensurate with production cost. Contrary, food-crop farmers have continued to enjoy high returns from their farms.

Owing to the prevailing low producer price of cocoa, the high production cost of cocoa and the soaring producer prices of food crops in 1983, there was an evidence of some farmers who were even prepared to cut out their cocoa trees just to free the land for food-cropping [46]. This observation is supported by the following statement from a report prepared by the Cocoa Services Division on the "Rehabilitation of Burnt Cocoa Farms" [47].

> There are clear indications that most cocoa farmers being desperate for cash and food wish to remove the cocoa trees and replant their farms with other quick and more profitable food and cash crops like maize, cassava, rice and vegatables.

In the Ivory Coast, cocoa continues to be the most profitable of all cash crops. According to the World Bank estimation [48], the relative profitability of cocoa is 28% greater than that of an improved variety of upland rice-rice being the next most profitable food crop in the Ivory

Coast (See Table 3.12).

A comparison of the return-potential of cocoa and coffee- the chief competitive cash crops in the Ivory Coast, shows that during the second half of the 1970s cocoa continued to maintain a high remunerative position over coffee - this is exemplified by Table 3.12. Coffee cultivation requires a higher wage-labour content than cocoa farming [49]. While as much as 45% of the man-days put into coffee production comes from hired labour, the proportion of hired labour required in cocoa cultivation is only 22% (Elliot, 1977, p. 132).

De Wilde notes that the unfavourable development of coffee prices, particularly in relation to those of cocoa, was responsible for the stagnation of coffee output in the 1970s. He further explains that while the

TABLE 3.13 IVORY COAST: NET RETURNS PER HECTARE AND PER MAN-DAYS FOR MAIN CROPS (1974 PRICES)

CROP	A	B	C	D	E	F	G
UPLAND RICE							
Traditional	750	70	52,500	4,000	48,000	90	539
Improved	1,800	70	126,000	14,000	112,000	110	1,018
COCOA							
Traditional	300	175	52,500	700	51,800	35	1,480
Improved	1,000	175	175,000	4,470	170,530	83	2,055
COFFEE							
Traditional	350	150	52,500	4,470	47,750	70	682
Improved	1,100	150	165,000	28,070	136,930	140	978
COTTON							
Manual	1,000	69.5	69,500	12,000	57,500	143	402
Ox Culti/ vation	1,300	69.5	90,350	19,700	70,650	116	609
Yams	6,000	15	90,00	27,000	63,000	210	300
Maize	750	20	15,000	900	14,100	70	201

a = Yield kg/ha
b = Price CFAF/kg
c = Gross Value CFAF/ha
d = Cash Cost CFAF/ha
e = Net Value CFAF/ha
f = Labour man-days
g = Return/man-days (CFAF)
Source: World Bank, 1978, p. 414

TABLE 3.14 COMPARATIVE GROSS INCOME FOR COCOA AND COFFEE

YEAR	PRODUCER GROSS INCOME* (CFAF/ha in real terms) COCOA		COFFEE	
1974	27,552	(52.79)	16,378	(31.38)
1975	47,565	(104.81)	25,040	(55.18)
1976	35,280	(90.49)	24,248	(57.32)
1977	29,457	(65.67)	21,048	(46.92)
1978	46,715	(109.97)	16,913	(39.81)
1979	38,336	(85.83)	19,344	(43.31)
1980	46,837	(86.91)	17,921	(33.26)

Source: de Wilde, 1984 p. 97.

* Yield in kilos per hectare multiplied by real producer price per kilo. Figures in brackets are the pound sterling equivalent. Exchange rates used for the conversion were obtained from various issues of Statistical Year book UNO.

average producer price of coffee in the four-year period 1977-1980 was 4.2% below that in 1970-1973, the average cocoa producer price in 1977-1980 was 17.1% higher than in the earlier period (de Wilde, 1984, p. 96). The modal farm-size in the Ivory Coast is about 3.5 hectares (Hecht, 1983, p. 49). This means that in 1980 for example, the real earning of an average cocoa farmer was £304.19 as compared to £116.41 received by the coffee farmer [50].

Thus the high profitability associated with cocoa cultivation and the additional incentive package [51] which the government offers exclusively to cocoa farmers, make cocoa farming more attractive to the average Ivorian farmer than any other crop grown in the country. Another factor which militates against the attractiveness of coffee cultivation in particular is that coffee is subject to a good-bad-year production cycle [52] and this can sometimes

lead to large fluctuations in the earnings of coffee farmers.

3.3.3 Summary

In sum, we note that the low producer price policy of the government of Ghana through the GCMB has led to an increasing shift of resources from the cocoa industry to food-crop farming. We have a contrastive situation in the Ivory Coast where owing to the relatively high prices received by cocoa farmers, investment in cocoa plantation ranks first among all the crops grown in the country.

3.4 Comparative Analysis of GCMB and CAISTAB

As noted in the earlier sections, one of the main objectives of both the GCMB and the CAISTAB was to stabilise producer prices paid to cocoa farmers in Ghana and the Ivory Coast respectively. To assess the extent to which these institutions have been successful in achieving this aim of producer price stabilisation, we calculate for each country the instability index of the producer prices of cocoa and compare the results. The statistical measure of instability employed for this purpose is the logarithmic variance method (Coppock index) developed by Coppock [53].

It is defined as:

$$I\text{-}I = \text{antilog}\sqrt{v \log};$$

where,

I-I = instability index,

v log = logarithmic variance of the series,

$$\frac{1}{n-1}\sum\left(\log\frac{X_{t+1}}{X_t} - m\right)^2,$$

Xt = producer price of cocoa in year t,

m = arithmetic mean of differences between logs of the Xs,

$$\frac{1}{n-1}\sum\log\frac{X_{t+1}}{X_t}, \text{ and}$$

n = number of years.

The instability indexes for the nominal producer prices[54] of cocoa in Ghana and the Ivory Coast for the period 1962-1982 were found to be 29.2 and 15.8 respectively. Even though the results revealed an instability in the producer prices of cocoa in the two countries, it is crystal clear that over the period, the Ivorian Stabilisation Fund prices offered to farmers were considerably more stable than those of the GCMB. Coppock considers an I-I of 20 to be too high

for any particular variable (Coppock, 1962, p. 51).

The significance of each of the instability indices we have obtained for Ghana and the Ivory Coast in relation to fluctuations in the world market prices of cocoa can be verified by carrying out a statistical test on the hypothesis that the GCMB and the CAISTAB have over the years, succeeded in stabilising the producer prices of cocoa [55].

We test the null hypotheses:

(a) H_o: $\sigma^2 WP_c = \sigma^2 GP_c$

(b) H_o: $\sigma^2 WP_c = \sigma^2 IVP_c$,

against the alternative hypotheses:

(a) H_1: $\sigma^2 WP_c > \sigma^2 GP_c$

(b) H_1: $\sigma^2 WP_c > \sigma^2 IVP_c$

where,

$\sigma^2 WP_c$ = the variance of the natural logarithms of the world market prices of cocoa per tonne,

$\sigma^2 GP_c$ = the variance of the natural logarithms of the producer prices of cocoa per tonne in Ghana, and

$\sigma^2 IVP_c$ = the variance of the natural logarithms of the producer prices of cocoa per tonne in the Ivory Coast.

A rejection of the null hypothesis for a particular country implies that cocoa producer price fixed by the Marketing Board or Stabilisation Fund, has fluctuated less than the world market price of cocoa and the Marketing Board or the Stabilisation Fund has tended to stabilise producer prices.

We construct the one-tailed test statistic by taking the ratio of the variance of the world market prices of cocoa to the variance of the producer prices of cocoa. The resultant ratio has an F-distribution of [56]:

$$F = \frac{\sigma^2 WP_c / n-2}{\sigma^2 P_i / n-2} \quad F\ (n_1-2,\ n_2-2)$$

We used the geometric index defined as [57]:

$$-\sum_{t=1}^{n} (\ln X_t - \ln \bar{X}_t)^2,$$

to calculate the variances of world market cocoa price, cocoa producer prices in Ghana and the Ivory Coast from 1961 to 1982 and obtained respectively 0.861, 1.383 and 0.321 [58]. These results gave us the F-statistics of 0.623 for Ghana and 2.682 for the Ivory Coast. The F-value at the 5% point with 20 degrees of freedom in both the numerator and denominator is 2.12. Based on our results, we accepted the

null hypothesis for Ghana and rejected it for the Ivory Coast. This implies that cocoa producer prices in Ghana have fluctuated more than the world market prices and therefore, the GCMB has failed in its role to stabilise cocoa producer prices over the years. The opposite conclusion is true of the Ivory Coast.

In 1952, four years after the operation of the GCMB, Bauer and Paish [59] conducted a similar study on the incomes of cocoa farmers in Ghana and discovered that during the period, the annual amounts paid to producers by the GMCB had actually fluctuated considerably more from year to year than had the amounts received by the Board from the sale of cocoa. This study by Bauer and Paish together with our results shows that the GCMB ever since its inception, has departed from its primary objective of stabilising cocoa producer prices.

The high instability index of producer prices in Ghana has a serious backlash on the Ghanaian economy. The Ghanaian economy thrives mainly on the proceeds from the export of primary products, of which the largest chunk comes from the cocoa industry. Cocoa contributes on average, 60% of Ghana's foreign exchange earnings [60]. Majority of cocoa farmers in Ghana are not educated [61], and therefore, in general, cocoa farmers have a little chance of obtaining jobs outside the cocoa industry. Cocoa farmers are thus tied to the land and they derive the greater part of their livelihood from their farms.

With the existing producer price fluctuations, there are times when cocoa farmers are not able to fully fulfil their family commitments. To avoid the humiliation which is associated with the failure to meet this social obligation and to provide for other necessities of life, it has been the tendency for cocoa farmers to increasingly shift their resources into other areas such as food-cropping and trading which appear to be more rewarding than cocoa farming [62]. Since the entire cocoa output comes from such peasant farmers a drift like this, certainly has a debilitating effect on Ghana's foreign exchange position. Conversely, the fairly stable and relatively high cocoa producer prices in the Ivory Coast have sustained the interests of both old and new farmers in the industry and this has inevitably, led to an expansion of the cocoa industry [63].

There is also a difference between the CAISTAB and the GCMB when their modus operandi is compared. While the GCMB is involved in the actual marketing of cocoa, the CAISTAB's role in the marketing system is only supervisory. The GCMB exercises the sole right to license private buyers to participate in the internal marketing of cocoa and even in this case, the licensed agents only act as buyers for the Board. Fraudulent practices are rife among the purchasing clerks of the GCMB. Such malpractices include outright cheating, manipulation of scales [64], deliberate delay of payments and misappropriation of money voted for cocoa purchases [65].

Beckman (1976) cites several instances where buying clerks intentionally delayed payments to cocoa farmers just to use the money for their private ventures [66]. In the 1970s, payments were similarly delayed under the `chit' system [67]. An article carried by one of the economic reviews of the Ghana Commercial Bank (GCB) had this to say about the `chit' system [68]:

> This system...has done a lot of harm to the cocoa industry. It has led to heavy indebtedness of cocoa farmers to money-lenders. It has also been the driving force behind the conversion of cocoa farmlands to the cultivation of other cash crops such as maize, plantain, cassava, etc. as farmers receive spot cash and relatively high producer price for the sale of these crops.

A GCMB purchasing clerk gave the following revealing information about his status in the society and the source of his wealth [69]:

Status:

> A Chief does not blow his own horn. But I have to state that I am a very important personality in this village; I enjoy the same status as the chief..., I sometimes surpass the chief in sheer social power. Important social activities such as church harvests are chaired by me. My presence gives credence to funerals...Much of the status I enjoy here is owed to how much I make from my cocoa `krakye's' (clerk's) duties. In

this rural community, I am a rich man. They all come to me for aid, especially, in the lean season when the golden pods have vanished from their farms...

Source of Wealth:

There is only one way the cocoa 'krakye' can make good funds to welcome visitors with and maintain his cardinal status in his village of work: to tax the farmer without his knowing it. It may or may not be cheating. But you can always do this even if the farmer is sophisticated enough to be suspicious...After all, how many cocoa farmers are schooled enough to read off the weight of their produce on an Avery Scale which is what I use?

The clerks often behave in this manner because they are aware that any loss resulting from their behaviour does not directly affect them but rather is borne by the State. Such practices are less likely to occur in the Ivory Coast because, first of all, the cocoa farmers at all times, have a choice of buyers to sell to and this rules out many of the forms of unfairness that can be meted out to farmers by the purchasers when they are the employees of a monopsony firm like the GCMB; secondly, the private buyers always set their minds on profit, hence, they put a high premium on marketing efficiency [70], and thirdly, there are several weighing and quality-control checks which the CAISTAB uses to eliminate any malpractices inherent in the system [71].

Another area of contrast between the two marketing systems occurs in the degree of political control exercised on the organisations by their respective governments. Successive governments in Ghana have at one time or the other, manipulated the Board to achieve their own political ends. This dates back to the colonial era when a massive surplus of the Board was invested in British government securities and utilised for the reconstruction of the metropolitan economy after the second World War (Beckman, 1976, p.42). [72] For example, from 1950 to 1957, the GCMB total reserves which were invested in long-term British government securities amounted to £1,322.5 million (Fitch and Oppenheimer, p.45). During the reign of Nkrumah, the GCMB became the political arm of the government. For instance, in 1961, the UGFCC which was the farmers' wing of the CPP was made the sole buyer of cocoa for the GCMB. The central purpose of this arrangement was to enable the CPP government to appropriate the cocoa income to finance the activities of the party as well as national development projects [73]. Incidentally, some of those development projects never conferred any direct gains on the cocoa farmers [74].

From the point of view of the Board, subsequent governments' involvement in the administration of the GCMB was equally unfavourable [75]. The government interfered with staffing of the GCMB, the selection of licensed buying agents and other operational matters of the Board [76].

The CAISTAB has not been totally free of government

control. In most cases, it is the Ivory Coast government which decides the allocation of the reserves of the fund to the various sectors of the economy that require funding (World Bank, 1978, p. 372). De Wilde notes that from the total net surplus of CFAF 580 billion which accrued to the Fund in the three years 1976/77 to 1978/79, approximately CFAF 156 billion (27%) was returned to agriculture for expenditures on crop planting programmes, extension and subsidies and CFAF 422 billion (73%) was transferred to the government for investment and other outlays in the non-agricultural sectors of the economy [77]. Hecht has also observed that: [78]

> In 1981, for example, the government earmarked $36million for schemes to improve cocoa and coffee production. If a $4.8 million fertiliser subsidy, only part of which actually went to tree crops, is included, the total public expenditure comes to $40.8 million, or 3.7% of the 1981 investment budget. By comparison, 48% of that budget was financed out of marketing board surpluses from previous years - that is, from cocoa and coffee earnings, which averaged $772 million a year during 1977-9.

A study made by Dodoo (1975, pp. 92,96) on tax on cocoa income in Ghana, revealed that in the period 1948-65, the potential cocoa producer income distributed to cocoa farmers ranged between only 6% in 1948-53 and 13% in 1960-65 [79]; the greater proportion of the cocoa tax went into the financing of government development projects.

Like Ghana, cocoa farmers in the Ivory Coast also contribute to government revenue through export taxes (cocoa duties). In the Ivory Coast, coffee and cocoa bear the heaviest export taxes which, in 1980, were levied at 23% of the standard export value of these crops: [80] the comparative figure for Ghana's cocoa in

TABLE 3.15 OPERATIONS OF THE GCMB (MILLION)

YEAR	PROFIT/LOSS BEFORE TAXES	EXPORT DUTY	PROFIT/LOSS AFTER TAXES
1972/73	126.2	125.5	0.7
1973/7	224.4	213.1	11.3
1974/75	270.5	318.7	-48.2
1975/76	158.3	266.2	-107.9
1976/77	401.8	433.3	-31.5
1977/78	633.7	586.4	47.3
1978/79	1,238.4	1,344.4	-96.0
1979/80	654.5	846.7	-192.2
1980/81	31.8	52.5	-20.7

SOURCE: World Bank, 1984, p. 181

1980 was 32.9% (World Bank, 1983, p. 45). One of the major conclusions of Dodoo's study was that cocoa income in Ghana during the period 1948-73 attracted a high rate of taxation, ranging from an average of 23% in 1960-65 to 55% in 1966-69[81]

It is clear from Table 3.15 that owing to the high export duty levied on cocoa, the GCMB incurred losses in six out of the nine years from 1973 to 1981.

Clearly, on the basis of producer price stability, promptness in the payment of farmers' remuneration and fair-play on the part of cocoa buyers, the CAISTAB's performance appears to be more efficient than that of the GCMB.

Footnotes to Chapter3.

1. See Section 1.3.1

2. The Ivory Coast system is strictly speaking not a marketing board. See Section 3.2.2 and Appendix 3.2 for a full discussion of the system

3. See below for a detailed discussion.

4. Other variables which influence cocoa supply include the producer prices of competitive crops, cocoa producer prices in the neighbouring countries, type of cocoa grown, availability of farm inputs as well as their prices, control of cocoa diseases and pests, the age-profile of cocoa trees at any point in time, weather conditions and the level of technology application in the cocoa industry.

5. See footnote

6. See Appendix 3.1 for a discussion of the estimation procedure.

7. The use of these independent variables is justified in Chapter 7 below.

8. Cocoa sold to the CMB is related to the producer price of cocoa in the Ivory Coast (CPiv) in the following way: Qg (total cocoa output in Ghana) = Qcmb (cocoa sold to CMB) + Qiv (cocoa smuggled to the Ivory Coast). From this equation, Qiv = Qg - Qcmb, but Qiv = f(CPiv). Therefore, Qg - Qcmb = f(CPiv) => Qcmb = f(CPiv).

9. See equation 4.

10. This crucial issue is fully discussed in Chapter 7 under the heading: Ghana: Illegal Trade in Cocoa.

11. It was common for brokers to employ sub-brokers who lived in the villages of the farmers to buy cocoa for them. The brokers had their own depots or sheds where supplies were received and kept. Each shed bore the name of the expatriate firm which owned it (See Kotey and Gyekye, 1974, p. 4)

12. The average producer price of cocoa from 1920-1938 was 76% of the world market price of cocoa.

13. This average has been pushed up slightly by the low export prices of cocoa during the war years of 1940-44

which made the percentage of cocoa export price that went into duty very high.

14. This was the era of the Cocoa Marketing Board.
15. Cocoa exports from Ghana in 1937 was 240,000 tonnes as compared to 316,000 tonnes in the previous year.

16. See Table 3.5

17. Colony here implies French West Africa.

18. See Campbell, 1978, p.78.

19. See Elliot, 1974, p.252.

20. The German occupation of northern France in 1940 split France into two - the faction which was loyal to the Germans under the Prime Minister at the time, Marshal Henri-Philippe Petain and the side that opposed the German presence spearheaded by Charles de Gaulle. Petain and de Gaulle managed to rally support from the French colonies in Africa - the latter won French Equatorial Africa while French West Africa went to the former. In order that Petain and his supporters could be pressurised to join the Allies, Britain began a sea blockade of the French Colonies in West Africa. This led to the contraction of the world market.
21. See Weinstein, 1978, pp.177-179

22. See Table 3.6 which shows cocoa production in the Ivory Coast as well as cocoa producer prices.

23. See Campbell, 1978, p.69.

24. See Elliot, 1974, p.252.

25. See Appendix 3.2 for a description of the structure and operation of the GCMB.

26. See Bauer and Paish, 1952.

27. See Table 6.1 for the annual growth rates of cocoa output in Ghana, 1924 to 1983.

28. See Section 1.3.1. and Appendix 6.5.

29. See Table 3.7 above.

30. By 1968, the level of prices had increased by 15.7% over the 1967 level.

31. Nominal producer prices were deflated by Consumer Price Index to obtain real producer prices. See Appendix 3.4.

32. See World Bank (1983), p. 44.

33. See Table 3.7.

34. See Appendix 3.2 for a description of the structure and operation of the Stabilisation Fund.

35. See Bene-Hoane, 1981, pp. 154-155.

36. See Table 3.6.

37. See Table 3.9 Compare columns 4 and 5 with column8.

38. See again Table 3.9. Compare columns 4 and 5.

39. See figure 3.3 and columns 6 and 7 of Table 3.9.

40. All absolute values were converted to natural logarithms. See Appendix 3.3 for further details.

41. See Hecht, 1983, p.31.

42. See Ofori-Attah, 1985, pp.28-31.

43. See Appendix 3.5 for figures used in calculating the production cost.

44. See West Africa, 14/10/85, No. 3555, p.2171.

45. See Appendix 6.4 for a discussion of the age-structure of cocoa farms in Ghana and the Ivory Coast.

46. The observation was made during an interview of some cocoa farmers in the Ashanti Region in 1983 - See Ofori-Attah, 1985, p.96.

47. See Cocoa Services Division, 1983, p.1.

48. See also de Wilde, 1984, p.96 for relative profitability of cocoa as against that of coffee.

49. See Table 3.13.

50. See Table 3.14 for producer gross income per hectare.

51. The package in 1974 included the payment of subsidies on production inputs, the charging of low interest rate on planting credit, and the granting of a cash bonus of CFAF 60,000 per hectare to farmers who undertake to grow cocoa according to specified government standards (See de Wilde, 1984, p.96).

52. See Elliot, 1977, p.113.

53. The Coppock index has the advantage of correcting for strong trend influences which if uncorrected, can seriously exaggerate the degree of instability. See Coppock, 1962, pp.23-25 and 1966, pp.3-4, and also see Erb and Schiavo-Campo, 1969.

54. See Table 3.9.

55. See Pollard and Graham, 1985, pp.1070-1072.

56. See Intriligator, 1978, p.617.

57. See Love, 1987, p.7.

58. See Appendix 3.4 and also Tables 3.6, 3.7, and 3.10.

59. See Bauer and Paish, 1952, p.760.

60. See Section 1.3 above for a detailed discussion of cocoa's contribution to the Ghanaian economy.

61. See Ofori-Attah, 1985, p.98.

62. See Section 3.3.2 above for a discussion of the relative profitability of cocoa farming.

63. See World Bank, 1978, pp.81-82 and de Wilde, 1984, p.96.

64. By adjusting the scales, the farmer receives less for his sales. The clerk later reweighs the excess cocoa beans and pockets the proceeds.

65. See Beckman, 1976, chapter 5 for a thorough discussion of the activities of the middlemen in the internal marketing of cocoa in Ghana in the first half of the 1960s.

66. See Beckman, 1976, pp.127-133. The Archer Report of 1978 noted that more than C65 million were diverted by cocoa buying agencies to float private companies instead of making cocoa purchases and paid farmers instead with `chits' (See Diaw, 1986).

67. The `chit' system was the method where the GCMB issued an IOU form or a chit to the cocoa farmer, which was redeemable at a later date. This was essentially to enable the GCMB to buy time to replenish its coffers. But sometimes the payment was deliberately delayed for a long time by the purchasing clerks so that the money eventually received from the GCMB could be diverted for speculative ventures.

68. See GCB, January-December, 1982, Vol. 5. Nos. 1-4, p. 6.

69. See West Africa, No. 3586, 26 May, 1986, p. 1113.

70. See Hecht, R. M., 1983, p. 34.

71. See Bene-Hoane, pp. 157-159.

72. See also Fitch and Oppenheimer, 1966, pp. 42-47 for an exposition on how the GCMB surpluses were utilised.
73. See Beckman, 1976, pp. 119-120 and also p. 232.

74. For example, the Tema motorway, the Tema township, the O. A. U. Conference Centre and the Akosombo Hydroelectric scheme were projects which were constructed with cocoa farmers' money but because of their urban location, they hardly convey any direct benefits to the cocoa farmers.

75. See Kotey, R. A. et al., 1974, Chapter 6.

76. ibid, p. 46.

77. See de Wilde, 1985, p. 92.

78. See Hecht, 1983, p. 42.

79. Benefits to cocoa farmers include government subsidies on fungicides, insecticides and spraying machines for use against cocoa pathogens; expenditures on the maintenance of feeder roads in cocoa-growing areas; CMB Local Development grants; CMB loans to cocoa farmers and scholarships to their dependents and expenditures on cocoa research. See Dodoo, 1975, p. 92.
80. See de Wilde, 1984, p. 93.

81. See Dodoo, 1975, p. 96.

CHAPTER 4

SUPPLY OF FARM INPUTS

Introduction

Favourable producer prices no doubt, provide the inducement for farmers' interest in the cocoa industry to be sustained. However, for cocoa farmers' interests to be translated into proper care and expansion of farm-holdings, they need to be effectively backed by an adequate supply of farm inputs. This chapter examines how far the governments of Ghana and the Ivory Coast have made these supportive inputs available to cocoa farmers for the enhancement of cocoa output.

The immediate inputs required in the cocoa industry in both Ghana and the Ivory Coast are land, labour and matchets. Cocoa trees are prone to diseases and attacks from pests and so, for preventive and curative reasons, two other complementary inputs are essential in the industry - insecticides/pesticides and spraying machines. To maintain soil fertility capable of supporting the cocoa tree throughout its 40-year economic life, fertilisers are sometimes used by farmers, especially in the Ivory Coast.

Therefore, altogether six main inputs-land, labour, matchets, insecticides/pesticides, spraying machines and fertilisers, are employed in the cocoa industry [1]. The supply and distribution of these inputs in Ghana and the Ivory Coast are discussed in the following sections.

4.1 Land

In almost all the cocoa growing areas in Ghana, landownership is of two types - there are stool lands and those which are owned by individual families. Family members have access to family land at all times and part of it can be leased or sold to migrant farmers by the family head. The stool lands are cultivated by subjects and in return, they pay some kind of land tax or rent to the paramount chief. Part of the stool land can equally be leased to migrant farmers who in turn, pay land tax to the chiefs. The cost of land varies from place to place[2]. Nukunya observers that in 1972, an acre of land in some cocoa growing areas of the Volta Region for example, cost N¢1,000 (£332) on the average (Nukunya, 1972, p. 23) [3].

Land ownership in the Ivory Coast is similar to that of Ghana. There are plots owned by individual families as well as those which belong to the stool (Elliot, 1977, p. 59). Immigrants can purchase land in the forest zones from either land owners for commercial farming. Once a plot has been

bought by a stranger - farmer, he has the right to transfer it freely to a third party at a later date (Hecht, 1983, p.33). Hecht observes that these guarantees of security of tenure and unrestricted transfer have provided considerable incentives to immigrant farmers from other regions of the Ivory Coast and from neighbouring countries, to settle in the southern zone where cocoa and coffee can be grown (Hecht, 1983, p.33).

Cocoa is not grown all over Ghana and the Ivory Coast. The most suitable ecological zones for the crop are the tropical evergreen and semi-evergreen rainforest regions of the two countries. The optimum temperature in these areas ranges between 70 and 90 °F (21 and 32 °C); the seasonal and diurnal ranges are usually small. The cocoa tree requires a well distributed rainfall regime, ideally, between 50 and 75 inches per annum with no marked or intensive dry season. (Lass and Wood, 1985, pp.6-7). Excessive moisture encourages disease and causes a reduction in soil fertility through leaching while rainfall below 50 inches, prevents adequate flowering of cocoa trees (Boateng, 1966, p.66).

In Ghana these favourable weather conditions for cocoa cultivation previously existed in the southern part of the country, right from the east to the west excluding the thin coastal plains. However, overcropping and indiscriminate felling of trees by timber merchants in past years especially in the Ashanti Region, seem to be reducing the conventional rains hitherto characteristic of the cocoa

zone. The average annual rainfall in the Ashanti Region for the decade 1973 to 1982, for example, was 44.88 inches while in the decade immediately preceding 1973, the average annual rainfall was 62.02 inches [4].

A considerable proportion of the original cocoa belt has consequently been turned into poor secondary forest which can no longer support the growth of cocoa (Boateng, 1966, p.67). This is particularly true in the Ashanti Region. For example, in the Ashanti Region, 1,251.4 acres of replanted cocoa farms were abandoned by the Ashanti Cocoa Project (ACP) in 1980 because the affected areas were largely covered by secondary forest (Ofori-Attah, 1985, p.41). In fact, in 1977, a landuse survey conducted by the ACP, in the project area revealed that out of the 42,500 acres covered by the project, only 0.2% was covered with thick forest which had never been planted with cocoa before [5]. This shows the limited scope left for a spatial expansion of the cocoa industry in the Ashanti Region.

The contraction of the cocoa land has forced some farmers who still have interest in cocoa farming to migrate to Brong-Ahafo and Western Regions where a good deal of the evergreen rainforest remains to be exploited. The influx of such farmers in the two regions has resulted in a sharp increase in the cost of land for cocoa cultivation [6]. This situation has persuaded several prospective cocoa farmers to go in for the readily available and cheap marginal lands for the cultivation of food crops which after all, have the dual

advantages of early yields and high returns (Ofori-Attah, 1985, pp. 26-30).

Shortage of suitable land for cocoa cultivation has not yet become a problem in the Ivory Coast - there are still large tracks of land to be developed [7]. This is so, because apart from its late entry into the cocoa industry, the Ivory Coast also possesses a forest zone which is about one-third larger than that of Ghana and has about two-thirds of the population of Ghana (Udo, 1978, p. 178).

4.2 Labour

Labour occupies a prominent position among the major inputs required in the cocoa industry. The industry is highly labour-intensive especially at the early stages when the farmer has to regularly weed the undergrowth to provide good aeration to the young cocoa trees and to prevent them from having to compete with other plants for the limited food nutrients. So far, none of the production stages, such as land preparation, cultivation of cocoa seeds or seedlings, farm maintenance, harvesting and drying cocoa beans, has been mechanised; they all have to be done manually.

Prior to the Aliens' Compliance Order of November 15, 1969, labour was not one of the problems faced by the Ghanaian cocoa farmer. It was estimated that about 47% of the total permanent employees on cocoa farms before November 1969 were persons of foreign origin (Addo, 1972, p. 36). The aliens

were employed alongside migrant labour from the northern Ghana, and contract labour who were largely local residents. In addition, most cocoa farmers depended on the labour of relatives, wives' children and sometimes other distant relations within the extended family system.

The situation has changed quite considerably. There is the virtual absence of alien-employment in the cocoa growing areas today and with the Green Revolution [8] of the 1970s, all the workers who migrated from northern Ghana to work on the cocoa farms have gone back either to establish their own rice farms or to take up employment with local rice farmers. Cocoa farmers can no longer rely on their children either for assistance since it is compulsory in Ghana for children to be sent to school, and on leaving the elementary school, most of the young graduates migrate to the urban areas to seek salaried jobs.

The problem of the Ghanaian cocoa farmer in obtaining labour became compounded in the 1970s when the oil economy of Nigeria lured a large percentage of the rural youth into taking up employment in the bourgeoning secondary and tertiary sectors of Nigeria. Even though most of these young immigrants have been repatriated into Ghana as far back as 1983, the problem of labour still persists [9], because the young men are reluctant to offer their services to the cocoa farmers. Those who were able to acquire enough capital from Nigeria are doing commerce in the urban centres and those who have gone back to, settle in the rural areas prefer to

work on their own food-crop farms because the food crop farms provide them with more food and a higher income than they will otherwise obtain by selling their labour.

Although the difficulty of obtaining labour can directly be attributed to the low agricultural labour wage legislation of the government, coupled with the lack of amenities in the rural areas which has led to mass migration of the rural youth into the urban centres, efforts made so far by the government to assist cocoa farmers to obtain adequate supply of labour have been few and far between. In 1977 for example, the government introduced a scheme which enabled cocoa farmers to hire labourers from a labour pool of the Cocoa Division at a substantially subsidised rate. But the size of the labour force, 20 to each cocoa district was so inadequate that only few farmers could benefit from the arrangement.

The problem of labour-supply in the Ivory Coast would be more acute than that of Ghana were it not for the high rate of in-migration. At independence, the Ivory Coast government realised that the country's low labour force was certainly going to militate against the successful development of the vast economic potential of the country (World Bank, 1978, p.4). Luckily, just in the neighbouring northern Sahelian countries abound under-employed workers who were looking for job opportunities in the agricultural economies of the south. The Ivory Coast government has since the early 1960s taken full advantage of the situation and signed a

commercial' monetary and aid pacts with Burkina Faso and Mali which have led to a large flow of cheap unskilled migrants into the country to work on small-holder farms and plantations and in urban areas. Some of these migrant workers also come from Guinea. The common currency used by the Ivory Coast and the Sahelian countries [10] provides an added incentive to an increasing number of Sahelians to make Ivory Coast their economic asylum. In the late 1970s foreign workers constituted about 70% of the unskilled labour force in the coffee and cocoa plantations and about 50% of all urban workers. Hecht studied two villages in the Divo region in 1979/80 and found that 63 of the 64 wage-labourers surveyed on small-holder cocoa and coffee farms were non-Ivorians(Hecht, 1983, p.32).

Apart from opening its borders to foreign labour to work on cocoa and coffee farms, the Ivory Coast government also provides free land clearing services to farmers establishing new plantations through the SATMACI [11].

4.3 Other on-Farm Inputs

Other on-farm inputs required by the cocoa farmer are insecticides, spraying machines, matchets and fertilisers. The supply of insecticides and spraying machines to cocoa farmers by the government of Ghana has always fallen short of farmers' demand. In 1966, when the acreage of cocoa in the country was about 200,000 and there were about 80,000

farmers, the government supplied only 67 spraying machines and 27,346 gallons (124,314 litres) of Gammalin 20. To spray an acre of a cocoa farm, four times a year, a cocoa farmer requires 1.2 litres of gammalin 20. At this rate, the insecticide requirement in 1966 should have been 240,000 litres - this was greater than the supply made available to cocoa farmers by as much as 115,686 litres.

In other years also, figures for these inputs were not sufficient to meet farmers' requirements [12]. According to Nyanteng (1980, pp.41 and 53) supplies of insecticides satisfied only about a quarter of the possible demand by farmers for the decade 1968/69 to 1977/78 and as of 1977/78 cocoa year, the ratio of usable spraying machines to cocoa farmers stood at 1 to 5.

There are no statistics on the yearly supply of matchets to cocoa farmers. In general, it is difficult to obtain a matchet to buy at the official price. Because of the scarcity of matchets, the black-market price is sometimes about five times the official price. In general, Ghanaian cocoa farmers do not use fertilisers. Majority of the cocoa farmers interviewed by the author [13] claimed that fertiliser application to cocoa trees does not cause any significant change in yield and therefore found it uneconomic to use fertilisers on their cocoa farms. A few however, attributed the lack of fertiliser application to its sheer unavailability.

In the Ivory Coast, the supply and distribution of

insecticides, spraying machines, matchets and fertilisers are strictly conducted through private and public agencies. The bulk of these inputs are imported by private firms such as the Societe Tropicale d'Engrais et Produits Chimiques (STEPC) and the Societe Africaine de Fabrication, Formulation et Conditionnement (SOFACO). These firms have their warehouses in Abidjan where imported inputs are stored. The public agencies which are also called development companies (SODE) are responsible for the supply of these farm inputs to farmers. One of such companies is the SATMACI which is in charge of cocoa, coffee and rice. It is the responsibility of the development companies to purchase the inputs from the importing firms from Abidjan and to transport them to the rural areas for distribution to the farmers. Credit is granted to the farmers through the Banque Nationale de D'eveloppement Agricole (BNDA) for the purchase of theinputs.

In 1959, the SATMACI launched its first nation-wide programme to fight capsids on 250,000 hectares of cocoa plantation in the areas of Agnabikikrou, Bougomanou, Tounda and Adzope. In 1960, another programme was launched which was aimed at introducing farmers to the use of fertilisers to raise yields. Farmers were also assisted by the SATMACI to clear new plantations, to prune cocoa trees and to provide correct shade to the trees. The SATMACI equally gives loans and high yield varieties of cocoa pods to cocoa farmers to rehabilitate their old farms. In 1973 farmers

benefited from another form of loan consisting of a supply of hand operated knapsack sprayers. 50% of the value was required as a down-payment and the rest was to be settled in two instalments plus interest. Each cocoa farmer who cultivates high yield varieties of cocoa is provided with 1,500 polythene bags per hectare to be used in nursing the seeds before the seedlings are transplanted.

Lack of statistics on supply of specific inputs to cocoa farmers in the Ivory Coast limits any comparative analysis with the position of input supply in Ghana. However, we can obtain a general picture of the Ivorian situation from the following observation by Stier about the supply of fertiliser since the supply and distribution of other farm inputs like fertiliser, are organised by the same firms and agencies. Stier states that: [14]

> In general...fertiliser distribution functions very well to the extent that farmers comprised by the development programme get their fertilisers on time and that means of financing them over the production cycle are made available.

4.4 Agricultural Credit

The source of credit for the cocoa farmer could either be self-generated or borrowed. Only a few cocoa farmers in Ghana are able to finance their farm operations themselves. The majority of them obtain loans from either the government or a money-lender. The interest on loans contracted from the latter is always very high. The Ghana Commercial Bank (GCB)

in 1980, observed that money-lenders in the country charged exorbitant interest rate some times exceeding 100% per annum.[15]

It however, appears that government loans which have good repayment terms are denied cocoa farmers because only one out of every five cocoa farmers interviewed by the author in 1983 in the Ashanti Region had ever obtained a bank loan for agricultural purposes [16]. In fact, most of the farmers claimed it was extremely difficult to obtain loans from government sources.

Apart from the general difficulty encountered by cocoa farmers in obtaining credit, it seems the credit which is given to farmers by the government is usually inadequate and poorly distributed. It is only the few farmers who happen to live in towns with banks who manage, even then with difficulty, to receive loans. As at 1977, the Agricultural Development Bank gave farmers who borrowed for rehabilitation, credits up to ¢54.00 per acre over a period of two years for capsid and mistletoe control, and brushing of farms. Borrowers for cocoa replanting received credits of up to ¢172.00 per acre in four annual instalments for crop establishment and subsequent farm maintenance including brushing and capsid control (GCMB, 1977, p. 14). At the time, the average cost of labour per day including food for the labourer in the cocoa growing areas was ¢10.00 and at least, 10 man-days were required per year for brushing an acre of cocoa farm; a spraying machine cost ¢30.00 and a litre of Gammalin 20 sold at ¢2.00; about 1.2 litres needed to spray

an acre of cocoa farm four times a year. So in a year, the cocoa farmers incurred on average, a cost of ¢132.40 while they obtained a yearly loan of only ¢43.00 from the government.

The provision of credit to cocoa farmers in the Ivory Coast is effected through the BNDA via the SATMACI. The BNDA has been offering institutional credit to cocoa farmers since 1968. This credit is of three kinds: development loans, production loans and socio-economic loans. Farmers obtain credit mostly from the last two.

The production loans can be used to meet all current production and marketing expenditures including the purchase of inputs such as fertilisers, pesticides, labour and matchets. The socio-exonomic loans on the other hand, are meant to meet the farmer's current expenditures for the period preceding the harvest.

The maximum durations for the recovery of the production and socio-economic loans are respectively 2 years and 6months. While the former attracts an interest rate of between 5.25 and 9%, no interest is imputed on the latter, instead a commission fee of 10% [17] is charged (Stier, 1972, p.29). Since 1974, the Ivory Coast government has been giving a cash bonus of CFAF 60,000 per hectare to farmers who undertake to plant cocoa in accordance with specified standards (de Wilde, 1984, p.96).

4.5 Conclusion

The chapter has revealed that cocoa land in Ghana is nearing exhaustion. Fertility of soil in areas where the rainforest vegetation has been reduced to secondary forest will be improved if farmers are encouraged to use fertilisers. In the Ivory Coast a good proportion of the rainforest belt still remains to be exploited.

The analysis has also shown that the supply of supportive inputs to cocoa farmers in Ghana is inadequate. Excess demand for agricultural inputs by Ghanaian farmers has made prices of such inputs to be prohibitive. It is important for the Ghana government to see the provision of inputs as an investment since agricultural inputs supplied in the right quantity and at the right time, often increase crop yield. In the Ivory Coast, cocoa farmers are sufficiently able to meet their farm inputs' requirements from both government and private sources.

Footnotes to Chapter 4.

1. It is assumed that cocoa seedlings are obtained free of charge from either government or private sources.

2. See Nukunya, 1972, pp. 21-22.

3. In Chapter 9 we have estimated the economic rent of an acre of land in Ghana in 1982 to be ¢8,000. In the Ivory Coast, a hectare of land attracted a rent of CFAF 25,000.

4. See Ofori-Attah, 1985, p. 41.

5. See ACP (1977), Annual Report, 1975/76, p. 35.

6. A questionnaire administered on my behalf by Daniel Bosieh, a university graduate teacher at the Sefwi-Wiawso Training College, Ghana, revealed that the average cost of an acre of land in the Western Region in 1985 was ¢10,000.

7. See de Wilde, 1984, p. 91 and Elliot, 1977, pp. 56 and 65.

8. The term applies to the interest generated in the growth of cereals such as rice, millet and maize during the National Redemption Council (NRC) government. Services provided by the government to farmers included hybrid seeds, fertilisers and tractor hiring. The revolution was also called `Operation feed Yourself'.

9. See next chapter, section 5.1.2.2 for a report on a survey in the Ashanti Region which lists labour availability as one of the major problems of cocoa farmers interviewed.

10. The Ivory Coast and the Upper Volta (Burkina Faso) are members of a common monetary union, Union Monetaire Ouest- Africaine (UMOA) with a single currency, the CFA franc while Mali also belongs to the franc zone.

11. Starting from 1957, any farmer who set up a new cocoa farm and maintained it according to the standards laid down by the government benefited from a bonus of CFAF 7,000 per hectare in the year of planting and an additional CFAF 8,000 in the fourth year (Elliot, 1977, pp. 192-194).

12. See Appendix 4.1

13. See Chapter 5, Appendix 5.3, for results of questionnaire.

14. See Stier, 1972, p.53.

15. See GCB, July - December, 1980, pp.3-5.

16. See Appendix 5.4 in Chapter 5.

17. The pay-back period does not make the socio-economic loans cheaper than the others. This is probably why it is offered only to a special group of farmers (See Stier, p.29).

CHAPTER 5.

GOVERNMENT COCOA REHABILITATION PROJECTS.

Introduction.

Having examined the above government agricultural policies affecting the cocoa industry, there is still one important area which the government can rely on to put vitality into the cocoa industry. This is in the area of rehabilitation. The government's effort to rehabilitate the cocoa industry manifests itself in two ways - disease control and replanting of old cocoa farms. This chapter studies how the governments of Ghana and the Ivory Coast carry out cocoa rehabilitation. In the case of Ghana, one of the major cocoa rehabilitation projects, the Ashanti Cocoa Project, is evaluated while in the Ivory Coast, the work of SATMACI in the field of cocoa rehabilitation is studied.

5.1 Cocoa Rehabilitation in Ghana.

5.1.1 Control of Cocoa Diseases.

Efforts to control cocoa diseases started as far back as 1941 when the discovery of the swollen shoot disease was only a year old. The method that has ever since been used

to control swollen shoot has been the cutting and burning of diseased trees. The policy has often not found favour with cocoa farmers. The reason been that most cocoa farmers view the destruction of diseased cocoa trees as an attempt by the government to deprive them of their only source of livelihood. Occasions when the government has been compassionate enough to compensate farmers for their capital loss, the amount involved has often been so small that it fails to commensurate with the cost farmers incur in re-establishing and maintaining the destroyed trees. For example, in the 1970s, while the farmer spent on average, ¢4.00 for planting and tending a cocoa tree, [1] the government's compensation per tree stood at ¢0.25. [2]

Because the cutting out programme has most of the time, been opposed by cocoa farmers, [3] the success rate as of December 1981 was 57% (World Bank, 1983, p. 8). The spread of the disease has continued unabated and so far, it has caused a massive destruction of cocoa farms in the Eastern Region. In 1981, out of the 40,076 cocoa trees known to be affected by the disease, 34,714 trees were said to have been confined to the Eastern Region alone. [4]

Similar attempts have been made by the government to check the menace caused to cocoa trees by capsid [5] through the spraying of affected cocoa trees with pesticides. Pesticides and spraying machines are sold to farmers at subsidised prices for use in spraying cocoa farms. Occasionally, the government organises mass spraying of cocoa farms which bear

symptoms of pest-infestation. So far the supply of pesticides has been erratic and inadequate. [6]

5.1.2 Cocoa Replanting Programmes: A Case Study of the Ashanti Cocoa Project (ACP).

5.1.2.1 Background: The Eastern Region (Suhum) Cocoa Project.

Before the beginning of the two major cocoa rehabilitation projects, the government in 1969, carried out a replanting exercise which was limited to farms that had been affected by the swollen shoot disease. This programme, code-named "plant-as-you-cut", sought to replant farms treated of the swollen shoot disease with hybrid cocoa. Table 5.1 shows that for a period of eight years, 65,000 acres of cocoa farms were covered under the scheme.

The first major cocoa rehabilitation project was launched in 1970 in the devastated area around Suhum in the Eastern Region. The Project was meant to replant 36,000 acres of landwith high yielding varieties and to rehabilitate 51,000 acres of standing cocoa. [7]

Table 5.2 shows the achievement of the Suhum Cocoa Project at the end of the implementation year: 68% and 48% respectively of the planned replanting and rehabilitation targets had been achieved.

TABLE 5.1: ACREAGE COVERED UNDER THE "PLANT-AS-YOU-CUT" PROGRAMME (1969-77)

YEAR	ACREAGE
1969/70	6,000
1970/71	6,000
1971/72	6,000
1972/73	6,000
1974/75	10,000
1975/76	10,000
1976/77	15,000
TOTAL	65,000

SOURCE: GCMB, 1977, p. 12.

TABLE 5.2: ACREAGE OF COCOA FARMS REPLANTED AND REHABILITATED UNDER THE SUHUM COCOA PROJECT.

YEAR	ACREAGE REPLANTED	ACREAGE REHABILITATED
1971/72	3,959.6	309.1
1972/73	5,289.5	8,118.7
1973/74	5,106.5	6,268.6
1974/75	6,256.0	6,390.3
1975/76	3,773.6	3,517.3
TOTAL	24,385.2	24,604.0

SOURCE: GCMB, 1977, p. 16.

In the World Bank appraisal of the Ashanti Cocoa Project, the Suhum Project was described as having performed poorly.[8]

The factors cited by both the World Bank and the Institute of Statistical, Social and Economic Research (ISSER) as been responsible for the failure of the Project to achieve the targeted replanting and rehabilitation acreages include: [9]

(a)planting of cocoa on poor soils;

(b)poor farmer-participation;

(c)unwillingness of technical staff to relinquish

old husbandry practices;

(d)inadequate supply of sprayers and insecticides;

and

(e)scarcity of labour.

5.1.2.2 The Ashanti Cocoa Project (ACP)

The ACP which began in 1975 was initially designed to replant 30,000 acres of farmland with high yielding cocoa varieties in a three-year period. The availability of an additional loan from the Arab Bank for Economic Development in Africa (BADEA), made it possible for the target to be raised to 42,500 acres with the implementation year extended to 1981. [10]

At the end of the implementation year, the Director of the ACP in his Project Completion Report, [11] concluded that the Project had been successful in:

(a) replanting of farm-land with hybrid cocoa - he noted that by June 1981, 91% of the target of 42,500 acres had been achieved. [12]

(b) educating farmers and training personnel engaged in the cocoa rehabilitation programme - about 7,500 farmers and 1,025 technical and managerial staff were said to have been either educated or trained in cocoa husbandry practices and management; [13] and

(c) implementing a comprehensive sector study.

The manager added that the ACP failed in the areas of active farmer participation; feeder road maintenance and project evaluation. [14]

In 1983, we surveyed the ACP zone and interviewed a number of the participating farmers and project officials on several important issues related to the Project. [15] We assess the performance of the Project in the light of the views expressed by farmers and project officials interviewed during the survey.

Discussion of Questionnaire Results. [16]

Choice of Land and Yield of Project-aided Farms.

Some farmers claimed that their farms established in the 1975/76 cocoa season had not been bearing satisfactorily. It was observed that as of 1982, of the 99% farms aged five or more years old, 31% had not started bearing at all and another 21% yielded, on average, less than a load. [17] 39.4% yielded between 1 and 10 loads. Statistics obtained from the 1982 Annual Report of the ACP lent support to our field observation - these are presented in Table 5.3.

The late bearing of trees was found to be partly due to unsuitability of some of the plots selected for cocoa cultivation. Although the Soil Research Institute (SRI) carried out a thorough research of the soils in the Project area before the implementation of the Project, [18] the Project officials in their eagerness to comply with the

planting targets suggested in the pre-project appraisal report by the World Bank, somehow ignored the recommendations of the SRI and accepted all

TABLE 5.3: EXPECTED AND ACTUAL OUTPUTS OF COCOA FROM ACP FARMS (Tonnes).

PROJECT YEAR	FORECAST	ACTUAL	% OF FORECAST
3	-	4.9	-
4	257.7	33.7	13
5	1,417.0	121.4	9
6	3,993.3	332.5	8

SOURCE: ACP, 1982, p. 48.

sorts of land offers. It is not strange therefore, that 1,251.4 acres of the project-aided farms have since been abandoned. [19] The same mistake was incidentally made during the implementation of the Suhum Cocoa Project. It therefore comes as a surprise that no concrete efforts were made to avert a recurrence of such a mistake in the second project. Officials of future rehabilitation projects should ensure that plots accepted for cocoa cultivation have been ascertained to be suitable by soil experts; this will minimise wastage of public funds.

Where the problem was not caused by soil infertility, we ascribed the poor yield of cocoa farms to inadequate attention paid to farms particularly, by the farm-owners. This question is fully discussed in the next section.

Farmer Participation.

The staff of the ACP claimed that most of the project farmers did not show much interest in the programme and some had even threatened to cut out the cocoa trees so that they could use the land for the cultivation of food crops which promised them higher returns.

It was reported in the Project Completion Report that during the implementation, it was noted that 10% of the farmer-participants were not often living at the addresses given during their registration. [20] Such farmers were either engaged in commercial activities in the cities or farming in other regions. Most of the remaining 90% did virtually nothing on their project-aided farms. It is on record that in any one particular year, the active participation in the maintenance of replanted farms never exceeded 6% (ACP, 1982, p.p. 21-22). The ACP attributed the poor farmer-participation largely to the unattractive producer price of cocoa.

The interview with cocoa farmers appeared to negate this view of the ACP staff. About 70% of the farmers interviewed claimed that they participated actively in both the establishment and the maintenance of their farms.

We believe the contrary view obtained from the farmers could be traced to the farm-maintenance sheets from which the interviewees were selected. These sheets bore mainly, the names of active farmer participants. But from the

results of the questionnaire, two reasons could be deduced to explain the situation as seen by the project officials.

Over half of the farmers interviewed were above 55 years old. However, cocoa farming is so enervating that at that age, such farmers were not likely to fully participate in the maintenance of their farms either in the short-run when they were working in conjunction with the project workers or in the long-run, when farms would be handed over to them. The active cocoa farmers aged between 26 and 45 years constituted only 27%.

Besides, 78% of the farmers had established their own cocoa farms in addition to the project-aided farms. The implication of this could be that more attention would be paid to the farmer-established farms to the neglect of the project-aided farms.

Level of Formal Education of Farmers.

Almost seven out of every ten farmers interviewed were illiterates. Only 5% of them had received post-elementary school education.

Since cocoa farming requires mostly unskilled labour, this high illiteracy rate might not pose any serious problem to the yield of cocoa farms. Farmers do not need any rigorous education before they can establish and maintain their cocoa farms. It is these illiterate farmers who have for several decades, produced the bulk of Ghana's cocoa output.

The fact however, remains that formal education can equip cocoa farmers to learn on their own, a lot about good agricultural practices from literally sources.

Illiterate cocoa farmers could be helped through a programme of regular orientation courses on farm husbandry.

Orientation Course for Farmers.

Out of every five farmers interviewed, four had at least attended one of the orientation courses organised by the ACP for its farmers. This fact agreed with the information obtained from the ACP. [21] The ACP knowing the importance of orientation courses in the dissemination of modern farmpractices, had drawn a programme of educational meetings for farmer-participants.

Prior to the start of the Project, the government had through the Cocoa Services Division, been running a hostel type oftraining for cocoa farmers. These training programmes were less effective because they were only held at a central place and lasted for one or two weeks and therefore, most cocoa farmers found it inconvenient to leave behind their farms, household and other economic activities to attend courses of that nature. At best, they sent their children or nephews to stand in forthem (ACP, 1982, p. 38).

To avoid these drawbacks associated with the hostel type of farmer training, the ACP took their educational meetings to the villages of the farmers. The meetings lasted for only a

day and so did not interfere very much with the normal duties of the farmers. The training was also geared directly to the target group itself and not their relatives. Topics discussed at such meetings included improved husbandry practices, the use of T50 for shade reduction, the effective spraying of cocoa farms and education on project policies. [22]

Table 5.4 provides figures on the number of meetings held and the corresponding average farmer attendances. In all, about 7,500 farmers benefited from these courses during the Project implementation period (ACP, 1982, p. 39).

Crop Preference.

When farmers were asked to indicate their preference for either cash or food crop farming, 47% of them preferred to grow food crops while 40% wanted to set up

TABLE 5.4 EDUCATIONAL MEETINGS HELD WITH FARMERS

PROJECT YEAR	NUMBER OF MEETINGS	AVERAGE ATTENDANCE OF COCOA FARMERS PER MEETING
1975/76	55	27
1976/77	240	12
1977/78	241	23
1978/79	132	15
1979/80	200	17
1980/81	190	20

SOURCE: ACP, (1982), p. 38.

oil-palm plantations. Only 13% wanted to remain in the cocoa industry.

Farmers possibly considered the relative prices of food crops vis-a-vis the traditional cash crops such as cocoa and coffee. The prices of the former were more attractive, hence the farmers chose to produce them rather than cocoa.

Supply of Inputs.

Every farmer had, at least, one cutlass and most of them had used insecticides. 64% of them had their own spraying machines. Most of the farmers said they bought their cutlasses outside government sources and therefore, prices were quite exorbitant. Even though, there was no clear evidence of a possible diversion of inputs supplied through the ACP, some farmers called for an equitable distribution of inputs by the ACP. This complaint stemmed from the criterion used by the ACP in the distribution of farm inputs which favoured active farmer participants.

On the question of labour, it was observed that labour was in short supply in all the zones; consequently, the cost of labour was very high. The youth in the rural areas preferred to work on their own food-crop farms rather than offering their services to the cocoa farmers. Food-crop farms served the dual purpose of providing them with more food and higher income than they would otherwise have obtained.

The average labour cost per day was found to be ¢66.00 and this excluded cost in kind. At the time, the legal minimum

wage in the country was C12.00 per man-day. In view of the high cost of labour, farmers who could afford to hire labour chose to utilise such labour on their own farms, especially on their food-crop farms.

Labour-supply problem however, did not appear to affect most of the Project-aided farms because the ACP had its own labourers who worked regularly on the farms. Farmers perhaps were referring to the availability of labour for work on their private farms.

Visit to Farms by Project Officials.

Cocoa Project Officials were expected to visit the project-aided farms from time to time to acquaint themselves with progress of work and to offer on-the-job farm husbandry training to farmers. From the interview results, there appeared to be conflicting statements between farmers and the field assistants regarding farm visits. 46% of the farmers said that no field assistants had visited their farms even though, the latter maintained that they did pay regular visits to the farms.

There seemed to be some element of truth in the claim of the project officials because in the first place, most of the farmers did not find the need to regularly visit their farms since they had the wrong impression that the government had established the Project to replant and maintain their cocoa farms for them (ACP, 1982, p. 23).

Secondly, it was an obligation for the field assistants to take their workers to the farms every day to work on them. Indeed, during our visits to the villages, we found the field assistants doing these routine visits to the farms with their labourers. The field assistants apart from the reports they sent to their superior officers, were also checked occasionally, by farm inspection officers.

Credit Facilities.

Most of the farmers questioned did not see the need for a loan. This might be due to the arrangement whereby costs incurred in planting and maintaining cocoa farms up to the bearing stage by the ACP was refunded by the farmer through the Produce Buying Division (PBD) of the Ghana Cocoa Marketing Board (GCMB) when farms started yielding. It appeared some farmers did not understand the standing arrangement since most of them never referred to the agreement with the ACP as a loan.

Lack of interest in bank loans could be ascribed to the apparent absence of adequate collateral on the part of the farmers.

Construction and Maintenance of Feeder Roads.

Contrary to the view of Project officials that the ACP had as at October 1981, maintained 140km of feeder roads through

the Ghana Highway Authority (GHA) [ACP, 1982, p. 40], the results of the questionnaire to farmers revealed that the ACP had neither embarked upon any road construction nor maintained any feeder road in any of the zones covered by the Project.

Investigation showed that owing to lack of technical staff, the ACP had actually loaned its road construction equipment to the GHA for use on roads in the project area. This could be the explanation for the ignorance of some farms about the ACP's involvement in road construction and maintenance. But the fact still stood that much had not been done in this area during theseven years of the ACP's existence. [23]

Cocoa Diseases

Farmers said their farms suffered from capsid attacks. Blackpod and swollen shoot were also prevalent. If intensive efforts were not made to combat these diseases, they would sooner or later, cause massive destruction to a large proportion of the project-aided farms.

5.1.3 Summary.

In the light of the actual conditions of the project-aided farms as we saw them, [24] coupled with the evidence of participating farmers, much still remains to be done to make the viability of the ACP a reality. Otherwise, the

project's ability, in terms of technological spillovers, to revitalise the Ghanaian cocoa industry will remain an illusion.

5.2 Cocoa Rehabilitation in the Ivory Coast.

5.2.1 Government Policies to Promote and Direct the Cocoa Industry Through SATMACI.

Unlike Ghana, where cocoa rehabilitation work is carried out by several unco-ordinated bodies, [25] in the Ivory Coast, all cocoa rehabilitation programmes are designated to one parastatal organisation, the Societe d'Assistance Technique pour la Modernisation de l'Agriculture en Cote d'Ivoire (SATMACI). The rehabilitation work of SATMACI comprises the direct undertaking of anti-capsid treatments of cocoa trees, the regeneration of traditional cocoa farms and the development of new farm lands with high yielding cocoa varieties.

SATMACI carried out its first nation-wide anti-capsid campaign in 1959. By 1965, 273,734 hectares of cocoa farms had been treated of capsid infestation under the scheme. [26] Other services offered under the exercise were farm clearing, introduction of shade trees, pruning of cocoa trees and the supply of fertilisers.

TABLE 5.5: ANTI-CAPSID CAMPAIGN: AREA TREATED BY SATMACI.

YEAR	TREATED AREA (HECTARES)	CUMULATIVE TOTAL (HECTARES)
1959	24,373.0	24,373.0
1960	60,871.0	85,244.0
1961	57,913.0	143,157.0
1962	50,405.0	193,562.0
1963	37,104.5	203,666.5
1964	33,220.0	263,886.5
1965	9,847.5	273,734.0

SOURCE: Elliot, 1977, p. 208.

The success of the SATMACI anti-capsid campaign in raising yield of treated farms by nearly 36% [27] and the little interest shown by cocoa farmers in the campaign, [28] made the government to promulgate a law in 1964 making the spraying of cocoa farms by individual farmers compulsory. [29] Cocoa farmers benefited from government subsidies on insecticides and spraying equipment. They also received training on crop management from the agricultural assistants of SATMACI.

The second phase of SATMACI's rehabilitation programme which resumed in 1963, consisted of the regeneration of traditional cocoa plantations. Under this programme, cocoa farms which are planted with traditional cocoa trees and have become prematurely senile due to a combination of factors such as poor maintenance and inefficient disease-control measures, are renovated through proper care and insecticide treatments. [30]

The main cost of the programme is borne by the farmer and the government. Inputs such as matchets, insecticides,

sprayers, fertilisers and selected cocoa pods and seedlings are procured by the individual farmer through the SATMACI at subsidised prices. Elliot asserts that it is clearly in the farmer's interest to undertake the regeneration of his plantation since the marginal benefit-cost ratio is greater than unity; this means that the farmer gets more back than he puts in. [31]

From 1963 to 1973, SATMACI succeeded in treating 232,000 out of the 420,000 hectares of cocoa plantations in production in the Ivory Coast. [32]

The third part of SATMACI's work involves the introduction and planting of selected plant material. These selected cocoa varieties are swollen shoot resistant and mature early. By the end of 1979, new plantations covering an area of 59,089 hectares had been completed. [33] Over 160,000 hectares of new land were expected to be planted with hybrid cocoa in the early 1980s. [34]

5.3 Conclusion.

Efforts have been made by the Ghana government to control cocoa diseases and to rehabilitate cocoa farms which have been made less productive either by old age or disease or both. However, these efforts have been sporadic and therefore ineffective. Cocoa diseases and pest-infestation are widespread in all the cocoa growing areas of Ghana. Projects launched to replant old and diseased cocoa farms,

in particular the Suhum and the Ashanti cocoa projects, have not been very successful because of a host of reasons including the planting of cocoa onpoor soils, poor farmer participation and inadequate supply of farm inputs.

The disease control programme of the SATMACI has achieved an appreciable success since the yield of treated farms has gone up by 36%. In sum, the sharp increase in cocoa output in the Ivory Coast from 231,000 tonnes in 1977 to 457,000 tonnes in 1982, is a clear manifestation of a virile industry which enjoys the active support of both government and enthusiastic farmers.

Footnotes to Chapter 5.

1. See Ofori-Attah, 1985, p. 48.

2. See GCMB, 1977, p. 11.

3. There have been times when cocoa farmers have chased away officers engaged in the exercise with guns and matchets (GCMB, 1977, p. 11).

4. See World Bank, 1983, p. 8.

5. Capsids are the main cocoa pests in Ghana.

6. See Appendix 4.1

7. See Ghana: 5-Year Development Plan, 1975/76 - 1979/80, p. 47.

8. See World Bank (1975), p. 10.

9. See World Bank (1975), pp. 10-11.

10. See ACP, (1982), p. 13.

11. See ACP, (1982), p.p. 76-80.

12. See ACP, (1982), p. 77.

13. See ACP, (1982), p. 77.

14. See ACP, (1982), p. 77-80.

15. See Appendix 5.1 for a sample of the questionnaire administered to cocoa farmers.

16. See Appendix 5.2 for the results of the questionnaire.

17. A load of cocoa weighs 66lb (30kg) and the size of a farm averages 2.0 acres.

18. See World Bank (1975), p. 14.

19. See ACP, 1980/81 Annual Report, p. 13.

20. See ACP, 1982, p. 21.

21. See ACP, 1982, p. 38-39.

22. See ACP, 1982, p. 38.

23. See ACP, 1982, p. 78.

24. See response number 21 of farmer questionnaire in Appendix 5.2.

25. In the 1970s there were the two World Bank Cocoa rehabilitation projects which operated concurrently with the GCMB cocoa plantations and the Cocoa Production Division's replanting programme. These rehabilitation projects had the same ultimate goals and operated in almost the same areas but each of them followed a distinct modus operandi. During the evaluation of the World Bank Suhum Cocoa Project, ISSER attributed the poor performance of the project largely to the lack of co-ordination between the World bank project and the Cocoa Production Division replanting programme in the Suhum district.

26. See Table 5.5 for area covered yearly by SATMACI.

27. See Elliot, 1974, p. 106.

28. The demonstration effect of the campaign on cocoa farms was not very much because farmers realised that the bulk of the increased income due to spraying the farms went to the government in the form of low cocoa producer price (See Elliot, 1977, p. 212). This explains why the government had to legislate to get cocoa farmers spray their farms. 29. See Elliot, 1974, p. p. 107-8.

30. Ibid. p. 116.

31. Ibid. p. 119.

32. See Bene-Hoane, 1981, chapter 3.

33. See de Wilde, 1984, p. 94.

34. See Bene-Hoane, 1981, Chapter 3.

PART III

EFFECT OF GOVERNMENT POLICIES ON THE COCOA INDUSTRY.

CHAPTER 6.

CHANGE IN COCOA OUTPUT AND LAND COVERAGE.

Introduction.

The response of cocoa farmers in Ghana and the Ivory Coast to the government policies outlined in the preceding chapters could either be positive, indifferent or negative.

A positive response manifests itself in proper care and expansion of cocoa farms by farmers. An indifferent response registers no change in farmers' attitude towards investment in cocoa. On the other hand, a negative reaction leads to a diversion of resources by farmers, to other ventures which are deemed to be more productive than cocoa farming; at the same time, it persuades some farmers who decide to remain in the industry to look for alternative markets where, they believe they will obtain higher remuneration for their produce.

The conclusions drawn with respect to the various policies analysed on the two countries generally, carry the impression that government policies in Ghana relating to the cocoa industry in the past years have by and large, had a debilitating effect on the growth of the cocoa industry while in the Ivory Coast, government policies on the whole, have encouraged the rapid expansion of the cocoa industry.

In this chapter and the next, the impact of the government policies that have been discussed above is examined through a study of the quantitative and spatial changes in cocoa production in the two countries from as early as the 1920s to the early 1980s. We also investigate the search for an alternative market by Ghanaian cocoa farmers - the phenomenon of cocoa smuggling.

6.1 Historical Trends in Cocoa Output: Ghana and the Ivory Coast. [2]

For the purpose of comparing the historical trends of cocoa output in Ghana and the Ivory Coast, we used the 5-period centred moving average to smooth cocoa production figures of both countries from 1922 to 1985. [3] We then computed for each country a decade-by-decade growth ratein cocoa output as shown in Table 6.1.

TABLE 6.1: GHANA AND THE IVORY COAST: PERIODIC GROWTH RATES OF COCOA PRODUCTION.

PERIOD	ANNUAL GROWTH RATE (%)	
	GHANA	IVORY COAST
1924-1933	1.74	19.70
1934-1943	-1.70	-4.34
1944-1953	1.38	13.29
1954-1963	8.23	4.57
1964-1973	-1.07	6.95
1974-1983	-7.41	10.93

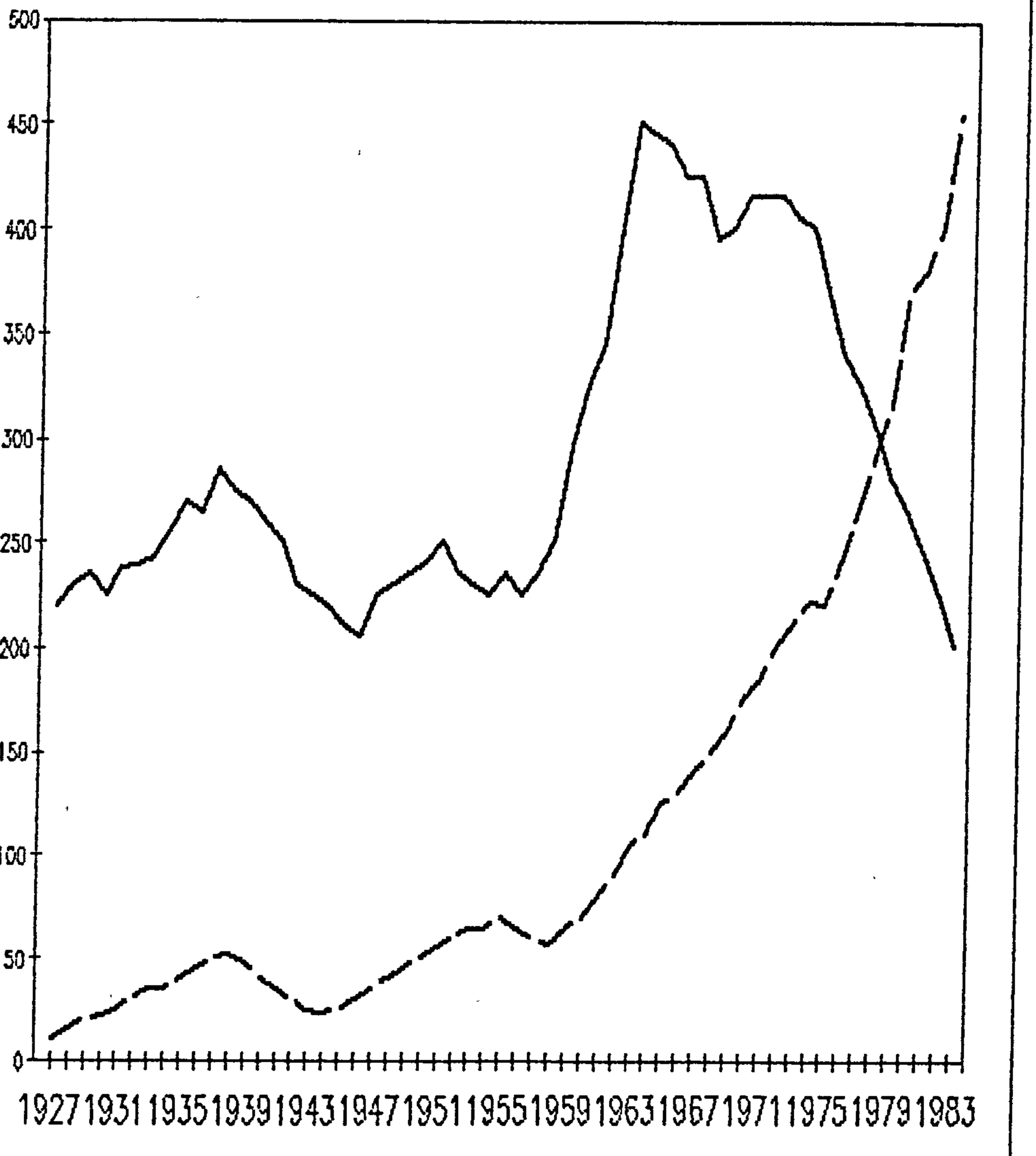
The moving average output series have been graphed in Fig. 6.1. It would be appreciated from the figure that the experience of cocoa production in Ghana for the past six decades has been a chequered one, exhibiting three major amplitudes in the production trend. These output cycles which describe cocoa farmers' response to changing cocoa producer prices, [4] occurred between the periods 1927 and 1946, 1946 and 1954, and 1954 and 1983. The latter is noted first of all for its precipitous slope between 1955 and 1963 which indicates a period of fast growth in cocoa output reaching a peak which has not been equalled since. Secondly, it possesses an elongated dip slope which has already fallen below the level of cocoa output attained in the second half of the 1920s, thus revealing quite clearly the gloomy position of the Ghana cocoa industry.

It is evident from this graph that cocoa output in Ghana began to decline even as far back as 1963. The fall only became pronounced in 1974, [5] when output fell steeply from around 400,000 tonnes to under 200,000 tonnes in 1983.

On the other hand, cocoa output in the Ivory Coast has exhibited an upward trend right from 1927 to 1983 except for the years 1938-1943 when there was a slight fall in output. Thus the difference between the two trends is that, while that of Ghana has since 1963, been tracing a downward path, that of the Ivory Coast has been moving in the opposite direction even for a longer period.

Figure 6.1

GHANA AND THE IVORY COAST:
THE TREND OF COCOA PRODUCTION 1925–1985
(5–YEAR MOVING AVERAGE)



SOLID LINE – GHANA

BROKEN LINE – IVORY COAST

The cocoa production growth rates presented in Table 6.1 provide an additional representation of the performance of the cocoa industry in Ghana and the Ivory Coast. There was a positive growth of 1.74% per year in the Ghana cocoa industry between 1924 and 1933. In the same period, the Ivory Coast cocoa industry recorded as high as 19.7% annual growth rate in cocoa output. Both countries witnessed a negative growth in cocoa production during the decade that spanned the second World War, however, the fall was greater in the Ivory Coast. During the next two decade, there were recoveries in cocoa output in the two countries. In Ghana, the growth rate of cocoa output increased from 1.38% per year between 1944 and 1953 to 8.23% for the decade 1954-1963. The corresponding figures in the Ivory Coast were 13.29% and 4.57% respectively. After 1963, the annual growth rate in Ghana assumed a negative value and in fact, in the decade 1974-1983, the negative annual growth rate of cocoa output was about seven times that of the rate in the previous decade. Contrary, the Ivory Coast cocoa industry has seen its yearly output growth rate increasing from 4.57% between 1954 and 1963 to 10.93% between 1974 and 1983.

6.2 Spatial Change in Cocoa Production

6.2.1 Ghana.

Periodic data on land acreage under cocoa in Ghana are extremely difficult to obtain. Table 6.2 carried two sets of estimates prepared by the Ministry of Agriculture for March 1964 and the decade 1970-1980. Even though, these figures show that there has been an expansion in the total area of land devoted to cocoa, the two series are so distant that we do not get an accurate trend of the spatial development of the Ghanaian cocoa industry.

TABLE 6.2 LAND ACREAGES UNDER COCOA IN GHANA.

REGION	MARCH 1964	1970-1980
Ashanti	1,580,635	1,366,854
Brong-Ahafo	1,003,992	964,428
Eastern	549,201	886,373
Central	424,333	551,420
Western	317,653	828,985
Volta	348,463	318,132
TOTAL	4,224,277	4,916,192

SOURCES:, March 1964: Killick, 1966, p. 237.
1970-1980: World Bank, 1983, p. 34.

This problem is partially resolved by using Bateman's proxy for cocoa acreage, tree stock, [7] to estimate the rate of growth of the land-acreage of the cocoa industry. The time scale used by Bateman has been extended by the World Bank up to 1981.

From the tree stock statistics in Appendix 6.3, we calculated the growth rates of the spatial expansion of the Ghanaian cocoa industry for the periods 1960-70 and 1971-1981 and obtained respectively, 16.5% and -0.5%; this shows a 106 percent decline in cocoa land acreage over the period.

Bateman in fact, concluded from his econometric analysis of cocoa supply in Ghana that from 1964 to 1971, the producer price of cocoa in any particular year, was eitherless than or equal to planting costs. [9] This meant that the coefficient of farmers' planting effort in the period was zero. [10] Bateman's conclusion is propped up by the statistics provided by Manu [11] in Table 6.3 below. Apart from 1966, the figures on new plantings between 1962 and 1970 correlated positively with the producer prices ofcocoa.

These observations by Bateman and Manu are further

TABLE 6.3: ACREAGE OF NEW COCOA PLANTINGS IN GHANA (1962-1970).

YEAR	COCOA PRODUCER PRICE*	ACREAGE
1962	£110	10,200
1963	£108	13,600
1964	£ 99	1,300
1965	£ 91	500
1966	£ 76	600
1967	£ 85	600
1968	£101	800
1969	£114	4,900
1970	£120	6,800

SOURCE: Manu, 1974, p. 272.
* Producer price of cocoa per tonne.

TABLE 6.4: GROWTH RATES OF THE PRICE INDICES OF MAJOR CROPS IN GHANA.

CROP	GROWTH RATE (1903-1980)
Plantain	24.25%
Palm Oil	21.78%
Cassava	21.78%
Cocoyam	21.72%
Cocoa	18.11%

SOURCE: Calculated from Table 3.12, Chapter 3.

supported by Table 6.4 which shows the growth rates of the price indices of cocoa and the major competing crops grown in the cocoa areas of Ghana. In the period 1963-1980, cocoa price index registered the lowest growth rate among the selected crops. With the existing wide gap between the producer price of cocoa and the prices of competitive crops, it is not surprising that in the 1970s several cocoa farmers, especially in the Ashanti, Brong-Ahafo and Volta regions, where a good deal of the land is less suitable for cocoa farming, neglected their farms and concentrated on food crop farming.

The negative growth of cocoa land coverage for the period 1971-1981, against the background of the low relative profitability of cocoa, [12] suggests that land under cocoa in Ghana as of the early 1980s was much less than the figure given by the 1970-1980 survey.

6.2.2 The Ivory Coast.

The Ivory Coast government has ever since independence, committed itself to agricultural development and in the cocoa industry, concrete efforts have been made by the government to whet up farmers' interest in the cultivation of cocoa. Favourable producer prices, good land tenure system and the warm welcome accorded labour migrants from Mali, Guinea and the Burkina Faso are some of the government policies that have combined to speed up the growth of the cocoa industry.

The real producer prices of cocoa for example, rose from CFAF51.5 per kilogram in 1965/66 to a peak of CFAF82.5 per kilogram in 1975/76 and remained at a remunerative level thereafter despite a decline to CFAF72.0 and 69.2/kg respectively in 1978/79 and 1980/81 (de Wilde, 1984, p.96). Thus the guaranteed prices offered to cocoa farmers gave them ample incentive to commit new lands into cocoa cultivation.

As column two of Table 6.5 shows, except for a single decrease in 1974/75, land under cocoa cultivation in the Ivory Coast has increased continuously from 372,800 hectares in 1961 to 1,163,000 hectares in 1981 - a threefold increase![13] Column four indicates a year-by-year hectarage of new plantings. From 1961 to 1965, each year witnessed an increase in new plantings. There was a small fall in 1966 but from 1966, there was a steady expansion in new plantings

for the next nine years and in fact, in 1974, the area of newly planted cocoa was more than doubled. There was a fall in the next two years and this was followed by a 4-year period of expansion, terminating in 1980. Of course, if in 1981 the government had not made practical efforts to slow down the rate at which the industry was growing spatially, the fall of 24,000 hectares in new plantings would not have occurred in 1981.

TABLE 6.5: DEVELOPMENT OF COCOA AREA IN THE IVORY COAST ('000 hectares).

YEAR	TOTAL PLANTED AREA	AREA HARVESTED	NEW PLANTINGS
1960/61	372.8	261.2	111.6
1961/62	388.0	267.7	120.3
1962/63	401.1	277.2	123.9
1963/64	416.8	291.8	125.0
1964/65	434.3	307.8	126.6
1965/66	452.8	327.3	125.5
1966/67	429.9	342.8	130.1
1967/68	493.7	358.0	135.7
1968/69	516.8	371.1	145.7
1969/70	539.2	386.8	152.4
1970/71	562.3	404.3	158.0
1971/72	586.3	422.8	163.5
1972/73	611.0	440.5	170.5
1973/74	898.5	497.0	401.5
1974/75	815.0	471.0	344.0
1975/76	840.0	498.0	342.0
1976/77	863.0	526.0	337.0
1977/78	896.5	557.0	339.5
1978/79	946.5	586.0	360.5
1979/80	1,076.0	610.0	486.0
1980/81	1,163.0	721.0	442.0

SOURCE: de Wilde, 1984, p.94

The expansion was further aided by the differential in producer prices between cocoa and coffee. [14] There is a strong competition between these two crops for land and labour. It comes out of Table 6.6 that a greater proportion

of these two resources has since 1969, been devoted to coffee cultivation. [15] But because both crops contribute equally well to the government's foreign earnings, the government in 1974, felt there was the need for an equitable distribution of resources between the two crops. Therefore, to sway farmers' interest towards the cultivation of cocoa, the producer prices of cocoa from 1974 to 1976 were made more attractive than those of coffee. [16]

In general, it could be said that cocoa producer prices in the 1970s were relatively more attractive than those of coffee. For example, while the average producer price for coffee in the four-year period, 1977-1980 was 4.2% below that in 1970-1973, the average cocoa producer price in 1977-1980 was 17.1% higher than in the earlier period. In 1975 and 1976, cocoa producer prices were raised for the first time above those of coffee, and beginning in 1977, identical prices were fixed for cocoa and coffee although the production of coffee requires more labour (de Wilde, 1984, p. 96).

Thus considering the comparative yields and prices of cocoa and coffee, the cultivation of the former appeared more appealing to farmers. Farmers who opted for cocoa farming received additional incentives from the government in terms of input subsidies, low interest rate on planting credit and the granting of a cash bonus of CFAF60,000 per hectare to any farmer who undertook to plant cocoa in accordance with specified standards (de Wilde, 1984, p.96). This extra

inducement further encouraged farmers to expand their farm holdings from the mid-1970s. For example, while in the decade 1961-1970, new plantings of cocoa grew at the rate of 2.96% per year, in the ensuing decade, 1971-1980, there was a 11.01% annual growth rate in new plantings. [7]

TABLE 6.6 TOTAL PLANTED AREA OF COCOA AND COFFEE ('000 hectares).

YEAR	COCOA	COFFEE
1969	516.8	736
1970	539.2	868
1971	562.3	887
1972	586.3	910
1974	898.5	1,060
1975	815.0	1,176
1976	840.0	1,214
1977	863.0	1,254
1978	896.5	1,292
1979	946.5	1,362
1980	1,076.0	1,174

SOURCE: de Wilde, 1984, p. 94.

TABLE 6.7: IVORY COAST EARNINGS FROM COCOA AND COFFEE EXPORTS (CFAF millions).

YEAR	COCOA	COFFEE
1960	8,700	18,800
1964	14,600	32,000
1968	23,700	36,900
1972	28,200	38,100
1976	93,700	132,800
1977	163,600	197,000
1978	232,700	130,900
1979	145,800	169,200
1980	170,700	123,600

SOURCE: Hecht, 1983, p. 29.

Footnotes to Chapter 6.

1. Since by large, those who are indifferent to government policies affecting the cocoa industry are few, our interest is in the other two groups.

2. See Appendix 6.5 for a discussion of the age-structure of cocoa farms in Ghana and the Ivory Coast.

3. See Appendix 6.2.

4. See Section 6.2.

5. Note that 1963 and 1974 in the figure correspond to 1965 and 1976 respectively since the graph has been drawn from a 5-year moving average series.

6. See Appendix 6.4 for a discussion of the impact of the 1983 bushfires on the Ghanaian cocoa industry.

7. See Bateman, 1974, p. 290.

8. See May, 1985, p. 72.

9. See Bateman, 1974, p. 288.

10. ibid. p. 319.

11. See Manu, 1974, p. 272.

12. See Chapter 3, section 3.1.3.

13. Except in 1981 when the government realised that the rapid expansion in cocoa area and output was outpacing the growth in world demand and could eventually lead to the depressing of cocoa prices that cash grants and subsidies on fertilisers and cocoa sprayers were eliminated to discourage further expansion in cocoa area.

14. See Appendix 6.1 for producer prices and land coverage of cocoa and coffee.

15. Coffee's relative profitability to the farmer appears to be higher than that of cocoa (See the succeeding chapter).

16. See Table 6.7 for earnings from cocoa and coffee exports.

17. Computed from column four of Table 6.5.

CHAPTER 7.

GHANA: ILLEGAL TRADE IN COCOA.

Introduction.

The conclusion we draw from the preceding chapter is that government policies have in the main, been responsible respectively for the decline and growth in the cocoa industry in Ghana and the Ivory Coast.

Some cocoa farmers in Ghana have reacted negatively to the unattractive producer price policies of the government by seeking new markets in the Ivory Coast and Togo where producer prices of cocoa are higher. Since the laws of Ghana do not permit cocoa farmers to sell their produce to buyers outside the country, smuggling remains the only means by which Ghanaian farmers along the borders can sell their produce in the neighbouring countries. This chapter discusses the causes and magnitude of cocoa smuggling in Ghana.

7.1 Factors Promoting Cocoa Smuggling.

Cocoa smuggling in Ghana is carried out by some cocoa farmers and their non-cocoa farmer accomplices in Brong-Ahafo and Western Regions in the south-west and in the Volta Region in the south-east. Cocoa smuggled in the

latter region is sold in Togo while Ivory Coast is the beneficiary of cocoa smuggled out of the two other regions.

Smuggling goes on in several ways. Cocoa farmers who have their farms sited next to the borders simply convey their cocoa beans usually, under the cover of night to the nearest cocoa stations in either Togo or the Ivory Coast for sale. Farmers who stay at a considerable distance from the frontiers employ young men to transport the dry cocoa beans along bush paths to the neighbouring countries for sale. There are also a few non-cocoa farmers who buy cocoa beans from farmers in Ghana and transport them to either Togo or the Ivory Coast where they are sold. It is also alleged that some cocoa merchants from Togo and the Ivory Coast are able to infiltrate the Ghanaian market to purchase cocoa usuallyin the border towns. Sometimes all this is done with the connivance of border guards who are often said to have their palms heavily greased by either the cocoa farmers or the foreign buyers.

The major explanatory variable for cocoa smuggling in Ghana is the large cocoa price differential in Ghana and the neighbouring cocoa producing countries of Togo and the Ivory Coast. [1] Traditionally, cocoa producer prices in the Ivory Coast and Togo have been much higher than those in Ghana. [2]

Available data presented in Table 7.1 show that with the exception of 1978 when a headload of cocoa in Ghana

TABLE 7.1: NOMINAL PRODUCER PRICES OF COCOA IN GHANA, TOGO AND IVORY COAST (CEDIS/30kg).*

YEAR	GHANA	TOGO	IVORY COAST
1961	6.00	7.50	7.50
1962	5.40	5.10	5.50
1963	5.40	5.10	5.50
1964	5.00	5.50	5.50
1965	5.00	5.50	5.50
1966	4.00	3.20	4.30
1967	5.00	4.30	5.50
1968	6.50	7.90	7.90
1969	7.00	9.00	7.90
1970	8.00	8.80	8.00
1971	8.00	9.30	8.90
1972	8.00	12.70	11.60
1973	10.00	12.70	11.60
1974	12.00	12.90	15.00
1975	15.00	14.11	23.85
1976	16.00	14.72	23.85
1977	20.00	15.95	24.56
1978	36.29	18.40	34.12
1979	72.00	79.35	98.18

* The Ivory Coast and Togo cocoa producer prices were converted to cedis at the official exchange rates. See Table 7.2 for producer prices in the 3 countries when the black market exchange rates are used.
SOURCE: Nyanteng, 1980, p. 21.

attracted a price higher thsn that offered to the Ivorian cocoa farmers, in all the other years, prices in the Ivory Coast were greater than those in Ghana. In the same vein, prices in Togo in most cases, were more favourable than those in Ghana. These disparities in the nominal producer prices of cocoa exert a strong influence on cocoa farmers whose farms are located in close proximity to the borders of Togo and the Ivory Coast to sell their cocoa in such neighbouring countries.

The overvaluation of the Ghanaian cedi coupled with the convertibility of the franc, provides a sufficient condition to lure people to indulge in this illicit

TABLE 7.2: EARNINGS OF COCOA SMUGGLERS USING UNOFFICIAL EXCHANGE RATE (CEDIS/TONNE).

YEAR	BLACK MARKET RATE (CEDI/CFA)	GHANA	TOGO	IVORY COAST
1961	0.003	220.46	276.88	276.65
1962	0.003	220.46	169.10	203.51
1963	0.002	216.78	137.01	159.82
1964	0.002	198.42	154.22	166.52
1965	0.003	181.88	187.35	187.69
1966	0.009	151.56	351.04	519.04
1967	0.007	197.67	368.76	472.77
1968	0.007	247.91	497.64	498.96
1969	0.007	278.55	571.68	523.78
1970	0.006	293.80	523.12	489.05
1971	0.006	300.47	583.81	530.52
1972	0.006	360.92	588.03	538.60
1973	0.006	385.04	564.19	563.21
1974	0.007	484.47	675.92	894.85
1975	0.007	577.90	783.56	1,193.94
1976	0.009	679.15	1,055.54	1,556.65
1977	0.022	976.78	2,795.70	4,260.43
1978	0.031	1,601.40	4,632.04	7,730.57
1979	0.042	3,308.10	8,347.46	10,972.32
1980	0.078	3,936.30	17,232.23	21,866.14
1981	0.068	5,333.50	14,914.72	20,338.25
1982	0.134	12,133.00	30,703.59	40,271.46

SOURCE: May, 1985, p. 129.

trade. The unofficial exchange rate employed in the transaction makes it so lucrative that it is very easy for any cocoa farmer living near any of the borders to succumb to the allurement of the profitable trade.

Table 7.2 offers an idea about the wide gap that exists between the earnings of Ghanaian cocoa farmers who sell their cocoa on the domestic market and those who trade theirs in either Togo or the Ivory Coast. Over the entire period covered by the table, save the years 1962 to 1964, the earnings of cocoa smugglers have always been higher than those received by their counterparts who sell their cocoa to the CMB. Even in 1981, when the Ivory Coast's producer price per headload of 30kg was only about 57% of the price of an equivalent weight in Ghana, [3] any smuggler who successfully sold a headload of cocoa in the Ivory Coast at the unofficial exchange rate received ¢610.15. When transportation cost and other transaction expenses are deducted from the proceeds, what remains is still so much greater than the ¢160 earned by a farmer who sells the same quantity of cocoa in Ghana.

The economic environment in Ghana [4] also lends support to cocoa smuggling. The restrictive trade practices characteristic of the Ghanaian economy have often led to inadequate supplies of essential commodities such as soap, milk, sugar, flour, cooking oil, baby food and clothing. These items, however, can readily be obtained in the neighbouring countries, especially, in the Ivory Coast. Therefore, farmers who manage to sell their cocoa in either Togo or the Ivory Coast use part of the foreign currency they acquire to purchase those commodities for their own use or for sale at considerable profit in Ghana.

Zormelo's discovery from research he conducted in some cocoa producing areas in the Volta Region provides empirical support for the reasons adduced above. He states that: [5]

> When farmers sell their cocoa at Togo they use part of the money in purchasing their cutlasses, which are displayed along the streets, in the markets, and stores in villages, towns and cities in Togo. In Ghana, however, cutlasses are presently obtainable in cities only, but farmers who are the real users reside in the rural areas. The farmers also purchase their barest necessities of life such as cloth, soap, utensils, etc. which are also not obtainable in the rural areas of Ghana.

Adams cites deliberate delays in paying cocoa farmers a sone of the factors promoting cocoa smuggling in Ghana. Interviews he had with some cocoa farmers in the Brong-Ahafo region revealed that: [6]

> Secretary-receivers are still issuing chits to farmers on the grounds that they have no money to pay them. After some time, the farmers are then paid in instalments. For this reason, most farmers are reluctant to market their cocoa through these receivers. The farmers find cocoa smugglers much more attractive to deal with for the latter are prepared to

pay a farmer C500 to C800 per a bag of cocoa. This money is paid immediately the farmer agrees to sell his cocoa to the smuggler. Also since the cocoa purchased by the secretary - receiver takes sometimes a year or more to be transported to the coast for shipment abroad, the secretary-receiver is tempted to sell the cocoa to the smuggler at a profit and finds no difficulty in accounting for cocoa purchased to the CMB.

7.2 Magnitude of Cocoa Smuggling in Ghana.

Despite the above motivating factors which provide a convincing proof that substantial quantities of cocoa are smuggled yearly from Ghana to the Ivory Coast and Togo, it appears much has not been done, particularly, by Ghanaian researchers in the area of systematic quantification of the extent of cocoa smuggling. A few attempts have however, been made by non-Ghanaian researchers to estimate the magnitude of cocoa smuggling in Ghana. A review of three of such works by Kumar, Franco and May [7] appears in Appendix 7.1.

7.2.1 Specification of Cocoa Supply Functions For Brong-Ahafo, Western and Volta Regions and the Ivory Coast.

The method we have employed to estimate the magnitude of cocoa smuggling in Ghana is similar to that of May. [6] The difference between the two techniques lies essentiallyin scope and in the definition of some of the explanatory variables.

7.2.1.1 Scope of our Method.

While May estimated the magnitude of smuggling for only Brong-Ahafo and Volta Regions, we have considered all the three border regions, namely, Brong-Ahafo, Western and Volta. In addition, we recognised the dual nature of cocoa smuggling and felt that to improve our investigation, there was the need to study the illicit trade from the end of at least one of the benefiting countries; in this case, the Ivory Coast, which in fact, receives the lion's share of the smuggled cocoa.

7.2.1.2 Justification of Regression Variables.

(i) Real Cocoa Producer Prices in Ghana, PG and the Ivory Coast, PIV/Togo, PTG.

Quite often, what the Ghanaian farmer immediately considers when it comes to the question of new investment in cocoa, maintenance of existing cocoa farms and where to sell harvested cocoa, is the real producer prices of cocoa in Ghana and the Ivory Coast (Togo) with the latter valued at the black market level. But because these producer prices are announced at the beginning of the cocoa season both in Ghana and the Ivory Coast (Togo), it is the previous year's price in each country which influences greatly the decision of the farmers. Thus the quantity of cocoa sold to the CMB has been made a function of lagged cocoa producer prices in Ghana, PG_{t-1}, and the Ivory Coast, PIV_{t-1} (Togo, PTG_{t-1}). We do not incorporate in the equation a variable to capture the long run impact of producer price changes because the objective of the study is to estimate the magnitude of cocoa smuggling which is by and large, a short run phenomenon.

(ii) Factor For Cocoa Smuggling, CSM.

Following Bhagwati's observation that the level of smuggling of an agricultural commodity is dependent on the difference between domestic and foreign prices, the difference capturing any discrepancy between the official and unofficial rates of exchange between the country's

currency and foreign currencies, [9] we used the ratio of cocoa producer prices in Ghana and the Ivory Coast (Togo), CSM, as one of our regressors. To reflect the discrepancy between the official and unofficial exchange rates of the cedi and the CFA franc, we converted the Ivory Coast (Togo) cocoa producer prices into cedis using the blackmarket exchange rate [10] before we calculated the yearly ratios.

(iii) Rainfall, R.

May used rainfall statistics from July-October lagged one year in his cocoa supply function. Cocoa trees flower on a large scale, at the beginning of the wet season. [11] This means that it is the immediate rains which influence the extent of the flowering of the cocoa trees. Further, in Ghana, the wet season starts from February, reaching a peak in June/July and terminating in November. This allows two cocoa flowering times - hence, Ghana has two cocoa seasons (major and minor) in the year.

We therefore, found it more appropriate to use the entire year's rainfall [12] as an explanatory variable in our cocoa supply equation instead of just the July-October rainfall as used by May. Conscious also of the negative impact either a low or an excessive rainfall could have on cocoa yield, we formulated two separate cocoa supply function sone containing the actual annual rainfall figures (R) and the other with a dummy variable for rainfall (DR). In choosing our dummy for rainfall, the value 2 was assigned to annual

rainfall of between 50 and 70 inches and rainfall outside this range was represented with 1. [13]

(iv) Time Trend, T.

To capture the effect of other variables such as humidity, technology and changes in cocoa land, we included a time trend variable, T, but the regression results showed an existence of autocorrelation in the equations which contained time trend as a regressor. Therefore, to avoid this problem, the equation was re-specificied without the time trend variable.

(v) Supply of Insecticides, IG.

Quantities of insecticide supplied to cocoa farmers in Ghana, IG, were also chosen as an explanatory variable but this variable was found to be insignificant and at the same time, it appeared to be wrongly (negatively) related to the dependent variable, cocoa sales to the CMB, so it was dropped from the final specification of the supply equation.

7.2.1.3 The Cocoa Supply Functions. [14]

We initially postulated that the quantity of cocoa sold to the CMB, QCMB, was linearly dependent on the lagged real cocoa producer price in Ghana, PG_{t-1}, lagged real cocoa producer price in the Ivory Coast, PIV_{t-1} (Togo, PTG_{t-1}), the ratio of cocoa prices in Ghana and the Ivory Coast

(Togo) CSM, annual rainfall, R or dummy for rainfall, DR.

This relationship is expressed mathematically as:

$$QCMB_t = \beta_1 + \beta_2 PG_{t-1} + \beta_3 PIV_{t-1}(PTG_{t-1}) + \beta_4 CSM_t + \beta_5 R_t(DR_t) + \upsilon_t \quad \ldots (1)$$

However, the low R-square and t-values we obtained from our regression results suggested that our assumption of linear relationship could be wrong.

We then recast the supply function into a non-linear form and used the natural logarithm to transform it into the form:

$$\ln QCMB_t = \ln\beta_1 + \beta_2 \ln PG_t - 1 + \beta_3 \ln PIV_{t-1}(\ln PTG_{t-1}) + \beta_4 \ln CSM_t + \beta_5 \ln R_t(\ln DR_t) + \ln \upsilon_t \quad \ldots (2)$$

The regression results for equation (2) this time appeared to be better than those obtained for equation (1). These results are presented in Table 7.3 below.

In the case of the Ivory Coast, national cocoa output, QIV, was made to depend non-linearly on lagged Ivorian cocoa producer prices, PIV_{t-1}, producer price of coffee, [15] PC_{t-1}, cocoa land, L_t, ratio of cocoa prices in the Ivory Coast and Ghana, CSM_{t-1}, and dummy for rainfall, DR_t. Algebraically, the Ivorian cocoa supply function is specified as:

$$\ln QIV_t = \beta_1 + \beta_2 \ln PIV_{t-1} + \beta_3 \ln PC_t - 1 + \beta_4 \ln CSM_t^{-1}$$

$$+ \beta_5 \ln L_t + \beta_6 \ln DR_t + \ln v_t \qquad \ldots (3)$$

TABLE 7.3: REGRESSION RESULTS OF COCOA SUPPLY FUNCTIONS

(A). GHANA (1961-1982)

1. BRONG-AHAFO REGION

$$\ln QCMB_{BA} = 11.605325 + 0.234148 \ln PG_{-1} - 0.147313 \ln PIV_{-1}$$

$$(9.517) \qquad (1.536) \qquad (-3.229)$$

$$-0.187891 \ln CSM - 0.127404 \ln R_{BA}$$

$$(-1.585) \qquad (-1.688) \qquad \ldots (4)$$

$$F = 10.80980$$

$$\bar{R}^2 = 0.67376$$

$$D\text{-}W = 1.95335$$

2. WESTERN REGION

$$\ln QCMB_{WR} = 14.100822 + 0.267386 \ln PG_{-1} - 0.536525 \ln PIV_{-1}$$

$$(10.814) \qquad (1.294) \qquad (-3.225)$$

$$-0.220388 \ln CSM + 0.420849 \ln DR$$

$$(-1.844) \qquad (3.605) \qquad \ldots (5)$$

$$F = 13.19238$$

$$\bar{R}^2 = 0.69901$$

$$D\text{-}W = 2.00231$$

3. VOLTA REGION

$$\ln QCMB_{VR} = 12.324545 + 0.150436\ \ln PG_{-1} - 0.581302\ \ln PTG_{-1}$$

$$(5.400) \qquad (0.586) \qquad (-6.154)$$

$$-0.284586\ \ln CSM + 0.011835\ \ln R_{VR} \qquad \ldots (6)$$

$$(-1.163) \qquad (0.032)$$

$F = 31.42012$

$\bar{R}^2 = 0.86494$

D-W = 2.36834

(B) IVORY COAST (1961-1982)

$$\ln Q_{IV} = 20.515503 - 0.817187\ \ln PIV_{-1} + 0.131414\ \ln PC_{-1}$$

$$(17.361) \qquad (-7.415) \qquad (0.410)$$

$$+0.164356\ \ln CSM^{-1} + 0.269402\ \ln DR \qquad \ldots (7)$$

$$(1.765) \qquad (2.465)$$

$F = 58.92006$

$\bar{R}^2 = 0.91689$

D-W = 2.03400

7.2.2 Analysis of Regression Results.

The F-statistics for equations (4) to (7) are all significant at the 1% points. The D-W values are all within the range for the acceptance of the null hypothesis of no serial correlation among the residuals. [16] We are interested in the significance of the variable, CSM in all

the equations since it is that variable which will be used to estimate the magnitude of cocoa smuggling.

In equations (5) and (7), the t-values of CSM are significant at the 5% level while in equations (4) and (6), they are significant at the levels of 10% and 15% respectively. It is quite striking to note the high significance of PIV_{-1} and PTG_{-1} in equations (4) to (6). This shows how important the cocoa producer prices of Ivory Coast and Togo are, in the determination of the quantity of cocoa sold to the CMB from Brong-Ahafo, Western and Volta Regions.

7.2.3 Estimation of the Magnitude of Cocoa Smuggling.

In justifying our independent variables, we said that the quantity of cocoa smuggled out of Ghana, QSM_t was a function of the ratio of cocoa producer prices in Ghana and the Ivory Coast (Togo) adjusted to reflect the discrepancy between the cedi and the CFA franc, CSM_t, that is:

$$QSM_t = \alpha CSM_t^{\beta_4}, \quad \alpha = 1 \qquad \ldots (8)$$

Taking natural logarithms of equation (8), we have

$$\ln QSM_t = \ln \alpha + \beta_4 \ln CSM_t \qquad \ldots (9)$$

At the beginning of every cocoa season, ln is zero, since the scale factor, a, is assumed to have a unit value.

Now CSM_t is also an explanatory variable for the quantity of cocoa sold to the CMB. Thus, the antilog of $\beta_4 \ln CSM_t$ is the fraction of cocoa sold to the CMB as a result of the influence of the variable, CSM_t on $QCMB_t$. The remaining fraction, (1-antilog β_4 ln CSM_t), represents the proportion of cocoa sales induced by the variable CSM_t which is not sold to the CMB, that is, the quantity of cocoa which is covered by smuggling. In terms of cocoa sales to the CMB, $QCMB_t$, equation (8) can be cast in the form: [17]

$$QSM_t = \frac{(1 - \text{antilog } \beta_4 \ln CSM_t)}{\text{antilog } \beta_4 \ln CSM_t} QCMB_t \quad \ldots (10)$$

From equation (10) and from the value of β_4 in each of the equations (4) to (6), the quantities of cocoa smuggled each year in the three regions were calculated; [18] the series are presented in Table 7.4. A similar method was used to estimate the cocoa gains for the Ivory Coast (see Table 7.5).

7.2.4 Comparison of Cocoa Smuggling Estimates.

In Table 7.5 the estimates of cocoa smuggled out of Ghana to the Ivory Coast have been presented alongside those

purported to have been gained (lost) by the Ivory Coast from smuggling. There does not seem to be much divergence in the two series except after 1974 when the Ivorian estimates become significantly different from the corresponding figures for Ghana. All the same, we do consider the average estimate of 45,767 tonnes for the Ivory Coast from 1971 to 1982 to be realistic since several other sources put the quantity of cocoa smuggled out of Ghana each year in the 1970s to be between 40,000 and 70,000 tonnes. [19] Our estimates therefore appear to agree with empirical evidence

TABLE 7.4: MAGNITUDE OF COCOA SMUGGLING IN GHANA ('000 TONNES).

YEAR	BRONG-AHAFO REGION	WESTERN REGION	VOLTA REGION
1961	4.22	1.16	2.08
1962	-1.26	-0.37	-2.10
1963	-4.51	-1.49	-2.56
1964	-2.93	-0.89	-1.93
1965	0.73	0.24	0.22
1966	25.94	7.46	5.74
1967	15.30	5.24	3.70
1968	15.01	4.74	5.27
1969	11.60	3.18	3.18
1970	11.41	3.64	3.73
1971	12.36	4.82	3.12
1972	9.08	4.59	1.49
1973	8.23	3.65	2.53
1974	9.42	5.96	1.38
1975	11.64	6.95	1.27
1976	14.64	6.82	1.74
1977	24.58	15.33	3.15
1978	24.09	17.41	2.47
1979	12.66	13.90	1.81
1980	20.70	23.91	2.61
1981	13.78	15.48	0.34
1982	12.66	13.29	0.59

from Ghana and the Ivory Coast. For example, Bory [20] has indicated that the three cocoa processing industries in the Ivory Coast in 1978 utilised 100,000 tonnes of cocoa beans to produce cocoa butter, cocoa paste and cocoa cake. He emphasised that this figure was one-third of the cocoa harvested that year - this was 303,600 tonnes. [21] In 1978, the Ivory Coast exported 244,011 tonnes of cocoa beans. [22] When this figure is added to the quantity of production retained to feed the local industries, the result exceeds cocoa production by as much as 44,011 tonnes. It is striking to note that the excess cocoa export in 1978 is almost the same as our cocoa smuggling estimate for 1978. [23]

TABLE 7.5: COCOA GAINED BY THE IVORY COAST THROUGH SMUGGLING ('000 TONNES).

YEAR	COCOA GAINS IN THE IVORY COAST	COCOA LOSSES IN BRONG-AHAFO AND WESTERN REGIONS
1961	-3.44	5.38
1962	1.07	-1.63
1963	5.31	-6.00
1964	2.82	-3.82
1965	-0.74	0.97
1966	-20.68	33.40
1967	-20.02	20.54
1968	-15.98	19.75
1969	-14.25	14.78
1970	-14.49	15.05
1971	-15.98	17.18
1972	-14.59	13.67
1973	-11.29	11.88
1974	-20.03	15.38
1975	-27.27	18.59
1976	-29.43	23.46
1977	-49.90	39.91
1978	-69.25	41.50
1979	-56.92	26.56
1980	-93.18	44.61
1981	-79.57	29.26
1982	-81.79	25.95

Table 7.6 shows that from 1979 to 1983, cocoa exports and domestic cocoa utilisation combined, exceeded cocoa production on four occasions. It is difficult to explain the excess of output over exports in 1979 and 1982 since according to Bory, [24] the only storage facility in the Ivory Coast, a private enterprise, has a capacity of only 3,000 tonnes. [25] There could not have been a smuggling of cocoa from the Ivory Coast to Ghana because in those two years it was rather profitable at the black-market exchange rate to smuggle cocoa from Ghana to the Ivory Coast. All the same, the cumulative balance shows an excess of cocoa exports over cocoa production from 1978 to 1983. Thus, the overall

TABLE 7.6: IVORY COAST COCOA PRODUCTION AND UTILISATION ('000 mt)

YEAR	A	B	C	D	E
1978	304	100	244	-40	-40
1979	312	106	171	35	-5
1980	379	106	284	-11	-16
1981	403	106	438	-141	-157
1982	457	106	326	25	-132
1983	355	106	286	-37	-169

A = COCOA PRODUCTION,
B = LOCAL COCOA CONSUMPTION*,
C = COCOA EXPORT,
D = DIFFERENCE,
E = CUMULATIVE DIFFERENCE.
* The CHOCODI chocolate factory with a capacity of 6,000tonnes was in operation by 1979 (See Bory, p.33).
SOURCE: Gill & Duffus, Cocoa Market Report, No. 320, Oct, 1985, pp. 10 and 14.

exogenous element in the Ivory Coast cocoa export could be said to have originated from Ghana.

In Table 7.7, our estimates are compared with those of Franco and May. May's figures, compared with the estimates of cocoa smuggling given by the Ghanaian government, tend to overestimate the magnitude of smuggling that goes on in Brong-Ahafo which is only one of the three regions from which cocoa smuggling is carried out. Our figures on the other hand, compare very well with the estimates of the Ghanaian government. There isan obvious similarity between our figures and those of May in terms of the direction of flow of the smuggled cocoa. From 1962 to 1964 when Ghanaian

TABLE 7.7 COMPARISON OF SEPARATE ESTIMATIONS OF THE MAGNITUDE OF COCOA SMUGGLING ('000 tonnes).

YEAR	OURS (NATIONAL)	MAY B/A REGION	FRANCO* (NATIONAL)
1961	7.46	5.90	10
1962	-3.73	-1.89	8
1963	-8.56	-7.65	14
1964	-5.75	-6.11	11
1965	1.19	0.93	14
1966	39.14	37.79	17
1967	24.24	31.48	17
1968	25.02	19.25	21
1969	17.96	23.27	17
1970	18.78	17.90	25
1971	20.30	21.42	31
1972	15.16	13.79	37
1973	14.41	9.18	42
1974	16.76	15.88	34
1975	19.86	20.79	30
1976	25.20	21.38	38
1977	43.06	37.83	40
1978	43.97	29.80	45
1979	28.37	31.79	50
1980	47.22	31.35	-
1981	29.60	24.07	-
1982	26.54	21.24	-

* Franco basically estimated the magnitude of cocoa smuggling to Togo but he generalised his results for the whole country.

cocoa producer prices were better than those in the Ivory Coast, there was expected to be an inflow of smuggled cocoa to Ghana from the Ivory Coast. This important fact fails to show in Franco's calculation. Franco's claim that there was cocoa smuggling averaging 11,000 tonnes each year from Ghana to Togo from 1962 to 1964 is incompatible with the main proposition upon which he based his estimation - that the level of smuggling of an agricultural commodity is dependent on the difference between domestic and foreign prices. Cocoa producer prices in Togo, from 1962 to 1964 were less than those in Ghana even at the black market rates. [26]

May quotes the following from the Pick's Currency Yearbook:[27]

> Black market transactions in Ghana's currency did not reach sizeable proportions until late 1964 and remained mostly limited to the local trade, centering in Accra.

While this statement rules out the possibility of the smuggling of cocoa out of Ghana between 1962 and 1964, it also beefs up our finding that cocoa smuggling in Ghana reached alarming proportions from 1966 onwards when black market currency transactions had become well ingrained in the Ghanaian economy.

7.3 Conclusion.

This chapter has confirmed the existence of illegal trade in cocoa between some Ghanaians and cocoa merchants in Togo and the Ivory Coast owing to the low producer prices in Ghana. Between 1962 and 1964 when cocoa producer prices were higher in Ghana than those in Togo and the Ivory Coast, the direction of cocoa smuggling was rather from Togo and the Ivory Coast to Ghana. Since 1965, the trend has changed in favour of Togo and the Ivory Coast because of the low producer prices in Ghana. The average quantity of cocoa smuggled yearly between 1971 and 1982 measured from the Ghanaian end was found to be 27,538 tonnes; data on the Ivory Coast put the estimate at 45,767 tonnes for the same period. By reconciling the two figures, we obtained a pooled average of 36,653 tonnes which was found to compare favourably with conservative cocoa smuggling magnitudes given by the Ghanaian government.

Footnotes to Chapter 7.

1. Here we are considering the price of cocoa in The Ivory Coast and Togo converted into cedis at the black market rate.

2. This considers prices in Togo and the Ivory Coast converted to cedis at the official exchange rate.

3. In 1981, a headload of 30kg of cocoa sold at £28.68 and £16.32 respectively in Ghana and the Ivory Coast.

4. The trade liberalisation policies pursued by the current government have since 1985 led to a greater availability of essential commodities, largely from abroad.

5. See Zormelo, 1981.

6. See Adams, 1981, p. 131. A system called the Akuafo-cheque has since November 1982, been introduced to check these malpractices. Farmers are paid through the bank. This means secretary-receivers do not directly handle money meant for cocoa purchases.

7. See Kumar, Ashok (1973), "Smuggling in Ghana: Its Magnitude & Economic Effects", in Nigerian Journal of Economic and Social Studies, Vol. 15, 1973, p.p. 285-303; Franco, G. Robert (1979), "The Optimal Producer Price of Cocoa In Ghana", in Journal of Development Economics 8 (1981), p.p. 77-92; and May, Ernesto (1985), Exchange Controls and Parallel Market Economies in Sub-Saharan Africa: Focus on Ghana, World Bank, p.p. 67-81.

8. See Appendix 7.1.

9. See Franco, 1979, p. 85. See also Singh, 1985, p. 4.

10. See Table 7.2.

11. See Lass, R. A. and G. A. R. Wood, eds. (1985), Cocoa Production: Present Constraints and Priorities for Research, The World Bank, p.p. 3-4.

12. Rainfall is used here as a proxy for climatic conditions in the cocoa growing areas and in the study, a homogenous rainfall is assumed for all the cocoa growing areas in Ghana including the Ivory Coast.

13. When the dummies are converted to natural logarithms the nominal value 1 becomes 0.

14. See Appendices 7.2 and 7.3 for data used to estimate the supply functions. Some of the books consulted on multiple regression were Pindyck & Rubinfeld (1982), Intriligator (1987), Hey (1974), Blalock, Jr (1972), Johnston (1984), Weinberg & Schumaker (1974) and Yeomans (1968). See bibliography.

15. Coffee is the major competitive cash crop to cocoa in the Ivory Coast. See section 4.1.2.

16. See Pindyck, R. S. and D. L. Rubinfeld (1982), Econometric Models and Economic Forecasts, McGraw-Hill International Bk. Co., p.p. 158-160.

17. From the supply equation, if we hold all variables constant, we have antilog $\beta_4 \ln CSM_t = QCMB_t$. Therefore, proportionally,

$$QSM_t = (1 - \text{antilog } \beta_4 \ln CSM_t) = QCMB_t \times \frac{(1 - \text{antilog } \beta_4 \ln CSM_t)}{\text{antilog } \beta_4 \ln CSM_t}$$

18. See Appendix 7.4.

19. See for example, Nyanteng, p. 20; (CBS, Economic Survey (1977-80), p. 52; ACP, 1982, p. 3 and The Ghanaian Times, Aug. 15, 1983, editorial.

20. See Bory, Paul, S. A. (1979), CAISTAB: Ivory Coast Stabilisation Fund, p. 33.

21. See Gill & Duffus, Cocoa Market Report, No. 320, 1985, p. 10 and de Wilde, 1984, p. 94.

22. See Gill & Duffus, ibid, p. 14.

23. See Table 7.5 column 3.

24. See Bory, p. 34.

25. Because storage facilities in the Ivory Coast are inadequate, private cocoa buyers rarely keep stock of previous years' purchases.

26. See Table 7.2.

27. See Pick's Currency Yearbook, 1979, p. 261.

PART IV

WORLD DEMAND FOR COCOA

AND COMPARATIVE ADVANTAGE

OF COCOA PRODUCTION

CHAPTER 8

WORLD DEMAND FOR COCOA

Introduction

Ghana has been working pretty hard since the turn of the 1980s to regain its lost position as the number one producer of cocoa in the world. In the same way, the Ivory Coast is doing all it can to maintain its lead in cocoa production. The purpose of this chapter is to examine the nature of the world demand for cocoa in order to find out whether it is economically sound for the major cocoa producers to pursue massive expansionary policies.

The chapter begins with an identification of the factors that determine the demand for cocoa on the world market. This is followed by an estimation of world cocoa demand function. The estimated equation is used to examine the future of the world demand for cocoa and whether it is worthwhile for the major cocoa producers to continue to expand output.

8.1 Determinants of World Demand for Cocoa

The factors which determine the quantity of cocoa demanded annually can be classified, from the point of view of the

importing countries into two categories. There are external and internal factors. The external factors comprise world-market cocoa price, and the prices of complementary and substitute products. ' These factors operate beyond the confines of the cocoa importing countries. The internal variables whose magnitude is largely determined by the forces within the individual cocoa-buying countries, include per-capita income, and changes in population, tastes and habits of consumers. These factors are fully discussed in the following section.

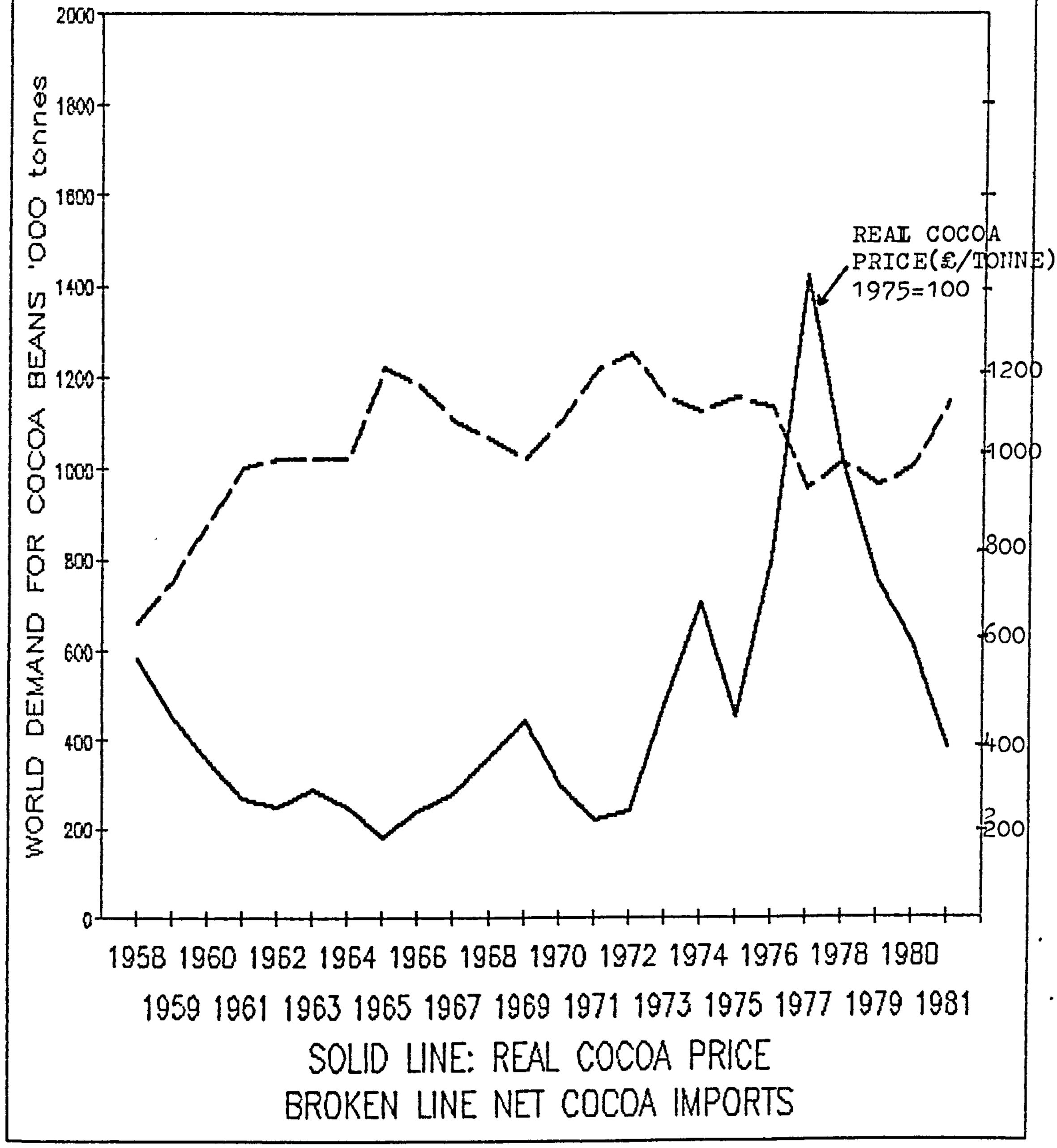
8.1.1 External Factors

8.1.1.1 World-Market Price Of Cocoa Beans

Figure 8.1 attempts to show in a visual form the relationship between cocoa beans demand and the real price of cocoa beans on the world market. It is not difficult to perceive from the two graphs a display of the relationship that is generally assumed to exist between the price and quantity demanded of a normal good. The negative correlation between the real price of cocoa beans and the quantity demanded comes out clearly in seven periods namely, 1958-1965, 1965-1969, 1969-1972, 1972-1974, 1974-1975, 1975-1977 and 1977 to 1981. Given the two-way relationship that exists between price and quantity, what this negative relationship in the yearly figures suggests is that the

FIGURE 8.1

RELATIONSHIP BETWEEN REAL PRICE OF COCOA BEANS AND QUANTITY DEMANDED



SOLID LINE: REAL COCOA PRICE

BROKEN LINE NET COCOA IMPORTS

supply relationship is shifting while the demand relationship is stable. This fits with what is generally believed about the beverage tree-crops on a world scale.

The relationship between the two variables as portrayed in the figure also illustrates another economic principle. Demand for raw beverage products is generally believed to be price-inelastic and this means that a proportionate change in price of the product normally leads to a less than proportionate change in the quantity demanded of the commodity. Table 8.1 compares the corresponding rates of change in the real price and quantity demanded of cocoa

TABLE 8.1 CORRESPONDING RATE OF CHANGE IN THE REAL PRICE AND QUANTITY DEMANDED OF COCOA BEANS(%)

PERIOD	RATE OF CHANGE	
	REAL PRICE	QUANTITY DEMANDED
1958-1965	-14.0	+7.6
1965-1969	+22.4	-4.4
1969-1972	-21.5	+7.1
1972-1974	+53.5	-5.5
1974-1975	-35.7	+3.0
1975-1977	+57.3	-10.0
1977-1981	-34.4	+3.6

beans in the periods derived from Figure 8.1. In all the periods between import troughs and peaks, a unit change in the real price of cocoa evokes a less than unit change in the quantity of cocoa demanded. We shall further examine this inverse relationship between the price of cocoa and world demand for cocoa in our cocoa demand model.

8.1.1.2 The Price Of Complementary Products

Cocoa is essentially used to produce chocolate products. The major ingredients of chocolate products are cocoa butter, cocoa cake, sugar and milk. Thus at any point in time, manufacturers of chocolate products take into account prices of sugar and milk in deciding what quantity of cocoa beans to import. Changes in the prices of the complementary products will lead to a proportional change in the quantity of cocoa beans demanded. For example, under normal circumstances, the higher the price of sugar, the less the quantity of cocoa beans that will be purchased by chocolate manufacturers. However, the extent to which changes in the price of complementary products can influence the quantity of cocoa beans demanded by chocolate manufacturers will depend on the fraction of total variable cost commanded by complementary products. The significance of these complementary goods in determining the quantity of cocoa beans demanded on the world market is further investigated in the cocoa demand model.

8.1.1.3 The Price Of Substitutes

TABLE 8.2 WORLD MARKET PRICE OF COCOA BEANS(£/tonne)

YEAR	PRICE	YEAR	PRICE
1961	177	1973	585
1962	167	1974	990
1963	205	1975	723
1964	188	1976	1399
1965	138	1977	2944
1966	193	1978	2066
1967	238	1979	1727
1968	320	1980	1270
1969	415	1981	1127
1970	306	1982	1033
1971	232	1983	1502
1972	270	1984	2070

SOURCE: Gill & Duffus, various issues of Cocoa Statistics.

Owing to the rise in cocoa prices in the 1970s [3] and the uncertainty over future prices, chocolate manufacturers have resorted to the use of substitutes in place of cocoa powder and cocoa butter. Cocoa powder substitutes are based largely on carob [4] while cocoa butter substitutes are produced by hydrogenation or fractionation of natural oils of which coconut, palm kernel and soya bean oils are the most popular. [5]

Thus the quantity of cocoa beans demanded by the manufacturers depends on the price of vegetable fats and oils which substitute for cocoa butter. The dearer the price of cocoa butter, the more inclined are cocoa manufacturers to substitute vegetable oils such as soya bean oil for cocoa butter.

8.1.2 Internal Factors

8.1.2.1 Per Capita Income

By definition, there is a direct functional relationship between the demand for a normal commodity and the income of the consumer. An increase in income induces a rise in the quantity of the commodity demanded whereas a fall in income is normally accompanied by a cut in the quantity demanded of the good in question.

If cocoa is a normal product, as seems probable if it has no close substitute that is more costly and preferred, there exists a positive relationship between the GDP of a cocoa-importing country and the quantity of cocoa beans demanded by the country. But because cocoa beans are not purchased by countries per se, but by chocolate manufacturers within the countries, the variable which better reflects the purchasing power of chocolate manufacturers annually, is the real aggregate per capita income of the importing countries. The real per capita income also implicitly takes into account population changes in the consuming countries

8.1.2.2 Changes In The Population, Tastes And Habits

Demand for cocoa beans is also influenced by changes in the population of importing countries as well as changes in

tastes and habits of consumers. These variables correlate positively with demand for cocoa beans. For example, in the Soviet Union, cocoa products apparently became more popular with consumers in the 1970s than in the 1960s. This positive change in the taste and habit of the Soviet consumers led to a sharp rise in the average yearly net cocoa beans import of the Soviet Union from 67,000 tonnes in the 1960s to 122,000 tonnes in the 1970s - a rise of 82%. However, in other developed countries, concern about dental problems and obesity dating back to the late 1970s is probably a major reason for a slight decrease in cocoa consumption. For instance, the average yearly net cocoa import by the United Kingdom fell from 89,000 tonnes for the period 1969-1975 to 78,000 tonnes for the years 1976-1984. The corresponding figures for the United States of America during the same periods were 249,000 tonnes and 183,000 tonnes.

8.2 Elasticity of World Demand for Cocoa

8.2.1 Specification Of World Cocoa Demand Equation

The first important step necessary for an analysis of the world market demand for cocoa is an estimation of price elasticity of world demand for cocoa [6]. This will show the relative importance of the factors which control the demand for cocoa on the world market.

Based on the preceding discussion on the determinants of world demand for cocoa beans, the following implicit functional relationship was specified;

$$WCD_t = f(GDP_{ct}/N_{ct}, CP_t, PSG_t, PSYB_t, TT_t) \quad \ldots(1)$$

where,

WCD_t = world demand for cocoa beans in year t,

GDP_{ct}/N_{ct} = per capita income of cocoa importing countries in year t,

CP_t = world market price for cocoa beans in year t,

PSG_t = world market price of sugar in year t,

$PSYB_t$ = world market price of soyabean oil in year t, and

TT_t = time trend

To determine the precise functional form between the dependent and independent variables of our model, we ran two trial regression programmes, the first one being a linear relationship and the second, a non-linear equation. The equation with the non-linear relationship produced a higher R 2 and so we hypothesized that the true model of the world market demand for cocoa would, be in the form of an exponential function [7] such as:

$$WCD_t = \varepsilon^{B1}GDP_{ct}/N_{ct}^{B2}CP_t^{B3}PSG_t^{B4}PSYB_t^{B5}TT_t^{B6}\varepsilon^{ut} \quad \ldots(2)$$

By linearizing equation 2, we obtain:

$$\ln WCD_t = \beta_1+\beta_2\ln GDP_{ct}/N_{ct}+\beta_3\ln CP_t+\beta_4\ln PSG_t + \beta_5\ln PSYB_t+\beta_6\ln TT_t+u_t \quad \ldots(3)$$

8.2.2 Justification for Variables in Equation

8.2.2.1 World Cocoa Demand, WCD

The nature of the cocoa market makes it extremely difficult for researchers to obtain accurate data on cocoa beans demanded by individual importing countries. It has therefore, been the practice in a number of previous studies on cocoa demand to use cocoa grindings as a proxy for consumption. [8] However, with the growth of trade in cocoa products, the use of this approach tends to introduce serious biases in the estimation of demand functions at the country level. [9] This is because there is an inter-trade between cocoa-products- manufacturing countries and therefore, statistics on grindings alone can either underestimate or overestimate the actual consumption of cocoa in any particular country.

To obtain a more exact measure of cocoa absorption, other researchers use apparent cocoa consumption. [10] Apparent cocoa consumption is calculated by an adjustment of net imports of cocoa beans or grindings for net trade in cocoa products, converted into bean equivalent by weight. [11]

In our estimation of the world cocoa demand equation, we adopted the apparent consumption approach. But because we have modelled our cocoa demand function on fifteen major consuming countries, we considered the net imports of cocoa beans of the selected countries.

8.2.2.2 Per Capita Income, GDP_c/N_c

The total GDP of fifteen major cocoa - importing countries, namely, Australia, Austria, Belgium, Canada, Denmark, France, Federal Republic of Germany, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, United Kingdom and United States of America was used to approximate the gross income of all cocoa -importing countries. [12] For the convenience of aggregation, the annual GDP of each country was converted into SDRS [13] and the result was divided by the total population of all the countries to obtain a proxy for the income per capita of all cocoa - importing countries. As indicated earlier on, this variable incorporates changes in the population of cocoa importing countries used in the model.

8.2.2.3 Cocoa Price, CP

The cocoa market is an example of a future market in which the seller contracts to deliver a specified quantity of cocoa of a specified quality at a specified time in the future but at a price determined in the present. Irrespective whether the value of cocoa would appreciate or depreciate in the period between the conclusion of the contract and its execution, both parties would adhere to the agreement. No payment is made by the buyer until the time of shipment.

The way the futures market operates suggests that at the beginning of the cocoa season when the manufacturer is planning how much cocoa beans to purchase, he bases his projections on the prevailing world market price of cocoa beans. But because this price changes over the cocoa year, it is the annual mean prices of cocoa beans which are employed in the model. The higher the price of cocoa beans, the less cocoa beans the manufacturer is disposed to buy in the current season.

8.2.2.4 Price Of Sugar, PSG

Sugar forms as much as 50% of almost all chocolate products by weight. [14] We have therefore, included this variable in our equation to examine the response of cocoa demand to changes in the price of sugar. This variable acts as a proxy for the complementary products used by the chocolate manufacturer and in general, it should correlate negatively with demand for cocoa beans.

8.2.2.5 Price Of Soyabean Oil, PSYB

We also incorporate the price of soyabean oil in our model to approximately capture the effect of a change in the price of cocoa butter substitutes on the quantity of cocoa beans demanded by chocolate manufacturers.

8.2.2.6 Time Trend, TT

We have introduced into the demand equation avariable for time trend to investigate the changes that occur in world cocoa demand over time.

8.2.3 Regression Results

An Ordinary Least Squares method was used to estimate the parameters of the independent variables of equation 3 over the period 1961-1982. The results obtained are presented in equation 4 below: [15]

$$\begin{aligned} \ln WCD = {} & 12.135298 + 0.269236 \ln GDP_c/N_c \\ & (10.205) \quad (1.943) \\ & -0.214852 \ln CP \; -0.045528 \ln PSG \\ & (-3.904) \quad (-0.595) \\ & +0.093804 \ln PSYB \; -0.72836 \ln TT \qquad ..(4) \\ & (1.199) \quad (-1.644) \end{aligned}$$

$$F = 4.70284$$

$$\bar{R}^2 = 0.46855$$

$$D\text{-}W = 1.59847$$

First of all, the signs of the estimated parameters in equation 4 conform to the a priori relationships hypothesized to exist between the individual explanatory variables and the regressand. [16] Together, the variables significantly explain the behaviour of world market demand for cocoa because at the 1% significance level, the critical F-value is 4.34 which is less than our calculated F-value of 4.7. The adjusted joint explanatory power of the variables in the equation is 47%.

Furthermore, apart from the real price of sugar which is statistically insignificant, three of the independent variables, namely, the real world market price of cocoa, CP, the real per capita income of cocoa consuming countries, GDPc/NC, and the real world market price of soyabean oil, PSYB, are statistically significant at the 95% level of confidence, while the last variable, time trend, TT, is significant at the 90% level of confidence [17].

On the question of serial correlation the computed D-W value lies incidentally within the region of indeterminacy. [18] Stewart has however, suggested that a value of D-W between 1 and 3 can cautiously be interpreted as being consistent with independence of the disturbances. He further states that, as the sample size is increased, the bounds shown in the D-W tables move in towards 2 and this suggests that for larger samples, the range of values consistent with the null hypothesis should be more like 1.5 - 2.5. [19]

By applying this rule of thumb to our case, we come to the conclusion that our cocoa demand equation 4 does not suffer from any serious problem of autocorrelation, [20] and can therefore, be used to examine the response of the dependent variable to changes in the individual explanatory variables.

8.2.4 Elasticity of Demand.

Since equation 4 has been cast in the logarithmic form, the estimated parameters are in fact estimates of the partial elasticity of demand with respect to each of the variables. [21] For instance, the elasticity of cocoa beans demand to changes in world market price of cocoa is -0.214852. This implies that, when all the other variables are held constant, a unit increase in the world market price of cocoa will result in a fall in demand for cocoa beans by approximately 21% and vice versa.

From the regression results, the most important variable which determines the quantity of cocoa beans demanded on the world market is the real world market price of cocoa beans. This is followed in the order of importance by the real per capita income of cocoa consuming countries, time trend and the real world market price of cocoa butter substitutes.

8.3 The Future of the World Cocoa Demand

The bulk of cocoa produced in the tropical developing countries is sold to industrialized countries in Europe and America in the form of beans. The leading cocoa consuming countries are the U.S.A., Federal Republic of Germany, the Netherlands, United Kingdom and the Soviet Union. For several years, U.S.A. has been the largest importer of cocoa, its share of the world market demand in 1981 was as much as 21%. Of the centrally planned economies, the Soviet Union tops the list of cocoa beans importers with an import-share of 10.6% in 1981.

The future of cocoa demanded on the world market very much depends on the demand elasticity of cocoa, the attitude of chocolate manufacturers towards the use of cocoa butter substitutes and changes in the taste of consumers of chocolate products.

8.3.1 Demand Elasticity Of Cocoa

We realise from equation 4 that all the variables that determine the demand for cocoa have low elasticities. [22] The implication of this is that changes in the situations of these variables will not have any substantial impact on the quantity of cocoa beans demanded.

The problem of balancing cocoa supply and demand on the world market in future is further compounded by the fact

that cocoa is produced independently by several countries and each producing country tends to react positively to any increase in the world market price of cocoa by expanding output in the long run.

8.3.2 Use Of Cocoa Butter Substitutes

Owing to the high price of cocoa butter as compared to prices of cocoa-butter substitutes, [23] it is likely that manufacturers of chocolate products will in future cut down their cocoa-butter intake and use more of the substitute fats and oils. This picture has already emerged in the U.K.

TABLE 8.3 AVERAGE TONNAGE PRICES OF COCOA BUTTER AND ITS SUBSTITURES (£/tonne)

Product	1977	1978	1979	1980
One Tonnage Weight Of	Price in Pounds			
Cocoa butter	3,329	2,837	3,247	2,835
Hardened coconut oil	481	530	692	501
Hardened palm kernel oil	463	521	669	492

Source: Karunasekera, 1983, p.39

cocoa products' industries. [24] While from 1975 to 1979 the quantity of cocoa beans used by the U.K. chocolate manufacturers grew at -4.3% annually, the quantity of all other ingredients employed in the same period, save

TABLE 8.4 TRENDS OF PURCHASED INGREDIENTS OF COCOA CHOCOLATE AND CONFECTIONERY INDUSTRIES IN THE U.K. (1975-1979)

Ingredients	Yearly Trend (%)
Sugar, glucose, syrup and trende	-1.0
Starch, molding and flour	13.0
Dairy butter and dried fruit	4.5
Milk solids	5.6
Nuts	8.3
Cocoa beans	-4.3
Oil and fats	10.3

Source: Growth rates of purchases were calculated from Table 2.12 in Karunasekera, 1983, p.41

sweeteners, grew positively at an average annual rate of 8%

[25]. Table 8.5 also shows that, apart from the Netherlands, cocoa imports by all the major cocoa-consuming countries from 1971 to 1980 have assumed a negative trend, with U.S.A. registering by far the fastest decline.

TABLE 8.5 GROWTH RATES OF NET COCOA BEANS IMPORTS INTO CONSUMING COUNTRIES(1971-1980)

Country	Annual Rate Of Import (%)
West Germany	-1.0
Netherlands	1.1
United Kingdom	-4.7
U.S.S.R.	-4.7
U.S.A.	-8.0
Other World	-2.2

Source: Growth rates were calculated from Table 7 in Gill & Duffus, Cocoa Market Report, October 1985, pp. 14, 15.

8.3.3 Changes In Consumers Tastes And Habbits

Some researchers [26] have suggested that demand for cocoa beans in the future could be slowed down in the developed countries owing to consumers concern about obesity and dental problems which are known to .develop out of frequent consumption of chocolate products. [27] The annual growth rates in cocoa demand have so far been 3.8%, 2.4% and -0.3% for the decades 1953-62, 1963-72 and 1973-82. [28]

We conclude from the foregoing analysis that because of the inelastic demand for cocoa beans coupled with the gradually increasing use of cocoa butter substitutes and the health problems associated with chocolate products' consumption, the world demand for cocoa might in future continue to grow positively but at a decreasing rate.

8.4 Summary Of The Future Of The Cocoa Industry

It emerges from the discussion in the foregoing sections and Chapter 5 that:

(a) the outlook for cocoa production in Ghana appears unpromising;

(b) the increase in cocoa output in the Ivory Coast seems likely to persist for several years; and

(c) the income and price elasticities of demand for cocoa are very low.

8.4.1 Demand For Cocoa Beans

On the demand side, the low income and price elasticities suggest that the quantity of cocoa beans demanded on the world market is relatively unresponsive to changes in cocoa price and the income of consuming countries. In other words, a small change in either of these two variables elicits a less than proportionate change in the quantity of cocoa demanded.

Confectionery and cosmetics producers react to an increase in the price of cocoa either by replacing cocoa powder and cocoa butter with substitutes such as caramels, vanilla, nuts and soyabean oil or by reducing the thickness of chocolate coating on their products. When the price of cocoa falls, manufacturers expand their cocoa inventory by buying more cocoa beans. However, from our estimated elasticities, in both cases, the change in demand is usually not substantial.

8.4.2 Supply Of Cocoa Beans

Owing to the exacting ecological requirements of the cocoa tree, cocoa production is concentrated in a few tropical developing countries of which the major ones are the Ivory Coast, Brazil, Ghana, Nigeria and Cameroon. The average yearly share of these five countries of the world supply of raw cocoa during the decade 1976-1985 was approximately 76%.

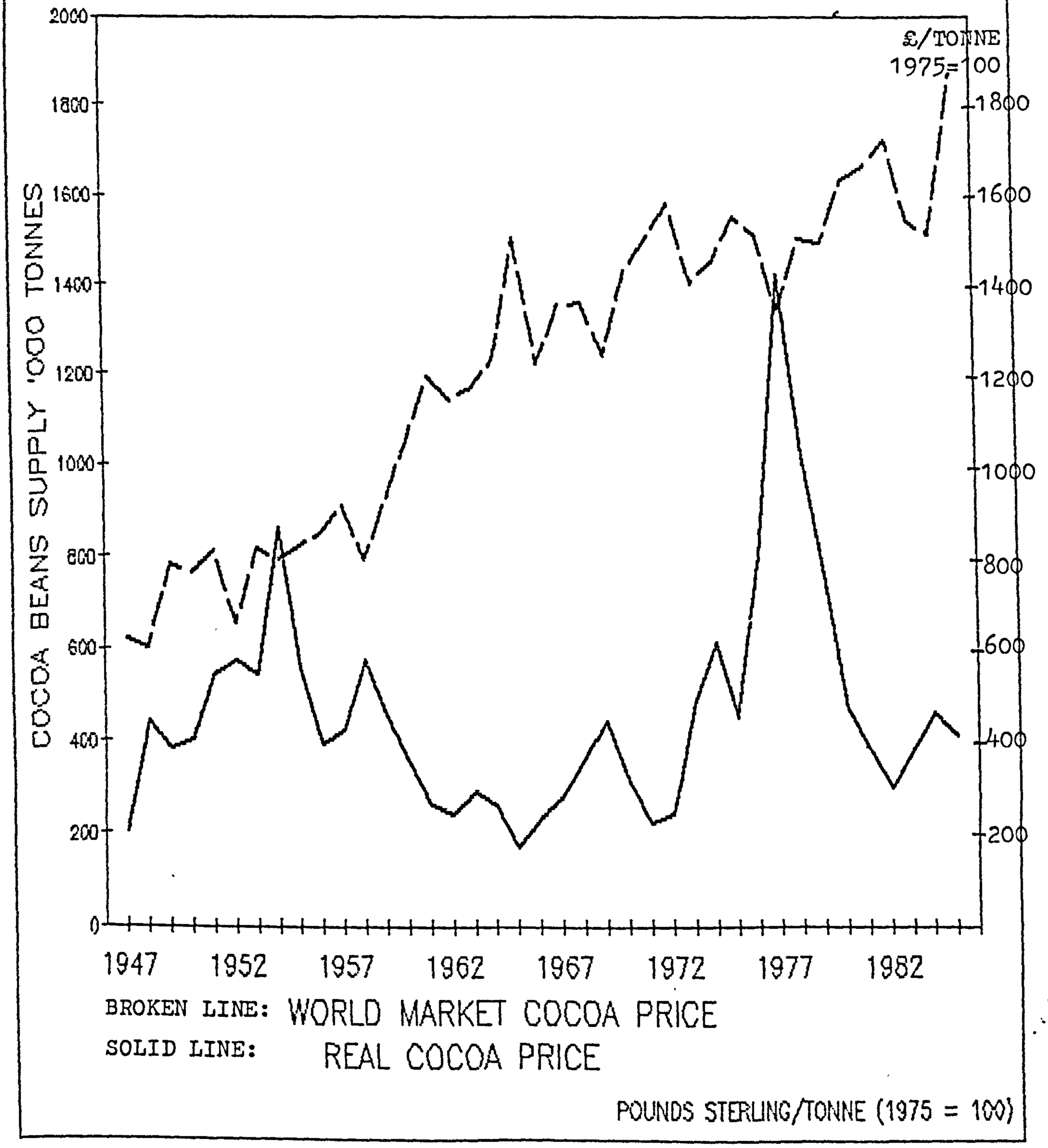
Until 1978, Ghana was the single largest producer of cocoa in the world, but since then this position has been occupied by the Ivory Coast. In 1985, cocoa production in the Ivory Coast accounted for 29% of the world supply, while that of Ghana, in the same year, represented 9% of the world total.

Besides ecological factors, cocoa-bean supply is very much influenced by the prevailing world market cocoa price. A period of increasing real cocoa prices, ceteris paribus, is followed by a period of increasing cocoa bean production. Cocoa supply has therefore, for along period, followed a cyclical pattern. [29] When the supply of cocoa on the world market in any given period is low, cocoa prices tend to be pushed up.

Since cocoa exports contribute over 50% of the foreign exchange earnings of most of the producing countries, [30] in a period of high prices of cocoa on the world market, governments of producing countries often initiate policies which promote the expansion of the industry. Such policies normally include increases in producer prices of cocoa which, all things being equal, are capable of inducing cocoa farmers to give better care to their old farms and to commit new plots into cocoa cultivation. Therefore, in the long-run situation, the production of cocoa beans on the world market is increased. If the increase in supply of cocoa beans is not matched by a corresponding rise in demand for cocoa the excess supply of raw cocoa eventually results in the depression of cocoa prices.

FIGURE 8.2

WORLD COCOA SUPPLY AND REAL COCOA PRICE



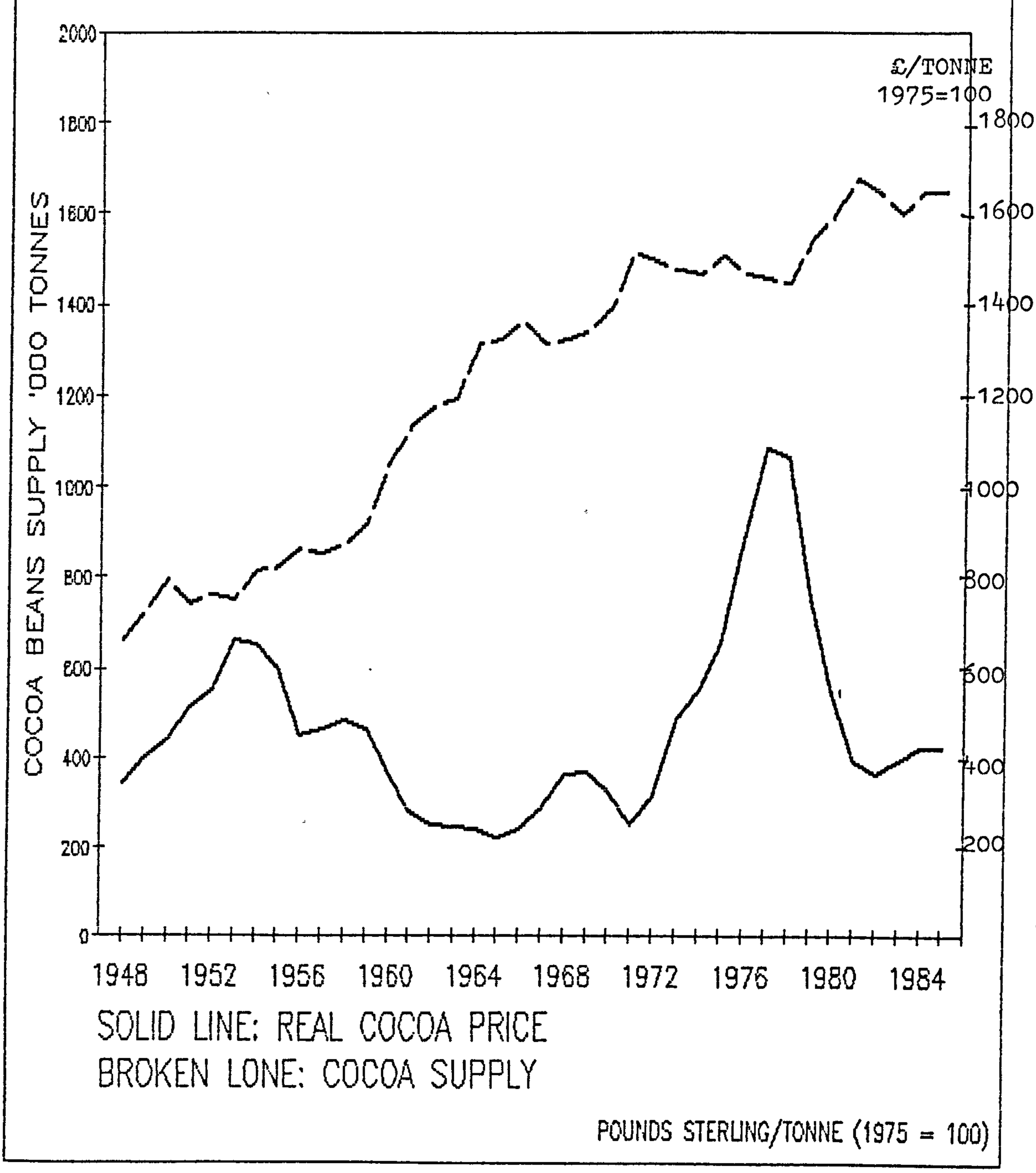
BROKEN LINE: WORLD MARKET COCOA PRICE

SOLID LINE: REAL COCOA PRICE

POUNDS STERLING/TONNE (1975 = 100)

FIGURE 8.3

WORLD COCOA SUPPLY AND REAL COCOA PRICE IN 3-YEAR MOVING AVERAGES



Currently, efforts are underway to turn round the declining cocoa output in Ghana. Similar efforts are going on in almost all the major cocoa-producing countries to step up production. If the on-going rehabilitation programmes in the major cocoa-producing countries succeed, and the upward trend in cocoa output in the Ivory Coast continues, cocoa supply onthe world market will out-grow cocoa demand and this will lead to a fall in cocoa prices. Declining cocoa prices means a decreasing net gain for cocoa exporters; the loss in foreign earnings tends to be greatest in countries such as Ghana where there is a downturn in output.

To prevent a possible glut in cocoa supply with its depressing impact on world market cocoa prices, it is important that governments of the major cocoa producing countries plan cocoa output within the limiting conditions of demand on the world market. Assuming our demand equation is a realistic representation of the world cocoa market, we can forecast, for example, the output of cocoa that Ghana and the Ivory Coast should export each year to clear the market, given that production of cocoa from all the other producing countries and all other factors that influence net cocoa beans import on the world marketdo not change over the period.

The estimated demand function, equation 4, can be expressed in the form:

$$WCD_t = 186334 \left[\frac{(GDP_{ct}/N_{ct})^{0.2692} (PSYB_t)^{0.0928}}{(CP_t)^{0.2149} (PSG_t)^{0.0455} (TT_t)^{0.0728}} \right] \quad \ldots (5)$$

Cocoa producer prices on the world market from 1973-1987 grew at an annual rate of 4%. At thisrate, we investigate the world market cocoa demand each year from 1987-1990. In the first instance, we assume a positive growth in cocoa prices for the selected period at the said rate. Later, we examine the case where world market cocoa prices decrease annually at the rate of 4%.

From equation 5, and using data based on 1986 [31] and the projected world market cocoa prices, we derive world market cocoa demand for the years 1987-1990. [32] From these figures we use the export shares of Ghana and the Ivory Coast [33] to predict the quantity of cocoa that should be exported each year by Ghana and the Ivory Coast to clear the world market.

TABLE 8.6 PROJECTED COCOA PRICES AND DEMAND: WORLD MARKET, GHANA AND IVORY COAST WHEN PRICE INCREASES EACH YEAR BY 4%

Year	Cocoa Prices £/tonne	World Demand For Cocoa (tonnes)	Forecast Cocoa Export (tonnes)	
			Ghana	Ivory Coast
1986*	1,568	1,270,553	174,066	326,532
1987	1,631	1,259,843	172,598	323,780
1988	1,696	1,249,307	171,155	321,072
1989	1,764	1,238,794	169,715	318,370
1990	1,834	1,228,480	168,302	315,719

*1986 is the base year

TABLE 8.7 PROJECTED COCOA PRICES AND DEMAND: WORLD MARKET, GHANA AND IVORY COAST WHEN PRICE DECREASES EACH YEAR BY 4%

Year	Cocoa Prices £/tonne	World Cocoa Demand (tonnes)	Forecast Cocoa Export (tonnes) Ghana	Ivory Coast
1986*	1,568	1,270,553	174,066	326,532
1987	1,505	1,281,801	175,607	329,423
1988	1.445	1,293,057	177,149	332,316
1989	1,387	1,304,501	178,717	335,257
1990	1,332	1,315,870	180,274	338,179

We have assumed that Ghana will maintain its export share of 13.7% for the period 1987-1990. If for any reason, Ghana's cocoa beans export goes up by say, 10% with no change in exports from other cocoa producing countries, the world market cocoa exports will increase by 1.37%. [34] From the estimated cocoa demand function, the price elasticity of cocoa on the world market is 21%; this leads to a fall in world market price by 6%. [35]

Similarly, a 10% increase in cocoa export from the Ivory Coast, which accounts for 25.7% of the world cocoa export, will cause the world market price of cocoa to fall further by about 12%. Therefore, given the prevailing demand conditions on the world market upto 1990, and assuming all other things are equal, it will be economically advantageous for Ghana and the Ivory Coast, the two leading cocoa exporters of cocoa in the world, to plan cocoa exports within the ranges specified in Table 8.6 and 8.7.

Footnotes to Chapter 8.

1. In the cocoa processing industry, sugar and soya beans, palm kernel or coconut oil are the chief complementary and substitute goods respectively.

2. A small proportion of processed cocoa is used in the pharmaceutical and perfume industries. There are no published statistics on the world use of cocoa butter in these two industries (See Karunasekera, 1983, p.22)

3. See Table 8.2.

4. See Karunasekara, p.37.

5. ibid p.37.

6. See Appendix 8.1 for basic data used in the demand model.

7. This procedure used to determine the functional form of models has been suggested by econometricians such as Rao and Miller. See Rao and Miller (1971) pp.18-20 and p.107 and also see Cassidy, 1981, pp.168 and 171.

8. See for example, Goreux, Louis M (1972), "Price Stabilization Policies in World Markets for Primary Commodities: An Application to Cocoa", a paper presented at the World Bank, Development Research Centre, February 9, 1972, p.25.

9. See Akiyama and Duncan, 1984, p.7.

10. See Yeung, et al, 1977, p.89. Behrman and Akiyama, et al, for example, used this approach however, the former further divided the annual grindings by current population and obtained the annual per capita grindings of cocoa beans. See Behrman, 1981, p.716 and Akiyama, et al, 1984, p,7,

11. The standard conversion factors are for cocoa butter 1.33; cocoa liquor, 1.25; cocoa powder and cake, 1.18; chocolate, 0.50; and milk crumb, 0.154. See Gill & Duffus, October 1985, p.13.

12. We could not incorporate the Soviet Union in the study because up-to-date statistics on cocoa imports from the Soviet Union were not available.

13. Again, to obtain the real money value of the per capita income and all the commodity prices in the demand equation, we converted all of them into pounds and deflated them by the United Kingdom Import Price Index.

14. See Yeung, et al, p. 94.

15. The figures in parentheses are the computed t-values of the independent variables.

16. See preceding discussion under section 8.2.2.

17. At the 95% level of confidence the critical value of the t-distribution is 1.746 which is lower than the computed t-value of the variable, GDP_c/N_c. Also at the 90% level of confidence, the critical value of the t-distribution is 1.337 which is less than the calculated t-value of the variable, TT.

18. See Pindyck and Rubinfeld, 1982, pp. 158-160.

19. See Stewart, 1986, pp. 181-182.

20. The D-W value of our equation is about 1.6.

21. See Chiang, 1967, p. 305 and also Weber, 1976, p. 344.

22. The studies made by Behrman and Akiyama et al, come out with similar low elasticities for the independent variables. See Behrman, 1968, p. 706 and Akiyama, et al, 1984, p. 14.

23. See Table 8.3.

24. See Table 8.4.

25. See Table 8.4.

26. See Yeung, et al (1977), p. 102.

27. See Cakebread, 1975, p. 53.

28. Growth rates were computed from figures of cocoa beans demand in Gill and Duffus, Cocoa Market Report, October, 1985, p. 9.

29. See Figures 8.2 and 8.3 and Appendix 8.2, especially Appendix 8.3.

30. In Ghana for example, cocoa contributes as much as 60% of the country's yearly foreign exchange earnings.

31. The per capita income of the 15 selected countries in 1986 was £175,962, world market cocoa price was £1,568/tonne, the world market price of sugar per tonne was £278 and that of soyabean oil was £232 per tonne.

32. See Table 8.6 and 8.7 below.

33. These shares were respectively 13.7% and 25.7%.

34. Ghana's cocoa export in year t, $GCE_t = 0.137\ WCE_t$, where WCE_t = world cocoa export in year t. If in year t+1, Ghana's cocoa export goes up by 10%, then Ghana's cocoa export in that year will be
$GCE_{t+1} = 1.1GCE_t = (1.1)(0.137)\ WCE_t = 0.1507\ WCE_t$
Thus the world market cocoa export increases by 0.0137, that is 1.37%.

35. Elasticity of demand is defined as a percentage change in quantity demanded of a commodity divided by a percentage change in the price of the commodity. This implies that a percentage change in price of the commodity can be derived by dividing the percentage change in the quantity of the commodity demanded by the elasticity of demand.

CHAPTER 9

COMPARATIVE ADVANTAGE ANALYSIS OF COCOA PRODUCTION [1]

Introduction and Methodology

With the ever declining real producer price of cocoa in Ghana and its depressing impact on farmers' income and cocoa output, the peasant cocoa farmer who lives in the heart of the cocoa zone, [2] and the government have to grapple with the vexed question of whether to abandon the industry altogether and invest in a more rewarding crop or to maintain the cocoa industry while efforts are made to develop a substitute cash crop. A decision of this nature requires an assessment of the private and social profitability of cocoa production at various producer prices and world prices respectively. This chapter therefore, measures the relationship between the current private and social advantages of cocoa to provide guidance to the government in planning for the industry and in setting price conditions for the farmer.

In Ghana, oil palm, coffee, citrus, cola and rubber are the main cash crops which compete with cocoa for almost the same investment resources. Of these crops, oil palm is the one most extensively grown by peasant farmers apart from cocoa.

The area under oil palm plantation has grown from 110,900 hectares in 1970 to 157,000 hectares in 1972 [3]. As many as 40% of the cocoa farmers randomly interviewed in 1983 in the Ashanti Region Cocoa Project zone by the author about the crop they most preferred to grow, given the availability of resources, chose the oil palm; 13% decided for cocoa, and the rest opted for foodcrops [4]. The interview results and the fast rate at which oil-palm cultivation is growing, make oil palm an important candidate for a comparative profitability assessment with cocoa at the private and social levels.

In the Ivory Coast equal weights of cocoa and coffee have, from 1980 to 1982, attracted the same producer prices [5], and farmers have the choice of investing in either crop or both. Faced with the constraint of limited resources in terms of land and capital inputs, the Ivorian peasant farmer has to decide to produce the crop which is advantageous to him given the prices he is offered. The Ivorian government on its part, has to decide which of the two crops has more potential to generate foreign exchange so that more emphasis can be placed on its production.

To aid the government to decide which crop is more economic to produce given the available resources and world prices and whether the producer-price regime is right, we carry out private and social cost-benefit analyses of the production of cocoa and the selected competitive crops. The scope of the social evaluation does not encompass all the

externalities attributable to the production and marketing of either crop because of the lack of data. However, shadow prices have been used to value all the cash flows involved in the production of each of the crops.

On the international scene, both Ghana and the Ivory Coast are major producers of cocoa . Now that Ghana is trailing behind the Ivory Coast and Brazil in cocoa output, every effort is being made by the Ghanaian government to save the cocoa industry from total collapse. Similar attempts have been embarked upon in the Ivory Coast to ensure that the Ivory Coast maintains its lead in cocoa production for many more years to come.

In the light of this international competition, we employ the Domestic Resource Costs (DRC) method in section 9.2 to measure the social opportunity cost of cocoa production in Ghana and the Ivory Coast. We hope the results will influence governments of the two countries to consider seriously the question of agricultural diversification.

9.1 Private and Social Cost-Benefit Analysis

9.1.1 Ghana: Profitability Of Cocoa And Oil Palm Production

9.1.1.1 Cash Flows

(a) Costs

Costs of production per acre of the two crops in each case have been classified into investment and operating-cost

components. Investment costs embrace capital expenditure on land preparation and the acquisition of farm inputs including land. Operating costs, on the other hand, cover largely costs of labour and off-farm inputs.

The various stages of production are matched with their corresponding man-day requirements. [6] In the case of the social cost-benefit analyses, subsidies on fertilizers, sprayers and insecticides have been ignored so that the prices used will reflect the actual cost of the inputs to the society.

(b) Benefits

The hybrid cocoa starts producing in the third year but, because the primal yield per acre is then normally very small [7], we reckon cocoa yield from the fourth year onwards. The estimated yields were obtained from the World Bank appraisal of the Ashanti Cocoa Project (ACP) [8]. In 1982, the producer price of cocoa per load of 30kg (66lb) was C360; this is multiplied by the yearly yields to produce the annual stream of benefits.

The commonest variety of oil palm grown in Ghana is the tenera. [9] The tenera has an economic life of 25 years [10] and a gestation period of 3 years; since the third year's yield, like that of cocoa, is negligible, it has not been included in the calculation of the benefits. A tenera plant produces 60kg of palm nut per year; this is equivalent to 2

gallons of palm oil. The price of palm nut in 1982 was estimated to be ¢3.00 per kilogram.

(c) Shadow Exchange Rate

The over-valuation of the Ghanaian cedi calls for an adjustment of the world market prices of cocoa and palm oil by choosing a shadow exchange rate for the economic analysis. While in 1982 the official exchange rate was ¢2.75 to the dollar (ie. ¢4.44 = £1, see World Bank, 1984, p. vi), on the parallel market, the pound sterling was worth about ¢54.00. [11] This was due to the restrictive trade policies of the government which had made foreign exchange assume more economic value than was reflected by the existing official exchange rate. Because of thisa shadow exchange rate of ¢50.00 to a pound sterling has been chosen for the analysis.

At this shadow exchange rate, the prices of cocoa beans and palm oil on the world market in our base year have been estimated as ¢23.43 and ¢6.00 per pound weight respectively.[12]

(d) Choice Of Discount rate

The long economic lives of cocoa and oil palm trees warrant the use of an interest rate to discount the cash flows associated with the crops. For the private appraisal, the real interest rate to be used may be derived by deflating

the prevailing nominal interest rate by the rate of inflation. In 1982, Ghana was faced with a two-digit inflation; while the nominal interest rate was 10.5%, inflation was running at the rate of 22.1%. The real interest rate in 1982 was thus - 9.5% [13]. A negative real discount rate naturally inflates the net present value of an investment and therefore, care must be exercised in the interpretation and use of the result for decision making. We have selected two additional discount rates for the private appraisal to compare the net returns. Cash flows under the social cost-benefit are discounted at the rates of 5% and 10%.

With the selected discount rates and the basic data provided in Appendices 9.1 and 9.2, the present value of costs (PVC) and the present value of returns (PVR) for each of the crops have been derived by discounting the yearly costs and benefits for the economic lives of the crops. [14] The net present value (NPV) of returns of each crop is obtained by taking the difference between the PVR and the PVC. The returns per man-days [15] have been computed for the private cost-benefit analysis.

9.1.1.2 Results Of Private Cost-Benefit Analysis Of Cocoa And Oil Palm Production

Table 9.1 shows that privately, oil palm production is more profitable than cocoa cultivation. There is a host of

ancillary products that can be obtained from the oil palm tree which makes it even more rewarding than cocoa to the local farmer.

The relatively short economic life of the oil-palm tree for example, implies that land committed to oil-palm plantation could be released after twenty five years, at most, for other agricultural investments. Cocoa, on the other hand, monopolises the land for as long as forty years.

TABLE 9.1 PRIVATE PROFITABILITY OF COCOA AND OIL PALM PER ACRE

	Cocoa	Oil Palm
Economic life (years)	25	25
Man-days per year/acre	69	76
NPV/acre at discount		
rate of -10%	¢ 433,841.74	¢1,281,287.32
0%	¢ 69,435.72	¢ 215,828.00
10%	¢ 16,326.51	¢ 57,520.73
Returns /man-day at		
-10%	¢251.50	¢674.36
0%	¢ 40.25	¢113.59
10%	¢ 9.46	¢ 30.27

Even when the oil-palm tree has come to the end of its productive years in terms of fruit bearing, it can still possess a high degree of economic utility. The tree can be tapped for its palm wine which, when fermented, can be distilled to produce a local gin called 'akpeteshie'. There is a very high demand for this gin in Ghana, and in 1982 a beer-bottle (about 1.14 pints) was sold for about ¢80. [16] As a matter of fact, palm-wine tapping provides a livelihood for many rural dwellers.

The palm-wine is collected in clay-pots and this means the creation of a market for the products of the local potters. The manufacturing of felling-chisels, tapping-knives and distilling-pipes ensures the continuity of the local blacksmith's job. Palm-wine selling offers employment opportunities to women. Similarly, the sale of `akpeteshie' constitutes a big business for some rural and urban dwellers who purchase the gin from the distillers and retail it in the cities.

Apart from the oil which can be extracted from the fruits of the oil-palm, there is another industrial oil which can be obtained from the kernels of the palm fruits. In 1982, a metric ton of palm oil and palm kernel oil sold respectively at $432 and $262 on the world market [17]. The palm branches of the oil-palm tree are used to make baskets, and this has provided self-employment to a number of people in the rural areas.

These additional products from the oil-palm tree combine with the differences already mentioned to make oil-palm plantation more profitable than cocoa farming to the individual farmer at 1982 producer prices. The kind of attraction oil-palm cultivation has from Ghanaian peasant farmers is reflected in the trend of growth of these two competing crops between 1970 and 1979. While the output of cocoa fell by 35% during the 10-year period, oil palm registered a 46% rise in output. [18]

9.1.1.3 The Results Of Social Cost-Benifit Analysis Of Cocoa And Oil Palm Production

The social cost-benefit analysis of cocoa and oil palm produced a contrary result; cocoa emerged superior to oil palm in earnings from the world market. The NPV of returns from cocoa was almost double that of palm oil at the 10% discount rate [19].

TABLE 9.2 ECONOMIC PROFITABILITY OF COCOA AND OIL PALM (1982 PRICES) PER ACRRE

Crop	A	B	C
Cocoa Beans	23.43	57,063.43	102,662.01
	37.49	113,610.85	220,843.65
	46.86	151,295.71	289,987.80
Palm Oil	6.00	33,998.40	64,929.60
	9.71	24,038.88	62,897.93
	12.01	37,071.60	87,787.61

A: Shadow price/lb (¢) at exchange rates of ¢50, ¢80 and ¢100 to the pound.
B: NPV of returns @ 10% real discount rate (¢)
C: NPV of returns @ 5% real discount rate (¢)

The positive NPVs of returns for both crops indicate that their production in Ghana is socially desirable. In other words, the cash flow from either of the crops is capable of repaying the initial investment and at the same time, earning a yearly return greater than the selected real discount rate [20]. But, as noted earlier, because the NPV of returns from cocoa is greater than that of the oil palm, cocoa comes on top as the more effective foreign-exchange generator of the two cash crops.

The palm-kernel oil has not been considered here because it is, by and large, a domestic commodity. Future exports of palm-kernel oil will, at least support the overall foreign earnings from the oil palm, but still the world market value of cocoa will be higher than that of the oil palm given the current demand for the two commodities.

Owing to the overvaluation of the Ghanaian currency, it was deemed expedient to conduct a sensitivity analysis based on the shadow exchange rate. Therefore, two additional shadow exchange rates of ¢80 and ¢100 to the pound sterling were chosen. These gave respectively the following pairs of shadow prices per pound weight for cocoa beans and palm oil on the world market:

(a) ¢37.49; ¢9.71, and

(b) ¢46.86; ¢12.01.

The sharp fall in the NPVs of returns at the three different prices demonstrate how sensitive are the economic returns from cocoa and oil palm to changes in the shadow exchange rate.

9.1.2 The Ivory Coast: Profitability Of Cocoa And Coffee Production

9.1.2.1 Cash Flows

(a) Costs

The costs of production for cocoa and coffee in the Ivory Coast have been similarly categorised into investment and operating costs. Costs of inputs were obtained from several sources including World Bank (1974, p.414), Linn (1977, p.49) and Elliot(1974, pp.110-122). Since some of the prices from the aforementioned sources were those that prevailed in the economy in the 1970s, we had to use the Consumer Price Index(CPI) to update the general price level in the economy in 1982.

(b) Benefits

The application of fertiliser to cocoa and coffee results in substantial early yields of the two crops; hence the benefit flows of the crops are calculated from the third year. Because the cocoa species grown in the Ivory Coast and Ghana are the same, we have chosen the same economic life of 25 years for a cocoa farm in the Ivory Coast. The coffee plant, however, has a shorter economic life. [21]

(c) Shadow Exchange Rate

Unlike the Ghanaian currency, the Ivorian franc was not overvalued in our base year. In addition, trade practices in the Ivory Coast were less restrictive in 1982. There was therefore, virtually no difference between the economic and official values of the franc. We have accordingly pegged our shadow exchange rate for the Ivory Coast economy at the official exchange rate of CFAf336.25 to the U.S dollar. [22] At this rate the world market prices of cocoa and coffee per kilogram weight come to CFAF 622.40 and CFAF 1,037.33 respectively. [23]

(d) Choice Of Discount Rate

The nominal interest rate in the Ivory Coast in 1982 was 12.5%. [24] The rate of inflation in the economy that year was 7.4% - thus giving a real discount rate of 4.7%. However, to facilitate computation, we have rounded off the real discount rate to 5%.

9.1.2.2 Results of Private Cost-Benefit Analysis of Cocoa and Coffee Production

The results reveal that per hectare cocoa has a higher return per man-day than coffee. [25]

TABLE 9.3 FINANCIAL PROFITABILITY OF COCOA AND COFFEE

	Cocoa	Coffee
Economic life (years)	25	25
Man-days per year/hectare	173	214
NPV of Returns At 5% Real Discount Rate (CFAF)	3,761,544.67	1,927,940.42
Returns per man-day (CFAF)	869.72	360.36

One part explanation for the difference in the returns per man-day per hectare from the two crops is that it requires about 39% more man-days per hectare to maintain a coffee farm annually than a cocoa farm. This puts much drain on the returns that are likely to accrue to the coffee farmer.

9.1.2.3 Results Of Social Cost-Benefit Analysis Of Cocoa And Coffee Production

When it comes to the earnings of the two crops from the world market, coffee has a slight edge over cocoa. [26]

TABLE 9.4 ECONOMIC PROFITABILITY OF COCOA AND COFFEE

Crop	price/kg CFAF	NVP Of Returns At 5% Real Discount Rate (CFAF)
Cocoa	622.40	9,394,589.61
Coffee	1,037.33	12,170,277.66

The yield of the coffee tree is more susceptible to weather vagaries than that of the cocoa tree. This makes world coffee production to be less stable than that of cocoa. Nevertheless, coffee as a beverage appeals more to consumers than cocoa when the latter is used as beverage. Hence, the unstable supply of and the high demand for coffee on the world market, might partly account for its economic advantage over cocoa. However, judging from our results, the difference in net returns between the two crops as of 1982 was not very large.

9.2 Cocoa Production In Ghana And Ivory Coast: Social Opportunity Cost Analysis

9.2.1 The Theory Of Comparative Advantage

The doctrine of comparative advantage [27] owes its origin to the work of David Ricardo in the early nineteenth century. [28] According to Ricardo, a country specialises advantageously in the export of a commodity if the relative cost of producing it is lower than in other counties. [29] Briefly stated, a country has a comparative advantage in the good that it can produce cheaply, that is, at lower opportunity cost than its trading partner. [30]

Following the pioneering work of Ricardo several versions of the theory of comparative advantage have been developed. [31] A common feature of many of the formulations of the

concept is the reliance on simple models comprising two countries, two commodities and one or two factors of production to demonstrate the economic efficiency of the principle of comparative advantage. Attempts have been made to modify the theory to overcome the limited dimensionality of the formal models, while at the same time, permitting a relaxation of the restrictive assumptions associated with them. [32]

9.2.2 Measuring Comparative Advantage-The Domestic Resource Costs(DRC)

One of the efforts which have been made to measure comparative advantage irrespective of the number of countries and commodities concerned, begins with Chenery's view [33] that a country can be described as having a comparative advantage in exporting a commodity if the social opportunity cost of producing additional amounts of the commodity [34] is less than the commodity's export price, and if the analysis considers social valuations of outputs and variables over time [35]. This definition of comparative advantage can be expressed relative to costs and returns as:

$$FM_v SER + \sum_{m=1}^{n} Q_m P_m < V_Q SER + E \qquad \ldots (1)$$

where,

V_Q = total value at world prices (in foreign currency), of the output of the project/commodity in question;

SER = shadow foreign exchange rate expressed as a ratio of local currency to foreign currency;

E = Net external benefits generated by the project/commodity for the rest of the domestic economy;

FM_v = Total (direct plus indirect) value (in foreign currency) of imported materials used by the project/commodity and total (direct plus indirect) value (in foreign currency) of repatriated earnings of foreign-owned factors of production employed on the project/commodity (including repatriated portions of the direct foreign factors cost, Q_1P_1 and of the indirect foreign factor costs);

Q_m = total (direct and indirect) quantity of the nth domestic factor employed on the project/commodity; and

P_m = Shadow price (in domestic currency) of the nth domestic factor employed on the project/commodity.

Equation 1 states that a country has a comparative advantage in producing and exporting a commodity if total social costs of an incremental output of the commodity in question [36] are less than total returns (V_QSER) plus net external benefits (E).

A re-arrangement of the terms of Equation 1 yields the following relationship:

$$\frac{\sum_{m=2}^{n} Q_m P_{rn} - E}{V_Q - FM_v} < SER \qquad \ldots (2)$$

The term on the left side of Equation 2 defines the domestic resource costs (DRC) of foreign exchange earned or saved by the activity in question as formulated by Michael Bruno [37]. The DRC measures the social opportunity cost (relative to the domestic factors of production employed directly or indirectly) of earning a net marginal unit of foreign exchange.

The concept of DRC is a restatement of the principle of comparative advantage: an export is socially profitable or has a comparative advantage in international trade, if the opportunity cost of domestic resources used in its incremental production per unit of net foreign exchange earned is less than the shadow price of foreign exchange [38]. The country has a comparative advantage for producing the incremental output of the commodity if the DRC ratio of the commodity is less than the shadow exchange rate.

The identification of classical comparative advantage in an international context from the DRC formula requires a further rearrangement of Equation 2 . This involves

multiplying through the equation by the inverse of the term for the shadow exchange rate (SER) to obtain the expression:

$$\frac{\sum_{m=2}^{n} Q_m P_m - E}{SER(V_Q - FM_V)} < 1 \qquad \ldots (3)$$

Equation 3 represents a ratio between the DRC of the Economic activity concerned in a country and the country's shadow exchange rate (SER). The DRC/SER ratio calculated for the same economic activity for all the countries for which the international comparative advantage of the economic activity isto be determined are then compared.

For example, in determining the comparative advantage of cocoa production in Ghana and the Ivory Coast, we first of all compute cocoa's DRC in both countries. We then derive for each country the ratio between cocoa's DRC and the country's SER. Next, we compare and rank the DRC/SER ratios. The country with the lower DRC/SER ratio is the one relatively more capable of reaping net social benefits from additional cocoa production.

9.2.3 Application Of DRC To Cocoa Production In Ghana And The Ivory Coast

9.2.3.1 Basic Data [39]

Requisite data for computing the DRC for cocoa production in each country cover the prices and quantities of all domestic and foreign inputs employed in the establishment and maintenance of an acre of hybrid cocoa; prices and quantities of foreign inputs; and the price of cocoa on the world market [40].

It takes seven years for the hybrid cocoa to reach its peak yield. Cocoa production begins in the third year and by the seventh year, the trees have attained their maximum yield-capacity. The long gestation period makes it necessary foran incorporation of a time value in the computation of the DRC. The yearly cash flows have therefore been discounted at an interest rate of 10%.

Because an individual cocoa farm has little external benefit to offer the community in which it is located, we do not include in our DRC estimation a figure for external social benefits (E). Extra gains go directly to the private cocoa farmer in the form of foodstuffs, [41] which are inter-cropped with the cocoa. These gains which are reaped in decreasing amounts in the first fouryears of the establishment of the cocoa farm are excluded from the benefit estimation.

9.2.3.2 Shadow Price Of Land

With the near-exhaustion of suitable land for cocoa production in Ghana, farmers often migrate to Brong-Ahafo and Western regions where they are able to purchase good land for cocoa cultivation. Prices of such plots vary from place to place. To obtain a representative economic price of land, we estimate the opportunity cost of land in terms of foodstuffs which could have been alternatively produced from the land.

This is in keeping with the following suggestion of UNIDO(1972, p.61) on the costing of land:

> If the land required by a project has no other potential use, the market-clearing price of the land is zero, and irrespective of the actual cost that must be paid for it, the land must be measured at zero cost as an input to the project. If the land does have an alternative use, but if the market price does not provide an appropriate measure of its value, it may be possible to measure the cost of the land by the net benefits forgone because the land can no longer be devoted to the alternative use.

The common food crop in the cocoa growing areas is plantain. An acre of land can accommodate 340. plantain trees which yield respectively 340, 170, 102 and 54 bunches a year from the first to the fourth year [42]. With the 1982 price of ¢15 per a bunch of plantain, the total value from an acre of plantain farm for the four years discounted at the rate of 10%, is ¢8,446. [43]

Based on this figure, we imputed ashadow price of ¢8,000 to an acre of land in Ghana. Similarly, on the basis of

opportunity cost, we obtained for the Ivory Coast, the shadow price of CFAF 25,000 for an acre of land.[44]

9.2.3.3 Shadow Wage Rate

The general view of economists who have done work on the labour market in developing countries is that there is an excess supply of unskilled labour over demand in the agricultural sector.[45] The implication of this is that in the developing countries, the cost of labour tends to be low in the agricultural sector.

The situation in Ghana and the Ivory Coast tends however, to negate this popular view, at least in the agricultural sector. In Ghana, the general tendency is for the rural youth population to migrate into the urban centres to work in the factories, thus cutting down considerably the agricultural labour force in the rural areas. The Ghanaian agricultural labour problem is further compounded by the exodus of the rural youth to Nigeria between 1975 and early 1983. The few available workers are competed for by cocoa, food-crop and vegetable farmers, especially during the peaks of labour demand. In the event, the price of labour has risen beyond the official wage rate.

In the Ivory Coast, foreign workers combine with the scanty indigenous youth population to provide labour to the agricultural sector; nevertheless, cocoa farmers have problems in obtaining ready labour to work on their farms

because, as in Ghana,. demand for labour outstrips the supply at wages that the farmers expect to pay.

The statutory wage rate in Ghana in 1982 was ¢12(World Bank, 1984, p.178),but with the existing excess demand for labour, the actual cost for hiring a day-worker in 1982 in the cocoa growing areas averaged ¢66.00.The high demand for labour and the cost of the worker's meals operated jointly to raise the labour cost to about five times the nominal official wage in 1982. We have accordingly chosen for the study a shadow wage rate of ¢50 for Ghana; this takes into account the cost of meals given to the worker. Similarly, the shadow wage rate in the Ivory Coast has been fixed at CFAF 400 [46] to reflect the scarcity of agricultural labour.

9.2.3.4 Shadow Exchange Rate (SER)

For the same reason given for the private and social cost-benefit analyses, [47] the shadow exchange rates chosen for the calculation of the DRC of cocoa in Ghana and the Ivory Coast are respectively, ¢50 to the pound sterling and CFAF 336.25 to the U.S. dollar.

9.2.3.5 Government Subsidies On Inputs

In order that prices of other inputs such as cutlasses, spraying machines, insecticides and fertilizers will reflect social opportunity cost we have removed all government

subsidies on such inputs. For example, in Ghana, government subsidy on spraying machines and insecticides from 1960 to 1977 ranged between 75% and 90% (Nyanteng, 1980, p.88)

9.2.3.6 Measurement Results

From the basic data presented in Appendix 9.3, the DRCs of Ghana and the Ivory Coast were calculated and divided appropriately by the SERs to obtain the DRC/SER ratios shownin Table 9.5.

TABLE 9.5 DRC/SER RATIOS FOR COCOA PRODUCTION

Country	DRC/SER Ratio
Ghana	0.760
Ivory Coast	0.217

Both ratios were less than 1. The implication of this is that cocoa production is socially profitable in Ghana and the Ivory Coast. However, since the smaller the DRC/SER ratio, the greater the relative comparative advantage, we can infer from the results that the Ivory Coast commands a larger relative comparative advantage in cocoa production than Ghana. In other words, while the Ivory Coast sacrifices about 22% of a unit of its domestic resources to produce cocoa and gains one comparable unit of foreign exchange, Ghana has to forgo as much as 76% of a unit of its productive factors to earn a unit of foreign exchange.

In general, resource availability and the prices of agricultural inputs in Ghana and the Ivory Coast combine to explain the DRC/SER ratios in Table 9.5. For example, in the Ivory Coast, the availability of excess cocoa land [48] makes the cost of comparable land much cheaper than in Ghana. In the same way, the adequate supply of agricultural inputs in the Ivory Coast[49] implies that prices of such commodities are determined essentially by the interplay of demand and supply forces, whereas in Ghana non-availability of agricultural inputs coupled with price-control policy often leads to high input prices. The larger the total domestic input costs [50], the higher the DRC/SER ratio is likely to be.

9.2.4 Sensitivity Analysis

The DRC/SER ratios are sensitive to changes in the SER and price of cocoa on the world market. The ratios vary inversely with changes in both SER and price of cocoa. [51]

For instance, as shown in Table 9.6, an increase in the price of cocoa, all other factors held constant will raise the value of the denominator in the ratio and this will decrease the magnitude of the DRC/SER ratio. A bigger DRC/SER ratio will result from a fall in the world market price of cocoa.

TABLE 9.6 SENSITIVITY ANALYSIS: 10% CHANGE IN WORLD MARKET PRICE OF COCOA

Country	Price Of Cocoa Per Pound	DRC/SER Ratio
Ghana	£0.52 (increase)	0.680
	£0.42 (decrease)	0.862
Ivory Coast	$0.9236 (increase)	0.196
	$0.7556 (decrease)	0.243

Similarly, when the SER is raised without altering other factors (Table 9.7), the denominator will again become bigger than before and this will depress the DRC/SER ratio. However, the ratio will be pushed up when the SER is reduced.

TABLE 9.7 SENSITIVITY ANALYSIS: 10% CHANGE IN SHADOW EXCHANGE RATE (SER)

Country	SER		DRC/SER Ratio
Ghana	¢55	(increase)	0.691
	¢45	(decrease)	0.845
Ivory Coast	CFAF322.65	(increase	0.226
	CFAF262.35	(decrease)	0.278

From the sensitivity analysis, the social desirability of cocoa production in Ghana very much depends on favourable world market price of cocoa. This necessary condition should exist side by side with a realistic exchange rate adjustment of the Ghanaian currency. An overvalued domestic currency will, for example, render cocoa production socially uneconomic.

9.3 Conclusion

The private cost-benefit and social-opportunity-cost analysis carried out in this chapter have revealed the following:

1. To the Ghanaian peasant farmer, oil palm production is more profitable than cocoa farming.
2. To the Ghanaian community, investment in cocoa production has more foreign-exchange-earning potential than investment in oil-palm plantation.
3. To the Ivorian peasant farmer, cocoa production is more financially promising than coffee cultivation.
4. To the Ivorian community, coffee generates higher foreign-exchange equivalent value than cocoa.
5. The social opportunity cost of cocoa production is higher in Ghana than it is in the Ivory Coast.

The attractiveness of oil palm plantation to Ghanaian peasant farmers is clearly seen in the 46% rise in oil palm output from 1970 to 1979 while within the same period, cocoa output fell by 35% [62]. But because cocoa provides Ghana with a higher contribution to its economic development, it is of paramount importance that the government halts the diversion of resources from the cocoa sector into the production of oil palm by raising the producer price of cocoa to a level which will make an investment in cocoa more

rewarding than any other major competitive crop in the country.

Given the reward positions of the cocoa and coffee crop in the Ivory Coast, most farmers are likely to opt for cocoa production but since coffee has a higher earning potential for real social income than cocoa the Ivorian government should adopt policies which will encourage the continued production of both crops at output levels that will ensure maximum economic benefit to the country. [53]

The fifth observation made above from the study provides a strong case for Ghana to shift from monoculture to diversified agricultural practice. The second observation, however, makes it imperative for the Ghanaian government to embark upon policies which will save the industry from a total collapse. A number of such policies are suggested in the concluding chapter.

Footnotes to Chapter 9

1. We recognise that technically we cannot talk about measuring the comparative advantage of the production of one crop in two non-homogeneous countries. What we are doing here is to use a variant measure of comparative advantage, namely, Domestic Resource Cost, to estimate the social opportunity cost of cocoa production in Ghana and the Ivory Coast. See section 9.2.2 below.

2. Cocoa farmers living in the border towns seem to have found a solution, though illegal, to the poor domestic remuneration they receive for their cocoa by selling their produce on the foreign markets. But for the majority of the farmers, the only alternative is to sell to the GCMB.

3. See World Bank, 1983, p.52.

4. See Ofori-Attah, 1985, p.168; also see Chapter 5 above.

5. See de Wilde, 1984, p.94. These prices were constant over the period.

6. See Appendix 9.1. The man-days are the estimates made by the field assistants of the Ashanti Cocoa Project (ACP).

7. For instance, the ACP farms yielded on average 181b per acre in the third year. See ACP, 1982, p,55.

8. See World Bank, 1975, Appraisal of Ashanti Region Cocoa Project, Ghana, Annex 9. The ACP is one of the two major cocoa rehabilitation projects launched by the government in the 1970s. It covers a wider zone than the other project-the Suhum Cocoa Project. See Chapter 5 above.

9. The information on the oil palm industry produced in the study was obtained from Ofori-Gyamfi, Eugene, 1986. See bibliography.

10. For the sake of comparison and also for the fact that net returns tend to be negligible as n becomes large, we have used a common economic life of 25 years for all the analyses.

11. The black-market exchange rate between the U.S. dollar and the cedi was U.S. $1.00 = ¢0.03 and this comes to ¢53.82 to a pound sterling See May 1985, p.129.

12. See World Bank (1984), p. 4 and Gill & Duffus, May 1983, p. 23 for world market prices of palm oil and cocoa. For example, in 1982, a tonne of palm oil was sold on the world market for U.S. $445.1 (£264.86) while the same weight of cocoa sold for £1,033.

13. To calculate the real discount rate, divide the nominal interest rate plus unity (1.105) by the inflation rate plus unity (1.221) and subtract unity from the result (-0.095). This figure is rounded off to -10%.

14. See footnote under 'BENEFITS' above.

15. The NPV of a crop is divided by the total number of man-days and the economic life of the crop to give the returns per man-day.

16. Information collected through a questionnaire administered on my behalf by Mr Kramo Braimah, a school teacher in the Ashanti Region, the chief cocoa growing region in Ghana.

17. See World Bank, 1984, p. 22.

18. Cocoa's output fell from 409,000 tonnes in 1970 to 265,000 tonnes in 1979 (World Bank, 1983, p48) while that of oil palm increased from 693,996 tonnes in 1970 to 1,012,000 tonnes in 1979 (World Bank, 1983, p. 50).

19. See Table 9.2.

20. See Roemer, Michael & Joseph J Stern, 1981, p. 85.

21. Again, a common economic life of 25 years was chosen for cocoa and coffee.

22. See UNO, 1982, Statistical Yearbook, p. 301.

23. See World Bank, 1984, p. 4 and Gill & Duffus, May 1983, p. 23.

24. See IMF, 1983, Statistiques Financieres Internationales, p. F. 271.

25. See Table 9.3.

26. See Table 9.4.

27. This term is used interchangeably with 'comparative cost' in most texts.

28. See Ricardo, 1817.

29. See Yeung, et al (eds), 1977, p. 115.

30. See Wonnacott & Wonnacott, 1986, p. 637. The theory of comparative advantage requires certain assumptions which vary according to what exactly is being asserted.

31. See Eli Hecksher, 1919, pp. 19-32 and Bertil Ohlin, 1933.

32. See for example, the contribution of Michael Bruno in this area, 1967, pp. 548-49 & 1972, pp. 21-22, in fact, Bruno is the originator of this idea of measuring comparative advantage.

33. See Hollis Chenery, 1961, pp. 18-51.

34. This implies the social value of factors of production used to produce the commodity if employed in their next best uses.

35. See Yeung, et al (eds), 1977, p. 116.

36. These social costs include the direct and indirect foreign costs (FMvSER, equivalent to Q_1P_1) and direct and indirect domestic costs (QmPm).

37. See Bruno (1965) and Steel (1970), pp. 60-69. Bruno expressed his DRC formula as:

$$\frac{\Sigma\, f_{sj}\, P_s}{P_j - f_{m+1,j}} < E,$$

where,
f_{sj} = input of primary factors per unit of output j;
P_s = price of primary factors s;
P_j = price per unit of output;
$f_{m+1,j}$ = total foreign exchange value of net imported inputs employed in project j; and
E = shadow exchange rate

38. See Yeung, et al (eds), 1977, p. 117.

39. See Appendix 9.3.

40. All prices are based on 1982 market conditions.

41. Such foodstuffs might include plantain, cocoyam, cassava and several vegetables.

42. See ACP, 1982, p. 85.

43. In 1985, an acre of land was sold for about for about ¢10,000 in the Western Region of Ghana(Sefwi-Wiawso). This information was gathered through a questionnaire

administered on my behalf by Daniel Bosieh, a university graduate teacher in the Western Region of Ghana.

44. The price of a bunch of plantain in the Ivory Coast in 1982 was estimated to be CFAC46. This price was used to determine the total earnings from an acre of a plantain farm for 4 years (the economic life of plantain). The resulting figure was then discounted at the rate of 10%.

45. See, for example, Lewis, W.A. (1954), 'Economic Development with Unlimited Supplies of Labour', Manchester School, 22, pp. 139-91 and also Ghatak, S and Ken Ingersent (1984), p. 98.

46. This figure is about 20% higher than the official wage rate in the Ivory Coast.

47. See sections 9.1.1.1 (c) and 9.1.2.1 (c) above.

48. See section 4.1 above.

49. See section 4.3 above.

50. Because of trade restrictions in Ghana, all producers face higher input costs than their counterparts in the Ivory Coast.

51. Changes in cocoa prices and in the shadow exchange rates were made arbitrarily to examine the behaviour of the DRC/SER ratios.

52. See Section 9.1.1.2 above.

53. See preceding chapter for discussion on the quantities of cocoa beans that will be economic for Ghana and the Ivory Coast to export between now and 1990.

PART V

RESEARCH FINDINGS, RECOMMENDATIONS AND EPILOGUE

CHAPTER 10

CONCLUSION

10.1 Research Findings

The fore-going anatomy of the cocoa industry in Ghana and the Ivory Coast has revealed a number of government policies which have operated in conjunction, on one hand, to cripple the Ghanaian cocoa industry and, on the other hand, to promote the cocoa industry in the Ivory Coast.

Government policies studied were those related to agricultural investment, cocoa producer price, cocoa marketing system, the supply of farm inputs and the maintenance of cocoa farms. The following section gives a resume of observations, made on each of the policies in the two countries.

Summary of Findings

10.1.1 Agricultural Investment

Most development plans in Ghana have given top priority to industrial development whereas in the Ivory Coast, emphasis has generally been placed on agriculture. Consequently, resource allocations to the agricultural sector have always

been lower in Ghana than in the Ivory Coast. We note, for instance, that from 1960 to 1980, the Ghanaian agricultural sector on the average, benefited from total public expenditure by only 8.9% while in the Ivory Coast, the percentage of public expenditure devoted to agriculture during the same period was 26. The government of Ghana spent less than 0.3% of its GDP from 1959 to 1971 on agricultural development as compared to the Ivory Coast government's figure of 1.65%.

10.1.2 Cocoa Producer Price

The Ivorian cocoa farmer receives a better remuneration than his Ghanaian counterpart. The profitability of cocoa on typical land for which data sited in the Ivory Coast in 1982 was apparently higher than that of coffee, which is the chief rival crop. In Ghana, cocoa apparently ranked in 1982 last among the major food and cash crops in terms of profit-rating. Furthermore, the purchasing power of the price received by the Ghanaian cocoa farmer was lower than that received by the Ivorian farmer. The disparity in farmer remuneration in the two neighbouring countries has led to an illicit trade in cocoa beans between some Ghanaians living in the border-towns and cocoa merchants from the Ivory Coast. Similar trade goes on in the eastern border with Togo. According to our estimation in Chapter 7,

the quantity of cocoa beans smuggled out of Ghana each year from 1976 to 1982 ranged between 23,000 and 45,000 tonnes.

10.1.3 Cocoa Marketing System

Cocoa is purchased, and sold on the world market in Ghana by a Marketing Board which was established in 1947. The Board has purchasing clerks stationed in almost every cocoa-growing town who buy cocoa beans from producers. Beans purchased are bagged and stored in sheds for onward transportation to the ports of shipment. A uniform producer price is fixed by the Board at the beginning of each cocoa season to be used in buying cocoa. On a few occasions, the Board has given licence to private buying agents to participate in the internal marketing of cocoa.

In the Ivory Coast, cocoa is purchased by private firms and individuals. The activities of these private cocoa buyers are overseen by a parastatal organisation, the CAISTAB. As in Ghana, the producer price of cocoa is fixed at the inception of the cocoa year by the CAISTAB. The CAISTAB supervises the sale of purchased cocoa beans on the world market.

Both marketing systems have been used to obtain a lion's share of cocoa farmers' incomes to finance development projects.[1] The Ghanaian system has bred a number of malpractices, and most often it is the cocoa farmers who are the victims.[2]

The Ivorian marketing system does not permit the practice of any of these fraudulent activities that occur in the Ghanaian system because of the fact that cocoa is purchased by several private buyers; any Ivorian cocoa buyer who does not pay farmers promptly is sure to lose his share of the market.

10.1.4 Supply of Farm Inputs

The chronically inadequate supply of insecticides, matchets, spraying machines and other farm inputs in Ghana has often created a situation where the few inputs in the system are hoarded and sold at exorbitant prices. In the circumstance, it is only the few large-scale cocoa farmers who are able to buy the inputs. This situation invariably affects the overall productivity of cocoa farmers.

This problem is not prevalent in the Ivory Coast. Farm inputs are openly sold on the market at reasonable prices. As noted earlier, Ghanaian cocoa farmers who live along the Ghana-Ivory Coast border use the proceeds from the illicit sale of their produce in the Ivory Coast to purchase such farm inputs from the Ivorian market.

10.1.5 Maintenance of Cocoa Farms

Cocoa farmers are directly motivated to maintain their farms properly if the incentives they enjoy make the marginal cost of farm maintenance to be less than the marginal revenue they receive from their farms as a result. As shown in Chapter 3, this is often not the case in Ghana. Moreover, it is generally difficult for farmers to obtain adequately most of their input requirements.

Efforts of the Ghanaian government to maintain cocoa farms have not been very successful largely because of inefficient implementation of rehabilitation projects coupled with duplication of policies.

The average cocoa farmer in the Ivory Coast is eager to take good care of his farm. The government through the SATMACI .is regenerating traditional cocoa farms and at the same time encouraging farmers to cultivate hybrid varieties of cocoa.

10.2 Policy Recommendations

Most of the policy recommendations made in this section are geared towards the revival of the cocoa industry in Ghana; references are made to the positive Ivorian agricultural policies highlighted in the study.

10.2.1 Agricultural Investment

Efforts to raise the nutritional and income levels of Ghanaians through industrialisation have not been successful since up to date the capacity utilisation of Ghanaian industries is below 30%. Most of the industries are still heavily dependent on the overseas market for the supply of raw materials and components. This suggests that export-promotion in Ghana is likely to be a more productive strategy than the type of import-substitution that has gone on.

A proper development of the agricultural sector can lead to a drastic cut in food imports, which in the 1970s formed about 16% of all imports and at the same time, essential raw materials can be produced locally to feed the agro-based industries. We propose, in the light of this that emphasis in economic development should be shifted from industrialisation to agriculture as obtains in the Ivory Coast and at least, a quarter of the public investment fund under any development plan should be put into the agricultural sector.

10.2.2 Cocoa Producer Price

The study has shown in Chapter 3 that, of all the government agricultural policies analysed, it is the producer price of cocoa which exerts the most profound

impact on cocoa output in Ghana. It has also been apparent from the study that, from the early 1970s until very recently, because of the relative prices of cocoa and food crops, there was an increasing diversion of resources from the cocoa sector into subsistence farming. Furthermore, the low producer prices of cocoa in Ghana vis-a-vis the Ivory Coast and Togo have sparked off an illicit trade in cocoa between some Ghanaian farmers and foreign cocoa merchants. Therefore, to revive the Ghanaian cocoa industry, it is important that the government adopts a system for setting the producer price of cocoa that relates it to the real value of the crop to the economy.

The yearly review of the cocoa producer price should be made in the light of the world market price of cocoa. But, because the world market price of cocoa suffers from constant fluctuations, we suggest that a "trend" world cocoa price measured in a more stable currency, say the pound sterling or SDRs should be used. The "trend" cocoa price is calculated for a period of at least ten years, for example, by averaging the "real"-pound price of cocoa over the last ten years. [4]

By some "realistic" exchange rate, of the sort to which Ghana is now officially moving,[5] the "trend" pound-sterling-cocoa price for the chosen period is converted into cedis. From this figure, we deduct both the internal and external marketing costs incurred by the GCMB. With the proposed re-organisation of the internal marketing

system,[6] which will lead to a considerable reduction of the staff of the GCMB, we envisage that these marketing costs will form a small proportion of the cedi-equivalent of the cocoa earnings from the world market.

For far too long, cocoa farmers have been heavily taxed by the government and, in fairness to them and also for an efficient allocation of resources[7] we propose that the export duty levied on cocoa should constitute not more than 5% of the export price of cocoa. Since the "trend" cocoa price can be greater or less than the actual world market cocoa price, it is important that a stabilisation fund, similar to the one in the Ivory Coast, should be operated by the GCMB. In a year when the actual world cocoa price is greater than the "trend" price, the surplus can be transferred into the stabilisation fund to be used to stabilise cocoa producer prices in other years when the world marketprice falls short of the "trend" price. After all deductions have been made, what is finally given to the cocoa farmer as the price for his product would at present compare favourably in the returns it gives with the prices of other competing crops and would at the same time, rub shoulders with cocoa producer prices in the neighbouring countries. Such a producer price will boost up interest in cocoa farming and make cocoa smuggling no longer rewarding.

The pricing system we have described can be cast in a simple mathematical formula as follows:

$$GCP_t = (I-T_t)\left[e_t \sum_{i=-10}^{k} C_i \; WCP_i - MTC_t\right]$$

when $i = -10$, $k = -1$, but

when $i = -5$, $k = +5$

where,

GCP_t = Cocoa producer price per tonne in Ghana in year t,

WCP_i = world market price of cocoa per tonne in year i in pound sterling,

C_i = deflation factor for conversion of pound sterling prices of cocoa to constant purchasing power terms,

e_t = shadow exchange rate between the cedi and the pound sterling in year t

MTC_t = marketing and transport costs per tonne of cocoa for year t, and

T_t = rate of tax in year t.

10.2.3 The GCMB And The Internal Marketing Of Cocoa: The Choice of Marketing System

In Chapter 3, we showed that both the oligopsony and the monopsony marketing systems have been tried in Ghana. Even though both systems within the Ghanaian context, have had their individual demerits, the oligopsony system clearly has an advantage over the monopsony system. Therefore, rather than relying exclusively on the GCMB to achieve the objectives of agricultural marketing policy, we recommend that a policy of partnership between governments, in this case the GCMB, and the private sector, similar in many respects to the Ivorian system, should be pursued. This, we believe, will infuse an element of efficiency into cocoa marketing in Ghana.

Private agents should be licensed to purchase all the cocoa produced by the peasant farmers. These private agents should all be self-financed so that there will be no need for the GCMB to pre-finance any of them. Cocoa purchased by the private agents is resold to the Board for sale abroad at a price slightly higher than the producer price of cocoa to cater for transportation and other marketing expenses. The share of direct cocoa purchases by the GCMB through the Produce Buying Division (PBD), should gradually be reduced to zero so that the operation cost of the Board can be cut down drastically. This will also eliminate the malpractices perpetrated by the buying clerks of the Board.

The system of partnership where the GCMB's major role in cocoa marketing is supervisory, will enable the Board to reduce massively its staff. Workers made redundant by the proposed system could be mobilised into labour gangs upon which the cocoa farmers would depend for the supply of ready labour; labourers would then be paid directly by the cocoa farmers. From the experience of the Ghana State farms, cocoa plantations established by the Board might not be properly maintained. Such farms could be sold to those of the redundant GCMB workers who are willing to go into cocoa farming, and this would relieve the Board of the financial burden of running the farms.

10.2.4 Supply of Farm Inputs

The supply of inputs, to cocoa farmers by the government has for a very long time been inadequate. The solution to this problem lies basically in stepping up supply of such inputs through both private and government sources. At the same time, there should be efficient distribution machinery for the inputs to reach the cocoa farmers in sufficient quantities at the right time.

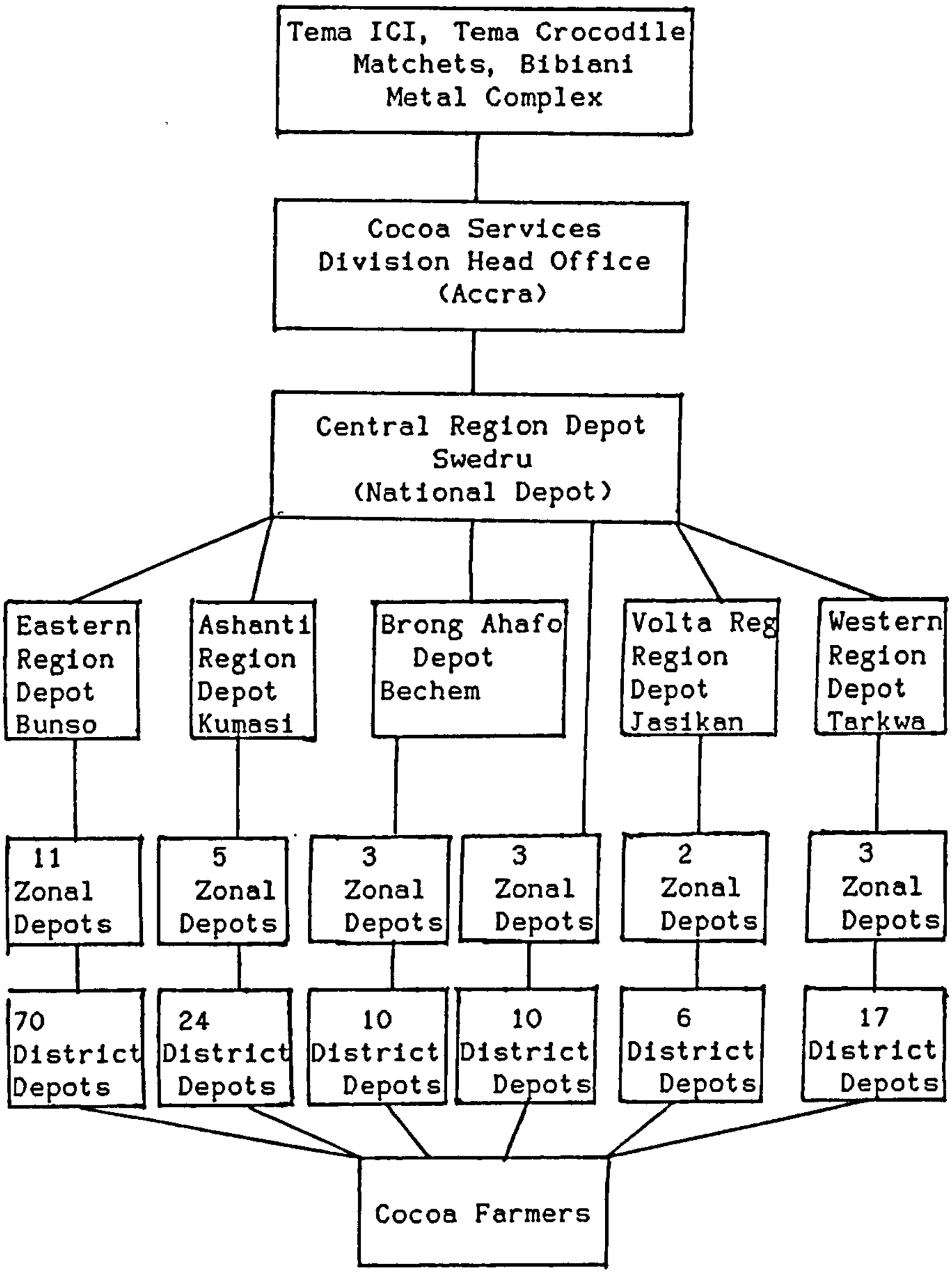
There are so far two supply channels for the essential inputs -internally, from Imperial Chemicals Industries (Ghana) Ltd. (producer of insecticides), Tema Crocodile Matchets and the Bibiani Metal Complex (the last two manufacture matchets); and externally, from the overseas

market. The latter, which caters mainly for spraying machines and their spare parts, requires foreign exchange. Part of the foreign earnings accruing to the GCMB stabilisation fund should be set aside for the importation of a number of spraying machines at regular intervals to replenish the existing stock. [8] The money that comes from the sale of such inputs to cocoa farmers should be put back into the stabilisation fund.

On the local scene, unlimited licence should be given to manufacturers of agricultural inputs to import raw materials and components, at a "realistic" exchange rate, so that they can step up production to satisfy local demand. In addition, private businessmen should be encouraged to import and sell freely agricultural inputs on the market. When there is enough of these inputs on the market, prices will then be determined by the forces of supply and demand. Cocoa farmers will then obtain inputs in the right quantity and at the right time and at reasonable prices.

As of now, the distribution of inputs in the cocoa industry has been centralised. The Cocoa Services Division in Accra acts as the headquarters which receives all inputs and further distributes them to the cocoa growing regions. The distribution channel for insecticides and cutlasses is presented in Chart 10.1; that of spraying machines starts from the Cocoa Services Division (Accra) and goes down the ladder to the farmers. The distribution of inputs should be decentralised so that each cocoa growing region can have its

CHART 10. 1: CHANNELS OF SPATIAL DISTRIBUTIOM OF INSECTICIDES AND CUTLASSES UNDER COCOA SERVICES DIVISION.



Source: Nyanteng, 1980, p. 66

own depot. The products of the industries can then be channeled straight to the regional depots. In the case of cutlasses, the Crocodile Matchet at Tema will supply depots in the Central, Eastern and Volta Regions while the Bibiani Metal Complex will feed those in the Ashanti, Brong-Ahafo and Western Regions.

This method will certainly reduce both transportation and administration costs. Under the current system, inputs are conveyed to Accra from Bibiani and Tema before they are despatched to the National Depot at Swedru for onward distribution to the various regional depots. However, with the proposed system, inputs from the Bibiani Factory will be transported direct to Bechem via Kumasi and then to Tarkwa while those manufactured at the Tema Factory will be conveyed to Jasikan, Bunso and Swedru. At the regional depots, the inputs are then sent to the district centres where representatives of farmers' co-operatives in the rural areas collect and share inputs among members.

Distribution of insecticides at the rural centres level should be based on farm-acreage while that of spraying machines should be made on the basis of one-farmer, one-machine. Extra inputs should be given to farmers whose farms yield above average to encourage farmers to take good care of their farms.

10.2.5 Rehabilitation of Cocoa Farms.

In the long run, the Ghana cocoa industry can be revived through rehabilitation of old farms and replanting of new farms. However, the government should not lose sight of the fact that an unplanned expansion of the cocoa industry in terms of land-acreage and output will create a permanent short-fall in local food supply and at the same time, lead to a depression of world market price of cocoa. [9]

Emphasis should, therefore, be placed on diversification of agriculture as obtains in the Ivory Coast, and the practice of intensive agriculture. By diversification of agriculture, the earnings from agricultural exports will be broad-based. Intensive agriculture will ensure a full utilisation of land allotted to each crop. This will call for an increasing use of fertilisers (as done in the Ivory Coast) and improved seeds to rehabilitate and replant respectively diseased and old cocoa farms instead of committing new lands to cocoa cultivation.

For government cocoa rehabilitation projects to be

successful, there is the need for the Cocoa Services Division, the World Bank and the GCMB projects to be merged and placed under one management. Where the government is assisting farmers to rehabilitate their farms, farmers should be full integrated into the programme right from the beginning so that the hand-over will be smooth and there will also be continuity in the proper maintenance of the farms. During the period that extension officers team up with cocoa farmers to work on the farms, farmers should be trained in modern farm husbandry so that each farmer obtains the maximum yield from his farm.

At least two workers from the permanent labour pool established from the workers made redundant by the GCMB could be assigned to individual farmers and made responsible for all types of work on the farms of such farmers. [10] This might create a good rapport between the workers and the farmers would certainly encourage the workers to give their best towards the maintenance of the cocoa farms.

10.3 Epilogue

The recommendations we have made in this chapter affect agricultural investment, the producer price of cocoa, the internal marketing of cocoa, the supply of farm inputs and cocoa-farm rehabilitation. On the producer price of cocoa, we have suggested that the government offers the cocoa

farmer a price which relates it to the real value of the crop to the economy. Such a producer price would, no doubt, rub shoulders with the prices of local food crops and, at the same time, compare quite favourably with cocoa producer prices in the neighbouring countries. It is anticipated that, at such a favourable price, the Ghanaian cocoa farmer would, on his own, take good care of his cocoa farm and even be induced to extend his farm-holding. All things being equal, this attractive price has the potential to gradually eliminate cocoa smuggling to the Ivory Coast and Togo.

If these recommendations were implemented by the government and in particular, cocoa rehabilitation projects were effectively and efficiently organised and private cocoa farmers obtained farm inputs in the required quantities and at the right time, then we would expect, as a matter of course, to see an upward growth in cocoa output.

Footnotes to Chapter 10.

1. In Ghana, some of the funds extracted were not used for economic pursuits. For example, in 1977/78, the military government financed a "Union Government" referendum campaign with funds mostly drawn from the CMB. See Diaw, 1986.

2. Diaw (1986, p.2098) has made the following observation about the earnings of Ghanaian cocoa farmers:

   > The records show that from 1939-1961, out of total net cocoa proceeds of £805 million, producers' gross receipts totalled £454 million. Again it is estimated that from 1961/62 to 1970/71, producers' gross receipts were an average of £42.9 million per year, representing 42.3 per cent of total gross average proceeds. Similarly, out of a total gross annual receipt of £423.9 million in the 1971/72-1980/81 crop years, producers' gross receipts totalled £134.8 million per year, representing 31.8 per cent of total cocoa earnings. These figures give an indication of the extent to which monies have been withheld from the farmers by the board.

3. See Killick, 1980, p.46. for quotation by Nkrumah expressing this view.

4. Cocoa prices used to derive the 'trend' price can also be extrapolated for a period of 5 years and averaged together with the prices of cocoa for the last five years.

5. The subject of a "realistic" exchange rate is so crucial in the determination of the local price of cocoa. See Yaw Ansu (1984) for a full discussion of the subject.

6. See Section 10.2.3 below.

7. Cocoa farmers are the only farmers who are taxed in Ghana.

8. Individuals should be permitted to import and sell spraying machines to farmers.

9. See the concluding section of Chapter 8 where we discuss the effect on world market cocoa price of an unplanned cocoa exports from Ghana and the Ivory Coast.

10. These workers would be drawing their wages from the cocoa farmers instead of the GCMB.

APPENDICES

APPENDIX 2.1 WHY THE STATE FARMS WERE NOT SUCCESSFUL

The State farms performed badly because of several reasons. The programme was not well planned and projects established were not backed by proper feasibility studies. Consequently, the implementation and the performance of most of the projects were very poor. Nkrumah visited the Soviet Union in the autumn of 1961 and by June 1962, the State Farms Corporation had been established and begun operations. Most of the farms were set up in a rush and in the event, no serious consideration was given to factors such as soil suitability, weather conditions, availability of skilled labour and other on-farm inputs. Often, farms were set up to satisfy political rather than economic interests. For example, the sugar plantations in Asutuare were developed in an area which lacked proper soils and adequate water, [1] and this has made it impossible to sufficiently feed the sugar factory with local sugar cane. Ever since its establishment, capacity utilisation of the plant has never exceeded 28%.

Another factor which explains the failure of the State farms was the involvement of many bodies in the mechanisation programme. [2] There was no effective coordination among these different organisations. Instead

of allowing the organisations to operate alongside one another, the government could have given one of them, preferably, the State Farms Corporation, the sole responsibility of using the imported farming techniques to produce food for the increasing population and raw materials for the domestic industries and for export.

The manpower position of the country at the time was not taken into account before the state farms were set up. There was an acute shortage of technical personnel who could be relied upon to utilise and maintain the imported technology. In 1964, for example, there were only three agricultural engineers in the country (Killick, 1980, p.p. 239-40). The shortage of managerial staff meant that the running of the farms had to be centralised at the headquarters in Accra; officials who took relevant decisions affecting the farms, in most cases, did not have a first-hand knowledge of what was actually going on on the farms. Moreover, because the farms were run from the headquarters, no proper accounts were kept of expenditures and returns from the state farms (Due, 1969, p. 647). The upshot was that most of the farms eventually became a liability to the state. By the end of 1964, the cumulative net loss of the state farms was estimated to be £150 million and the loss in the following year was even alarming - twice as much as the 1964 figure. [3]

Some of the implements imported for use on the state farms were ill-suited to the agricultural needs of the country.

For example, of about $40 million worth of tractors purchased from Yogoslavia and Czechoslavakia in the early 1960s 80 percent became inoperative after a short period of time (Le Vine, 1975, p. 102). This was so because such tractors were not originally designed to be used in the tropics. Due makes the following observation about the UGFCC which in the early sixties was mostly responsible for the importation of farm machinery for use on the state farms: 4

> In furtherance of its mechanization programmes, the UGFCC entered into a number of contracts, contract agreements and credit terms with foreign trading firms for the supply of large
>
> quantities of machinery and agricultural implements most of which turned out to be unsuitable for farming conditions in the country.

The number of workers employed on each state farm was note conomically related to the actual returns of the farm. This situation came about because organisers of the farms who were mostly members of the ruling party - the Convention People's Party (C.P.P.), used the farms as a means of providing employment for party members and relatives. In 1965, the total state farm labour force including management was about 18,800 with an annual wage bill of about £G2million (Seidman, 1972, p. 176).

APPENDIX 3.1

ESTIMATION OF COCOA SUPPLY FUNCTIONS FOR GHANA AND THE IVORY COAST

Researchers who have made similar attempts to estimate a supply function for the Ghana cocoa industry for example, include Merill Bateman (1965), Jere Berhman (1968), Robert Stern (1965) and Jacob K. Atta (1981). Following the pioneering work of Nerlove, [5] researchers on agricultural supply response have either used planted acreage or a measure of output as dependent variable. Yotopoulos and Nugent (1976, p.137) argue that the former has a merit over the latter because acreage is believed to be more directly under the farmer's control and once planted cannot be varied during the production period by factors outside the farmer's control; on the other hand, realised output may vary significantly and systematically from the farmer's planned output owing to the effects of weather and other environmental factors.

All the same, because of data constraints, all supply equations formulated so far for cocoa, have been cast in terms of output. [6] Common independent variables running through such works are cocoa producer price - either current actual prices as in the works of Berhman and Stern (Askari & Cummings, 1976) or lagged deflated producer prices as in the

case of Bateman (1985) and Atta (1981), lagged cocoa output, rainfall figures, supply of insecticides and time trend.

Subject to the same constraints, we have formulated the supply functions for the cocoa industry in Ghana and the Ivory Coast from 1961 to 1980 in terms of output, CQt, which is made to depend in the case of Ghana, on the real producer price of cocoa in Ghana and in the Ivory Coast, supply of insecticides, GIS, and rainfall, GR. For the Ivory Coast, we regressed cocoa output on the real producer price of cocoa and coffee, land covered by cocoa and the real producer price of cocoa in Ghana. Prices of the major inputs used in the cocoa industry could not be incorporated in the equations because there were no time series statistics on them.

Assuming a non-linear relationship between the dependent variable and the regressors, we ran out multiple regression programmes from data presented in various tables in this chapter and chapter [7], and obtained the following results:

$$CQCH_t = 13.814518 + 0.183836\ COCPG_t - 0.307051\ COCPU_t \quad \ldots (1)$$

$$(12.179) \qquad (2.083) \qquad (-2.811)$$

$$\bar{R}^2 = 0.52928$$

$$F = 11.68172$$

$$D\text{-}W = 1.36531$$

$$CQIV_t = 11.807681 + 0.490546\ COCPV_t - 0.540618\ COCPG_t \quad \ldots (2)$$

(12.141) (2.875) (-6.629)

$\bar{R}^2 = 0.80811$

$F = 41.00753$

$D\text{-}W = 0.83308$

$$CQGH_t = 13.886777 + 0.260055\ COCPG_t - 0.284677\ COCPV_t$$

(11.393) (2.873) (-2.756)

$$-0.080511 GIS_t + 0.092323\ GR_t \quad \ldots (3)$$

(-2.203) (0.724)

$\bar{R}^2 = 0.60665$

$F = 8.32577$

$D\text{-}W = 1.70260$

$$QCIV_t = -10.091058 + 1.368495\ LACV_t - 0.161327\ COCPV_t$$

(-4.151) (7.485) (-2.460)

$$+0.616543\ COFPV_t - 0.135459\ COVPG_t \quad \ldots . (4)$$

(2.357) (-1.237)

$\bar{R}^2 = 0.95235$

$F = 95.93588$

$D\text{-}W = 2.28184$

In equations 1 to 3, all the individual regressors save Ghana rainfall, GR are significant at the 5 percent level. In equation 4, all the regressors are significant at the 5 percent level except the Ghana cocoa producer price variable which is only significant at 15 percent level. In all the

equations, the independent variables jointly significnatly explain the regressands at the 1% significance level. The D-W statistics for equations 3 to 4 show that the residuals of the regressors in those equations are not serially correlated. The first two equations display the problem of serial correlation but this does not inhibit the use of the equations in the particular analysis carried out in the chapter.

APPENDIX 3.2

THE STRUCTURE AND OPERATION OF GCMB AND CAISTAB

3.2.1 Ghana Cocoa Marketing Board (GCMB).

(a) Structure.

As a public statutory board, the GCMB plays the central role of administering several institutions and organisations concerned with various operating and serving aspects of the Ghana cocoa industry.

The headquarters of the Board is in Accra, the capital of the country and it is run with the help of regional offices which are located in Ho, Swedru, Dunkwa, Koforidua, Kumasi and Sunyani - these regional offices represent the six cocoa growing regions of the country. Among other functions, the regional offices provide the vital link between the Board at the headquarters and the farmers and licensed buying agents in the rural areas.

The overall administrative head of the Board is the Chief Executive and he is assisted by two Deputy Chief Executives. In addition, there are five directors who are responsible for administration, operations, finance, legal/secretarial and haulage. There are thirteen departments under the Board. The Board also runs ten subsidiaries and divisions namely the CocoaMarketing Company (Ghana) Ltd, Produce Buying Agency, Cocoa Production Division, Produce Inspection

Division, Cocoa Research Institute, Cocoa Products Factory (Tema), West African Mills, Cocoa Rehabilitation Projects (Suhum/Ashanti) and the Bibiani Metal Complex.

The Board is governed by a Board of Directors comprising a crop of the country's bankers, economists, administrators and cocoa farmers.

(b) Operation. [7]

At the start of every cocoa season in October, the GCMB announces a producer price which is used for all purchases of cocoa during the season irrespective of the place of purchase. The object of this system of pricing is to 'cut the link between the price of cocoa on the world market... in some seasons when world prices are high, the price paid to the producer will be less than the average realisation on overseas sales... there will however, be other seasons in which the average world price is below the price paid to producers.' [8] The intention is to use the Board's profits to stabilise the producer price of cocoa. [9]

The Board uses the cost-benefit approach to determine the producer price of cocoa. The main variables used in estimating the cost of production of a given cocoa farm are the established number of man-days required to perform specific farm operations during the year, the prevailing farm labour wage, the actual costs of inputs and interest rates on bank lending for agricultural purposes. The result

is weighed against the benefit flow and a profit margin is added to serve as an incentive for old as well as prospective cocoa farmers.

Currently, the determination of cocoa producer price is made by a tripartite committee comprising representatives from the government, farmers and the executives of the GCMB. The committee is assistd by a technical staff whose duty is to conduct field surveys, work out detailed estimates of cost and benefit and make an appropriate producer price recommendation for consideration by the tripartite committee.

Prior to 1961, the Board had several buying agents which operated throughtout the cocoa growing areas. These licensed agents were abolished in April 1961 and the United Ghana Farmers Cooperatives Council (UGFCC) was assigned the sole responsibility of buying cocoa for the GCMB. [10] The monopsonistic system was replaced in 1966 with a multiple type which was made up of a number of licensed buying agents - again they bought cocoa on behalf of the GCMB.

The unitary buying system was re-introduced in 1977 with the Produce Buying Agency (PBA) replacing the indigenous buying agents. The PBA together with the Ghana Co-operative Marketing Association (GCMA) bought cocoa initially for the GCMB. The two companies were later amalgamated under the name Produce Buying Division (PBA) as the single buyingagent of the GCMB from 1977 onwards.

3.2.2 The Ivory Coast Stabilisation Fund (Caisse De Stabilisation Et De Soutien Des Prix Des Production Agricoles, Caistab).

(a) Structure.

The Fund is a financially autonomous state company run by a Board of Governors which is made up of representatives of the general pbulic, producers and exporters (Bene-Hoane, p. 150). By the decree of September 21, 1966, the administrative structure of the Fund was re-organised under the headship of aGeneral Secretary. The Board which controls the Fund has four divisions under it, namely, the Product Management Division, the Financial Management Division, the Technical Division and the Public Relations section. The Product Management Division, for example, is charged with the stabilisation of the prices of agricultural products, compensation of exporters and the co-ordination of the various sales by the departments responsible for coffee, cotton and cashew nut and oil seeds. [11] The same decree of 1966 also extended the area of operation of the Fund to cover other agricultural products like cotton and vegetable oils[12] and at the same time, it authorised the Fund to diversify its resources by means of investments (Bory, p. 10).

The Stabilisation fund is currently financed through such sources as taxes and export levies, dividends from private

investments and interest earned on short-term or long-term investments in commercial banks of government securities. [13]

(b) Operation.

At the beginning of each cocoa season in October, the Ivory Coast government through the Stabilisation Fund, fixes a uniform purchase price for every agricultural product affected by the stabilisation. The price is worked out in the light of the prevailing world market prices of the commodities concerned, foreseable market trends, production forecasts, the reserve position of the Stabilisation Fund, the government's revenue requirements, the income distribution policy and the relative incentives that the government intends to give producers of various crops (Bene-Hoane, p. 154, and Bory, p. 10).

The Stabilisation Fund computes the cost prices of commodities on the basis of either FOB or CIF prices. Using the guaranteed price as a guide, the Fund compiles a schedule of expenses [14] or "differentials" incurred between buying from the producer and arriving at the port of shipment (FOB price) or, according to circumstances, as far as the final destination (CIF price).

If the price realised on the world market by the exporters is higher than the cost price, then the Stabilisation Fund receives the difference and is able in this way to build up its financial reserves. On the other hand, if the selling

price on the world market is less than the cost price, the fund intervenes to maintain the price level by paying exporters the difference. Relating this to the producer price of cocoa, a fall in the world market price of cocoa incapacitates the government to pay cocoa farmers a price equal or greater than the previous producer price. But with the existence of a Stabilisation Fund, when there is a fall in the world market price of cocoa, the government utilises the reserved funds to maintain the existing producer price, thus stabilising the incomes of producers.

The cocoa purchasers undertake to buy the entire harvest according to the quotas allocated to each of them. This system provides producers with an absolute guarantee of being able to dispose of their crop at the price fixed for the particular season. Two intermediaries are involved in the marketing system -the agent or the buyer and the exporter.

The agent works on behalf of the exporter and his task is regulated by decree No. 63-418 of October 4, 1963. Among other things, the decree stipulates that an agent must hold a licence issued by the local Prefect, must be a resident of his market area, must be a person without a previous criminal record, must keep records of all his purchases and must put inwriting that he will respect all the marketing regulations (Bene-Hoane, p. 156).

The activities of the exporter are similarly regulated by the decree No. 71-510 of October 2, 1971. The export of

cocoa and coffee can only be carried out by approved companies or cooperatives and must satisfy the following requirements: [15]

(i) all companies, whatever, their legal firm must have a paid-up capital in the amount of not less than CFAF30million (£108,000). Such companies must also maintain a banking deposit in the amount of CFAF15million ($54,000).

(ii) Such companies must also have furnished a proof that they had or will have at their disposal an adequate organisational and administrative capacity, commercial skill and the knowledge to handle the products involved, and

(iii) they must be holders of special licences and pledge to conform to all regulations in force concerning marketing, handling and accounting procedures. They also must have their headquarters in the Ivory Coast, be entered in the Register of Commerce, and be in good standing with the National Treasury Department. The managers of such companies must reside in the Ivory Coast and be persons of good reputation, without a previous criminal record.

APPENDIX 3.3 CALCULATION OF RATE OF INCREASE IN PRODUCER PRICES AND INFLATION IN GHANA AND THE IVORY COAST

The rate of increase in either cocoa producer price or inflation in any period in either Ghana or the Ivory Coast is computed from the general formula:[16]

$$CP_t = CP_o e^{gt} \ldots (1)$$

where,

CP_t = either cocoa producer price (nominal) or Consumer Price Index (CPI) in year t,

CP_o = either cocoa producer price (nominal) or CPI in the base year,

g = rate of increase in either cocoa producer price or inflation,

t = time trend, and

e = 2.7182... (the base of natural log).

If we assume a constant exponential growth in cocoa producer prices and inflation, we can take the natural logarithms of equation 1 to obtain:

$$\ln CP_t = \ln CP_o + gt \ldots (2)$$

Equation 2 can then be cast in the form

$$y = a + gt \ldots (3)$$

where,

$y = \ln CP_t$, and

$a = \ln CP_o$.

Now, from figures in cocoa producer prices (nominal) and Consumer Price Indices in Ghana and the Ivory Coast [17] presented in Appendix 3.4, values for CP, y and t can be calculated for the estimation of the values of a and g using the Ordinary Least Squares estimation method. The Least Squares estimation results are presented below:

(a)Rate of increase in cocoa producer prices (1960-1979)

GHCP = 4.3563 + 0.0696t

ICCP = 4.2848 + 0.0905t

(b) Rate of inflation (1960-1979)

GHRI = 2.7268 + 0.1524t

ICRI = 4.4304 + 0.0653t

APPENDIX 3.4 BLACK MARKET EXCHANGE RATES AND COCOA PRICES: WORLD, GHANA AND THE IVORY COAST

YEAR	BLACK MARKET RATES		COCOA PRICES		
			GHANA1	IVORY COAST1	IVORY COAST
	US/CEDI	CEDI/CFA	CEDIS/mt	CFA/mt	CEDIS/mt
1960	1.40	0.003	220.46	94,736	275.77
1961	1.40	0.003	220.46	94,921	276.65
1962	1.40	0.003	220.46	69,805	203.51
1963	1.79	0.002	216.78	69,993	159.82
1964	1.72	0.002	198.42	70,185	166.52
1965	1.53	0.003	181.88	70,126	187.69
1966	0.47	0.009	151.56	59,144	519.04
1967	0.60	0.007	197.67	70,513	472.77
1968	0.57	0.007	247.91	70,185	498.96
1969	0.57	0.007	278.55	73,298	523.78
1970	0.61	0.006	293.80	82,269	489.05
1971	0.57	0.006	300.47	84,511	530.52
1972	0.61	0.006	360.92	85,182	538.60
1973	0.67	0.006	385.04	92,838	563.21
1974	0.58	0.007	484.47	125,770	894.85
1975	0.67	0.007	577.90	175,230	1,193.94
1976	0.52	0.009	679.15	176,970	1,556.65
1977	0.19	0.022	976.78	198,110	4,260.43
1978	0.14	0.031	1,601.40	250,340	7,730.57
1979	0.10	0.042	3,308.10	262,890	10,972.32
1980	0.06	0.078	3,936.30	279,160	21,866.14
1981	0.06	0.068	5,333.50	300,000	20,338.25
1982	0.03	0.134	12,133.00	300,000	40,271.46

SOURCE: 1. May, 1985, p. 129.

APPENDIX 3.4 (contd)

COCOA PRICES

	1	2	3
1960	222	617.16	440.83
1961	177	506.96	362.11
1962	167	462.87	330.62
1963	205	551.04	307.84
1964	188	506.96	294.74
1965	138	374.71	244.91
1966	193	529.00	1,125.53
1967	238	639.21	1,065.35
1968	320	749.41	1,314.35
1969	415	1,013.91	1,778.79
1970	306	749.41	1,228.54
1971	232	595.12	1,044.07
1972	270	705.33	1,156.28
1973	585	1,410.66	2,105.46
1974	990	2,160.08	3,724.28
1975	723	1,653.12	2,467.34
1976	1,399	2,402.53	4,620.25
1977	2,944	4,478.44	25,549.68
1978	2,006	-	-
1979	1,727	-	-
1980	1,270	51,202.64	853,377.33
1981	1,127	46,937.57	773,292.83
1982	1,033	40,799.00	1,359,966.67

1 SPOT PRICE GHANA, LONDON(2) £/MT
2 SPOT PRICE GHANA, NEW YORK(2) US$/MT
3 SPOT PRICE GHANA, NEW YORK(2) CEDIS/MT

SOURCE: 2. Gill & Duffus, April 1981 and October 1985.

APPENDIX 3.5 PRODUCTION COST OF AN ACRE OF HYBRID COCOA FARM (1985 Prices). [10]

A. ESTABLISHMENT COST

Total Mandays = 38 @ ¢100 per manday	= ¢3,800
Cost of 680 seedlings @ ¢5.00 per seedling	= ¢3,400
Cost of 340 plantain suckers @ ¢8.00 per sucker	= ¢2,720
Cost of 1 cutlass	= ¢ 300
Cost of 1 spraying machine	= ¢ 3,850
Cost of 1 harvesting knife	= ¢ 70
Plus 5% working capital	= ¢14,847

B. OPERATING COST.

Total mandays = 31 @ ¢ 100 per manday	= ¢ 3,100
Cost of 1 cutlass	= ¢ 300
Cost of 1.13 litres of insecticide	= ¢ 180.80
Cost of 4 baskets	= ¢ 240
Cost of 1 drying mat	= ¢ 400
Total Operating Cost	= ¢ 4,200.80

TOTAL PRODUCTION COST = ¢19,067.80

APPENDIX 4.1 SUPPLY OF INSECTICIDES AND SPRAYING MACHINES IN GHANA

YEAR	INSECTICIDES ('0000 litres)	MOTORISED SPRAYERS	HAND SPRAYERS
1959	677	13,945	13,528
1960	1,406	20,358	11,486
1961	889	7,097	3,317
1962	947	20,036	2,550
1963	1,203	21,996	3,644
1964	884	11,782	6,310
1965	389	11,840	8,147
1966	123	35	32
1967	466	576	569
1968	803	1,949	1,410
1969	954	2,293	2,232
1970	1,240	3,136	2,665
1971	847	4,110	2,401
1972	670	11	5,022
1973	937	4,273	3,861
1974	600	4,681	1,156
1975	788	3,058	979
1976	887	570	942
1977	57	9	-
1978	1,507	1,070	-
1979	1,463	7,667	-
1980	318	502	-
1981	179	1,127	-

SOURCE: From the files of Cocoa Service Division
Ministry of Cocoa Affairs, Accra.

APPENDIX 5.1 EVALUATION OF ASHANTI COCOA PROJECT:

FARMER QUESTIONNAIRE

Preliminary Information

1. Name of farmer.....
2. Date interviewed.....
3. Age.....
4. Sex ( ) Male ( ) Female
5. Town/Village.....
6. Project zone: ( ) Bekwai ( ) Effiduasi ( ) Konongo
7. Level of education

   ( ) Elementary ( ) Commercial

   ( ) Secondary ( ) Agricultural

   ( ) Teacher Training ( ) Others

1. Establishment of Farm

1.1 How may project-aided farms do you have?.....

1.2 Supply the following information about your farm(s)

Farm	Year Established	Location	Size	Type of Cocoa	Method of Cultivation
A					
B					
C					
D					

1.3 How do you get the seeds/seedlings you grow on your farm?

( ) From own nursery farm

( ) Purchase them

( ) From Cocoa Project nurseries

( ) Other source(s) - specify

1.4 What role did you play in the establishment of the farm?

Participated in:

( ) Clearing land

( ) Planting of cocoa seeds/seedlings

( ) Planting of food crops

( ) Other job(s) - specify

1.5 Name the type and indicate the source of supply of the shade crop used on your farm.

Farm	Shade Plant	Source
A		
B		
C		
D		

1.6 Provide the following information if you possess other cocoa farms apart from the project-aided farm:

Farm	Year Established	Location	Size	Type of Cocoa	Method of Cultivation
A					
B					
C					
D					

1.7 Indicate in order of preference which of the following crops you would like to grow considering their current producer prices. (Use numbers to indicate preference)

( ) Plantain ( ) Coffee

( ) Cocoa ( ) Cassava

( ) Oil-palm ( ) Maize

1.8 Does the new cocoa price of C600 per load give you any incentive to:

(a) Maintain your old cocoa farm(s)?

( ) Yes ( ) No Explain

(b) establish new cocoa farm(s)?

( ) Yes ( ) No Explain

2. Supply of Inputs.

2.1 Cutlasses

No. possessed	Date purchased	Source	Price
1			
2			
3			
4			

2.2 Insecticides

Type of Insecticide	Source	No. of Tins purchased	Price per tin	Quantity required
Gammalin 20 Unden Box 2E Elocron				

2.3 Do you get the insecticide at the time you need it?

( ) Yes ( ) No Explain

2.4 Spraying machines

(a) How many times in a year do you spray your farm?.....

(b) Give the actual months in which spraying is done.....

2.5 Supply the following information:

Type of Spraying machine	Ownership	Age of machine	Source of purchase	Price of machine
( ) Motorised sprayer ( ) Hand-sprayer				

2.6 How would you rate the performance of your machine(s)?

Type of machine	Very Good	Good	Satisfactory	Bad	Out-of-use
Motorised sprayer					
Hand-sprayer					

2.7 Who services your machine for you in times of break-down?

( ) Agricultural officer

( ) Cocoa Project officer

( ) Others (Specify)

2.8 How much do you pay for such services?.....

2.9 Fertiliser

(a) Do you use fertiliser on your cocoa farm?

( ) Yes ( ) No Why?.....

(b) How often? ( ) Once a year

( ) Twice a year

( ) More than twice a year.

2.10 (a) When do you apply for fertiliser?.....

(b)What quantity do you use at every

application?.....

2.11 How much do you pay for a bag of

fertiliser?.....

Labour

2.12 How many people usually help you to work on

your farm?.....

2.13 Of these, how many (a) give free labour?.....

(b) are hired labourers?....

2.14 How much do you pay per person in a day for

those whose services you hire?.....

2.15 What has been the trend of wage rates in the

locality over the last 5 years? (NB Interviewer should

start from the current year).

Year	Money value	Payment in kind
1978		
1979		
1980		
1981		
1982		

2.16 Do you have any difficulty in getting labour?

( ) Yes ( ) No Explain.....

3. Farm Yield

3.1 When did you make the maiden harvest from your farm?.....

3.2 How many loads did that fetch you?

3.3(a) What was the yield during last year's major cocoa season?

(b) How many loads did you receive during the minor season?

3.4 Give the yields you expect to get next year:

Major season.....

Minor season.....

3.5 State the factors that normally affect the yield of your cocoa farm:

( ) Insects and diseases

( ) Inadequate weeding and pruning

( ) Poor weather

( ) Other factors

3.6 Would you say the yield from your Project-aided farm is greater than what you use to get from your old cocoa farm?

( ) Yes ( ) No Explain

4. Farm Maintenance

4.1 State any role(s) you have played in maintaining your farm since its establishment.

( ) Clearing ( ) Breaking of pods

( ) Brushing ( ) Fermenting

( ) Replanting ( ) Drying cocoa beans

( ) Harvesting ( ) Other Services

(Specify)

4.2 Visit of farm by Cocoa Project officials

Visits	Date of Visit	Venue	Purpose
1			
2			
3			
4			

4.3 Farmer-training

Type of Course	Number	Organiser	Venue	Medium of Instruction

4.4 Mention briefly any two things you have learnt from such courses.

1. .....

2. .....

5. Credit Facilities

5.1 (a) How much loan did you take during the last cocoa season?

(b)From where did you get the loan?

(c)How much interest did you pay on it?

5.2 Mention other source(s) from which you obtain loans to run your farm.....

5.3 Do you encounter any problems in obtaining loans?

( ) Yes ( ) No

Specify type of problems

5.4 What exact work on the farm do you use the loan for?

5.5 When do you normally go in for a loan?

6. Infrastructure.

6.1 When was the last time maintenance work was done on the road linking your town to the district capital? (Interviewer should mention the particular district capital).

6.2 Which body was responsible for the work?

( ) District Council

( ) Cocoa Project

( ) Other body (Specify)

6.3 Which of the following facilities do you enjoy in your town/area?

( ) Hospital/Clinic How close to where you live?

( ) Pipe-borne water

( ) Railway line

( ) Electricity. Indicate source of supply

( ) Public

( ) Private

6.4 State the year in which the following infrastructural facilities were provided in your area:

Type	Year Provided/maintained
Feeder Road	
Railway Line	
Hospital/clinic	
Cocoa buying centre	
Pipe-borne water	
Electricity	

7. General Problems of Cocoa Farmers

7.1 Has any of your farms ever suffered from swollen shoot, capsid, black pod, etc?

( ) Yes ( ) No

7.2 Specify which type of disease

( ) Black pod

( ) Capsid

( ) Swollen shoot

7.3 How did you combat the disease?

( ) Spraying

( ) Destroying diseased trees

( ) Abandoning farm

( ) Other measures (specify)

7.4 (a)Has the yield of your farm been affected by any natural hazard of late?

( ) Yes ( ) No

(b) Specify, if any.....

7.5 Mention any 2 major problems you face as a cocoa farmer.

(a) .....

(b) .....

APPENDIX 5.2 RESULTS OF FARMER QUESTIONNAIRE.

Introduction

A five-day preliminary survey of the Project area was made. This permitted the selection of sample size and the villages from which the farmers were to be chosen. The Project Manager and other important officials were interviewed and relevant materials 18 were accordingly collected from them.

Based on observations made during the reconnaissance visit to the Project Area, a comprehensive questionnaire 19 was designed to elicit from farmers and officials alike information on aspects such as when and how farms were established, the supply and utilisation of inputs, farm yield, credit facilities and the maintenance of farms.

The questionnaire was administered with the help of two research assistants from the Centre for Development Studies (CDS), University of Cape Coast, Ghana. In all, 117 farmers were interviewed from 34 villages.

The breakdown is as follows:

Bekwai zone: 37 farmers interviewed from 15 villages.

Effiduasi zone: 40 farmers interviewed from 6 villages.

Konongo zone: 40 farmers interviewed from 13 villages.

Criteria for Selection of farmers and Villages.

Time and distance constraints confined the enquiry to the immediate hinterlands of the zonal centres. In the Konongo zone, proximity of the three units made it possible for farm villages to be selected from all the 3 units namely Konongo, Juaso and Juansa. This was not the case in the Effiduasi zone where unit centres were far apart; work was therefore restricted to the Effiduasi Unit. The picture was different when we visited the Bekwai zone. We had sufficient time to carry out the exercise and furthermore, the units we settled on, were close together. 20

The selection of farms was based on two basic factors:

(i) Farms in which trees had started bearing - this was to facilitate the calculation of the direct benefit of the project.

(ii) Farms that would lend themselves to the testing of the hypothesis that the gestation period of the hybrid cocoa trees is three years.

Hence, about 85% of the farms selected were five or more years old. Few farms aged below 5 years were however, chosen to investigate the gestation period factor.

Visit to Selected Farms.

Owing to inadequate time, only six project-aided farms could be visited. These were the farms quite close to some of the villages visited. Two farms from each zone were

visited. Four of such farms were in good growing conditions while the remaining two had been burnt and land had been used to grow food crops including maize and cassava. When farmers were questioned about their decision to switch over to food-cropping they quickly referred to the high returns from food-crop farms as the major motivating factor. The table below sums up what has so far been said.

Table 1. Summary Data on Field Survey.

Zone	Total Units*	Units Visited	Villages Visited	Farmers Interviewed	Farms Visited
Konongo	3	3	13	40	2
Effiduasi	4	1	6	40	2
Bekwai	5	3	15	37	2
TOTAL	12	7	34	117	6

* A unit is made up of a number of villages; farms are located in the villages and are owned by individual farmers in the villages.

There are three units in the Konongo zone and all were visited. Only one out of the four units in the Effiduasi zone was chosen while three out of the fiveunits in the Bekwai zone were taken.

Visits to other Establishments.

Visits were also made to the Ministry of Agriculture, Cocoa Services Division, the Ghana Cocoa Marketing Board (GCMB), the Produce Buying Division (PBD), Meteorological Services Department and the Institute of Statistical, Social and Economic Research (ISSER) for further data collection on the

cocoa industry. Material obtained included statistics on the supply of inputs, cocoa purchases and rainfall regime in the Ashanti Region.

Direct Interview with Project Manager.

A questionnaire was initially designed to be used in eliciting vital information about the Project from the Project Manager. But after meeting the Manager, a number of written material was given, the content of which provided answers to all the questions raised in the questionnaire. These materials included:

(i) Appraisal of Ashanti Region Cocoa Project;

(ii) 4 annual reports of the project for the years 1975/76, 1976/77, 1977/78, and 1980/81;

(iii) 3 maps showing project zonal areas.

To further solicit the cooperation of the project's officials at the various zonal centres, the PM gave the researcher a letter of introduction. The Project officers at Konongo, Bekwai and Effiduasi were interviewed about the progress of work in their respective zones. They all complained of poor farmer participation and unsuitability of some land areas for cocoa cultivation. While they attributed the former largely to misinformation of farmers by field assistants at the inception of the Project coupled with the low producer price of cocoa, they admitted that the latter might be the result of the indiscriminate acceptance of land offered by farmers on the part of project officials in order

to meet the World Bank planting targets.

The first visit indeed set the stage for the administration of the farmer-questionnaire at the next visit.

Results of Farmer-Questionnaire

1. Age of Farmers

Age Group	Absolute No.	%
26-35	13	11.1
36-45	18	15.4
46-55	22	18.8
56-65	34	29.1
66-75	20	17.1
76-85	8	6.8
86-95	2	1.7
Total	117	100

2. Sex

Type	Absolute No.	%
Male	80	68.4
Female	37	31.6

3. Level of Formal Education

Type	No.	%
No education	81	69.2
Elementary school	30	25.6
Post-elementary school	6	5.1

4. No. of farm holdings other than project-aided farms

Farms	No. of farmers	%
0	25	21.7
1	58	50.4
2	17	14.8
3	9	7.8
4	3	2.6
5 or more	3	2.6

5. Size, Age and Yield of farms (as at 1982).

ACERAGE	NUMBER OF FARMS	%
LESS THAN 1.0	3	3
1.0 - 2.9	35	32.7
3.0 - 4.9	33	30.8
5.0 OR MORE	36	33.6
AGE IN YEARS		
1 - 2 YEARS	4	3.4
3 - 4	14	12.0
5 OR MORE	99	84.6
No OF LOADS	FARMS OVER 5 YRS OLD	
no yields	31	31.3
less than 1	21	21.2
1 - 10	39	39.4
> 10	8	8.1

6. Sources of seeds/seedlings.

- all from cocoa project nurseries.

7. Farmer Participation

	Establishment of farm	Maintenance of farm
Sample size	116	116
No. of participating farmers	79	91
% of participating farmers	68.1	78.4

8. Source of Plantain Suckers

Source	No. of Farmers	%
Project	46	43.8
Farmer	34	32.4
Both	25	23.8

9. Crop Preference

Choice	No. of Farmers	%
Cocoa	15	13
Oil-Palm	46	40
Food crops*	54	47

* Refers to maize, cassava and plantain.

10. Producer Price*

Opinion	No.	%
Price gives no incentive	52	44.4
Price gives incentive	65	55.6

*Opinion was divided among farmers. A slightly higher percentage thought the current price of C600 per load was satisfactory, but I think it is likely that some farmers hid their real feelings about the producer price of cocoa from researchers because of the general political climate 21 in the country at the time.

11. No. of cutlasses possessed by farmers

Cutlass	No.	%
1-2	96	86.1
3-4	13	11.1
4-6	3	2.6
More than 6	5	4.3

12. Source of purchase of inputs

	A		B		C	
	No.	%	No.	%	No.	%
Cocoa Project	28	25.0	50	47.6	47	62.7
Government agent	41	36.6	53	50.3	28	37.3
Agent selling above control price	43	38.4	2	1.9	-	-

A = Cutlass, B = Insecticide, C = Spraying Machine.

13. Use of fertiliser

Only 7 out of 117 farmers had ever used fertiliser on their cocoa farms. While some farmers attributed the virtually no application of fertiliser to unavailability, others claimed cocoa trees did not require the use of fertiliser.

14. Availability of hired labour

Opinion	No.	%
Difficult to get hired labour	88	77.2
Not difficult to get hired labour	26	22.8

15. Cost of Labour as at 1983

Class (C)	Frequency
31-40	1
41-50	4
51-60	15
61-70	41
71-80	17
81-90	29

16. Visit of farm by Cocoa Project official

Opinion	No.	%
Farm visited by officials	67	59.3
Farm not visited by officials	46	40.7

17. Orientation Course for farmers

Opinion	No.	%
Received training from Project officers	93	83.0
No training	19	17.0

18. Credit facilities

Source	No.	%
Loan from ACP	-	-
Loan from Bank	18	16.4
Loan from money-lenders (private)	1	0.9
No loan taken	91	82.7

19. Construction and Maintenance of feeder roads

Agent responsible	No.	%
ACP	-	-
District Council (GHA)	21	63.6
Self-help	12	36.4

20. Cocoa Disease

Type	No.	%
Black pod	17	13.5
Capsid	92	73.0
Swollen shoot	12	9.5
Nil	5	40
Total	126	100

*Some farms exhibited more than one disease type at a time hence, the swelling up of the sample rise.

21. Current State of Farms*

State	No.	%
Farm flourishing	21	19.1
Farm severely affected by drought	17	15.5
Farm burnt	72	65.5

* The recent widespread bushfire in the country (1983) destroyed about 66% of the farms selected. Only one out of every 5 farms considered could be said to be flourishing. See Appendix 6.4.

22. Farmer Problems

Common problems mentioned by farmers were:

(i) Lack of inputs

(ii) Difficulty in obtaining bank loans

(iii) Absence of welfare services

(iv) Poor maintenance of cocoa farms by project workers

(v) Uncooperative attitude of some project workers

(vi) Low producer price of cocoa

(vii) Discrimination in the distribution of farm inputs by project officials

APPENDIX 6.1 PRODUCER PRICESAND PLANTED AREA OF COCOA AND COFFEE IN THE IVORY COAST*

YEAR	COCOA		ROBUSTA COFFEE	
	PRODUCER PRICE	TOTAL PLANTED AREA	PRODUCER PRICE	TOTAL PLANTED AREA
1961	74	373	90	-
1962	64	388	75	-
1963	64	401	75	-
1964	70	417	90	-
1965	70	434	90	-
1966	55	453	75	-
1967	70	473	90	-
1968	70	494	90	-
1969	70	517	90	736
1970	80	539	95	868
1971	85	562	105	887
1972	85	586	105	910
1973	85	611	105	955
1974	140	899	120	1,060
1975	175	815	150	1,176
1976	175	840	150	1,214
1977	180	863	180	1,254
1978	250	897	250	1,292
1979	250	947	250	1,362
1980	300	1,076	300	1,174
1981	300	1,163	300	-
1982	300	-	300	-

* Producer prices are in CFAF/kg and total planted area is in thousands of hectares.

SOURCE: de Wilde, 1984, p. 94

APPENDIX 6.2: COCOA PRODUCTION IN GHANA AND THE IVORY COAST*(5-Year Moving Averages) '000 Tonnes

YEAR	GHANA	IVORY COAST	YEAR	GHANA	IVORY COAST
1924	198	5	1954	224	63
1925	213	6	1955	234	68
1926	216	9	1956	226	65
1927	224	11	1957	235	65
1928	229	14	1958	254	61
1929	232	17	1959	294	66
1930	227	20	1960	323	68
1931	237	23	1961	367	79
1932	232	28	1962	400	88
1933	241	32	1963	451	105
1934	254	38	1964	447	109
1935	272	43	1965	440	123
1936	269	46	1966	440	131
1937	284	49	1967	426	141
1938	278	50	1968	394	147
1939	268	49	1969	396	161
1940	258	45	1970	414	176
1941	251	38	1971	412	183
1942	230	30	1972	412	195
1943	228	26	1973	405	208
1944	222	23	1974	399	218
1945	210	25	1975	371	219
1946	209	27	1976	342	243
1947	225	34	1977	325	263
1948	228	39	1978	309	291
1949	238	45	1979	282	326
1950	241	47	1980	263	371
1951	249	53	1981	244	381
1952	236	55	1982	223	400
1953	230	60	1983	199	433

* Production figures were obtained from Gill & Duffus, Cocoa Statistics, April, 1981 and May 1983 and Cocoa Market Report, No. 320, October 1985.

APPENDIX 6.3: GHANA: COCOA TREE STOCK*

YEAR	TREE STOCK
1960	22.862
1961	28.828
1962	36.980
1963	47.381
1964	58.877
1965	70.680
1966	81.607
1967	92.161
1968	102.030
1969	110.560
1970	117.050
1971	122.520
1972	126.920
1973	130.420
1974	132.660
1975	133.730
1976	132.490
1977	130.600
1978	126.620
1979	125.590
1980	122.490
1981	119.270

* Because its computation depends upon an index of farmer effort and an index of tree yield, it does not have dimensions by itself.

SOURCE: May, 1985, p. 130.

APPENDIX 6.4: GHANA: EFFECT OF THE 1983 BUSH-FIRES ON THE COCOA INDUSTRY

In 1983, the cocoa industry faced a major disaster which accounted for most of the 21% drop in cocoa output in the 1982/83 cocoa year. [22] Ghana experienced an unusually long harmattan (dry season) which resulted in the withering of a large proportion of the vegetative cover of the land; several streams were equally dried up. Normally, the preparation of new farm lands which includes the burning of weeds on the newly weeded plots, is done during the dry season. The burning of such new plots at the height of the dry season sparked off a nation-wide bush-fire which forthe first time in the history of the country, caused extensive damage to cocoa and food crop farms. The Cocoa Services Division has estimated that about 274,000 acres of cocoa farms were destroyed by the bush-fires. The regional break-downs are shown in Table 6.4.1.

TABLE 6.4.1 ACREAGE OF COCOA FARMS BURNT DURING THE 1983 BUSH FIRES.

REGION	TOTAL COCOA ACREAGE	ACREAGE OF COCOA BURNT
Ashanti	1,366,854	27,229
Brong-Ahafo	964,428	183,891
Eastern	886,373	28,369
Western	828,984	4,255
Central	551,420	22,786
Volta	318,132	7,160
TOTAL	4,916,191	273,690

SOURCE: CSD, 1983, p. 15.

From May through November 1983, Dadzie, Menyah, and Ackah jointly conducted a national survey of cocoa farmers to test their response to the introduction of a bank based system of cocoa purchasing. During the research, the effects of the 1983 bush-fires were also assessed by the team. A questionnaire was administered to 2,200 cocoa farmers who wererandomly sampled from all the six cocoa growing regions. The responses showed that 96.4% of the farmers had their cocoa farms `destroyed' by the bushfires, [23] and that the mean acreage of cocoa farms destroyed was 14.7. [24] The magnitude of the `destruction' could be seen when it is realised that the average farm size of the cocoa farmers interviewed was 19.6 acres. [25]

Out of the 110 farmers we interviewed in the Ashanti Region in July/August 1983, 65.5% claimed the bush-fires `destroyed' their cocoa farms. [26]

From the revelation of these two studies, it can be concluded that the actual acreage of cocoa farms destroyed in 1983 by the bush-fires has either been under-estimated by the C.S.D. or the C.S.D. figure refers strictly to farms that had been completely destroyed by the fire and needed to be replanted. On the other hand, the high proportion of burnt farms produced by the two questionnaires shows clearly farmers misconception of the aims of the surveys. Farmers had thought that the questionnaires were meant to collect information on burnt cocoa farms to be used in paying

compensation money to affected farmers. Hence, the larger the acreage of your burnt farm, the more handsome compensation you received.

APPENDIX 6.5 AGE-STRUCTURE OF COCOA FARMS.

6.5.1 Ghana

The age of cocoa trees is one of the primary factors which determine how much the trees can yield in any given period. Table 1 represents four separate surveys conducted on the age-structure of Ghanaian cocoa trees. Based on these surveys, the Ministry of Agriculture has observed that cocoa trees aged up to 7 years bear nothing, those from 7 to 15 years of age bear 40% of a full yield but those aged over 30 years are only capable of bearing 78% of a full yield. [27]

TABLE 1: PERCENTAGE ESTIMATES OFAGE-STRUCTURE OF GHANAIAN COCOA TREES.

AGE GROUP	1953a	1953b	1958/9 & 1959/60	1970
0-7 years	13	10	25	91
8-15 years	14	17	10	17.7
16-30years	42	40	42	57.5
Over 30 years	30	33	23	15.7

SOURCES: Figures under 1953a and b and 1958/9 and 1959/60 were obtained from Birmingham, et al., (1967), p. 243. The 1970 census was conducted by the Ministry of Agriculture, Ghana, see World Bank, 1983, p.p. 33-34

The two 1953 estimates both portray an old and aging stock of cocoa trees. The relatively high producer prices of

cocoa in the second half of the 1950s presumably, encouraged several farmers to establish new cocoa farms. Accordingly, the next census conducted in 1958-1960 showed an increase innon-bearing trees from 10% to 25% while the percentage for trees aged over 30 years fell by 10%. The 1970 estimates revealed farmers' natural reaction to government's low producer price policies in the 1960s. Few cocoa farms were cultivated as is evident from the sharp fall in the percentage of trees aged between 0 and 7 years from 25% in 1958-1960 to 9% in 1970. However, the percentage of trees aged over 30 years fell again by 7%. This could be due to the large percentage of new plantings made a decade earlier.

Taking the 1970 estimates as they stand, a high proportion of the trees aged between 16 and 30 years at the time, are now on average, well over 30 years old. When this is added to the 16% that were aged over 30 years in 1970, we could conjecture that the percentage of cocoa trees currently aged over 30 years and therefore, yielding only 78% of their capacity-yield, would be in the region of 40%. [28] The Project Manager of the Ashanti Cocoa Project (ACP) in his Project Completion Report, had this to say about the Ghanaian cocoa industry: [29]

> Many cocoa farms have outlived their economic lives and are fast dying out. A good number of existing cocoa farms are over 30 years old and are therefore past their prime production period.

6.5.1 Ivory Coast

Significant increases in cocoa output occurred from the beginning of the 1960s when the Ivorian government developed a comprehensive production expansion programme aimed at whetting keen interest in cocoa cultivation. Discriminatory policies were adopted against the growing of the rival crop, coffee. Forinstance, beginning from 1957, any farmer who set up a new cocoa farm and maintained it according to the standards laid down by the government benefited from a bonus of CFAF 7,000 per hectare in the year of planting and an additional CFAF 8,000 in the fourth year (Elliot, 1977, p.p. 192-194). In 1965, the government placed a ban on the creation of new coffee plantations or the extension of old ones (Elliot, 1977, p.195).

According to Elliot (1977, p. 188), the Ivorian government resorted to these measures because of the limitations placed on the amount of coffee that Ivory Coast could sell in quota markets; at the same time, there was a strong competition in the non-quota countries.

These special incentives enjoyed by the Ivorian cocoa farmers led to a rapid growth of the cocoa industry from 1960 onwards. In 1960, cocoa area in the Ivory Coast was 249,000 hectares by 1965, land under cocoa had gone up by 74%. [30] From Table 3, land under cocoa and coffee expanded respectively at the rates of 6.71% and 4.98% per year between 1969 and 1980.

TABLE 2: LAND UNDER COCOA IN SELECTED YEARS.

YEAR	COCOA HECTAREAGE	% INCREASE
1950	158,400	-
1955	188,400	19
1960	249,000	32
1965	434,300	74
1970	539,200	24
1975	815,000	51
1980	1,076,000	32

SOURCE: Elliot, 1974, p. 254 and de Wilde, 1984, p. 94

TABLE 3: IVORY COAST: TOTAL PLANTED AREAOF COCOA AND COFFEE ('hectares)*

YEAR	COCOA	COFFEE
1969	517	736
1970	539	868
1971	562	887
1972	586	910
1973	611	955
1974	899	1,060
1975**	815	1,176
1976	840	1,214
1977	863	1,254
1978	897	1,292
1979	947	1,362
1980	1,076	1,174

Rates of growth per year: Cocoa = 6.713%,
Coffee = 4.983%.

SOURCE: de Wilde, 1984, p. 94

* Rates of growth per year were computed from the figures in the table.

** The drop in land under cocoa from 899,000 hectares in 1974 to 815,000 hectares in 1975 was probably due to the exclusion of unregenerated traditional cocoa farms in the 1975 agricultural census. Elliot notes that 15% of the cocoa area to be regenerated between 1970 and 1975 were found to be either too isolated or located on soil which was too poor to merit regeneration (Elliot, 1974, p. 131).

It was estimated that cocoa plantings in the period 1965 to 1970 were of the order of 20,000 hectares a year (Elliot, 1977, p. 195). In 1971, the gross area planted in cocoa was 490,000 hectares and by the end of 1974, the figure had shot up to 899,000 hectares. [31] Cocoa area increased rapidly in the next six years to over one million hectares. The rapid expansion in the industry within these last 25 years shows that a large proportion of the Ivorian cocoa farms are currently in their prime economic age.

TABLE 4: AGE DISTRIBUTION OF COCOA TREES IN THE IVORY COAST*

AGE CLASS	1969/70 CENSUS AREA (hectares)	%	1980/81 CENSUS AREA (hectares)	%
0-7years	108,400	22.5	264,500	22.7
8-15 years	119,600	24.8	478,805	41.2
16-35 years	202,400	42.1	251,224	21.6
Over 35years	51,300	10.6	168,476	14.5
TOTAL	481,700	100.0	1,163,005	100.0

SOURCES: 1969/70 Census - See Elliot, 1974, p. 258
1980/81 Census- Computed from information on total planted area in cocoa obtained from Elliot (1974), p. p. 258-259 and de Wilde (1984), p. 94.

* The economic life of a cocoa tree is between the 5th and the 40th years.

Table 4 shows the percentage distribution of theage-structure of the Ivorian cocoa trees in 1970 and 1981. In 1970, over 47% of the Ivorian cocoa trees were under 16 years old; the corresponding figure for Ghana was 27%. The Ivory Coast figure rose to 64% in 1980. According

to the Ghanaian Ministry of Agriculture, the 1970 cocoa census spanned the period 1970-1980. [32] This means that in 1980, the proportion of cocoa trees in Ghana aged below 16 years was still 27%.

Thus, whilst the age-structure of the Ghanaian cocoa trees in the 1970s portrays a bleak future for the industry, in the Ivory Coast, the future of the cocoa industry looks very bright since the bulk of cocoa trees in the country are yet to attain their full capacity yield.

APPENDIX 7.1: REVIEW OF WORKS ON COCOA SMUGGLING.

Kumar illustrated the method he used to calculate the amount of cocoa smuggled out of Ghana to the Ivory Coast and Togo each year with the following example. Assume two adjacent countries X and Y which under identical agricultural influences, produce 16 tons and 12 tons (of cocoa) respectively in 1970. This makes a total of 28 tons between the two countries. In 1971, the total production (though not necessarily amounting to 28 tons) must bear the same proportion - 4:3; so if the total production falls in 1971 to 14 tons, then the two countries should produce 8 tons and 6 tons respectively. If they in fact produce 4 tons and 10 tons respectively, country X has lost 4 tons to country Y. Where movement of cocoa is banned between X and Y, these can be said to have been smuggled into country Y.

Kumar assumes that cocoa production in Ghana, the Ivory

Coast and Togo is influenced by the same factors. He states that `the three countries are subject to the same climatic and agronomic conditions. The level of technology and mode of production are the same. Production ratios can therefore change only as a result of changes in fruit-bearing tree population.' [33]

Apart from climatic conditions and mode of production which are fairly the same across the three countries, all the other factors are quite different. While most of the cocoa growing lands in Ghana have been reduced into secondary forests by overcropping and indiscriminate felling of trees by timber merchants and have therefore been rendered less supportive for cocoa cultivation, [34] the Ivory Coast for example, still possesses large tracks of good cocoa lands yet to be developed. [35] In terms of technology, the Ivory Coast cocoa industry combines fertilisers with high yielding cocoa while Ghana does not use fertilisers at all even though high yielding varieties are grown. These differences can at any time alter the production ratios of cocoa between the countries which Kumar assumesto be the same over a given period.

Secondly, Kumar's method relies on a base year whose production figures are used as the output ratios for the countries involved in the study. Such a base year is supposed to be free from smuggling. In practice, it is extremely difficult to identify a particular year in which cocoa producer prices, given a common currency, were equal

in Ghana and in any of the two other countries to preclude the smuggling of cocoa from one country to the other. Kumar's own base year of 1959 could not be said to be smuggling free since from 1957 to 1961, the nominal cocoa producer prices in the Ivory Coast were by far greater than the corresponding prices in Ghana and therefore, it was possible that there were leakages of cocoa from Ghana to the Ivory Coast even at the time.

Kumar also used national cocoa statistics of Ghana in his computations. This could lead to an overestimation of the magnitude of cocoa smuggling since smuggling is confined to only the border districts of Brong-Ahafo, Western and Volta Regions of Ghana. No wonder, Kumar estimated that in 1971, the quantity of cocoa smuggled to the Ivory Coast alone from Ghana was 44,753 tons (45,469 tonnes), approximately 25% of cocoa production in the Ivory Coast that year. [36]

The exaggeration in Kumar's estimates becomes obvious when it is realised that in 1971, the hecterage of harvested cocoa in the Ivory Coast was 404,300 -these were made up of regenerated traditional cocoa mainly. Elliot uses the term 'regeneration' for traditional cocoa which receives proper maintenance and insecticide treatments [37] and according to Elliot, such cocoa trees are capable of yielding not less than 500kg/hectare. [38] If even a lower yield per hectare of 400kg is used to estimate cocoa production in 1971 so that an allowance is made for cocoa farms that are notable to yield the given minimum figure, we obtain an output of

161,720 tonnes. This is short of the actual production that year by just 17,480 tonnes. 39

Franco in his work on the optimal producer price of cocoa in Ghana formulated the following equation for cocoa smuggling: 40

$$Sde_2 = g\ (PT,\ Pf) \ldots . (1)$$

where,

Sde_2 = cocoa exports through unofficial channels,

Pt = cocoa producer price in Togo, and

Pf = real producer price of cocoa in Ghana.

The reduced-form of equation (1) using other equations developed in Franco's model is: 41

$$Sde_2 = a+a_1\ Pf+a_2Yf+a_3\ PT-(Sde_1+Sdd)\ ..\ (2)$$

Sde_1 = cocoa exports through official channels,

Sdd = quantity of cocoa consumed locally, and

Yf = real income of farmers

Inspite of the rigorous nature of Franco's method, there were some errors in his choice of variables which could adversely influence the results of his model. Franco, like Kumar, used national cocoa statistics; in particular, he utilised cocoa export figures in estimating the quantity of cocoa smuggled out of the country each year. Not only would such statistics overestimate the magnitude of cocoa

smuggling but they would also produce figures which would be far from the true representation of the year-by-year quantity of cocoa smuggled out of the country. This is because transportation and other marketing problems associated with the Ghanaian cocoa industry do not in any year guarantee an equality between cocoa production and cocoa export. Franco also based his study only on Togo which absorbs a small fraction of the smuggled cocoa from Ghana and later generalised his estimates for the whole country.

May, like Franco, used regression analysis to estimate the magnitude of cocoa smuggling in Ghana. He first of all formulated a cocoa supply function for the two regions he studied, Brong-Ahafo and Volta. The econometric specification of his supply equation is: [42]

$$\ln Q_{CMB} = a_0+a_1\ln PCAP+a_2\ln P+a_3\ln R+a_4\ln P_* +e \quad (3)$$

where,

Q_{CMB} = total cocoa sales to the CMB,

PCAP = cocoa production capacity,

P = real producer price of cocoa

R = rainfall, and

P_* = ratio of producer prices.

May then used the least-squares estimation technique to estimate the parameters of the supply equation. A function

for cocoa smuggling (Q_s), was specified as:

$$Q_m = \frac{(1-S)}{S} Q_{CMB} \quad \ldots\ldots (4)$$

where,

$$S = f(P_m) \quad \ldots\ldots (5)$$

The estimated parameter of P_m was then used to calculate the magnitude of cocoa smuggling each year using equation (4).[43]

APPENDIX 7.2: DATA USED TO ESTIMATE COCOA SUPPLY FUNCTIONS OF BRONG-AHAFO, WESTERN & VOLTA REGIONS OF GHANA*

YEAR	COCOA OUTPUT ('000 tonnes)			RAINFALL	DUMMY FOR
	BRONG-AHAFO	WESTERN	VOLTA	(INCHES)	RAINFALL
1961	96	23	31	46.80	1
1962	85	21	29	66.90	2
1963	81	23	21	78.01	1
1964	89	24	28	58.32	2
1965	121	34	27	60.76	2
1966	100	24	20	79.59	1
1967	86	25	19	45.11	1
1968	107	28	24	92.27	1
1969	92	21	14	47.11	1
1970	114	31	21	52.12	2
1971	110	36	15	42.75	1
1972	117	50	10	64.14	2
1973	111	42	22	55.54	2
1974	77	41	14	56.38	2
1975	80	40	14	58.00	2
1976	87	44	13	53.05	2
1977	77	40	9	39.06	1
1978	70	42	7	48.49	1
1979	50	46	6	60.56	2
1980	75	52	5	45.71	1
1981	48	45	1	46.87	1
1982	50	44	2	35.10	1

* See also Table 7.2 for cocoa producer prices in Ghana, the Ivory Coast and Togo. Those of the Ivory Coast and Togo have been adjusted for the overvaluation of the cedi using the black market exchange rate.

SOURCE: Kotey, et al., (eds), 1974, p. 315, and World Bank, 1983, p.p. 42-43.

APPENDIX 7.3: DATA USED TO ESTIMATE COCOA SUPPLY FUNCTION OF THE IVORY COAST.

YEAR	COCOA OUTPUT	HARVESTED COCOA LAND	PRODUCER PRICES (CFAF/kg)	
	'000 TONNES	'000 HECTARES	COCOA	COFFEE
1961	93.6	261.2	74	90
1962	81.0	267.7	64	75
1963	103.0	277.2	64	75
1964	98.2	291.8	70	80
1965	147.5	307.8	70	90
1966	113.3	327.3	55	75
1967	149.7	342.8	70	90
1968	146.6	358.0	70	90
1969	144.5	371.1	70	90
1970	180.7	386.8	80	95
1971	179.2	404.3	85	105
1972	225.8	422.8	85	105
1973	185.4	440.5	85	105
1974	208.5	497.0	110	120
1975	241.5	471.0	175	150
1976	231.1	498.0	175	150
1977	232.3	526.0	180	180
1978	303.6	557.0	250	250
1979	318.4	586.0	250	250
1980	379.4	610.0	300	300
1981	403.0	721.0	300	300
1982	457.0	456.7	300	300

SOURCE: de Wilde, 1984, p. 94.

APPENDIX 7.4: DATA USED TO ESTIMATE THE MAGNITUDE OF COCOA SMUGGLING IN GHANA AND THE IVORY COAST.

YEAR	RATIO OF COCOA PRICES, CSM	ANTILOG $\beta 4 \ln CSMt$					
	A	B	C	D	E	F	G
1961	0.797	0.796	1.255	0.958	0.951	0.937	1.038
1962	1.083	1.304	0.923	1.015	1.018	1.078	0.987
1963	1.356	1.582	0.737	1.059	1.069	1.139	0.951
1964	1.192	1.287	0.839	1.034	1.039	1.074	0.972
1965	0.969	0.971	1.032	0.994	0.993	0.992	1.005
1966	0.292	0.412	3.425	0.794	0.762	0.777	1.224
1967	0.418	0.536	2.392	0.849	0.825	0.837	1.154
1968	0.497	0.498	2.013	0.877	0.857	0.820	1.122
1969	0.532	0.487	1.880	0.888	0.870	0.815	1.109
1970	0.601	0.562	1.665	0.909	0.894	0.849	1.087
1971	0.566	0.515	1.766	0.899	0.882	0.828	1.098
1972	0.670	0.614	1.492	0.928	0.916	0.870	1.069
1973	0.684	0.682	1.463	0.931	0.920	0.897	1.065
1974	0.541	0.717	1.847	0.891	0.873	0.910	1.106
1975	0.484	0.738	2.066	0.873	0.852	0.917	1.127
1976	0.436	0.643	2.292	0.856	0.833	0.882	1.146
1977	0.229	0.349	4.362	0.758	0.723	0.741	1.274
1978	0.207	0.346	4.827	0.744	0.707	0.739	1.295
1979	0.301	0.396	3.317	0.798	0.768	0.768	1.218
1980	0.180	0.228	5.555	0.724	0.685	0.657	1.326
1981	0.262	0.358	3.813	0.777	0.744	0.747	1.246
1982	0.301	0.402	3.319	0.798	0.768	0.772	1.218

KEY:

A = PG/PIV
B = PG/PTG
C = PIV/PG
D = B/A
E = WESTERN
F = VOLTA
G = IVORY COAST

APPENDIX 8.1 BASIC DATA USED IN MODELLING WORLD COCOA DEMAND FUNCTION

Year	1	2	3	4	5	6
1961	41	852	15,095	431	107.8	249
1962	41	843	16,159	407	108.0	198
1963	42	838	16,695	488	107.6	190
1964	43	808	17,837	437	105.6	195
1965	43	945	18,742	321	106.5	223
1966	44	916	19,425	439	106.6	214
1967	44	1059	23,843	541	122.0	205
1968	43	759	26,902	744	109.5	174
1969	44	747	28,570	943	106.1	189
1970	46	812	29,411	665	102.0	265
1971	49	886	29,314	437	91.0	245
1972	52	888	33,167	479	122.5	188
1973	65	823	31,575	746	97.2	289
1974	94	758	24,324	861	106.5	377
1975	100	753	28,731	618	281.0	278
1976	99	777	38,268	1216	193.8	337
1977	112	687	35,143	2163	128.7	269
1978	127	737	34,672	1213	128.9	235
1979	154	680	28,506	851	116.6	194
1980	193	694	23,055	516	106.8	130
1981	183	844	30,486	529	133.1	145
1982	172	815	38,358	545	158.7	162

1 U.K. Import Unit Price Index 1975 = 100
2 Cocoa Beans Demand 1 ('000 tonnes)
3 Real Per Capita income 2 (£)
4 Real Cocoa Beans Price (£1/tonne)
5 Real Price of Sugar (£/tonne)
6 Real Price of Soyabean Oil (£/tonne)

NOTES:
1 These figures represent the yearly total imports of cocoa beans of the 15 major cocoa consuming countries selected for the study.
2 The figures are the average real per capita income of the 15 countries

SOURCES:
(a) Statistics on cocoa beans demand were obtained from Gill & Duffus, Cocoa Market Report No. 320, October 1985, p. 9.
(b) World market cocoa prices were obtained from several issues of Gill & Duffus, Cocoa Statistics.
(c) GDPs and population figures used to calculate the per capita income of the 15 selected countries were obtained from various issues of I.M.F. International Financial Statistics.
(d) Prices of sugar and soyabean oil were also obtained from various issues of I.M.F. International Financial Statistics.

APPENDIX 8.2: THE TREND IN WORLD SUPPLY OF COCOA BEANS

Because cocoa is a perennial crop, any change in its supply position induced by a change in the world market price of cocoa, lingers on for at least three years. Therefore, there is an inverse cyclical relationship between cocoa production and world market cocoa prices. This relationship is illustrated by Figure 8.1 which presents in a graphic form, the supply of cocoa alongside the world market real cocoa price from 1947 to 1985. From Figure 8.2 which shows a three-year moving average graphs of world cocoa supply and real cocoa price, we can identify seven periods during which a period of increasing production and declining real cocoa price is followed by one of falling production and rising real cocoa price. These cycles which are not uniform in length, occur in the periods 1948-53, 1953-66, 1966-68, 1968-71, 1971-78, 1978-81 and 1981 onwards, such cycles are explained by the response of the chief cocoa producers to changes in the world market price of cocoa.

(i) Period 1948-53,

During this period, the behaviour of world cocoa production was one of fluctuation rather than outright decline. World market cocoa price had remained stagnant in the war years and this had led to a continuous decline in cocoa supply up to 1944. A 7% rise in world market price of cocoa in 1945

halted the downward trend of cocoa supply but from this time up to about 1953, cocoa supply fluctuated between 599,000 and 813,000 tonnes. All these years the real cocoa price of cocoa showed an upward growth.

(ii) Period 1953-66.

The rising real cocoa prices immediately after the war through to 1953, animated the cocoa industry in all the major producing countries. World supply of cocoa began to rise after 1953. Sharp increases in cocoa supply occurred between 1958 and 1961 and by 1965, supply had shot up to 1,500,000 tonnes [44]. Ghana registered the highest growth rate during the period; its share of the world cocoa supply was as high as 38%.

(iii) Period 1966-68.

The impact of the continuous fall in the real prices of cocoa from 1953 to 1965 began to be visible after 1965 when cocoa supply dropped sharply from 1,500,000 tonnes in 1965 to 1,220,000 tonnes in the ensuing year. The 3-year moving average graph shows that supply declined from 1965 to 1968. [45] Over the period, however, the real prices of cocoa resumed an upward trend.

(iv) Period 1968-71.

The decline in cocoa supply in the previous cycle was short-lived owing to the rise in the real prices of cocoa from 1966 to 1968. Cocoa supply began to go up again in all the chief producing countries save Ghana. There was a notable increase in cocoa output in Nigeria during the period.

(v) Period 1971-78.

Cocoa supply in this period declined and this was, by large, due to the fall in the real prices of cocoa in the preceding cycle. Cocoa production in Brazil, Nigeria, Cameroon and Ghana fell during the period. The decline was greatest in Ghana. Of all the leading cocoa producers, it was only the Ivory Coast which registered a positive growth in cocoa production during the period.

(vi) Period 1978-81.

The real prices of cocoa in the previous period rose from below £300 per tonne in 1971 to over £1,050 per tonne in 1977. This sparked off an increase in cocoa supply from 1978 to 1981. There was a substantial recovery in cocoa output in Brazil and Cameroon and in the Ivory Coast, production continued to rise at a fast rate.

(vii) Period After 1981.

The year 1981 marked the beginning of another cycle of declining cocoa supply; this was the influence of the sharp fall in real cocoa price from 1977 to 1981. [46]

APPENDIX 9.1 DATA USED FOR PRIVATE COST-BENEFIT ANALYSIS

9.1.1 Ghana: Estimated Costs of Production Per Acre for Hybrid Cocoa (1982 prices).

A. Investment Cost

Operation	Man-days	Cost (¢)
Cost of an acre of land		8,000.00
Underbrushing	7	84.00
Felling, beating and cutting up	4	48.00
Burning and clearing plant debris	3	36.00
Cutting pegs, lining and pegging	8	96.00
Holing	5	60.00
Conveying of cocoa seedlings and plantain suckers	6	72.00
Planting of cocoa seedlings and plantain suckers	5	60.00
Cost of cocoa seedlings (680 seedlings/acre @ ¢0.64 each)		435.20
Cost of plantain suckers (340 suckers/acre @ ¢0.80 each)		272.00
TOTAL INVESTMENT COST		9,163.20

B. Annual Operating Cost		
Brushing & pruning (2 x year)	12	144.00
Spraying (4 x year)	4	48.00
Harvesting (2 x year)	4	48.00
Breaking of pods & fermentation	4	48.00
Carrying fermented beans to house	4	48.00
Conveying dried beans to buying centre	3	36.00
Cost of inputs: 1 spraying machine		30.00
1 cutlass		15.00
1.13litres of insecticide @ ¢0.50/litre		2.28
1 harvesting knife		30.00
4 baskets @ ¢10 each		40.00
1 drying mat		50.00
TOTAL OPERATING COST		539.28

Notes:
1. Costs of inputs are assumed to be uniform across the cocoa growing areas.
2. Annual operating costs are assumed to be the same for all years, from years 1 to 25.
3. Cost of labour per man-days in 1982 was ¢12.

9.1.2 Ghana: Estimated Costs of Production Per Acre for Oil Palm (1982 Cedis)

A. Investment Cost

Operation	Man-days	Cost (¢)
Cost of an acre of land		8,000.00
Underbrushing	7	84.00
Felling beating and cutting up	4	48.00
Burning and clearing plant debris	3	36.00
Cutting pegs, lining and pegging	8	96.00
Holing and filling of top soil	8	96.00
Conveying cover crop and seedling from nursery	6	72.00
Planting of seedlings & cover crop	5	60.00
Fixing wire collars	4	48.00
Cost of oil palm seedlings (60 seedlings/acre @ ¢3.00 Each)		180.00
Cost of wire collars (60/acre @ ¢0.50 each)		30.00
Cost of plantain suckers (340 suckers/acre @ ¢0.80 each)		272.00
TOTAL INVESTMENT COST		9,022.00

B. Annual Operating Cost

Ring weeding (2 x year)		6	72.00
Brushing of cover crop (2 x year)		10	120.00
Fertiliser application		1	12.00
Fertiliser cost			53.00
Pruning		5	60.00
Harvesting including collecting		6	72.00
Selling time		3	36.00
Cost of inputs:	(i) 1 cutlass		15.00
	(ii) 1 chisel for harvesting		30.00
	(iii) 4 baskets		40.00
TOTAL ANNUAL OPERATING COSTS			510.00

9.1.3 Ghana: Estimated Returns from an Acre of Hybrid Cocoa Farm (1982 Cedis)

A. Cocoa Beans*

PLANT YEAR	YIELD (lb/ac)	VALUE(¢)
4	100	545.45
5	300	1,636.36
6	400	2,181.82
7-25	750	4,090.91

B. Plantain (acre)

PLANT YEAR	YIELD (bunches)	VALUE (C15/bunch)
1	340	5,100.00
2	170	2,550.00
3	102	1,530.00
4	54	810.00

* The producer price of cocoa in 1982 was ¢360 per load of 30kg (66lb).

SOURCE: Costs and returns for the cocoa farm have been estimated from data obtained from Ashanti Cocoa Project (ACP) Annual Reports, Ashanti Region Cocoa Appraisal, World Bank (1975) and Ofori-Attah, 1985.

9.1.4 Ghana: Estimated Returns from an Acre of Oil Palm (1982 Cedis).

Yield of 60 tenera oil palm trees per year = 3,600kg
(This is equivalent to 120 gallons of edible oil)
Cost of palm nuts/fruits per kg = ¢3.00
Therefore, an acre of oil palm plantation yields ¢10,800/year
120 gallons of palm oil weigh approximately 1,200lbs.

SOURCE: Information used in estimating the costs and returns for oil palm plantation was obtained from various sources including Ofori-Gyamfi (see Bibliography) and Ministry of Agriculture, Accra (Mr. Isaac Acheampong, a research assistant at the University of Cape Coast, C.D.S., collected data from the ministry on my behalf).

9.1.5 Ivory Coast: Estimated Costs of Production Per Hectare* for Hybrid Cocoa (1982 CFAF)

A. Investment Cost

Operation	Man-days	Cost (CFAF)
Cost of a hectare of land		25,000
Underbrushing	17	5,950
Felling, beating and cutting up	10	3,500
Burning and clearing plant debris	7	2,450
Cutting pegs, lining and pegging	20	7,000
Holing	12	4,200
Conveying of cocoa seedlings and plantain suckers	15	5,250
Planting of cocoa seedlings and plantain suckers	12	4,200
Cost of cocoa seedlings (1,400 seedlings/ha @ CFAF 20 each)		28,000
Cost of plantain suckers (840 suckers/ha @ CFAF 15 each)		12,600
TOTAL INVESTMENT COST		98,150

B. Annual Operating Cost

Brushing & pruning (2 x year)	30	10,500
Spraying (4 x year)	10	3,500
Fertiliser application	3	1,050
Harvesting (2 x year)	10	3,500
Breaking of pods & fermentation	10	3,500
Carrying fermented beans to house	10	3,500
Conveying dried beans to buying centre	7	2,450
Cost of inputs: 1 spraying machine		44,000
1 cutlass		700
2.791itres of insecticide		4,464
Cost of fertiliser		22,000
1 harvesting knife		1,000
4 baskets @ CFAF 300		1.200
1 drying mat		1,400
TOTAL OPERATING COST		102,764

* 1 hectare = 2.4711 acres

SOURCE: Data obtained from several sources including Elliot, Linn, de Wilde and de Graaff.

9.1.6 Ivory Coast; Estimated costs of Production Per Hectare for Robusta Coffee (1982 CFAF)

A. Investment Cost

Operation	Man-days	Cost (C)
Cost of a hectare of land		25,000
Underbrushing	17	5,900
Felling, beating and cutting up	10	3,500
Burning and clearing plant debris	7	2,450
Cutting pegs, lining and pegging	20	7,000
Holing	12	4,200
Conveying of coffee seedlings and plantain suckers	15	5,250
Planting of coffee seedlings and plantain suckers	12	4,200
Cost of coffee seedlings (746 seedlings/ha @ CFAF 20 each)		14,920
Cost of plantain suckers (840 suckers/ha @ CFAF 15 each)		12,600
TOTAL INVESTMENT COST		85,020

B. Annual Operating Cost

Brushing & pruning (2 x year)	30	10,500
Harvesting	30	10,500
Pulping of coffee cherries	20	7,000
Fermentation	4	1,400
Washing coffee	10	3,500
Drying coffee	10	3,500
Selling time	4	1,400
Fertiliser application	3	1,050
Cost of inputs: 1 spraying machine		44,000
1 cutlass		700
2.791itres of insecticide		4,464
Cost of fertiliser		22,000
4 baskets @ CFAF 300		1,200
1 drying mat		1,400
TOTAL OPERATING COST		112,614

9.1.7 Ivory Coast Estimated Returns From A Hectare of Hybrid Cocoa Farm (1982 CFAF)

A. Cocoa Beans

PLANT YEAR	YIELD (kg/ha)	VALUE (CFAF 300/kg)
3	250	75,000
4	600	180,000
5	1000	300,000
6	1300	390,000
7-25	1600	480,000

B. Plantain (hectare)

PLANT YEAR	YIELD (Bunches)	VALUE (CFAF 46/kg
1	840 (9,525.6 kg)	438,177.60
2	420 (4,762.8 kg)	219,088.80
3	252 (2,857.68kg)	131,453.28
4	133 (1,508.22kg)	69,378.12

9.1.8 Ivory Coat Estimated Returns From A Hectare of Coffee (1982 CFAF)

PLANT YEAR	YIELD (lb/ha)	VALUE (CFAF 300/kg)
3	254	76,200
4	338	101,400
5	677	203,100
6	1015	304,500
7-25	1354	406,200

APPENDIX 9.2 DATA USED FOR SOCIAL COST-BENEFIT ANALYSIS

9.2.1 Ghana: Social Costs of Cocoa Production Per Acre (1982 Cedis)*

Operation	Cost
Total labour cost @ C50/ manday(38mandays)	1,900.00
Cost of other inputs(land, spraying machine,etc)	8,707.20
Total establishment cost	10,607.20
Annual maintenance cost	3,214.00
20% maintenance cost for marketing cost	642.80
Annual maintenance and marketing cost	3,856.80

*Establishment and maintenance costs estimated from Table 9.1.1.

9.2.2 Ghana: Social Benefits of Cocoa Production Per Acre (1982 Cedis)

PLANT YEAR	YIELD	VALUE		
		C23.43/lb	C46.86/lb	C37.49/lb
4	100	C2,343	4,686	3,749
5	300	C7,029	14,058	11,247
6	400	C9,372	18,744	14,996
7-25	750	C17,572.50	35,145	28,117.50

9.2.3 Ghana: Social Costs of Oil Palm Production Per Acre (1982 Cedis)*

Operation	Cost
Total labour cost @ C50/manday(45mandays)	2,250.00
Cost of other inputs	8,472.00
Total establishment cost	10,722.00
Annual maintenance cost	1,860.00
20% maintenance cost for marketing cost	372.00
Annual maintenance and marketing cost	2,232.00

*See Table 9.1.2

9.2.4 Ghana: Social Returns of Oil Palm Production Per Acre (1982 Cedis)

PLANT YEAR	YIELD (lb/ac)	VALUE OF YIELD C6.00/lb	C12.01/lb	C9.71/lb
3-25	1,200	C7,200	14,412	11,652

9.2.5 Ivory Coast: Social Costs of Cocoa Production Per Hectare (1982 CFAF)*

Operation	Cost
Total labour cost @ CFAF400/ manday(83mandays)	33,200
Cost of other inputs	65,600
Total establishment cost	98,800
Annual maintenance cost	106,764
20% maintenance cost for marketing cost	21,435.80
Annual maintenance and marketing	128,199.80

* See Table 9.1.5

9.2.6 Ivory Coast: Social Benefits of Cocoa Production Per Hectare (1982 CFAF)

PLANT YEAR	YIELD (kg/ha)	VALUE (CFAF 622.40/kg)
3	250	155,600
4	600	373,440
5	1000	622,400
6	1300	809,120
7-25	1600	995,840

9.2.7 Ivory Coast: Social Costs of Coffee Production Per Hectare (1982 CFAF)*

Operation	Cost
Total labour cost (93mandays)	37,200
Cost of other inputs	52,520
Total establishment cost	89,720
Annual maintenance cost	118,164
20% maintenance cost for marketing cost	23,638.80
Annual maintenance and marketing	141,802.80

* See Table 9.1.6

9.2.8 Ivory Coast: Social Benefits of Coffee Production Per Hectare (1982 CFAF)

PLANT YEAR	YIELD (kg/ha)	VALUE (CFAF 1,037.40/kg)
3	254	263,481.82
4	338	350,617.54
5	677	702,272.41
6	1,015	1,052,889.95
7-25	1,354	1,404,544.82

APPENDIX 9.3 DATA USED FOR SOCIAL OPPORTUNITY COST ANALYSIS

9.3.1 Ghana: Basic Data for DRC Calculation.

Year	Input-type	Cost ¢	Yield lb	Value of Yield £0.47/lb
1	Land (1 acre)	8,000	-	-
	Labour (26 Man-days)	1,300		
	Cocoa Seedlings (680 seedlings)	435		
	Cutlass (1)	87		
	4 baskets	80		
2	Labour (12 Man-days)	600	-	-
	Cocoa Seedlings (34)	22		
	Cutlass	87		
3	Labour (20 man-days)	1,000	60	28
	Cutlass	87		
	Harvesting knife	80		
	Insecticide	151		
	Drying mat	80		
	Spraying Machine	£56	(imported)	
4	Labour (24 man-days)	1,200	100	47
	Cutlass	87		
	Insecticide	151		
	4 baskets	80		
5	Labour (28 man-days)	1,400	300	141
	Cutlass	87		
	Insecticide	151		
6	Labour (31 man-days)	1,550	400	188
	Cutlass	87		
	Insecticide	151		
7	Labour (31 man-days)	1,550	750	352.50
	Cutlass	87		
	Insecticide	151		
	4 baskets	80		

9.3.2 Ivory Coast: Basic Data for DRC Calculation.

Year	Input-type	Cost CFAF	Yield lb	Value of Yield $0.8396/lb
1	Land (1 acre)	25,000	-	-
	Labour (27 Man-days)	10,800		
	Cocoa Seedlings (680 seedlings)	13,600		
	Fertiliser	8,903		
	Cutlass	700		
	4 baskets	1,200		
2	Labour (13 Man-days)	5,200		
	Cocoa Seedlings (34 seedlings)	680		
	Cutlass	700		
	Fertiliser	8,903		
3	Labour (21 Man-days)	8,400	223.00	187.23
	Cutlass	700		
	Harvesting knife	1,000		
	Insecticide	1,806		
	Drying mat	1,400		
	Fertiliser	8,903		
	Spraying Machine	$151.00 (Imported)		
4	Labour (25 man-days)	10,000	535.29	449.43
	Cutlass	700		
	Insecticide	1,806		
	Fertiliser	8,903		
	4 baskets	1,200		
5	Labour (29 man-days)	11,600	892.15	749.05
	Cutlass	700		
	Insecticide	1,806		
	Fertiliser	8,903		
6	Labour (32 man-days)	12,800	1,159.80	973.77
	Insecticide	1,806		
	Fertiliser	8,903		
	Cutlass	700		
7	Labour (32 man-days)	12,800	1,427.45	1,198.49
	Cutlass	700		
	Fertiliser	8,903		
	Insecticide	1,806		
	4 baskets	1,200		

Footnotes to Appendices.

1. See Le Vine, 1975, p. 102,

2. In 1965, there were the State Farms Corporation, the UCFCC, the Workers' Brigade, the Young Farmers' League and several other institutions all undertaking agricultural projects in the country.

3. See Seidman, 1972, p. 178.

4. See Due, 1969, p. 643.

5. See bibliography for Nerlove's work (1956 and 1958).

6. Again, poor data base has made researchers use either figures on cocoa purchases or those of cocoa exports. For example, we made use of the former in our supply equations for the same reason.

7. Most of the information in this section was obtained from an interview with Flt.Lt. J. B. Atiemo, Deputy Chief Executive of the GCMB in charge of Operations.

8. See Bauer and Paish, 1952, p. 756.

9. Ibid, p. 756.

10. See de Graft-Johnson, 1974, p. 358.

11. See Bene-Hoane, p. 152 for detail discussion of the functions of the other departments.

12. Ibid, p. 150.

13. Such expenses include costs of transportation down to Abidjan or other port of shipment, loading into sacks, carriage, warehousing and international handling.

14. See Bene-Hoane, p. p. 156-157.

15. See Ofori-Attah, 1985, p. p. 93-94.

16. Time series of cocoa producer prices spanned the period 1960 to 1979. We did not include prices in the 1980s because the cocoa tree has a gestation period of between 3 and 5 years and therefore, in the long run, any influence of a price change on cocoa output takes at least 3 years to be visible. For conformity of comparison, the Consumer Price Indices for the two countries covered the same period as the series for the producer prices.

17. Prices of inputs were collected separately on behalf of the author by Messrs Kramo Braima (an official of the Ghana Education Service, Kumasi), Daniel Bosieh (a University graduate teacher), and Isaac Acheampong (a University research assistant, University of Cape Coast, Ghana).

18. See below for details of such materials.

19. See Appendix 7.2.2.

20. Jacobu and Poano units share common boundaries and lie to the west of Bekwai.

21. The military government at the time did not tolerate criticism of government policies. Any person found doing so was arrested and made to face military brutalities, sometimes ending up in jail.

22. The fall in cocoa output in the previous year was 13%. See Gill & Duffus, Cocoa Market Report, October, 1985, p. 10.

23. See Dadzie, et al., 1985, p. 61.

24. Ibid. P. 20.

25. See Dadzie, et al, 1985, p. 20

26. See Ofori-Attah, 1985, p. 170 and also Appendix 5.

27. See Birmingham, et al., 1967, p. 242.

28. This figure, however, depends on the degree of new investments made in the industry in the decade 1970-1980 by peasant cocoa farmers and the government of Ghana. See Chapters 3 (Section 3.3) and 5.

29. See ACP, 1982, P. 4.

30. See Table 2.

31. See World Bank, 1978, p. p. 218-9.

32. See World Bank, 1983, p 33.

33. See Kumar, 1973, p. 289.

34. See Chapter 4.

35. See Chapter 4.

36. See Kumar, Table 6, p. 294. Cocoa output in the Ivory Coast in 1971 was 179,200 tonnes.

37. See Elliot, 1974, p. 116.

38. Ibid, p. 118. Hecht uses 410 kg/ha as the average yield (See Hecht, 1983, p. 43).

39. This figure compares favourably with the 17,180 tonnes we obtained from our estimation for 1971. See Table 3.9.

40. See Franco, 1979, p. 85.

41. Ibid, p. 90.

42. See May, 1985, p.p. 70-75 for detail description of his econometric model.

43. See May, 1985, p.p. 78-81.

44. See Figure 8.2

45 See Figure 8.3

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