OUTPUT-INCOME EFFECTS ON AGRICULTURAL EXPORT PRICING STRATEGY IN NIGERIA:
The Case for Cocoa*

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I. INTRODUCTION

THE WESTERN STATE, lying essentially in the southern forest zone of Nigeria, occupies an area of 18.396 million acres. Of this area, about 10.43 per cent is cultivated to farm and tree crops, whilst 35.45 per cent of the cultivated area is devoted to cocoa [15]. This commodity, which has its own peculiar ecological zone, forms the backbone of the Western State economy. Apart from providing means of livelihood through commodity income to about 1 million farmers, it also supports a fleet of "runners," pan buyers, LBAs (Licensed Buying Agents), produce inspection officers, workers in the State Marketing Board, cocoa transporters, and cooperative associations as well as their officials. In addition, substantial sums of money accruing from trading surpluses of the Western Nigeria Marketing Board (WNMB) help to finance government development projects, as well as administrative expenses.

The cocoa industry showed much promise immediately after the Second World War. This success and/or boom in cocoa trade continued till the mid-1950s when a continuing decline set in. This had led to a mounting controversy on the extent of impoverishment and the deteriorating situation of the cocoa farmers. These twin maladies, it is often claimed, have disincentive effects on cocoa production. The resulting backwash/backlash effects are claimed to precipitate declining export proceeds which result from declining acreage response and inefficient management. This situation further aggravates farmers' poverty as well as makes serious inroads into farmers' re-investment propensities in cocoa production. The end result is a vicious circle which finally will culminate in losing our position in the world cocoa market as well as losing a substantial proportion of government revenue accruing from the cocoa industry.

This study is undertaken to examine the validity or otherwise of these contentions. In the rest of this paper, section II will discuss the problem and objectives of the study. Section III will discuss the structure of the Western Nigeria cocoa industry. Section IV will be devoted to a resume of the methodology, sources

of data and the estimating equations used, whilst section V will examine the WNMB pricing policy and its effects. In section VI an attempt will be made to define a working pricing strategy whilst section VII will contain a summary and conclusion of the study.

II. PROBLEM AND OBJECTIVES OF THE STUDY

The introductory comments above vividly point to the fact that the Western Nigerian cocoa industry, which accounts for about 95 per cent of Nigeria's cocoa exports, faces a very serious problem. This problem, it is claimed, arises from the output-income effects of the agricultural export pricing strategy of the WNMB. This grave problem may be summarized as one of a seriously deterio- rating cocoa production situation which, in turn, engenders serious (but as yet driven underground) socio-politico unrests. Such a gloomy picture calls for greater attention in order to facilitate speedy recovery and/or economic prosperity in the cocoa industry. In other words, there is a gasping need for information on the extent of the damage done to the cocoa industry in Western Nigeria in order to help in designing new and realistic policies that are instrumental to a meaningful rejuvenation and progress in the industry.

  Table I presents relevant statistics that enable us to measure and/or assess the cocoa situation. In column 2 of this table, it is shown that producers have been paid a persistently lower percentage of the world price for their cocoa over the twenty year period. Column 3 shows that on the average, quantity exported fluctuated between 16 and 19 per cent of world market purchase of cocoa beans. The output is increasing at a highly decreasing rate. When one considers the fact that about 60 per cent of the cocoa groves in the state are either senile or disease-ridden or both, then one realizes that significant decreases in output are in the offing. Column 4 shows that cocoa earnings as a percentage of world spendings on cocoa purchases fluctuated between 14 and 17 per cent on the average. This exemplifies the fact that cocoa is fast becoming a less significant income-earner on the national scene. The effect of this on the state level becomes more serious, since no other comparable and/or alternative sources of income exist as of now. This contention is depicted more vividly in column 5 where it is shown that cocoa earnings constitute, on the average, between 16 and 20 per cent of Nigeria's export earnings. In general, columns 2 to 5 of Table I depict a falling aggregate output-income situation in the Western Nigeria cocoa industry.

  The impact of this problem is further aggravated by the fact that the producer's share of this falling income has followed a persistent downward trend. Column 6 of Table I shows that cocoa taxes (purchase tax plus export duty) have shown a persistent upward trend. Column 7 shows that the expenses of the WNMB have become a rising percentage of expected income. Column 8 shows that the WNMB has pursued a consistent policy of making substantial and progressively rising trading surpluses. Thus it can be seen that columns 6, 7, and 8 show that during the periods 1948–1952, 1953–1957, 1958–1962, 1963–1967,

TABLE I

NIGERIA: RELEVANT COCOA STATISTICS

Year	Producer Price as per cent of World Price	Quantity Exported as per cent of World Market Purchase	Cocoa Earnings as per cent of World Spendings on Cocoa	Cocoa Earnings as per cent of Nigeria's Earnings from all Exports	Cocoa Taxes as per cent of Expected Cocoa Income	WNMB Expenses as per cent of Expected Cocoa Income	WNMB Trading Surplus as per cent of Exported Cocoa Income
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1948	32.30	15.64	10.98	28.60	1.73	8.00	51.45
49	98.40	14.61	12.91	18.10	4.76	13.88	2.86
50	50.00	13.70	13.01	21.00	3.21	10.48	34.14
51	46.90	18.20	18.42	26.10	14.21	7.07	33.62
52	68.50	19.82	18.94	22.20	19.15	7.92	5.02
Mean '48–'52	59.20	16.39	14.85	23.20	8.61	9.47	25.42
53	70.80	14.54	14.37	20.00	18.22	10.42	0.36
54	43.30	14.37	14.70	26.30	30.21	4.74	14.31
55	67.50	12.79	12.85	19.70	22.54	7.26	19.21
56	96.20	15.60	15.38	17.80	17.76	10.30	−17.38
57	72.10	17.44	16.15	20.30	14.33	11.29	− 4.88
Mean '53–'57	70.00	14.95	14.69	20.80	20.61	8.80	2.32
58	48.00	13.85	13.63	19.70	17.03	6.79	18.88
59	55.10	19.40	19.10	24.40	20.79	7.50	20.45
60	76.90	17.46	20.05	21.60	16.50	8.51	2.99
61	95.20	18.42	20.08	19.40	13.84	11.89	−11.11
62	59.50	19.14	19.45	19.80	11.88	13.55	9.48
Mean '58–'62	65.90	17.65	18.46	20.80	16.01	9.65	8.14
63	62.50	17.09	18.84	17.00	11.34	11.71	4.11
64	62.50	19.39	22.43	18.70	14.76	10.35	9.35
65	100.00	19.84	27.69	15.90	11.45	13.00	15.04
66	47.70	17.38	17.73	9.30	10.64	17.55	6.33
67	48.90	22.91	27.91	20.20	14.45	9.13	23.21
Mean '63–'67	64.30	19.32	22.92	16.20	12.53	12.35	11.61
Mean '58–'67	65.60	18.49	20.69	18.50	14.36	10.84	9.87
Mean '48–'67	65.10	17.08	17.73	20.20	15.86	9.83	11.87

Sources: Computed from [13], [4], [6], and [9].

1958–1967, and 1948–1967, total deductions from producer's expected income
averaged 43.50, 31.73, 33.80, 36.55, 35.07, and. 37.56 per cent respectively.
In other words the proportion of producer's expected income actually paid to
him during these periods averaged 56.50, 68.27, 66.20, 63.45, 64.93, and
62.44 per cent respectively.

The data presented in Table I have shown, quite clearly, the magnitude of
the deteriorating cocoa situation, the seriousness of the urgent need to stimulate
economic prosperity in Western Nigeria's commodity economy, the need to
smoulder the dormant but highly inflamable conflagration of social unrests in the

cocoa state and the urgency of designing a new commodity pricing policy that is commensurate with and/or conducive to progress. All these constitute the serious problem of agricultural export pricing strategy in Nigeria.

Given this broad framework of the problem, our main objectives in this paper will be:

1. To examine the past and present structure of the Western Nigeria cocoa economy.

2. To assess the role of the WNMB pricing policy on cocoa output and income.

3. To examine WNMB trading surpluses, investment and grants activities, and obligations to government and governmental bodies.

4. To attempt a definitive and deterministic pricing policy as well as assess the effects of such a pricing policy on producer income and the board's trading surpluses.

5. To hazard a definite policy in commodity export pricing and operational management for the next decade and a half.

III. THE STRUCTURE OF WESTERN NIGERIA COCOA INDUSTRY

The Western Nigeria cocoa industry is a small-scale enterprise operated by about 400,000 peasant farmers. More than 79 per cent of these farmers have cocoa farms varying between 1 and 5 acres whilst about 19 per cent have cocoa farms varying between 5 and 20 acres. About 2 per cent of the farmers have over 20 acres of cocoa farmland. The average size of holdings, as revealed in a recent survey by S.A. Oni [12], varies from province to province in the cocoa zone. For example he claims that average size of cocoa holding is about 4.30 acres in Ijebu province, 3.20 acres in Abeokuta province, 6.90 acres in Ibadan province, 4.60 acres in Oyo province, and 11.60 acres in Ondo province.

The average income obtained from this small acreage is also very small. The reports by Galletti, Baldwin, and Dina [8] showed that the average income of cocoa farmers was about £92 per family and this sum accounts for about 80 per cent of the total farm receipts. Marked income differences are also said to exist among the producing provinces. To illustrate, it is claimed that average cocoa incomes are £63 in Ibadan province, and £144 in Abeokuta and Ijebu provinces. The survey of 231 farmers by S.A. Oni [12] showed that provincial average cocoa incomes in 1968/69 and 1969/70 seasons are respectively £129 and £239 in Ondo province, £49 and £72 in Oyo province, £38 and £66 in Ibadan province, £26 and £37 in Abeokuta province, and £36 and £41 in Ijebu province, whilst, the aggregate for the State were respectively £64 and £106.

The present structure of the Western Nigeria cocoa industry, with its significant implications on the supply side, is affected by a number of factors. First is the job schedule of the cocoa farmers with concentrated labour requirement

peaks during harvesting. The second is the size of the cocoa holdings which limits acreage to what the farm family can effectively handle with minimum "casual" and "seasonal" labour requirement. The third is the bio-physiographic and agronomic requirement of cocoa tree with respect to yield, varietal properties, and resistivity to diseases and insect pests within its ecological setting. Fourth is the incidence of pests and diseases of cocoa such as black pod, swollen shoot virus, capsid pest diseases and other pests. Fifth is the impact of economic forces such as producer price, the structure of resource inputs, input availability, relative input prices, and the role of technical changes such as spraying, fertilization, now improved seedlings, etc. All these affect the output of the individual acreage response.

On the demand side, the structure of the Western Nigeria cocoa industry is affected by such factors as world market prices, internal producer prices, the role of competing cocoa producers, import price of competing products such as sugar and candies, aggregate annual grindings in importing countries or the level of industrial productivity, the level of inventories and/or stockpiles, per capita

TABLE II

NIGERIA: DESTINATION OF COCOA EXPORTS

Year	Aggregate Exports (1,000 tons)	Percentages			
		U.K.	U.S.A.	EEC	Others
1948	91.00	n.a.	n.a.	n.a.	n.a.
49	103.64	43.3	43.6	12.4	0.7
50	99.95	37.8	52.9	9.0	0.3
51	121.48	44.6	39.9	7.4	8.1
52	114.73	40.8	43.5	8.7	7.0
Mean '48–'52	106.16	41.6	45.0	9.4	4.0
53	104.67	50.4	39.6	6.7	3.3
54	98.37	64.8	23.2	8.1	3.9
55	88.42	65.8	19.7	6.8	7.6
56	117.13	33.8	37.7	22.2	6.3
57	135.30	43.9	18.8	25.1	12.2
Mean '53–'57	108.78	51.7	27.8	13.8	6.7
58	87.65	53.2	19.2	20.5	7.1
59	142.80	32.2	17.4	39.2	11.1
60	154.18	26.9	22.3	31.1	19.7
61	183.91	26.7	36.5	26.6	10.2
62	194.65	24.3	31.9	30.3	13.5
Mean '58–'62	152.64	32.7	25.5	29.5	12.3
63	174.61	30.7	21.1	31.5	16.7
64	196.82	23.3	14.2	41.2	21.3
65	255.28	21.0	19.2	39.6	20.2
66	190.21	28.8	31.3	22.6	17.3
67	244.26	16.5	17.3	27.3	28.9
Mean '63–'67	212.24	24.1	20.6	32.4	22.9
Mean '58–'67	182.44	28.4	23.0	31.0	17.6
Mean '48–'67	144.95	37.3	28.9	21.9	11.9

Source: [7].

disposable income or consumer expenditures, the level of trade restrictions and changes in taste and technology. An appraisal of the structural changes on the demand side can be made from an analysis of the destinations of Nigerian cocoa in the twenty-year period, 1948–1967.

Table II shows that during the periods 1948–1952, 1953–1957, 1958–1962, and 1963–1967, United Kingdom's average annual importations of Nigerian cocoa amounted to 41.60, 51.70, 32.70, and 24.10 per cent of our cocoa exports. The corresponding figures for the United States were 45.00, 27.82, 25.50, and 20.60 per cent respectively, while the corresponding importation by EEC amounted to 9.40, 13.80, 29.50, and 32.40 per cent respectively. On the aggregate, the three chief destinations' average annual imports were 96.00, 93.30, 87.70, and 77.10 per cent respectively. During the entire twenty-year period, average annual importation of Nigerian cocoa by the U.K., U.S.A., EEC, and aggregate of the three destinations amounted to 37.30, 28.90, 21.90, and 88.10 per cent of all cocoa exports respectively.

Table III is a vivid presentation of the trends in regional and aggregate revenue

TABLE III

NIGERIA: AGGREGATE AND REGIONAL EARNINGS FROM COCOA EXPORTS

Year	Aggregate Earnings (£ million)	Percentages			
		U.K.	U.S.A.	EEC	Others
1948	17.88	n.a.	n.a.	n.a.	n.a.
49	14.70	41.8	42.4	14.2	1.6
50	18.98	41.0	49.8	8.8	0.4
51	31.38	45.0	38.3	7.6	9.1
52	28.67	40.0	43.3	9.6	7.1
Mean '48–'52	22.32	42.0	43.5	10.0	4.5
53	24.86	51.0	39.0	7.5	2.7
54	39.26	61.6	25.0	8.8	4.6
55	26.18	66.2	18.9	8.0	6.9
56	23.99	33.9	38.1	21.7	6.3
57	26.04	44.9	18.4	24.6	12.1
Mean '53–'57	28.07	51.5	27.9	14.1	6.5
58	26.66	53.5	19.1	21.7	5.7
59	38.29	32.8	16.8	39.2	11.2
60	36.77	26.0	21.1	30.8	22.1
61	33.74	26.1	37.5	28.2	8.2
62	33.35	24.0	32.2	30.0	13.8
Mean '58–'62	33.76	32.5	25.3	30.0	12.2
63	32.36	29.7	20.4	31.7	18.2
64	40.10	23.3	13.8	41.5	21.4
65	42.70	17.2	30.6	33.2	19.0
66	28.26	28.4	27.7	24.8	19.1
67	54.68	15.6	16.9	36.7	30.8
Mean '63–'67	39.62	22.8	21.9	33.6	21.7
Mean '58–'67	36.69	27.7	23.6	31.8	16.9
Mean '48–'67	30.94	36.9	28.9	22.6	11.6

Source: [7].

from the demand for cocoa during the twenty-year period under study. The demand for Nigerian cocoa in U.K. has followed a discernible downward trend with minor oscillations. The same situation is also true of the demand in U.S.A. and EEC whilst other countries present a picture of an upward trend. On the aggregate, the demand for Nigerian cocoa has followed a persistently fluctuating upward. Revenuewise, the same picture is discernible as shown in Table III.

The importance of this structural consideration in the Western Nigerian cocoa industry may be noted. A consideration of the supply side points to the need for improving and/or modernizing the industry. A consideration of aggregate trends in demand for and earnings from cocoa exports highlights the need for export diversification. An analysis of the regional demand for and earnings from cocoa exports points vividly to the need for and the areas of export market penetration. The importance of these two concepts of diversification and market penetration on the demand side cannot be over-emphasized. Whilst diversification in this context is a means of minimizing aggregate variabilities in export receipts, market penetration is a means of ensuring that increased production of cocoa is well taken care of. It is within an understanding of the stated problem and the structure of Western Nigerian cocoa industry discussed here that we can realistically appraise the output-income effects of cocoa export pricing strategy in Nigeria.

IV. METHODOLOGY AND ESTIMATING EQUATIONS

Multiple regression analyses of export demand and supply schedules for Nigerian cocoa, based on time series data for 1948–1967, were carried out. The data were obtained from the *United Nations Yearbook of International Trade Statistics,* the *United Nations Statistical Yearbook,* and *Nigeria Annual Abstracts of Statistics.* The results of the linear, power, and exponential functions for the export demand relations are presented below:

EQ. 1. $X = -132.815 - 0.233P_t + 24.062S_t + 0.207Y_t$
   $(1.68) \quad (0.65) \quad (0.61)$
   $- 0.115I_t + 4.741T \quad R^2 = 0.8076$
   $(0.22) \quad (1.30) \quad d^* = 2.294$

EQ. 2. $\text{Log } X = 2.854 - 0.457 \text{ Log } P_t + 0.053 \text{ Log } S_t + 0.004 \text{ Log } Y_t$
   $(2.45) \quad (0.27) \quad (0.01)$
   $+ 0.063 \text{ Log } I_t + 2.048 \text{ Log } T \quad R^2 = 0.8463$
   $(0.21) \quad (1.69) \quad d^* = 2.330$

EQ. 3. $\text{Log } X = 2.826 - 0.002P_t + 0.086S_t + 0.001Y_t$
   $(2.24) \quad (0.41) \quad (0.34)$
   $+ 0.001I_t + 0.038T \quad R^2 = 0.8461$
   $(0.30) \quad (1.84) \quad d^* = 2.409$

where X is the quantity of cocoa exported, P_t is the average price per ton, S_t is the index of competitors' supply, Y_t is the mean disposable income of our main customers, I_t is the mean index of industrial production for our importers, and

T is the trend variable to take account of changes in taste and technology. The justifications for the use of these variables have been spelled out by Olayide and Olatunbosun [11]. R^2 is the coefficient of multiple determination, d^* is the calculated Durbin-Watson Statistics [1, 2] and the figures in parentheses are t-ratios. The three estimating equations explain between 81 and 85 per cent of the variability in the regressand and hence provide a good fit to the cocoa data in each case. Many of the regression coefficients are not statistically significant as measured by t-test. The power and the exponential functions appear to be the lead equations, based on the criteria of high R^2 and correct signing of the regression coefficients. Tests for serial correlation, using the Durbin-Watson test statistics, indicated the absence of auto-correlated errors in the estimating equations. The acceptance of the "null hypothesis" thus implies the usefulness of the estimating equations for predictive purposes.

The results of the export supply model analysed by the method of least squares multiple regression for the linear, power, and exponential functions are presented below:

EQ. 4.　　　$Q = 0.8947 - 0.2670P_{t\text{-}7} - 0.7798A_{t\text{-}8} + 17.0621T$
　　　　　　　　　$(1.65)^*$　　　(2.18)　　　(5.59)
　　　　　　　　　　　　　　　　　　　　$R^2 = 0.8089$
　　　　　　　　　　　　　　　　　　　　$d^* = 2.540$

EQ. 5.　Log $Q = 7.7740 - 0.1788$ Log $P_{t\text{-}7} - 4.0133$ Log $A_{t\text{-}8} +$
　　　　　　　　　(2.35)　　　　　(1.77)
　　　　　　　　　　　　6.3657 Log T　　$R^2 = 0.8289$
　　　　　　　　　　　　(6.01)　　　　$d^* = 2.380$

EQ. 6.　Log $Q = 3.9525 - 0.0009P_{t\text{-}7} - 0.0046A_{t\text{-}8} + 0.1025T$　$R^2 = 0.8055$
　　　　　　　　　$(1.33)^*$　　(2.05)　　　(5.33)　　$d^* = 2.179$

where Q is the estimated quantity of cocoa produced in thousand tons, $P_{t\text{-}7}$ is the producer price lagged seven years, $A_{t\text{-}8}$ is the acreage in production lagged eight years, T is the trend variable to account for changes in technology of cocoa production, and all other variables are as designed above. The three explanatory variables account for 81 to 83 per cent of variability in the supply of cocoa. The regression coefficients which are not significant at the 5 per cent level, as measured by t-test, are asterisked. Thus most of the regression coefficients may be said to be significantly different from zero. Durbin-Watson tests for serial correlation indicate an acceptance of the "null hypothesis" at the 1 per cent level. The regression coefficients for the price and acreage variables are wrongly signed for a supply relation, which is probably an indication of the use of wrong estimating equations. These results with wrong signs do not differ significantly from those of S.A. Oni [12] where the inclusion of more explanatory variables such as disease control (D_t), weather index (W_t), and current price (P_t) do not altogether remove the problem of wrong signs.

In order to assess the extent to which farmers' incomes have been depleted, we conceived of an *ex post* "workable" equilibrium price which equates the estimated export supply and demand schedules. It was found that the exponential function was the most amenable for this exercise. Consequently EQ. 3 and EQ. 6

were converted to reduced forms by keeping the other variables, excepting the price variable, fixed at their mean values. The resulting reduced-form equations are:

EQ. 7.　Log $X = 5.4072 - 0.002P$.

EQ. 8.　Log $Q = 5.1058 - 0.0009P$.

By equating supply (Q) to demand (X) we obtained an *ex post* "workable equilibrium price" of £274.00 per ton for the twenty-year period. The mean annual producer price for the period was £131.95 per ton. If we deduct this from the equilibrium price, we obtain the mean annual price gap or underpayment of £142.05 per ton. This gap is a very interesting evidence of excessive taxation of and deductions from the income of Nigerian cocoa producers by the Marketing Board. The issue of price gaps and underpayments leads us to an analysis of the extent to which producer income has been depleted by the export pricing strategy of the Marketing Board.

V.　THE PRICING STRATEGY AND ITS EFFECTS

The pricing strategy of the WNMB is to fix a guaranteed minimum price at the beginning of the cocoa season. This minimum price, with a differential of about £15 per ton between the per ton producer prices for grades I and II cocoa, runs throughout the cocoa season, irrespective of what obtains in the world commodity market. Furthermore the guaranteed minimum price is usually fixed at a level much below world market price. A study of the producer prices showed that rather than stabilize, the WNMB has destabilized the prices paid to cocoa producers. Stabilization of prices, one would expect, should imply progressive rises in prices and/or constant producer prices at fairly substantial proportion of world market prices. For example, an analysis of the number of times producer prices were raised, lowered, and kept constant even at the very low percentages of world market prices, showed that the WNMB destabilized cocoa producer price by lowering it five times and kept it constant five times during the twenty-year period under study.

(a) *Effects on production:* During the second decade of the twenty-year period, the deleterious pricing strategy adopted by the WNMB led to a very significant diminishing rate of production response. Quantity supplied, no doubt, showed an oscillating upward trend as revealed in Table II for aggregate exports, but such increases were not due to any substantial acreage response. Some of the factors responsible for this slackening rate of production response include senile and aging condition of most cocoa groves, slackening impetus in disease control measures, disregard of yield-increasing recommendations since the marginal returns do not justify them, sloppy harvesting and processing operations, and lack of enthusiasm in putting new acreages under tree crops. All these are a manifestation of the repressive pricing strategy adopted by the WNMB. In addition there has developed a strong tendency towards inefficient diversification as evidenced by a cocoa farmers devoting increasingly greater

attention to arable crop production. Furthermore, there is increasing evidence of the growth of absentee landlordism, share-cropping arrangements and pledging of cocoa trees, all of which are not in the best interests of increased production and efficient management.

(b) *Price-induced income depletion:* The extent to which the pricing strategy has depleted farmers' income can be gleaned by valuing cocoa exports at the world market, equilibrium, and producer prices and comparing the resulting earnings. Table IV is a presentation of the information based on such calcula-

TABLE IV

COCOA: VALUE OF EXPORTS AND DISBURSEMENTS

(£ million)

Year	Market Price Value	Equilibrium Price		Producer Price	
		Value	Surplus	Value	Surplus
1948	17.88	24.93	− 7.05	7.01	+10.87
49	14.70	28.40	−13.70	12.44	+ 2.26
50	18.98	27.39	− 8.41	10.00	+ 8.98
51	31.38	33.29	− 1.91	14.58	+16.80
52	28.67	31.43	− 2.76	19.50	+ 9.17
53	24.86	28.68	−17.79	3.82	+ 7.07
54	39.26	26.95	+12.31	16.72	+22.54
55	26.18	24.23	+ 1.95	17.68	+ 8.50
56	23.99	32.09	− 8.10	23.43	+ 0.56
57	26.04	37.07	−11.03	20.30	+ 5.74
58	26.06	24.02	+ 2.04	13.15	+12.91
59	38.29	39.13	− 0.84	21.42	+16.87
60	36.77	42.25	− 5.48	24.67	+12.10
61	33.74	50.39	−16.65	20.60	+13.14
62	33.35	53.33	−19.98	19.47	+13.88
63	32.36	47.84	−15.48	18.33	+14.03
64	40.10	53.93	−13.83	21.65	+18.45
65	42.70	69.95	−27.25	30.63	+12.07
66	28.26	52.12	−23.86	12.36	+15.90
67	54.68	66.93	−12.25	21.98	+32.70
Total	618.25	794.40	−176.00	363.80	254.60
Mean '58–'67	36.63	49.99	−13.36	20.43	16.21
Mean '48–'67	30.91	39.72	− 8.80	18.19	12.73

tions. Equilibrium price valuation results in a total negative surplus of £176.00 million. This amounts to mean annual negative surpluses of £13.36 million during the decade 1958–1967 and £8.80 million during the twenty-year period. Valuation at the paid producer price results in a total positive surplus of £254.60 million. This amounts to mean annual positive surpluses of £16.21 million during the 1958–1967 decade and £12.73 million during the entire period. The negative surpluses could be viewed as inducement spending/grants to cocoa producers in order to increase their managerial efficiency as well as raise the acreage under cocoa. Thus by reducing producer income by this amount, reinvestment in cocoa production was greatly hampered by a significant

proportion of the sum. This will depend, of course, on the marginal propensity to save and/or invest. It is even safe to contend that this sum could have been paid largely in kind and partly in cash in order to stimulate acreage response and efficient management of cocoa groves through schemes of replanting, rehabilitation, fertilization, chemical spraying, and other improved cultural practices.

(c) *Surplus and tax induced income depletion:* The WNMB acted as a vehicle for making substantial deductions in producer income through the collection of government-imposed produce sales tax and export duties and by actively seeking to accumulate substantial trading surpluses annually, apart from their ever-rising operational costs. Table V is a presentation of these deductions,

TABLE V

NIGERIA: DEDUCTIONS FROM GROSS INCOME OF COCOA FARMERS*

Year	Export Duties £ million	Produce Sales Tax £ million	Estimated Expenses† £ million	Board's Trading Surplus £ million	Total as per cent of Gross Income
1947/48	0.31	—	1.43	9.20	61.19
1948/49	0.70	—	2.04	0.42	21.50
1949/50	0.61	—	1.99	6.48	47.84
1950/51	4.46	—	2.22	10.55	54.91
1951/52	5.49	—	2.27	1.44	32.09
1952/53	4.53	—	2.59	0.09	29.00
1953/54	11.47	0.39	1.86	5.62	49.26
1954/55	5.57	0.33	1.90	5.03	49.01
1955/56	3.84	0.42	2.47	−4.17	28.05
1956/57	3.22	0.51	2.94	−1.27	25.61
1957/58	4.15	0.29	1.77	4.92	41.75
1958/59	7.50	0.53	2.87	7.83	48.92
1959/60	5.48	0.59	3.13	1.10	28.01
1960/61	3.94	0.73	4.01	−3.75	25.73
1961/62	3.20	0.76	4.52	3.16	34.90
1962/63	2.91	0.76	3.79	1.33	27.16
1963/64	5.13	0.79	4.15	3.75	34.46
1964/65	3.87	1.02	5.55	6.42	39.48
1965/66	2.29	0.72	4.96	1.79	34.54
1966/67	7.00	0.90	4.99	12.69	46.78
Total	85.67	8.74	61.45	72.63	36.92
Mean '58–'67	4.55	0.71	3.97	3.92	35.84
Mean '48–'67	4.28	0.62	3.07	3.63	37.49

Source: [3, pp. 144–45] and [10].

* Up until 1953/54 inclusive, statistics refer to all Nigeria (plus Southern Cameroons); from 1954/55 on, they refer only to Western Nigeria.

† Expenses are estimated as gross earnings minus the sum of export duties, produce sales tax, and announced trading surpluses of the Marketing Boards until 1959/60; from 1960/61 on, they are as given by WNMB. These expenses are made up of shipping and handling (NPA), agency charges (NPMC), operating expenses, administrative expenses, allowances to Licensed Buying Agents, and transportation to port.

expenses, and trading surpluses. Average annual deduction of 37.53 per cent or
£11.60 million was made. In the second decade of the period, the average
annual aggregate deduction stood at 35.90 per cent or £13.15 million, and this
at a time when the world market situation for cocoa was very gloomy. Apart
from the tradings surpluses which averaged 11.74 per cent of gross income
during the entire period, the table shows that WNMB expenses followed an
upward trend. This is an indication of "Parkinson's Law" and highly significant
"feather-bedding" in staffing and operations as well as inefficiency of the trans-
portation and the physical distribution systems. That nothing has been done
to significantly minimize operational expenses is proof positive of the inefficiency
of public enterprises in the developmental pattern and processes in developing
countries. And in the cocoa case, Nigeria is no exception.

(d) *Quality induced income depletion:* One important aspect of the pricing
strategy which has considerable effects on production and income of cocoa
producers is the introduction of quality restrictions. This was necessary in the
case of cocoa due to the need for Nigeria to maintain her foothold in the world
cocoa market as well as raise the then slipping confidence of her traditional cocoa
customers who tended to regard. Nigerian cocoa as proverbially one of very
poor quality. To avert the resulting disaster, grading rules were modified and
made more stringent, and different prices were set for the various grades
specified. This differential price system provided a "forced" incentive to quality
improvement, since farmers are aware of the higher prices for grade one cocoa.

Although cocoa farmers got the message and tightened quality control pro-
cedures in the fermentation and drying of cocoa beans, the WNMB went further
by progressively eliminating the lower grades from its purchasing operations.
First grades IV and V were rejected and this was later followed by refusal to
purchase grade III cocoa, thus rejecting produce which would have been accepted
on the world cocoa market. Table VI is a presentation of the information on
the effects of quality control on Western Nigerian cocoa. Columns 2, 3, and 4
present the grade-price systems and the differentials. Column 5 presents informa-
tion on the improvement in quality which was precipitated by the differential
grade-pricing system. By the end of the 1966/67 season, the quality of the
Nigerian cocoa has so considerably improved that 99.9 per cent of all cocoa
purchased in Western Nigeria was grade I. This is a salutary achievement on
the production side. But on the income side cocoa farmers, as shown in column
6 lost on the average an annual sum of £35,700 as a result of selling lower
grade cocoa. This sum does not take into account value of rejected grades III,
IV, and V. This valuation is also undertaken at the producer price rather than
at either the equilibrium price or the world market price, each of which would
have shown substantial income depletion.

(e) *Investment-grants activities:* A lot has been written about investment
activities of the WNMB, that we feel this analysis would not be complete without
mentioning them. Throughout the period 1955–1964, not less than £0.5 mil-
lion was voted annually by the WNMB to finance the WNPDC (Western Nigeria
Production and Development Corporation) charged with the expressed intention

TABLE VI

WESTERN NIGERIA: EFFECTS OF GRADING SYSTEM ON COCOA

Year (1)	Grade I Price £N/Ton (2)	Grade II Price £N/Ton (3)	Price Differential £N/Ton (4)	Per cent of Cocoa in Grade I (5)	Underpayments due to Grades £'000 (6)
1948	62.5	60.0	2.5	48.0	85.0
49	120.0	115.0	5.0	79.0	109.0
50	100.0	95.0	5.0	92.0	37.0
51	120.0	110.0	10.0	96.0	46.0
52	170.0	155.0	15.0	97.0	52.0
Mean '48–'52	114.5	107.0	7.5	82.4	65.8
53	170.0	155.0	15.0	97.0	49.0
54	170.0	155.0	15.0	99.0	10.0
55	200.0	185.0	15.0	95.0	49.0
56	200.0	185.0	15.0	97.0	32.0
57	150.0	135.0	15.0	99.0	22.0
Mean '53–'57	178.0	163.0	15.0	97.4	32.4
58	150.0	135.0	15.0	97.0	28.0
59	150.0	135.0	15.0	99.5	7.0
60	160.0	145.0	15.0	98.0	35.0
61	160.0	145.0	15.0	95.8	105.0
62	100.0	85.0	15.0	98.7	31.0
Mean '58–'62	144.0	129.0	15.0	97.8	40.8
63	105.0	90.0	15.0	99.5	13.0
64	110.0	95.0	15.0	99.9	3.0
65	120.0	105.0	15.0	99.9	1.0
66	65.0	50.0	15.0	99.9	1.0
67	90.0	75.0	15.0	99.9	1.0
Mean '63–'67	98.0	83.0	15.0	99.8	3.8
Mean '58–'67	121.0	106.0	15.0	98.8	22.3
Mean '48–'67	133.6	120.5	13.1	94.4	35.7

Source: [14].

of facilitating increased agricultural productivity. Substantial grants were made to the regional government for development schemes as typified by £10.00 million by WNMB to its government. On industrialization, the WNMB made investments in major industries like cement, shoe factories, oil presses, fishing, and several small-scale enterprises such as weaving, ceramics and pottery, leather works, building projects, etc. On education it made not less than £0.5 million grant towards the establishment of a state university and awarded scholarships for training in Nigeria and overseas in such fields as medicine, agriculture, architecture, engineering, etc. Loans to the government have been substantial in view of the progressive rise in government expenditures on such social amenities as hospitals, education, infrastructural facilities, etc. On farmers' credit schemes, the WNMB made about £5.0 million for investments in local commercial bank, cooperative bank, and credit corporation. On agricultural research, substantial

sums were allocated to the government to cover direct and indirect expenses for both research work and extension programmes. It also help to finance research organizations such as CRIN (Cocoa Research Institute of Nigeria), WARRI (West African Rice Research Institute) and NIFOR (Nigerian Institute for Oilpalm Research).[1] Comprehensive as these investments and grants were, they involve considerable graft, corruption, and wasteful white elephant projects.

VI.   TOWARDS A REALISTIC PRICING POLICY

Resulting from the effects of pricing strategy discussed above, the Nigerian cocoa industry faces unique problems of readjustment. First, there is the problem of increasing/maintaining our share of the quantity of cocoa exports on the world market. Second, there is the problem of maintaining and/or increasing our share of receipts accruing from world expenditures on cocoa purchases. Third, there is the problem of raising producers' income by increasing their share of export proceeds. Lastly, there is the problem of minimizing the random fluctuations in

TABLE VII
NIGERIA: PRICING POLICY FOR COCOA PURCHASES

(£N/Ton)

Year	Actual Producer Price	Moving Averages*					
		4-Year	5-Year	6-Year	7-Year	8-Year	9-Year
1948	77.00	77.00	77.00	77.00	77.00	77.00	77.00
49	120.00	120.00	120.00	120.00	120.00	120.00	120.00
50	100.00	100.00	100.00	100.00	100.00	100.00	100.00
51	120.00	120.00	120.00	120.00	120.00	120.00	120.00
52	170.00	170.00	170.00	170.00	170.00	170.00	170.00
53	170.00	170.00	170.00	170.00	170.00	170.00	170.00
54	170.00	170.00	170.00	170.00	170.00	170.00	170.00
55	200.00	200.00	200.00	200.00	200.00	200.00	200.00
56	200.00	200.00	200.00	200.00	200.00	200.00	200.00
57	150.00	185.00	182.00	172.00	161.00	156.00	147.00
58	150.00	189.00	184.00	180.00	170.00	161.00	155.00
59	150.00	194.00	187.00	182.00	177.00	168.00	159.00
60	160.00	192.00	190.00	184.00	178.00	174.00	166.00
61	112.00	190.00	189.00	186.00	179.00	175.00	171.00
62	100.00	191.00	186.00	184.00	181.00	176.00	171.00
63	105.00	192.00	187.00	181.00	178.00	176.00	171.00
64	110.00	191.00	188.00	182.00	175.00	173.00	171.00
65	120.00	191.00	188.00	183.00	177.00	170.00	168.00
66	65.00	191.00	188.00	183.00	178.00	172.00	164.00
67	90.00	191.00	187.00	183.00	178.00	173.00	166.00

* The moving averages are calculated from 1956. In other words, the period 1948–1956 is taken as "learning" period by the Commodity Marketing Board.

[1] Information on this section V-(e) was obtained from *Western Nigeria Marketing Board Annual Reports, 1955–1964.*

cocoa yields from year to year. Since the random fluctuations in yield are due to random effects of bio-physiographic factors, the only solution to the problem lies in minimizing the impact of such factors through better management, fertilization, spraying, and pest-control activities. Such practices connote increased investment in cocoa production on individual producer as well as governmental levels. The sum-totality of these four problems boils down to one of better, more stable and realistic pricing strategy apart from the need for increased governmental "support" policies in the next ten years.

(a) *Moving average pricing strategy:* In order to work out a realistic and deterministic pricing strategy, we examined the implications of a strategy of "moving average pricing." This rests on five assumptions. First, the WNMB is here to stay but subject to a reorganization of its structure, conduct, and performance. Second, price stabilization shall be our main objective in the next two decades. Third, government can only get a minimum amount of grant from WNMB. Fourth, the WNMB was in a "learning stage" during the period 1948–1956 (a period of nine years) since Commodity Marketing Boards were regionalized in 1955. Fifth, the decision was taken in 1955 to adopt moving average pricing strategy. The producer prices that would have been paid for

TABLE VIII

COCOA: EXPECTED REVENUE AT MOVING AVERAGE PRICES

(£ million)

Year	4-Year	5-Year	6-Year	7-Year	8-Year	9-Year
1948	7.01	7.01	7.01	7.01	7.01	7.01
49	12.44	12.44	12.44	12.44	12.44	12.44
50	10.00	10.00	10.00	10.00	10.00	10.00
51	14.58	14.58	14.58	14.58	14.58	14.58
52	19.51	19.51	19.51	19.51	19.51	19.51
53	17.79	17.79	17.79	17.79	17.79	17.79
54	16.72	16.72	16.72	16.72	16.72	16.72
55	17.68	17.68	17.68	17.68	17.68	17.68
56	23.43	23.43	23.43	23.43	23.43	23.43
57	25.03	24.62	23.27	21.78	21.11	19.89
58	16.57	16.13	15.78	14.90	14.11	13.59
59	27.70	26.70	25.99	25.28	23.99	22.71
60	29.60	29.29	28.37	27.44	26.83	25.59
61	34.94	34.76	34.21	32.92	32.18	31.45
62	37.18	36.20	35.81	35.23	34.26	33.29
63	33.53	32.65	31.60	31.08	30.73	29.86
64	37.59	37.00	35.82	34.44	34.05	33.66
65	48.75	47.99	46.72	45.18	43.39	42.89
66	36.33	35.76	34.81	33.86	32.71	31.19
67	46.65	45.68	44.70	43.48	42.26	40.55
Total	513.03	505.94	496.24	484.75	474.78	463.63
Mean '57–'67	33.99	33.34	32.46	31.42	30.51	29.50
Mean '48–'67	25.65	25.30	24.81	24.24	23.74	23.18
Mean producers' rebate '57–'67	13.58	12.93	12.05	11.01	10.10	9.09

cocoa on 4-year, 5-year, 6-year, 7-year, 8-year, and 9-year moving average basis· are presented in Table VII. These prices are very interesting since they represent what Nigerian cocoa farmers would have been paid during the "post-learning" eleven-year period (i.e., 1957–1967). Compared with the producer prices paid during the "post-learning" period, the moving average pricing strategy is considerably better. It is difficult on this moving average pricing strategy alone to decide which one ought to have been adopted. There is the need to tie this in with the income so that the choice of pricing strategy could be based on the welfare criterion of making cocoa producers better-off without making the government worse-off.

(b) *Resulting income:* Table VIII presents the expected producer revenue/ income that would have accrued if the various moving average prices had been paid per ton of graded (preferably gadre one) cocoa. Each of these moving average prices results in an upward trend in producer income. This is a pricing strategy which is consistent, realistic, and yielding a positive-sum benefit to cocoa producers, who would have received a mean annual income in the eleven year period (1957–1967) of £33.99, £33.34, £32.46, £31.42, £30.51, and £29.50 million respectively.

(c) *Resulting gaps:* A very meaningful way of assessing the expected income

TABLE IX

Cocoa: Surplus Revenue at Moving Average Prices

(£ million)

Year	4-Year	5-Year	6-Year	7-Year	8-Year	9-Year
1948	+10.87	+10.87	+10.87	+10.87	+10.87	+10.87
49	+ 2.26	+ 2.26	+ 2.26	+ 2.26	+ 2.26	+ 2.26
50	+ 8.98	+ 8.98	+ 8.98	+ 8.98	+ 8.98	+ 8.98
51	+16.80	+16.80	+16.80	+16.80	+16.80	+16.80
52	+ 9.17	+ 9.17	+ 9.17	+ 9.17	+ 9.17	+ 9.17
53	+ 7.07	+ 7.07	+ 7.07	+ 7.07	+ 7.07	+ 7.07
54	+22.54	+22.54	+22.54	+22.54	+22.54	+22.54
55	+ 8.50	+ 8.50	+ 8.50	+ 8.50	+ 8.50	+ 8.50
56	+ 0.56	+ 0.56	+ 0.56	+ 0.56	+ 0.56	+ 0.56
57	+ 1.01	+ 1.42	+ 2.77	+ 4.26	+ 4.93	+ 6.15
58	+ 9.49	+ 9.93	+10.28	+11.16	+11.95	+12.47
59	+10.59	+11.59	+12.30	+13.01	+14.30	+15.58
60	+ 7.17	+ 7.48	+ 8.40	+ 9.33	+ 9.94	+11.18
61	− 1.20	− 1.02	− 0.47	+ 0.82	+ 1.56	+ 2.29
62	− 3.83	− 2.85	− 2.46	− 1.88	− 0.91	+ 0.05
63	− 1.13	− 0.29	+ 0.76	+ 1.28	+ 1.63	+ 2.50
64	+ 2.51	+ 3.10	+ 4.28	+ 5.66	+ 6.05	+ 6.44
65	− 6.05	− 5.29	− 4.02	− 2.48	− 0.69	− 0.19
66	− 8.07	− 7.50	− 6.55	− 5.60	− 4.45	− 2.93
67	+ 8.03	+ 9.00	+ 9.98	+11.20	+12.42	+14.13
Total	+105.27	+112.32	+120.50	+133.51	+143.48	+154.43
Mean '57–'67	+1.68	+ 2.32	+ 3.07	+ 4.25	+ 5.16	+ 6.15
Mean '48– 67	+ 5.26	+ 5.62	+ 6.03	+ 6.68	+ 7.17	+ 7.72

situation, discussed above, is to look at the gaps between what producers were actually paid and what moving average would have given them. This is the idea of "producers surplus" revenue in the hands of the WNMB. Table IX presents the surplus revenue at the moving average prices as the value of cocoa exports at world market prices minus the value at moving average pricing basis. Any of the moving average pricing strategy would have made cocoa producers well-off without making the government through the WNMB worse-off.

From government revenue and realistic price stabilization policy viewpoints, the arbitrary choice of pricing strategy would have been made from 7-year, 8-year, and 9-year moving average basis, since these will leave the WNMB a mean (gross) annual surplus during the 1957–1967 post-learning period of £4.25, £5.16, and £6.15 million respectively. WNMB expenses have been estimated at a mean annual sum of £3.88 million during the same period. This again shows that 7-year, 8-year, and 9-year moving average prices constitute our range of price strategy choice. Over the whole 20-year period, total expenses amounted to £61.86 million. If this is taken from the total surpluses in Table IX, any of the moving average prices could have yielded substantial trading surpluses. But maximization of trading surpluses subjected to realistic producer income would imply that our choice of pricing strategy could have been usefully made from among 6-year, 7-year, 8-year, and 9-year moving average prices.

VII. SUMMARY AND CONCLUSION

In this analysis, we have attempted to discuss the structure of the Nigerian cocoa industry and the four readjustment problems that have been created by the export pricing strategy of the WNMB. The serious impacts of this pricing strategy on production and income of cocoa producers were subjected to quantitative examination. We have also attempted to present a definitive and deterministic pricing strategy based on moving average system. An examination of this pricing strategy under five working assumptions showed that cocoa producers would have been made better-off without making the government worse-off. It must be stressed that this is only one of many pricing strategies that could have been adopted. Our study on other possible export pricing strategies is in progress.

Our conclusion is that there is a drastic need for a change in the structure, conduct, and performance of the WNMB. Five important policy issues emanate from the need to solve the four readjustment problems during the 1970 decade. First, there is the need to adopt a different and/or new price-incentive strategy. Second, the stabilization-revenue policies need to be re-evaluated and reformulated. Third, increased emphasis on cocoa production stimulation is very essential. Fourth, commodity processing and by-product manufactures from cocoa should be embarked upon subject to sound feasibility studies. Fifth, we must actively seek to expand the markets for our cocoa.

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