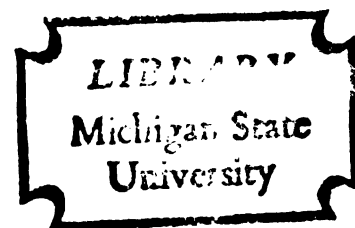


NIGERIAN FARM SETTLEMENTS AND
SCHOOL LEAVERS' FARMS - -
PROFITABILITY, RESOURCE USE AND
SOCIAL-PSYCHOLOGICAL CONSIDERATIONS

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
DUPE OLATUNBOSUN
1967



This is to certify that the

thesis entitled

Nigerian Farm Settlements and School Leavers'
Farms -- Profitability, Resource Use
and Social-Psychological Considerations.

presented by

Dupe Olatunbosun

**has been accepted towards fulfillment
of the requirements for**

Ph.D. degree in Agricultural Economics


Major professor

Date November 17, 1967



~~7-19-71~~ R14

~~7-19-71~~ 171

ABSTRACT

NIGERIAN FARM SETTLEMENTS AND SCHOOL LEAVERS' FARMS -- PROFITABILITY, RESOURCE USE AND SOCIAL-PSYCHOLOGICAL CONSIDERATIONS

by Dupe Olatunbosun

Modified Israeli Moshav farm settlements were established in Western Nigeria in 1959 to increase agricultural productivity and absorb unemployed school leavers. Subsequently, the Midwestern Nigeria came into being in 1963, continued the farm settlements, and in addition established in 1964 a less capital intensive scheme than the farm settlements--the school leavers' farms.

However, serious questions have been raised concerning the performance of these two types of farm organizations. This study was undertaken to evaluate the performance of these farm organizations and make recommendations which might be helpful to the government in improving the present operations of these farm organizations and in preparing the next development plan.

The objectives of this study are to (1) analyze social-psychological characteristics and the organization of farmers in the farm settlements and school leavers' farms in Western and Midwestern Nigeria, (2) analyze the performance of the farm settlements and school leavers' farms, and (3) make recommendations

which might lead to high rates of return on the investment in farm settlements and school leavers' farms and which might induce direct investment in agricultural production.

A sample of 180 farmers was interviewed from four farm settlements and two school leavers' farms in Western and Midwestern Nigeria in late 1966 to analyze social-psychological characteristics of the farmers. F statistic was used to test mean differences between responses from social-psychological variables among the different farm organizations. Input-output information on food crop production were obtained and multiple regression technique was used to determine the relationships of economic and social-psychological variables on gross-margins per two acres of food crops per farmer.

Expected costs and direct benefits from investments in tree crops, cocoa, rubber and oilpalm were estimated for each type of farm organization over a 33-year cycle under alternative technical and price assumptions. Expected rates of return to producers and to Nigeria on investment in tree crops over a 33-year cycle were computed first, when total costs include direct costs and social-overhead costs, and then, when total costs do not include social-overhead costs.

The analysis of social-psychological variables indicated that farmers in the farm settlements viewed their roles as government employees, they have low morale, and they are pessimistic about the future of the scheme; while the farmers in the school leavers' farms view their roles as private farmers, they have high morale, and they are optimistic about the future.

Multiple regression analysis of food crop production indicated that food crop production is more profitable in the school leavers' farms than in the farm settlements.

Estimated rates of return to producers and to Nigeria on investment in tree crop range from - 110% to less than 20% in the farm settlements and from 10% to 64.5% in the school leavers' farms. Since farm settlements yield expected low returns and also carry small indirect benefits, they are viewed as economically unsound. Investments in school leavers' farms are profitable government investments even if indirect benefits are not considered.

The author submits that the government should not expand the farm settlement scheme as presently organized. Modifications

in the present settlements include the determination of each farmer's property and indebtedness thereon, a greater role for farmers in decision-making, a reduction in government personnel attached to farm settlements, the elimination or reorganization of farm institutes and the formation of multi-purpose cooperative societies.

It is suggested that external agencies should consider supporting through loans the expansion of modified farm settlements and school leavers' farms. It is also suggested that a new type of credit institution be established in Western and Midwestern Nigeria which will offer farmers loans which will be guaranteed by government. A further suggestion is that needed research be conducted on economics of food crop production in Nigeria and on rates of return on investment in alternative farm organizations such as nucleus plantations, government plantations and other types of small-holder schemes.

**NIGERIAN FARM SETTLEMENTS AND SCHOOL LEAVERS' FARMS --
PROFITABILITY, RESOURCE USE AND SOCIAL-PSYCHOLOGICAL CONSIDERATIONS**

By

Dupe Olatunbosun

A THESIS

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1967

ACKNOWLEDGMENTS

I wish to express my deep gratitude and appreciation to my Major Professor, Dr. Glenn L. Johnson who served as Chairman of my Guidance and Thesis Committees and who has offered intellectual stimulation and encouragement at all stages of my graduate program. Professor Johnson's willingness to assist me on numerous problems has made my graduate program at Michigan State University an especially memorable experience.

I also wish to extend my gratitude to Dr. Jack Wakeley of the Psychology Department for his unstinting efforts in introducing me to the field of psychology and for his help in advising me on the social-psychological dimension of my dissertation research. Gratitude is also conveyed to Doctors Harold Wein, Orion Ulrey and Thomas Saving who were members of my Guidance Committee.

Special recognition is due Dr. Carl K. Eicher, who served on my Thesis Committee, for his constructive guidance and valuable assistance throughout the writing of this thesis, and also Dr. George Dike for his helpful suggestions while serving on my Thesis Committee.

Doctors Eugene Jacobson, John Jordan, Richard Heifner, Carl Leidholm, Les Manderscheid and colleague Gary Seevers were helpful to me at different stages in the development and writing of my thesis, and I am grateful for their counsel.

My dream of following formal course work in the United States with dissertation research on an important Nigerian problem was realized only through the full support and cooperation of the Ministries of Agriculture and Natural Resources in Western and Midwestern Nigeria, the Community Development Division of the Ministry of Trade and Industry in Midwestern Nigeria, the Nigerian Institute of Social and Economic Research in Ibadan, the University of Ife, and CSNRD/USAID.

I am appreciative of USAID-Nigeria financial assistance during the first part of my graduate study. Also, I am deeply grateful to the USAID sponsored Consortium for the Study of Nigerian Rural Development which provided financial assistance for my field research in Nigeria and subsequent data analysis and writing at Michigan State University.

Finally, I cannot fully express my gratitude to my loving wife, Funke, for her encouragement, patience, understanding, and untiring assistance throughout my graduate program.

TO MY WIFE
FUNKE

TABLE OF CONTENTS

	Page
Acknowledgments	ii
List of Tables	ix
List of Diagrams	xii
CHAPTER I: Introduction	1
The Problem	1
Objectives	4
CHAPTER II: Colonial Agricultural Policy and Sources of Growth in the Agricultural Sector from 1900 to Independence in 1960.	5
Colonial Agricultural Policy: 1900-1960.	5
Governmental Activities in Agriculture.	11
Major Sources of Growth: 1900-1960	20
Growth of Export Crops: 1900-1960.	22
Introduction of the Moshav Farm Settlements in Western Nigeria	30
Summary	41
CHAPTER III: Method of Analysis	43
Introduction.	43
Analyses for the Farm Settlements and the School Leavers' Farms and Farmers.	44
Social-Psychological analysis of the farmers.	44

	Page
Gross-Margin analysis of food crop production	56
Internal rates of return on investment in tree crops	58
Data Collection	60
Sources of data.	60
The questionnaire.	61
Pre-test	62
Training and interviewers.	62
Interviews	63
Sampling method.	63
Summary	64
CHAPTER IV: Social-Psychological Characteristics of the Farmers in the Farm Settlements and the School Leavers' Farms in 1966	65
Introduction.	65
The Concept of Organizational Performance	65
Method of Analysis.	67
Results and Discussions	78
Operation of the Farm Settlements	90
Operation of the School Leavers' Farms.	95
Summary	96

	Page
CHAPTER V: Food Crop Production - Social-Psychological Aspects, Resource Use and Profitability. . .	98
Introduction.	98
Input-Output Survey	99
Analytical Techniques	101
Summary	130
CHAPTER VI: Potential Internal Rates of Return on Investment in Tree Crop Production in the Farm Settlements and the School Leavers' Farms	133
Introduction.	133
Sources of Data	134
Product Price Assumptions	135
Technical Assumptions: Yields per acre	139
Cost Assumptions.	145
Method of Analysis.	154
Results	159
Summary	173
CHAPTER VII: Summary, Conclusions and Recommendations .	174
Introduction.	174
Summary and Conclusions	174
Recommendations	183
Discontinue new investment in the farm settlement scheme as presently organized . . .	183
Modifications in the farm settlement	184

	Page
Modifications in the School leavers' farms.	193
Implications for external assistance agencies.	194
Modifications in credit systems.	194
Implications for future planners in Nigeria. .	195
Need for further research.	196
BIBLIOGRAPHY	197
APPENDICES	205

LIST OF TABLES

Table		Page
1	Estimates of Mid-Year Population of Nigeria from 1952-1965	9
2	Active Population Employed in Agriculture, 1952-53.	10
3-A	Exports of Certain Commodities from Nigeria, 1899-1951	17
3-B	Statistics Relating to the Marketing of Some Nigerian Exports, 1942-52	25
3-C	Value of Cocoa Exports from Nigeria Compared with Value of Total Exports and Imports, 1934-52.	28
3-D	Export Duties on Cocoa Related to Cocoa Exports and Nigerian Government Revenue, 1934-52.	29
4	Distribution of Responses from Three Social- Psychological Variables in the Farm Settlements and School Leavers' Farms in 1966	71
5	Distribution of Responses--"Discriminating" Social-Psychological Variables	72
6	Results of F' Statistics on Attitudinal Variables in the Farm Settlement and School Leavers' Farms in 1966	79
7	Attitudinal Variables: Distribution of Total Scores Per Farm Organization	85
8	Farm Settlers Houses--Midwest.	93
9-A	Number of Farmers Interviewed in Each Farm Organization	102

Table		Page
9-B	Mean Values of All Inputs Used Per Farmer in Each Farm Organization in 1965-1966	102
9-C	Simple Correlations.	116
10	Regression Results for Gross-Margin Analysis of Food Crop Production in All the Six Farm Organizations	117
11	Relative Shifts in Gross-Margin (in units) Due to Differences in Organizational Patterns in the Different Farm Organizations.	120
12	Regression Results for Gross-Margin Analysis of Food Crop Production in Each Farm Organization	122
13	Distribution of Gross-Margin Per Two-Acre in the Different Farm Organizations.	127
14	Average Gross-Margin per Farmer in Each Farm Organization.	128
15	Components of the Differential Between World Cocoa Price and Returns to Nigeria	136
16	Cocoa: Calculation of Returns to Nigeria and to Producers Under Various Price Assumptions .	137
17	World Cocoa Prices by Major Buying Points, 1957-66.	138
18	Oil-Palm: Calculation of Returns to Nigeria and to Producers Under Different Price Assumptions.	140
19	Cocoa: Yield Assumptions Per Acre-Yields of Dry Cocoa Beans in Lbs. Per Acre	141
20	Rubber: Yield Assumptions Per Acre-Lbs. of Dry Rubber Per Acre.	142
21	Oil-Palm: Yield Assumptions Per Acre (lbs). .	143

Table		Page
22	Acreage Planted Up to December, 1966 and Target Acreage Up to the End of the First Development Plan 1962/68 in Each Farm Organization	146
23	Average Equipment Requirements and Costs per Farm in Midwestern Nigeria	150
24	Distances of Farm Organizations from Nearest Major Markets in Western and Midwestern Nigeria (miles).	153
25	Estimated Rates of Return on Investment to Producers of Rubber and Oilpalm in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria	163
26	Estimated Rates of Return on Investment to Nigeria from Rubber and Oilpalm Production from Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria. . . .	164
27	Estimated Rates of Return on Investment in Cocoa Production in One Farm Settlement in Western Nigeria.	166
28	Estimated Rates of Return on Investment to Producers of Rubber and Oilpalm in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria	167
29	Estimated Rates of Return on Investment to Nigeria from Rubber and Oilpalm Production in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria.	169
30	Estimated Rates of Return on Investment in Cocoa Production in One Farm Settlement in Western Nigeria.	171
31	Estimated Minimum and Maximum Rates of Return on Investment in Tree Crops in the Farm Settlements and School Leavers' Farms.	178

LIST OF DIAGRAMS

DIAGRAM		Page
1	Ladder: Responses from Attitudinal Variables on Level of Satisfaction. . . .	75
2	Comparison of the Six Farm Organizations with Respect to the Level of Satisfaction of the Farmers	87
3	Comparison of Farm Settlements and School Leavers' Farms with Respect to the Level of Satisfaction of the Farmers.	88

LIST OF APPENDICES

APPENDIX	Page
A Quantity of Some Nigerian Agricultural Exports, 1900-60.	205
B Value of Some Nigerian Agricultural Exports, 1900-60.	210
C Questionnaire	215
D Social-Overhead Costs (£) on Investment in Cocoa, Rubber and Oilpalm in the Different Farm Organizations.	238
E Direct Costs (£) on Investment in Cocoa, Rubber and Oilpalm.	254
F Total Potential Direct Benefits (£) to Producers on Investment in Cocoa, Rubber and Oilpalm in the Different Farm Organizations	270
G Total Potential Direct Benefits (£) to Nigeria on Investment in Cocoa, Rubber and Oilpalm in the Different Farm Organizations	286
H Mathematical Proof of the Equation for Internal Rate of Return Used in this Analysis.	302

CHAPTER I

INTRODUCTION

The Problem

Nigeria is an independent nation among the African countries. Her 43.6 million people depend mainly on agriculture which is the mainstay of the country's economy. To obtain foreign exchange and feed her growing population, Nigeria needs to expand her production of food and export crops. Realizing the need for this expansion, in 1959, the Western Nigerian government (which then included the present Midwestern region) assigned an important role to food and export crop production. The following extract from a 1959 policy statement shows the importance which Western Nigerian government attached to this problem:

"Although progress is being made in establishing industry, in the foreseeable future the greatest increase in the national wealth of Western Nigeria is likely to come from the optimum use of the land and its agricultural potentialities. Every effort will be made to promote and encourage the cultivation of food crops, and the government will continue to promote vigorously the expansion of export crop production.^{1/}

To achieve this objective, the government set out proposals for establishing cooperative farm settlements in Western Nigeria.^{2/}

^{1/} "Future Policy of the Ministry of Agriculture and Natural Resources." (Sessional paper, Ibadan: Ministry of Agriculture and Natural Resources, 1959(, No. 9, p. 1.

^{2/} Ibid, p. 9.

The farm settlements started in late 1959. Pursuing the desire to increase agricultural production in Nigeria, in the first National Development Plan, Nigeria gave top priority to programs and policies to expand food and export crops in particular through farm settlements, and during the 1962-55 period, about 75 percent of government capital outlays in agriculture were allocated to farm settlements.

This policy to increase agricultural production was continued when the Midwestern region was created in 1963, and a year later, in 1964, the Community Development Division of the Ministry of Trade and Industry in Midwestern Nigeria started another type of farm settlement--"School leavers' farms"--as a means of increasing food and export crop production in the region. In recognition of the potential contribution which these two forms of farm organizations (The farm settlements, and the school leavers' farms) can make towards the process of economic development in the region if properly organized, the Economic Planning Committee set up a subcommittee in February 1965 in the Midwest to review and redefine the policies of these farm organizations and make recommendations on their efficient management.^{3/}

^{3/} The Subcommittee was headed by Dr. C. Oyolu of the University of Nigeria, Nsukka, and other members are Messers I. Amadi-Émina, W. J. Anukpe, and I. A. Eweka.

This national objective to increase agricultural production was also supported by various international organizations. For example, in 1965 the International Bank for Reconstruction and Development Report commented that Southern Nigeria should concentrate on increasing export crop production--cocoa, rubber, and oilpalm through the expansion of smallholder schemes. Similarly, the recent FAO Report lists the Nigerian's need to provide an adequate food supply for the growing population and her need to provide agricultural export earnings.^{4/}

For this expansion to occur, investment from within Nigeria and external financial and managerial assistance will be necessary. The Western Nigerian government's recent draft memorandum for the second National Development Plan, which places a very high priority on farm settlements and proposes to spend £,776,260 on farm settlements in Western Nigeria from 1968-69 to 1972-73, is aimed at achieving this agricultural expansion.^{5/} However, serious questions have been raised concerning the performance of the farm settlements and of alternative forms of farm organizations such as the school leavers' farms as means of

^{4/} FAO Report: Agricultural Development in Nigeria: 1965-1980, Rome, October 1966, p. 19.

^{5/} "Second National Development Plan: 1968-69-1972-73", Ministry of Agriculture and National Resources, (Ibadan: 1967).

achieving this agricultural expansion and of obtaining high rates of return on investment in agriculture. It was therefore thought necessary to evaluate the performance of these different forms of farm organizations and make some recommendations which might be helpful to the government in constructing the next development plan.

Objectives

1. To analyze the social-psychological characteristics and the organization of the farmers in the farm settlements and the school leavers' farms in Western and Midwestern Nigeria.
2. To analyze the performance of farm settlements and the school leavers' farms from 1959 to 1966.^{6/}
3. To make recommendations which might (a) lead to high rates of return on investment in the farm settlements and school leavers' farms in Western and Midwestern Nigeria, and (b) which might induce direct investment in agricultural production.

^{6/} The farm settlements started in 1959 while the School Leavers' farms started in 1964.

CHAPTER II

COLONIAL AGRICULTURAL POLICY AND SOURCES OF GROWTH IN THE AGRICULTURAL SECTOR FROM 1900 TO INDEPENDENCE IN 1960

The purpose of this chapter is to identify the major sources of growth in the agricultural sector in Nigeria from 1900 to 1960. Attention will focus on colonial policies which have affected the organization and productivity of Western Nigerian agriculture until it became a self-governing region in 1957. In addition, the evolution of organizational patterns in agriculture during this period will be analyzed. Finally, the influence of the Western Nigerian governmental policy from 1959 on agricultural development will be discussed with emphasis on the establishment of the farm settlements, the integrated rural development farms, and the school leavers' farms.

Colonial Agricultural Policy, 1900-1960

The course of agricultural development in Nigeria was dictated by the objectives of colonial expansion in Africa mainly to provide markets and raw materials for industries in the "mother countries." These twin objectives were the motivating forces behind many decisions of the colonial governments. Successive colonial administrators and agricultural experts devoted a greater part of their time to persuading private farmers to produce crops

to be used in the "mother country" and the government did not involve itself in directly productive activity in agriculture. Economic considerations that would improve trading facilities between Nigeria and the "mother country" received top priority. By 1909, the western railway which started in Lagos in 1896 had reached Northern Nigeria. More money was invested in the communication system and in the building of more railway lines, roads, and water transport systems. The latter was to serve mainly a dual function: organizing an efficient administrative machinery, and enabling export crops to be shipped more cheaply to overseas markets and incoming goods to be handled much more efficiently.

The foreign government in Southern Nigeria maintained a policy which aimed primarily at the development of the agricultural resources of Southern Nigeria through the indigenous inhabitants, and modern plantation methods never gained a firm foothold in Southern Nigeria.^{1/}

Although foreigners in Northern Nigeria successively claimed overlordship to land by right of conquest, the colonial government maintained a policy of non-intervention in the traditional land tenure system in Southern Nigeria and left untouched the essential rights of the community of land.

^{1/} Sir High Clifford, as cited in W. K. Hancock, Survey of British Commonwealth Affairs II, "Problems of Economic Policy, 1918-1939", (London: Oxford University Press).

"The land and Native Rights Proclamation of 1910' was sharply criticized in Southern Nigeria as confiscatory and as turning the private farmer who, under customary law, enjoys land rent-free in perpetuity into a rent-paying, short-term lessee on a precarious tenure. In the same year, 'Native Lands Acquisition' was proclaimed in Southern Nigeria. This Proclamation forbids any foreigner from acquiring any interest or right in or over any lands within Southern Nigeria from a native except under an instrument which has received the approval in writing of the government. This Proclamation, though with various amendments, remains one of the pillars of land legislation in Southern Nigeria."^{2/}

Hence, rather than acquiring the ownership of the means of production, the foreigners who could have invested in direct production in agriculture, were contented with purchasing the output of the existing producers, because of the land policy.

The Colonial land policy of non-intervention in Southern Nigeria's "laws of inheritance" which restricted land to Nigerian farmers left direct productive processes in agriculture mainly in the hands of the private farmer who still depends on his primitive tools and traditional technique of "rotational fallow."

While the increase in agricultural output is due mainly to the private farmer, population continues to grow rapidly, creating

^{2/} H. A. Oluwasanmi, Agriculture and Nigerian Economic Development, (Ibadan: Oxford University Press, 1966), p. 38. See also "Laws of the Colony and Protectorate of Southern Nigeria", (London: 1908), Vol. II, pp. 1-88.

the need for greater output to feed the growing population and to provide much needed foreign exchange earnings. No attention was, however, paid to this growing population because the general public knew very little about the implications of population growth on the level of per capita income in the country.

Furthermore, only mere educated guesses were made about the size and rate of growth of Nigeria's population before 1900. Oluwasanmi has noted, "Before 1900 very little that is trustworthy is known of the size and rate of growth of the population of what is now Nigeria or of any of its component parts, nor did our knowledge of Nigeria's population improve very appreciably with the establishment of 'Pax Britannica.'"^{3/} Serious questions have always existed concerning the accuracy of Nigerian census figures even after 1900.^{4/} However, Table 1, Nigerian census figures from 1952-1965 shows, how great the need is to increase output of both food and export crops in Nigeria. The increase in population brought more people into agriculture. Table 2 shows that 78.2 percent of the active population in Nigeria was employed in agriculture in 1952-53. The increased demand for cultivable land brought in soil mining and excessive fragmentation of holdings.

^{3/} Ibid. pp. 60-61.

^{4/} Table 1 showing different population estimates in Nigeria even after 1950 indicates one cannot rely heavily on Nigerian census figures.

Table 1. Estimates of Mid-Year Population of Nigeria from 1952 to 1965^{1/} (in millions)

Year	Eke's Series	Okigbo's Series
1952	30.80	30.10
1953	31.63	30.70
1954	32.48	31.31
1955	33.36	31.94
1956	34.26	32.58
1957	35.19	33.23
1958	36.14	33.89
1959	37.11	34.58
1960	38.11	35.27
1961	39.14	35.98
1962	40.20	36.70
1963	41.28	37.43
1964	42.39	38.18
1965	43.55	38.94

^{1/} Source: "Population of Nigeria: 1952-1965" by I.I.U. Eke, The Nigerian Journal of Economic and Social Studies, Vol. 8, No. 2, (July 1966), p. 309

Table 2. Active Population Employed in Agriculture, 1952-53^{1/}

Item	North	West	East	Lagos	Nigeria
Active Population ('000)	8,116	2,702	3,521	111	14,494
Agricultural Population ('000)	5,945	2,339	3,043	7	11,334
Active Population in Agriculture (percent)	72.8	86.6	86.4	4.5	78.2

^{1/} H. A. Oluwasanmi, Agriculture and Nigerian Economic Development, (Ibadan: Oxford University Press, 1966), p. 65.

The long period of fallow during which the soil regains its fertility through the process of natural regeneration was drastically reduced, and the need to improve agricultural techniques and raise productivity per acre in agriculture was increased.

Governmental Activities in Agriculture

During the period 1900-1960 of Colonial agricultural policy, there are three important decisions which influenced agricultural development in Nigeria: (1) the government began to encourage farmers to increase output per acre in 1910, (2) government marketing boards were established in 1947, and (3) the government became directly involved in productive processes in agriculture in 1949.

As the need to increase output became more important, the government directed its attention mainly to research and education rather than to productive processes in agriculture. The Department of Agriculture encouraged private farmers to raise output per acre by distributing high yielding seed varieties and by teaching them better methods of cultivation. Between 1909 and 1917, 5,400 acres of rubber were planted in Midwestern Nigeria, and this had been attributed to the encouragement given by the Department of Agriculture to private farmers by distributing seedlings and providing advice on cultivation and processing.^{5/}

^{5/} Kurt R. Anschel, "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University, 1965), p. 56.

In 1939, the Oil Palm Research Station was launched, and in 1951, the Cocoa Research Institute in Ghana was expanded to include Nigeria under a new name--West African Cocoa Research Institute (Ghana); in the same year, Oil Palm Research was expanded to become West African Oil Palm Research Institute (Nigeria). In addition, the West African Maize Research Unit (Nigeria), the West African Rice Research Institute (Sierra Leone) and six other West African Research Institutes were established. Welsch reported that nearly all governmental activity in the rice industry in Southern Nigeria has been directed into research and education.^{6/} "FAO reports that the heavy spraying campaign of 1958-59 in Nigeria and Ghana may have contributed as much as 75 percent to the 100,000 ton increase of total African production in cocoa in 1959-60, and perhaps as much as 40-50 percent to the 200,000 ton jump in 1960-61."^{7/}

In addition to the establishment of these research Institutes in 1957, the government began to teach the farmers proper rubber

^{6/} Delane Emil Welsch, "The Rice Industry in the Abakaliki Area of Eastern Nigeria," (Unpublished Ph.D. Thesis, Michigan State University, 1964).

^{7/} FAO, Agricultural Development in Nigeria, 1965-1980, (Rome: October, 1966), p. 54. See also "The Dynamics of Long-Term Agricultural Development in Nigeria", by Carl K. Eicher, (Unpublished paper presented at Annual Meeting of the American Farm Economic Association, Guelph, Ontario: August 13-16, 1967).

tapping and processing in Western Nigeria. In the same year, the government started the sale of fertilizers to farmers. The fertilizer scheme failed, however, because the cost of the fertilizer was too high for the limited financial resources of the private farmers and because the value of the fertilizer was not effectively demonstrated to the farmers. In contrast, the fertilizer scheme has been successful in Northern Nigerian mainly because the Northern Nigerian government subsidizes the fertilizer that is sold to private farmers. The amount sold to private farmers in Northern Nigeria increased from 416 tons in 1960 when it was sold for cash to 1,800 tons in 1962, and in 1964-65, it rose to about 9,000 tons.^{8/}

In addition to encouraging the private farmers to increase their output per acre through the establishment of various Research Institutes, and by making seedlings, fertilizer and training available to them, the Western Regional Government also encouraged the establishment of cooperative societies. Loans were made available to farmers through these single-purpose cooperative societies. The cooperative society--a cooperative marketing society--appeared in the Western Region in 1922 to help the cocoa farmer obtain a fair price for his product. The Department of Agriculture, however, did not organize the cocoa

^{8/} FAO, op. cit., p. 194.

farmers into a cooperative society until 1930. Even though in 1932, Faulkner, then the Director of Agriculture, Moor Plantation, saw the need for legislation, the cooperative society ordinance was not enacted until 1935.^{9/}

The number of cooperative societies has since grown to over 900, each society performing a single function. The different societies include Cooperative Credit, Cooperative-Thrift and Loan, Consumer Cooperative, Cooperative-Farms, Crafts, and Industries Cooperative, Marketing and Processing Cooperative, and Housing-Cooperative. The government utilizes these various cooperative societies mainly as agencies for distributing credit. Nigerian farmers have apparently seen little opportunity in participating in cooperatives and even in the Western Region where the proportion of farmer member/non-member is highest, the percentage membership was only 5.5% in 1964.^{10/}

The Cocoa Marketing Board, set up in 1947 with the primary but doubtful objective of preventing short-term fluctuations in cocoa prices, has had considerable effect on cocoa producers in Western Nigeria. The groundnut, oilpalm, and cotton marketing boards set up in 1949 have also had effects on the production of these commodities.

^{9/} Nugent B. Jeffery and Grant B. Taplin, "Cooperatives in Nigeria", (Syracuse University, 1961, Unpublished Report). See also John H. Heckman, USAID Consultant Report, No. C-45 on Cooperatives in Nigeria, (March, 1964).

^{10/} John H. Heckman, USAID Consultant, Report No. C-45, Cooperatives in Nigeria, (March, 1964).

By prescribing producer prices annually, Marketing Boards have influenced the existing producers as well as the potential ones. They interfered with price levels which would have helped to direct resources into the production of various commodities in accordance with changes in supply and demand conditions in the market. Anschel reported that because a substantial proportion of the commercial value of oilpalm products was withheld from the producers, the producers directed their resources from oilpalm production to rubber which is not under the Marketing Board.^{11/}

In 1951, the Marketing Boards controlled 69 percent by value of all Nigerian exports and 78 percent of all non-mineral exports.^{12/} In all these exports, producer prices were generally kept between two-fifths and three-fifths of world market prices. The groundnut producers often receive less, generally one-third to two-fifths.^{13/} By paying producer prices far below commercial values, the Marketing Boards did not only make the crops under their control less attractive to potential producers compared to other crops or indeed to other forms of activity, but their action also had an adverse effect on the ability and the incentive

^{11/} Kurt R. Anschel, "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University: 1965) p. 46.

^{12/} Peter Bauer, West African Trade: A Study of Competition, Oligopoly, and Monopoly in a Changing Economy. (London: Routledge and Keagan Paul Ltd., 1963), p. 276.

^{13/} Ibid., p. 299.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

to produce and to maintain or increase capacity. Peter Bauer wrote that the emergence of a substantial cash and exchange economy among the TIV people of Northern Nigeria was retarded because their main export product, Bennisseed, came under the control of the groundnut Marketing Board.^{14/}

Table 3-A shows the export of certain commodities from Nigeria from 1899-1951. The comparative stability in quantity of export crops controlled by the Marketing Boards between 1937 and 1951 and the rapid expansion, in the same period, of hides and skins and timber not controlled by Marketing Boards indicate how the payment of comparatively low producer prices by Marketing Boards until 1951 retarded the growth of those export crops subject to Marketing Board control. To a producer, high prices are the greatest incentive to expand production and to maintain, improve, and extend productive capacity. The extensive powers of the Marketing Boards which enabled them to prescribe producer prices below commercial values of the export crops under their control have thus created a powerful deterrent to agricultural development in Nigeria.

In 1949, the Nigerian government took an important step to demonstrate to private farmers modern techniques of production designed to increase agricultural output. In partnership with the Colonial Development Corporation, the government established

^{14/} Ibid., p. 299.

Table 3-A. Exports of Certain Commodities from Nigeria,
1899-1951*

Item	1899- 1901	1919- 1921	1929- 1931	1935- 1937	1951
			(000 tons)		
Palm Oil	14	80	129	150	150
Palm Kernels	52	192	255	346	347
Groundnuts	--	45	151	242	141
Cocoa	--	20	53	91	122
Cotton	--	4	6	11	15
Hides and Skins	--	4	6	7	14
Timber	27	29	34	44	394**

* Peter Bauer, West African Trade, (London: Routledge and Kegan Paul, Ltd., 1963), p. 195.

** Estimated from cubic feet.

The Niger Agricultural Project^{15/} which was situated on a virtually uninhabited tract of fertile land near a small town called Mokwa.^{16/} The Project had been inspired by the success of the Gezira Scheme in the Sudan, and the planners of the Mokwa Scheme patterned the whole system after the Gezira Scheme.^{17/}

By 1951, 78 families had been settled at Mokwa. This number increased to 135 families in 1952, and by 1953, 28 more families had been settled, thus bringing the total number of families settled to 163. By the end of 1952, evidence showed that the program was failing. The inadequacy of technical experimentation and preliminary feasibility studies to test the adaptability of the Gezira Scheme in a different environment brought the Mokwa Project into unanticipated technical difficulties. Farm sizes were larger than the farmer and his family could reasonably cope with. An acute labour shortage became an obvious problem. The machinery in which a lot of money had been invested could not be used for ordinary farm

^{15/} K. D. S. Baldwin, The Niger Agricultural Project, (Oxford: Basil Blackwell), 1957.

^{16/} The Nigerian Agricultural Project derived its more popular title--"Mokwa Scheme" from this small town. In the United Kingdom, it is known as "The Ground-nut Scheme".

^{17/} Arthur Gaitskell., Gezira: A Study of Development in the Sudan, (London: Faber and Faber, 1959).

operations. The machines would remain idle for about 75 percent of the time while the farmer continued to use his cutlass and traditional hoe for most of the farm operations. Thus, even though 163 families had been settled out of a target of 22,000 and 9,652 acres already cleared, the project came to a financial failure in 1957 with a substantial loss of over £500,000.

In 1954, three years before the Mokwa Scheme came to its unsuccessful end, Lewis cited the relatively high cost involved in the government's building settler's houses compared with the settler's building a similar house himself, the heavy capital investment in machinery, schools, and roads as well as lack of adequate feasibility studies. These are some of the problems which most developing countries often face in their land settlement schemes.^{18/}

In brief, there can be little question that the colonial government which may have constituted an important source of initiative and a dynamic element in promoting Nigerian agricultural economic development restricted its role to mainly that

^{18/} W. Arthur Lewis, "Thoughts on Land Settlement", Journal of Agricultural Economics, Vol. 14, (June, 1954). Reprinted in Carl Eicher and L. W. Witt (eds.), Agriculture in Economic Development, (New York: McGraw-Hill, 1964), pp. 299-310.

of trading and helping the indigenous people to develop their natural resources through research and extension until 1949.^{19/}

Major Sources of Growth, 1900-1960

The trade-creating policy of the colonial government and Southern Nigerian land tenure policy prevented the use of modern techniques and skilled personnel by foreigners possessing large amounts of capital and who may possess technical know-how to operate large-scale production in agriculture. The private agriculture which has been part and parcel of the traditional economy continues to use primitive tools and unskilled labour, and the great bulk of the agricultural sector remains little touched by "nontraditional" techniques or innovations.

Typically, a Nigerian farmer is engaged at one and the same time in production for export, production for internal trade, and production for home consumption. In fact, it is common for all three types of production to take place at the same time on the same plot of land. Because of a lack of training and large amounts of capital to invest in agriculture, the private

^{19/} J. S. Furnivall, "Colonial Policy and Practice" (Cambridge, England: The University Press, 1948), pp. 323-334. Furnivall's materials show how very little attention was paid to local farmer production, as does also P. T. Bauer's "The Rubber Industry: A Study in Competition and Monopoly", (Cambridge: Harvard University Press, 1948).

farmer remains a poor and an unskilled producer who employs backward methods of cultivation. Baldwin wrote that the low incomes of the producers are among the factors responsible for the low level of technology in underdeveloped countries. Such producers tend to possess a high degree of risk aversion; i.e., they prefer a smaller expected (or average) income to a larger expected income if the range of possible outcomes is smaller in the former situation.^{20/} Anschel found that the private farmers in Midwestern Nigeria did the major expansion of rubber production without specific governmental encouragement, and because the private farmers who are the major producers of rubber in Nigeria lack the necessary capital and technical know-how modern technology has not influenced practices much.^{21/} Even though productivity per acre or per man-hour scarcely changed because of the technological backwardness of the economy, productivity per man increased through increased utilization of available factor inputs--in terms of surplus land and indigenous capital resulting from responses to economic

^{20/} Robert E. Baldwin, "Export Technology and Development From a Subsistence Level", Economic Journal, Vol. LXXIII, (March, 1963), pp. 80-92.

^{21/} Kurt R. Anschel, op. cit.

incentives of attractive prices offered by the foreign traders. Anschel reported that the increase in rubber exports between 1921 and 1935 was due mainly to favorable price levels.^{22/} Furthermore, in order to avoid the heavy penalties that were then being imposed on tax defaulters together with the urge to meet the challenge of new economic opportunities in terms of acquiring new goods brought in by the foreign traders, the private farmer began to exert more effort to provide for his desires and those of his family. The farmer now produced more than his own normal requirements. He sold the surplus for money. Working in this way, the Nigerian private farmer has not only been able to feed himself and his extended family, which in some cases in Nigeria may extend from the first to the twentieth cousin, but he has also been able to make substantial contributions towards the process of growth in the Nigerian economy.

Growth of Export Crops, 1900-1960

The Nigerian private farmer has helped to increase the production of both food and export crops in Nigeria, and his export crops have been a major source of growth in the Nigerian

^{22/} Kurt R. Anschel, "Economic Aspects of Peasant Rubber Productions in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University: 1965).

economy. Between 1900 and 1960, the export volume rose more than sixteenfold. 1954 estimates suggest that there were about a million acres planted in cocoa. Appendices A and B show the quantity and value of certain commodities exported from Nigeria from 1900 to 1960. The increases in export production shown in these tables have been associated with small increases in capital input.^{23/} This presents a striking illustration of the potentialities for the improvement of productivity in private agriculture.

Galletti, Baldwin, and Dina reported that in the early 1950's the wages paid by cocoa and rubber farmers in Nigeria compared well with those that the government and town employers paid their workers.^{24/} In 1962, Webster studied the origin and spread of cocoa farming in Western Nigeria and found that since cocoa was introduced to the farmers by the African church, the private farmers have played a significant role in increasing cocoa production in Western Nigeria.^{25/} The private farmers

^{23/} Gerald K. Helleiner, Peasant Agriculture, Government, and Economic Growth in Nigeria, (Homewood, Illinois: Richard Irwin, 1966), p. 85.

^{24/} R. Galletti, K.D.S. Baldwin, and I.O. Dina, Nigerian Cocoa Farmers, (Oxford: Oxford University Press, 1956), pp. 211-215.

^{25/} J. B. Webster, "Agege: Plantations and the African Church", Conference Proceedings (Ibadan: Nigerian Institute of Social and Economic Research: March, 1962).

have voluntarily invested their money, time, and energy to increase agricultural output and they have been responsible mainly for the expansion of both food and export crops which have been the major sources of growth in Nigerian economy since 1900. Table 3-B shows the statistics relating to the marketing of selected Nigerian exports between 1942 and 1951. The principal exports (about 70 percent) from Nigeria between 1949 and 1951 shown in Table IV indicate that the major sources of growth in the Nigerian economy were cocoa, palm kernels, palm oil, and groundnuts.

Palm produce plays an important role in the private sector, both as a source of domestic food supplies and as a source of an export crop. Between 1900 and 1950, exports of palm oil rose fourfold while exports of palm kernels rose from 85,000 tons in 1900 to more than 400,000 tons in 1950. Palm produce exports rose in value from £1.5 million in 1900 to £28.7 million in 1950. The total earnings from exports of palm oil and palm kernels were over £32 million in 1955 and stood at about £40 million in 1959. Together, palm oil and palm kernels have accounted for between 15.7% (1960) and 36.4% (1949) of the total value of Nigerian exports in the postwar years.

The importance of rubber to the Nigerian economy has also grown rapidly in recent years. In the late 1950's and early 1960's, rubber accounted for 6 to 8.5 percent of total Nigerian

Table 3-B. Statistics Relating to the Marketing of Selected Nigerian Exports, 1942-51

Item	1942- 43	1943- 44	1944- 45	1945- 46	1946- 47	1947- 48	1948- 49	1949- 50	1950- 51
	(1,000's tons)								
Groundnuts	108	194	228	301	323	336	323	188	143
Palm Kernels	331	314	293	277	316	327	376	381	330
Palm Oil	135	125	114	101	126	139	161	159	143
Cocoa	111	71	86	103	111	74	109	100	110

Peter Bauer, West African Trade, A Study of Competition, Oligopoly and Monopoly in a Changing Economy, (London: Routledge and Kegan Paul, Ltd., 1963), pp. 397-407.

exports. Over 95 percent of Nigeria's total rubber output is today produced on small private plots.^{26/} Anschel found that the personal initiative of Midwestern smallholders has been the main force behind the progress achieved in rubber production in Nigeria.^{27/} Rubber production has contributed towards Nigerian economic growth in terms of foreign exchange earnings, tax revenues, and income obtained from it. In 1962, for example, rubber comprised seven percent of merchandise exports, and was fifth in importance among Nigerian exports. Rubber is now Nigeria's fastest growing agricultural export, and its exports have doubled since 1955. Today, rubber is the Midwest's most important export industry, and over 80 percent of all Nigeria's rubber exports is produced in the Midwest.^{28/}

In the economy of Nigeria, particularly the Western Region, cocoa is outstanding. Whether related to the total of the exports or to the total of the imports even to the total national income which it helped to buy, cocoa has been important

^{26/} Peter Von Blanckenburg, "Rubber Farming in Benin Area, A study of Some Socio-Economic Factors Influencing Rubber Production", Preliminary Report, (Ibadan: Nigerian Institute of Social and Economic Research).

^{27/} Kurt R. Anschel, op. cit., p. 69.

^{28/} "Midwestern Nigeria", New York Times, January 20, 1964, p. 63.

in the country's economy since the 1920's. In 1950-51, the value of cocoa production was 2.2 percent of the total estimated national income.^{29/} It provided almost 6.5 percent of the total estimated Western Region income. Tables 3-C and 3-D from Galletti, Baldwin, and Dina show that in relation to Nigeria's trade, cocoa has become more important since World War II.^{30/} Table 3-C shows that even before the war, cocoa exports were enough to pay for more than a fifth of the country's imports. During 1949-52, the Cocoa Marketing Board was built up by reserves from the annual surpluses, which amounted to over £7 million in 1949-50 and over £15 million in 1950-51. These sums made available for development and research contributed significantly to the economy of Western Nigeria. Of all the export crops, cocoa can most truly be said to be the life blood of Western Nigeria which is the second largest producer of cocoa in the world.

In summary, during 1900-1960 period, the private farmer was the dominant factor in agricultural production in Nigeria.

^{29/} Prest and Stewart, The National Income of Nigeria, 1950-51 (London: HMSO, 1953), pp. 27-61.

^{30/} R. Galletti, K. D. S. Baldwin, and I. O. Dina, Nigerian Cocoa Farmers, (Oxford: Oxford University Press, 1956), pp. 10-11.

Table 3-C. Value of Cocoa Exports From Nigeria Compared With Value Of Total Exports and Imports, 1934-52

Period	Merchandise Trade		Cocoa Exports (£000)	Cocoa Exports as Percentage of	
	Imports (£000)	Exports (£000)		Imports	Exports
1934-38	47,255	64,703	10,095	21.3	15.6
1939-43	43,649	65,532	7,713	17.7	111.8
1944-48	123,738	166,682	35,796	29.0	21.5
1949-52	317,781	411,648	93,728	29.5	22.8

Source: Nigeria Digest of Statistics, (1953) and reproduced from Galletti, Baldwin, and Dina, op. cit.

Table 3-D. Export Duties on Cocoa Related to Cocoa Exports and Nigerian Government Revenue

Period	Cocoa Exports		Central Gov't. Revenue (£000)	Cocoa Duties			
	Quantity ('000 tons)	Value (£000)		Total (£000)	Percentage of Export		
					Value	Revenue	Per Ton (£)
1934-38	447.0	10,095	29,446	521	5.2	1.8	1.17
1939-43	455.6	7,713	36,206	683	8.9	1.9	1.50
1944-48	449.5	35,796	68,794	1,164	3.3	1.7	2.58
1949-52	439.7	93,728	137,697	12,288	13.1	8.9	27.95

Source: Nigeria Digest of Statistics, (1953) and reproduced from Galletti, Baldwin, and Dina, Ibid.

By employing additional labour and land inputs, the farmer increased export crop production. Between 1919 and 1959, Nigerian exports altogether rose 955 percent,^{31/} and income from export production of the private farmer still constitutes the most important source of revenue for the public sector's development effort in Nigeria.

Introduction of the Moshav Farm Settlements in Western Nigeria

The Western Nigerian Government policy of 1959 gave priority to programs that would increase agricultural production in Western Nigeria and a land settlement scheme was chosen as one approach towards achieving increase in agricultural production.^{32/} Moshav,^{33/} the small landowners cooperative settlement, is one of the two basic types of land settlement schemes in the cooperative agricultural sector of Israel, the other being the

^{31/} P. Lamartine-Yates, "Forty Years of Foreign Trade". (London: Allen and Unwin, 1958), p. 238. Compare also M. Harwitz, "Subsaharan Africa as a Growing Economic System", in Herskovits and Harwitz, (eds.), Economic Transition in Africa, (Evanston, Illinois: Northwestern University Press, 1964).

^{32/} "Future Policy of the Ministry of Agriculture and Natural Resources", (Ibadan: 1959), p. 12.

^{33/} Moshav is Israel's "small-holder" village. It was designed to combine individual initiative and responsibility with a cooperative approach to the problems of farm purchasing, marketing, and credit. While each family retains its individuality, the cooperative techniques allow a more efficient farming and community service system.

kibbutz where both production and consumption are organized collectively. Production and consumption decisions in the Moshav are basically the responsibility of the individual farmer and his family, while purchasing, selling, and other services are generally handled cooperatively. The Moshav was purposely chosen by the national authorities in Israel as the principal instrument for the mass absorption of postwar immigration in the agricultural sector. The Moshav Scheme, based on a multipurpose cooperative system, has been very successful in Israel. It is responsible for 50 percent of the agricultural output of Israel.^{34/}

In Nigeria, however, the Mokwa Scheme was a financial failure. The private farmers still continue to employ their traditional techniques which have changed little for centuries. Agricultural output has not increased substantially, and unemployment figures continue to rise. Thus, faced with the need to increase agricultural output, and against the background of wide-scale unemployment, especially of the primary six, school leavers, many United Nations experts as well as some

^{34/} M. I. Klayman, "The Transferability of the Israeli Moshav for the Agricultural Development of Other Countries". (An Unpublished Paper, April 7, 1967).

Nigerian leaders thought it reasonable to apply the experience of Israeli Moshav to Western Nigeria.^{35/} In 1959, Chief Akin Deko, then Minister of Agriculture in the West, traveled to Israel to study the Moshav for possible adoption in Western Nigeria. Encouraged by the potential productivity of the Moshav form of organization, Chief Akin Deko, on his return from Israel, proposed the implementation of a modified Israeli Moshav land settlement scheme to Western Nigeria.^{36/} He saw in this scheme the answer to many of the problems that plague Nigerian agriculture. One of these, illiteracy, was reduced in 1955 by the introduction of universal free primary education, but this added many new obstacles. In the Western region, about 108,000 school leavers were turned out every year while barely 50 percent of these gained admission into other schools for further education, or find useful employment; this meant over 50,000 young people per year who had no place to go

^{35/} E. Krenin, "The Introduction of Israel's Land Settlement Plan to Nigeria", Journal of Farm Economics, Vol. 45, No. 3 (August 1963), pp. 535-46.

R. Schickele, formerly of the FAO for example, considers the Gezira Scheme in the Sudan and the Israeli Moshav as the systems offering the best solutions to the organization of agricultural production in Africa.

^{36/} Yalan E., Planning of Agricultural Settlements in Israel, 1960. See also Government of Western Nigeria, "Future Policy of the Ministry of Agriculture and Natural Resources", (Ibadan: Government Printer, 1955), pp. 8-16.

but the city to look for work. Unemployment rose. In a country where population was growing at the rate of 1.1 to 1.4 million per annum,^{37/} a serious problem of unemployment existed. The government felt there was a need for new farming techniques, a need for larger holdings and larger yields per acre. To Chief Akin Deko, the Moshav scheme was the answer to these problems.

The project was entrusted to an FAO team headed by an Israeli planner.^{38/} The plan they proposed was that there should be 13 farm settlements of the nuclear type built between 1960-69, and at least one in each province. Due to political pressures, however, the government decided instead to establish 25 individual Moshavim (singular for Moshav) scattered throughout the region so that there would be at least one in each district. Each settlement was to have at least 1,500 acres and be able to support 50 settlers with provisions to increase to 5,000-6,000 acres and support 200 members, which is the minimal amount that can be supported by the modern facilities

^{37/} FAO, Agricultural Development in Nigeria, 1965-1980.

^{38/} In addition to its head, the team consisted of a farm management economist (Indian), and education and extension expert (Scottish), a livestock expert (Australian), an agricultural engineer (British), and a veterinarian (British).

that the settlement should have. The settlers were to come from an area within 30 miles of the settlement and have at least a primary VI education. There were to be two perennial crops from the following: cocoa, oil-palm, rubber, coconut, citrus, or kola depending on the suitability of the soil. On the permanent tree crop settlement there would be 16-18 acres of tree crops and from one to three acres for arable crops and the settler's house. On the arable crop settlement, each settler would have about 70 acres in corn, grass, and other crops. Poultry and other livestock were to be encouraged. The land was to be obtained from the Obas, Chiefs, and Bales in the communities chosen. If this could not be done voluntarily, it would be acquired by compulsory acquisition.^{39/}

The settlers were to be trained at Farm Institutes where they were to learn all they needed to be good farmers. Courses in animal and crop husbandry, farm management, general science, etc., were to be offered. During this time, the settlers were to be treated just as any other school boys in dormitories having common dining rooms. Upon completion of their two years at the Institutes, they were to be sent to a farm settlement of their home area.^{40/}

^{39/}"Future Policy of the Ministry of Agriculture and Natural Resources", (Ibadan: Government Printer, 1959), p. 12.

^{40/}"Farm Settlement Schemes in Nigeria", Nigeria Trade Journal, (Lagos: January, 1962).

When the settlers arrived on the settlement, they were to begin as settler labour, and stay in this category receiving a subsistence allowance of about £3 a month until their crops began to produce. A record is kept of how much is received since this amount will have to be paid back later. When the crops are about seven years old, they are in full production and the settler is to start paying off the debt for his house, for establishing and maintaining his holding as well as money spent on him for subsistence allowance. The cost per settler was estimated at £3,600 or \$10,000.

The farm settlement scheme has the following objectives:

- (1) To bring about rural progress.
- (2) To make farming efficient, lucrative and attractive to the hundreds of thousands of primary six school leavers who shun the type of village life they know and drift to the cities in search of amusements and white-collar jobs.^{41/}
- (3) To demonstrate that by careful planning, farms can be established and operated by young, educated farmers with

^{41/}Archibald Callaway, "School Leavers and the Developing Economy of Nigeria", The Nigerian Political Scene, R.O. Tilman and T. Cole (eds.), (Durham: Duke University Press, 1962), pp. 220-238.

reasonable assistance in the form of advice and loans from the government or other sources, which will provide a comfortable standard of living for the owners comparable to or higher than that gained by persons of their own status in other forms of employment.

(4) To mitigate against an unfavorable land tenure system that contains no legal boundaries and in which the lack of security of tenure deprives the farmers of an asset against which to raise loans and of an incentive to invest in long-term improvements.

(5) To partially solve the unemployment of the school leavers who cannot all be absorbed by higher institutions or by industries. By 1967, it was estimated that there would be as many as 700,000 unemployed school leavers in Western Nigeria.^{42/}

(6) To act "as models for others to copy" and serve as "another extension method with a view to accelerating agricultural development in the region."^{43/} The following quotation from the Western Nigerian Government policy statement of 1959 serves to illustrate the value attached to this objective:

^{42/} "Nigeria Works It Out", The Economist, (London: July 7, 1962), p. 44.

^{43/} Ministry of Agricultural and Natural Resources, Land Settlement Scheme--Farm Settlement, Paragraph 14, (Ibadan: Government Printer, June, 1960).

"Demonstrations on government farms rarely appeal to the farmer; the results being often attributed to some special factor provided by government which is beyond the reach of the ordinary farmer. Under the proposed scheme, the farmer himself will, under direction, be applying new techniques to his own plot of land. All aspects of the experiment will be known and open to him. He will thus be trying out and verifying for himself the effects of new techniques. He will no longer attribute the success to hidden factors or to causes beyond his means. As a result, gossip, interest and enthusiasm regarding these new techniques that have yielded so much success will spread from the cooperative farm settlements to neighboring private farms. This aspect of the cooperative farming scheme will in itself be a revolution in agricultural methods."^{44/}

With these stated objectives, the Western Nigerian government launched a modified Israeli Moshav land settlement scheme in 1959.

Hitherto, Western Nigeria had had no experience of a multi-purpose type of cooperative system. The cooperative societies in existence performed single functions, and the government looked upon them as agencies for distributing credit. The main objective of the farm settlement scheme was to organize the farmers into multi-purpose cooperative societies which would

^{44/}"Future Policy of the Ministry of Agriculture and Natural Resources", (Ibadan: Government of Western Nigeria, 1959), p. 5. See also E. Krenin, "The Introduction of Israel's Land Settlement Plan to Nigeria", Journal of Farm Economics, Vol. 45, No. 3, (August, 1963), pp. 535-46.

assume the responsibilities of marketing, purchasing, supervising, auditing, and ultimately, the whole function of business organization and the provision of technical advice and finance. However, the real distinction between the multi-purpose cooperative society of the Israeli Moshav type and the single-purpose cooperative society already in existence in Western Nigeria appears not to have been properly understood. Hence the multi-purpose cooperative movement, an essential aspect of the farm settlement scheme and the driving force behind the success of Israeli Moshav which is the inspiration for launching the scheme in Western Nigeria, was never introduced.

Criticisms of the farm settlement's costs led to considerable downward revisions in the Western Region. In 1964, a new type of form of farm organization, the "integrated rural development" scheme was inaugurated at a proposed cost of only ^{£ 2,520} £900 per settler.^{45/} The scheme was under the Ministry of Economic Planning in Western Region. It is essentially the same as the farm settlement scheme, but the settlers do not receive formal training in the Farm Institutes, the acreage

^{45/} Western Region Official Document, No. 8, (1963), pp. 1-4.

per farmer is less relative to that of the farm settlement scheme, and the government does not undertake to build individual houses for the settlers.^{46/}

Also in 1964, the Community Development Division of the Midwestern Nigerian Ministry of Economic Planning started another form of farm organization, "the school leavers' farm". The "school leavers' farms" is a peripheral type of settlement in that it takes place in and around an existing village. This is in contrast to the nuclear type of farm settlement where the settlement takes place in a new area where a new village has to be established.

The "school leavers' farms" are set up in a small, compact rural community consisting of a few participating villages. The villages give a piece of land, free of all charges, as their contribution to the project. This is again in contrast to the farm settlement scheme where thousands of pounds are paid by the government for land acquisition and crop compensation. The suitability of the land is determined by the staff of the Ministry of Agriculture on behalf of the Community Development

^{46/}The "integrated rural development" scheme has now been transferred to the Ministry of Agriculture and Natural Resources in the West. Also, government now plans to build houses for the settlers.

Division. In return, the Community Development officials working in cooperation with the representatives of the villages select 40 school leavers from the villages. Here again, one needs to contrast this selection approach with that of the farm settlement scheme where only the officials of the Ministry concerned select the boys to go to the farm settlements. The land is shared among the boys so that each gets a holding of 15 acres. The farmers are trained on-the-job and are guided, with the assistance of the agricultural extension staff in the area by a Rural Development Organizer who himself has been trained for the job. The on-the-job training approach of the "school leavers' farms" contrasts with the formal training for two years at the Farm Institutes in the farm settlement scheme.

Unlike the farm settlement scheme, no houses are built for the farmers in the "school leavers' farms". Instead, they live in their community and go back and forth from their community to their farms which are usually between two to four miles from their homes.

The farmers assume responsibility for establishing and maintaining their farms when they join the the scheme. The Community Development Division provides a small loan on a short-term basis for the boys to purchase seeds, fertilizer,

and tools. In order to enlist continuous community support and goodwill, the project is overseen by a "Block Council" consisting of the elders and other village representatives.

Summary

Export agriculture was the mainspring of development in Nigeria from 1900-1960. Unlike the Belgian Congo and the Dutch Indies where European capital and entrepreneurship played a significant role in direct production in agriculture, in Nigeria, the private indigenous farmer was the dominant factor in agricultural production. The major source of growth was from opening new land and using more labour by foregoing leisure to produce cocoa, rubber, oilpalm, groundnuts and cotton which have been the main sources of Nigeria's revenue. Although the colonial government restricted its role mainly to that of trading, substantial increases in output from cocoa, rubber, and oilpalm have been attributed to its research and extension programs. Finally, the laissez-faire system was partially modified when marketing boards were introduced in 1949 to control the foreign sale of all major export crops in Nigeria except rubber.

As Nicholls pointed out, it is important to examine the economic history of a country carefully before planning future

economic development.^{47/} In the same way, it is hoped that the analysis of Nigeria's past development given in this chapter will enable future planners to gain from past experience and provide them with a benchmark with which to assess future development.

^{47/}William H. Nicholls, "The Place of Agriculture in Economic Development", Agriculture in Economic Development, Carl Eicher and L. W. Witt (eds.), (New York: McGraw-Hill, 1968), pp. 11-44.

CHAPTER III

METHOD OF ANALYSIS

A. Introduction

Farm settlements and school leavers' farms are different forms of farm organizations with the same primary objective of increasing agricultural productivity in Western and Midwestern Nigeria. To compare the performance of agricultural production in these different forms of farm organizations, data were collected in Nigeria in late 1966 and early 1967 on (1) social-psychological characteristics of the farmers, (2) food crop production, and (3) tree crop production. The purpose of this chapter is to present the analytical framework and a brief discussion of data collection in order to outline how the performance of agricultural production in the different forms of farm organizations will be evaluated.

Chapter four is devoted to the social-psychological characteristics of the farmers. In Chapter four, how different management practices can affect the social-psychological characteristics of each farmer and their consequences on organizational effectiveness are analyzed. Chapter five is concerned with gross-margin analysis of food crop

production. The efficiency of food crop production in the different types of farm organizations is evaluated in this chapter. Finally, in Chapter six, the internal rate of return on investment in tree crop production is used as a measure of efficiency of tree crop production in the different forms of farm organizations.

B. Analyses for the Farm Settlements' and School Leavers' Farms and Farmers

1. Social-Psychological Analysis of the Farmers

The social-psychological variables discussed in this section are those which have been selected to provide information about the general disposition and morale of farmers in the different farm organizations.

a. Attitude Toward Change: There is need for an individual to change in terms of his values, motivations and orientation to his life situations. McClelland contends that high need achievement which is indicative of an individual's desire for occupational excellence is associated with his more rapid economic development.^{1/}

^{1/} David McClelland, National Character and Economic Growth in Turkey and Iran, in Lucion W. Pye (ed.), Communication and Political Development, (Princeton: Princeton University Press, 1963). For a comparison of achievement motivation among major tribal groupings in Nigeria see Robert Levine, Dreams and Deeds, Achievement Motivation in Nigeria, (Chicago: University of Chicago Press, 1966).

Fundamental changes are required in the cognitive processes of the individual, especially in respect to those which serve to hamper the acceptance of new ideas.

b. Satisfaction: The degree to which an individual's expectations are fulfilled by his actualities is an important measure of the individual's level of satisfaction. Lerner,^{2/} in 1958, measured satisfaction by posing a direct question asking the degree to which his Middle East respondents were satisfied with their level of living. A similar question has been used as a measure of satisfaction by Stickley^{3/} with Columbian farmers.

In this study, as explained in the questionnaire in the Appendix, a ladder scale is used to measure the level of satisfaction of the farmers. To the extent that living conditions five years ago are rated more highly by the farmer than present conditions, dissatisfaction would result. In

^{2/} Daniel Lerner, The Passing of Traditional Society: Modernizing the Middle East, (New York: Free Press, 1958).

^{3/} Thomas S. Stickley, Socio-economic Correlates of Levels of Living Among Farmers in Three Columbian Neighborhoods, (Unpublished M.S. Thesis, Columbus: Ohio State University, 1964).

addition to being able to note the "direction" of responses, one is able to assign magnitude to the difference. Conversely, when present conditions are rated higher than past conditions, satisfaction is likely to be the result. To the extent that a farmer feels he is making some progress, a certain degree of satisfaction should result.

c. Fatalism: Fatalism was defined by Arensberg and Niehoff^{4/} as the belief that the events in one's life are pre-ordained and little can be done to alter such events. Rogers defined fatalism as "a passive view of the world implying the feeling that an individual's efforts cannot determine his future."^{5/} Fatalism reflects a negative view of reality and is often invoked to explain misfortunes. Niehoff and Anderson suggest three types of fatalism:

1. Supernatural, including (a) theological patterns of belief that stem from the theology of the traditional culture; and (b) magical patterns of supernatural belief which stress the manipulation of everyday affairs rather than ethical, cosmological, or theological concepts.

^{4/} Conrad M. Arensberg and Arthur M. Niehoff, Introducing Social Change (Chicago: Aldine Publishing Company, 1964).

^{5/} Everett M. Rogers. "Motivations, Values and Attitudes of Subsistence Farmers: Towards a Subculture of Peasantry." Paper presented at the Agricultural Development Council's Conference on Subsistence and Peasant Economics, (Honolulu, Hawaii: East West Center, University of Hawaii, 1965).

2. Situational apathy which arises from a real understanding of limited possibilities for improvement, usually economic in nature.
3. Project negativism, which is apathy toward development projects based on previous project failures.^{6/}

d. Preference for Risk-Taking: The concepts of risk and uncertainty within the context of economic decision-making were originally formulated by Knight. Knight made the distinction between three stages of knowledge. First, under static situations when there is perfect knowledge and foresight, there is certainty about knowledge. Within the less certain situation of dynamics, however, that is, when the static assumptions of perfect knowledge and foresight are relaxed, there are two knowledge situations: a situation in which the knowledge of probability distribution is complete enough to set up insurance schemes (risk) and a situation in which knowledge of probability distribution is not complete enough to set up insurance schemes (uncertainty).^{7/} Hardy

^{6/} Arthur H. Niehoff and Arnold J. Anderson, Peasant Fatalism and Socio-economic Innovation, (Washington: Human Resources Research Office, George Washington University, 1965).

^{7/} Frank H. Knight, Risk, Uncertainty and Profit, (New York: Houghton Mifflin, 1921), pp. 233-34.

maintained that it appears probable that the cases of risk (statistical probability) and the cases of true uncertainty differ only in the amount of information an individual has to deal with the cases he has on hand, the length of time necessary to accumulate a length of cases big enough to establish a statistical frequency and the fineness of the classification the individual is using.^{8/} Pointing out the nature of previous other distinctions between risk and uncertainty, Hart wrote some had written that "The difference between risk and uncertainty is that a probability distribution exists in the case of risk, while a probability distribution of probability distributions exists in the case of uncertainty."^{9/} Hart pointed out, however, that in the case of uncertainty, it would be possible to obtain a single probability distribution from the series of probability distributions, but this would be unprofitable under certain conditions.

^{8/} C. O. Hardy, Risk and Risk Bearing, (Chicago: University of Chicago Press, 1923), p. 54. See also A Study of Managerial Processes of Midwestern Farmers, Glenn L. Johnson, et. al. (eds.) (Ames, Iowa: The Iowa State University Press, 1961), pp. 41-54.

^{9/} A. G. Hart, "Risk, Uncertainty, and the Unprofitability of Compounding Probabilities", Readings in the Theory of Income Distribution, (Philadelphia: The Blakeston Company, 1946), pp. 547-57.

The distinction between risk and uncertainty was brought out clearly by Johnson and colleagues who divided the knowledge situation into five categories: (1) subjective certainty, in which a manager regards his information as so good that he does not need to take precautions against being wrong; (2) risk in which specifications for a choice or an estimate are met, that is, a situation in which the manager regards his present knowledge as adequate for making decisions and in which the cost of additional knowledge is exactly equal to its value. Risk may exist with respect to either positive or negative decisions; (3) inaction, in which specifications for a choice are not met but in which the individual is neither willing to act nor to learn because the cost of additional knowledge is greater than its value; (4) forced actions, in which specifications for a choice are not met but the individual is forced to act by an outside force; (5) learning, in which specifications for a choice are not met but the individual is willing to learn because the cost of additional information is less than its value. Forced learning may be regarded as the sixth category of knowledge situation. This is a situation in which an individual thinks he knows enough to make a decision but an outside force compels him to learn more.^{10/}

^{10/} Glenn L. Johnson and Curtis F. Lard, "Knowledge Situations", A Study of Managerial Processes of Midwestern Farmers, Glenn L. Johnson et. al. (eds.), (Ames, Iowa: The Iowa State University Press, 1961), pp. 41-54.

While in both risk and uncertainty the occurrence of a given outcome is not known, in risk situations, the probability of each alternative is known. In risk situations, when an individual insures, he prefers to take a certain small loss in his income in preference to the small chance of a large loss. This is because the utility of expected income of the individual is greater than the expected utility. When an individual gambles, the utility of the expected income is less than the expected utility. People with a high degree of achievement motivation often fall almost uniformly in between wild speculative gamble and conservative approach towards risk. Such people like to incur a moderate degree of risk which is big enough to offer some excitement and the hope of a worthwhile gain, but not so big that their own efforts would have less of an influence on the outcome than sheer luck. The extremes of risk-taking are likely to be favored by persons whose achievement drives are rather weak. Some of them will choose the big risk, apparently because the outcome is so far beyond their power to influence that there is no reason to feel any sense of personal responsibility for what happens. They can chalk their losses up to hard luck and credit their gains to their shrewdness. Others may habitually choose tiny

risks where the gains are small but secure, perhaps because their exposure to blame for things that go wrong is very small indeed.^{11/}

In a highly centralized administrative system where workers merely take instructions and in which workers have very little knowledge about the organization of the productive activities, individual decision-making among the workers is generally poorly handled. They do not generally possess enough information to evaluate the cost and the value of additional information. Because such workers live in a situation of uncertainty in which knowledge of probability distribution is not complete enough to make reasonable decisions, they lack the ability to know when it is wise to take risk. When they make decisions, they often choose the wild speculative gamble or take a conservative approach towards risk. Such individuals generally miss their high profit points as they often fail to take a chance of a worthwhile gain and often fail to avoid a probable loss.

In an organization where there is more reliance on individual workers and where workers have knowledge of the

^{11/} For more discussions on risk-taking, see Arnold J. Toynbee, A Study of History, (New York: Oxford University Press, 1947), pp. 140-160.

organization of their productive activities, decision-making is generally properly handled by the workers. Because these workers live in a situation in which the knowledge of probability distribution is complete enough to make reasonable decisions, they are able to evaluate the cost and the value of an additional information to know when it is wise to take risk. Such workers often fall within wild speculative gamble and conservative approach towards risk. They generally operate close to their high profit points, taking moderate degree of risk which will enable them to take an opportunity of a worthwhile gain and to avoid a probable loss.

e. Feeling of Powerlessness: The feeling of powerlessness is the perception that an individual's own behavior cannot effect the outcomes he desires. It is closely synonymous with helplessness. Most persons in less developed countries have generally been found to possess low levels of political efficacy, to distrust their government, and to feel helpless in influencing decisions because their opinions are hardly ever sought.^{12/} One of the central themes of most community

^{12/} Arthur H. Niehoff, op. cit. Niehoff discusses the effect of having a feeling of powerlessness among his Middle East respondents.

development programs is that villagers, by working together with appropriate technical assistance and government financial support, can successfully solve many of their local problems. The prevalent feeling of powerlessness among these villagers could act as a powerful deterrent to these self-help programs of community development.

f. Group Loyalty: Since the work group is one in which people are particularly eager to achieve and maintain a sense of personal worth, most persons are highly motivated to behave in ways consistent with the goals and values of their work group in order to obtain recognition, support, security and favorable reactions from this group. It is likely, therefore, that management will make the full use of the potential capacities of its human resources when each person in an organization is a member of one or more effectively functioning work groups that have a high degree of group loyalty, effective skills of interaction, and high performance goals. Mann demonstrated that increased use of group meetings dealing with attitudes, perceptions, communication, and motivation of workers improved the performance of workers in a number of agricultural establishments.^{13/} Since the power of group motivational

^{13/} F. C. Mann, "Studying and Creating Change: A Means to Understanding Social Organizations". (New York: Industrial Research Association, 1957), pp. 146-167.

forces can be used both to the advantage and disadvantage of organizational goals, attempts can be made to focus these forces on achieving organizational objectives.^{14/}

g. Level of Participation: It is usual for any organization to produce goods and services to meet the current needs of its population, as well as those wants represented by the rising level of expectations. This requires organizational productivity. Yet, it would seem to be a well-established principle that the productivity of any organization has a relationship to the extent to which the individuals in the total work force have the incentive to produce. Giving a worker an opportunity to participate in the decisions which affect him is one such incentive. Wickert, for example, studied employee turnover and feelings of ego-involvement in the day-to-day operations of telephone operators and female service representatives in the Michigan Bell Telephone Company. The principal finding was that those who stayed with the company had a greater feeling of involvement in the day-to-day operations of the company than those who left.^{15/} This desire

^{14/} Robert L. Kahn, "The Prediction of Productivity". Journal of Social Issues, 12: 41-59 (1956), p. 44.

^{15/} F. R. Wickert, "Turnover and Employee's Feeling of Ego-Involvement", Personnel Psychology, pp. 185-197.

for feeling of involvement is not peculiar to industrial situations nor to persons in the developed countries of the world; it is common in farming situations both in the developed and in the less-developed nations. Rice, for instance, found that the steady state of output in an Indian farming estate was markedly and significantly higher after the farmers reorganized the work themselves. Also, the amount of wastage and damage was considerably reduced.^{16/} The appropriate extent to which management allows its workers' participation is very crucial. An optimal rather than a maximal level of participation of the worker in decision-making will likely be more desirable. The main objective is to allow a two-way communication for efficient performance.

h. Techniques of Analysis: Tabular analysis was used to compare the social-psychological characteristics of the farmers in the different farm organizations. With respect to the attitudinal variables designed to measure the level of satisfaction of the farmers, tests of significance were performed

^{16/} R. K. Rice, Productivity and Social Organization, (London: Tavistock Publication, 1958).

to determine whether there is any significant difference among the different farm organizations with respect to general disposition and morale of the farmers.

2. Gross-Margin Analysis of Food Crop Production

Now that the social-psychological variables which are used to measure the general disposition and morale of the farmers in Chapter four have been examined, let us discuss gross-margin analysis which will be used to measure the efficiency of food crop production in Chapter five.

a. Definition of gross-margin: Gross margin is defined as the return to the farmer for all factors of production (land, labor, capital and management) which he employs. It is also the net accounting profit plus home consumption. Arithmetically, $\text{Gross-margin} = (\text{Total sales plus home consumption}) \text{ minus } (\text{Total Variable Costs of Production})$.

Gross-margin per two acres of food crops per farmer is used as a measure of efficiency of food crop production in this study.

b. Techniques of Analysis: Multiple regression techniques are used to analyze the factors affecting the gross-margin of the farmers. The type of regression model which is used for this analysis is as follows:

$$GM = b_0 + \sum_{i=1}^3 b_i x_i + \sum_{i=4}^6 b_i x_i + \sum_{i=7}^{12} b_i x_i + U$$

Where: GM = gross margin per two acres of food crops.

X_1, X_2, X_3 = economic variables

$X_4, \dots, X_6$ = Dummy variables representing social-psychological variables.

$X_7, \dots, X_{12}$ = Dummy variables representing types of farm organizations.

U = The unexplained Residual.

X_1 = Hired labor, X_2 = Tools, X_3 = Other costs, X_4 = Preference for risk-taking, X_5 = Feeling of powerlessness, X_6 = Level of participation, X_7 = Ilora farm settlement, X_8 = Imariwo farm settlement, X_9 = Okitipupa farm settlement, X_{10} = Mbiri farm settlement, X_{11} = Igieduma school leavers' farm, X_{12} = Ushie school leavers' farm.

The multiple regression technique considers the relationship of each independent variable (1) to the dependent variable, and (2) to each other independent variable, in explaining the variation in the dependent variable. Thus, multiple regression allows the researcher to determine the separate effects of the independent variables upon the dependent variable. Multiple regression analysis is recommended by Ward because it "not only

reduces the dangers inherent in piece-meal research but also facilitates the investigation of broad problems never before considered researchable."^{17/}

3. Internal Rates of Return on Investments in Tree Crops

Having discussed the analysis of food crop production in these farm organizations, let us focus on how to analyze efficiency of tree crop production in these organizations. Analysis of investment choices can be partially made on the basis of the expected rate of return on investment. In both the Farm Settlements and the School Leavers' Farms investments in tree crops -- cocoa, rubber and oilpalm -- are important. To analyze the efficiency of tree crop production in these different farm organizations, internal rates of return on investment in tree crops are calculated.

a. Definition of Internal rate of return: "The 'yield' of a project is its internal rate of return, i.e., the rate of discount which makes the present value of the project's receipt stream equal to the present value of its cost stream; in other words, the rate of discount which makes the present worth zero."

^{17/} J. H. Ward Jr., Multiple linear regression models, in H. Borke (ed.), Computer Applications in the Behavioral Science, (Englewood Cliffs, N.J.: 1962), p. 206.

Mathematically, the internal rate of return is given by:

$$0 = -c_1 + \frac{b_1 - c_2}{(1+r)} + \frac{b_2 - c_3}{(1+r)^2} + \dots + \frac{b_n}{(1+r)^n} \quad \text{18/}$$

where: $c_1, c_2, c_3, \dots, c_n$ = series of prospective costs
in years 1, 2, 3, ..., n

$b_1, b_2, b_3, \dots, b_n$ = series of prospective returns
in years 1, 2, 3, ..., n

r = internal rate of return.

b. Technique of Analysis:

Tabular analysis is used to show the variations in the social-overhead costs among the different forms of farm organizations. In this study, social-overhead costs are not directly involved in the productive process. Such costs include costs of housing, costs of formal training of the participants, personnel and administrative expenses, costs of establishing water supply and light and medical supplies.

Internal rates of return on investment in tree crop production to farmers and to the government are calculated

^{18/} This equation eliminates the assumption that both costs and returns occur at the same time. A situation which could give rise to meaningless results as explained in chapter six of this thesis.

first, without including the social-overhead costs and secondly, with the social-overhead costs and compared with different discount rates. The difference between the two internal rates of return indicates the change in the profitability of the project due to social-overhead costs. It thus helps to assess the magnitude of indirect benefits which the form of organization employed will need to generate to justify the investment in social-overhead costs. The internal rate of return to the private farmer is calculated using producer prices. The internal rate of return to the economy as a whole is calculated using world market prices. This is to provide information on the profitability of investment in tree crop production from the point of view of both private and public investment. Finally, the following section is devoted to a brief discussion of the sources of data and method of data collection used in this study.

C. Data Collection

1. Sources of Data

To measure the performance of these different forms of farm organizations, primary data were collected in Nigeria. The data on social-overhead costs were obtained from the records in the farm settlements and the school leavers' farms and from the official records at the headquarters of these farm organizations.

In order to obtain information on the social-psychological characteristics of the farmers and on the efficiency of food crop production, a questionnaire format was used to interview 180 participants in the farm settlements and the school leavers' farms.

With respect to internal rates of return on tree crop production, data used were obtained from the farm organizations and from assumptions of yields, and product prices. On the cost side, data used are based on actual expenditures on tree crop production in the farm settlements and school leaver farms up to 1966. These data were collected from the farm records and from the official records at the headquarters of the farm organizations. FAO cost assumptions on farm settlements were then used from 1967 to the end of the economic life of the tree crops. To obtain data on direct benefits from the tree crops, the yearly receipts to the tree crops were obtained on an ex ante basis and they show what a potential buyer could pay given various assumptions of yields and product prices.

2. The Questionnaire (see Appendix C)

The first part of the questionnaire is concerned with the social-psychological characteristics of the farmers. It attempts to elicit the form of management practices in each

organization. In addition, it is intended to provide personal information about age, education, marital status, number of children, and religion. The second part of the questionnaire is designed to provide information on food crop production; such information includes total variable costs of production, number of acres of food crop, types of crops, total sales, and value of food crops produced on the farm that were either stored for further use or consumed at home.

3. Pre-test

Forty-four farmers were selected randomly from one farm settlement and one school leavers' farm to pre-test the questionnaire. After analyzing the results of the pre-test, the questionnaire was modified. The farm settlement and the school leavers' farms from where farmers were chosen for pre-tests were eliminated from the main survey for this study to avoid bias in the responses.

4. Training the Interviewers

Although the six interviewers selected out of a total number of thirty had research experience in the Nigerian Institute of Social and Economic Research at Ibadan, all interviewers were given special training on how to conduct interviews.

5. Interviews:

180 participants were interviewed from the farm settlements and the school leavers' farms. The six interviewers and the researcher interviewed from one place to the other, spending two days in each farm organization. At the end of each day's work, the data were checked in case there might be need to go back for a recount.

6. Sampling Method:

In selecting a representative sample among the Farm Settlements and the School Leavers' Farms, important consideration was given to tree crop production which forms the major investment in these farm organizations. Two farm organizations with rubber-oilpalm production were selected from each of these two forms of farm organizations. Since cocoa is an important crop in Western Nigeria, one farm organization with cocoa as its main crop was chosen from Western Nigeria. In using these criteria, careful consideration was given to factors such as soil and weather conditions in order that permissible generalizations could be made about such factors. 180 farmers interviewed were selected randomly from the lists of names obtained from the headquarters of the different farm organizations.

D. Summary

In this chapter, the methodology which is used in three subsequent chapters (four, five and six) to analyze the performance of agricultural production in the farm settlements and the school leavers' farms has been presented. Let us now turn to the analysis of the social-psychological characteristics of the farmers which is presented in chapter four of this study.

CHAPTER IV

SOCIAL-PSYCHOLOGICAL CHARACTERISTICS OF THE FARMERS IN THE FARM SETTLEMENTS AND THE SCHOOL LEAVERS' FARMS IN 1966

Introduction

This chapter is concerned with the analysis of the social-psychological characteristics of the farmers in the different farm organizations. Attention focuses on how management practices in the farm settlements and the school leavers' farms can affect the general dispositions and morale of the farmers. The effect of such management practices on organizational performance is analyzed.

The Concept of Organizational Performance

An organization such as a farm settlement or a school leaver's farm can be viewed as a system. The management practices in an organization impose or specify certain activities and interactions for the people involved in the organization. Organizational performance is defined as the capacity of that organization to survive, adapt, maintain itself, and grow, regardless of the particular functions it fulfills. In his definition of organizational performance, Bennis notes that:

"If we view organizations as adaptive, problem-solving, organic structures, then inferences about performance have to be made....on the basis of the processes through which the organization approaches problems. In other words, no single measurement of organizational efficiency can provide valid indications of organizational health."^{1/}

There are various management practices which will make one organization more effective than the other in developing and using normative and non-normative concepts to define and solve problems. Such management practices change the inputs, affect the timing and the application of the inputs. Giving the workers an opportunity to participate in decisions about their own welfare and working circumstances is one management practice which can make one organization more effective than the other.

Any organization which expects its members to be committed, flexible, and in good communication with one another for the sake of overall organizational performance, is in effect asking them to be morally involved in the organization and to be committed to organizational goals. If the organization expects them to be involved to this degree, the organization

^{1/} W. G. Bennis, "Toward a 'truly' Scientific Management, the Concept of Organizational Health". General Systems Yearbook, (1962), 7, pp. 269-282.

must for its part, through its management practices, provide rewards and conditions consistent with such involvement. It cannot merely pay more money to obtain commitment, creativity, and flexibility; there must be the possibility of obtaining non-monetary rewards such as autonomy, genuine responsibility, a feeling of ownership, opportunities for challenge and for psychological growth.

Method of Analysis:

The social-psychological variables employed in this study are those which have been defined in chapter three. To obtain information on the social-psychological characteristics of the farmers, 180 farmers were interviewed from four farm settlements and two school leavers' farms using a questionnaire format designed for this purpose. (See Appendix). The questionnaire was precoded to facilitate analysis.

From the lists of names obtained from the respective headquarters of these six farm settlement organizations, thirty farmers were selected randomly from each of the six farm organizations. The six enumerators and the researcher travelled from one farm organization to another interviewing the farmers individually, sometimes on their farms, and sometimes in their homes. About two to three days were spent in each farm

organization to finish the interviews. Each enumerator was assigned a number which he retained throughout the period of the survey. The enumerator wrote this number on the top of each questionnaire he used. This was to facilitate checking in case of errors. Each enumerator was assigned a certain number of farmers whom he interviewed in each farm organization surveyed. The enumerator then paid visits to the farms and houses of these farmers until he interviewed all of them. Fortunately, due to the cooperation of the farmers, all those chosen randomly were interviewed; thus, there was no need for substitution.

Apart from taking part in interviewing the farmers, the researcher discussed the organization of the farmers with the officers on the farms and also supervised the enumerators. At the end of each day's work, all the questionnaires used were checked to determine if it was necessary to return to the field to verify or obtain further information. After checking, the codes marked by the enumerators as responses given by the farmers were recorded in their appropriate columns. The same procedure was carried out in all the six farm organizations surveyed.

When all the 180 farmers selected had been interviewed, the responses which were recorded in their appropriate columns were, first, scored on a special scoring sheet; they were then

transferred to punched cards. Punched cards were used for analysis purposes in order that the data could be analyzed by the CDC 3600 computer at Michigan State University.

Two frequency column count programs designated as FCC I and FCC II were used.^{2/} These programs were utilized in tabulating the frequency distributions for every variable used. This proved to be a very useful step in analyzing the social-psychological characteristics of the participants and in gaining a "clinical feel" of the data.

The items in the questionnaire were coded in such a way that higher scores in each item represents favorability of response while lower scores represents unfavorability of response within the context of this study. On this basis, the total score by each farmer on each variable was obtained. This enabled a classification to be made between the number of favorable responses and those of unfavorable responses. This analysis proved to be useful in identifying those variables which did not "discriminate" among the farmers irrespective of their form of farm organizations. Variables in which over

^{2/} J. Clark, Manual of Computer Programs. Research Services, Department of Communication, Michigan State University, 1964 (mimeo).

90 percent of all the farmers gave the same type of response were classified as "non-discriminating" variables. Table 4 shows the distribution of responses of the "non-discriminating" variables between the farm organizations. A total score of more than 50 percent on each variable by a farmer was regarded as a favorable response in that variable, and a total score of less than 50 percent as unfavorable.

Table 5 shows the distribution of responses from those variables which "discriminate" among the farmers with respect to the form of farm organizations to which they belong. To determine unfavorable preferences for risk-taking, the farmers who preferred either wild speculative gambling or no risk-taking at all were regarded as having unfavorable preference for risk-taking. The farmers who fell between these two extremes of risk-taking, i.e., those who preferred to incur a moderate degree of risk, were regarded as those who had favorable preference for risk-taking (see Appendix C Questionnaire, No. 18).

With respect to the variable on feeling of powerlessness, any farmer who had a score which is greater than 50 percent of the total score in the items on the variable was regarded as one who had no feeling of powerlessness--this was regarded as a favorable response. An unfavorable response, means that

Table 4. A. Distribution of Number of Responses From Three Social-psychological Variables in the Farm Settlements and School Leavers' Farms in 1966

Farm Organizations	Fatalism		Attitude Towards Change		Group Loyalty	
	Fatalistic Attitude	Non-fatalistic Attitude	Favorable Attitude towards Change	Unfavorable Attitude towards Change	Reported Awareness of Group Loyalty	Reported Unawareness of Group Loyalty
1	5	25	30	0	30	0
2	3	27	28	2	30	0
3	1	29	29	1	30	0
4	4	26	27	3	30	0
5	2	28	28	2	30	0
6	1	29	28	2	30	0

B. Percentage Distribution of Total Responses

Variables	Favorable Response	Unfavorable Response
Fatalism	91.1	8.9
Attitude Towards Change	94.4	5.6
Group Loyalty	100.0	0.0

Table 5. A. Distribution of Responses -- "Discriminating" Social-psychological Variables in the Farm Settlements and School Leavers' Farms in 1966

Farm Organi- zations	Preference of		Feeling of		Level of		Report of	
	Risk-Taking		Powerlessness		Participation		Ownership	
	Good Prefer- ence	Poor Prefer- ence	Feeling of Power- lessness	No Feeling of Power- lessness	High Level of Partici- pation	Low Level of Partici- pation	Report as Owners	Report as Labor- ers
1	7	23	24	6	1	29	1	29
2	3	27	28	2	2	28	1	29
3	6	24	24	6	1	29	1	29
4	7	23	26	4	1	29	1	29
5	26	4	4	26	29	1	29	1
6	27	3	3	27	29	1	29	1

B. Percentage Distribution of Responses From "Discriminating" Variables Between Farm Settlements, i.e., 1, 2, 3, and 4 above, and School Leaver Farms, i.e., 5 and 6

Organi- zations	Preference of		Feeling of		Level of		Report of	
	Risk-Taking		Powerlessness		Participation		Ownership	
	Good Prefer- ence	Poor Prefer- ence	Feeling of Power- lessness	No Feeling of Power- lessness	High Level of Partici- pation	Low Level of Partici- pation	Report as Owners	Report as Labor- ers
Farm Settle- ments	19.17	80.83	85.00	15.00	4.17	95.83	3.33	96.67
School Leaver Farms	88.33	11.67	11.67	88.33	96.67	3.33	96.67	3.33

a feeling of powerlessness is recorded when a farmer scores below 50 percent of the total score (see Questionnaire, No. 20).

The level of participation of a farmer in an organization was determined by asking whether he hired the laborers who work on his farm himself or someone hired them for him, whether he in fact knew how much the laborers earned daily for working on his farm. The farmer was also asked whether he knew how much he owed the government for the farm and the house he owned. He was also asked whether he sold the products from his farm himself or whether the government undertook that responsibility for him. Finally, the farmer was asked if the resident officers on the farm often sought his opinion in matters concerning the operations of his farm. A score of less than 50 percent in all the questions on this variable was regarded as a low level of participation of the farmer, and this meant an unfavorable response.

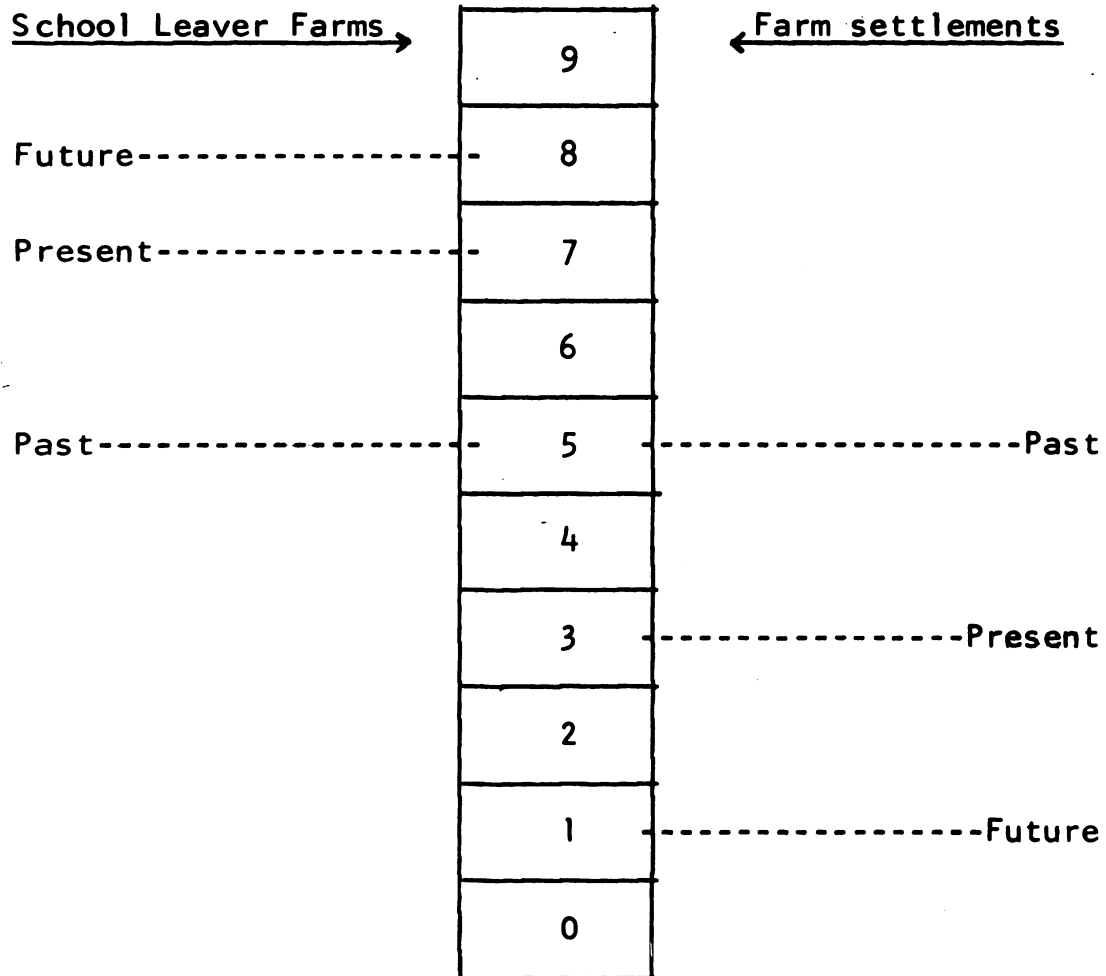
To determine whether the farmers had a feeling of ownership and a sense of commitment in the organization, they were asked questions to determine if they regarded themselves as owner-operators of the farms, or as laborers working for the government. (See Questionnaire No. 25). The score for each farmer in these questions was used to determine whether he regarded himself as an owner-operator or as a government laborer. A score

of more than 50 percent of the total score in this variable was regarded as a favorable response, and this meant that the farmer regarded himself as a government laborer (Questionnaire No. 25).

To determine if a farmer thought he had made some progress since he started in the farm organization, and also to determine whether the farmer thought he would continue to make progress should he remain in the organization, four additional questions were asked to know how satisfied the farmer is (a) with his level of living, (b) with the organization, (c) with his personal security, and (d) with his income. In each of these four predictors, the farmer's idea of his past, his present, and his future conditions was compared (Questionnaire No. 17). In this analysis, importance is attached to the direction and magnitude of change between one time period and another (see Diagram 1). In order to determine whether there was any difference in the direction and magnitude of change in the attitude of the farmers between the different farm organization, it was necessary to show that all the farmers rated their level of satisfaction equally when they first started in the farm organizations. On this basis, it was possible to discover that all the farmers were the same when they first started in the

DIAGRAM 1

LADDER: RESPONSES FROM ATTITUDINAL
VARIABLES ON LEVEL OF SATISFACTION



farm organizations, but a few years later, i.e., at the time of this study, there were significant differences between these farm organizations with respect to the attitude of the farmers. Furthermore, it was possible to find out whether the differences would increase or decrease in the future. F statistic was used for this analysis.

The responses from all the social-psychological variables were tabulated to analyze the social-psychological characteristics of the farmers in the six farm organizations. Comparative analysis was facilitated because an equal sample size of thirty farmers from each farm organization was chosen. The variables which did not "discriminate" between the farm organizations, i.e., the variables in which over 90 percent of the farmers interviewed gave the same response, were analyzed first. Then the variables in which there were differences in responses between the farm organizations were analyzed. Because the recorded differences between the farm organizations were highly significant, testing for statistical significance was unnecessary since it was not likely to improve results. However, with respect to the responses from the attitudinal variable designed to measure the level of satisfaction of the farmers, F statistic was used to test the following three hypotheses:

(1) That all the farmers rated the farm organizations and their own level of satisfaction differently when they first began their career in these farm organizations.

(2) That all the farmers rated the farm organizations and their own level of satisfaction differently at the time this study was carried out--i.e., at least two years after the farmers had been in the farm organizations.

(3) That all the farmers rated the farm organization and their own level of satisfaction differently with respect to the future.

Even though differences between two means are usually tested by the t statistic, for convenience of computer programming, and because differences between more than two means are being tested, F statistic was used to test mean differences between the responses in the farm organizations. Comparisons of F and t statistics have shown that the results are the same.^{3/} If an F between group means was significant, inspection of the size of the means indicated which one was the highest and consequently the main contributor to the differences reflected in the F ratio. A significant overall F leads to non-rejection of the hypothesis being tested. In this study, a significant level of 0.01 in any of the three hypotheses was chosen to mean non-rejection of that particular hypothesis. A significant level

^{3/} A. L. Edwards, Experimental Design in Psychological Research, (New York: Holt, Rinehart and Winston, 1965), p. 146.

greater than 0.01 in any hypothesis therefore means a rejection of that hypothesis, and this means that the farmers rated the organizations and their own level of satisfaction equally at the time corresponding to that of the hypothesis being rejected. A larger F ratio in one of the two instances when the farmers rated the organizations and their own level of satisfaction differently, i.e., when the null hypothesis was accepted, was chosen to indicate that the farmers are more different in this rating relative to that with small F ratio (see Table 6). F statistic was used to test these three hypotheses within each farm organization and then with all the six farm organizations together. The behavior of the responses tabulated and the results of the statistical analysis were used to obtain a meaningful explanation of the general disposition and morale of the farmers in the different farm organizations.

Results and Discussions

Table 4 shows the distribution of responses from three social-psychological variables--Fatalism, Attitude towards change, and Group loyalty. The distribution of these responses does not follow any specific pattern that shows any differences between the farm organizations. Among all the farmers interviewed,

Table 6. Results of F Statistics on Attitudinal Variables in the Farm Settlement and School Leavers' Farms in 1966

A. F Statistic -- Satisfaction With Level of Living

Time	Significant Levels	<u>F</u> Ratios
Past	0.82	0.48
Present	0.01	189.40
Future	0.01	398.97

B. F Statistic -- Satisfaction With Organization

Time	Significant Levels	<u>F</u> Ratios
Past	0.56	1.19
Present	0.01	157.56
Future	0.01	375.09

C. F Statistic -- Satisfaction With Personal Security

Time	Significant Levels	<u>F</u> Ratios
Past	0.31	1.63
Present	0.01	158.99
Future	0.01	320.66

D. F Statistic -- Satisfaction With Income

Time	Significant Levels	<u>F</u> Ratios
Past	0.44	1.64
Present	0.01	146.29
Future	0.01	358.56

94.4 percent have favorable attitudes toward change and appear receptive to new ideas which will increase their yields and improve their standard of living. Out of all the farmers interviewed, only 8.9 percent are fatalistic; the remaining 91.1 percent are not fatalistic. This also indicates that the farmers, irrespective of the form of farm organization to which they belong, are likely to be responsive to economic incentives.^{4/}

All the farmers interviewed in the farm organizations replied that they held meetings with fellow farmers in their farm organizations to discuss the general running of the organizations. Although the farmers in the farm settlement form of farm organization reported more meetings per annum on the average more than the farmers in the school leavers' farms form of farm organization, all the farmers had a sense of group loyalty.

They all reported willingness to conform to the rules and regulations of their "informal organizations". In these "informal organizations" fines are often imposed for non-conformity to the rules and regulations.

^{4/} Arthur H. Niehoff and Arnold J. Anderson, Peasant Fatalism and Socio-economic Innovation. (Chicago: Human Resources Research Office, George Washington University, 1965).

Even though there are no significant differences between the farm organizations with respect to the responses from group loyalty, discussions with the farmers revealed that the "informal organizations" have different objectives in different farm organizations. In the farm settlement form of farm organization, it appears that the power of the "informal organizations" is being used to destroy the objective of the entire organization. In their group meetings, the farmers often planned to sabotage the goal of the organization. The researcher accompanied Dr. C. Oyolu of the University of Nigeria, Nsukka, and two government officials of the Mid West Ministry of Agriculture to one farm settlement late in 1966. There the farmers told us that they decided in their last meeting to place their grievances before us. They also told us that they often meet to decide on what actions to take in the organization regardless of the instructions given to them by the resident officers in the organization. The farmers appeared to have unfavorable attitudes toward the farm settlement scheme, and this appears to explain why their group loyalty has an adverse effect on organizational performance.

There is substantial evidence, both from operating experience and from the more precise measurement obtained in

research projects, that work groups can have goals which will influence performance either favorably or adversely. In 1931, in the famous Western Electric Study, Mayo found that the goals of the "informal organization" in Western Electric often tended to restrict production, to increase absence, and in other ways to run counter to the general objectives of the organization.^{5/} In 1938, Whitehead found similar results in an agricultural enterprise.^{6/}

Similar private discussions held with the farmers in the school leavers' farms revealed that these farmers have favorable attitudes toward the scheme. They have used their group loyalty toward the progress of the scheme. These farmers often work together during the peak periods, and often choose who among them will work in fellow farmers' plots in case of illness.

The studies of the Tavistock Institute in England on the human factors affecting the productivity of coal miners provide evidence as to the importance of the work group.^{7/}

Table 5 (A) shows that the six farm organizations can be classified into two forms of farm organizations on the basis

^{5/}E. Mayo, The Human Problems in Organizations. (New York: Viking, 1931).

^{6/}T. W. Whitehead, The Industrial Worker, (Cambridge, Massachusetts: Harvard University, 1939).

^{7/}E. L. Trist and K. W. Bamforth, Some Social and Psychological Consequences of the Congwall Method of Coal-getting. Human Relations, (1961), 4 (1), pp. 3-38.

of the specific pattern taken by the distribution of responses in preference for risk-taking, feeling of powerlessness, level of participation, and report of ownership. Farm organizations one through four actually belong to the farm settlement form of farm organization, while farm organizations five and six belong to the school leavers' farms form of farm organization. In Table 5 (B), the percentage distribution of responses between these two forms of farm organizations is compared. Table 5 (B) also shows that the farmers in the school leavers' farms gave favorable responses in these four social-psychological variables while the farmers in the farm settlements gave unfavorable responses in these four variables.

Tables 6 A, B, C, and D show the results of F statistics for the three hypotheses already stated in the section on the method of analysis earlier in this chapter. These results show that one cannot accept the first hypothesis, but the second and third hypotheses can be accepted. Rejecting the first hypothesis therefore means that there are no significant differences among the farmers in all the farm organizations in their levels of satisfaction ratings when they first started in the farm organizations. By accepting the second and third hypotheses, there seem to be significant differences among the farmers in how they rated their levels of satisfaction with respect to the present and the future.

Table 7 shows the percentage distribution of responses in the four predictors measuring the level of satisfaction of the farmers. The specific pattern of this distribution shows that the farmers responded in the same way to all the four predictors. The inference from this is that the farmers believe that any progress they can make with respect to their level of living, their income, or with respect to their state of personal security is synonymous with the success of their respective farm organizations. The fact that there is no significant difference in the patterns of response from these four predictors provides an opportunity to give a unitary interpretation to them in analyzing the direction and the degree of change in the farmers' levels of satisfaction in the different farm organizations (see Table 7). This is shown in Diagram 2 as well.

Diagrams two and three show the significant differences in the direction and magnitude of change in the levels of satisfaction between the farmers in the farm settlements and those in the school leavers' farms. The averages of the actual numbers recorded during interviews were used in plotting the graphs.

Diagram 3 and the results of F statistics in Tables 6 A, B, C, and D show that the farmers in both the farm settlements and the school leavers' farms felt that they were the same with respect to their levels of satisfaction in all the four

Table 7. Attitudinal Variables: Numerical Distribution of Total Scores, by Farm Organizations

Farm Organizations	Present	Past	Future
A. Satisfaction With Level of Living			
1	37	144	17
2	41	152	19
3	57	143	31
4	63	148	36
5	187	143	252
6	193	148	254
B. Satisfaction With the Scheme's Progress			
1	32	140	11
2	55	132	22
3	56	134	32
4	71	148	34
5	184	135	251
6	193	145	263

Farm Organizations	Present	Past	Future
<u>C. Satisfaction With One's Personal Security</u>			
1	40	141	18
2	42	142	13
3	53	140	33
4	71	144	37
5	166	136	232
6	177	140	240
<u>D. Satisfaction With Income</u>			
1	46	138	13
2	35	131	7
3	45	124	16
4	56	124	33
5	151	120	223
6	156	133	230

Diagram 2

Comparison of the Six Farm Organizations
With Respect to the Level of Satisfaction of the Farmers

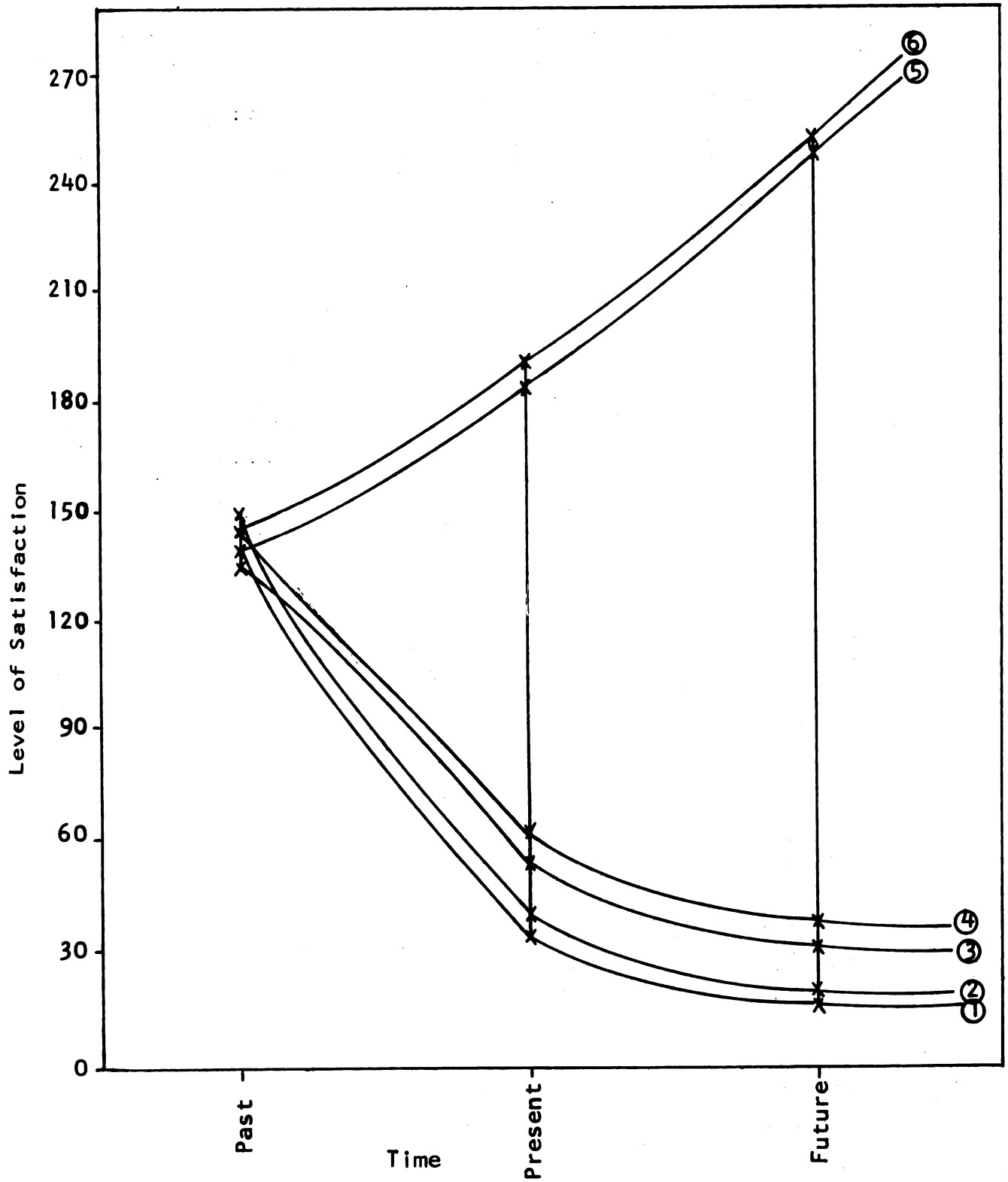
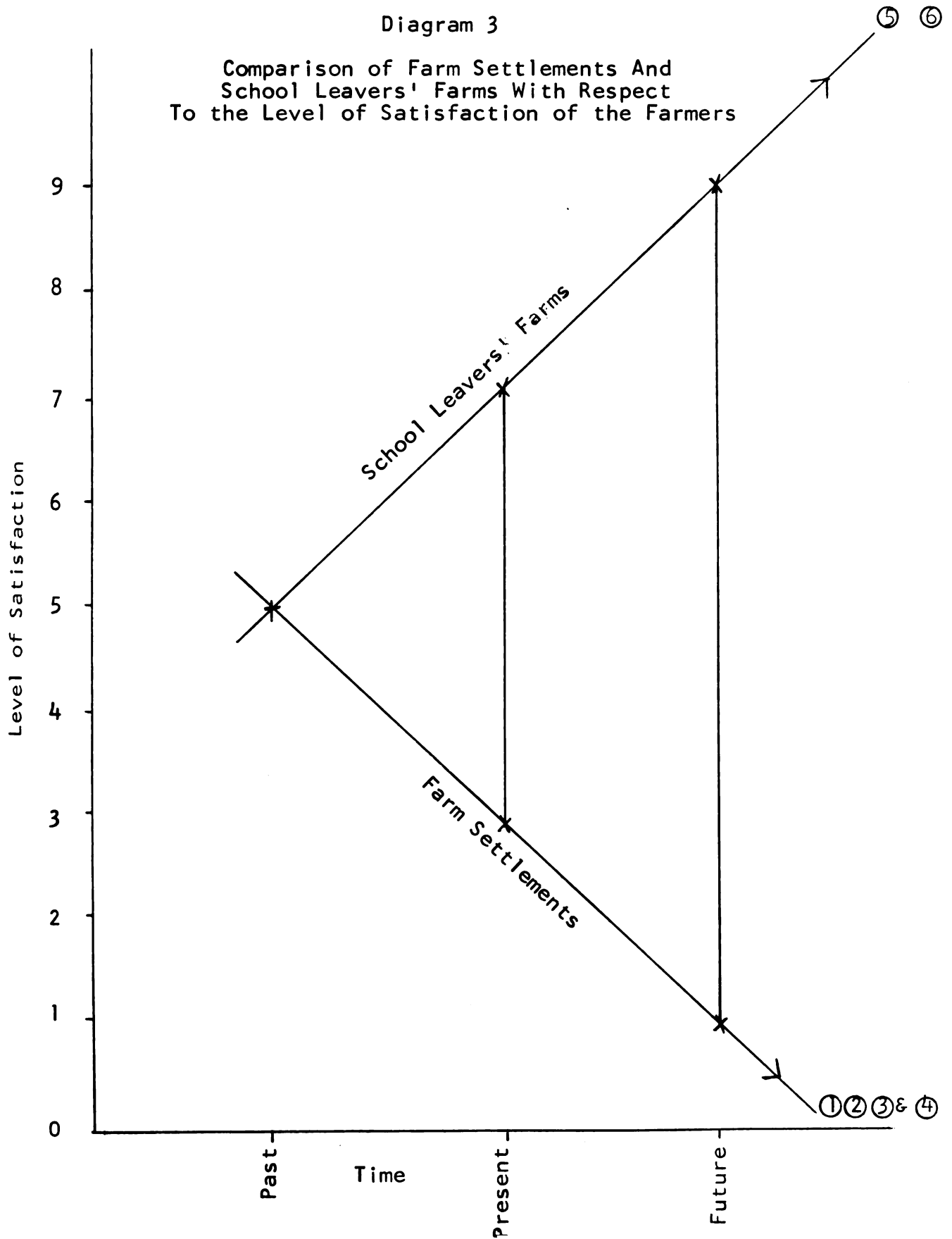


Diagram 3

Comparison of Farm Settlements And
School Leavers' Farms With Respect
To the Level of Satisfaction of the Farmers



predictors designed to measure satisfaction in this study when the farmers first started their lives in these farm organizations. That is, the farmers, irrespective of their form of farm organization, rated the organization equally. At the time of this study, which was at least two years after they had been in the organizations, farmers in the farm settlements had become pessimistic about the success of the farm settlement scheme while those in the school leavers' farms were filled with high hopes for the future. The conclusion from this is that the farmers in the school leavers' farms were reasonably satisfied with the progress they had made, and they appeared optimistic about their future.

On the other hand, the farmers in the farm settlements felt that they had made no progress and that the farm settlement scheme had worsened their conditions. They even felt that should conditions remain as they were on the settlements, the situation would continue to deteriorate with time (see Diagrams 2 and 3).

The results analyzed above and those of the researcher's personal interviews with various officers in the farm settlements and in the school leavers' farms, as well as the researchers' experience by living with the farmers in these

two forms of farm organizations, gave a useful insight into the operations of both the farm settlements and the school leavers' farms. In the following section, a brief description of these operations is given. Attention focuses on the management practices in the two forms of farm organizations--the farm settlements and the school leavers' farms.

Operation of the Farm Settlements

The operation of the farm settlement scheme is very similar to the classical example of control in the well know Gezira scheme, where the farmer's land is plowed for him, and where he has to plant the seed he is given in the rotations he is told, to fertilize and cultivate as recommended, and to hand over the crop for processing and marketing--for all of which operations he is, of course, financially responsible.^{8/} In addition, in the farm settlements, the houses are built for the farmers and the laborers that work on their farms are hired and paid by the government--all of which expenses the farmers also have to pay. This type of control has partly reduced the

^{8/} Arthur Gaitskell, Gezira: A Study of Developments in the Sudan (London: Faber and Faber, 1959).

status of the farmer from that of an independent farmer towards that of a laborer acting under orders. This type of hierarchially administered operation has created conflicts and tension between the few officers in the organization who command and the many farmers who obey. This type of control strongly mitigates against successful farm operation. Successful farming demands a constant process of judgment-making, in which sound technical and economic principles must be combined with particular facts of time and place. Decisions need to be made close to the ground and with minimum delay. In the farm settlements, the farmers do not have decision-making competence, and decisions regarding day-to-day operations on their farms are made for them. This has affected their general dispositions and morale.

Because of the strong control exercised by the government, the farmers in the farm settlements have very little or nothing to do with the decision-making processes in the farm organizations. Direct control of expenditures and hiring of labor are done not on the farm, but from far away in the headquarters.

Neither the officers in the field nor the farmers have control over the work they are doing; they have no powers to control labor and funds as dictated day by day by farm operations and financial limitations. It is common for farms to take on casual labor at peak periods of operations and lay them off when

operations ease off. This recognized practice has not been put into operation in the farm settlements. Instead, labor recruitment is controlled from the headquarters. As a result, the farm settlements have become a "dumping ground" for unnecessary and redundant labor, and the laborers have no urge to do any work in the settlements in view of the manner in which they have been employed and over whom the officers in the field have no operational control. Because the government hires the labor for the farmers, the laborer gets the government rate of 6/3^d a day when the farmers can hire the same labor for 4/ or less a day. Similarly, the financial cost of the farm settlements has been increased partly because the government built the farmers' houses, rather than let them build their own houses. Table 8 shows that the houses built in five farm settlements in the Midwest would have cost the government £61,500 less if the houses had been built by local contractors. This would have meant a corresponding decrease of £61,500 in the liability of farmers' dwelling houses. It is most likely that the decrease in farmers' liability would have been even greater if the farmers had organized the building of the houses themselves. Arthur Lewis writes,

Table 8. Farm Settlers' Houses -- Midwest

Farm Settlement	Number of Houses Constructed to Date	Cost at £600 each (By Nigersol Building Co., Ltd.)	Cost at £350 each (By M.A.N.R. Using Direct Labor or Local Contractors	Differences: Excess of (3) or (4)
(1)	(2)	(3)	(4)	(5)
		£	£	£
1 Ekpoma	73	43,000	25,550	18,250
2 Iguoriakhi	20	12,000	7,000	5,000
3 Okpe	16	9,600	5,600	4,000
4 Mbiri	67	40,200	23,450	16,750
5 Utagba-Uno	70	42,000	24,500	17,500
TOTAL	246	147,600	86,100	61,500

Note: Government officials in the farm settlements told the authors that the settlers' houses were constructed by Nigersol Company Limited and other contractors or direct labor. The Nigersol houses were said to have been valued at £600 each and the others £350 each, making a saving of £250 per house. For instance, out of the 70 houses constructed at Utagba-Uno Farm Settlement, the Nigersol built 58 at £600 each, i.e., £34,800, which could have been built by direct labor or local contractors for £20,300 with a saving of £14,500.

Source: Midwest Government Publication, "Evaluation of the Farm Settlements and the School Leaver Farms", by C. Oyolu, et. al., (1965).

"In all my travels, I have never found a government agency which could build cheap rural houses. Their houses cost more than the house the settler would build for himself, and only too often become a burden round his neck and that of the minister of Finance. So in underdeveloped countries I always feel that there is much to be said for leaving the rural people to put up their own houses."^{9/}

The farmers in the farm settlements are thus saddled with avoidable costs because the government does almost everything for them. This has increased the cost of the settlements considerably. Commenting on governments' involvement in land settlement, Arthur Lewis said that the more the government does for the settler, the greater is the financial cost of the settlement, and the smaller is the number of people it can help.^{10/} These types of management practices in the farm settlements have given the farmers the impression that they are government employees who have no stake in the scheme. This attitude is reflected in the responses obtained from the social-psychological variables employed in this study (see Tables 5 A and B). It is also reflected in the general complaints in all

^{9/} Arthur W. Lewis, "Thoughts on Land Settlement", Agriculture in Economic Development, Carl Eicher and L. W. Witt (eds.), (New York: McGraw-Hill, Inc., 1964), pp. 299-310.

^{10/} Ibid., p. 303.

the farm settlements visited. These complaints include: (1) that the farmers have not been given public holidays, and (2) that the farmers have not usually been given sick-leave and annual leave. These complaints, though they seem trivial, are significant in reflecting the image which the farmers have of themselves in the organization. The types of attitudes among the farmers have been unfavorable and pessimistic. (see Diagrams 2 and 3).

Operation of the School Leavers' Farms

The operation of the school leavers' farms is very similar to that of the traditional private farmer in Nigeria who clears his land himself, plants his seeds, sells his products himself in the local markets, and hires labor when his family labor becomes inadequate. He is the owner-operator of the farm. Unlike the traditional private farmer, however, a farmer in a school leavers' farm has the privilege of the services of a trained community development organizer who advises him on how best to use his resources. He also receives short-term loans from the government and buy subsidized seeds and seedlings from the government. In addition, the benefit of on-the-job training is made available to him once a month on his farm.

In the school leavers' farms, the philosophy of "working with the people", rather than "doing things for them" appears to be the guiding principle of management. The farmers are given the opportunity to make most of their decisions with minimum interference from management authority--the community development organizer is there merely to advise them rather than issue instructions, assign jobs, or hire labor for them. The feeling of ego-involvement, sense of commitment and spirit of ownership which the management practices of the school leavers' farmers encourage among the farmers in the organization make them regard themselves as owner-operators rather than as government employees (see Tables 5 A, and B). The favorable attitude among the farmers is reflected in their general good dispositions and high morale (see Diagram 3).

Summary

Because of the highly centralized administrative system with major and many day-to-day farm decisions being made by government officers far away in the headquarters, the farmers in the farm settlements (government farms in default) in general have no feelings of ownership and no feelings of commitment in the scheme. They regard themselves as government employees rather than as owners of the farms. This attitude appears to

account for the general feeling of powerlessness, unfavorable preference for risk-taking, tendency toward sabotage, and poor general disposition and low morale among the farmers. Heavy expenditures by government on housing and formal training as incentives for the farmers have had no differential impact on the general dispositions and morale of the farmers.

In contrast, in the school leavers' farms where there is more reliance on individual farmers in carrying out their routine farm operations, there are strong feelings of ego-involvement and feelings of ownership among the farmers. These farmers regard themselves as owner-operators and not as government employees. These favorable attitudes appear to account for the lack of feelings of powerlessness, favorable preference for risk-taking, and general good dispositions and high morale among the farmers even though they lack such incentives as elaborate housing and formal training.

Although these young farmers feel satisfied and are optimistic about the school leavers' farms, they complained of a lack of an all-purpose building on the farm site for shelter. They also expressed the fear that their future acreage allotment may not be contiguous to their present farms since large acreage has not been made available to them. In addition, the Rural Organizers on-site in the school leavers' farms appear to be poorly trained for their job and the villagers who have been a great asset to the scheme are beginning to lose interest due to lack of any motivation from the Community Development Division.

CHAPTER V

FOOD CROP PRODUCTION -- SOCIAL-PSYCHOLOGICAL ASPECTS, RESOURCE USE AND PROFITABILITY

Introduction

Although attention must be given to export crop production in Nigeria today in order to obtain much needed foreign earnings, to expand the purchasing power of rural people and to finance imports, the need also exists to increase food crop production to feed Nigeria's population which is growing by at least one million per year. Thus the farm settlements and the school leavers' farms have been organized to serve as a source of food crop production as well as to produce export crops.

This Chapter concentrates on food crop production. Resource use is related to profitability (gross margin) of food crop production as conditioned by the situations existing on the different farm organizations. As was indicated in Chapter Four of this study, social-psychological variables vary importantly among the different farm organizations. As this chapter explores the relationship of these different social-psychological variables to both resource use and

profitability, it is, in this sense, a continuation of Chapter Four.

Input-Output Survey

Individual interviews were held with each of the 180 farmers randomly chosen for this study. The questionnaire (see Appendix C) prepared for this purpose was used. The questionnaire was complex since the farmers produce various types of annual crops. A farmer, for example, often grows six different food crops on his farm. In addition to recording the quantity and price of all sales during the period 1965/66, the total value of sales and the total quantity produced during this period was recorded. The fraction consumed at home as well as the part stored for the next production year was also recorded. As the farmer is given land free and since all data was converted to apply to two acres per farmer, no cost is charged for the use of land in this analysis. Hired labor inputs were determined by asking the farmers how many laborers they employed during the period 1965/66 and for how many days the laborers were hired. Tools and equipment inputs were determined by asking the farmers how many they owned, whether they have sold some, the cost of each tool, when it was bought, and its life expectancy. Estimates of

the cost of fertilizer used were made in the same way. The farmers were asked when they purchased fertilizer, how much they bought, what was the cost and how long it would last. Because most of the farmers do not know the correct number of acres of food crops they own, every farmer was assisted to determine it. A prismatic compass and a tape measure were used, and each plot was plotted on graph paper. A planometer was used to estimate the acreage. Gross-margin is the difference between total sales plus home consumption and total variable costs of production.

The gross-margin per farmer was adjusted to a two-acre basis. This adjustment was made in order to compare the profitability (gross-margin) of food crop production per farmer on an equal acreage basis. Two acres were used as over 85 percent of all the farmers interviewed, operated two acres of food crops.

Furthermore, 300 man-days per year of the farmer's own labor commonly used by Nigerian governments as operator's labor was assumed for both his food and export crops. This assumption was made because it was difficult to determine accurately how much of the farmer's time is devoted exclusively to food crop production, especially that each farmer is engaged

at one and the same time in production for food and export crops. As explained on page 104, the adjustment of the gross-margin per farmer on a two-acre basis, and the assumption of 300 man-day of operator labor per farmer are factors which could lead to excessive variance. Hence, the interpretation of the results of this analysis has to be done cautiously. Table 9-A shows the number of farmers interviewed in each type of farm organization, and Table 15-B shows the mean values of resource inputs used per farmer in each farm organization during the period November 1965 to November 1966.

Analytical Techniques

As explained in chapter three, the preliminary single dependent variable which was considered in this analysis is gross-margin per two acres of food crop production per farmer. The association of quantity of resources, social-psychological variables, and type of organization with gross margins for food crop production was determined by using multiple regression techniques for a predictive equation.

The predictive regression equation was first run for all the farm organizations together; in the equation shown on page 106 of this chapter, the types of farm organizations were

Table 9-A Number of Farmers Interviewed in Each Type of Farm Organization

Farm Organizations	Number Interviewed
1. Ilora Farm Settlement	30
2. Imariwo Farm Settlement	30
3. Okitipupa Farm Settlement	30
4. Mbiri Farm Settlement	30
5. Igieduma School Leavers' Farm	30
6. Ushie School Leavers' Farm	30

Table 9-B Annual Mean Values of All Inputs Used Per Farmer in Each Farm Organization in 1965-1966

Farm Organizations	Hired Labor £	Tools £	Fertilizers and Seeds £
1. Ilora Farm Settlement	21.17	4.11	4.00
2. Imariow Farm Settlement	16.64	3.73	3.61
3. Okitipupa Farm Settlement	11.23	3.98	4.26
4. Mbiri Farm Settlement	10.90	4.13	5.47
5. Igieduma School Leavers' Farm	2.10	4.46	5.86
6. Ushie School Leavers' Farm	1.60	4.28	4.78

incorporated with resource inputs and social-psychological variables as a set of independent variables. The main purpose of including the types of organizations as independent variables was to determine the association between type of organization and gross-margins.

A second regression equation shown on page 106 was run using only resource inputs and social-psychological variables. The main objective of this second analysis was to determine the association of these independent variables with the gross-margin in each farm organization.

In both analyses, certain independent variables were highly correlated. Such high correlation leads to the well-known statistical problem of multicollinearity. Put in practical terms, a problem of multicollinearity arises when some or all of the independent variables in a relationship are so highly correlated that it becomes very difficult, if not impossible, to disentangle their separate influences and obtain a reasonably precise estimate of their individual effects.^{1/} One alternative of partially avoiding the problem of multicollinearity is to eliminate from the regression one of a pair of correlated variables. Although this procedure reduces the

^{1/} J. Johnston, Econometric Methods, (New York: McGraw-Hill, Inc., 1963), p. 201.

standard error of the coefficient of the retained variable, it does give a biased estimate of the regression coefficient for the retained variable assuming the excluded variable fixed. However, the procedure will give an unbiased estimate of the relationship between the dependent and the retained variable if the original model falsely specified a relationship between the dependent and the excluded variable, that is, the variable excluded due to multicollinearity should not have been included in the first place. It was felt that the gain by lowering standard errors outweighed the loss associated with bias estimates and, consequently, the variables with the smallest R^2 delete were excluded.^{2/}

As explained on the next page, instead of a set of simultaneous structural equations, a single "predictive" equation was estimated in this analysis. This single predictive equation includes variables from a number of equations from a system of structural equations. Thus, it is likely that some of the supposedly independent variables in the predictive one were actually jointly determined in the system.

^{2/} R^2 delete is the amount by which the total R^2 decreases when a variable is dropped from a regression with all other variables retained.

When two variables in a single equation are jointly determined in a larger system, "the ordinary least-squares estimators will be biased and they will be inconsistent".^{3/} Thus the coefficients estimated from this analysis were obtained from an estimation procedure which probably yields a biased and inconsistent estimate. However, "this fact alone will not necessarily rule out the use of ordinary least squares as an estimating methods, since the choice of a method in practice has to be made on a balance of the properties of the method and computational simplicity."^{4/} For predictive purposes, ordinary least-squares may be further justified because it is not essential to have precise estimates of particular structural parameters. Instead, the objective is to associate a particular dependent variable (gross-margin) with various combinations and levels of the independent variables determining intervening dependent variables.

If the data had been good enough to obtain precise estimates of the parameters, so that e.g. elasticities could be calculated, it might have been possible to take into

^{3/} J. Johnston, Econometric Methods, (New York: McGraw-Hill Inc., 1960), p. 253.

^{4/} Ibid., p. 253.

account other equations in the system, and a set of simultaneous structural equations might have been used. One would then have interpreted the regression coefficient of an independent variable as a change in the dependent variable (gross-margin) due to the theoretical effect of a unit change in the use of that particular independent variable. Although using a single predictive equation seems justified for the predictive purposes of this work, its use places restrictions on any structural interpretations which can be given to the results of this analysis.

The two predictive regression equations used in the analyses are as follows:

$$(1) \quad GM = b_0 + \sum_{i=1}^3 b_i x_i + \sum_{i=4}^6 b_i x_i + \sum_{i=7}^{12} b_i x_i + U$$

$$(2) \quad GM = b_0 + \sum_{i=1}^3 b_i x_i + \sum_{i=4}^6 b_i x_i + U$$

Where: GM = Gross-margin per two acres of food crops.

and x_i : x_1 = Hired labor

x_2 = Tools

x_3 = Fertilizer and seeds

- x_4 = Preference for risk-taking
- x_5 = Level of participation
- x_6 = Feeling of powerlessness
- $x_7 - x_{12}$ = Dummy variables representing the types of farm organizations
- U = The disturbance term.

An alternative specification incorporated second degree terms (including interaction terms) as independent variables. They were x_1^2 , x_2^2 , x_3^2 , $x_1 \cdot x_2$, $x_1 \cdot x_3$, and $x_2 \cdot x_3$. Although this procedure raised R^2 as expected, it yielded coefficient estimates which were not significantly different from zero. Therefore, this theoretically more adequate but more complicated specification seemed unwarranted statistically and the linear specification was used for the final analysis. Since around the mean of the independent variables, the linear relationship is a close approximation to a curvilinear one, one can reasonably interpret the regression coefficient obtained for any particular independent variable as a change in gross-margin resulting from a unit increase in the use of that particular variable.

Two different sets of dummy variables were used in the first regression equation while only one set of dummy variables was used in the second regression equation. The first set of dummy variables deals with social-psychological variables (x_4, x_5, x_6). The main reason for including this first set of dummy variables was to determine the association of social-psychological variables with gross-margin, i.e. to determine whether the behavior of these variables is associated with the attainment of economic optimum, i.e., whether these variables are associated with those who miss their high profit points. The second set of dummy variables, ($x_7, \dots, x_{12}$) is concerned with the type of farm organization. The second set of dummy variables was used to measure the association of type of organization with gross-margin. The dummy variables for the type of organization are six as one was dropped to avoid a singular matrix. None of the dummy variables representing the social-psychological variables was dropped because the question of obtaining a perfect correlation among the variables does not arise since each of the variables can take a value of either one or zero independently of the others; unlike the first set of dummy variables where if one takes a value of one, all the others take the value of zero. In this second

set of dummy variables representing the type of organization, the coefficient for the variable (representing the group of private farmers) that was dropped is the constant for the regression equation.

The value of these dummy variables is either one or zero. In the first set of dummy variables representing the social-psychological variables, a value of one was used if the response was favorable, and zero was used for unfavorable responses. For example, consider the dummy variable for a feeling of powerlessness. The value of one was assigned to this variable if the participant had little feeling of powerlessness (represents a favorable response), while the value zero was assigned if he had a feeling of powerlessness (represents an unfavorable response). In the second set of dummy variables representing the type of organization, a one was used if the observation belonged to the organization represented by the variable; otherwise a zero was used. Details of the two sets of dummy variables in the regression models are shown below:

$$\begin{aligned} X_4 &= 1 \text{ for } R_1 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_5 &= 1 \text{ for } R_2 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_6 &= 1 \text{ for } R_3 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_7 &= 1 \text{ for } Z_2 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_8 &= 1 \text{ for } Z_3 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_9 &= 1 \text{ for } Z_4 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_{10} &= 1 \text{ for } Z_5 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_{11} &= 1 \text{ for } Z_6 \\ &= 0 \text{ for all others} \end{aligned}$$

$$\begin{aligned} X_{12} &= 1 \text{ for } Z_7 \\ &= 0 \text{ for all others} \end{aligned}$$

In the matrix form, the dummy variables are as follows:

	R_1	R_2	R_3
$X_4 =$	1	0	0
$X_5 =$	0	1	0
$X_6 =$	0	0	1

	Z_1	Z_2	Z_3	Z_4	Z_5	Z_6	Z_7
$X_7 =$	0	1	0	0	0	0	0
$X_8 =$	0	0	1	0	0	0	0
$X_9 =$	0	0	0	1	0	0	0
$X_{10} =$	0	0	0	0	1	0	0
$X_{11} =$	0	0	0	0	0	1	0
$X_{12} =$	0	0	0	0	0	0	1

Where: R_1 = Preference for risk-taking
 R_2 = Level of participation
 R_3 = Feeling of powerlessness
 Z_1 = Private Farmers
 Z_2 = Ilora Farm settlement
 Z_3 = Imariwo Farm settlement^{5/}
 Z_4 = Okitipupa Farm settlement
 Z_5 = Mbiri Farm settlement
 Z_6 = Igieduma School leavers' farm
 Z_7 = Ushie School leavers' farm

^{5/} Imariwo belongs to the "Integrated Rural Development Scheme" -- a modified form of farm settlement.

The predictive equations in this analysis were fitted with techniques based on the following standard assumptions,^{6/} which for reasons stated below are not thought to be met.

- (a) The expected values of disturbance terms are zero, i.e., $E(U) = 0$.
- (b) The disturbance terms have equal variances for all observations, i.e., $E(U^2) = \sigma^2$
- (c) The disturbance is independent, i.e., $E(U_i U_j) = 0$, for all $i \neq j$.
- (d) The independent variables are independent of the disturbance term.

Failure to meet these assumptions requires that the estimates of the coefficients be carefully interpreted.

The problem results from the use of a single predictive equation instead of some set of structural equations^{7/} such as shown below:

- (a) $GM = f(X_1, X_2, X_3)$
- (b) f is related to (X_4, X_5, X_6)

^{6/} J. Johnston, op. cit., p. 107.

^{7/} "Structural relationships involve structural parameters, which have to be estimated by statistical methods." See Gerhard Tintner, Econometrics (New York: John Wiley and Sons, Inc., 1952), p. 10.

$$(c) \quad X_i = f_i (X_4, X_5, X_6) \quad i = 1, 2, 3$$

$$(d) \quad f \text{ is also related to } (X_7, \dots, X_{12})$$

$$(e) \quad X_i = g_i(X_7, \dots, X_{12}) \quad i = 1, 2, 3.$$

Thus, theoretically, one should deal with a, b, c, d, and e separately as part of a set of simultaneous structural equations. In this study, however, these equations have been combined in a single equation which is regarded as "predictive". This procedure places restrictions on the structural interpretation which can be given to the results of this analysis. By using one single equation of the form: $GM = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, \dots, X_{12})$ instead of 3 equations plus 2 sets of 3 equations for a total system of 9 equations in 9 unknowns (but observed) dependent variables, 8 of these 9 dependent variables have been inappropriately specified as independent variables, i.e. it would have been more appropriate to treat:

$$\begin{aligned} X_1 &= f_1 (X_4, X_5, X_6) \\ X_2 &= f_2 (X_4, X_5, X_6) \\ X_3 &= f_3 (X_4, X_5, X_6) \end{aligned}$$

$$\begin{aligned} X_4 &= g_1 (X_7, \dots, X_{12}) \\ X_5 &= g_2 (X_7, \dots, X_{12}) \\ X_6 &= g_3 (X_7, \dots, X_{12}) \end{aligned}$$

$$\begin{aligned} f &= f_1 (X_4, X_5, X_6) \\ f &= f_2 (X_7, \dots, X_{12}) \end{aligned}$$

Though, it would have been preferable, it probably was not possible to solve the system for $GM, X_1, X_2, X_3, = f_i (X_4, \dots, X_{12})$ $i = 0, \dots, 3$. Even if this were mathematically possible, the variances of the data and the intercorrelations among the variables would make it statistically difficult to get good estimates. Thus the single predictive equation used in this study is such that any structural interpretations of its coefficients need to be done carefully and cautiously. For example, in a structural equation, a change in gross-margin, resulting from a change in one variable is only a partial effect obtained by changing that particular variable, *ceteris paribus*. However, in this case it is possible that changing that variable may change other variables which are, in theory dependent on it rather than being independent. Thus, some of the assumptions stated on page 113 are not strictly met.

If $X_1 = f(X_6)$ where X_1 (Hired labor) is an endogenous variable in the system of equations and X_6 (Level of participation) is an exogenous variable, then by using a single predictive equation in which X_1 is treated as an independent variable, the estimated regression coefficient of X_1 i.e. b_1 is of dubious structural meaning. If for example $b_1 = 0.6$ for the predictive equation, this coefficient is some

unspecified combination of the influence of X_6 on X_1 and of X_1 on GM. Thus, one can easily make an error in regarding .6 as measuring the effect of a change in X_1 on gross-margin.

If Y is to be regarded as a linear, first degree structural function of X_1, X_2, X_3 it is important to know whether the b_i 's are equal to, greater than or less than zero. Yet the above argument raises grave doubts as to whether the b_i 's for X_1, X_2 and X_3 from the predictive equation can be interpreted as structural coefficients of such a function without careful study of the correlations among the X_i 's. A table of the simple correlation coefficient follows.

The use of this table can be illustrated as follows:

(1) If X_4 (preference for Risk-taking) has medium values we expect X_1 (Hired labor) to be such that the structural coefficient relating X_1 to GM is near zero. If X_4 has high or low values our theory causes us to expect the structural coefficient to be greater or less than zero. In the regular farm settlement only 19.17 percent of the farmers have medium values for X_4 . By contrast, in the school leavers' farms, 88.33 percent have medium values for X_4 . For the regular settlements, Table 12 indicates that so much hired labor was used that the relationship between labor use and GM ranges from -.27 to -.96 and that these were significantly different

Table 9-C. Simple Correlations

Independent Variables	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	X ₁₀	X ₁₁	X ₁₂
X ₁ Hired labor	1.0											
X ₂ Tools	.73	1.0										
X ₃ Other costs	.45	.21	1.0									
X ₄ Preference for Risk Taking	.48	.03	.18	1.0								
X ₅ Feeling of Powerlessness	.54	.02	.03	.10	1.0							
X ₆ Level of Participation	.75	.12	.05	.44	.38	1.0						
X ₇ Ilora	.34	.23	.17	.48	.38	.38	1.0					
X ₈ Imariwo	.35	.29	.08	.46	.34	.37	.15	1.0				
X ₉ Okitipupa	.35	.18	.07	.45	.37	.39	.33	.20	1.0			
X ₁₀ Mbiri	.39	.26	.15	.44	.34	.43	.09	.31	.20	1.0		
X ₁₁ Igieduma	.53	.29	.19	.66	.58	.58	.04	.03	.06	.10	1.0	
X ₁₂ Ushie	.58	.26	.14	.68	.62	.59	.06	.04	.08	.14	.22	1.0

Table 10. Regression Results for Gross-Margin Analysis of Food Crop Production in All the Six Farm Organizations^{1/}

$$\begin{array}{cccccc}
 B_0 & B_1 & B_2 & B_3 & B_4 & B_5 \\
 Y = 13.95 - 0.97X_1 + 0.79X_2 + 0.11X_3 + 5.59X_4 + 2.78X_5 \\
 (4.64) & (0.23) & (1.20) & (0.66) & (1.85) & (1.89) \\
 \\
 B_6 & B_7 & B_8 & B_9 & B_{10} \\
 + 12.23X_6 + 40.74X_7 + 30.65X_8 + 38.96X_9 + 40.54X_{10} \\
 (2.58) & (4.76) & (4.82) & (4.24) & (3.86) \\
 \\
 B_{11} & B_{12} \\
 + 70.03X_{11} + 70.87X_{12} \\
 (3.03) & (3.28)
 \end{array}$$

$$R^2 = 0.898$$

$$\bar{R}^2 = 0.892$$

Y = Gross-margin

X₁ = Hired labor

X₂ = Tools

X₃ = Fertilizer and seeds

X₄ = Preference for Risk-Taking

X₅ = Feeling of Powerlessness

X₆ = Level of Participation

X₇ = Ilora Farm Organization

X₈ = Imariwo Farm Organization

X₉ = Okitipupa Farm Organization

X₁₀ = Mbiri Farm Organization

X₁₁ = Igieduma Farm Organization

X₁₂ = Ushie Farm Organization

^{1/} These figures represent regression coefficients. Standard errors are given in parentheses

from zero at a five percent level of significance.^{8/} By contrast again, the corresponding coefficients for the school leavers' farms are .07 and .08 which are near zero even though significantly different from zero. Thus, the predictive coefficients seem to make structural sense. However, the simple correlations need to be checked further.

As X_1 and X_4 are positively correlated at .48 level, overestimation of one is associated with underestimation of the other and vice versa. It is difficult to think of structural reasons why $GM = f(X_1, X_2, X_3)$ should shift upward with preference for risk taking, and hence, it is difficult to reason structurally that GM should be a positive function of risk taking. Yet the coefficient relating GM to risk taking is 11.4 for school leavers and 1.4 for regular farm settlements. However, it must also be remembered that X_4 is correlated with type of farm; hence, the high regression coefficient for X_4 may reflect the type of farm as well as degree of risk taking.

^{8/} The significant level is the probability that the estimated regression coefficient would be as much different from zero if the true effect of the variable (i.e., the true value of the corresponding B) were zero -- see D. Gale Johnson and R. L. Gustafson, Grain Yields and the American Food Supply. (Chicago: The University of Chicago Press, 1962).

In general, there are reasons which are capable of explaining the addition to GM in the school leavers' farms, as the coefficients for the school leavers' farms are 28.4 and 29.2% (see Table 11). In conclusion, the regression coefficients relating X_1 to GM for the total sample, the school leavers' farms and the regular farm settlements appear to be reasonable and may be given a structural interpretation with caution.

(2) If X_5 has high values, i.e., if the farmers feel they have power to control their work the structural coefficient relating X_1 (hired labor) to gross-margin should be expected to be near zero (at optimum). Conversely, if X_5 has low values (i.e., if the farmers feel they have no power to control) one expects the structural coefficient to be greater or less than zero. Table 5 shows that only 15.0 percent of the farmers in the regular farm settlements have high values for X_5 , while 88.33 percent of the farmers in the school leavers' farms have high values for X_5 . In the regular farm settlements, Table 12 indicates a negative relationship between X_1 and gross-margin, and that this relationship is significantly different from zero (at optimum) at a five percent level of significance. But in the school leavers' farms, the corresponding coefficient is 1.08 which is near zero (the optimum). The results in Tables 5 and 12 indicate that the predictive coefficients seem to make structural sense.

Table 11. Relative Shifts in Gross-Margin Due to Differences in Organizational Pattern in the Different Farm Organizations.^{1/}

Types of Farm Organizations	Relative Shifts in Gross-Margin
1. Ilora Farm Settlement	-0.94
2. Imariwo Farm Settlement	-11.03
3. Okitipupa Farm Settlement	-2.72
4. Mbiri Farm Settlement	-1.14
5. Igieduma School Leavers' Farm	+28.35
6. Ushie School Leavers' Farm	+29.19
7. Private Farmers	-41.68

^{1/} The above figures were obtained by calculating the deviation of each farm organization from the average intercept. Mathematically, this involves computing a correction factor which is $\frac{b_7 + b_8 + b_9 + b_{10} + b_{11} + b_{12}}{7}$, where b_7 through b_{12}

represent the coefficients for the six dummy variables included in the equation. (See Table 10). To obtain the shift in gross-margin due to each type of farm organization, the correction factor was subtracted from the regression coefficient of the dummy variable representing that particular farm organization. To obtain the shift in gross-margin due to the excluded dummy variable (Private farmers), the correction factor was subtracted from the constant term.

As Table 9C of simple correlations shows that X_1 and X_5 are positively correlated at 0.54 level, overestimation of one should be expected to be associated with underestimation of the other and vice versa. Structurally, however, one finds it difficult to imagine why $GM = f(X_1, X_2, X_3)$ should shift upward with a decreased feeling of powerlessness and, hence one finds it difficult to think of any structural reason why gross-margin should be a positive function of a decreased feeling of powerlessness. Yet in Table 12, the coefficients relating gross-margin to a decreased feeling of powerlessness are 19.68 and 19.29 for the school leavers' farms and range from 1.15 to 2.31 for the regular farm settlements. However, since X_5 is correlated with type of farm, the high regression coefficient for X_5 may reflect the influence of type of farm on gross margin as well as the effect of a decreased feeling of powerlessness. An increase of £19.48 in the gross-margins of the farmers in the school leavers' farms are partially explained by the coefficients of 28.4 and 29.2 for the two school leavers' farms (see Table 11). These coefficients are associated with the type of farm which relies more on individual farmers and which enables these farmers to operate around their high profit points.

Tab

A.

$\hat{Y}$

R^2

B.

$\hat{Y}$

R^2

C.

$\hat{Y}$

R^2

Table 12. Regression Results for Gross-Margin Analysis of Food Crop Production in Each Farm Organization

A. Ilorra Farm Settlement

$$\hat{Y} = \underset{(17.06)}{B_0} - \underset{(0.32)}{0.85X_1} + \underset{(0.69)}{0.65X_2} + \underset{(0.12)}{0.02X_3} + \underset{(0.95)}{1.02X_4} + \underset{(0.53)}{1.68X_5} + \underset{(0.85)}{1.64X_6}$$

$$R^2 = 0.643 \quad \bar{R}^2 = 0.539$$

B. Imariwo Farm Settlement

$$\hat{Y} = \underset{(10.75)}{B_0} - \underset{(0.34)}{0.96X_1} + \underset{(0.39)}{0.39X_2} + \underset{(0.42)}{0.59X_3} + \underset{(0.65)}{1.85X_4} + \underset{(0.97)}{2.31X_5} + \underset{(0.68)}{1.95X_6}$$

$$R^2 = 0.719 \quad \bar{R}^2 = 0.646$$

C. Okitipupa Farm Settlement

$$\hat{Y} = \underset{(9.55)}{B_0} - \underset{(0.15)}{0.42X_1} + \underset{(0.42)}{0.36X_2} + \underset{(0.67)}{0.73X_3} + \underset{(0.36)}{1.27X_4} + \underset{(0.68)}{1.19X_5} + \underset{(0.46)}{1.61X_6}$$

$$R^2 = 0.672 \quad \bar{R}^2 = 0.617$$

D. Mbiri Farm Settlement

$$\hat{Y} = \begin{matrix} B_0 & B_1 & B_2 & B_3 & B_4 & B_5 & B_6 \\ 53.73 & -0.27X_1 & +0.41X_2 & +0.11X_3 & +1.64X_4 & +1.15X_5 & +1.45X_6 \\ (6.76) & (0.06) & (0.41) & (0.31) & (0.45) & (0.37) & (0.63) \end{matrix}$$

$$R^2 = 0.763 \quad \bar{R}^2 = 0.701$$

E. Igieduma School Leavers' Farm

$$\hat{Y} = \begin{matrix} B_0 & B_1 & B_2 & B_3 & B_4 & B_5 & B_6 \\ 85.77 & -0.08X_1 & +0.93X_2 & +0.58X_3 & +11.13X_4 & +19.68X_5 & +16.96X_6 \\ (32.74) & (0.03) & (0.79) & (0.45) & (13.38) & (24.06) & (23.38) \end{matrix}$$

$$R^2 = 0.436 \quad \bar{R}^2 = 0.369$$

F. Ushie School Leavers' Farm

$$\hat{Y} = \begin{matrix} B_0 & B_1 & B_2 & B_3 & B_4 & B_5 & B_6 \\ 80.90 & -0.07X_1 & +0.58X_2 & +0.27X_3 & +11.43X_4 & +19.29X_5 & +16.68X_6 \\ (40.41) & (0.03) & (0.46) & (0.22) & (12.04) & (15.28) & (13.89) \end{matrix}$$

$$R^2 = 0.431 \quad \bar{R}^2 = 0.365$$

However, Table 11 shows that the private farmers who operate entirely on their own did not do as well in producing food crops as either the school leavers' or regular farm settlers. This result is not surprising since the private farmers have little form of incentive by way of short-term loans, input subsidies, and extension service which the school leavers' farmers enjoy. Furthermore, Table 11 indicates that Farm Settlements have done slightly better than the private farmers but not as well as the School leavers' farms. This suggests that there is something to be said for the extension attention which the farmers in the farm settlements receive by way of Farm Institutes training and farm settlement's personnel. However, the inferior performance of the farm settlements relative to the School leavers' farms indicates that the farm settlements have not gained much from the substantial capital invested in the Farm Institute and in the farm settlements' personnel. Thus the regression coefficients relating X_1 to GM for the total sample, the school leavers' farms and the regular farm settlements appear to be reasonable and may be given structural interpretation if carefully applied. (3) If X_6 has high values, (i.e., if farmers are able to participate in decisions affecting their farm operations), the structural

01

02

03

04

05

06

07

08

09

10

11

12

13

14

15

16

17

18

19

20

21

22

coefficient relating X_1 (hired labor) to gross-margin would be expected to be near zero (the optimum), indicating that the farmers are operating around their high profit points with respect to labor use. On the other hand, if X_6 has low values, (i.e., if the farmers are not able to participate in decisions affecting their farm operations), one would expect the structural coefficient to be greater or less than zero, indicating that the farmers have missed their high profit point with respect to labor use. Table 5 shows that only 5.17 percent of the farmers in the farm settlements have high values for X_6 while in the school leavers' farms, 96.67 percent have high values for X_6 . Table 12 indicates that farmers in the regular farm settlements have missed their high profit point due to excess use of hired labor as the relationship between labor use and gross-margin ranges from -.27 to -.96 and that these were statistically significant from zero (the optimum) at a five percent level of significance. By contrast, the corresponding coefficients for the school leavers' farms are .07 and .08 which are near zero (the optimum). The existence of predominantly high values for X_6 is associated with a profitable use of labor in the school leavers' farms; also, the existence of predominantly low values

for X_6 is associated with unprofitable use of labor in the regular farm settlements. This once again indicates that the predictive coefficients seem to make structural sense.

Since X_1 and X_6 are positively correlated at 0.75 level (see Table 9-C), over-estimation of X_1 should be expected to be associated with underestimation of X_6 and vice versa. One finds it difficult to think of any structural reason why $GM = f(X_1, X_2, X_3)$ should shift upward with high values for X_6 (level of participation), and hence, it is difficult to reason structurally that gross-margin should be a positive function of X_6 . Yet, in Table 12, the coefficient relating gross-margin to level of participation is 16.82 for the school leavers' farms and 1.66 for the regular farm settlements. However, since X_6 is correlated with type of farm (see Table 9-C), the high regression coefficient for X_6 may reflect the type of farm as well as level of participation of farmers in decisions affecting their farm operations. A coefficient of £16.82 in the gross-margins of the farmers in the school leavers' farms is consistent with the regression coefficients of 28.4 and 29.2 for the two school leavers' farms (see Table 11). Therefore, in conclusion, the regression coefficients relating X_1 to gross-margin in the predictive equation appear to be reasonable and may be given structural meaning with caution.

Table 13. Distribution of Gross-Margin Per Two Acre Farm in the Different Farm Organizations (₦)^{1/}

Partici- pants	Farm Organizations					
	Ilora	Imariwo	Okitipupa	Mbiri	Igieduma	Ushie
1	23	37	41	52	114	139
2	29	49	32	52	86	108
3	29	19	52	59	111	116
4	38	14	62	47	113	113
5	38	23	49	38	118	103
6	24	27	29	20	109	82
7	62	13	28	36	118	101
8	39	22	49	30	105	75
9	11	27	48	49	68	86
10	36	14	40	45	102	109
11	19	13	24	59	122	115
12	53	47	32	41	125	100
13	39	44	48	57	85	107
14	29	31	45	40	98	94
15	36	41	57	32	78	82
16	48	15	68	27	140	120
17	31	16	19	32	76	115
18	26	17	28	40	77	78
19	30	18	45	55	73	138
20	55	18	51	42	65	87
21	43	16	57	67	124	80
22	54	20	47	45	94	74
23	27	58	53	22	83	90
24	29	33	27	49	64	104
25	35	17	46	56	113	64
26	37	21	30	33	77	75
27	37	21	30	64	65	99
28	50	20	40	29	88	71
29	62	15	41	35	118	63
30	39	8	47	36	86	82

^{1/} More data will be available in a mimeograph to be published by the Consortium for the Study of Nigerian Rural Development, Michigan State University.

Table 14. Average Gross-Margin Per Farmer in Each Farm Organization (£)

Types of Farm Organizations		Average Gross Margin Per Man
1	Ilora Farm Settlement	36.9
2	Imariwo Farm Settlement	24.4
3	Okitipupa Farm Settlement	42.1
4	Mbiri Farm Settlement	42.9
5	Igieduma School Leavers' Farm	96.5
6	Ushie School Leavers' Farm	95.6

(4) If X_2 (£'s of tools) and X_3 (£'s of fertilizer and seeds) are used in moderate amounts, i.e., in such a way that the marginal factor cost of X_2 or X_3 is not greater than the marginal value product of X_2 or X_3 respectively, the structural coefficient relating X_2 to GM and X_3 to GM should be expected to be near zero (at optimum). Conversely, if X_2 and X_3 have been used so much that their marginal factor costs are greater than their marginal value products, one expects their structural coefficients to be less than zero.

In the regular farm settlements and in the school leavers' farms, Table 9-B indicates a moderate use of X_2 and X_3 . Also, in both the regular farm settlements and the school leavers' farms, Table 12 indicates a positive relationship between X_2 and gross-margin as well as between X_3 and gross-margin. Table 12 further shows that this positive relationship is not significantly different from zero (at optimum) both in the farm settlements and in the school leavers' farms. This indicates that the predictive coefficients seem to make structural sense. As Table 9-C of simple correlations shows that X_2 and X_3 have very low correlations with X_4 , X_5 and X_6 , this indicates that the shifts in gross-margins due to the regression coefficients of X_2 and X_3 are not likely to be associated with X_4 , X_5 and X_6 . Furthermore, Table 9-C shows

that correlations between X_2 , X_3 and type of farm are very low. Here again, it seems the addition to gross-margin from the use of X_2 and X_3 is not associated with type of farm. This is an indication that the predictive regression coefficients for X_2 and X_3 may reflect the true influence of X_2 and X_3 on gross-margin. Hence, one can reasonably conclude that the regression coefficients relating X_2 and X_3 to gross-margin in the predictive equation make structural sense and may be interpreted with caution as such.

Summary

Hired labor has been used beyond the most profitable level of production in the four farm settlements, and as a result, there is a negative relationship between hired labor and gross-margins in the farm settlements. By contrast, the positive relationship between hired labor and gross-margin in the two school leavers' farms indicates hired labor has not been used beyond the most profitable level of production. The non-significant positive relationship between tools, seeds, fertilizers, and gross-margin, in both the farm settlements and the school leavers' farms may indicate that all the farm organizations have not yet reached their high profit points with respect to the use of these variables.

The existence of predominantly lower gross-margins among the farmers in the farm settlements relative to the school leavers' is associated with the farm settlement type of organization where farmers feel they have no power to control their work, where farmers do not participate in decisions affecting their farm operations, where farmers have less opportunity to economize on the use of labor and have difficulty minimizing cost.

However, in both the farm settlements and the school leavers' farms, results were superior to those obtained from the private farmers who operate entirely on their own but who generally lack assistance by way of loans, input subsidies, and extension advice.

The existence of predominantly higher gross-margins among the farmers in the school leavers' farms is associated with the school leavers' type of organization where farmers feel they have power to control their work, where farmers participate in decisions affecting their farm operations, and where farmers have the opportunity to economize on the use of labor and to minimize cost.

This suggests the wisdom of organizing farm settlements so that farm settlers do feel that they have power to control their

work, learn to take risks and so that they can participate in decisions affecting their farm operations.

Finally, the question of the relative emphasis to be placed on food crops vs export crop production in Nigeria, though not dealt with in this study, needs to be given top priority in considering future research needs in Nigeria.

CHAPTER VI

POTENTIAL INTERNAL RATES OF RETURN ON INVESTMENT IN TREE CROP PRODUCTION IN THE FARM SETTLEMENTS AND THE SCHOOL LEAVERS' FARMS

Introduction

The purpose of this chapter is to analyze the various forms of investment in tree crops, cocoa, rubber and oilpalm, in the farm settlements and the school leavers' farms. In this chapter, investment in tree crops in the farm settlements and the school leavers' farms will be evaluated, and the experience acquired during their years of operation will be used to determine whether the farm organizations will achieve their objectives.

Although estimated returns on an investment may appear to be quite reliable under various assumptions of yields, costs, and product prices, the actual implementation of development schemes may cause different results. The radical departure of a project from its planned schedule of operation can affect its performance appreciably. For example, the planners of the farm settlement scheme counted on using cooperatives as a means of reducing production and marketing costs. However, cooperatives have not generally been introduced and hired labor has been used

extensively. An FAO Report states that the farm settlement scheme now costs about £5,000 per settler instead of the estimated cost of £3,600 per settler.^{1/} Also, even though the settler was expected to refund one-fifteenth of the cost (£250 annually) from the sixth to the twentieth year, after the seventh year, the settler is still unable to refund as much as a penny.^{2/}

However plausible these early criticisms may be, any constructive appraisal of the farm settlement scheme must take into account the potential returns from the tree crops over a 30-33 year period. For example, when the tree crops are at full bearing, the government expects the settlement to yield an average annual gross income of £450 per settler.^{3/} Therefore, the success or failure of the farm settlement scheme will primarily depend upon the income and cost streams generated by the tree crops over a 30-33 year period.

Sources of Data

In rate of return analysis, there are sources of uncertainty which cannot be avoided. A lack of knowledge about appropriate

^{1/} FAO, Agricultural Development in Nigeria, 1965-1980, (Rome: 1966), p. 345.

^{2/} FAO, The Farm Settlement Scheme in Western Region: Report to the Government of Nigeria (Rome: 1963), No. 1720.

^{3/} FAO, Ibid., No. 1720 (1963).

product prices is likely to affect the expected returns. One may know in advance that the prices used may fluctuate. The world market price itself may vary, and the producer price cannot be determined with any great confidence. These sources of variation in expected returns are dealt with in this analysis by assuming different levels of product prices and yields in calculating internal rates of return.

Product Price Assumption

Cocoa Prices: Three different price assumptions are used. These are a low f.o.b. price of £120 per ton, a medium f.o.b. price of £160 per ton, and a high f.o.b. price of £200 per ton. These prices, however, do not reflect the actual returns to Nigeria since there are certain cost differentials between the world market price and what Nigeria actually receives. The differential between the world price and returns to Nigeria of £26 per ton is shown in Table 15. Hence, returns to Nigeria per ton on the basis of f.o.b. prices given above are £94, £134, and £174, respectively. The corresponding returns to producer per ton are a low price of £66, a medium of £90 and a high price of £114 as shown in Table 16.

Table 15. Components of the Differential Between World Cocoa Price and Returns to Nigeria

Components of the Differential	Charges per ton £
(1) Buying allowance to Liscensing Buying Agents	13.5
(2) Produce inspection charges	0.6
(3) Handling and storage	1.85
(4) Miscellaneous charges (fumigation, deterioration, etc.)	2.10
(5) Administration and finance	1.95
(6) Transport to port	<u>6.0</u>
Total Differential per ton	£26.00

Source: FAO, Agricultural Development in Nigeria 1965-1980.
(Rome: 1966), p. 69.

See also Cocoa Project Analysis 1, Economics
Department of Premier's office, Western Nigeria,
(1966).

Table 16. Cocoa: Calculation of Returns to Nigerian and to Producers under Various Price Assumptions

Item	Low	Medium	High
	(£ per ton)		
1. F.O.B. price ^{1/}	120	160	-26
2. Differential ^{2/}	-26	-26	-26
3. Returns to Nigeria	94	134	174
4. Sales Tax ^{3/}	4	4	4
5. Export Duty	12	16	20
6. Marketing Board Surplus	12	24	36
7. Total (for 4, 5, 26)	28	44	60
8. Producer Price ^{4/} (7) from (3)	66	90	114

^{1/} F.O.B. price assumptions are those used in FAO, Agricultural Development in Nigeria 1965-1980, (Rome: 1966), p. 69.
For historical cocoa price movements see Table 17 in this chapter.

^{2/} Obtained from Table 15 in this chapter.

^{3/} See FAO, ibid., p. 69.

^{4/} Producer prices used in this analysis do not include transport allowance which has already been considered in direct production costs.

Table 17. World Cocoa Prices by Major Buying Points, 1957-1966

Year	pence/lb.	£/ton	£/ton	Price Differential between London- New York £
1957	30.6	245	247	+2
1958	44.3	354	352	-2
1959	36.6	293	285	-8
1960	28.4	227	226	-1
1961	22.6	181	180	-1
1962	21.0	168	170	+2
1963	25.3	202	208	+6
1964	23.4	187	190	+3
1965	17.3	138	141	+3
Jan. 1965	23.0	184	192	+8
July 1965	12.2	98	98	-
Jan. 1966	22.6	181	179	-2

Source: FAO Cocoa Statistics. Vol. 9 (July, 1966), p. 17.

Rubber Prices: In estimating returns to Nigeria from rubber production, two different price assumptions are used, a low price of 15 pence and a high price of 18 pence per pound of dry rubber.^{4/} These correspond to 12 and 15 pence per pound of dry rubber, respectively, in terms of return to producer.^{5/} These prices represent what the producers obtain for their latex delivered to processing plants.

Oil Palm: Price Assumptions: Table 18 shows the two price assumptions for both palm-oil and palm-kernels.

Technical Assumptions: Yields Per Acre

The technical assumptions underlying the calculations for cocoa, rubber and oilpalm are presented in Table 19, 20, and 21, respectively. While the assumptions of yields per acre of cocoa and oilpalm are similar to those used in previous studies estimating expected returns from these crops, the assumption of

^{4/} FAO, Agricultural Development, op. cit., pp. 86-89.

^{5/} FAO, Ibid., p. 89. See also Kurt R. Anschel, "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University, 1965), p. 40. In using similar prices, Oyolu wrote, "even though rubber is subject to incessant price fluctuations, the price has been maintained at uniform price level of 12^d per pound of dry rubber for the years 1959/60 to 1964/65. See C. Oyolu, et. al., "Evaluating Farm Settlements and School Leavers' Farms in Mid-western Nigeria", (Unpublished Report, Benin: 1965), p. 85.

Table 18. Oil Palm: Calculation of Returns to Nigeria and to Producers Under Different Price Assumptions

Item	Low Price		High Price	
	Palm-oil	Palm-kernels	Palm-oil	Palm-kernels
	(£ per ton)			
1. F.O.B. price ^{1/}	65.0	40.0	75.0	50.0
2. Buying allowance	7.5	3.5	7.5	3.5
3. Port handling charges	4.0	1.6	4.0	1.6
4. Bags	-	1.9	-	1.9
5. Administrative costs	1.0	1.0	1.0	1.0
6. Total Differential charges	12.5	8.0	12.5	8.0
7. Returns to Nigeria	52.5	32.0	62.5	42.0
8. Purchase tax	4.0	2.0	4.0	2.0
9. Export duty	6.5	4.0	7.5	5.0
10. Marketing Board surplus	6.0	4.0	10.0	8.0
11. Sub Total	16.5	10.0	21.5	15.0
12. Returns to producer ^{2/}	36.0	22.0	41.0	27.0

^{1/} Source: FAO, Agricultural Development in Nigeria 1965-1980, (Rome: 1966), p. 141. See also David MacFarlane and Martin Oworen, "Investment in Oil Palm Plantations in Nigeria: An Economic Appraisal", Economic Development Institute, University of Nigeria, (Enugu: Nigeria, December, 1964), Mimeo. p. 81.

^{2/} See Kurt R. Anschel, op. cit., p. 45. In 1964, the prices paid to producers were about £36 per ton of palm-oil and £22 per ton of palm-kernels. See FAO, Ibid., p. 130.

Table 19. Cocoa: Yield Assumptions per Acre - Yields of Dry Cocoa Beans in lbs. Per Acre

Planting Year	Production Year	Low Yield (850 lbs/ac)	Medium Yield (1000 lbs/ac)	High Yield (1200 lbs/ac)
4	1	60	60	60
5	2	170	170	170
6	3	340	340	340
7	4	500	500	500
8	5	570	670	670
9	6	680	800	800
10	7	723	850	900
11	8	765	900	1000
12	9	806	950	1100
13	10	850	1000	1200
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
33	30	850	1000	1200

Source: FAO, Agricultural Development in Nigeria, 1965-1980, (Rome: 1966), p. 52. Low yield figures were calculated from FAO yields of 1000 lbs/acre.

Table 20. Rubber: Yields Assumptions per Acre
lbs. of Dry Rubber per acre

Planting Year	Production Year	Low Yield (600 lbs/ac)	Medium Yield (900 lbs/ac)	High Yield (1200 lbs/ ac.)
7	1	240	360	480
8	2	360	540	720
9	3	450	675	900
10	4	510	765	1020
11	5	540	810	1080
12	6	570	855	1140
13	7	600	900	1200
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
33	27	600	900	1200

Source: Using the assumptions of maximum yields above, the yield estimate per acre per year was calculated from FAO assumptions of maximum yields. See FAO, Agricultural Development in Nigeria, 1965-1980, (Rome: 1966), p. 89.

Table 21. Oil-Palm: Yield Assumptions per Acre (lbs).

Planting Year	Production Year	Palm-oil			Palm-kernels		
		Low Yield 6000 lbs. bunches/ acre	Medium Yield 8000 lbs. bunches/ acre	High Yield 1000 lbs. bunches/ acre	Low Yield 6000 lbs. bunches/ acre	Medium Yield 8000 lbs. bunches/ acre	High Yield 10,000 lbs bunches/ acre
4	1	270	270	270	68	68	68
5	2	338	450	450	85	113	113
6	3	743	990	990	186	248	248
7	4	945	1260	1260	236	315	315
8	5	1080	1440	1440	270	360	360 ¹⁴³
9	6	1215	1620	1620	304	405	405
10	7	1215	1620	1800	304	405	450
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
33	30	1215	1620	1800	304	405	450

Sources: (1) FAO, Agricultural Development in Nigeria 1965-1980, (Rome: 1966), p. 123.

(2) David L. MacFarlane and Martin A. Oworen, "Investment in Oil-palm Plantation in Nigeria", (Economic Development Institute, Enugu: 1964).

(3) A low yield assumption of 6000 bunches per acre has been included in this study, and this was worked out from other yield assumptions.

yield per acre of rubber is different from that used in any previous study of this kind. FAO assumes a maximum yield of a low 1,000 pounds and a high 1,300 pounds of dry rubber per acre,^{6/} while in their estimate of expected returns from rubber in the Midwest, Oyolu, et al., assume a maximum yield of 1,500 pounds of dry rubber per acre.^{7/} In view of the production records of rubber in Nigeria, these assumptions appear too high. Anschel found that the average yield per acre in Nigeria is slightly under 400 pounds.^{8/} Messers Armstrong, Tappan, and Robertson, all of whom have had considerable experience in rubber production in Nigeria, agree that the average current yield of producers in Nigeria is below 400 pounds.^{9/} In this study, however, a low yield of 600 pounds per acre is used to allow for possible improvement in management and tapping practices.

^{6/} FAO, Agricultural Development in Nigeria, 1965-1980, (Rome: 1966), p. 89.

^{7/} Oyolu, Ibid.

^{8/} Kurt R. Anschel, "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University: 1965), p. 95.

^{9/} Letter from Orin J. Scoville, Field Project Leader, Consortium for the Study of Nigerian Rural Development, (Lagos, Nigeria: August 17, 1967).

Total expected returns are based on the target acreage for each farm organization up to the end of the first development plan 1962-68 over a 33 year life span for the tree crops. The acreage planted up to December 1966 and the target acreage for each farm organization are shown in Table 22. In addition, the rental value of the houses built in each farm settlement was included. This was estimated at 10 shillings a month for each settlers' house over a 33 year life cycle.

Cost Assumptions

The cost items in this study have been divided into two broad groups -- the social-overhead costs and the direct costs of production.

Social-overhead costs are defined in this study as costs not directly involved in the productive process. These costs are influenced by the form of farm organization employed. For example social-overhead costs in the farm settlement scheme include costs of providing houses for the settlers, formal training in Farm Institutes, and administrative costs such as office buildings, stores, office supplies, and staff costs both on site and in the headquarters.

The social-overhead costs incurred in each farm organization through December 1966 were obtained. The costs of settlers' houses were based on the actual amount spent on the houses plus

Table 22. Acreage Planted Up to December, 1966 and Target Acreage up to the End of the First Development Plan 1962/68 in Each Farm Organization

Farm Organizations	Acreage Planted Up to December, 1966			Target Acreage Up to end of 1962/68 Plan		
	Cocoa	Rubber	Oilpalm	Cocoa	Rubber	Oilpalm
1 Okitipupa	--	812	1180	--	812	1300
2 Mbiri	--	564	977	--	724	1245
3 Igieduma	--	100	50	--	240	160
4 Ushie	--	100	50	--	240	160
5 Imariwo	350	--	--	350	--	--

the costs of houses to be built to complete the 1962-68 Development Plan. Even though some of the houses built cost £600 each, while some cost £350 each, the remaining houses to be built in the First Plan were estimated at £350 each. Costs of formal training were based on the number of settlers trained in the farm settlements. The cost of training each settler in the Farm Institute for two years is £400.^{10/} With respect to administrative costs, the actual costs involved up to December 1966 were used. To obtain annual administrative costs up to the end of economic life of the tree crops, an average of the costs spent up to December 1966 was calculated for each farm organization. Even though experience from similar government projects in Nigeria or in other countries seems to indicate that administrative costs tend to increase over the years, a 10% decrease in administrative costs was used in this study in the interest of caution. Hence, instead of using the annual average obtained for each farm organization, it was reduced by 10% to obtain yearly administrative expenses.^{11/} (See Appendix D).

^{10/} Jerome C. Wells, "An appraisal of Agricultural Investments in the 1962-68 Nigerian Development Plan", (Unpublished Ph.D. Thesis, University of Michigan, Ann Arbor, 1964), Table B-13, p. 263.

^{11/} Such items as stores and offices built as part of administrative expenses but which require no major costs once the initial investment has been made were accounted for by allowing a five percent maintenance cost.

Direct costs are divided into five categories -- (1) Development, (2) Nursery and Pre-Nursery, (3) Tools and Machinery, (4) Establishment and Maintenance, and (5) Harvesting and Transportation. Each of these cost categories is made up of the following items:

Development Costs: These include surveying, land acquisition and crop compensation, transport of labor and supervisory staff prior to the erection of buildings on the settlement, roads and bridges directly involved in the settlement.

Nursery and Pre-Nursery: Labor for pre-nursery and main nursery, seeds and seedlings, fertilizer, and other costs such as pesticides.

Figures used in this study for these two categories of costs above are the actual costs incurred in these farm organizations, and they are based on the data obtained from the farm accounts and the files in their respective headquarters.

Tools and Machinery: These include nursery equipment, tractors and equipment, traditional tools and equipment. Estimates on costs of tractors and equipment are based on the actual number of tractors purchased specifically for each farm organization. Agricultural tractors and equipment were estimated at £1,500 each. An annual maintenance allowance of 5% has been

included.^{12/} Since the useful life of a tractor is approximately ten years, one may assume that a new tractor is purchased every 10 years. Although new sets of tractors would be required about three to four years before the end of the economic life of the tree crops in each farm organization, only the 5% annual maintenance allowance has been imputed, for it is better to err on the side of caution and assume that the already purchased tractors might still be useful after ten years. With respect to the School leavers' farms where there is no modern equipment, the basis for calculation is shown in Table 23. To obtain the total cost of tools and equipment in one farm organization, the costs per farmer were multiplied by the number of farmers in the farm organization. The life expectancy of the tools was used to determine the appropriate time for replacement.

Establishment and Maintenance: These include labor costs involved until all the acres are fully planted, costs of

^{12/} "In underdeveloped countries, maintenance is more important and costly because of the delays and costs involved in getting spare parts, and because of additional hazards caused by poorly trained and inexperienced workers, and frequently by bad climatic conditions". See Murray D. Bryce, Industrial Development: A Guide for Accelerating Economic Growth, (New York: McGraw-Hill, Inc., 1960), p. 133.

Table 23. Estimated Average Equipment Requirements and Costs per Farm in Midwestern Nigeria

Tools	Number Owned	Expected Life (months)	Average Unit Cost (shillings)	Average Annual cost (shillings)
Hoes	1.0	29.8	4.6	1.61
Spades	1.0	39.6	15.5	5.01
Cutlass	2.0	33.5	5.0	3.26
Knives	2.0	19.2	2.5	3.33
Files	1.0	36.0	2.5	0.83
Tapping knives	2.86	6.6	3.8	1.92
Pails	2.79	19.9	4.98	8.37
Cups (snail shells)	515.38	29.6	0.05	10.46
Cups (coconut shells)	640.31	29.4	0.05	13.09
Cups (cans)	1.50	16.0	2.74	3.10
Cups (sardine cans)	5.57	9.0	1.60	10.10

Source: Input-output Data collected during the study, November, 1966, and data obtained from Kurt Anschel's Study on "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University, 1965).

maintaining immature acres, and all costs of maintaining the mature acres until the crops are harvested; such costs also include labor costs, costs of materials such as herbicides, insecticides, and fertilizers. Since these farm organizations have been in operation for some years, costs of establishment and immature acreage used in this study are the actual costs spent in these farm organizations. The figures were obtained from both the farm accounts and from the various files in their respective headquarters. To obtain the costs of maintenance of mature acres, the cost assumptions used by FAO in estimating cost data on farm settlements in Western Nigeria were used. These costs are based on the implicit assumption that a settler will work full time in his farm and hence will require only occasional hired labor. Although from experience acquired after seven years of operation of the farm settlements more hired labor has been used than expected, the farm settlements have been given the benefit of the doubt by using these conservative cost assumptions.^{13/}

The same cost assumptions have been used for the school leavers' farms since the planners of this scheme assumed that the farmers in the school leavers' farms, like those in the farm settlements, would work full time in their farms.

^{13/}See FAO, Agricultural Development, op. cit., p. 408 (cocoa), p. 432 (rubber), and p. 468 (oilpalm). FAO cost assumptions were also used to estimate cost of establishment and maintenance of immature acreage of the number of acres yet to be planted to reach the target acreage for 1962/68 Development Plan.

Harvesting and Transportation: This includes costs of all operations involved from harvesting of the crops to transportation to markets. Since the farmers are expected to carry out most of the farm operations with a modest demand on hired labor, the FAO estimates based on this assumption were used. At full bearing £1.9 per acre was used in estimating the cost of harvesting cocoa.^{14/} At full bearing, for tapping and collection of one acre of rubber, £15.65 was used.^{15/} For harvesting an acre of oilpalm, £0.6 was used in this estimate.^{16/} To obtain transportation costs, six pence per ton per mile was used.^{17/} When compared with one shilling per ton per mile used by MacFarlane and Oworen in estimating returns from oilpalm production in Eastern Nigeria, a transportation cost of 6^d per ton per mile used in this study appears to be on the low side.^{18/} Table 24 showing the distances of the farm organizations from nearest major markets was used together with output produced in each farm organization to obtain the transportation costs.

^{14/}FAO, Farm Settlement Scheme in Western Nigeria, EPTA, Report No. 1720 (Rome: 1963, Table Appendix 1.2), p. 34.

^{15/}Ibid., p. 37.

^{16/}Ibid., p. 36.

^{17/}FAO, Agricultural Development, op. cit., p. 85 and p. 125.

^{18/}David L. MacFarlane and Martin A. Oworen, "Investment in Oilpalm Plantations in Nigeria". (Economic Development Institute, University of Nigeria: August, 1965), p. 92.

Table 24. Distances of Farm Organizations From Nearest Major Markets in Western and Midwestern Nigeria (miles)

Farm Organizations	Distance to Nearest Major Market
1. Okitipupa	7
2. Imariwo	3
3. Igieduma	2
4. Mbiri	12
5. Usmie	3

All the labor cost assumptions used in this study are based on the current government rate of 6/3^d per day in Western and Midwestern Nigeria. The returns calculated in this study assume favorable soil conditions and good farm management practices. The assumptions of static-micro economic theory underlie the estimate in this analysis. In addition, this study assumes perfect competition, proportionality, and continuity of the production function. The assumption of perfect competition implies that factor and different product prices used in this analysis are independent of the actions of any single buyer or seller. This permits estimates to be made over the relevant farm sizes without adjusting these prices. Little evidence indicates that the markets for inputs used and for the products at the farm level in Nigeria are less than perfectly competitive. The number of buyers and sellers is too large to permit significant market control.

Method of Analysis

Using the various yields, costs, and product price assumptions, two sets of internal rates of return on investment were determined, one set with the social-overhead costs, and the other set without the social-overhead costs. The planners of the farm settlement form of farm organization attach much importance to indirect benefits that can be achieved from the scheme. Emulation of the

settlement form of organization by farmers in the neighboring villages and a subsequent slowing of migration of youths from rural to urban areas are frequently cited as significant indirect benefits which may later more than offset the rather heavy social-overhead costs involved in this form of farm organization. In recognition of these alleged indirect benefits to the farm settlement scheme, the Ministry of Agriculture in its initial estimates of returns to individual settlers applied a subsidized rate of interest of 1-1/2% to all capital inputs used in the scheme. Such estimates assume not only the existence of the indirect benefits but also their magnitude. Wells writes,

"Although the potential of such indirect benefits may be great, they defy quantitative estimation and cannot be assumed to exist per se. It is assumed that unless direct benefits in the form of returns to crops and livestock cover the costs directly attributable to their production, there will be no indirect benefits to the project. Since it is highly unlikely that farmers will emulate techniques which do not appear profitable to them, this assumption approximates a necessary--if not sufficient--condition for the presence of such benefits."^{19/}

Calculating two different sets of internal rates of return provides an opportunity to determine the profitability of

^{19/} Jerome C. Wells, "An Appraisal of Agricultural Investments in the 1962-68 Nigerian Development Plan", (Unpublished Ph.D. Thesis, University of Michigan, Ann Arbor: 1964).

investment with and without the social-overhead costs. The difference between these two different sets of internal rates of return indicates the magnitude of the indirect benefits that must be generated for overall success of the scheme.

In each set of internal rates of returns, returns to producer and returns to Nigeria, or to the economy as a whole, were calculated using producer and world market prices respectively.

Computation of Internal Rates of Return: The internal rate of return for a project in the general case is defined as that discounting rate r which reduces the stream of net returns associated with the project to a present value of zero (or, equivalently, which makes the discounted value of the associated cost stream equal to the discounted value of the receipts stream). Mathematically, we have:

$$0 = -c_1 + \frac{b_1 - c_2}{(1+r)^1} + \frac{b_2 - c_3}{(1+r)^2} + \dots + \frac{b_n}{(1+r)^n}$$

where r is the internal rate of return, n is the full life of the project, and $b_1, b_2 \dots b_n$ and $c_1, c_2 \dots c_n$ are a series of prospective receipts and costs respectively. By comparing the internal rate of return with the opportunity cost of capital, it is assumed that productive investment decisions cannot be

correctly made independently of the financing decision. The opportunity cost of capital is important in productive investment decisions, because the decision on the margin involves a balancing of the opportunity cost of capital and the return from further productive investment.^{20/}

Using the mathematical formula for the internal rate of return explained earlier in this chapter, we have:

$$(1) \quad 0 = -c_1 + \frac{b_1 - c_2}{(1+r)} + \frac{b_2 - c_3}{(1+r)^2} + \dots + \frac{b_n}{(1+r)^n}$$

The above equation can be reduced to:

$$(2) \quad 0 = -c_1 + \frac{a_1}{(1+r)} + \frac{a_2}{(1+r)^2} + \dots + \frac{a_n}{(1+r)^n}$$

where $a_1, a_2, \dots, a_n$ are series of prospective net receipts from year one to year 33, and c_1 is the investment in year one. Equation (2) above can be reduced to

$$(3) \quad 0 = \sum_{i=1}^{i=n} \frac{a_i}{(1+r)^i} - c_1$$

^{20/} The borrowing rate (the "cost of capital") has been recommended by Dean and Lorie and Savage. (See Joel Dean, Capital Budgeting, (New York: Columbia University Press, 1951) pp. 43-44. James H. Lorie and Leonard J. Savage, "Three Problems in Rationing Capital", Journal of Business, XXVIII (October, 1955), pp. 229-39.

where $n = 33$ years, the economic life of the project.

By computer programming, r , the internal rate of return on the investment, was obtained.

The following are the assumptions about the costs and returns given above.

(1) Capital costs along with the variable costs are assumed to have occurred at the beginning of each year, i.e. January 1, throughout the life of the project.

(2) It is assumed that returns are realized at the end of each year, i.e., December 31.

(3) Since the returns obtained on the 31st of December of the first year are closer to costs incurred in January 1st of the second year than to costs incurred in January 1st of the first year, the net returns for the first year were obtained by subtracting the costs incurred in the second year from the returns obtained in the first year. In the same manner, the net returns for the second year were obtained by subtracting the costs incurred in the third year from the returns obtained in the second year. This procedure was followed throughout the entire life of the project. The costs incurred in the first year remain as c_1 as shown in the preceding equation. Although this procedure in which investment expenditures and returns on investment are assumed to occur at different times gives a somewhat

lower yield than when investment expenditures and returns on investment are assumed to occur at the same time; it is preferred because it is better to err on the side of caution in an analysis of this type.^{21/}

Results

Tables 25 through 30 summarize the expected internal rates of return on investment in tree crop production in the different farm organizations. A number of alternative calculations have been made to permit evaluation of the investments under different yields and product price assumptions.

These results show that internal rates of return to the producer and to Nigeria are considerably higher in the school leavers' farms than in the farm settlements' farms. The derivation of a measure for the opportunity cost of capital,

^{21/} Moreover, this procedure avoids the possibility of obtaining meaningless results such as a negative or an infinite internal rate of return on an investment which yields positive net returns every year throughout its economic life. This situation could arise if one makes the assumption that costs, including capital costs, and returns occur at the same time. Under this assumption, the equation for internal rate of return is

$$0 = \sum_{i=1}^{i=n} \frac{b_i - c_i}{(1+r)^i}$$

Estimated internal rates of return under this assumption (i.e., the assumption that costs and returns occur at the same time), were 2 - 3% higher than estimated internal rates of return under the assumption used in this analysis. See Appendix H for a mathematical proof of the equation used in this study.

however, is a complex process for there is no completely satisfactory solution for its measurement in an operational setting. As a measure of opportunity cost of capital, Eckstein has suggested the use of a government rate which measures the opportunity cost of additional taxation. He argues that when foreign borrowing is an important source of government funds, "Opportunity costs of marginal taxation" is similar to the rate which reflects capital rationing to the borrowing government.^{22/} To estimate the real cost of capital to the economy, Schmedtje suggests that the "prime rate" of interest on investments involving least risks from bank rates to the government and major safe investments be combined with a free "market rate". Applying this approach to Nigeria, Schmedtje's estimate of the real cost of capital in Nigeria is about 9-10%.^{23/} Stolper, on the other hand used 6% in planning Nigerian 1962/68 Development Plan. Six percent may not reflect the true opportunity cost of capital in Nigeria since the government's borrowing rate

^{22/} Otto Eckstein, Water Resource Development: The Economics of Project Evaluation, Harvard Economic Studies, Vol. CIV, (Cambridge, Mass.: Harvard University Press, 1961), pp. 97-99. Specifically, Eckstein argues for the use of a weighted average of the rates relevant for the business households on which the burden of additional taxation falls.

^{23/} Jochen Schmedtje, "On Estimating the Opportunity Cost of Capital", (Washington: J.B.R.D., 1963), p.50, (Mimeographed).

of interest involves lower risks relative to typical farmers in Nigeria. Six percent would certainly be too low as "cost of capital" to a farmer who has to finance investment with his own cash.

In view of the difficulties associated with obtaining an adequate measure of the opportunity cost of capital, I have assumed various rates of interest to reflect the opportunity cost of capital. In this study, to evaluate the economic justification of investment on tree crops in each farm organization, 6%, 10%, and 15% are used to represent the range of most likely cost of capital or opportunity cost of capital.

The profile of potential returns is compared with these different opportunity costs of capital.

Table 25 shows that when total costs of production include both direct costs and social-overhead costs, no individual farmer would likely invest in rubber-oilpalm production in either Okitipupa or Mbiri farm settlements since the internal rate of return to the producer on such an investment in these two farm organizations is less than 6 percent, the lowest cost of capital assumption used in this study. Table 25 also shows that except under conditions of high yield and high product price assumptions, the internal rate of return to the producer is negative in these two farm settlements, indicating that the discounted present

value of cost is greater than the discounted present value of returns in these investments.

Table 25 shows that even under conditions of low yield and low product price assumptions, it is still profitable for an individual farmer to invest in rubber-oilpalm production in either Igieduma or Ushie school leavers' farms. Even at an opportunity cost of capital of 10%, it is still profitable for an individual farmer to undertake the investment even under low product price assumption. At the highest cost of capital of 15%, however, unless the medium yield assumption is achieved, there is no profitable level of investment for an individual farmer in rubber-oilpalm production in the school leavers' farms under low product price assumption.

Table 26 shows that when total costs of production include both direct and social-overhead costs, the economy as a whole will have to depend almost entirely on indirect benefits for economic justification of the investments in rubber-oilpalm in either Okitipupa or Mbiri farm settlement, even at an opportunity cost of capital of 6%. The internal rate of return to Nigeria in these investments is less than 6% in both farm settlements except under the conditions of high yield and high product price assumptions.

Table 25. Estimated Rates of Return to Producers on Investment in Rubber and Oilpalm Production in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria^{1/}

Farm Organizations	Low Price Assumptions			High Price Assumptions		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Okitipupa Farm Settlement	-110.6	-105.8	-5.4	-108	-7.6	-0.4
2. Mbiri Farm Settlement	-107.2	-7.1	-0.8	-9.0	-1.3	2.1
3. Igieduma School leavers' farm	9.8	19.6	24.3	13.8	23.2	27.9
4. Ushie School leavers' farm	9.8	19.6	24.3	13.8	23.2	27.0

Note:

^{1/}Estimated rates of return on investment when total costs include both social-overhead costs and direct productive costs.

Table 26. Estimated Rates of Return to Nigeria on Investment in Rubber and Oilpalm Production From Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria^{1/}

Farm Organizations	Low Price Assumptions			High Price Assumptions		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Okitipupa Farm Settlement	-101.6	-0.6	1.7	-5.2	1.9	5.9
2. Mbiri Farm Settlement	-6.8	1.9	4.6	-0.7	4.9	7.4
3. Igieduma School leavers' farm	24.1	35.2	39.8	29.9	41.1	46.1
4. Ushie School leavers' farm	24.1	35.2	39.9	29.9	41.2	46.1

^{1/}Estimated Rates of return on investment when total costs include both direct costs and social-overhead costs.

With respect to both Igieduma and Ushie School Leavers' farms, however, it is profitable for the economy as a whole to invest in rubber-oilpalm production even at an opportunity cost of capital of 15% without depending on indirect benefits.

Table 27 shows when total costs include both direct costs and social-overhead costs, no individual farmer would be willing to invest in cocoa production in the Imariwo farm settlement unless under conditions of medium yield and high product price assumptions or high yield and high product price assumptions. In terms of returns to the economy as a whole, Table 27 shows that an investment in cocoa is profitable under conditions of medium and high price assumptions. With low product price assumptions, however, the government would have to depend entirely on indirect benefits for economic justification of such an investment.

Table 28 shows that when total costs do not include social-overhead costs, at an opportunity cost of capital of 6% it is profitable for an individual farmer to invest in rubber-oilpalm production in either the Okitipupa or the Mbiri farm settlement only under conditions of: (1) high yield and low product price assumptions, (2) medium yield and high product price assumptions, and (3) high yield and high product price assumptions. With respect to Igieduma and Ushie school leavers' farms, even at a 15% opportunity cost of capital, it is profitable for an

Table 27. Estimated Rates of Return on Investment in Cocoa Production in I马里沃农场定居点在西非尼日利亚

	Low Price Assumption			Medium Price Assumption			High Price Assumption		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Returns to Producer	-102	-3.8	-1.1	-1.3	2.5	3.9	3.2	5.9	7.3
2. Returns to Nigeria	0.6	3.6	4.8	6.0	8.9	9.8	9.8	12.7	13.7

1/ Estimated rates of return on investment when total costs include both direct costs and social-overhead costs.

Table 28. Estimated Rates of Return to Producers on Investments in Rubber and Oilpalm Production in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria^{1/}

Farm Organizations	Low Price Assumptions			High Price Assumptions		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Okitipupa Farm Settlement	-7.9	2.5	5.5	-1.4	4.9	7.3
2. Mbiri Farm Settlement	-1.5	4.9	7.9	3.9	7.7	9.9
3. Igieduma School leavers' farm	16.3	27.6	33.0	20.7	31.6	37.3
4. Ushie School leavers' farm	16.4	27.6	33.0	20.8	31.7	37.4

^{1/} Estimated rates of return on investment when total costs do not include social-overhead costs.

individual farmer to invest in rubber-oilpalm production. The internal rate of return to the producer in the school leavers' farms ranges from 18.6% to 39.7%.

Table 29 shows that even when total costs do not include social-overhead costs, at a 6% opportunity cost of capital, it is not profitable for the economy as a whole to invest in rubber-oilpalm production in either the Okitipupa or Mbiri farm settlements under low yield and low product price assumptions unless the government would have to depend on indirect benefits for economic justification of such investments. At a 10% opportunity cost of capital, the low yield assumptions under low and high product price assumptions becomes unprofitable in both farm settlements and the government would have to depend on indirect benefits to provide economic justification of the investment. At an opportunity cost of capital at 15%, only the Mbiri farm settlement is profitable on the basis of direct costs and direct returns to Nigeria. In the Igieduma and Ushie school leavers' farms, it is highly profitable for the economy as a whole to invest in rubber-oilpalm production even at a 15% opportunity cost of capital on the basis of direct costs and direct returns to Nigeria. Internal rates of return to Nigeria in the two school leavers' farms ranged from 39.2% to 66.0%.

Table 29. Estimated Rates of Return to Nigeria on Investment in Rubber and Oilpalm Production in Farm Settlements and School Leavers' Farms in Western and Midwestern Nigeria^{1/}

Farm Organizations	Low Price Assumptions			High Price Assumptions		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Okitipupa Farm Settlement	2.2	7.3	10.1	5.3	10.8	18.9
2. Mbiri Farm Settlement	4.8	9.9	12.2	7.9	13.2	15.4
3. Igieduma School leavers' farm	36.9	50.2	55.9	45.1	57.9	63.5
4. Ushie School leavers' farm	36.9	50.2	55.9	45.1	57.9	63.5

^{1/} Estimated rates of return on investment when total costs do not include social-overhead costs.

Finally, Table 30 shows that when total costs do not include social-overhead costs, at a 6% opportunity cost of capital it is profitable for an individual farmer to invest in cocoa production in the Imariwo farm settlement under medium and high product price assumptions. With low product price assumptions, however, it is profitable for a farmer to invest only if the high yield assumption is achieved. At a 10% opportunity cost of capital, the investment is profitable only at a high product price assumption and also at a high yield and medium product price assumption. At an opportunity cost of capital of 15%, however, there is no profitable investment for the farmer since the internal rate of return to the producer even at a high yield and high product price assumptions is less than 15%, the opportunity cost of capital. With regard to economy as a whole, at a 6% opportunity cost of capital, investment in cocoa production is profitable on the basis of direct costs and direct returns to Nigeria. At a 10% opportunity cost of capital, investment in cocoa still represents a profitable investment even on the basis of direct costs and direct returns except at a low yield and low price assumptions. At a 15% opportunity cost of capital, however, the government would have to depend on indirect benefits for economic justification of investment in cocoa production under a low price assumption, and also at a low yield and medium price

Table 30. Estimated Rates of Return on Investment in Cocoa Production in Imeriwo Farm Settlement in Western Nigeria^{1/}

Item	Low Price Assumptions			Medium Price Assumption			High Price Assumption		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1. Returns to Producer	2.8	4.6	6.3	6.5	7.4	9.8	9.7	11.6	12.9
2. Returns to Nigeria	7.3	9.7	10.5	11.6	13.7	14.9	15.3	17.5	18.4

^{1/} Estimated rates of return on investment when total costs do not include social-overhead costs.

assumptions. Medium yield and high yield at a medium price assumption and all yield assumptions under a high price assumption represent profitable investment decisions on the basis of direct costs and direct returns.

In the farm settlement form of farm organizations, a low internal rate of return to the producer on an investment in cocoa and rubber-oilpalm in general will make such an investment unprofitable for an individual farmer, and the government will have to depend almost entirely on indirect benefits from the farm settlements form of organization for economic justification of the investments in the tree crops in terms of returns to the economy as a whole. In general, in the school leavers' farms, it is profitable for an individual farmer to finance investment in rubber-oilpalm because internal rates of return to the producer from the investment will be substantially higher than the opportunity cost of capital. In terms of returns to the economy as a whole, the investment in rubber-oilpalm represents a profitable investment, and the government does not need to rely on indirect benefits for economic justification of the investment.

Summary

In this chapter, we used a rate of return to compute internal rates of return on an investment in tree crops in the farm settlements and the school leavers' farms. The computed internal rates of return show that the rates of return on investments in tree crops (cocoa, rubber and oilpalm) are considerably higher in the school leavers' farms than in the farm settlements.

CHAPTER VII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to summarize the preceding chapters, draw general conclusions, and arrive at policy recommendations for investment in farm settlements and school leavers' farms in Western and Midwestern Nigeria.

Summary and Conclusions

Because of the colonial land policy of preserving land for Nigerian private farmers, the main source of growth in Nigeria's economic development from 1900-1960 as outlined in chapter two came from Nigerian private farmers who expanded export and food crops primarily through additional labor and land inputs with little assistance from an agricultural extension service, foreign aid, or government land settlement schemes.

Farm settlements were established in Western Nigeria, in 1959 with the primary objectives of increasing agricultural productivity and opportunities for employment. Subsequently, the Western region was split into two regions and in 1963, the Midwestern region came into being. Farm settlements continued in the Midwest and a new scheme was introduced: school

leavers' farms with objectives of increasing agricultural productivity and opportunities for employment.

Western and Midwestern Nigeria need information on the performance of these farm organizations to guide them in the preparation and implementation of their second development plan. Thus, in order to help provide such information, this study evaluated the performance of the farm settlements and the school leavers' farms in Western and Midwestern Nigeria. In making this evaluation the "regular" farm settlement scheme is contrasted and compared with less capital intensive schemes in the midwest, the school leavers' farms.

Three measures of performance, social-psychological characteristics of the farmers, efficiency of tree crop production and internal rates of return on investment in tree crops, training and housing were used to appraise the performance of agricultural production in the farm settlements and the school leavers' farms.

Results show that because of the highly centralized administrative system of the farm settlements in which major and many day-to-day farm decisions are made by government officers from a far away headquarters, the farmers in the farm settlements view their roles in the scheme as government

laborers rather than as private farmers. Moreover, despite heavy government expenditures on elaborate housing and the formal training of settlers in Farm Institutes, the farmers have poor general dispositions and low morale. By contrast, even though the farmers in the school leavers' farms lack housing and formal training in Farm Institutes, they have strong feelings of ego-involvement, feelings of ownership, good general dispositions and high morale. Such feelings have been caused mainly by the administrative system in the school leavers' farms which relies on individual farmers to carry out their own routine farm operations.

Turning to food crop production, in the farm settlements, the excessive use of hired labor has reduced the farmers' profit margin, while tools, seeds, and fertilizers have not been used enough to maximize profits in both the farm settlements and the school leavers' farms. In addition, social-psychological variables were highly significant statistically in explaining within-group variations in farm settlements with predominantly low gross-margins, but such variables were not statistically significant in explaining within-group variations in school leavers' farms with predominantly higher gross-margins. Finally, results show that a farmer in a school leavers' farms, *ceteris paribus*, is likely to have a higher gross-margin per acre than a farmer in a farm settlement.

Results of estimates of potential direct benefits from investment in tree crops (cocoa, rubber and oilpalm) including the rental value of the houses built in the farm settlements show that substantial expenditures on training, and administration yield very low returns in the farm settlements. As shown in Table 31, internal rates of return to producers on investment in tree crops range from less than -110% to 12.9%. In terms of returns to the economy as a whole, returns on investment in tree crops and the rental value of the houses built in the farm settlements range from about -101% to a maximum of 18.9%. It is clear that the margins of profit are such, even after taking into account the impact of marketing board taxes, that careful adjustment to economic optima is required for economic viability and survival. Further, it is clear that the regular farm settlers have not been generally successful in reaching these optima. Except under favorable prices and yields the government will have to depend almost entirely on indirect benefits from the farm settlement's form of organizations for economic justification of the investment in tree crops in the farm settlements.

In the school leavers' farms, the prospective internal rates of return on export crops to the producer and to the economy as a whole on investment were estimated to be generally high. Rates of return to producers range from a minimum of 10% to a maximum of 37.4% while rates of return to the economy as a whole range from 24.1% to 63.5%. The greater efficiency in the use of

Table 31. Estimated Minimum and Maximum Rates of Return to Producers and to Nigeria on Investment in Tree Crops in the Farm Settlements and School Leavers' Farms.^{1/}

No.	Name of Settlement	Rates of Return to Producers		Rates of Return to Nigeria	
		Minimum Rates of Return	Maximum Rates of Return	Minimum Rates of Return	Maximum Rates of Return
"Regular Farm Settlement"					
1	Okitipupa farm settlement	-110	7.3	-101	18.9
2	Mbiri farm settlement	-107	9.9	-6.8	15.4
3	Imariwo farm settlement	-102	12.9	0.6	18.4
"School Leaver"					
4	Igieduma school leavers' farm	9.8	37.3	24.1	63.5
5	Ushie school leavers' farm	9.8	37.4	24.1	63.5

^{1/} The sixth settlement studied is Ilora farm settlement. This is an arable farm settlement in which no tree crops are grown; hence, no internal rate of return on investment in tree crops was calculated for this settlement.

resources is due to the absence of relatively unproductive large capital investment in housing and amenities. It is profitable for an individual farmer to finance investment in tree crop production in school leavers' farms. In terms of returns to the economy as a whole from investment in tree crops in the school leavers' farms, the government does not need to rely on any form of indirect benefits for economic justification of its investment in the school leavers' project.

It is appropriate at this point to evaluate the possible indirect benefits that may be generated from the farm settlements' form of organization in terms of returns to the economy as a whole. The major problems in evaluating such indirect benefits however, are those of identifying such possible indirect benefits and relating their relative importance to the project's direct benefits with some degree of accuracy. McKean has noted that the best counsel is to include only those indirect benefits which are directly relevant and significant or those, even though indirectly related, which are clearly identifiable and measurable.^{1/} Since expected revenues from export taxation on

^{1/} Roland N. McKean, Efficiency in Government Through Operations Analysis, (New York: John Wiley and Sons, Inc., London, 1966), pp. 141-42.

tree crops have been incorporated in calculating direct benefits to Nigeria in this analysis and since rental values of the houses built have been accounted for, other types of indirect benefits to Nigeria that may result from the farm settlement's form of organization are in the form of "diffuse" effects. The diffuse effects that are frequently cited as possible indirect benefits from the farm settlement's form of organization include employment and "demonstration."

Wells has noted, however, that:

It is not sufficient to assume, as is often done, that beneficial indirect effects automatically justify a project. Some attempt to estimate the magnitude of the alleged effects should take place, and at least some questions should be asked about the direction in which they might act, or about variables in project evaluation upon which their realization might depend.^{2/}

Results from this study show that returns to an individual investing in either food or tree crops in the farm settlements are generally low and unprofitable. In addition, the farmers in the farm settlements have poor general dispositions, low morale and highly pessimistic views about the success of the scheme. Thus with respect to possible "demonstration" effects

^{2/} Jerome C. Wells, "An Appraisal of Agricultural Investments in the 1962-68 Nigerian Development Plan", (Unpublished Ph.D. thesis, University of Michigan: Ann Arbor, Michigan, 1964).

from the farm settlement's form of organization, it is hard to imagine private investors emulating an investment which is not directly and obviously profitable to them. By October, 1965, 43% of the total intake of farmers in Western Nigeria had left the farm settlements, even though they received a daily wage of 6s3^d, an equivalent of approximately £115 per annum.^{3/} This shows that the magnitude of possible indirect benefits to Nigeria from emulation of the farm settlement's form of organization appears small.

When the employment benefits of the farm settlements are considered, farm settlements do not seem to be important creators of employment. In mid-1964, for example, all the farm settlements in Western Nigeria employed only 1,170 farmers. In a region where over 50 percent out of 108,000 new primary six school leavers every year are unemployed, indirect benefits from employment effects in the farm settlement's form of organization appear insignificant.

In brief, indirect benefits to Nigeria from "demonstration" effects which could arrest the rural-urban flow of young people are likely to be small due to the unprofitability of investment

^{3/} A. Husein, "Western Nigerian Farm Settlements", (Ibadan: Western Nigeria Ministry of Agriculture, 1966), (Mimeographed).

in the farm settlements. In addition, employment benefits of the farm settlements are insignificant; hence the indirect benefits from the farm settlement's form of organization seem to be insignificant if indeed they do exist.

Thus in terms of combined direct and indirect benefits to the economy as a whole, when the farm settlements are viewed as investments carrying small indirect benefits, they do not seem economically sound. Farm settlements have the alleged advantage of ensuring the adoption of the latest techniques and therefore of achieving high yields per man and per acre. Unfortunately, these benefits do not seem to have been used to advantage; furthermore, the form of organization employed seems to make these benefits unlikely and positive rates of return on investments in tree crops, training and housing may not be possible. The school leavers' farms, on the other hand, represent profitable investments which are more likely to stimulate greater investments in export and food crops than take place in the farm settlements.

Finally, this study shows that a less capital intensive form of investment in agriculture involving less elaborate housing and training schemes and under a form of organization that relies more on farmers themselves will likely yield higher rates of return on investment.

Recommendations

1. Discontinue new investment in the farm settlement scheme as presently organized.

In its Draft of the Second National Development Plan 1968/69 - 1972/73, the Western Nigerian Government attaches top priority to farm settlements and proposes to spend ₦1,776,260 on farm settlements during this period. Huge sums of money already paid for land acquisition and crop compensation as well as possible reduction in unemployment of primary school leavers are cited as important justifications for new investments in the farm settlement scheme.^{4/} In view of the unprofitability of investment in the farm settlements in Western and Midwestern Nigeria, there appears to be no justification for new investments in the farm settlement scheme as presently organized.^{5/} In addition, when rural population is projected to increase at one million per year any benefits from a capital intensive scheme which are going to create employment for a small number of people will be narrowly distributed.

^{4/} "Second National Development Plan 1968/69-1972/73, (Ibadan: Ministry of Agriculture, 1967), pp. 1-2, (Unpublished document).

^{5/} The form of organization in Midwestern Nigeria farm settlements has recently undergone some modifications which appear to be moving in the right direction. These modifications were, however, just being implemented at the time of this study, and this probably explains why there are no significant differences between Western and Midwestern Nigeria farm settlements in this study.

2. Modifications in the farm settlements

When the farm settlement scheme as it has operated is evaluated on the basis of combined potential direct and indirect benefits from the scheme, except under extremely favorable yield and price assumptions, no monetary justification exists for the scheme to continue in operation. Modifications in the way they are operated however, would make the settlement less unprofitable and in some instances profitable. Further, neither private nor governmental decisions on such matters are based solely on monetary rationale. Non-monetary factors have to be considered, and they may take preference over monetary considerations in some circumstances. Viewing the farm settlement scheme therefore on the basis of monetary values, non-monetary values and political and social considerations, it will be in the best interest of both individual farmers and Nigerian governments if the existing farm settlements are modified as follows:

- (a) There should be a complete assessment of each farmer's holdings, obligations, and his house so that each farmer's property and indebtedness are known. A system of repaying the government's loans can then

be worked out and duly signed as a legal document by both parties. The present system in which no farmer in the farm settlements knows his indebtedness is unsatisfactory.

- (b) The present organization in which all decisions relating to labor and finance come from a far away headquarters should be modified to permit more decentralized decision making. Successful farming certainly demands a constant process of judgment-making in which sound technical and economic principles are applied with respect to particular time and place considerations. Decisions, therefore, need to be made close to the group and with minimum delay by those who bear responsibility for the outcomes. It is judged to be cheaper and more effective to build the decision-making competence into the farmers and to place the responsibility squarely on them. Recruitment of labor for routine farm operations should be left entirely in the hands of the farmers themselves.

In view of the fact that the expenditures incurred on hired labor are converted into loans charged to the farmers, farmers should be given the opportunity to economize on the use of labor so that they can minimize cost. In order to help private decision-makers do this, the "systems" should inform them as to what the cost is and exactly as to how they are responsible. If the organization relies more on the farmers for decision-making, these farmers are likely to develop a sense of commitment and a feeling of ownership; hence, their individual potentials could be tapped.

- (c) In view of the fact that substantial expenditures on training the farmers in the Farm Institutes have had no differential impact on rates of return on investment in the farm settlements as compared with school leavers' farms, the training of settlers in the Farm Institutes should be discontinued or

substantially reorganized. Many of the farmers look upon the Farm Institutes as means of extending their periods of free education at government expense while they are looking for white collar jobs in the big cities. This is reflected in the large number of trained settlers who have left the farm settlements. The type of training provided at the Farm Institute is such that the farmers are not prepared adequately for the rural life on the farm settlements. Consequently, the farmers find it very difficult, if not impossible, to adjust. Many become dissatisfied and leave. The present Farm Institutes should be reorganized and be used for refresher courses, seminars, and short-term courses for local farmers.

It is submitted that on-the-job training will have advantages over training in Farm Institutes, provided that formal lectures and demonstrations are included in the scheme. Apart from the saving in cost, on-the-job training exposes the farmers early to the work on their farms. On-the-job training also provides an opportunity for the farmers to share in the experience of establishing their farms from the start, and beginning

early to develop the spirit of cooperative action and community development. On-the-job training should, however, not be confined to giving technical information on the principles and practices of good husbandry and farm management; it should also include lectures on the philosophy, policy and objectives of the scheme.

- (d) The provision of adequate and comfortable accommodation for farmers and their families early in their lives on the settlements was considered a prerequisite for the success of the farm settlements scheme. Providing houses for the farmers in this nuclear type of settlement may be a reasonable incentive for the young farmers. One question, however, the wisdom of building the houses for the farmers and the timing of this form of incentive. . . . The houses cost about twice as much as those which the farmers would have built for themselves. Most of the farmers assumed that the houses were free gifts from the government, but they were told later that the cost has been charged to their accounts.

In order to keep the settlement's costs reasonably low, the farmers must construct their own houses.

Farmers could be given loans to build their own houses subject to zoning restrictions and code requirements after they have shown sufficient interest in their farming operations. Such loans seem to be better rewards than the building of expensive houses for farmers who will live in them for only a few months before leaving the settlements. The desire to make farming attractive to young school leavers, the desire for something to act as a show-piece for others to emulate as stated in the objectives for establishing the farm settlement scheme seem to have caused the planners of the farm settlements scheme to invest in building houses for the farmers. It is doubtful that the local farmers would emulate such an adventure. If farming is to be made attractive, it should be based on a sound economic foundation.

- (e) Multipurpose cooperative action, the main philosophy of the Moshav system which the farm settlement scheme is trying to emulate, is an essential aspect of the scheme. This means that the Cooperative Division should have been fully concerned with the farm settlement scheme from the start. It is a serious deviation from the principle of the farm settlement scheme for

the government to undertake the responsibility of selling products for the farmers. As reported in chapter four of this study, farm products from the farm settlements are marketed by the government. It is the duty of the Cooperative Division staff of the Ministry of Trade and Industry to provide multipurpose cooperative education and training for the farmers in the farm settlements. The farmers should have individual passbooks, should know how much they have saved, should have the pleasure of watching their savings grow and should enjoy the benefits of interest or dividend and credit facilities. The fact that a multipurpose cooperative society has not been established in the farm settlements is a serious weakness of the scheme. The objective of the Cooperative Division should be to organize the farmers into multipurpose cooperative societies which will assume the responsibilities for marketing, purchasing, supervising, auditing, and ultimately the whole function of business organization

- (f) The experience acquired from the "regular" farm settlement scheme has demonstrated that there are severe

limitations to increasing agricultural production through the farm settlements in Western and Mid-western Nigeria. Rates of return on investment are too low for any average farmer to imitate; the rural-urban flow of youths has hardly been affected, and the contribution to unemployment problems by the farm settlements has been insignificant. A reduction in costs and higher rates of returns on investment can be achieved in the farm settlements if there is a reduction in the personnel allocated to farm settlements and if the farmers have their own decision-making responsibilities. The displaced personnel should be engaged in paying more attention to the small local farmers who have been the driving force behind the process of economic development in Nigeria since the beginning of the 20th century.

- (g) The farm settlement scheme is not only an exercise in agricultural production, it is also an exercise in the

manipulation and organization of human beings and rural communities. Human beings should therefore not be regarded as an incidental part of economic activity. It is important for good relationship and efficient organization that officers on-site in the settlements hold monthly meetings to discuss progress made and know the requirements of the farmers. As reported in Chapter Four of this study, the officers in the farm settlements are only concerned with issuing instructions to the farmers and do not appear concerned about the general well-being of the farmers. The success of the scheme depends not only on the farmers, but also on the quality and dedication of the men who supervise the activities of the farmers, as well as the degree of understanding, cooperation and coordination which these supervisors receive from the headquarters. The personnel posted to the farm settlements must, therefore, receive training in human relations. In addition, personnel on-site in the settlements should be allowed to remain involved in their respective settlements for a long time because proficiency grows with experience.

3. Modifications in the School Leavers' Farms

The following recommendations are of special interest to the school leavers' farms.

- (a) The Rural Development Organizers in charge of the school leavers' farms are rather poorly trained for the important task assigned to them. Even though these men appear to be doing a good job, in terms of long-run benefits to the scheme, the supervisors on-site in the school leavers' farms need to be better trained in good husbandry practices, in human relations and cooperatives.
- (b) The farmers should be ensured that they will have their future acreage allotments next to their present farms. This requires that the government should assist the farmers to acquire a large area of land through the cooperation of the villagers.
- (c) The farmers in the school leavers' farms should have an all-purpose building for shelter in case of rains, and also for meetings, and for mid-day meals. Often the farmers are tempted to stay home after lunch rather than to go back to work, especially on a very sunny day.

- (d) The village leaders that form the "Block Council" in the school leavers' farms are doing a good job. This "Block Council" should be properly constituted as an advisory body for the school leavers' farms. In addition, means of stimulating their greater interest and their continued participation in the development program should be sought and implemented.

4. Implication for External Assistance Agencies

The prospective high rates of return on investment in tree crops in the school leavers' farms suggest it is desirable for external agencies such as USAID, CDC, etc. to consider supporting through loans the expansion of modified farm settlements and modified school leavers' forms of farm organization.

5. Modifications in Credit Systems

Even if external assistance is not forthcoming to offer loans, new credit organizations are needed to support the expansion of modified school leavers' farms and modified farm settlements. It is recommended that Nigerian Governments consider setting up new credit institutions which will offer farmers short-time and long-time loans which will be guaranteed by government, since neither the private nor the public agencies

as they are presently organized are willing to lend a sufficient amount of money to farmers who have little or no equity. The new credit institution should operate through a system of federal, and local agencies. There is need for a high degree of coordination between agricultural extension and the staff of these credit agencies. This new type of credit institution must be protected from political difficulties that have beset the previous credit organizations in Nigeria. Some useful guidelines to consider in establishing new credit institutions in Nigeria can be obtained from CSNRD credit report.^{1/}

6. Implications for Future Planners in Nigeria

An important issue now facing planners in Nigeria is the relative emphasis to be placed on the expansion of food and export crops. This research has demonstrated that expansion of export crops in Western and Midwestern Nigeria can effectively take place via modified farm settlements and school leavers' farms and probably via other forms. Unfortunately, there are

^{1/} Harold Bauman, Chan Connolly, and John Witney, "A Situation Report of Agricultural Credit in Nigeria", CSNRD-3 Report, Michigan State University, June 1966.

insufficient data at this time to estimate rates of return on investment in food crop production in any part of Nigeria; therefore, the final decision as to the most profitable means, ways, and location of producing food in Nigeria will depend on the results obtained from future research directed to economics of food crop production in Nigeria. A study on "The Livestock Human Nutrition Balance in Nigeria" by Smith, Dema and Idusogie, is in progress; this study is expected to provide guidance on this issue when it is completed.^{2/}

7. Need for Further Research

Although the objectives of this study have been restricted to farm settlements and school leavers' farms, planners preparing Nigeria's Second Development Plan need to sponsor research on estimating rates of return on investment in alternative farm organizations such as nucleus plantations, government plantations, and through input subsidies such as the fertilizer subsidy scheme which has achieved considerable success in Northern Nigeria.

^{2/} This study is under Sub-Project 3 of a number of studies being conducted by Consortium for the Study of Nigerian Rural Development.

BIBLIOGRAPHY

Books

1. Arensberg, Conrad M. and Arthur M. Niehoff, Introducing Social Change, (Chicago: Aldine Publishing Company, 1964).
2. Baldwin, K. D. S. The Niger ... Agricultural Project, (Oxford: Basil Blackwell, 1957).
3. Bauer, Peter. West Africa Trade: A Study of Competition, Oligopoly and Monopoly in a Changing Economy, (London: Routledge and Kegan Paul Ltd., 1963).
4. Bennis, W. G. "Toward a 'truly' Scientific Management, the Concept of Organizational Health", General Systems Yearbook, (1962).
5. Bryce, Murray D. Industrial Development: A Guide for Accelerating Economic Growth, (New York: McGraw-Hill, Inc., 1960).
6. Callaway, Archibald. "School Leavers and the Development Economy of Nigeria", The Nigerian Political Scene, R. O. Tilman and T. Cole (eds.), (Durham: Duke University Press, 1962).
7. Clifford, Sir Hugh. "Problems of Economic Policy, 1918-1939", Survey of British Commonwealth Affairs II, W.K. Hancock (ed.), (London: Oxford University Press).
8. Dean, Joel. Capital Budgeting, (New York: Columbia University Press, 1951).
9. ———. Managerial Economics, (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1951).
10. Edwards, A. L. Experimental Design in Psychological Research, (New York: Holt, Rinehart and Winston, 1965).
11. Ezekiel, M. and K. Fox. Methods of Correlation and Regression Analysis, (3rd edition; New York: John Wiley and Sons, 1959).

12. Furnivall, J. S. Colonial Policy and Practice, (Cambridge, England: The University Press, 1948).
13. Gaitskell, Arthur. Gezira: A Study of Development in the Sudan, (London: Faber and Faber, 1959).
14. Galletti, R., K. D. S. Baldwin and I. O. Dina, Nigerian Cocoa Farmers, (Oxford: Oxford University Press, 1956).
15. Hardy, C. O., Risk and Risk Bearing, (Chicago: University of Chicago Press, 1923), p. 54.
16. Hart, A. G., "Risk, Uncertainty, and the Unprofitability of Compounding Probabilities", Readings in the Theory of Income Distribution, (Philadelphia Pa.: The Blakeston Co., 1946), pp. 547-57.
17. Harwitz, M. and A. Herskovits (eds.), "Subsaharan Africa as a Growing Economic System," Economic Transition in Africa, (Evanston, Illinois: Northwestern University Press, 1964).
18. Helleiner, Gerald K. Peasant Agriculture, Government and Economic Growth in Nigeria, (Illinois: Richard Irwin, Homewood Illinois, 1966).
19. Johnston, Glenn L., and Curtis F. Lard, "Knowledge Situations", A Study of Managerial Processes of Midwestern Farmers, Glenn L. Johnson et. al., (Ames, Iowa: The Iowa State University Press, 1961), pp. 41-54.
20. Johnston, J. Econometric Methods, (New York: McGraw-Hill, Inc., London, 1963).
21. Knight, Frank H. Risk, Uncertainty and Profit, (New York: Houghton, Mifflin, 1958).
22. Lamartine-Yates, P. Forty Years of Foreign Trade, (London: Allen and Urwin, 1958).

23. Lutz, Fredrich and Vera. The Theory of Investment of the Firm, (Princeton: Princeton University Press, 1951).
24. Mayo, E. The Human Problems of Organizations, (New York: Viking, 1931).
25. McClelland, David. National Character and Economic Growth in Turkey and Iran, Lucion W. Pye (ed.), "Communication and Political Development", (Princeton: Princeton University Press, 1963).
26. McGregor, Douglas. The Human Side of Enterprise, (New York: McGraw-Hill, 1960).
27. McKean, Roland N. Efficiency in Government Through Systems Analysis, (New York: John Wiley and Sons, Inc., London, 1966).
28. Nicholls, William H. "The Place of Agriculture in Economic Development", Agriculture in Economic Development, Carl K. Eicher, and L. W. Witts (eds.), (New York: McGraw-Hill, 1964).
29. Niehoff, Arthur H. and Charnel J. Anderson, Peasant Fatalism and Socio-Economic Innovation, (Washington: Human Resources Research Office, George Washington University, 1965).
30. Oluwasanmi, H. A. Agriculture and Nigerian Economic Development, (Ibadan: Oxford University Press, 1966).
31. Rice, R. K. Productivity and Social Organization, (London: Tavistock Publication, 1958).
32. Tintner, Gerhard. Econometrics, (New York: John Wiley and Sons, Inc., 1952), p. 10.
33. Toynbee, Arnold J., A Study of History, (New York: Oxford University Press, 1947), pp. 140-160.
34. Ward, J. H., Jr. Multiple Regression Models, H. Borke (ed.), Computer Applications in the Behavioral Science, (Englewood Cliffs, N.J.: 1962).

35. Whitehead, T. W. The Industrial Worker, (Cambridge, Mass.: Harvard University Press, 1938).

Articles and Periodicals

1. Alchian, A. A. "The Rate of Interest, Fisher's Rate of Interest Over Cost, and Keynes' Internal Rate of Return", American Economic Review, XLV, (December, 1955), p. 939.
2. Aluko, Samuel A. "How Many Nigerians?" The Journals of Modern African Studies, Vol. 3, No. 3, (Cambridge: Cambridge University Press, 1965), pp. 371-92
3. Baldwin, Robert E. "Export Technology and Development from a Subsistence Level", Economic Journal, Vol. LXXIII, (March, 1963), pp. 80-92.
4. Eckstein, Otto. "Water Resource Development: The Economics of Project Evaluation", Harvard Economic Studies, Vol. CIV, (Cambridge, Mass.: Harvard University Press, 1961), pp. 97-99.
5. "Farm Settlement Scheme in Nigeria", Nigeria Trade Journal, (Lagos: January, 1962).
6. Kahn, Robert L. "The Prediction of Productivity", Journal of Social Issues, 12: 41-59 (1956), p. 44.
7. Krenin, E. "The Introduction of Israel's Land Settlement Plan to Nigeria", Journal of Farm Economics, Vol. 45, No. 3 (August 1963), pp. 535-46.
8. Lerner, Daniel, "The Passing of Traditional Society: Modernizing the Middle East", New York: Free Press, (August, 1958).
9. Lewis, Arthur W. "Thoughts on Land Settlement", Journal of Agricultural Economics, Vol. 11, (June, 1954), Reprinted in Carl K. Eicher and L. W. Witt (eds.), Agriculture in Economic Development, (New York: McGraw-Hill, 1964), pp. 299-310.

10. Lorie, James H. and Leonard J. Savage, "Three Problems in Rationing Capital", Journal of Business, XXVIII, (October, 1955), pp. 229-39.
11. Mann, F. C. "Studying and Creating Change: A Means to Understanding Social Organizations", Industrial Research Association, 13, (1957), pp. 146-67.
12. "Midwestern Nigeria", New York Times, (January 20, 1964), p. 63.
13. "Nigeria Works It Out", The Economist, (London: July 7, 1962), p. 44.
14. Trist, E. L. and K. W. Bamforth, "Some Social and Psychological Consequences of the Congwall Method of Coat-getting", Human Relations, No. 4, (1961), pp. 3-38.
15. Wickert, F. R. "Turnover and Employee's Feeling of Ego-Involvement", Personnel Psychology, XXV, (1959), pp. 185-97.

Public Documents

1. "Future Policy of the Ministry of Agriculture and Natural Resources", (sessional paper, Ibadan: Ministry of Agriculture and Natural Resources, 1959), No. 9, p. 1.
2. Prest, A. and A. Stewart, The National Income of Nigeria, 1950/51, (HMSO, 1953), pp. 27-61.
3. "Second National Development Plan: 1968/69 - 1972/73", (Draft) (Ibadan: Ministry of Agriculture and Natural Resources, 1967).
4. Western Region Official Document, No. 8 (1963), pp. 1-4.

Reports

1. Blanckenburg, Peter Von. "Rubber Farming in Benin Area, A Study of Some Socio-Economic Factors Influencing Rubber Production", (Preliminary Report, N.I.S.E.R.: Ibadan, 1963).
2. FAO. The Farm Settlement Scheme in Western Region: Report to the Government of Nigeria, (Rome: 1963), No. 1720.
3. FAO. Agricultural Development in Nigeria: 1965-1980, (Rome: October, 1966), p. 19.
4. Heckman, John H. USAID Consultant Report, No. C-45, (March, 1964).
5. Schmedtje, Jochen. "On Estimating the Opportunity Cost of Capital", I.B.R.D. (Mimeo, Draft, 1963), p. 50.
6. Webster, J. B. "Agege: Plantations and the African Church", Conference Proceedings, (Ibadan: N.I.S.E.R., March, 1962).

Unpublished Materials

1. Anshel, Kurt R. "Economic Aspects of Peasant Rubber Production in Midwestern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University, 1965).
2. Clark, John. Manual of Computer Programs, Research Services, (unpublished paper, Department of Communication, Michigan State University: 1964).
3. Eicher, Carl K. "The Dynamics of Long-Term Agricultural Development in Nigeria", (Unpublished paper presented at the Annual Meeting of American Farm Economic Association, Guelph: Ontario, August 13-16, 1967).
4. Husein, A. "Western Nigeria Farm Settlements", (Unpublished paper, (Ibadan: Ministry of Agriculture and Natural Resources, 1966).

5. Jefferey, Nugent B. and Grant B. Taplin. "Cooperatives in Nigeria", (Unpublished Report, Syracuse University, 1961).
6. Klayman, M. I. "The Transferability of the Israeli Moshav for the Agricultural Development of Other Countries", (Unpublished paper presented at the ADC Conference on Cooperatives, University of Kentucky: April 26-30, 1967).
7. MacFarlane, David and Martin Oworen, "Investment in Oilpalm Plantations in Nigeria: An Economic Appraisal", (Economic Development Institute: University of Nigeria, December, 1964), p. 84.
8. Rogers, Everett M. "Motivations, Values and Attitudes of Subsistence Farmers: Towards a Subculture of Peasantry". (Unpublished paper presented at the Agricultural Development Council's Conference on Subsistence and Peasant Economics, (Honolulu, Hawaii: East West Center; University of Hawaii, 1965).
9. Stickley, Thomas S. "Socio-economic Correlates of Levels of Living Among Farmers in Three Columbian Neighborhoods", (Unpublished M.S. Thesis, Columbus: Ohio State University, 1964).
10. Wells, Jerome C. "An Appraisal of Agricultural Investments in the 1962-68 Nigerian Development Plan", (Unpublished Ph.D. Thesis, University of Michigan: Ann Arbor, Michigan, 1964).
11. Welsch, Delane Emil. "The Rice Industry in the Abakaliki Area of Eastern Nigeria", (Unpublished Ph.D. Thesis, Michigan State University: 1964).
12. Yalan, E. "Planning of Agricultural Settlements in Israel", (Unpublished paper, Ibadan: Ministry of Agriculture and Natural Resources, 1960).

Other Sources

Letter from Orin J. Senville, Field Project Leader, (Consortium for the Study of Nigerian Rural Development, Lagos: Nigeria, August 17, 1967).

APPENDIX A

**QUANTITY OF SOME NIGERIAN AGRICULTURAL
EXPORTS 1900-1960**

Quantity of Some Nigerian Agricultural Exports 1900-1960 (Long tons)

Years	Cocoa	Palm		Rubber	Groundnut	Raw	
		Kernels	Oil			Cotton	Benniseed
1900	202	85,624	45,508	1,271	599	11	n.a.
1901	206	114,046	56,766	864	210	3	n.a.
1902	307	132,556	64,167	454	322	6	n.a.
1903	281	131,898	54,257	584	468	129	n.a.
1904	531	139,788	57,947	1,194	777	513	n.a.
1905	470	108,822	50,562	1,390	790	615	126
1906	723	113,347	57,260	1,533	1,661	1,204	185
1907	933	133,630	65,473	95	1,936	1,826	330
1908	1,366	136,558	70,460	5	1,654	1,024	314
1909	2,241	158,849	82,130	62	1,615	2,247	388
1910	2,932	172,907	76,851	1,176	995	1,106	308
1911	4,401	176,390	79,387	966	1,179	999	468
1912	3,390	184,625	76,994	705	2,518	1,952	472
1913	3,621	174,718	83,090	511	19,288	2,840	1,209
1914	4,939	162,452	72,531	1,665	17,997	2,522	1,490
1915	9,105	153,319	72,994	248	8,910	1,204	616

Years	Palm			Palm		Rubber	Groundnut	Raw	
	Cocoa	Kernels	Oil	Oil				Cotton	Benniseed
1916	8,956	161,439	67,422	396	50,368	3,328	1,581		
1917	15,442	185,998	74,619	392	50,334	2,357	273		
1918	10,219	205,167	86,425	157	57,554	661	42		
1919	25,711	216,913	100,967	398	39,334	3,011	2,853		
1920	17,155	207,010	84,856	492	45,409	3,257	1,150		
1921	17,944	153,354	52,771	85	50,979	5,721	1,196		
1922	31,271	178,723	87,609	124	23,890	2,947	1,410		
1923	32,821	223,172	99,439	214	22,887	3,135	2,988		
1924	37,205	252,847	127,083	522	78,266	4,639	4,263		
1925	44,705	272,925	128,113	950	127,266	6,636	1,942		
1926	39,099	249,100	113,267	1,594	126,799	8,966	4,120		
1927	39,210	257,206	113,240	1,997	90,773	4,977	3,220		
1928	49,163	246,638	127,111	2,294	103,161	3,748	5,213		
1929	55,236	251,477	131,845	1,974	147,379	5,865	6,373		
1930	52,331	260,022	135,801	2,177	146,371	8,003	9,548		

Years	Cocoa	Palm		Rubber	Groundnut	Raw	
		Kernels	Oil			Cotton	Benniseed
1931	52,806	254,454	118,179	1,821	159,739	3,515	5,908
1932	71,039	309,061	116,060	845	188,123	1,191	10,416
1933	60,737	259,945	128,696	1,007	204,606	4,403	9,658
1934	77,982	289,447	112,773	1,613	244,852	5,852	12,646
1935	88,143	312,746	142,628	2,059	183,993	10,847	13,186
1936	80,553	386,145	162,778	2,173	218,389	11,110	11,485
1937	103,216	337,749	145,718	2,573	325,929	9,588	10,545
1938	97,104	313,048	110,243	3,135	189,136	5,724	17,744
1939	113,841	299,943	121,042	2,778	147,263	4,384	15,158
1940	89,737	235,521	132,723	2,902	169,480	9,331	8,070
1941	104,681	378,124	127,778	2,055	247,176	10,235	8,793
1942	59,937	344,569	151,287	6,667	194,190	18,517	22,094
1943	87,487	331,292	135,268	7,365	142,152	7,152	12,535
1944	70,051	313,530	124,829	9,395	156,194	4,328	3,775
1945	77,004	292,588	114,199	10,519	176,242	1,060	6,738

Years	Cocoa	Palm Kernels	Palm Oil	Rubber	Groundnut	Raw Cotton	Benniseed
1946	100,186	277,242	100,885	11,448	285,668	6,612	7,334
1947	110,793	316,376	125,954	7,445	255,866	5,248	5,698
1948	91,449	327,174	139,204	8,019	245,155	4,635	7,542
1949	103,637	375,835	170,145	6,958	378,321	9,984	19,385
1950	99,949	415,906	173,010	13,562	311,221	12,623	14,372
1951	121,487	347,013	149,752	20,856	141,359	15,374	11,265
1952	114,731	374,163	167,288	18,331	260,444	19,296	13,463
1953	104,671	402,872	201,345	21,260	326,725	17,707	12,250
1954	98,373	464,111	208,482	20,900	427,868	25,959	15,221
1955	88,413	433,234	182,143	30,380	396,904	33,174	12,978
1956	117,133	451,069	185,235	38,149	448,084	27,852	22,195
1957	135,300	406,200	166,200	39,992	302,388	25,196	19,212
1958	87,684	441,228	170,508	41,206	513,180	33,705	12,204
1959	142,800	430,608	163,692	53,374	498,228	36,884	18,096
1960	154,176	418,176	183,360	57,229	332,916	26,974	27,276

Source: Gerald K. Helleiner, Peasant Agriculture, Government and Economic Growth in Nigeria, Richard Irwin, Homewood, Illinois, 1966, pp. 501-509.

APPENDIX B

**VALUE OF SOME NIGERIAN AGRICULTURAL
EXPORTS 1900-1960**

Value of Some Nigerian Agricultural Exports 1900-1960 (£000's)

Years	Cocoa	Palm Kernels	Palm Oil	Rubber	Groundnut	Raw Cotton	Benniseed
1900	9	834	681	186	4	0.5	n.a.
1901	8	948	813	122	1	0.2	n.a.
1902	11	1,274	958	56	2	0.2	n.a.
1903	10	1,094	848	77	3	7	n.a.
1904	19	1,278	929	182	5	15	n.a.
1905	17	1,090	858	248	7	16	1
1906	27	1,194	1,002	307	13	42	1
1907	48	1,658	1,314	245	18	97	2
1908	51	1,425	1,144	99	15	53	2
1909	72	1,816	1,447	109	15	103	3
1910	101	2,451	1,742	312	9	78	2
1911	165	2,574	1,697	179	10	67	4
1912	131	2,797	1,655	125	19	103	3
1913	157	3,110	1,854	90	175	159	9

Years	Palm		Palm		Rubber	Groundnut	Raw	
	Cocoa	Kernels	Oil				Cotton	Benniseed
1914	172	2,541	1,572	39	179	161	12	
1915	314	1,693	1,462	38	72	56	5	
1916	393	1,740	1,403	34	474	244	17	
1917	499	2,582	1,883	32	710	234	3	
1918	236	3,226	2,704	20	920	97	1	
1919	1,068	4,948	4,246	44	699	485	54	
1920	1,238	5,718	4,677	57	1,120	717	16	
1921	436	2,832	1,656	10	1,112	369	17	
1922	871	2,810	2,676	14	481	271	20	
1923	922	3,741	2,982	21	403	397	50	
1924	980	4,461	3,944	52	1,461	762	64	
1925	1,484	4,937	4,166	108	2,394	797	26	
1926	1,363	4,440	3,616	203	2,343	1,182	62	
1927	1,999	4,439	3,375	256	1,630	331	49	
1928	2,421	4,423	3,751	256	1,849	349	77	
1929	2,306	4,265	3,767	164	2,466	543	92	
1930	1,756	3,679	3,250	150	2,196	n.a.	n.a.	

Years	Palm			Raw		
	Cocoa	Kernels	Oil	Rubber	Groundnut	Cotton
1931	1,093	2,132	1,542	71	1,511	153
1932	1,461	2,696	1,514	31	1,874	52
1933	1,144	1,899	1,384	33	2,064	193
1934	1,290	1,591	885	44	1,860	n.a.
1935	1,584	2,245	1,656	62	2,093	n.a.
1936	1,997	3,637	2,079	90	2,847	n.a.
1937	3,660	3,648	2,364	132	4,056	492
1938	1,572	2,172	984	132	1,308	252
1939	1,776	1,873	930	128	1,048	191
1940	1,583	1,500	1,099	265	1,476	621
1941	1,769	2,283	1,047	245	2,140	619
1942	1,043	2,458	1,427	664	1,688	1,127
1943	1,542	3,117	1,587	794	1,475	437
1944	1,338	3,637	2,030	1,070	2,013	264
1945	2,150	3,496	1,894	1,220	2,696	63
1946	3,780	4,164	2,052	1,404	5,676	540
						108
						152
						117
						70
						83
						189
						137
						44
						79
						72

Years	Palm		Palm		Rubber	Groundnut	Raw	
	Cocoa	Kernels	Oil				Cotton	Benniseed
1947	10,656	9,491	5,038		677	6,397	520	142
1948	17,859	11,451	9,048		719	9,806	476	302
1949	14,697	16,913	11,910		591	18,916	1,448	969
1950	18,984	16,694	12,072		2,835	15,237	2,975	704
1951	31,381	20,059	12,949		7,483	9,321	4,950	652
1952	28,666	22,767	17,091		4,139	22,114	6,734	1,133
1953	24,858	22,185	13,020		3,287	24,928	5,518	797
1954	39,261	22,791	13,431		2,907	29,900	7,350	975
1955	26,187	19,196	13,151		5,577	23,134	9,380	883
1956	23,985	20,440	14,866		6,409	27,764	7,113	1,392
1957	26,036	17,959	13,801		7,022	20,139	6,337	1,366
1958	26,668	20,450	12,663		7,627	26,948	7,845	890
1959	38,289	25,971	13,808		11,608	27,472	7,301	1,157
1960	36,772	26,062	13,982		14,239	22,878	6,207	1,851

Source: Ibid.

↑

↔

↔

↑↑

↔

↔

↔

APPENDIX C

QUESTIONNAIRE

APPENDIX C QUESTIONNAIRE

	<u>Column</u>	<u>Code Number</u>
Project No. _____	(1-2-3)	_____
Respondent No. _____	(4-5-6)	_____
Card No. _____	(7)	_____
Group I: Locations 1 _____		
2 _____	(8)	_____
3 _____		
4 _____		
Group II: Locations 5 _____	(9)	_____
6 _____		
Date _____		
Interviewer No. _____		

Good day, I am from the Nigerian Institute of Social and Economic Research. We are conducting a survey to learn how to improve conditions in Nigeria. We are speaking to some of the farmers in this settlement to learn more about the conditions of farmers. I would like to ask you a few questions privately, and my first question is:

(INTERVIEWER: If respondent answers 'no' and you see indications of a poor interview situation, such as company, small children playing around, etc., make some mention of the difficulty (if appropriate) and then ask:)

Is there some time between now and (Tuesday, for example) that would be more convenient for you? I'd be glad to come back and talk to you at any time you mention.

(If this situation is suitable and the respondents is willing to talk with you, then you can sit with him and proceed as follows:)

For the purpose of this investigation, the answers of all persons who will be questioned are important. If you know very little or nothing about the questions, your answers are important. If you know a great deal about them, your answers are even more important.

As you can very well see, this questionnaire is completely anonymous, you may answer all of the questions freely without any concern about being identified. It is very important to this study to obtain your answer to every question.

1. How old are you? _____ (10-11) _____

2. What is your marital status? (please circle only one)

Married.....3

Single.....2

Divorced.....1

Widower.....0

(12) _____

3. If married, how many wives do you have? _____

(13) _____

4. How many children do you have? (Please indicate their ages as well).

<u>Children</u>	<u>Age</u>	<u>Years of School</u>	(14)
_____	_____	_____	_____

5. How many years of complete _____

(a) School did you have? _____

(b) Which certificate did you receive? _____

Secondary..... 3

Modern Secondary..... 2

Elementary..... 1

None..... 0

Other (specify)..... _____

(15) _____

6. What is your religion?

- (a) Catholic.....3
 Protestant.....2
 Moslem.....1
 Traditional.....0
 Other (specify)...._____ (16) _____

(b) Would you say religion is important to you in your daily life? (Unless Don't know, proceed).

(c) Would you say it is very or fairly important or unimportant?

- Very important.....4
 Fairly important.....3
 Don't know.....2
 Fairly unimportant....1
 Very unimportant.....0 (17) _____

7. (a) How many times since last November have you been to see an officer of this settlement about the operation of your farm?_____ (18) _____

(b) How many times since last November have officers in this settlement come to see you about the operations of your farm?_____ (19) _____

(c) How many times since since November have there been meetings of both the settlers and the officers of this settlement?____ (20) _____

(d) How many times since last November have there been meetings of only the settlers in this farm settlement? _____ (21) _____

(e) Would you say the meetings in which both the officers and the settlers are present are useful to you in your farm operations?

(2) YES (0) NO (1) DON'T KNOW (22) _____

(f) Would you say the meetings in which only the settlers are present are useful to you in your farm operations? (2) YES (0) NO (1) DON'T KNOW (23) _____

(g) Which type of group meeting would you say is more useful to you in your farm operations -- the type with the settlement officer and settlers present or the type with only your fellow settlers present?

(1) Both settlement officer and settler present.

(2) Only fellow settlers present.

(3) Don't know.

(24) _____

8. (a) Extension experts say adding fary yard manure to the soil results in more to your crops. If you could add these manures to your farmland at a small cost to you, would you be willing to have the manure added?

Yes.....3

Maybe.....2

Don't know...1

Not at all...0

(25) _____

(b) Are you favorable to the use of artificial insemination as a means of improving the breed of livestock? (Unless Don't Know) would you say very or only somewhat favorable/unfavorable?

Very favorable.....4

Somewhat favorable.....3

Don't Know.....2

Somewhat unfavorable....1

Very unfavorable.....1

(26) _____

(c) Do you think it is important that the supervisors, or organizers (e.g., Senior Agricultural Superintendent, Agricultural Superintendents, and Agricultural Assistants) of this farm settlement be changed regularly, even if they are doing a good job?

Very important.....4

Fairly important.....3

Don't know.....2

Not very important....1

Not at all important...0

(27) _____

9. (a) Do you use hired labor on your farm? (Please circle one) 1 (YES) (proceed with b) 0 NO (skip to Q.e)
(28) _____

(b) Who hires the labor? 1 Self
0 Officer

(29) _____

(c) Do you take part in such decisions as regards hiring labor on your farm? (Please circle one).
1 YES 0 No
(30) _____

(d) Do you like to be consulted about whether to use hired labor on your farm? 1 YES
(Proceed with Q.e) 0 NO (skip to Q. f)
(31) _____

(e) How important is it to you to be consulted about decisions pertaining to hiring labor on your farm? (Please circle only one).

Very important.....4
Fairly important.....3
Don't know.....2
Not very important.....1
Not at all important....0

(32) _____

(f) In general, do the officers on this farm settlement often seek your opinion in matters concerning the operation of the settlement?
(Please circle only one).

Always.....4
Sometimes.....3
Don't know.....2
Seldom.....1
Not at all.....0

(33) _____

10. (a) Before you started farming in your unit, was any clearing done on the farm? (Please circle one).
1 YES (proceed with Q.b) 0 NO (skip to Q.11)
(34) _____

(b) Who cleared the land?

1. Self 2. Communally 0. Govt. (35) _____

(c) About how much did you pay all together to these people for helping you clear all your land £ _____.
Don't know = 9

(36-37) _____

11. (a) Which farm tools and implements do you have on this farm?

1 Modern 0 Traditional (38) _____

12. (a) Do you have a house of your own? (Please circle one). 1 YES (proceed to Q.b) 0 No (skip Q.13) (39) _____

- (b) Who built the house? (Please circle one).
1 Self (skipt to Q.g) 0 (Govt. (Proceed with Q.c) (40) _____

- (c) Do you know how much it cost to built the house? (Please circle one). 1 YES 0 NO (41) _____

- (d) Have you paid any money for the building of the house? (Please circle one). 1 YES 0 NO (42) _____

- (e) How much have you paid? (Please circle one)
£_____ Don't know = 9 (43-45) _____

- (f) How much do you still owe on the house? (Please circle one). £_____ Don't know = 9 (46-48) _____

13. (a) Do you owe the Government any money for the establishment and maintenance of your farm and house? (Please circle one). 2 YES (proceed with Q.b) 0 NO (skip to Q.14) 1 DON'T KNOW (skip to Q.14) (49) _____

- (b) How much do you owe the farm settlement?
£_____ Don't know = 9 (50-52) _____

- (c) Do you pay back this money installmentally from your own pocket or is it deducted from your earnings before you see it? (Please circle only one). 1 Pay from own pocket (skip to Q.14) 0 Deducted from earnings (proceed with Q.d) (53) _____

- (d) Do you know how much is usually deducted from your money? (Please circle one). 1 YES 0 NO (54) _____

14. (a) Suppose you needed to borrow some money, say, to buy some cows or perhaps to fence your farm, is there any organization in this settlement that you could approach for such an amount? 1 YES (Proceed with Q.b) 0 NO (skip to 0.15) (55) _____
- (b) Do you belong to any of such organizations in this settlement where you can go to borrow money? 1 YES 0 NO (56) _____
- (c) In your opinion, are the credit facilities available in this settlement adequate for farmers who wish to develop and modernize their land? (Please circle one). 1 YES 0 NO (57) _____
15. (a) Do you raise poultry on your farm? 1 YES (Proceed with Q.b) 0 NO (skip to Q.d) if married, (skip to Q.16) if not married. (58) _____
- (b) Who manages the poultry? (Please circle one) 1 Self 2 Wives 3 Hired Labor (If wife, proceed with Q.c; if self or hired labor, skip to Q.d). (59) _____
- (c) Do you regard the income from the sales of this poultry as your own or your wife's or both wife's? 0 Own 1 Both (60) _____
- (d) Does your wife have any other sources of income of her own apart from poultry keeping? (Please circle one). 1 YES 0 NO (61) _____
- (e) What are these other sources of income? (Please list)
- Petty Trading.....1
 Farm work.....1
 Other (please specify)..._____ (62) _____

- (f) Do you think it is important for your wife to have her own source of income independent of yours?
 (Unless don't know) _____
 How important is this feeling you have just expressed above to you?
 Very important.....4
 Fairly important.....3
 Don't know.....2
 Not very important.....1
 Not at all important....0 (63) _____

CARD 11

(10)
 (1-9) _____

16. (a) What is your total cash income, before taxes, earned since last November? Include income from any regular sources. Make the best estimate you can.
 £ _____ (10-11-12) _____

- (b) How much are your taxes per year £ _____
 (13) _____

- (c) About how do you think your income compares with your mates or friends of same education who are not on this farm settlement but who are working in the towns? (Please circle one)

Don't know.....5 (Repunched to median)
 Much higher.....4
 Higher.....3
 About the same.....2
 Lower.....1
 Much lower.....0 (14) _____

- (d) Which of the following requisites do you consider most important to make your life happier and satisfactory in the future? (Please circle only one).

More money.....1	0	(15)	_____
More friends.....1	0	(16)	_____
Better job.....1	0	(17)	_____

Good health.....1	0	(18)	_____
Don't know.....1	0	(19)	_____
Importance in community.....1	0	(20)	_____
Security.....1	0	(21)	_____
Other (please specify)...			_____

(INTERVIEWER: Hand respondent card showing ladder. Point to top of ladder each time you mention it. (Top of ladder is step number 10). Point to bottom of ladder each time you mention it. While you ask a question, move your finger up and down ladder).

17. Now here is a picture of a ladder. Suppose we say that at the top of the ladder stands a person who is living the best possible life, and at the bottom stands a person who is living the worst possible life.

- (a) What step on the ladder do you feel you personally stand at the present time? Step Number _____
(22)
- (b) What step on the ladder would you say you stood five years ago? Step Number _____
(23)
- (c) What step do you think you will be on the ladder five years from now? Step Number _____
(24)

Now let's change the things which stand at the top and bottom of this ladder. Suppose we say that the top of the ladder represents your greatest hopes for this farm settlement and the bottom represents your worst fears for this farm settlement.

- (a) What step do you think the farm settlement stands on the ladder at the present time? Step Number _____
(25)
- (b) What step did the farm settlement stand on the ladder five years ago? Step Number _____
(26)
- (c) What step do you think the farm settlement will stand on the ladder five years from now? Step Number _____
(27)

Suppose at the top of the ladder stands a person who is completely free from worry about the future, who feels confident and unworried-in other words, secure. At the bottom of the ladder is a person with little or no security.

- (a) What step do you stand on the ladder right now?
Step Number _____ (28) _____
- (b) What step would you say you stood on five years ago regarding your feelings of security?
Step Number _____ (29) _____
- (c) What step do you think you will be on five years from now? Step Number _____ (30) _____

Let's consider the ladder again. At the top of the ladder stands a person who earns enough money to pay for all his needs, and at the bottom of the ladder stands a person who earns too little money to pay for any of his needs. In terms of income, where would you place yourself?

- (a) Right now.....Step No. _____ (31) _____
- (b) Five years ago.....Step No. _____ (32) _____
- (c) Five years from now.Step No. _____ (33) _____

18. If you receive a money gift today which is equal to the amount of money you earn in a whole year in your present work, would you:

(INTERVIEWER: Read alternatives, a, b, c, to the respondent who should pick just one. If he does not know, mark d).

- (a) Invest most of it in a business where you stand the chance of either losing almost all the money or gaining substantial profits that will almost double the money?

2 _____

- (b) Put most of it in a bank or other business where you stand the chance of either losing just a small part of the money or gaining some little profit?

3 _____

(c) Not invest it in any business at all?

1 _____

(d) No answer. (Don't know)

0 _____ (34) _____

19. (a) Some people say planning only makes a person unhappy because your plans hardly ever work out anyway. Other people say that you must plan so that things will work out so that you will be happy. Do you think it is important to plan for the future?

Very important.....4

Fairly important.....3

Don't know.....2

Not very important.....1

Not important at all....0

(35) _____

- (b) Some people say it is luck that determines a man's success. Do you agree with this statement?

Disagree strongly.....4

Disagree slightly.....3

Don't know.....2

Agree slightly.....1

Agree strongly.....0

(36) _____

- (c) Do you think that man can control his own future?

Yes.....4

Maybe.....3

Don't know.....2

Probably not.....1

Not at all.....0

(37) _____

20. Now I'm going to read some statements to you. I would like you to tell me what your feeling on each statement is; that is, tell me if you agree or disagree with the statement.

- (a) Sometimes I feel all alone in the world:

Disagree strongly.....4
 Disagree slightly.....3
 Don't know.....2
 Agree slightly.....1
 Agree strongly.....0

(38)

- (b) There is little chance to get ahead in this life unless a man knows the right people.

Disagree strongly.....4
 Disagree slightly.....3
 Don't know.....2
 Agree slightly.....1
 Agree strongly.....0

(39)

- (c) Sometimes I have the feeling that other people are using me.

Disagree strongly.....4
 Disagree slightly.....3
 Don't know.....2
 Agree slightly.....1
 Agree strongly.....0

(40)

- (d) There is very little persons like myself can do to improve the general opinion of this farm settlement.

Disagree strongly.....4
 Disagree slightly.....3
 Don't know.....2
 Agree slightly.....1
 Agree strongly.....0

(41)

- (e) I think each of us in this farm settlement can do a great deal to improve the condition of things.

Agree strongly.....4
 Agree slightly.....3
 Don't know.....2
 Disagree slightly.....1
 Disagree strongly.....0

(42)

21. (a) Apart from the farm you have in this settlement do you have private farm outside the settlement?

0 YES 1 NO

(43)

- (b) How many acres is the farm you have outside the settlement? ____ Acres (44) _____
22. (a) Do you exchange labor with others on this settlement for any farm work? 1 YES (proceed with Q.b) 0 NO (skip to Q.23). (45) _____
- (b) For which of these jobs do you exchange labor?
- | | | |
|------------------------|------|-------|
| (1) land clearing..... | (46) | _____ |
| (2) planting..... | (47) | _____ |
| (3) harvesting..... | (48) | _____ |
| (4) weeding..... | (49) | _____ |
23. (a) Has anything been sold from your farm since you started this farm? 1 YES (Proceed with Q.b) 0 NO (skip to Q.24) (50) _____
- (b) Who sells these products?
- | | | |
|--------------------------|---|------------|
| Self..... | 2 | |
| Wife..... | 1 | |
| Other (please specify).. | 0 | (51) _____ |
- (c) To whom do you often sell your products?
- | | | |
|-------------------------|---|------------|
| Other..... | 1 | |
| Govt. or its agent..... | 0 | (52) _____ |
- (d) Do you often know for how much these products are sold after they have been sold? 1 YES 0 NO (53) _____
24. (a) Do you have any savings? 1 YES (Proceed with Q.b) 0 NO (Skip to Q. 25) (54) _____
- (b) Where do you save this money?
- | | | |
|------------------------|---|------------|
| Cooperative..... | 2 | |
| Public bank..... | 1 | |
| Self..... | 0 | |
| Other (please specify) | | (55) _____ |
- (c) About how much do you save every month?
- £ _____ (56-57) _____

(d) Who tells you how much to save every month?

Nobody.....2

Fellow farmers.....1

Officer.....0

Other (please specify)

(58)

25. (a) Do you work on this settlement?

1 YES (Proceed with Q.b) 0 NO (skip to
Q.26) (59)

(b) Who owns the farm on which you work everyday?

3 Self 2 Both 1 Don't know

0 Government

(60)

(c) Who will have the money realized from this farm?

3 Self 1 Don't know 2 Both (self & Govt.)

0 Government

(61)

(d) You told me that you work on this farm, in what capacity do you work?

As the owner?.....2

As a supervisor?.....1

As a laborer?.....0

(62)

26. (a) For about how many hours did you work on your farm this last week? _____ hours

Don't know = 9

(63)

(b) Are you told the amount of work or the operations you have to do on your farm every week?

1 YES (Proceed with Q.c) 0 NO (skip)

(64)

(c) Do you always finish the work or operations assigned to you every week? 1 YES 0 NO

(65)

(d) Why didn't you finish the work?

Too much.....1

Not enough time..0

Other (please specify)

(66)

27. Do you have any farm apart from the farm government established for you?

2. YES 1. NO (Discontinue the interview)

28. Where is this other farm you said you have?

2. On the settlement 1. Outside the settlement

29. What crops do you plan on this other farm and how many acres is each of them?

<u>Crops</u>	<u>No. of Acres</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

Others. (please specify)

30. Do you have poultry in this your second farm?

2. YES 1. NO (Skip Question 5)

31. What is the size of this poultry unit?

_____ layer units

32. How many acres is the size of this your second farm?

_____ acres

33. Do you have any other livestock apart from poultry?

2. YES 1. NO (Skip Question 8)

34. What is the size of this livestock?

_____ (In units of livestock)

35. Do you hire labor on this your second farm?

2. YES 1. NO (Skip Question 10)

36. How much have you spent on hired labor since November last year?

_____ (Amount in shillings)

37. How much do you think you spent on hired labor from November 1964 to November 1965?

_____ (Amount in shillings)

38. How much do you pay per day when you hire labor on your farm?

_____ (Amount in shillings)

39. Do you keep a record of this expenditure?

2. YES (Proceed with Question 14)

1. NO (Skip Question 14)

40. Will you like me to see this record?

2. YES 1. NO

If respondent answers "yes" ask for the record and look through it. If respondent answers "no" ask for his reason.

41. How much have you spent since November last year in buying the seeds you planted on your farm?

_____ (Amount in shillings)

42. How much do you think you spent from November 1964 to November last year in buying seeds to plant on your farm?

_____ (Amount in shillings)

43. Did you plant any new crop this year?

2. YES 1. NO (Skip Question 18)

44. How much did you spend in planting these new crops?

_____ (Amount in shillings)

45. Have you added this amount to your earlier estimate for 1965/1966?

2. YES 1. NO

If respondent answers "no" adjust for this in 1965/66 estimates.

46. How much have you spent on your poultry unit since November last year? Include cost of layers, poultry mash, and other costs.

_____ (shillings)

47. How much do you think you spent from November 1964 to November 1965 on similar items?

_____ (shillings)

48. How much did you spend on your other livestock since November last year?

_____ (shillings)

49. How much did you spend on this other livestock from November 1964 to November 1965?

_____ (shillings)

50. Do you use fertilizer in this your second farm?

2. YES 1. NO (Skip Questions 25 to 27)

51. From where do you often buy this fertilizer?

2. Government 1. Other (please specify)

52. How much did you spend on fertilizer on this your second farm since November last year?

_____ (shillings)

53. How much did you spend on fertilizer from November 1964 to November 1965?

_____ (shillings)

54. Is there any other money you spent on this your second farm which you have not mentioned?

2. YES 1. NO (Skip Questions 29 and 30)

55. How much do you think this additional cost you have not mentioned is since November last year?

_____(shillings)

56. How much do you think this additional cost will be from November 1964 to November 1965 if there were such costs?

_____(shillings)

57. Which tools do you use on this your second farm and what are their costs?

Hoe	1. _____	(shillings)
Cutlass	2. _____	
Shovels	3. _____	
Knives	4. _____	
Space	5. _____	
Others (please specify)		

Total Cost _____

58. When did you buy these tools?

196_____

59. Did you buy any new tools this year?

2. YES 1. NO (Skip Question 34)

60. How much did you pay for these new tools and what are they?

_____(shillings)

61. Did you use any machine on this your personal farm?

2. YES 1. NO (Skip Question 36)

62. How much did you pay since last November last year for using these machines?

_____ (shillings)

63. How much did you pay from November 1964 to November 1965 for using these machines?

_____ (shillings)

64. Has anything been sold from this your second farm?

2. YES 1. NO (Discontinue the interview)

65. Who sells these things?

- 3. Self
- 2. Wife
- 1. Self and wife
- 0. Other (please specify)

66. If you do not sell these products, do you always know for how much they are sold?

2. YES 1. NO

67. Is the money always given to you?

2. YES 1. NO

68. How much have you realized from the sales of your crops since last November?

<u>Crops</u>	<u>Total sales</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. Other (please specify) _____	_____

69. How much did you realize from the sales of these crops from November 1964 to November 1965?

<u>Crops</u>	<u>Total Sales</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. Other (please specify) _____	_____

70. How much have you realized from the sales of your poultry products since November last year?

layers	_____ (shillings)
pullets	_____ (shillings)
eggs	_____ (shillings)
Others (please specify)	_____ (shillings)

71. How much did you realize from the sales of these poultry products from November 1964 to November 1965?

layers	_____ (shillings)
pullets	_____ (shillings)
eggs	_____ (shillings)
Others (please specify)	_____ (shillings)

72. How much have you realized from your other livestock since November last year.

_____ (shillings)

73. How much did you realize from these livestock from November 1964 to November 1965?

_____ (shillings)

74. Do you realize money from any other source(s) from this your second farm that you have not mentioned to me?

2. YES 1. NO (Skip Questions 49 to 51)

75. Which are these sources? Please name them: _____

76. How much have you realized from these additional source(s) since November last year?

_____ (shillings)

77. How much did you realize from these additional sources from November 1964 to November 1965?

_____ (shillings)

78. How many members of your family help you to do some work on this your second farm?

_____ If respondent answers "none" skip to Question 53.

79. Does this number you have given me include your brothers and cousins?

2. YES 1. NO (Skip Question 54)

80. How many brothers and cousins are included in this number then?

81. How much do you spend every month for your food?

_____ (shillings)

82. Does this amount include the cost of feeding your family?
I mean those living with you on this settlement.

2. YES (Skip to Question 57)
1. NO (Proceed with Question 55)

83. How much do you spend altogether on food every month then?

_____ (shillings)

84. Do you obtain any of the items for your food from this second farm?

2. YES 1. NO

85. What do you think is the percentage of your food items that you obtain from this your second farm?

- 4. _____ 75 percent to 100 percent
- 3. _____ 74 percent to 50 percent
- 2. _____ 49 percent to 25 percent
- 1. _____ Less than 25 percent

Because of the difficulty of recall, the analysis on food crop production was confined to one year period, November 1965 to November 1966.

APPENDIX D

SOCIAL-OVERHEAD COSTS (£)

Table 1. Social-Overhead Costs (£) on Investment in Rubber-Oilpalm in
Oktipupa Farm Settlement

Planting Year	Settler's Houses	Training of Settlers	Administrative Costs	TOTAL
1	23,130	-	26,897	50,027
2	10,308	11,200	28,468	49,979
3	9,156	-	21,786	30,942
4	9,487	8,000	19,403	36,890
5	4,919	5,200	22,977	33,096
6	-	-	18,098	18,098
7	10,800	6,000	19,134	35,934
8	-	-	18,395	18,395
9	-	-	18,395	18,395
10	-	-	18,395	18,395
11	-	-	18,395	18,395
12	-	-	18,395	18,395
13	-	-	18,395	18,395
14	-	-	18,395	18,395

Planting Year	Settlers' Houses	Training of Settlers	Administrative Cost	TOTAL
15	-	-	18,395	18,395
16	-	-	18,395	18,395
17	-	-	18,395	18,395
18	-	-	18,395	18,395
19	-	-	18,395	18,395
20	-	-	18,395	18,395
21	-	-	18,395	18,395
22	-	-	18,395	18,395
23	-	-	18,395	18,395
24	-	-	18,395	18,395
25	-	-	18,395	18,395
26	-	-	18,395	18,395
27	-	-	18,395	18,395
28	-	-	18,395	18,395
29	-	-	18,395	18,395

Planting Year	Settlers' Houses	Training of Settlers	Administration Cost	TOTAL
30	-	-	18,395	18,395
31	-	-	18,395	18,395
32	-	-	18,395	18,395
33	-	-	18,395	18,395

Table 2. Social-Overhead Costs (£) on Investment in Rubber-Oilpalm
in Mbiri Farm Settlement

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
1	21,678	-	21,193	42,871
2	15,887	6,000	23,675	45,562
3	7,090	-	24,979	32,069
4	9,749	7,200	19,865	36,814
5	-	6,000	15,887	21,887
6	9,342	12,000	14,096	35,438
7	-	-	16,485	16,485
8	9,800	-	16,159	25,959
9	-	-	16,159	16,159
10	-	-	16,159	16,159
11	-	-	16,159	16,159
12	-	-	16,159	16,159
13	-	-	16,159	16,159
14	-	-	16,159	16,159

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
15	-	-	16,159	16,159
16	-	-	16,159	16,159
17	-	-	16,159	16,159
18	-	-	16,159	16,159
19	-	-	16,159	16,159
20	-	-	16,159	16,159
21	-	-	16,159	16,159
22	-	-	16,159	16,159
23	-	-	16,159	16,159
24	-	-	16,159	16,159
25	-	-	16,159	16,159
26	-	-	16,159	16,159
27	-	-	16,159	16,159
28	-	-	16,159	16,159

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
29	-	-	16,159	16,159
30	-	-	16,159	16,159
31	-	-	16,159	16,159
32	-	-	16,159	16,159
33	-	-	16,159	16,159

Table 3. Social-Overhead Costs (£) on Investment in Rubber-Oilpalm in Igieduma School Leaver's Farm

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
1	-	-	1,059	1,059
2	-	-	957	957
3	-	-	907	907
4	-	-	907	907
5	-	-	907	907
6	-	-	907	907
7	-	-	907	907
8	-	-	907	907
9	-	-	907	907
10	-	-	907	907
11	-	-	907	907
12	-	-	907	907
13	-	-	907	907
14	-	-	907	907

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
15	-	-	907	907
16	-	-	907	907
17	-	-	907	907
18	-	-	907	907
19	-	-	907	907
20	-	-	907	907
21	-	-	907	907
22	-	-	907	907
23	-	-	907	907
24	-	-	907	907
25	-	-	907	907
26	-	-	907	907
27	-	-	907	907
28	-	-	907	907

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
29	-	-	907	907
30	-	-	907	907
31	-	-	907	907
32	-	-	907	907
33	-	-	907	907

Table 4. Social-Overhead Costs (£) on Investment in Rubber-Oilpalm in Ushie School Leaver's Farm

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
1	-	-	1,059	1,059
2	-	-	957	957
3	-	-	907	907
4	-	-	907	907
5	-	-	907	907
6	-	-	907	907
7	-	-	907	907
8	-	-	907	907
9	-	-	907	907
10	-	-	907	907
11	-	-	907	907
12	-	-	907	907
13	-	-	907	907
14	-	-	907	907

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
15	-	-	907	907
16	-	-	907	907
17	-	-	907	907
18	-	-	907	907
19	-	-	907	907
20	-	-	907	907
21	-	-	907	907
22	-	-	907	907
23	-	-	907	907
24	-	-	907	907
25	-	-	907	907
26	-	-	907	907
27	-	-	907	907
28	-	-	907	907

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
29	-	-	907	907
30	-	-	907	907
31	-	-	907	907
32	-	-	907	907
33	-	-	907	907

Table 5. Social-Overhead Costs (£) on Investment in Cocoa in Imaniwo Farm Settlement

Planting Year	Settlers Houses	Training of Settlers	Administrative Costs	TOTAL
1	-	-	3,061	3,061
2	-	-	4,656	4,656
3	-	-	3,472	3,472
4	-	-	3,472	3,472
5	-	-	3,472	3,472
6	-	-	3,472	3,472
7	-	-	3,472	3,472
8	-	-	3,472	3,472
9	-	-	3,472	3,472
10	-	-	3,472	3,472
11	-	-	3,472	3,472
12	-	-	3,472	3,472
13	-	-	3,472	3,472

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
14	-	-	3,472	3,472
15	-	-	3,472	3,472
16	-	-	3,472	3,472
17	-	-	3,472	3,472
18	-	-	3,472	3,472
19	-	-	3,472	3,472
20	-	-	3,472	3,472
21	-	-	3,472	3,472
22	-	-	3,472	3,472
23	-	-	3,472	3,472
24	-	-	3,472	3,472
25	-	-	3,472	3,472
26	-	-	3,472	3,472
27	-	-	3,472	3,472
28	-	-	3,472	3,472

Planting Year	Settlers' Houses	Training of Settlers	Administrative Costs	TOTAL
29	-	-	3,472	3,472
30	-	-	3,472	3,472
31	-	-	3,472	3,472
32	-	-	3,472	3,472
33	-	-	3,472	3,472

APPENDIX E

Table 1. Direct Costs (£) on Investment in Rubber-Oilpalm in Okitipulpa Farm Settlement

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
1	21,369	10,079	3,500	65,460	-	100,408
2	25,309	9,763	1,650	19,743	-	56,465
3	7,754	6,297	1,725	15,908	-	31,684
4	5,503	7,928	300	14,010	818	28,559
5	6,897	5,054	300	15,254	1,388	28,893
6	-	4,139	300	13,465	2,596	20,500
7	-	-	300	12,984	18,431	31,715
8	-	-	1,800	11,048	18,431	31,279
9	-	-	1,875	11,048	21,720	34,643
10	-	-	1,950	11,048	22,100	35,098
11	-	-	1,875	11,048	22,100	35,023
12	-	-	1,875	11,048	22,100	35,023
13	-	-	-	11,048	22,100	35,023

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and maintenance	Harvesting and Transportation	TOTAL
14	-	-	375	11,048	22,100	33,523
15	-	-	375	11,049	22,100	33,523
16	-	-	375	11,048	22,100	33,523
17	-	-	375	11,048	22,100	33,523
18	-	-	1,800	11,048	22,100	34,948
19	-	-	1,800	11,048	22,100	34,948
20	-	-	1,800	11,048	22,100	34,948
21	-	-	1,800	11,048	22,100	34,948
22	-	-	1,800	11,048	22,100	34,948
23	-	-	375	11,048	22,100	33,523
24	-	-	375	11,048	22,100	33,523
25	-	-	375	11,048	22,100	33,523
26	-	-	375	11,048	22,100	33,523

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
27	-	-	375	11,048	22,100	33,523
28	-	-	375	11,048	22,100	33,523
29	-	-	375	11,048	22,100	33,523
30	-	-	375	11,048	22,100	33,523
31	-	-	375	11,048	22,100	33,523
32	-	-	375	11,048	22,100	33,523
33	-	-	375	11,048	22,100	33,523

Table 2. Direct Costs (£) on Investment in Rubber-Oilpalm in Mbiri Farm Settlement

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
1	35,645	5,832	2,000	12,093	-	55,570
2	10,124	3,481	75	89,100	-	102,780
3	6,485	4,711	75	8,986	-	20,257
4	1,984	2,225	75	84,230	849	26,135
5	-	3,986	75	20,424	1,427	25,912
6	-	-	75	15,683	2,631	18,389
7	-	-	75	19,776	16,791	36,642
8	-	-	75	10,366	16,791	27,232
9	-	-	75	10,366	19,795	30,236
10	-	-	75	10,366	20,180	30,621
11	-	-	1,500	10,366	20,180	32,046
12	-	-	75	10,366	20,180	30,621
13	-	-	75	10,366	20,180	30,621
14	-	-	75	10,366	20,180	30,621

Planting Year	Development	Nursery and Pre-Nursery		Tools and Machinery		Establishment and Maintenance		Harvesting and Transportation		TOTAL
15	-	-	-	75		10,366		20,180		30,621
16	-	-	-	75		10,366		20,180		30,621
17	-	-	-	75		10,366		20,180		30,621
18	-	-	-	75		10,366		20,180		30,621
19	-	-	-	75		10,366		20,180		30,621
20	-	-	-	75		10,366		20,180		30,621
21	-	-	-	75		10,366		20,180		30,621
22	-	-	-	1,500		10,366		20,180		32,046
23	-	-	-	75		10,366		20,180		30,621
24	-	-	-	75		10,366		20,180		30,621
25	-	-	-	75		10,366		20,180		30,621
26	-	-	-	75		10,366		20,180		30,621
27	-	-	-	75		10,366		20,180		30,621
28	-	-	-	75		10,366		20,180		30,621

Planting Year	Development	Nursery and Pre-Nursery		Tools and Machinery	Establishment and Maintenance		Harvesting and Transportation	TOTAL
29	-	-	-	75	10,366	10,366	20,180	30,621
30	-	-	-	75	10,366	10,366	20,180	30,621
31	-	-	-	75	10,366	10,366	20,180	30,621
32	-	-	-	75	10,366	10,366	20,180	30,621
33	-	-	-	75	10,366	10,366	20,180	30,621

Table 3. Direct Costs (£) on Investment in Rubber-Oilpalm in Igieduma School Leaver's Farm

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
1	100	-	80	650	-	830
2	100	-	-	1,006	-	1,106
3	75	-	-	1,247	-	1,322
4	50	-	80	1,645	208	1,983
5	-	-	-	2,168	416	2,584
6	-	-	-	2,485	624	3,109
7	-	-	174	2,163	1,472	3,809
8	-	-	94	2,080	2,320	4,494
9	-	-	94	2,080	3,168	5,342
10	-	-	174	2,080	4,160	6,414
11	-	-	94	2,080	4,160	6,334
12	-	-	94	2,080	4,160	6,334
13	-	-	174	2,080	4,160	6,414

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
14	-	-	94	2,080	4,160	6,334
15	-	-	94	2,080	4,160	6,334
16	-	-	174	2,080	4,160	6,414
17	-	-	94	2,080	4,160	6,334
18	-	-	94	2,080	4,160	6,334
19	-	-	174	2,080	4,160	6,414
20	-	-	94	2,080	4,160	6,334
21	-	-	94	2,080	4,160	6,334
22	-	-	174	2,080	4,160	6,414
23	-	-	94	2,080	4,160	6,334
24	-	-	94	2,080	4,160	6,334
25	-	-	174	2,080	4,160	6,414
26	-	-	94	2,080	4,160	6,334
27	-	-	94	2,080	4,160	6,334

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
28	-	-	174	2,080	4,160	6,414
29	-	-	94	2,080	4,160	6,334
30	-	-	94	2,080	4,160	6,334
31	-	-	174	2,080	4,160	6,414
32	-	-	94	2,080	4,160	6,334
33	-	-	94	2,080	4,160	6,334

Table 4. Direct Costs (£) on Investment in Rubber-Oilpalm in Ushie School Leaver's Farm

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
1	100	-	80	638	-	818
2	100	-	-	984	-	1,084
3	75	-	-	1,247	-	1,322
4	50	-	80	1,645	208	1,983
5	-	-	-	2,168	416	2,584
6	-	-	-	2,485	624	3,109
7	-	-	174	2,163	1,472	3,809
8	-	-	94	2,080	2,320	4,494
9	-	-	94	2,080	3,168	5,342
10	-	-	174	2,080	4,160	6,414
11	-	-	94	2,080	4,160	6,334
12	-	-	94	2,080	4,160	6,334

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
13	-	-	174	2,080	4,160	6,414
14	-	-	94	2,080	4,160	6,334
15	-	-	94	2,080	4,160	6,334
16	-	-	174	2,080	4,160	6,414
17	-	-	94	2,080	4,160	6,334
18	-	-	94	2,080	4,160	6,334
19	-	-	174	2,080	4,160	6,414
20	-	-	94	2,080	4,160	6,334
21	-	-	94	2,080	4,160	6,334
22	-	-	174	2,080	4,160	6,414
23	-	-	94	2,080	4,160	6,334
24	-	-	94	2,080	4,160	6,334
25	-	-	174	2,080	4,160	6,414

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
26	-	-	94	2,080	4,160	6,334
27	-	-	94	2,080	4,160	6,334
28	-	-	174	2,080	4,160	6,414
29	-	-	94	2,080	4,160	6,334
30	-	-	94	2,080	4,160	6,334
31	-	-	174	2,080	4,160	6,414
32	-	-	94	2,080	4,160	6,334
33	-	-	94	2,080	4,160	6,334

Table 5. Direct Costs (£) on Investment in Cocoa in Imaiwo Farm Settlement

Planting Year	Development	Nursery and Pre-Nursery		Tools and Machinery	Establishment and Maintenance		Harvesting and Transportation	TOTAL
1	10,929	-	-	100	9,750	-	-	20,779
2	7,603	-	-	-	4,972	-	-	12,575
3	5,983	-	-	-	3,209	-	-	9,192
4	-	-	-	100	4,095	210	-	4,405
5	-	-	-	-	3,430	315	-	3,745
6	-	-	-	-	3,535	420	-	3,955
7	-	-	-	100	3,640	525	-	4,265
8	-	-	-	-	3,745	665	-	4,410
9	-	-	-	-	3,745	665	-	4,410
10	-	-	-	100	3,745	665	-	4,510
11	-	-	-	-	3,745	665	-	4,410
12	-	-	-	-	3,745	665	-	4,410

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
13	-	-	100	3,745	665	4,510
14	-	-	-	3,745	665	4,410
15	-	-	-	3,745	665	4,410
16	-	-	100	3,745	665	4,510
17	-	-	-	3,745	665	4,410
18	-	-	-	3,745	665	4,410
19	-	-	100	3,745	665	4,510
20	-	-	-	3,745	665	4,410
21	-	-	-	3,745	665	4,410
22	-	-	100	3,745	665	4,510
23	-	-	-	3,745	665	4,410
24	-	-	-	3,745	665	4,410
25	-	-	100	3,745	665	4,510

Planting Year	Development	Nursery and Pre-Nursery	Tools and Machinery	Establishment and Maintenance	Harvesting and Transportation	TOTAL
26	-	-	-	3,745	665	4,410
27	-	-	-	3,745	665	4,410
28	-	-	100	3,745	665	4,510
29	-	-	-	3,745	665	4,410
30	-	-	-	3,745	665	4,410
31	-	-	100	3,745	665	4,510
32	-	-	-	3,745	665	4,410
33	-	-	-	3,745	665	4,410

APPENDIX F

Table 1. Total Potential Direct Benefits (£) to Producers on Investment in Rubber-Oilpalm in Okitipupa Farm Settlement

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield		Medium Yield	Low Yield		Medium Yield
	Yield	High Yield		Yield	High Yield	
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	4589	4589	4589	5280	5280	5280
5	5742	7647	7647	6606	8799	8799
6	12621	16820	16820	14522	19353	19353
7	22505	31088	34316	25998	35925	39691
8	28030	38088	43830	32407	45093	50742
9	32743	45674	51077	37870	52844	59905
10	33817	48095	58015	39753	55668	67192
11	35164	49305	59629	40694	57081	69075
12	35971	50515	61243	41636	58543	70958

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	36778	51726	62857	42577	59905	72841
14	36778	51726	62857	42577	59905	72841
15	36778	51726	62857	42577	59905	72841
16	36778	51726	62857	42577	59905	72841
17	36778	51726	62857	42577	59905	72841
18	36778	51726	62857	42577	59905	72841
19	36778	51726	62857	42577	59905	72841
20	36778	51726	62857	42577	59905	72841
21	36778	51726	62857	42577	59905	72841
22	36778	51726	62857	42577	59905	72841
23	36778	51726	62857	42577	59905	72841
24	36778	51726	62857	42577	59905	72841
25	36778	51726	62857	42577	59905	72841

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	36778	51726	62857	42577	59905	72841
27	36778	51726	62857	42577	59905	72841
28	36778	51726	62857	42577	59905	72841
29	36778	51726	62857	42577	59905	72841
30	36778	51726	62857	42577	59905	72841
31	36778	51726	62857	42577	59905	72841
32	36778	51726	62857	42577	59905	72841
33	36778	51726	62857	42577	59905	72841

Table 2. Total Potential Direct Benefits (£) to Producers on Investment in Rubber-Oilpalm in Mbirj Farm Settlement

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	4818	4818	4818	5544	5544	5544
5	6033	8028	8028	6942	9238	9238
6	13255	17666	17666	15252	20327	20327
7	23681	32717	36131	27357	37809	41792
8	29508	41050	46171	34117	47479	53453
9	34478	41836	54505	39876	55656	63125
10	36185	49707	61126	48310	58644	70802
11	37038	50988	62836	49306	60137	72793
12	37891	52268	64543	50300	61631	74785

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	38745	53548	66250	51297	63125	76776
14	38745	53548	66250	51297	63125	76776
15	38745	53548	66250	51297	63125	76776
16	38745	53548	66250	51297	63125	76776
17	38745	53548	66250	51297	63125	76776
18	38745	53548	66250	51297	63125	76776
19	38745	53548	66250	51297	63125	76776
20	38745	53548	66250	51297	63125	76776
21	38745	53548	66250	51297	63125	76776
22	38745	53548	66250	51297	63125	76776
23	38745	53548	66250	51297	63125	76776
24	38745	53548	66250	51297	63125	76776
25	38745	53548	66250	51297	63125	76776

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	38745	53548	66250	51297	63125	76776
27	38745	53548	66250	51297	63125	76776
28	38745	53548	66250	51297	63125	76776
29	38745	53548	66250	51297	63125	76776
30	38745	53548	66250	51297	63125	76776
31	38745	53548	66250	51297	63125	76776
32	38745	53548	66250	51297	61325	76776
33	38745	53548	66250	51297	63125	76776

Table 3. Total Potential Direct Benefits (£) to Producers on Investment in Rubber Oil-palm in Igleduma School Leaver's Farm

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	798	798	798	917	917	917
5	1000	1332	1332	1150	1532	1532
6	2198	2931	2931	2530	3377	3377
7	5680	8055	9495	6582	9338	11018
8	7518	10746	12906	8719	12469	14989
9	8999	12901	15601	10441	14974	18124
10	9719	13981	17572	11281	16234	30416
11	10079	14521	18292	11701	16864	21256
12	10079	15061	19012	12101	17494	22096

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	10799	15601	19732	12541	18124	22936
14	10799	15601	19732	12541	18124	22936
15	10799	15601	19732	12541	18124	22936
16	10799	15601	19732	12541	18124	22936
17	10799	15601	19732	12541	18124	22936
18	10799	15601	19732	12541	18124	22936
19	10799	15601	19732	12541	18124	22936
20	10799	15601	19732	12541	18124	22936
21	10799	15601	19732	12541	18124	22936
22	10799	15601	19732	12541	18124	22936
23	10799	15601	19732	12541	18124	22936
24	10799	15601	19732	12541	18124	22936
25	10799	15601	19732	12541	18124	22936

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	10799	15601	19732	12541	18124	22936
27	10799	15601	19732	12541	18124	22936
28	10799	15601	19732	12541	18124	22936
29	10799	15601	19732	12541	18124	22936
30	10799	15601	19732	12541	18124	22936
31	10799	15601	19732	12541	18124	22936
32	10799	15601	19732	12541	18124	22936
33	10799	15601	19732	12541	18124	22936

Table 4. Total Potential Direct Benefits (£) to Producers on Investment in Rubber-Oilpalm in Ushie School Leaver's Farm

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	.					
5	798	798	798	917	917	917
6	1000	1332	1332	1150	1532	1532
7	2198	2931	2931	2530	3377	3377
8	5680	8055	9495	6582	9338	11018
9	7518	10746	12906	8719	12469	14989
10	8999	12901	15601	10441	14974	18124
11	9719	13981	17572	11281	16234	20416
12	10079	15061	19012	11701	16864	21256

Planting Year	Alternative I			Alternative II		
	(Low Price Assumptions)			(High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	10799	15601	19732	12101	17494	22096
14	10799	15601	19732	12541	18124	22936
15	10799	15601	19732	12541	18124	22936
16	10799	15601	19732	12541	18124	22936
17	10799	15601	19732	12541	18124	22936
18	10799	15601	19732	12541	18124	22936
19	10799	15601	19732	12541	18124	22936
20	10799	15601	19732	12541	18124	22936
21	10799	15601	19732	12541	18124	22936
22	10799	15601	19732	12541	18124	22936
23	10799	15601	19732	12541	18124	22936
24	10799	15601	19732	12541	18124	22936
25	10799	15601	19732	12541	18124	22936

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	10799	15601	19732	12541	18124	22936
27	10799	15601	19732	12541	18124	22936
28	10799	15601	19732	12541	18124	22936
29	10799	15601	19732	12541	18124	22936
30	10799	15601	19732	12541	18124	22936
31	10799	15601	19732	12541	18124	22936
32	10799	15601	19732	12541	18124	22936
33	10799	15601	19732	12541	18124	22936

Table 5. Total Potential Direct Benefits (£) to Producers on Investment in Cocoa in Imariwo Farm Settlement

Planting Year	Low Price: £66/ton			Medium Price: £90/ton			High Price: £114/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-
4	567	567	567	772	772	772	978	978	978
5	1621	1621	1621	2211	2211	2211	2802	2802	2802
6	3251	3251	3251	4434	4434	4434	5617	5617	5617
7	4788	4788	4788	6529	6529	6529	8269	8269	8269
8	5457	6409	6409	7441	8740	8740	9425	11071	11071
9	6504	7653	7653	8869	10436	10436	11233	13220	13220
10	6916	8134	8614	9430	11092	11747	11944	14049	14880
11	7319	8614	10005	9980	11747	13642	12641	14880	17280
12	7713	9095	10527	10518	12402	14356	13324	15709	18184

Planting Year	Low Price: £66/ton			Medium Price: £90/ton			High Price: £114/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	8134	10005	11488	11092	13642	15666	14049	17280	19843
14	8134	10005	11488	11092	13642	15666	14049	17280	19843
15	8134	10005	11488	11092	13642	15666	14049	17280	19843
16	8134	10005	11488	11092	13642	15666	14049	17280	19843
17	8134	10005	11488	11092	13642	15666	14049	17280	19843
18	8134	10005	11488	11092	13642	15666	14049	17280	19843
19	8134	10005	11488	11092	13642	15666	14049	17280	19843
20	8134	10005	11488	11092	13642	15666	14049	17280	19843
21	8134	10005	11488	11092	13642	15666	14049	17280	19843
22	8134	10005	11488	11092	13642	15666	14049	17280	19843
23	8134	10005	11488	11092	13642	15666	14049	17280	19843
24	8134	10005	11488	11092	13642	15666	14049	17280	19843
25	8134	10005	11488	11092	13642	15666	14049	17280	19843

Planting Year	Low Price: £66/ton			Medium Price: £99/ton			High Price: £114/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	8134	10005	11488	11092	13642	15666	14049	17280	19843
27	8134	10005	11488	11092	13642	15666	14049	17280	19843
28	8134	10005	11488	11092	13642	15666	14049	17280	19843
29	8134	10005	11488	11092	13642	15666	14049	17280	19843
30	8134	10005	11488	11092	13642	15666	14049	17280	19843
31	8134	10005	11488	11092	13642	15666	14049	17280	19843
32	8134	10005	11488	11092	13642	15666	14049	17280	19843
33	8134	10005	11488	11092	13642	15666	14049	17280	19843

APPENDIX G

Table 1. Total Potential Direct Benefits (£) to Nigeria on Investment in Rubber-Oilpalm in Okitipupa Farm Settlement

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	6661	6661	6661	8049	8049	8049
5	8338	11098	11098	10075	13348	13348
6	18295	24308	24308	22044	29422	29422
7	31285	43061	47096	37735	51949	56791
8	38677	53550	59603	46571	64555	71818
9	45007	62474	70040	54195	75338	84417
10	47024	65541	78515	56616	78969	163905
11	48033	67014	80533	57827	80785	166326
12	49042	68527	82550	59037	82601	168747

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	50051	70040	84568	60248	84417	171168
14	50051	70040	84568	60248	84417	171168
15	50051	70040	84568	60248	84417	171168
16	50051	70040	84568	60248	84417	171168
17	50051	70040	84568	60248	84417	171168
18	50051	70040	84568	60248	84417	171168
19	50051	70040	84568	60248	84417	171168
20	50051	70040	84568	60248	84417	171168
21	50051	70040	84568	60248	84417	171168
22	50051	70040	84568	60248	84417	171168
23	50051	70040	84568	60248	84417	171168
24	50051	70040	84568	60248	84417	171168
25	50051	70040	84568	60248	84417	171168

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	50051	70040	84568	60248	84417	171168
27	50051	70040	84568	60248	84417	171168
28	50051	70040	84568	60248	84417	171168
29	50051	70040	84568	60248	84417	171168
30	50051	70040	84568	60248	84417	171168
31	50051	70040	84568	60248	84417	171168
32	50051	70040	84568	60248	84417	171168
33	50051	70040	84568	60248	84417	171168

Table 2. Total Potential Direct Benefits (£) to Nigeria on Investment in Rubber-Oilpalm in Mbiri Farm Settlement

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	6992	6992	6992	8449	8449	8449
5	8749	11634	11634	10572	14122	14122
6	19190	25568	25568	23188	30895	30895
7	32907	45323	49591	39715	54659	59780
8	40683	56365	62767	49052	67950	75632
9	47367	65813	73815	57101	79324	88926
10	49500	69014	82724	59662	83165	99656
11	50567	70614	84858	60942	85085	102217
12	51634	72214	86992	62222	87006	104777

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	52701	73815	89126	63503	88926	107338
14	52701	73815	89126	63503	88926	107338
15	52701	73815	89126	63503	88926	107338
16	52701	73815	89126	63503	88926	107338
17	52701	73815	89216	63503	88926	107338
18	52701	73815	89216	63503	88926	107338
19	52701	73815	89216	63503	88926	107338
20	52701	73815	89216	63503	88926	107338
21	52701	73815	89216	63503	88926	107338
22	52701	73815	89216	63502	88926	107338
23	52701	73815	89216	63502	88926	107338
24	52701	73815	89216	63502	88926	107338
25	52701	73815	89216	63502	88926	107338

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	52701	73815	89126	63503	88926	107338
27	52701	73815	89126	63503	88926	107338
28	52701	73815	89126	63503	88926	107338
29	52701	73815	89126	63503	88926	107338
30	52701	73815	89126	63503	88926	107338
31	52701	73815	89126	63503	88926	107338
32	52701	73815	89126	63503	88926	107338
33	52701	73815	89126	63503	88926	107338

Table 3. Total Potential Direct Benefits (£) to Nigeria in Investment in Rubber-Oilpalm in Igieduma School Leaver's Farm

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	1171	1171	1171	1411	1411	1411
5	1469	1959	1959	1770	2358	2358
6	3231	4314	4314	3893	5197	5197
7	7716	10890	12690	9278	13095	15255
8	10101	14370	17070	12144	17275	20515
9	12039	17180	20557	14473	20653	24703
10	12939	18532	23137	15553	22273	27803
11	13389	19207	24037	16093	23083	28883
12	13839	19882	24937	16633	23893	29963

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	14289	20557	25837	17173	24703	31043
14	14289	20557	25837	17173	24703	31043
15	14289	20557	25837	17173	24703	31043
16	14289	20557	25837	17173	24703	31043
17	14289	20557	25837	17173	24703	31043
18	14289	20557	25837	17173	24703	31043
19	14289	20557	25837	17173	24703	31043
20	14289	20557	25837	17173	24703	31043
21	14289	20557	25837	17173	24703	31043
22	14289	20557	25837	17173	24703	31043
23	14289	20557	25837	17173	24703	31043
24	14289	20557	25837	17173	24703	31043
25	14289	20557	25837	17173	24703	31043

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	14289	20557	25837	17173	24703	31043
27	14289	20557	25837	17173	24703	31043
28	14289	20557	25837	17173	24703	31043
29	14289	20557	25837	17173	24703	31043
30	14289	20557	25837	17173	24703	31043
31	14289	20557	25837	17173	24703	31043
32	14289	20557	25837	17173	24703	31043
33	14289	20557	25837	17173	24703	31043

Table 4. Total Potential Direct Benefits (£) to Nigeria on Investment in Rubber-Oilpalm in Ushie School Leaver's Farm

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	1171	1171	1171	1411	1411	1411
5	1469	1959	1959	1770	2358	2358
6	3231	4314	4314	3893	5197	5197
7	7716	1089-	12690	9278	13095	15255
8	10101	14370	17070	12144	17275	20515
9	12039	17180	20557	14473	20653	24703
10	12939	18532	23137	15553	22273	27803
11	13389	19207	24037	16093	23083	28883
12	13839	19882	24937	16633	23893	29963

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
13	14289	20557	25837	17173	24703	31043
14	14289	20557	25837	17173	25703	31043
15	14289	20557	25837	17173	24703	31043
16	14289	20557	25837	17173	24703	31043
17	14289	20557	25837	17173	24703	31043
18	14289	20557	25837	17173	24703	31043
19	14289	20557	25837	17173	24703	31043
20	14289	20557	25837	17173	24703	31043
21	14289	20557	25837	17173	24703	31043
22	14289	20557	25837	17173	24703	31043
23	14289	20557	25837	17173	24703	31043
24	14289	20557	25837	17173	24703	31043
25	14289	20557	25837	17173	24703	31043

Planting Year	Alternative I (Low Price Assumptions)			Alternative II (High Price Assumptions)		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	14289	20557	25837	17173	24703	31043
27	14289	20557	25837	17173	24703	31043
28	14289	20557	25837	17173	24703	31043
29	14289	20557	25837	17173	24703	31043
30	14289	20557	25837	17173	24703	31043
31	14289	20557	25837	17173	24703	31043
32	14289	20557	25837	17173	24703	31043
33	14289	20557	25837	17173	24703	31043

Table 5. Total Potential Direct Benefits (£) to Nigeria on Investment in Cocoa in Imariwo Farm Settlement

Planting Year	Low Price: £94/ton			Medium Price: £134/ton			High Price: £174/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
1	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-
4	806	806	806	1149	1149	1149	1492	1492	1492
5	2309	2309	2309	3292	3292	3292	4274	4274	4274
6	4631	4631	4631	6601	6601	6601	8572	8572	8572
7	6819	6819	6819	9720	9720	9720	12622	12622	12622
8	7714	9127	9127	11079	13012	13012	14386	16896	16896
9	9263	10899	10899	13204	15538	15538	17146	20176	20176
10	9849	11584	12268	14040	16514	17489	18465	21444	22710
11	10423	12268	14248	14859	17489	20311	19295	22710	26374
12	10985	12953	14993	15660	18465	21373	20335	23977	27754
13	11584	14248	16362	16514	20311	23325	21444	26374	30287

Planting Year	Low Price: £04/ton			Medium Price: £134/ton			High Price: £174/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
14	11584	14248	16362	16514	20311	23325	21444	26374	30287
15	11584	14248	16362	16514	20311	23325	21444	26374	30287
16	11584	14248	16362	16514	20311	23325	21444	26374	30287
17	11584	14248	16362	16514	20311	23325	21444	26474	30287
18	11584	14248	16362	16514	20311	23325	21444	26474	30287
19	11584	14248	16362	16514	20311	23325	21444	26474	30287
20	11584	14248	16362	16514	20311	23325	21444	26474	30287
21	11584	14248	16362	16514	20311	23325	21444	26474	30287
22	11584	14248	16362	16514	20311	23325	21444	26474	30287
23	11584	14248	16362	16514	20311	23325	21444	26474	30287
24	11584	14248	16362	16514	20311	23325	21444	26474	30287
25	11584	14248	16362	16514	20311	23325	21444	26474	30287

Planting Year	Low Price: £94/ton			Medium Price: £134/ton			High Price: £174/ton		
	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield	Low Yield	Medium Yield	High Yield
26	11584	14248	16362	16514	20311	23325	21444	26374	30287
27	11584	14248	16362	16514	20311	23325	21444	26374	30287
28	11584	14248	16362	16514	20311	23325	21444	26374	30287
29	11584	14248	16362	16514	20311	23325	21444	26374	30287
30	11584	14248	16362	16514	20311	23325	21444	26374	30287
31	11584	14248	16362	16514	20311	23325	21444	26374	30287
32	11584	14248	16362	16514	20311	23325	21444	26374	30287
33	11584	14248	16362	16514	20311	23325	21444	26374	30287

APPENDIX H

Mathematical Proof of the Equation for Internal Rate
of Return Used in this Analysis

Assume:

$$(1) \quad b_i - c_i = b^m > 0$$

$$(2) \quad i \rightarrow \infty, \text{ 30 years or more}$$

where b_i 's are series of prospective receipts, and c_i 's are series of prospective costs

then

$$0 = -c + \frac{b^m}{(1+r)^1} + \frac{b^m}{(1+r)^2} + \dots + \frac{b^m}{(1+r)^{30}} + \dots$$

$$0 = -c + b^m \left\{ \frac{1}{(1+r)^1} + \frac{1}{(1+r)^2} + \dots + \frac{1}{(1+r)^{30}} + \dots \right\}$$

$$0 = -c + b^m \left(\sum_{i=1}^{\infty} \frac{1}{(1+r)^i} \right)$$

$$0 = -c + b^m \left\{ \frac{1}{(1+r)^1} + \frac{1}{(1+r)^2} + \dots \right\}$$

$$\text{by } \frac{1}{(1+r)^0} \frac{1}{1-r}$$

$$0 = -c + b^m \left\{ \frac{1}{1 - \frac{1}{1+r}} - \frac{1}{(1+r)^0} \right\}$$

$$0 = -c + b^m \left\{ \frac{1}{\frac{(1+r)-1}{1+r}} - 1 \right\}$$

^{1/} George B. Thomas, *Calculus and Analytic Geometry* (Reading, Mass.: Addison-Wesley Publishing Co., 1960), p. 771, Theorem 2.

$$c = b^m \left\{ \frac{1+r}{r} - 1 \right\}$$

$$c = b^m \left(\frac{1+r - r}{r} \right) = b^m \left(\frac{1}{r} \right)$$

$$c = \frac{b^m}{r}$$

$$r = \frac{b^m}{c} \therefore r = f(c)$$

