AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
Batch 68

1. SUBJECT CLASSIFICATION

A. PRIMARY
Food production and nutrition — AE30-0000-G214

B. SECONDARY
Development--Nigeria

2. TITLE AND SUBTITLE
Strategies and recommendations for Nigerian rural development 1969/1985

3. AUTHOR(S)
(100) Johnson,G.L.; Scoville,O.J.; Dike,G.K.; Eicher,C.K.
(101) Consortium for the Study of Nigerian Rural Development

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1969	169p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
CSNRD

8. SUPPLEMENTARY NOTES (*Sponsoring Organization, Publishers, Availability*)

9. ABSTRACT

10. CONTROL NUMBER
PN-AAE-469

11. PRICE OF DOCUMENT

12. DESCRIPTORS
Agricultural economics
Nigeria
Strategy

13. PROJECT NUMBER

14. CONTRACT NUMBER
AID/afr-264 GTS

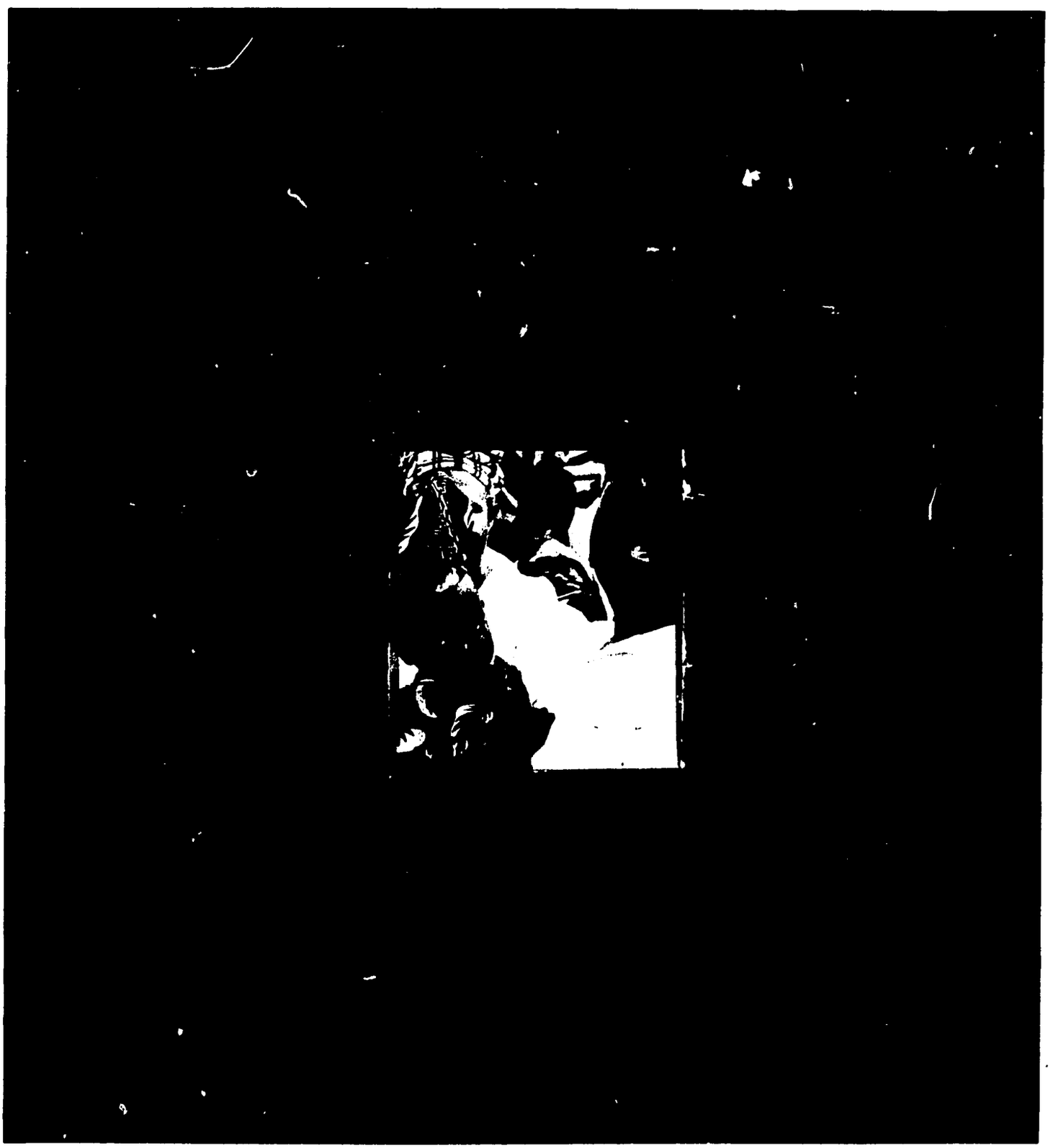
15. TYPE OF DOCUMENT

AID 590-1 (4-74)

GREEN

Strategies and Recommendations for Nigerian Rural Development 1969/1985

CSNRD 33



AGENCY FOR INTERNATIONAL DEVELOPMENT

UNITED STATES A.I.D. MISSION TO NIGERIA
3 MOLONEY STREET
LAGOS, NIGERIA

P.M.B. 12182
Cable Address: USAID Lagos

Telephone:
25951-6

June 10, 1969

Mr. A. A. Ayida
Permanent Secretary
Ministry of Economic Development
Independence Building
Lagos, Nigeria

Dear Mr. Ayida:

I transmit herewith for the consideration of your government the report prepared by the Consortium for the Study of Nigerian Rural Development (CSNRD) entitled Strategies and Recommendations for Nigerian Rural Development 1969/1985.

We will be pleased to receive and discuss with you the reactions of your government to this report.

I take this opportunity to thank you and the other officials of the government of Nigeria whose cooperation made possible this study.

Sincerely yours,

MICHAEL H. B. ADLER
Minister-Director

CONSORTIUM FOR THE STUDY OF NIGERIAN RURAL DEVELOPMENT/ GOVERNMENTAL AGENCIES EDUCATIONAL INSTITUTIONS

May 29, 1969

Michael H. B. Adler, Director
USAID Mission to Nigeria
3 Maloney Street
Lagos, Nigeria

Dear Director Adler:

It is my pleasure to forward CSNRD report No. 33 to you for transmittal to Mr. A. A. Ayida, Permanent Secretary, Federal Ministry of Economic Development. This report by Glenn L. Johnson, O. J. Scoville, George K. Dike, and Carl K. Eicher is entitled "Strategies and Recommendations for Nigerian Rural Development, 1969/1985." It is the general overall report referred to in I-A-3 of TOAID A-732 dated 11-11-67.

In accordance with agreements established between Mission representatives, Nigerian Representatives and me when I was in Lagos in April, 1969, the acceptance of this document by Nigerian officials for distribution in Nigeria through Nigerian agencies requires a supply of 3,000 copies. That quantity is being shipped to you for transmittal to the appropriate Nigerian agencies.

Sincerely,

Glenn Johnson

Glenn L. Johnson
Director

GLJ/ddp

Glenn L. Johnson, Director/George K. Dike, Deputy Director 204 Ag. Hall, Michigan State University / East Lansing, Michigan 48823 517-355-2267

Strategies and Recommendations for Nigerian Rural Development, 1969/1985

by
Glenn L. Johnson
Orlin J. Scoville
George K. Dike
Carl K. Eicher

—

July 1969

—

Consortium for the Study of Nigerian Rural Development

With the cooperation and participation of the following Nigerian agencies:
Federal Ministry of Economic Development
Federal Ministry of Agriculture and Natural Resources
National Universities Commission
Nigerian Institute of Social and Economic Research
Economic Development Institute
and with the support of
The United States Agency for International Development
Under Contract AID/Afr 264

Contents

FOREWORD AND INTRODUCTION i

CSNRD'S MAIN RECOMMENDATIONS AND A SUMMARY OF ITS RESEARCH RESULTS . 1
- The Main Recommendations 1
- A Summary 2
  - Agriculture in the Nigerian Economy . . . 2
- Problems and Issues in Nigerian Agricultural Development 5
- A Choice Among Three Broad Strategies . . . 7
- The Orientation of Our Recommended Strategy, Policies, Campaigns and Programs 9
- Production Campaigns 10
  - Production Campaigns for Export Crops . . 10
  - Production Campaigns for Import Substitution Crops 12
  - Research Programs and Limited Production Campaigns for Nutritionally Superior Foods 13
  - Research Programs for Staple Foods and Food Grains 13
- Programs, Institutional Changes and Activities to Support Development. 13
  - A Stronger Federal Ministry of Agriculture and Natural Resources 13
  - Coordination of Research and Educational Resources 14
  - Agricultural Credit 15
  - Encouragement of Investment in Agribusiness . 16
  - Family Planning 16
  - Community Development, Food-Aid, Reconstruction, and Development Projects . . . 16
  - Changing Federal, State and Local Relationships 16
- Overall Financial and Manpower Requirements for Recommended Campaigns and Programs . 17

PART ONE: THE AGRICULTURAL SECTOR OF THE NIGERIAN ECONOMY—CHARACTERISTICS, GROWTH AND PROBLEMS 19

CHAPTER ONE: AGRICULTURE IN THE NIGERIAN ECONOMY 19

CHAPTER TWO: NIGERIAN AGRICULTURE—ITS PRESENT STATUS 20
- General Characteristic 20
- Ecological Areas 21
- Food Production, Nutrition, Internal Trade and Population Growth 22
- Livestock 24
- The land market 25
  - Land use 26
  - Land tenure 27
  - Land earnings and values 29
- The Agricultural Labor Market and Trained Manpower 30
- Agricultural Capital and the Credit Market . . 32
- The Marketing System for Products and Factors of Production 37
  - Product markets 37
  - Factors of production 39
- The State of Nigerian Agricultural Technology . 40
- Responses to Price and the Danger of Misusing Supply elasticities 40

CHAPTER THREE: GROWTH AND CHANGE IN NIGERIAN AGRICULTURE. 43
- Growth Rates 43
- Policies and Programs 43
- Colonial Period 43
- Post-Independence 46
- 1962-68 Period. 46
- War and Reconstruction 48
- Summary 49

CHAPTER FOUR: CSNRD'S APPROACH TO THE PROBLEMS FACING NIGERIAN AGRICULTURE . . . 50
- The Problems 50
- Crucial Policy Issues 52
  - Federal ministry 52
  - Private and public effort 25
  - Smallholders 52
  - Prices and taxes 53
  - Marketing boards 53
  - Ownership patterns 55
  - Financing development 55
  - Credit 57
  - Agricultural education 57
  - Agricultural research 57
- CSNRD'S Approach 58

PART TWO: THE CONSEQUENCES OF THREE ALTERNATIVE AGRICULTURAL DEVELOPMENT STRATEGIES—1969-1985 59

CHAPTER FIVE:
THREE ALTERNATIVE STRATEGIES . . 60
The First Strategy—Continuation of Present Policies 60
The Second Strategy—The Present Strategy Modified to Encourage more Balanced Rural and Urban Development 60
The Third Strategy—A Policy of Taxing and Pricing Agricultural Products Adversely in the Hope of Getting Nonfarm Development . . 61
Projected Consequences of Following the Three Alternative Strategies 61

PART THREE: POLICIES, CAMPAIGNS AND PROGRAMS FOR IMPLEMENTING NIGERIAN RURAL DEVELOPMENT 65

CHAPTER SIX:
THREE MAJOR POLICIES FOR IMPLEMENTING CSNRD'S RECOMMENDED STRATEGY 66
More About the Three Major Policies to Implement the Second Strategy 66
Providing Nigerian farmers with better prices and incentives 66
Concentrating direct, short-run public support to farmers. 68
Providing infrastructural support for both Long-Run and Short-Run courses of action 70

CHAPTER SEVEN:
RECOMMENDED PRODUCTION CAMPAIGNS 72
Export Crop Expansion 74
Cocoa campaign 74
Rubber campaign 78
Oil palm campaign 82
Groundnut campaign 88
Import Substitution Crops 93
Cotton 93
Kenaf 96
Sugar 99
Wheat 99
Rice. 99
Nutritionally Superior Foods 99
Superior foods other than beef 100
The Nigerian beef industry 100
Research and Development Program for Staple Food Crops and Feed Grains. 102
CSNRD Recommendations Also Require Curtailment of Ineffective Programs 103
CSNRD Recommendations Also Require Curtailment of Ineffective Programs 104

CHAPTER EIGHT:
PROGRAMS TO REINFORCE PRODUCTION CAMPAIGNS AND TO PROVIDE LONG-RUN SUPPORT TO RURAL DEVELOPMENT 104
Strengthening the Federal Ministry of Agriculture and Natural Resources 104
Agricultural planning unit 105
Other ministerial agencies 106
Strengthening Agricultural Planning Units in the State Ministries of Agriculture and Natural Resources 106
Education for Agriculture 107
B. Sc. level 107
Graduate level 112
Training in veterinary medicine 113
Subuniversity agricultural training 113
Agricultural extension programs 115
Agricultural Research. 122
The need to focus agricultural research on priority crops and livestock products . . 122
Improving administrative structures for agricultural research 126
Agricultural research council. 126
Building a strong research staff 128
Personnel and financial requirements . . . 129
An Agricultural Credit Program. 129
Rural Community Development, Food Aid, Infrastructure and reconstruction projects . 132
Family Planning 133
Strengthening Managerial and Private Financial Resources 133
Changing Federal, State and Local Relationships as they Affect Rural Development 134
The market situation and area specialization . 134
Agricultural planning 134
Financing new states 135
Evaluation 135

CHAPTER NINE:
OVERALL FINANCIAL AND MANPOWER REQUIREMENTS FOR AGRICULTURAL PROGRAMS UNDER THE THREE SETS OF POLICIES 136
Comparisons among the Three Alternative Strategies as to Public Expenditures on Agricultural Programs 136
Needed tax revenue 138
Manpower 139
Manpower, Expenditure and Revenue Details for CSNRD Recommendations (Strategy II) . . 140
Manpower under CSNRD recommendations . 140
Expenditures under our recommendations . . 143
Needed tax revenue 145
Summary 148

A SELECTED BIBLIOGRAPHY OF NIGERIAN RURAL DEVELOPMENT 151
Books and Monographs 151
Official Government Documents. 151
Journal Articles and Chapters in Books. . . . 152

CSNRD PUBLICATIONS 155
Numbered Publications 155
Unnumbered Publications 155

APPENDIX I 155
The Consortium for the Study of Nigerian Rural Development 156

APPENDIX II
Federal and Regional Revenues from Agriculture 158

Tables

Table I.1—Contribution of Agriculture to Nigeria's Gross Domestic Product at Factor Cost, 1967 . . 19

Table I.2—Annual Average Trading Surpluses of the Marketing Boards of Nigeria by Periods, 1947-48 to 1965-66 19

Table II.1—Major Food Imports of Nigeria, 1966, 1967 23

Table II.2—Total Nigerian Imports and Food Imports by Value as Percentage of Total Imports, 1954-67 . 23

Table II.3—Projections of Population in Nigeria . . 24

Table II.4—Estimated Livestock Numbers in Nigeria by Former Regions, about 1963 24

Table II.5—Land Use by Former Regions, Nigeria, 1965 26

Table II.6—Estimated Harvested Acreage of Specified Nigerian Crops Grown Alone and Mixed (Acreage Equivalent) by Ecological Area, 1968 26

Table II.7—Estimated Number of Farm Families and Number of Families Growing Specified Crops, Nigeria and Former Regions, 1963 27

Table II.8—Estimated Labor Force Entrants From the Nigerian School Systems by Former Regions, 1965 . 31

Table II.9—Peak Loans From Commercial Banks for Various Crops in Nigeria, 1965 36

Table II.10—Percent Distribution of Traders by Total Net Margin as Percent of Total Sales and by Type of Seller (Ibadan, Nigeria), August-September 1966 . 39

Table II.11—Average Gross Margin of Traders as Percent of Selling Price by Commodity and by Type of Seller (Ibadan, Nigeria), August-September 1966 . 39

Table III.1—Value of Nigerian Exports of Principal Agricultural Products, 1950-67 44

Table III.2—Development Plan Allocations to Agriculture, Federation of Nigeria, 1962-68 46

Table IV.1—The Impact of Petroleum Revenues on Total Government Revenues, for Nigeria, 1963-73 . 56

Table V.1—National Income Projections under Three Alternative Strategies, Nigeria, 1970-85 63

Table V.2—Projected Export Earnings, Farmers Incomes, Government Revenues, and Government Expenditure from Export Crops, under Three Alternative Strategies, Nigeria, 1970-85 63

Table VII.1—Selected Aspects of Cocoa Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985 77

Table VII.2—Cocoa Projections Under Alternative Strategies and Programs: Payments to Farmers from Exports, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985 77

Table VII.3—Selected Aspects of Rubber Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985 81

Table VII.4—Rubber Projections Under Alternative Strategies and Programs: Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975, and 1985 81

Table VII.5—Suggested Oil Palm Campaign, 1970-75, Acreage 85

Table VII.6—Selected Aspects of Oil Palm Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985 86

Table VII.7—Palm Products Projections under Alternative Strategies and Programs: Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985 86

Table VII.8—Selected Aspects of Groundnut Production under Alternative Strategies, Nigeria, 1963, 1966, 1967, 1970, 1975, 1985 92

Table VII.9—Groundnut Products Projections under Alternative Strategies and Programs: Payments to Farmers from Exports, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975, 1985 . 92

Table VII.10—Projected Per Capita Consumption of Textile Fibers and Cotton in Nigeria 95

Table VII.11—Selected Aspects of Cotton Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985 97

TABLE VII.12—Cotton and Cotton Products Projections under Alternative Strategies and Programs: Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985 97

Table VIII.1—Estimated Number of Technical Staff Employed in Extension and Related Field Services. Nigeria, by Former Regions, 1966-67 116

Table VIII.2—Projections of Required Numbers of Positions for Nondegree Agricultural (Technical) Manpower to Staff Recommended Intensive Campaigns and a Continuing General Extension Effort, for the Years 1970, 1975 and 1985 118

Table VIII.3—Nigerian Agricultural Research Agencies, Research Personnel and Expenditures, 1966 with Projections for 1975 and 1985 129

Table VIII.4—Estimated Volume of Credit, Credit Agency Staff and Expenditures of a Credit Program to Support Strategy II, Nigeria, 1970-85. . . . 131

Table IX.1—Annual Government Appropriated Public Sector Agricultural Expenditures Under Three Alternative Strategies, Nigeria, 1966-85 137

Table IX.2—Relative Employment in the Public and Private Agricultural Sectors and the Employment of Selected Trained Agriculturalists under Three Alternative Strategies, Nigeria, 1966-85 140

Table IX.3—Employment of University Graduates (B.Sc.'s, M.Sc.'s and Ph.D's) Under CSNRD Recommendations by Areas. Nigeria, 1966-85 . . . 142

Table IX.4—Training Requirements for University Graduates in Agriculture Under CSNRD Recommendations by Areas, Nigeria. 1966-85 144

Table IX.5—Employment of Agricultural Crop Extension Staff Under CSNRD Recommendations by Areas, Nigeria, 1966-85 144

Table IX.6—Training Requirements for Agricultural School Graduates under CSNRD Recommendations by Training Areas, Nigeria, 1966-85 145

Table IX.7—Annual Government-Appropriated Public Sector Agricultural Expenditures under CSNRD Recommendations by Areas, Nigeria, 1966-85 . . 146

Table IX.8—Total Annual Government-Appropriated Needed Tax Revenues and Revenue Sources for Agricultural Programs Under Three Alternative Strategies, Nigeria, 1966-85 147

Table IX.9—Projected Approximate Petroleum Revenue Allocation, Nigeria, 1966-85. 148

APPENDIX

Table I—Federal Revenues from Agriculture . . . 157

Table II—Regional Revenue from Agriculture . . 157

Figures

Figure II.1—Ecological Areas of Nigeria 21

Figure III.1—Growth of Nigerian Agricultural Exports, 1953-66 45

Figure III.2—Principal Research Centers of Nigeria in Relation to Ecological Zones 49

Figure IV.1—Nigerian Imports and Exports with Tax Revenues Generated, 1954-55 to 1964-65 . . . 58

Figure VII.1—Natural Rubber Prices (U.S. cents per pound) on New York Market, 1955-67 78

Figure IX.1—Changes in the 1966 Level of Public Expenditure in Agriculture and Farmers' Income and Exchange Earnings from Export Crops under Three Alternative Sets of Policies, Nigeria, 1970-85 . . 138

Figure IX.2—Revenue Required from Nonagricultural Sources to Finance Public Agricultural Programs, Nigeria, 1970-85 139

(Figure III.2 appears also on page 3 of the Summary and Recommendations. Figures IX.1 and IX.2 appear also on pages 17 and 18 of the Summary and Recommendations.)

Foreword and Introduction

The Consortium for the Study of Nigerian Rural Development (CSNRD) has been conducting studies in cooperation with Nigerian agencies for over two years. These studies were designed to complement each other. Together they reveal new insights into the operation of Nigeria's agricultural economy.

This report builds upon earlier drafts which have been reviewed and discussed with many Nigerian and non-Nigerian scholars and administrators. It summarizes CSNRD results and the implications of those results for federal, state and local agencies planning the development of Nigeria's agricultural economy. It should be stressed that CSNRD research took the Food and Agriculture Organization of the United Nations report entitled *Agricultural Development in Nigeria 1965-80* as a point of departure. Thus, this report builds on, extends and, where changed conditions warrant, modifies the FAO report.

Though CSNRD remains responsible for the contents of this report, CSNRD wishes to express special gratitude to the following people for their help, criticisms and discussions: Michael Adler, P. Ahiemie, James Akinwumi, Akinsola Akiwowo, Herbert Albrecht, C. Arnold Anderson, Q.B.O. Anthonio, T.S.B. Aribisala, P. C. Asiodu, A. A. Ayida, E. O. Ayo, Russell W. Bierman, Anson Chong, C. A. Clarke, Harry Darling, John Due, James Emerson, Ralph Fisher, Fred Harbison, J. E. Y. Hardcastle, Gerald Helleiner, F. F. Hill, Harley Hinrichs, George Ige, Ahmed Joda, William Johnson, Francis Jones, Ronald Jones, Hamisu Kano, Francis LeBeau, Anita McMillan Whitney, Walton M. Nixon, E. C. Ogor, H. M. A. Onitiri, Louis S. Peek, Scott Pearson, Eugene M. Reed, William E. Reed, Lyle Schertz, T. W. Schultz, Bukar Schaib, Richard Sharpe, Wolfgang Stolper, Glen Taggart, Milton Taylor, Rob West, Frank Van Buer, John van der Meulen, William B. Wheeler and many others.

This report contains CSNRD's preliminary recommendations to further the development of Nigerian agriculture with projections of the effects of alternative courses of action over the 1970-85 period. The recommendations have relevance for actions of the Nigerian federal, state and local governments. The document reflects Nigerian reactions, arguments and suggestions.

The specific objectives of this report are to:

1. Summarize briefly some of the characteristics of Nigerian agriculture and present some recent history of Nigerian rural development and of development of other countries (Chapters One and Two).
2. Identify the major agricultural problems that hinder Nigerian rural development (Chapters Three and Four).
3. Present three broad sets of agricultural development strategies with projections showing how the Nigerian agricultural economy might be expected to perform under them (Chapter Five). The three strategy alternatives are:
   a. Strategy I—to continue policies and programs about as they have been in recent years.
   b. Strategy II—to modify recent policies and programs to give greater encouragement to rural development.
   c. Strategy III—to follow policies and programs less favorable to agricultural growth than at present in order to make heavy investments in infrastructure (both agrarian and nonagrarian) to enlarge the public sector and to invest in nonfarm enterprises.
4. Present a set of recommendations, strategies and tactics to use in helping Nigeria facilitate her agricultural development by moving toward the second strategy above as a target

(Chapters Six, Seven and Eight). These are with special reference to:

a. agricultural commodities and commodity groups,
b. infrastructure with emphasis on agricultural research, extension, university level education and transport,
c. factors of production,
d. other institutional arrangements such as the organization of the Federal Ministry of Agriculture and Natural Resources, taxation, credit, marketing and produce inspection.

5. Set forth the overall financial and manpower requirements for the recommended campaigns and programs (Chapter Nine).

This report recognizes that Nigeria is in a period of acute and large-scale institutional changes. Such a period involves important opportunities to make significant changes not ordinarily possible in more stable periods as well as real dangers from the haphazard, arbitrary, hastily thought-out changes which inevitably accompany civil war, military stress and political change.

The duration of Nigeria's painful, costly civil war makes it necessary to orient this report to that war and its eventual outcome. In general, this document was written under the presupposition that peace will involve a substantial number of states under a federal government with a center more powerful than in the pre-war years. Further, it was assumed that blocks of these states would not be dominated by any of the major ethnic groups. We assume that a peace will be established which will restore substantial human and financial resource mobility throughout the country.

This report has drawn upon the knowledge and ideas of each member of the CSNRD staff. Primary responsibility for its content rests with Glenn L. Johnson, Director; O. J. Scoville, Field Project Leader; George K. Dike, Deputy Director; and Carl Eicher, Staff Economist.

During the final months of its preparation, the following staff members or former staff members were brought in to consult on various portions of the report: O. W. Herrmann, James Kincaid, James Long and Malcolm Purvis. Invaluable help with export data, manpower estimates and program costs was provided by George Brinkman and Robert Gray. Herbert Kriesel took early leadership in developing the projections contained in the report. The contributions of all these persons were crucial and important. In putting the entire document together, however, it should be noted that numerous changes had to be made in the interest of consistency, clarity, workability and in view of the total Nigerian environment. Thus, wherever this document conflicts with other CSNRD documents as a result of these changes, this document takes precedence. These changes were made by the four persons primarily responsible for drafting this document. In view of this the Director of CSNRD has insisted that the four people responsible for drafting this report acknowledge their responsibility by being listed as authors, a procedure which should not be permitted to distract from the substantial contribution of other persons to this document.

As to the detailed organization of the report, the reader is advised to consult the table of contents. It is organized in detail showing how the nine chapters and their contents fit into the three major parts of the report.

CSNRD's Main Recommendations and a Summary of Its Research Results

RURAL TRANSFORMATION IS THE KEY to growth and development of Nigeria, 1970-85, and such a transformation is within Nigeria's grasp. Agricultural growth can also provide a substantial stimulus to nonfarm development, for the payoffs are high in agriculture and agriculture can provide a rapidly expanding market for the products of new urban industry.

We estimate conservatively that by 1985 favorable rural development policies and programs can increase GDP by about £420 million annually over a continuation of existing and alternative policies. That is about as much as Nigeria's petroleum industry will be contributing to Nigeria by then. In 1985, Nigerian population may be approaching 100 million people. Then, as now, it will be impossible to provide urban employment for such large numbers of people. Thus, Nigeria cannot have success without a vigorous agriculture to provide jobs for those who will not be able to find urban employment.

Rural transformation can be harnessed as an effective instrument of growth and development. The driving force for this transformation is with Nigeria's 5 million smallholders who have a record of (1) willingness to accept new crops and new technologies and (2) responding well to favorable prices and opportunities to earn income by producing and working.

Abundant and underutilized physical and human resources, the existence of a basic framework of institutions and public services and the potentials of large and diversified foreign markets indicate that substantial means are available in Nigerian agriculture for expanded growth of the economy and development of Nigeria's people.

The Main Recommendations

Our recommendations for the 1969-85 period are summarized here so that the reader can see almost immediately the general nature of the opportunities ahead for Nigeria.

The overall strategy which we recommend is two-fold in nature:

1. *In the short run*, we recommend that Nigeria (a) concentrate on opportunities not previously exploited to expand agricultural production and export earnings by more fully meeting international demands for her export commodities, (b) distribute the resultant increase in income widely over a large number of rural people to provide the means of financing the expansion in production, to generate additional effective domestic demand for both farm and nonfarm products and to obtain substantial increases in welfare for her masses of rural people.

In the short run, our strategy should be implemented by following three broad major policies in designing agricultural production campaigns and programs.

The *first* policy is that of providing her agricultural producers with favorable price relationships and incentives in order to provide *private* motivation to expand production to *socially* desirable levels.

The *second* policy is that of concentrating direct short-run, public support to agricultural producers in the production of commodities having high payoffs. This should be done in a highly coordinated, systematic manner involving heavy reliance on local agencies and state ministries of agriculture and natural resources as well as reliance on a strengthened Federal Ministry of Agriculture and Natural Resources. This policy also involves encouraging and placing heavy reliance on private sources of inputs, finance and marketing services.

The *third* policy should be one of providing infractructural support (including extension and agricultural research) for both the short-run strategy outlined above and the long-run strategy to be outlined below.

Programs for implementing these three policies are

discussed in more detail in the summary to follow and in still greater detail in the main report and in its supporting documents.

2. *In the long run*, our strategy focuses on food crops and begins with expanded research now, to be followed with production campaigns for food crops starting 5 to 10 years in the future. The object of the research is to increase yields and reduce per-unit costs of food and feed crops and livestock to permit Nigeria to develop cheaper and better food, expanded livestock production and, possibly, exports of food, feed and beef. When these research results become available in the mid- and late 1970's, production campaigns and supporting infrastructure and supporting institutions will be required for food crops which are not provided for in detail in this report; however, the public and private investments for the second thrust forward, like those for the first, will have high social (and private) payoffs and, hence, can be largely self-financing. For this reason our estimates of returns on recommendations are very conservative and might very well increase by another £100 million. We are confident that major biological advances can be achieved by Nigerian research institutions in close cooperation with the new International Institute for Tropical Agriculture if greatly expanded attention is devoted to agricultural research now.

The report analyzes financial and manpower capacities and requirements for our recommendations. Our recommendations compare favorably with either a continuation of present policies or a shift to a strategy still more exploitative of Nigerian agriculture. As to manpower, our recommendations would result in the largest private and the smallest public agricultural sectors. However, our recommendations would demand and provide more highly trained agriculturalists in government, the universities and research institutes as well as in industry. In short, employment of trained agriculturalists would increase in both the public and private sectors. The required numbers can be trained in existing institutions with only minor modifications.

Our recommendations require lower public expenditures than either a continuation of present strategy or a shift to a harsher strategy more exploitative of agriculture. At the same time, we calculate that agricultural GDP will expand 105 percent from 1967 to 1985 as compared with 78 percent for the present strategies and 58 percent for a harsher strategy, even without allowance for substantial additional expansions from food, feed and livestock production campains starting in, say, the 1975-80 period. The savings in expenditures are through reductions in (1) farm settlements, (2) input subsidies which would be unneeded with higher product prices, (3) development corporation plantations and (4) public production and/or distrubution of such things as modern planting materials, fertilizers, seeds, baby chicks, sprays, etc., as a result of turning them over to the private sector. These savings would (1) permit the expansion of other more strategic services not providable by the private sector and (2) offset much of the loss in revenue from eliminating export taxes, purchase taxes and marketing board surpluses. We estimate that the amount of government revenue required of nonfarm sources such as petroleum would be lower under our recommendations than if either (1) the present strategy were continued or (2) Nigeria shifted to a harsher strategy designed to extract income from agriculture. The difference comes from an additional £420 to £515 million of GDP per year by 1985 of which £242 to £428 million would be from agriculture as compared with continuation of present or more exploitative policies, respectively.

If the increase in the value of agricultural production which would result from following our recommendation (over and above that which would result from a continuation of present policies) were taxed by 10 percent with excise, income and property taxes, the financial problems created by dropping present taxes which discourage output would be solved. If the whole of agriculture's income which would result from following our recommendations were taxed at little over 1 percent, the problem of revenue could also be solved. However, part of the needed revenue could be made up with petroleum taxes and taxes on urban income generated by the higher rural incomes.

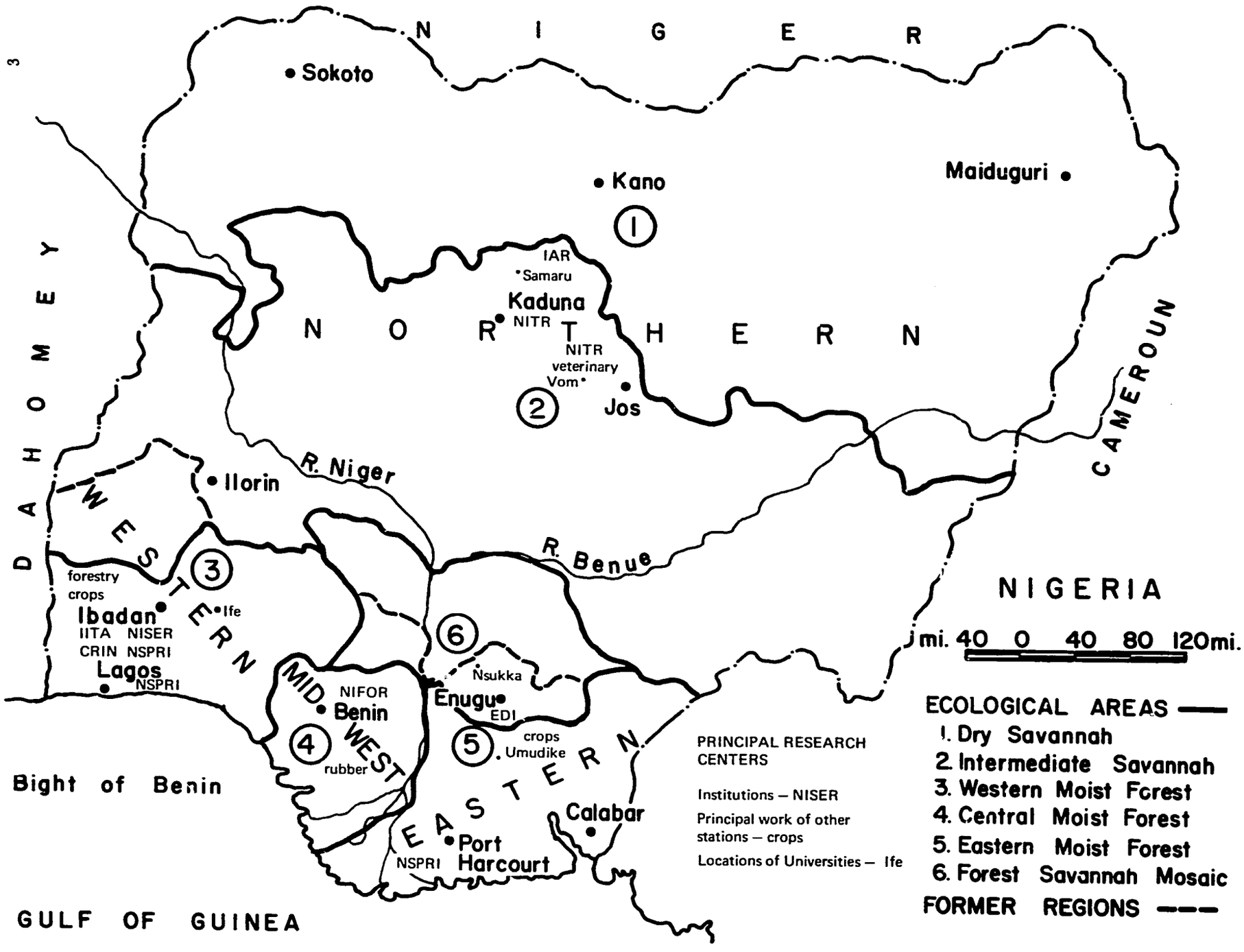
Some of the magnitude of increased employment under our recommendations can be acquired if we reason in terms of £45 per-capita gross income in agriculture. For a family of eight, this implies £360 gross income per year per income-earning family head. Thus, the increase in GDP of roughly £480 million would provide the equivalent of employment for 1.3 million families made up of over 10 million persons.

A Summary

This summary is divided into six sections dealing with agriculture in the Nigerian economy, developmental issues, choices among alternative strategies, production campaigns, institutional programs and, finally, manpower and financial balances.

Agriculture in the Nigerian Economy

Agriculture is the predominant industry in Nigeria. It contributes about half the national income and employs around 70 per cent of the labor force. Agriculture is an important source of public revenue through the taxation of export crops, the profits of marketing boards, the cattle head tax, etc. In addition, personal taxes are paid by farmers, and import duties are passed on to them as consumers.


N I G E R
Sokoto
Kano
Maiduguri
1
IAR
Samaru
Kaduna
NITR
N O R T H E R N
NITR
veterinary
Vom
2
Jos
CAMEROUN
DAHOMEY
R. Niger
Ilorin
WESTERN
3
forestry
crops
Ibadan
Ife
IITA NISER
CRIN NSPRI
Lagos
NSPRI
R. Benue
6
Nsukka
Enugu
EDI
MID. WEST
NIFOR
Benin
4
rubber
5
crops
Umudike
EASTERN
Calabar
Port
Harcourt
NSPRI
Bight of Benin
GULF OF GUINEA
NIGERIA
mi. 40 0 40 80 120mi.
PRINCIPAL RESEARCH CENTERS
Institutions – NISER
Principal work of other stations – crops
Locations of Universities – Ife
ECOLOGICAL AREAS
1. Dry Savannah
2. Intermediate Savannah
3. Western Moist Forest
4. Central Moist Forest
5. Eastern Moist Forest
6. Forest Savannah Mosaic
FORMER REGIONS

The Nigerian agricultural economy is predominantly one of smallholders, growing, characteristically, 2 or 3 acres of crops in the south and 8 or 10 acres in the north. There are about 5 million smallholders. Generally, it is customary to have two or three crops growing together on the same land. Such intercropping complicates the adoption of improved technology. Erosion control, weed and pest control and fertility maintenance for annual crops are attempted through a system of shifting cultivation commonly called "bush fallow," which requires a very extensive use of land. Output of all of the major export and food crops depends on the decisions and resources of hundreds of thousands of producers.

Chickens and goats are found in small numbers on most Nigerian farms. Beef cattle number around 10 million head, and are mainly confined to tsetse-free northern areas. They are owned mostly by Fulani herdsmen who graze them in a seasonal migratory pattern. Sales of milk are an important product from the Fulani herds. Grazing and management systems are adapted to availability of cheap land and low-cost labor.

The principal ecological areas of Nigeria are shown in the accompanying Figure. Cocoa is mainly produced in the western moist forest, rubber in the central moist forest, and oil palm in all three moist forest zones, but mainly in the east. Groundnuts, guinea corn and millet are mostly grown in the dry and intermediate savannah areas. Yam and cassava are the standard food crops of the southern zones. The forest-savannah mosaic is a thinly populated area, heavily tsetse-infested and with a diverse agriculture. While there are areas of concentration of production, farm and area specialization of food crop production is not pronounced. Each area and most farms continue to grow a major part of their food requirements.

Land tenure in Nigeria is still largely under the control of families, clans or villages. Ownership and control of food crop land by individuals tends to be transitory, but they may establish quite firm control over land in tree crops. Tenure institutions are becoming modified as agriculture modernizes, with the emergence of individual property rights and, in some instances, titles.

Marketing boards have been monopsony buyers of cocoa, groundnuts, cotton, oil palm products, beniseed, soybeans and a few other commodities for about 20 years. These are served by a network of licensed buying agents throughout the country. These boards have handled collection and marketing and have been the agencies to collect taxes on produce. They also have had a responsibility to accumulate funds for price stabilization and as a source of development capital. Most of this has been used for agricultural and nonagricultural development projects. The boards have been severely criticized for inadequacies in management of their marketing functions, inadequate surveillance of the activities of the buying agents and product inspectors and investment of resources in many poorly chosen development projects. Of even more importance is the role of marketing board and governmental price and tax policies which have held down product prices to farmers and thus restricted effective demand and producer incomes and depressed the values of production resources.

In economic terms, Nigerian agriculture has substantial unused or underutilized productive capacity in land and labor as evidenced by low returns to labor and capital and low rents to land. Within the context of traditional technology, investment of land, labor and capital has been pushed beyond privately profitable margins at prices now paid to farmers. However, these margins are held below levels which would promote full social utilization of resources by Nigerian-imposed limits on effective demand at the producer level. For export crops, world effective demand is large, but the low prices offered to Nigerian farmers as a result of producer sales taxes, export duties and high marketing board surpluses have prevented the farmer from realizing the full benefits of world demand. For food crops, the low incomes of consumers, many of whom are underpaid producers of export crops, restrain the aggregate level of demand for food and cause even moderate increases in output to sell at prices that are unprofitable to the producer. Thus, unwise Nigerian policies make it privately unprofitable for producers to expand production of both food and export crops to socially desirable levels.

Nigerian prices of food crops and feeding stuffs present something of an anomaly. Despite the existence of excess productive capacity, internal real prices for carbohydrate foods, protein foods and livestock feeds (except groundnut meal) are above world market levels. The basic problem is one of high costs due to inadequate available technology.

The low prices for export crops and underutilization of resources also help to explain the virtual lack of specialized food crop producing areas in Nigeria. Export crop producers do not feel motivated to use all their resources for export crop production. Thus, government price policies deny Nigerians the benefits of specialization in production.

Nigeria has made encouraging progress in developing an infrastructure of roads, rail lines, schools, research centers, extension services and market agencies.

Four faculties of agriculture and five schools for the training of extension workers have been established. The state extension services employ almost 4,000 workers. Research centers have been in operation for many years for the export crops, including the Cocoa Research Institute of Nigeria at Ibadan, the Nigerian

Institute for Oil Palm Research at Benin and the Institute of Agricultural Research at Samaru. Research on food crops has been done at Moor Plantation, Ibadan, at Umudike in eastern Nigeria and at the Institute for Agricultural Research. The Rubber Research Station at Iyanomo is of recent origin.

Marketing of food crops is done through a network of traditional handlers. Usually this network functions quite well within limited trading areas and within the normal range of annual fluctuation in production. Partially because of limited effective demand, traditional markets are less effective in dealing with temporary increases in supply or with rapid increases resulting from technological changes in production.

The supply of capital available to agriculture appears to have been adequate to support the modest growth in demand from a market that is restrained by low prices for the main cash crops. Capital formation has been mainly from the labor of farmers, applied to land development, tree planting or construction. Short term credit needs are largely provided through money lenders. The cost of extending credit is high; hence, interest rates are high. Past governmental and cooperative efforts to create and improve credit institutions have usually been disappointing.

Despite adverse tax treatment and pricing policies, growth of agricultural output in Nigeria compares favorably with that of many other developing countries. Since 1950, output of agricultural export products has grown at a compound annual rate of about 4.5 percent. Most of this growth has been accomplished by smallholders who pay heavy taxes on their export crops. However, the growth rate of export crops since 1963 has declined. The slow recent growth probably reflects the impact of the adverse treatment of Nigeria's private agricultural sector and the failure of its public agricultural sector in the area of direct production. Output of food crops has grown at about the same rate as population. For the food crops, the increasing labor force has brought more land into cultivation to furnish the means for expanding output. Increased labor and modest purchases of fertilizer, pesticides and seeds, and additional land in crops have generated the modest growth of the export crops.

At present, Nigerian agriculture is characterized by overcommitted resources on *private* account (in the sense that returns are low at the margin on all resources: labor, traditional forms of capital and on the value of land) but undercommitted resources on *social* account. In short, underutilized resources of land, labor and capital are available that could be more effectively utilized if the gaps between social and private returns were closed by giving producers the world price for export crops and if new technology were discovered for the domestically consumed food, feed and livestock crops. On the demand side, there is opportunity to produce more for export in the near future by reducing sharply the taxes and marketing margins on the export crops, thus providing farmers with a higher price for their products and services and permitting them to get a larger share of world markets. In recent years, economists have amassed a large body of evidence to support the conclusion that smallholder peasants will respond to substantially higher product prices, lower input prices and/or substantial improvements in yields. We are confident that Nigerian producers would very quickly expand utilization of land, labor and capital on these export and certain import substitution crops. For the food crops, a concentrated effort to achieve breakthroughs in high-yielding varieties could achieve a similar result in a few years.

Problems and Issues in Nigerian Agricultural Development

Public and private programs and campaigns for agricultural development can be viewed as instruments for attaining the objectives of state and national strategies and policies. Numerous problems and questions need to be considered in formulating strategies and policies. We list some of these problems here.

1. What actions need to be taken in the reconstruction period to re-establish internal trading patterns, encourage mobility of resources, expand food production in areas affected by the crisis, provide employment for soldiers and refugees and establish sources of revenue for the new states?
2. What are the appropriate roles for public and private investment in the production and marketing of agricultural products and factors of production?
3. How can incentives be improved for private investment?
4. How can internal food and feed costs be lowered to permit improved diets, livestock feeding and exports?
5. How can effective demand be generated for the masses to enable them to pay producers the cost of providing a more adequate diet?
6. How can discovery and adoption of improved agricultural technology be generated?
7. How can employment in agriculture be expanded and underemployment be reduced?
8. How can land values be built up to serve as a credit base for agriculture?
9. How can the earning power of agricultural capital be increased and more Nigerian capital be generated for agricultural development?
10. What needs to be done to improve the effectiveness of public and private services such as agricultural planning, research, credit, education, extension and produce inspection?

11. What should be Nigerian policy with respect to population control?

With these questions in mind, we turn to a discussion of the policy issues they raise in connection with rural development.

1. *Appropriate public and private roles in agricultural development* is not an either/or question. All countries seek combinations that fit the capabilities of their private and public sectors. Overburdened and limited numbers of civil servants cannot be expected to handle successfully the detailed operations of millions of small farmers. On the other hand, all countries need publicly supported agricultural research and education, some regulation of product markets and of the markets for the factors of production, and public sources of information about markets.

We believe it is highly important that Nigeria continue to strengthen the public development activities that clearly can best be done by the public sector, but that it must critically evaluate public activities in production, the supply of inputs and marketing to see if (a) they are successful, (b) they represent the best use that could be made of public funds and public officials and (c) some of them might better be done by private agencies.

2. *Another issue involves the emphasis to be placed on private smallholders.* We have compared the performance of government land settlements and public and private plantations with that of smallholders and we are convinced that the main thrust of the Nigerian rural development program should be to encourage and support the efforts of private smallholders. At the same time, some attention should be given to experimentation with ancillary projects that will help smallholders. Nucleus plantations that assist them with marketing and farm supply services, and low-capital "school leaver" farms for ex-servicemen and refugees are examples of such projects.

We have found that traditional land settlements which require capital outlays of £3,000 to £5,000 per settler are generally unprofitable and help very few people. Our studies of plantations indicate that this form of organization has done very poorly when publicly run and only moderately well in private hands.

3. There is a complex set of policy issues involving *prices and taxes* on export crops and the use of *marketing board surpluses.* We are convinced that these policies have seriously discouraged expansion of export agriculture and investment in agriculture and have diverted capital generated by farmers to prestigious and uneconomic public ventures that have contributed little to development. Nigeria will obtain much more growth of her agricultural resources if she changes to a policy which closes the gap between private and social returns so as to motivate private smallholders to do that which is socially desirable. In the past, prices to farmers have been set so low on palm produce that part of the crop has not been harvested, though at world prices it was in the interest of the Nigerian society at large to have the palm produce harvested. Other examples of adverse effects of low producer prices could be cited.

Another consequence of low producer prices relative to world prices is the depressing effect on land values. The government has in effect collected the rental value of land used for export crops and as a result land values have not built up. Such a buildup would have provided a base for extension of credit to promote the formation of such Nigerian-produced, biological capital as palm trees, cocoa trees, rubber trees, bullocks and of hand tools. In addition, land prices reflecting the social productivity of land would have caused a more socially effective utilization of land.

The Nigerian government should re-examine its tax and income diversion policies for export crops in an effort to improve the terms of trade for producers. This action is essential to insure full, effective utilization of the products and results of Nigeria's expensive educational, research and service programs for agriculture.

4. Nigeria has crucial policy decisions to make concerning the *financing of overall development* in relation to alternative sources of revenue and the comparative effects upon producers of tapping these resources.

Nigeria has increased its taxes from about 5 to 14 percent of GDP since 1950.[1] This is a remarkable achievement. Historically, the main source of revenue has been from taxation of foreign trade (imports and exports). One of the effects of the rising demand for government revenue has been to turn the terms of trade against the agricultural sector through produce sales taxes, export duties and marketing board surpluses. This has resulted in stagnation of oil palm exports, large rural to urban migration and low effective demand or purchasing power for not only millions of farmers but also for the tradesmen and local manufacturers who depend on farmers for a market.

There are alternative agricultural taxes that would be less discouraging to producers than those which reduce prices to farmers. Examples are excise taxes on consumer goods, local taxes, and those levied on the use of income, income and property values based on income. The problem of alternative tax sources would be mitigated, however, by the increased stream of taxable incomes that will come to producers, marketers and processors if production can be expanded, as we think it can be, in response to higher prices, other incentives and technical assistance.

The need for taxes from agriculture should also be examined in the light of the anticipated large increase

[1] Lewis, W. A., *Reflections on Nigeria's Economic Growth.* OECD, Paris, 1967, p. 63.

in public revenues as the petroleum industry grows. The dramatic rise in petroleum exports since 1963 and the anticipated future growth in this industry provide the means whereby policy makers can turn the internal terms of trade in favor of agriculture by shifting part of the collective tax burden from agriculture to petroleum and without increasing tax rates on the petroleum industry. It has been projected that government revenue from petroleum could rise from the £27 million of 1967 to as much as £200 million by 1973,[2] This would be about half of estimated government revenues for that year.

Petroleum is a key element, though less important than agricultural growth, in discussions of Nigerian public finance in relation to growth in the 1970's, both agricultural and nonagricultural. Although there are numerous opportunities to improve the administration of other taxes, petroleum has the immediate potential for the 1970's of (a) providing for an increasing share of government revenue relative to GDP and (b) enabling the domestic terms of trade to be more favorable to agriculture.

5. An issue connected with the *marketing boards* has to do with *administration and organization*. At present, these boards are state or common-service bodies. It would be easier to maintain a common Nigerian market with uniform prices and subsidy policies if these bodies were made national. It would also be easier to administer these agencies to promote agricultural development if they were under some control from the Federal Ministry of Agriculture and Natural Resources. The role of the boards needs to be clarified with respect to local buying activities. At present, the licensed buying agents are not adequately performing their functions. Possibly local buyers should be brought more completely under the surveillance of the boards. Alternatively, any reputable person might be licensed to buy from farmers, subject to disciplinary action for malfeasance.

6. A policy decision needs to be made with respect to *a public agricultural credit institution* and the respective roles of federal and state agencies in such an institution. Nigerian agriculture has progressed thus far with reliance upon traditional sources of lending. Our studies of oil palm and cocoa production lead us to believe that traditional sources of capital could provide for a somewhat accelerated rate of expansion. However, the vigorous agricultural growth of which Nigeria is capable would require new credit institutions. Past unfavorable experience with regional credit agencies suggests that a national institution might have more freedom from political pressure. A national institution would permit more efficient use of administrative and training resources and more effective use of capital since peak lending seasons vary among the states and the regional diversity of crops and weather would reduce risk for a national institution.

7. With respect to *agricultural education*, a policy question arises concerning federal and state relationships in university-level agricultural education and lower-level schools of agriculture. There is also a question of administration of the extension services. There are also serious questions about the kind and level of output from Nigeria's agricultural education programs. A national university system based upon the four universities that offer work in agriculture would permit most efficient use of highly-trained university staff and scarce facilities.

We believe that Nigeria should develop ecological centers for agricultural education and research built around the existing institutions. There would be advantages in sharing of staff and coordination of programs if the schools of agriculture were placed under the universities. The extension services are now state agencies and it would seem expedient to keep them under the ministries of agriculture rather than attach them to the universities. An issue arises, however, with respect to a possible federal-state cooperative role to (a) help the state services address themselves to problems of national significance and (b) assist states obtain federal financing for extension.

8. In the field of *agricultural research*, a number of crucial policy decisions need to be made. These involve the role of federal research centers in relation to the agricultural faculties in the universities and the state ministries of agriculture and natural resources. A drive for separate research stations in each of the new states could dissipate research efforts and funds so that only superficial work would be possible. The universities have highly trained persons who could contribute more time to research with resulting benefits to their teaching. Conversely, some of the specialists at research institutes could be attached to university faculties with mutual benefit to both institutions. Policies need to be thought out and acted upon that would permit Nigeria to gain the maximum benefit for research centers and universities from the existence of the new International Institute for Tropical Agricultural Research at Ibadan.

A Choice Among Three Broad Strategies

The policy issues examined above and the problems which create these issues are so numerous, complex and interrelated that separate analysis of each problem and issue was beyond the resources of CSNRD. However, our discussions of the above problems and issues

[2] Pearson, Scott, *Growth and Development of the Nigerian Economy.* "Nigerian Petroleum: Implications for Medium Term Planning" in C. Eicher, and C. Liedholm (eds.) Michigan State University Press, East Lansing, 1969.

with Nigerians and others were simplified by a tendency to group possible approaches to Nigeria's agricultural problems into three strategies. Our knowledge and studies in Nigeria and studies of agricultural policy in other countries, i.e., Colombia, Thailand, Mexico, Argentina, Taiwan, India, Pakistan, the United States, Norway and Ghana, to give an incomplete list, indicated that these three broad strategies are alternatives open to and under consideration in Nigeria. The availability of studies from other countries and our own studies of Nigeria provided considerable help and evidence to use in estimating the consequences of following each of the three alternative broad strategies.

The three sets represent:

1. A continuation of the present strategy of taxing export agriculture heavily while allowing food production and marketing to be guided by forces of the market.

2. Moving from the present strategy (a) on export crops to higher producer prices and improved producer incentives and services for the production of export and selected import substitution crops and (b) vigorous research to find new cost-reducing technologies for the staple food and feed crops.

3. A harsher strategy than at present on private producers of export crops with a large public agricultural sector involving the possible imposition of price ceilings, direct investments in, and supervision of, agricutural productive resource allocation controls and food rationing with the objectives of cheap foods for city dwellers and maximum extraction of government revenues from agriculture.

A careful analysis of the economic consequences of following these alternative strategies over the 1970-85 period leads us to conclude that Nigeria can achieve dramatic gains in income, employment, foreign exchange earnings and income distribution from following the second strategy which (1) emphasizes export crops as a means of stimulating incomes and employment of large numbers of small farmers and thus achieving growth for the economy as a whole, and (2) seeks major long-term reductions in the cost of producing staple food and feed crops. The salient differences in income and foreign exchange earnings for this strategy as compared with a continuation of the strategy and consequent policies and programs now in effect are shown below:

	1967 (£ mil.)	1985 (£ mil.)
GDP (total)		
From the second set of policies		5,154
From continuation of present policies	1,731	4,734
Difference (annual)		+ 420
GDP from agriculture (value added)		
From the second set of policies		1,846
From continuation of present policies	899	1,604
Difference (annual)		+ 242
Value of agricultural exports		
From the second set of policies		254
From continuation of present policies	98	134
Difference (annual)		+ 120

We estimate that Nigeria can be producing over three times its 1966 GDP by 1985. By then GDP from a properly managed agriculture would probably make up about one third of the total as contrasted to 55 percent in 1966. Conservatively, that one third, however, would be over twice as large as in 1966. It would contribute much more foreign exchange, large amounts of raw material for industry, more and better quality food per capita for up to 100 million people, and more income for savings and investment in both the farm and nonfarm sectors. From the standpoint of social and distributive justice, we see the possibility of substantially improving the lots of millions of smallholders and livestock producers to such an extent that the increase in their effective demand for the products of Nigeria's urban and industrial economy would be a positive force for developing the urban economy.

How Nigeria manages her agriculture in the years ahead will be of tremendous importance. The difference between improved and present management could create the equivalent of a million and a third new employment opportunities at £360 per family head to improve the lives of 10 million family members dependent on employment in agriculture, in agricultural processing and in the service industries including those producing manufactured goods for the rural economy.

Our conclusion is that the second strategy is far superior to the first and third. The policy and program recommendations presented at the beginning of this summary are designed to implement our second strategy.

Our strategy and recommendations require lower public expenditures than either a continuation of present policies or a shift to a harsher policy which is more exploitative of agriculture. At the same time, we calculate that agricultural GDP will expand 105 percent from 1967 to 1985 as compared with 78 percent for the present policies and 58 percent for the harsher policies, even without allowance for substantial additional expansions from second strategy production campaigns starting in, say, the 1975-80 period. We estimate that the amount of government revenue required of nonfarm sources such as petroleum would be lower under our recommendations than if either (1) the present strategy continued or (2) Nigeria shifted to a harsher strategy designed to extract income from agriculture while maintaining cheaper food for the benefit of the urban masses.

We estimate that our strategy can provide an additional £420 to £515 million of GDP per year by 1985 as compared with continuation of present and harsher strategies respectively. Of these increases, £242 to £428 million would be from agriculture. This dramatic increase compares favorably with petroleum which will contribute about the same amount to GDP in 1985, only part of which will remain with Nigeria, however.

The Orientation of Our Recommended Strategy, Policies, Campaigns and Programs

Our recommendations involve a general strategy with short- and long-run components, three basic policies and a large number of campaigns and programs to implement the three policies. The overall strategy which we recommend is twofold in nature.

In the *short run*, we recommend that Nigeria: (1) concentrate on opportunities to expand agricultural export crops production and export earnings (these opportunities arise out of restrictive pricing and taxation programs and marketing board practices which can be corrected); (2) distribute the resultant increases in income widely over a large number of rural people to provide the means of financing the expansion of production, to generate additional effective domestic demand for both farm and nonfarm products and to obtain a substantial improvement in the welfare of masses of her rural people.

The main strategy also has a *longer-term* component. It involves much greater support for biological research to develop economically superior varieties of plants and animals. Here the need is urgent with respect to food and feed crops, including the high protein food sources. Success in obtaining new biological technology will open up new opportunities to produce staple food and feed crops to supply the greater quantities which will be taken by domestic and foreign outlets at the lower costs of production and prices resulting from the improved technology.

The above strategy can be expressed in terms of three major policies which we think Nigeria should adopt.

The *first* policy is that of providing her agricultural producers with favorable price relationships in order to provide *private* motivation to expand production to *socially* desirable levels.

The *second* policy is that of concentrating direct, short-run public support to agricultural producers on the production of commodities having high payoffs. This should be done in a highly coordinated, systematic manner involving heavy reliance on local agencies and state ministries of agriculture and natural resources as well as reliance on a strengthened Federal Ministry of Agriculture and Natural Resources. This policy also involves encouraging and placing heavy reliance on private sources of inputs, finance and marketing services.

The *third* policy should be one of providing infrastructure support (including research, extension and resident instruction) for both the short- and long-run efforts outlined above.

In the *short run*—the next 10 to 15 years—we visualize extensive *production campaigns* for the *export crops*, cocoa, groundnuts, rubber and oil palm which offer attractive prices to growers and provide packages of production resources, services and technical advice. We propose that the campaigns be started on the basis of known technology but that, concurrently, research should be continued and strengthened to provide better technology for the future.

Some *important import substitution crops* for which Nigeria has, or can achieve, comparative advantage should also be encouraged. We recommend a campaign for cotton to meet growing needs of the Nigerian textile industry and selective programs on a less ambitious scale for sugar and kenaf.

A third category of commodities is made up of *superior foods* that could *contribute to nutritional levels* but for which effective demand is thin. These include poultry, eggs, range livestock, maize and beans. For such commodities modest programs are suggested to (a) educate consumers to the nutritional value of such foods, (b) encourage some expansion through extension and pilot development schemes where the market will absorb increased output and (c) lower production costs through research.

A fourth category of crops is represented by the *great staple carbohydrate foods* that make up the bulk of the Nigerian diet—yams, cassava, guinea corn and millet. Rice is currently priced above world levels (approximately world levels plus transport cost to Nigeria). Our studies of socially desirable reallocation of production among Nigeria's ecological areas indicate

that southern areas should expand tree crop production while increasing consumption of foodstuffs from the northern and middle belt areas. Thus, some attention needs to be given to modest production campaigns for expanding food crop production in these areas. However, increases in total production of these commodities much above population growth rates will result in low prices relative to present high costs of production. Thus, we do not advocate large scale production campaigns for these commodities; instead, we address our main attention to the research phase. Success in the research phase is the basis for long-run additional agricultural growth in the northern and middle areas. Reduction in costs of producing proteins and starch in these areas would open up many new high-payoff opportunities for private and public investment.

In addition to commodity campaigns, we recommend action to support these field efforts through improvement in educational and research institutions, development of a credit activity, encouragement of private investments and improved marketing.

Implementation of the longer-run component of our strategy begins with research, *now*, to be followed with production campaigns starting 5 to 10 years in the future. This second thrust will be based on biological advances in food and feed crop and livestock production which we are confident can be brought about by Nigerian agricultural research institutions working jointly with the new International Institute for Tropical Agriculture. Such research can be expected to increase yields and reduce per-unit costs of food and feed crops to permit Nigeria to enter a new era. This will be an era of cheaper and better food, expanded livestock production and, possibly, of food, feed and beef exports. At that time, additional production campaigns and supporting infrastructure and supporting institutions will be required which are not developed in detail here; however, the public and private investments for the second strategy, like for the first, will have high social (and private) payoffs and, hence, can be largely self-financing, though we feel that federal and state resources may be required initially. The second thrust and its eventual programs will be of substantial benefit to the savannahs and derived savannahs of the north and middle belt areas. Programs for implementing the research phase of the second thrust are discussed in more detail later in this summary and at length in Chapters Six, Seven and Eight, in the main report which is only summarized here.

Production Campaigns

Production Campaigns for Export Crops

Cocoa is the dynamic feature of economic development of Western Nigeria. Most of Nigeria's 350,000 cocoa farmers are located in Western Nigeria. Nigeria's share of world cocoa trade has increased from roughly 14 percent in the mid-1950's to 18 percent in the mid-1960's. The world outlook for cocoa is good and cocoa prices are expected to remain high in the 1970's.

Our research indicates that cocoa production can be doubled over the 1970-85 period. The essentials of a campaign for doubling cocoa output are as follows:

1. The Western, Mid-Western and South-Eastern States should draw up production campaigns for the 1970-75 period, which include high producer prices, subsidies on fertilizers and pesticides, loans to producers and extension assistance.
2. Campaigns should include the following techniques:
   (a) Increased application of pesticides and fertilizer on present cocoa acreage
   (b) Planting new cocoa acreage
   (c) Removal of old and diseased cocoa trees and replanting with new varieties.
3. Cocoa prices to producers should be increased in early 1970 by about £25 per ton through reduction in tax levels and marketing board margins.
4. During the 1970-75 period, subsidies on pesticides, insecticides and seedlings should be reduced and responsibility for supplying these materials should be shifted from governmental to private supplies.
5. The replanting and new planting schemes should aim at planting about 15,000 acres in 1970 and 27,000 acres in 1971 to about 33,000 acres in 1975. Each farmer would have an average of about 5 acres.
6. Farmers who replant cocoa could be offered a per-acre loan of £22 and initially a subsidy of an equal amount. Farmers who plant cocoa on new land could be offered loans of £16 and subsidies of £16 per acre.
7. The replanting and planting schemes should be administered by the state ministries of agriculture, while the Federal Ministry of Agriculture and Natural Resources will be primarily concerned with cocoa research through CRIN, securing external loans and coordinating marketing board policies, pricing programs and operation.
8. Extension staff for the cocoa program should be expanded (in part by eliminating extension functions for low-priority commodities and programs) and trained to carry out the cocoa campaigns. At the outset one agent would be needed for about 40 farmers. As farmers gain experi-

ence, each agent can work with more farmers.

9. The research staff of the Cocoa Research Institute of Nigeria would be assisted by three or four senior scientists for a minimum period of five years and an experienced agricultural economist should assist the fertilizer research team at CRIN.
10. The marketing board would establish a modest stabilization fund to stabilize year-to-year fluctuations in prices to growers.
11. For the period 1975-85, all export duties, taxes and marketing board surpluses not needed for price stabilization would be eliminated, and input subsidies would be dropped. The credit program would be greatly expanded to take care of farmers' increased needs. We estimate that under these conditions farmers would plant or replant 40,000 acres a year after 1975.

About one million Nigerian farmers derive income from *the oil palm*. For the past 14 years, the oil palm industry has been virtually stagnant in Nigeria. It has suffered from a prolonged period of underinvestment as a result of inadequate producer incentives resulting from low prices offered to producers. If action is not taken soon to alter policies affecting palm produce, Nigeria's growing population may require the importation of palm oil within 15 to 18 years.

Nigeria faces keen competition in world oil markets for the sale of palm oil. World palm oil prices fell 25 percent from early 1967 to late 1968. We cannot be as optimistic about the future of the oil palm industry as we are for cocoa. Nevertheless, Nigerian producers of palm oil and kernels can achieve substantial returns on labor, land and capital (mainly in the form of Nigerian-produced improved palm trees) even at conservative world prices if (a) high yielding NIFOR hybrid palms can be made available for mass farmer adoption and (b) marketing board and export duties are reduced and finally eliminated by 1975.

An oil palm rehabilitation scheme modeled after the highly successful Oil Palm Rehabilitation Scheme of the former Eastern Region can be used as the central mechanism for getting mass farmer adoption of the NIFOR hybrid palms. We recommend the rehabilitation scheme include both loans and subsidies and close extension supervision over the 1970-75 period. The essentials of the oil palm campaign are as follows:

1. Oil palm production campaigns for the 1970-75 period should be drawn up by the oil palm producing states in cooperation with the Federal Ministry of Agriculture and Natural Resources. A combination subsidy-loan scheme would be developed by each state. The subsidy would include in-kind provision of seedlings, pesticides and fertilizer worth about £12 per acre. A loan of about £10 per acre should be made available over a five-year period to pay for hired labor and miscellaneous costs.
2. The Nigerian Institute for Oil Palm Research should be strengthened quickly to ensure that it can supply an adequate volume of seeds and can contribute a flow of new technology for the improvement of the scheme, including processing technology.
3. As seeds are released by NIFOR, the states should arrange for production and distribution of seedlings, directly at first, but increasingly through other agencies such as community nurseries, young farmers clubs and private firms.
4. Extension staffs should be expanded to render advisory and loan assistance to farmers. Initially one agent could look after 40 farmers with this work load going up as farmers gain experience.
5. The state extension services should arrange for distribution of Stork hydraulic presses to private operators and provide training in their use. Here again it is important to increase palm produce prices to farmers so that they will have the wherewithal to pay for the services of these modern presses.
6. Pricing and subsidy policy should include a substantial reduction in taxes at once, and by 1975, complete elimination of all taxes and board surpluses on palm products and elimination of producer subsidies. It is assumed that the loan program will be greatly expanded from 1975 on to help ensure that the replanting will continue at a rapid rate from 1975-85.

We estimate that under this program, about 11,000 acres would be planted in 1970; 22,000 in 1971; 40,000 in 1972; 60,000 in 1973; 70,000 in 1974 and 80,000 in 1975. The average farmer would plant about 10 acres of hybrid palms.

Nigeria is the world's largest exporter of *groundnuts*. Groundnuts are a key source of income and growth of the upper four northern states; agricultural planning for these states, by necessity, requires that major attention be devoted to policies to guide the production, processing and evacuation of groundnut products.

The prospects are reasonably good for Nigeria to triple groundnut production over the 1970-85 period under our recommended strategy.

The specifics of a groundnut campaign to achieve the above target are as follows:

1. Each major groundnut-producing state should draw up a groundnut production campaign for the 1970-75 period.
2. The package approach of offering intensive extension service and new inputs—mainly fertilizer—to a restricted number of farmers should

be the major focus of the campaign for the 1970-75 period.

3. Improved fertilizer distribution and improved produce inspection and evacuation should be major areas of emphasis in the 1970-72 period.
4. After real resources, mainly fertilizer, are available to the masses of farmers—say in 1973—it is proposed to raise producer prices by £5 per ton by reducing marketing board and export taxes. In 1975 it is proposed to raise producer prices by another £5 per ton. Improved producer prices, from £27 per ton in 1970 to £37 in 1975, will give producers greatly expanded incentives for using fertilizer and bullocks and bringing more land into cultivation especially in the North-Eastern State.
5. The seasonal credit bottleneck can be overcome in the short run by continuing the present level of fertilizer subsidy until 1973 at which time producer prices will be increased.
6. Three major bottlenecks—labor shortage during the planting season, inefficient and corrupt produce inspection and marketing system and a shortage of intermediate credit for financing animal-powered mechanization—cannot be overcome without substantial local experimentation. For these reasons, we recommend a task force be established to focus on a program of intensive applied research in one or more states to determine how the new hybrid millet and sorghum varieties can be introduced into a typical farming operation or into the market system to insure stable food supplies to permit planting of groundnuts earlier in the season with the aid of some animal-powered mechanization. Also, the task force should devote special attention to experimentation with various types of organizations to introduce modern inputs at the village level. Cooperatives under close supervision may become a viable agency to provide inputs to farmers, including credit and a means of collecting loans.

There are about 100,000 *rubber producers* in Nigeria, mainly in the Mid-West State. In the past 15 years, the world price of natural rubber has steadily declined while synthetic rubber has gradually increased its share of the total world rubber market. Synthetic rubber now accounts for about two-thirds of world rubber production. However, the price of natural rubber now appears to have reached a floor of about 16 cents a pound (c.i.f. New York). New natural rubber processing technology has been developed and there is a new, cautious optimism about natural rubber holding its one-third share of world rubber output in the 1970's. In addition, the 25 percent reduction in world oil palm prices in 1967 and 1968 makes rubber more competitive with oil palm in the rain forest belt of Nigeria provided rubber yields can be increased to 1,000 pounds of dry rubber per acre and new rubber processing technology can be introduced. However, policies for rubber must be judged against prospects for oil palm which is the principle alternative cash crop in Nigeria's rain forest.

Our rubber campaign for Nigeria focuses on increasing quality and, hence, farmers' income from existing wild rubber trees through the use of the improved crumb processing technology. Foreign exchange earnings, of course, will also be increased through this new technology. The next step in the production campaign is to create a pilot experimental planting of a 5,000 acre block of land to be planted to new rubber clones and managed in accordance with approved technology. The pilot program would generate input-output data on yields, costs and labor requirements for both production and processing. These data will help guide future program decisions.

In summary, there now is modest optimism about the future of rubber in Nigeria. However, the key to Nigeria's rubber industry is whether Nigeria can compete with other natural rubber producers such as Malaysia and whether rubber can be competitive with oil palm in the rain forest areas of Nigeria. If oil palm prices should unexpectedly increase in the early 1970's, then it is our judgment that oil palm should gradually replace rubber in the Mid-West State. However, if oil palm prices remain depressed and if Nigeria can successfully introduce the new crumb processing technology for smallholders, and if yields can be pushed up to around 1,000 pounds of dry rubber per acre, then natural rubber has a reasonably good future in Nigeria.

Production Campaigns for Import Substitution Crops

Cotton is a large and socially profitable import substitution crop in Nigeria. The market prospects are good for Nigerian cotton farmers as increased per-capita income under our recommended strategy and policies will generate the effective demand for expanded cotton consumption. For these reasons we suggest a production campaign to improve yields and profitability of cotton production.

Two major bottlenecks for cotton production are (1) inadequate producer incentives and (2) low yields which stem primarily from late planting. Partial steps to increase producer incentives were taken by the marketing board in 1968 when the price of seed cotton was increased to 6 pence per pound. However, there are numerous shortcomings in the produce inspection service and in the operation of licensed buying agents which reduce the price actually received by farmers. For these reasons the cotton campaign focuses on improving producer incentives by improving

the produce inspection and licensed buying agent system.

The late planting of cotton is closely related to food crop requirements of the small farmers who are producing both food crops and cotton. The current research on new millet and sorghum varieties at Samaru holds great promise for the cotton industry. These new food grain varieties which will hopefully be released for mass farmer adoption in the mid-1970's will enable farmers to reduce the acreage planted to meet family food needs and enable farmers to speed up the planting of cotton and groundnuts. Therefore, the cotton campaign should focus extension effort on getting either (1) rapid farmer adoption of the hybrid millet and sorghum varieties as they become available or (2) the development of trading patterns for these crops so that farmers can count on stable, reliable supplies of food from the market. Expansion of bullock power and increased use of spraying for cotton are also important.

In addition to cotton for textiles, we suggest that Nigeria expand domestic production of *sugar*, drawing upon its experience at Bacita. We also suggest that attention could profitably be given to expanding *kenaf* production to supply the existing bag mills at Badagry and Jos. We recommend a survey of the potentialities of irrigated *wheats* in the north to see if a further expansion is economically feasible. Some opportunities exist to expand *rice* production on an import substitution basis.

Research Programs and Limited Production Campaigns for Nutritionally Superior Foods

Beef, poultry, eggs, milk, maize and beans are examples of nutritionally superior foods with thin markets at present low levels of consumer income in Nigeria. Expansion in output for some of these has been achieved through extension programs but prices have then fallen so low that producers have lost money. Yet, even at lower prices, increased consumption has been out of reach of the masses. Thus our production campaigns and policies to increase the real incomes of millions of smallholders, producers of export crops and, indirectly, of urban dwellers, are important here as these campaigns and policies will increase effective demand for nutritionally superior foods. We recommend continued research to lower costs and improve quality (high lysine maize, for example), an expanded extension nutrition program effort to expand demand and a modest extension effort to expand production. For the large and complex beef industry, we recommend that the Livestock and Meat Authority extend its efforts with external technical assistance to lower beef production costs and to modernize the activities of transportation, processing and distribution.

Research Programs for Staple Foods and Food Grains

Perhaps the most urgent problem facing agricultural planners during the reconstruction period will be that of re-establishing food production and internal trading patterns in the former Eastern Region. However, since the production of the four major staples satisfies effective economic demand under peacetime conditions in Nigeria and at present low levels of income, there is little economic justification for Nigeria to launch major long-run food production campaigns in the 1970s to satisfy the domestic market at the expense of export crop production. With the increased specialization we recommend of southern areas in the production of export tree crops, there will be added need for shipment of food from the middle belt and northern savannahs to the South; thus, short-term food production campaigns would have some value in those areas if our other recommendations are followed.

Nigeria does have a long-term food production problem, however, as her internal prices of protein and starch are above world market prices. Nigeria needs genetic improvements in the major root and cereal crops to achieve large, cost-reducing increases in yields per acre. Such improvements promise to open up an era of increased prosperity for the savannah areas, as well as cheaper, better food and improved nutrition for many Nigerians and higher per capita incomes in the food-producing areas.

With respect to the major carbohydrate food crops, we recommend expanded research to find outstanding new varieties and improved agronomic practices for the purpose of lowering domestic food costs, making feasible a livestock-feeding industry and opening up export markets for grains and dried cassava meal. Program details for this research are summarized in the section on research below.

Programs, Institutional Changes and Activities to Support Development

In addition to the production campaigns, a number of programs, institutional changes and activities are needed to support Nigerian rural development. Some of these are needed to back up the export crop production campaigns while others are needed to produce technological advances and trained manpower to expand food, feed and livestock production.

A Stronger Federal Ministry of Agriculture and Natural Resources

A prime need is for a strengthened Federal Ministry of Agriculture and Natural Resources to coordinate, plan for and to mobilize federal support for agricultural development. The federal ministry should have an agricultural planning unit. There should be an Advisory Committee on Agricultural Education. (ACAE) administered in the Federal Ministry of Agri-

culture and Natural Resources and advisory to the National Universities Advisory Commission. In addition, there should be an Agricultural Research Committee (ARC). These two committees should be in a position to help coordinate and rationalize agricultural education (university and subdegree training) and research along lines detailed below. In addition, there should be a Federal Office of Extension in the Federal Ministry of Agriculture and Natural Resources to help carry out the kinds of policies and programs outlined below for extension. Still further, the Federal Ministry of Agriculture and Natural Resources should be in a position to influence the development and operation of any federal agricultural credit program which may be created to finance the production campaigns. Also, inasmuch as an agricultural orientation is important in bringing about the needed changes in agricultural taxing, pricing policies and operations of the marketing boards including the Nigerian Produce Marketing Company, Ltd. (NPMC), the Federal Ministry of Agriculture and Natural Resources should be given power to influence the policies and operations of these agencies.

Coordination of Research and Educational Resources

Efficiency of public resources would be enhanced if the university faculties of agriculture, the ministry schools of agriculture and the major research stations were affiliated to form research and teaching complexes focused upon the major ecological areas. Affiliation could be mainly informal, although we feel the universities and schools of agriculture should be formally united. These centers would be:

1. Ibadan-Ife-Moor Plantation-CRIN Complex, with the Akure and Moor Plantation Schools attached.
2. Nsukka-Enugu-Umudike Complex, probably with NIFOR and the Iyanomo Rubber Station attached.
3. Ahmadu Bello-Vom-IAR Complex, including the Kabba, Mando Road and Samaru Schools of Agriculture.

Through informal and formal arrangements, these complexes would evolve cooperative agreements for joint teaching and research assignments. Some extension specialists who might be employed by the Federal Ministry of Agriculture, or by groups of states, should work out of these complexes. CSNRD regards rehabilitation and reactivation of the agricultural faculty at the University of Nigeria as crucial to service for the eastern middle belt as well as for the Mid-Western State and the new states in the former Eastern Region.

The present educational plants appear adequate for the numbers of university B.Sc.'s in agriculture Nigeria will need to produce over the next 15 or 20 years, except in the North which should expand its facilities in accordance with present plans. Good price policies, however, would stimulate private investment in agriculture and sharply increase demand for trained agriculturalists.

University capabilities for research in selected fields need to be supported, financially and administratively.

Universities should proceed slowly with the *development of graduate schools*, continuing in the meantime to send graduate students abroad for study. Nigerian graduate students in foreign universities should be encouraged and helped to go to Nigeria to do their thesis research on problems that are important to Nigeria.

The supply of University teachers should be increased by drawing upon nonfaculty agricultural scientists to help with teaching.

Opportunities for specialized undergraduate teaching should be expanded, especially in the fields of agricultural economics, agricultural engineering and agricultural business.

More attention needs to be given to work-study opportunities, internships, on-job-training and other devices for giving practical guided experience.

Education in veterinary medicine should continue to be confined to Ahmadu Bello University but animal husbandry training should be expanded at all centers.

We feel that considerable revision needs to be made in the training offered in the schools of agriculture. Also, training periods can be shortened. A constructive step that could be taken with respect to these schools would be to merge them with the universities so that courses could be standardized and rated for university credit in cases where they are at university levels.

Additional specialized optional courses should be given by the schools to fit men for specific careers. More attention needs to be given to practical field training of students.

The most constructive improvement that could be made in extension work would be to concentrate the bulk of the extension staff on the concrete and specific commodity production campaigns we recommend. This would greatly increase the productivity of extension workers because they would be working on commodities for which there is known improved technology to extend, and for which the preconditions for success—adequate prices, modern inputs and properly run marketing services—would be made available if our other recommendations were followed. Extension should be retrenched, not expanded, if these preconditions are not met.

We recommend that a Federal Office of Extension be established in the Ministry of Agriculture and Natural Resources to assist with program planning, to provide some specialist help and to coordinate programs

among states. In its planning role it would work closely with the proposed federal planning and economic analysis unit in the Ministry of Agriculture and Natural Resources.

Attention needs to be given to improvement in the administration and planning of state extension programs.

Extension workers are overburdened with farm supply service activities. These activities need to be shifted rapidly to the private sector.

Logistic support for extension workers is inadequate and needs to be increased in order to permit effective use of these workers.

Extension work with rural women and youth needs to be gradually expanded. The work with women should stress nutrition, but should also give attention to production programs. Youth work should be production-oriented. Prizes, awards and public recognition should be provided for individual excellence in agricultural production and homemaking projects.

Each of the commodity campaigns discussed earlier requires adequate research support. In some instances, laboratory space and equipment will be needed, but more often the prime need is for senior, experienced research scientists.

Virtually no applied research is being done to develop new types of farms and to transform present farm units and marketing organizations into efficient units for management of modern production resources capable of growth in output and productivity. Substantial work of this nature should be undertaken.

A major research effort is needed to lower costs of producing carbohydrate foods and proteins for our long-run thrust. Expanded research is recommended on cereal grains, edible legumes and beef cattle. This should be done at IAR and elsewhere in Nigeria in close cooperation with IITA. Our emphasis for these commodities is on expanded research to get costs of production down to competitive world levels so that Nigeria can satisfy her domestic needs and, hopefully, enter world export markets for such crops as maize, cassava, rice, the sorghums and millets, and possibly start a livestock feeding industry. Benefits would be twofold: cheaper foods at home and expanded export markets.

In view of the wide interest by Nigerians in growing wheat, prospects for wheat should be evaluated by an expert to see if major wheat research should be launched.

Two major international tropical research activities are proposed by CSNRD in addition to or as part of IITA, one dealing with problems of soil fertility and shifting cultivation and another with livestock husbandry and diseases. Nigeria is well-situated to provide the location of such research centers. We propose that the soil fertility work should be closely connected to the IITA and the livestock research center be affiliated with Ahmadu Bello University.

Research on agricultural production economics, marketing, rural sociology and agricultural policy needs to be expanded at the Nigerian Institute of Social and Economic Research, the Economic Development Institute when the University of Nigeria is re-established, and at the Rural Economic Research unit of Ahmadu Bello University as well as in the university departments of agricultural economics.

Research institutions need to relate themselves to the work to be done at IITA in ways that will be mutually supporting. This new institution will, in a few years, produce new varieties and new findings that can be tested and adapted at other stations. Also, the work at IITA will free other researchers from the necessity of duplicating this work so they can turn to other problems. Finally, the opportunities at IITA for seminars and in-service training can be of great help to Nigerian researchers.

We recommend that an Agricultural Research Commission or Committee be established in the Federal Ministry of Agriculture and Natural Resources to coordinate and find support for priority research proposals for agriculture.

Agricultural Credit

As Nigeria has had disappointing experiences with public credit institutions, we recommend careful experimentation before launching any new large-scale credit agency. Fortunately, existing sources of credit will suffice to finance the development campaigns for the first few years while credit alternatives are tried out.

Eventually a national credit agency will be needed that will:

1. focus attention initially on high-payoff export and import substitution crops,
2. work with private suppliers of production inputs to improve availability and reduce costs, and
3. work with produce buyers and expedite collection of loans.

In the process of evolving an effective credit institution, we recommend that the Central Bank of Nigeria play a leading role (with the advice, support and counsel of the Federal Ministry of Agriculture and Natural Resources) in organizing such an agency, providing training and in supervising it until it is well established. As the agricultural lending agency should work out loan supervision arrangements with the extension services and loan collection arrangements with the marketing boards or the licensed buying agents, it is important that both the bank and these agencies be under some degree of administrative control from

the Federal Ministry of Agriculture and Natural Resources.

Encouragement of Investment in Agribusiness

Our main recommendations for public and private agricultural investment are in connection with the production campaigns and the programs for a few other crop and livestock enterprises. However, there are several related processing and farm supply activities that should be carefully examined to see if they can be made attractive for additional private investment. These involve: textile manufacturing, palm kernel crushing, groundnut crushing, kenaf fiber production, sugar refining, cassava processing, meat processing, tanning and leather products, mixing and distribution of fertilizer, and feed manufacturing. Some of these will pose problems of limited domestic demand. Others, such as meat processing, will encounter problems of domestic demand and of entry into foreign markets.

Government policies to encourage investors are generally quite favorable, but policies on import duties on producers' goods, interstate taxes on cotton and expatriate quotas need to be reviewed.

Nigeria is critically short of managers and experienced entrepreneurs in the modern sector. Increased efforts are needed to give training and experience. The government should provide adequate incentives (including favorable prices) to enter business. Industrial development centers should be expanded and corporations should be encouraged to expand in-service training facilities. The possibilities of associating satellite, smallholder schemes with plantations or processing firms should be explored. Socially oriented private and quasi-private firms such as the Commonwealth Development Corporation and the International Basic Economy Corporation should be encouraged to invest in Nigeria.

Family Planning

Nigeria has capacity to feed her expanding population, under peacetime conditions, for several more decades. However, her population growth rate is such that she may have 100 million people by 1985. Such numbers will make it difficult, if not impossible, to increase real per capita incomes to acceptable levels.[3] Even if an effective family planning program were put in effect now, it would be several years before its impact would be apparent in the adult working population. Thus, the hour is now late. Nigeria should waste no time in getting an effective family-planning program underway.

Community Development, Food-Aid, Reconstruction, and Development Projects

We recommend that community development projects be preceded by the production of income to support them. This suggests the wisdom of merging local production campaign efforts with local community development projects. Community and local development projects for state and federal support should be carefully scrutinized to insure (1) that those financed have as high or higher prospective payoff than alternatives not financed and (2) that the payoffs to private businesses and individuals are not such that the project could be financed privately either from domestic or foreign financial sources. Among projects which should be sharply curtailed are the farm settlement schemes. Irrigation projects should also be sharply scrutinized.

If CSNRD recommendations are adopted, it is anticipated that development projects will overshadow reconstruction projects. Thus reconstruction as well as development projects must be carefully scrutinized. Old mistakes should not be reconstructed. Even past successful projects should not always be reconstructed. The future will involve more people, more production (particularly if our recommendations for agriculture are accepted), more trade, more exports, more manufacturing, higher incomes, etc. Nigeria is advised to build for such a future.

We recommend that reconstruction and development projects be run so as to create substantial amounts of employment and income for Nigeria's less-advantaged people. We advocate this both on egalitarian grounds and in the interests of increasing effective demand for nutritious foods.

While food-aid will be needed in the reconstruction period, care should be taken even then that exports subsidized by foreign governments do not destroy the markets for the areas traditionally supplying the former Eastern Region with grains, pulses and meat. In the longer pull, food-aid should not be permitted to hold internal food prices down to levels which will prevent Nigeria from developing her own capacity to produce food, feed and livestock products for her own needs and, indeed, for needs elsewhere in the world.

Changing Federal, State and Local Relationships

The creation of the new state structure in Nigeria will offer new opportunities for decentralizing the public activities involved in planning, encouraging and regulating economic development. Simultaneously it presents new needs for overall federal coordination, support and planning.

It will be of great importance for Nigeria to maintain the economic advantages of a large national market for agricultural products and for human and physical resources.

National development programs will need to take

[3] Cownie, John. *Nigerian National Income Accounts: Summary and Projections to 1985.* CSNRD 14.

into account the physical and human resources of the different states, their educational needs and financial requirements and production potentials. Plans for development must provide for balanced growth throughout the country, but within the premise of a single market.

Development planning should involve the best thinking of leaders and informed persons at all levels—local, state and federal. A two-way flow of ideas and information is needed from the grass roots to Lagos and from the federal capital out to the country. Appropriate governmental organization will need to be constructed to make this possible. The Federal Ministries of Economic Development and of Agriculture and Natural Resources will have important roles to play, along with the universities and the state ministries of agriculture and of finance. State ministries of agriculture are in a potentially strategic position because of their network of extension officers who should be in constant touch with local people and local conditions.

Overall Financial and Manpower Requirements for Recommended Campaigns and Programs

The report ends with a chapter on financial and manpower capacities and requirements. CSNRD recommendations compare very favorably with either a continuation of present policies or a shift to harsher policies still more exploitative of Nigerian agriculture. As to manpower, our recommendations would result in the largest private and the smallest public agricultural sector. However, our recommendations would demand and provide more highly trained agriculturalists in government, the universities and research institutes as well as in industry. In short, employment of trained agriculturalists would increase in both the public and private sectors. The required numbers can be trained in existing institutions with only minor modifications.

Our recommendations require lower public expenditures than either a continuation of present strategies or a shift to a harsher strategy which is more exploitative of agriculture. At the same time, we calculated that agricultural GDP will expand 105 percent from 1967 to 1985 as compared with 78 for the present policies and 58 for the harsher policies, even without allowance for substantial additional expansions from second strategy production campaigns for foods and feeds starting in, say, the 1975-80 period. The savings in expenditures are through reductions in (1) farm settlements, (2) input subsidies which would be unneeded with higher product prices, (3) development corporation plantations and (4) public production and/or distribution of such things as modern planting materials, fertilizers, seeds, baby chicks, sprays, etc., as a result of turning them over to the private sector.

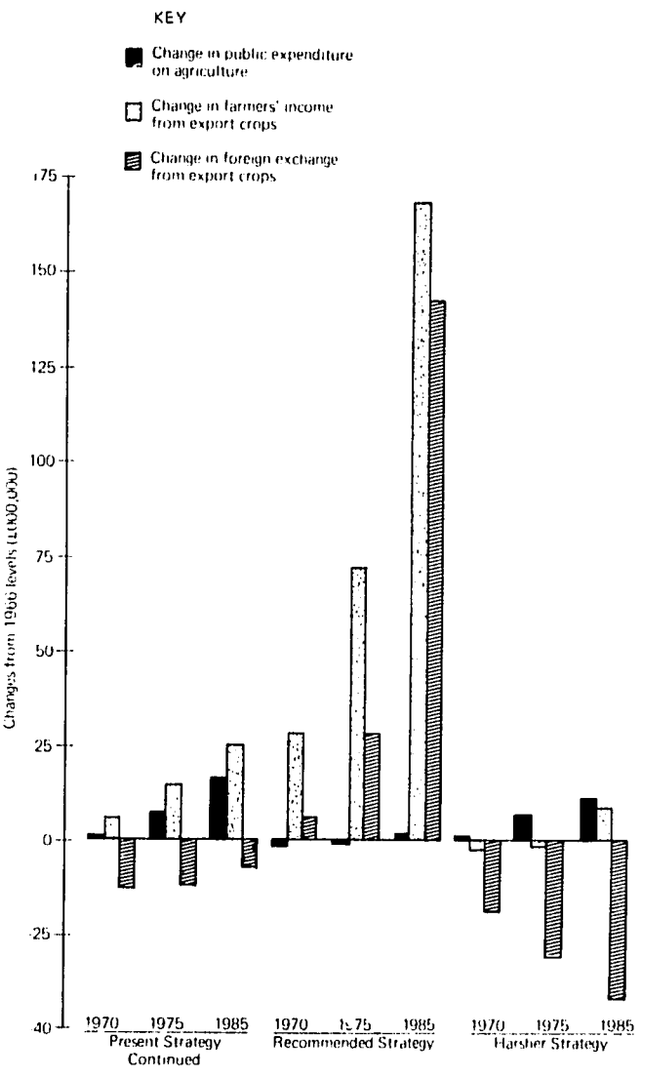


Figure IX.1 -- Changes from the 1966 level of Public Expenditure in Agriculture and Farmers' Income and Exchange Earnings from Export Crops Under Three Alternative Strategies, Nigeria, 1970, 1975 and 1985.

Source. Tables V.2 and IX.1.

These savings would (1) permit the expansion of other more strategic services not providable by the private sector and (2) offset much of the loss in revenue from eliminating export taxes, purchase taxes and marketing board surpluses. We estimate that the amount of government revenue required of nonfarm sources such as petroleum would be lower by 1985 under our recommendations than if either (1) present policies were continued or (2) Nigeria shifted to a harsher policy designed to extract income from agriculture.

The difference in incomes amounts to an additional £420 to £515 million of GDP per year by 1985 of which £242 to £428 million would be from agriculture as compared with continuation of present and harsher strategies, respectively. If the increase in agriculture value for our recommendation over a continuation of present strategies were taxed by 10 percent with excises, income and property taxes, the financial problems created by dropping present taxes, which discourage production, would be solved. If the whole of agriculture's income under our recommendations were taxed at a little over 1 percent, the problem could also be solved. However, part of the money could be made up with petroleum taxes and taxes on urban incomes generated by the higher rural incomes.

In closing, one other comment should be made. Both of the alternatives to our recommendations appear to be so unviable that it is unlikely that they could be followed unti 1985 without being modified, perhaps haphazardly. To continue the present Nigerian strategy is to follow a route similar to that followed by Argentinea—that route led to stagnation of one of the world's great agricultural economies of the 1920's and 30's. The harsher exploitative strategy we considered is similar to strategies followed by such centrally controlled economies as those of the Soviet Union and Nkrumah's Ghana, both of which failed to obtain adequate rural development. The lesson is the same whether in Peron's rightist Argentina or Nkrumah's leftist Ghana: poor agricultural policy is poor agricultural policy—left or right—and it can bring even major agricultural export countries to disaster and the verge of starvation.

On the other hand, Mexico, which had no opportunity to follow the short-run program we recommend for Nigeria, has followed our long-run program successfully and is now self-sufficient in food. Japan followed both the short- and long-run aspect of our strategy with great success despite very meager resources. Even India and Pakistan appear to be having success with strategies similar to those we recommend for Nigeria after years of failure following harsher, more exploitative policies designed to (1) extract income from agriculture for urban development and (2) maintain low food prices for the urban masses.

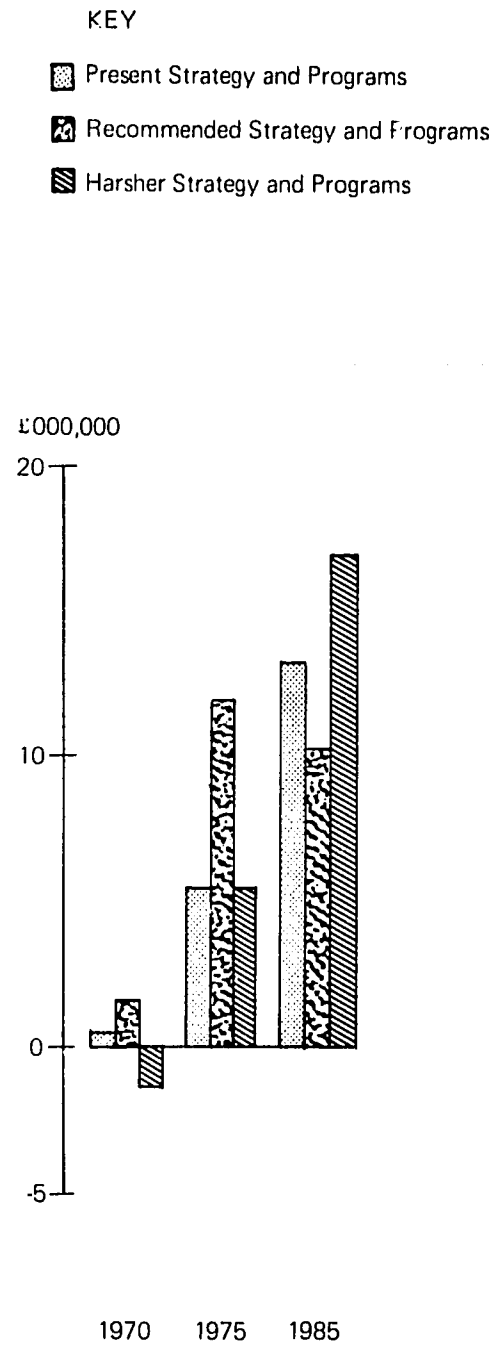


Figure IX.2 – Revenue Required from Non-Agricultural Sources to Finance Public Agricultural Programs under Three Alternative Strategies, Nigeria, 1970, 1975 and 1985.

Source: Table IX. 8.

Part One
The Agricultural Sector–Characteristics, Growth and Problems

CHAPTER I
Agriculture in the Nigerian Economy

AS WITH VIRTUALLY ALL underdeveloped economies, agriculture is the predominant industry in Nigeria. About half the national income originates in agriculture and livestock production. Approximately 5 percent comes from fishing and forestry, and about the same amount from off-farm agricultural processing (Table I.1). Approximately 80 percent of the Nigerian labor force is employed in agriculture.[1]

Agriculture is an important contributor to public revenues through export duties and produce sales taxes. In 1965-66 approximately £15.4 million or 10 percent of federal revenues came from agricultural products. An additional £4.5 million was collected by Regional governments. Thus in 1965-66, total taxes paid on agricultural products amounted to about 3 percent of the Gross Domestic Product (GDP) from agriculture, or 15 percent of the value of agricultural exports from which they are largely derived. In addition to taxes, income is transferred from agriculture to other industries through the investment of marketing board[2] surpluses. Surpluses from marketing board operations averaged about £14 million a year in the post-World War II-Korean War era but have run around £3 million a year in recent years (Table I.2). A relatively minor part has been used for commodity price stabilization and for agricultural development projects. Most of the funds have been invested in many kinds of development projects other than agriculture. Between about 1947 and 1962, estimated withdrawals through taxes and marketing board surpluses amounted to the following proportions of potential producer income: cocoa, 31.9 percent; groundnuts, 24.9 percent; palm kernels, 28.1 percent; palm oil, 21.0 percent, and cotton, 22.1 percent.[3]

In addition to taxes and marketing board revenues, some loss of revenues to agriculture occurred as a result of charges, marketing margins and collections not required to cover the cost of providing necessary marketing service. The latter are of greatest importance for the export commodities and for beef.

Table I.1—Contribution of Agriculture to Nigeria's Gross Domestic Product at Factor Cost, 1967[1]

Item	Value	Proportion
	£ million	*Percent*
Total GDP	1,591	100.0
Agriculture, including livestock	899	56.5
Domestic Consumption	(791)	
Raw Materials	(10)	
Exports	(98)	
Fishing and forestry	60	3.8
Petroleum	45	2.8
Other	587	36.9
Agricultural Processing	(60)	

[1]Cownie, John, *Nigerian National Income Accounts: Summary and Projections to 1985*, CSNRD 14. Cownie's GDP coefficients were adjusted to the population figures in Table II.3 for "Agriculture, including livestock" and "domestic consumption." "Agricultural processing" is estimated on the basis of a proportion of GDP reported from processing included in value of agricultural output.

Table I.2—Annual Average Trading Surpluses of the Marketing Boards of Nigeria by Periods, 1947-48 to 1965-66[1]

Period	Annual average marketing board surpluses
	£ million
1947-48 to 1953-54	13,825
1954-55 to 1960-61	3,268
1961-62 to 1965-66	2,820

[1]Data for 1947-48 to 1960-61 from Helleiner, G. K. The Fiscal Role of Marketing Boards in Nigerian Economic Development 1947-61. *The Econ Jour* 75(295), 582-610. Data for later years prepared by CSNRD from marketing board reports. Figures exclude cotton trading surpluses for 1947-48 and 1948-49 and oil palm products for 1962-63 to 1965-66 for which data are not available. Figures for palm kernels and palm oil are reported on calendar year basis in some instances. These have been assigned to the latter year of the crop year; e.g., 1957 data are shown for crop year 1956-75. Marketing board surpluses calculated by CSNRD are not entirely comparable with earlier figures, as published surpluses have been reduced (or deficits increased) by certain administration and other operating costs not included in the published reports.

[1]Food and Agriculture Organization of the United Nations (FAO), *Agricultural Development in Nigeria:* 1965-80. Rome, 1966. p. 383.

[2]See Chapter 2, page 39 and Chapter 3, p. 44 for discussions of marketing board operations.

[3]Helleiner, G. K., "Peasant Agriculture, Government, and Economic Growth in Nigeria." Richard D. Irwin, Inc., Homewood, Ill., 1966. Appendix Tables V-F-1 through 5.

CHAPTER II

Nigerian Agriculture – Its Present Status

THIS BROAD OVERVIEW of Nigerian agriculture will deal with its general characteristics, its ecology, its nutrition and trade, its land market and land use pattern, its labor market, its capital and credit markets, its product and factor (other than credit) markets, technology and its responsiveness to price incentives. Following this overview, Chapter III will deal with the history of modern Nigerian agricultural development as a prelude to the listing of important problems and policy decisions in Chapter IV.

General Characteristic

Nigerian agriculture is characterized by substantial underutilized productive capacity (even with traditional technology). Evidence for this includes low returns for labor (MVPs or marginal value products) in the neighborhood of 1 to 2 shillings per day in subsistence agriculture and for capital (MVPs for capital) of perhaps 5 percent.[1] In addition, the low value of land attests to its low productivity.[2] In short, Nigerian agriculture displays the evidences of an economy which is overinvested in labor and capital and which is probably overpricing land despite the low value it places on agricultural land.

With these evidences of unused productive capacity relative to effective demand, an economist quickly examines demand to see if the difficulty lies on that side. Here the evidence is good that marketing board and pricing policies are preventing a substantial part of the effective foreign demand from reaching producers in the form of product prices high enough to increase the earning power of land, labor and capital.

The thinness of effective demand for subsistence items relative to productive capacity displays itself repeatedly in local gluts and disastrous drops in prices. Consumers simply do not have the real income to even absorb moderate increases in output. Recent studies of staple food markets in Africa by the Stanford Food Research Institute[3] show extensively developed trading patterns in gari, fresh and dried yams, maize, rice, etc., with traders having difficulty in competing with local producers who are willing and able to supply foodstuffs rather effectively in all but the largest, most urban markets such as Lagos which is somewhat remote from well-drained productive land.

Ironically, it is the imposition of marketing board taxes and pricing policies which deprives large numbers of poor, smallholder producers of extra income. This extra income would generate extra demand directly from producers for foodstuffs. Further, an indirect effect of this extra income would be to increase the demand by Nigerian smallholders for the simple products of Nigeria's growing indigenous industry.[4] An increase in indigenous industrial employment and wages would, in turn, increase the nonfarm demand for agricultural food and nonfood products.

Despite the short-run imbalance involving greater productive capacity than effective demand, Nigerian agriculture is characterized by high internal real prices for starchy foods, feeds and proteins (other than groundnut meal). Unlike Thailand, Nigeria has not been able to compete in world livestock feed markets with her cassava. Prices of maize, millet and grain sorghum have been so high and supplies so dispersed and expensive to assemble that export has been impossible and, indeed, it has been difficult to assemble feedstuffs

[1] Liedholm, Carl, Production Functions for Eastern Nigerian Industry, *Nigerian Jour. Econ. and Soc. Studies* (Vol. 8, No. 3, 1966), pp. 427-439.

[2] Okurume, Godwin, *The Food Crop Economy in Nigerian Agricultural Policy*, CSNRD 31. Contrary to a popular view that land is not available to people outside the immediate social and cultural setting and that even Nigerian farmers cannot find extra land, Okurume cites cases of land offered to him and others on numerous occasions and that, indeed, land is available in communities for expanded farm operations if some farmer is so inclined. The rewards, however, are not attractive.

[3] Thodey, A. R., *Marketing of Staple Foods in Western Nigeria*, 1968; and Whitney, Anita, *Marketing of Staple Foods in Eastern Nigeria*, 1968, Stanford Research Institute, Menlo Park, Calif.

[4] Welsh, D. E., The Rice Industry in the Abakaliki Area of Eastern Nigeria, *Journ. Farm Econ.*, Vol. 47, No. 2, 1965.

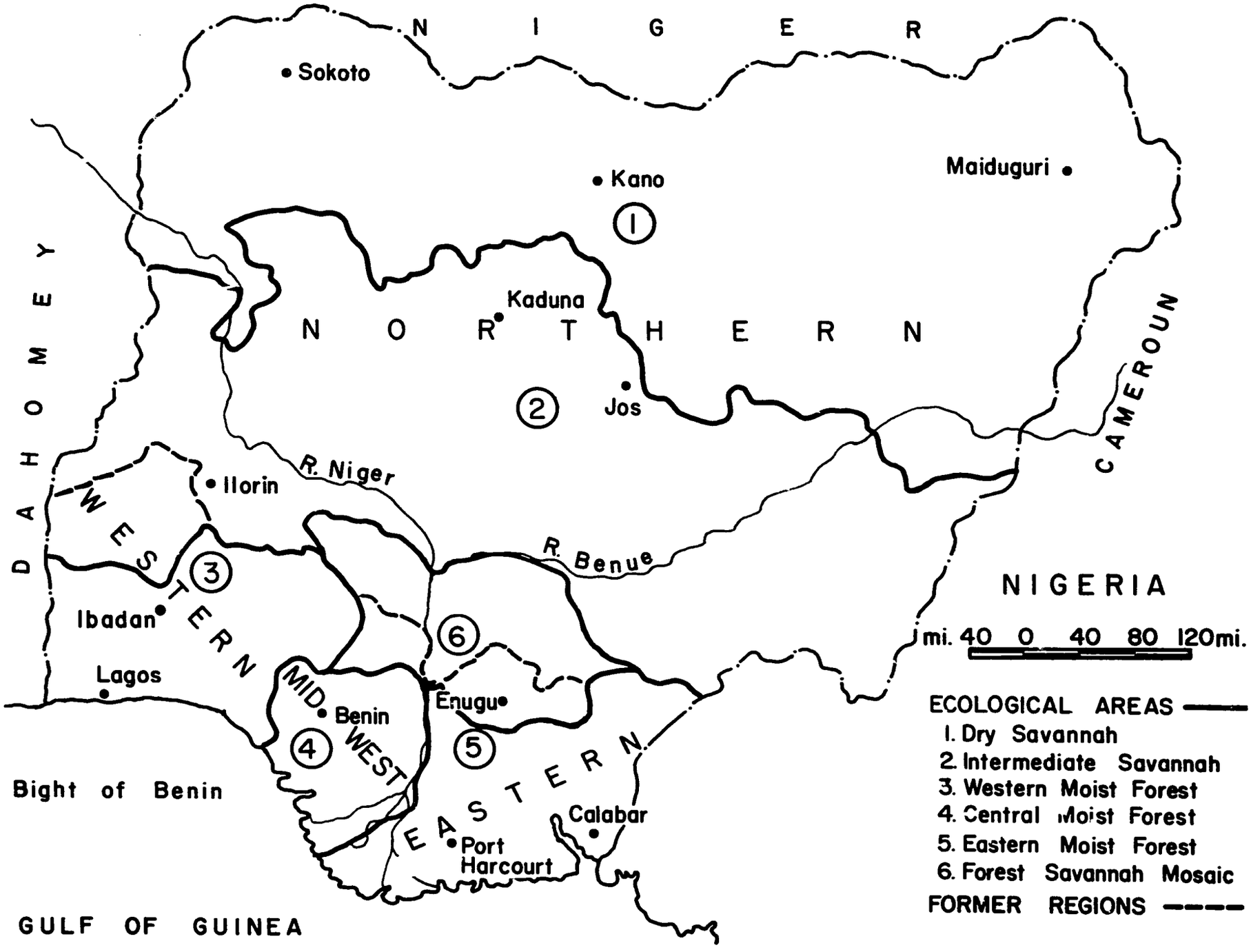

NIGER
Sokoto
Kano
Maiduguri
DAHOMEY
NORTHERN
Kaduna
Jos
CAMEROUN
R. Niger
Ilorin
WESTERN
R. Benue
Ibadan
Lagos
MID. WEST
Benin
Enugu
EASTERN
Calabar
Port Harcourt
Bight of Benin
GULF OF GUINEA
NIGERIA
mi. 40 0 40 80 120mi.
ECOLOGICAL AREAS
1. Dry Savannah
2. Intermediate Savannah
3. Western Moist Forest
4. Central Moist Forest
5. Eastern Moist Forest
6. Forest Savannah Mosaic
FORMER REGIONS

FIG II.1

to produce quality livestock products for even the thin meagre markets provided by expatriates and the new elite. Internal rice prices are high. As Nigeria is a rice importer, internal prices are world prices plus transport costs to Nigeria. The long-run problem in the case of food prices is one of inadequate technology and consequent high cost of production. This is in sharp contrast to the situation for the export crops. For these crops, technology has been adequate to permit Nigerian producers to compete in world markets despite the export taxes and marketing board revenues which depress prices to producers below world price levels. Still further, there is a large unadopted reserve of oil palm, rubber and cocoa technology.

Ecological Areas

The principal variations in Nigerian agriculture arise from climatic differences. Six ecological areas can be identified which possess reasonably homogeneous agricultural conditions. Type-of-farming data are not available for Nigeria, but there have been some careful ecological studies of the country.[5] The six ecological areas include: the dry savannah at the north, the intermediate savannah, and three moist forest areas: the west, the central and the eastern, and the forest-savannah mosaic (a transitional area that lies between the southern moist forest zones at the south and the intermediate savannah). None of the areas corresponds to any of the four political regions into which the country was formerly divided.

Figure 1 presents the six ecological areas. The general pattern consists of three horizontal bands proceeding from east to west: the two savannah areas in the central and northern parts of Nigeria and the rain-forest zone at the south. These same bands continue across West Africa. In general, within any one area, the agricultural possibilities may be regarded as reasonably homogeneous.

Three of the ecological areas comprise a partitioning of the moist forest zone. By this partitioning, it is possible to distinguish between the cocoa-producing areas of the western-most moist forest, the rubber-producing areas of the central moist forest and the oil palm-producing areas of the eastern moist forest.

Area Six, the forest-savannah mosaic, consists of eight provincial divisions that lie south of the confluence of the Benue and the Niger rivers. About two-thirds of the area lies east of the Niger; about one-third lies to the west. In this zone, there is a fairly rapid transition from the rain-forest areas of the South through the derived savannah that comprises this zone to the intermediate savannah that comprises Area Two. It is an area of diverse agricultural production, diverse food habits and diverse population.

A similar derived-savannah area extends east and west all across the country, but, except in Area Six, the corresponding ecological zone is relatively narrow from north to south. Therefore, the eastward and westward extensions of the forest-savannah mosaic are ignored by combining that territory with the adjacent ecological areas.

Food production, nutrition, internal trade and population growth

In one sense, Nigeria is primarily a subsistence food economy. The subsistence food sector accounts for over half of Nigerian Gross National Product (GNP). In general, it is believed that this sector has grown and will continue to grow at about the same rate as population unless present policies are changed either for better or for worse.

Nigeria is satisfying most of her effective domestic demand for food at her present food prices and low levels of real per-capita income. Nigeria's internal price of cooking oils is low relative to world levels, while her internal prices of starch and protein are high, particularly if quality is taken into account and real prices are computed in terms of hours of work required to produce a day's supply of calories. The evidence is that the price declines (for starch and proteins) which would accompany expansions in output would be large at present high prices, but that they would be considerably smaller at lower prices.

Protein and calcium requirements or needs (as contrasted to effective demand) go unmet in Nigeria in some areas and at certain times of the year. Creation of enough effective demand to cover the cost of more fully meeting those needs is both important and possible.

Victor Smith's CSNRD livestock/human nutrition study[6] indicates that present and improved nutrition levels could be satisfied while expanding production for Nigeria's nonfarm economy and for export if somewhat more specialization and trade were to take place among ecological areas and if incomes were more evenly distributed. With a 50 percent increase in maize, millet, grain sorghum and rice yields, specialization and trade among ecological areas would be even more advantageous, and prices of starches and proteins might fall to levels at which absolute prices would be less responsive to increases in output. With such yields and consequent lower costs of production and prices, production for export and for use as industrial raw materials could be greatly expanded. Much

---

[5] Keay, R.W.J., The Federal Government Printer, *An Outline of Nigerian Vegetation*, Lagos, Nigeria, 1959. L'Association pour L'Etude Taxonomique de la Flore d'Afrique Tropicale, *Vegetation Map of Africa South of the Tropic of Cancer*, published with the assistance of UNESCO, Oxford University Press, Oxford, 1959. CSNRD is indebted for counsel concerning the selection of these areas to Dr. John M. Hunter, Department of Geography, Michigan State University (then at the University of Durham, Durham, England) and to Mr. Cmolade Adejuyigbe of the University of Durham.

[6] Smith, Victor E., *Optimal Resource Allocation for Income and Nutrition*, CSNRD working paper 11, 1969.

higher nutritional standards could be met with higher per-capita real incomes.

This means that major increases in food output above population growth rates would result in declining food prices and disincentives to food-producing farmers unless (1) effective demand for food is increased[7] by (a) distributing more real income broadly over large segments of the population and (b) conducting widespread education programs in human nutrition, or (2) production costs and, hence, prices are reduced.

Recent experience with wheat, rice and maize in the Philippines, Kenya, India, Thailand, Mexico, Taiwan and Pakistan indicates that such increases in yields and consequent reductions in prices and costs are probably technically possible and economically feasible sometime in Nigeria's future, i.e., 5 to 10 years hence, provided proper economic policies and programs are followed. By exploiting new varieties with appropriate policies and programs, some of these countries have been able to lower costs of production to replace imports and, some, to enter the international markets for food and feed grains.[8]

Nigeria imports little food with the exception of wheat and three main processed foods—milk and cream, fish and sugar. These four food imports accounted for 77 percent of the value of all food imports in 1966 and 75 percent in 1967, as shown in Table II.1. Table II.2 reveals that the value of all food imports has remained at around 10 percent of the value of all imports over the past 14 years. Food imports are less than 4 percent of all food consumption.

Food production in Nigeria has always been relatively diversified and unspecialized except for limited specialization in export crops. While it is true that Nigerian products are adapted to the widely different ecological zones of Nigeria, most foods are produced in fairly significant variety close to the point of consumption. Except for beef, pulses, modest quantities of yams, cassava and kola, very few ecological zones depend substantially on trade with other zones.

Internal trade and specialization would be larger except for the taxation, levies and other arrangements which have kept producer prices low for export crops. If export crop producers were permitted to realize prices based on the full comparative advantage of their soils and location in world markets, export crop production would probably expand much further in some zones. This, in turn, would expand effective demand for foodstuffs in the zones producing export crops. This demand would prompt imports either from other areas in Nigeria or from abroad. Liberia's rubber-producing areas import food from abroad. Though, historically, the same might have happened in Nigeria, her capacity to produce food of the quality low income Nigerians consume (i.e., her large labor and land resources) might have prevented importation. In any event, importation is unlikely to occur in the future if the internal cost of producing food is brought down to world food price levels and up to world quality. Here the experience of the Far East with Los Banos rice varieties, of India and Pakistan with Mexican varieties of dwarf wheat and of Kenya and Thailand with maize are relevant and instructive. If Nigeria can obtain higher feed and food grain yields, her internal price of starch may very well be reduced enough either to (1) export food and feed

Table II.1—Major Food Imports of Nigeria, 1966, 1967.

Food Imports	Value		Percent of all food imports	
	1966	1967	1966	1967
	£	£	*Percent*	*Percent*
All fish	7,467,066	4,900,208	28.96	23.02
Wheat	5,718,236	4,576,564	22.18	21.51
Milk and cream	4,025,707	3,606,113	15.61	16.95
Sugar	2,519,790	2,792,677	9.77	13.12
Other (including cattle)	6,053,509	5,403,964	23.48	25.40
TOTAL	25,784,308	21,279,526	100.00	100.00

Source: Nigeria Trade Summaries, 1960-66, and provisional data from Federal Office of Statistics, Lagos.

Table II.2—Total Nigerian Imports and Food Imports by Value as Percentage of Total Imports, 1954-67

Year	Total imports	Food and live animal imports	Food imports as percent of total imports
	£	£	*Percent*
1954	114,069,000	12,031,000	10.54
1955	136,116,832	12,953,259	9.51
1956	152,713,477	16,044,900	10.50
1957	152,457,877	18,328,433	12.02
1958	166,450,983	18,164,543	10.91
1959	178,405,339	20,846,335	11.68
1960	215,890,804	23,911,334	11.07
1961	222,013,067	22,723,578	10.23
1962	203,217,500	23,492,838	11.56
1963	207,556,248	21,902,263	10.55
1964	253,879,677	20,620,281	8.12
1965	275,148,985	23,037,514	8.37
1966	256,371,945	25,784,308	10.05
1967	222,800,000	21,279,526	9.52

Source: *Annual Abstract of Statistics*, 1967, 1950-54; *Nigeria Trade Summaries*, 1960-66. Provisional data from Federal Office of Statistics, Lagos.

[7]For an analysis of effective demand as a constraint on development in Latin America, see Currie, L., "Obstacles to Development." Michigan State University Press, East Lansing, 1967.

[8]Rockfeller Foundation, *The President's Review and Annual Report*. New York 1966-67; President's Science Advisory Committee, *The World Food Problem*. Vols. I and II. The White House, Washington, D.C., 1967; Asian Development Bank, *Asian Agricultural Survey*, II. Manila, Philippines, 1968.

grains and/or (2) expand into livestock feeding to provide both improved protein for her people and more fertilizer for her land. The scope for exporting food is very restricted unless costs of production and prices can be reduced. Nigeria, unlike India and Pakistan, does not raise its real national income greatly when domestic food crops supplies are expanded beyond population growth rates, as this expansion results in sharply declining food prices, as experienced in 1968 in the northern states.

In summary, Nigeria still has unused agricultural productive capacity which can improve the quality of diet to Nigerians as effective demand is increased and nutrition education becomes more widespread. With improved pricing policies and with the biological results which appear obtainable, Nigeria has a large potential for producing food, agricultural raw material for industry and agricultural export crops. The important policies involved here include (1) the maintenance of favorable terms of exchange for both domestic and export agriculture, (2) relatively free trade among Nigerian ecological zones and (3) aggressive research to attain economically superior varieties of food and feed grains.

This Section and the Section on Nigeria's agricultural labor market indicate that Nigeria, with the proper policies, need not face constraints on the development of her nonfarm economy in the form of either the ability of her agriculture to (1) produce food or (2) supply labor.[9]

Though CSNRD researchers know that some international agencies use more conservative data, CSNRD has used the population data and growth rates presented in Table II.3 which are consistent with official Nigerian governmental data.

Our analysis of Nigerian capacity to produce food indicates that Nigeria does not run the danger of having population press on food supplies to the point of starvation and deprivation for the next two or three decades despite the enormous population figures in Table II.3. However, Nigeria does have a population problem as it will be very difficult for her to obtain a rate of growth in total output which will permit the kind of increases in per-capita income being sought by Nigerian planners and leaders. Nigeria does need to curtail her birth rates if she is to increase her per-capita real incomes. CSNRD computations indicate that sharp immediate reductions in birth rates would have little impact on population data until well into the 1970's. Thus, the hour is already late for positive action in the area of family planning.

Livestock

Recent FAO estimates of livestock population in Nigeria are shown in Table II.4. It is noteworthy that nearly all the cattle are concentrated in the North,

Table II.3—Projections of Population in Nigeria[1]

Year	Population
	Million
1963	55.6
1966	60.8
1970	67.0
1975	75.9
1980	86.6
1985	99.6

Source: AID data book, 1963, 1966.

[1]Growth rates of population are assumed as follows:
1963-66 — 2.3 percent per year
1967-70 — 2.4 percent per year
1971-73 — 2.5 percent per year
1974-76 — 2.6 percent per year
1977-80 — 2.7 percent per year
1981-84 — 2.8 percent per year
1985- — 2.9 percent per year

Table II.4—Estimated Livestock Numbers in Nigeria by Former Regions, about 1963[1]

Species	Total Nigeria	Former Region			
		Northern	Eastern	Western	Midwestern
			(000)		
Horses	431	431	—	—	—
Donkeys	2,085	2,085	—	—	—
Camels	17	17	—	—	—
Cattle	10,859	10,256	434	85	84
Goats	21,205	14,317	4,684	1,434	770
Sheep	7,235	4,448	1,752	675	360
Pigs	680	118	161	341	60
Poultry	66,040	41,716	14,264	7,560	2,500

[1]Food and Agriculture Organization of the United Nations, *Agricultural Development in Nigeria, 1965-1980* (Rome, 1966), p. 216.

but that there are substantial numbers of goats, sheep and poultry in all regions. Most of the swine are in southern Nigeria.

On the basis of a study of the Nigerian livestock industry by a West German group, the former Northern Regional government established the Livestock Marketing Authority with broad responsibility for livestock production and marketing. Victor Smith's CSNRD livestock/human nutrition study[10] indicates that the livestock industry has a crucial long-term role to play in converting roughages into high-quality proteins for human consumption.

The savannah lands of Nigeria, and the millions of native cattle, goats and sheep that roam within their boundaries with their owners, present an attractive potential for improved livestock production. For various important reasons these potentials are far from realized.

[9]For a contrary point of view not accepted by CSNRD see Güsten, R., Can the Nigerian Economy Grow at 6% p.a. in the Near Future: A Pre-Planning Exercise. *Nigerian Jour. Econ. and Soc. Studies*, IX (March 1967) 11-32. Also see Okurme, *The Food Crop Economy in Nigerian Agricultural Policy*, CSNRD 31, January 1969, for further documentation of the CSNRD position.

[10]*Op. cit.*

Among the most serious deterrents to livestock improvement and productivity in West Africa are (1) the ever-present disastrous disease losses and (2) the socio-economic structure which governs, by custom, tradition and market forces, the daily lives of the nomadic herding peoples who inhabit the area. Finding solutions for livestock disease problems and acceptable adaptations for the nomadic peoples are tasks of gigantic proportions.

Despite these deterrents the development and increased productivity of the livestock industry is believed so important that it should not remain relatively untouched by modern science and technology. If the problems of disease, livestock improvement, feed supply and productivity can be solved or controlled—and scientists believe they can—it will be possible to increase the supply of badly needed animal protein, develop acceptable mixed crop-livestock farming systems, increase farm income, improve soil fertility and productivity and contribute materially to increasing the level of nutrition for the peoples both within and outside the area.

"The production and marketing of meat are very inefficient processes in West Africa. Raising average meat animals to market age takes twice as long in Nigeria as in Europe, and the animals are approximately twice the age and half the carcass weight of those in Australia or the United States. With meat-hungry Africa and a potential resource that can easily satisfy nutritional requirements and, in addition, contribute to foreign trade, such inefficiency cannot be tolerated; there are areas of Africa, no more suitable for livestock production, that have altered the situation and have succeeded in approaching the productivity achieved in other parts of the world. The marketing of beef is alleged by many Nigerians to involve substantial elements of inefficiency as a result of operations of "cattle rings" and of other organizations, the effect of which is to lower prices received by producers and to increase the cost of meat to consumers.

"Another fact worthy of note in the comparative production of meat is that West Africa's average annual takeoff of cattle in relation to the total cattle production is 7 to 10 percent. A comparable figure in Europe and the United States is 28 percent and over."[11]

With these basic comparative-productivity estimates established, it is clear that any livestock improvement program for West Africa must be designed to eliminate causes of loss by disease and periodic animal starvation, contribute to the alleviation of human protein deficiencies and increase the efficiencies of livestock movement to market areas.

Beef is the main component of Nigeria's livestock industry. Beef production is largely located in the tsetse fly-free region of northern Nigeria. In the wet season, (May-October) approximately 10 million cattle (managed mostly by nomadic Fulani tribesmen) graze on the grassland of this area. It is estimated that 96 percent of the national herd is in the six northern states. During the dry season, herds migrate southward in search of water and feed as the drouth and heat cause the fly to restrict its area of activity to the more dense shrubbery, thus freeing pasture areas for unmolested grazing.

A major problem of the industry is lack of adequate dry-season nutrition which results in substantial weight losses, lowered birth rates, higher death rates and delayed animal maturation. Some traditional management practices also seem to allocate substantial nutritive resources to relatively unproductive animals. Some observers believe that overgrazing of the limited tsetse-free grassland is causing deterioration of perennial grasses and further aggravating the nutrition problem.

Many animals produced in northern Nigeria are marketed in the southern part of the country. Approximately half of those marketed are trekked hundreds of miles and arrive at consumption centers in very poor condition after substantial weight loss. Many of the cows in Fulani herds are milked and the milk is sold in towns along the route of the migration. This is an important source of income to cattlemen and has an influence on the location of the herds. There is a substantial movement of grazing cattle from Niger and Chad into northern Nigeria where they eventually are marketed. Improved beef production, marketing and processing could result in substantial increases in efficiency, output and income as a result of improved management, technology and institutional adjustment.

The Land Market

It is helpful to have a picture of the pattern of land use in Nigeria to get the Nigerian land tenure system in proper perspective, to establish the magnitude of land earnings and values and to understand the operation of Nigeria's land market.

The land area of Nigeria comprises 225 million acres. This area is used more or less as indicated in Table II.5. About 20 million acres, according to one estimate, are used for crops, including tree crops. This is only about 9 percent of the land area of the country, but much of the remainder is land lying fallow in the shifting cultivation system, in forest reserves, in grazing use or is of no agricultural value. The figures given in Table II.5 may not reflect the rapid expansion in crop land use in eastern Nigeria that has accompanied shortened fallow periods.

[11] Paraphrased from a Report by the Study Group in Animal Diseases in West Africa, National Academy of Science, National Research Council, Apirl 29, 1965.

Table II.5—Land Use by Former Regions, Nigeria, 1965[1]

Land use	Total Nigeria	Former Region		
		Northern	Western and Midwestern	Eastern
	1,000 acres			
Costal swamp	6,663	–	3,495	3,168
Under farm and tree crops	20,012	15,840	2,658	1,514
Forest reserve	20,753	14,440	4,635	1,678
Other	180,822	150,060	18,253	12,509
TOTAL	224,755	180,340	25,546	18,969

[1]Oyenuga, V. A., *Agriculture in Nigeria*. FAO, Rome, 1967. Based on Federal Office of Statistics data, no date given.

Land use

Nigeria has a wide variety of soils as a result of variations in climatic conditions that change from coastal swamps through the rain forest and savannah zones to the semi-arid sudan areas in the North. Numerous writers characterize tropical soils, generally, and Nigerian soils in particular, as being low in fertility as a result of high rates of decomposition in high temperature areas and further depressed in the high-rainfall southern areas by excessive leaching of nutrients and erosion. Oyenuga[12] has emphasized, however, that little is known about the potentials of tropical soils under correct management. It is generally agreed that there is substantial room for improvement in the productivity of Nigerian soils through use of fertilizers and better soil management but that little is known about economically feasible systems of improved soil management. (See page 125).

The FAO team estimated that 37 percent of the land area of Nigeria was reasonably suited for agriculture, not including areas that might be usable as range land.

In terms of potential development, FAO estimated that about 79 percent could be made suitable for agriculture.[13] The team considered that Nigerian physical conditions are quite favorable for development and estimated that ". . . with modern technology, the improvement of productivity of the soils would be comparable to an increase of two and one-half times the actual size of the country."[14]

Southern Nigeria is well supplied with rainfall, although problems of seasonal drought and flooding occur. The North has problems associated with limited rainfall and a long dry season. Irrigation is practiced on a very limited scale. Little information is available on the river and groundwater resources of Nigeria but there appear to be substantial opportunities for irriga-

[12]Oyenuga, V.A., *Agriculture in Nigeria*, FAO, 1967, pp. 53-59. Also see Herrman, O.W., *Soil Fertility in the Tropics, a Research Proposal*, CSNRD-12 for a more extensive treatment.

[13]Food and Agriculture Organization of the United Nations, (FAO) *Agricultural Development in Nigeria:* 1965-1980, Rome, 1966. 389-90.

[14]*Ibid.*, p. 391.

Table II.6.—Estimated Harvested Acreage of Specified Nigerian Crops Grown Alone and Mixed (Acreage Equivalent) by Ecological Area, 1968

Crop	Total Nigeria	Ecological area					
		1	2	3	4	5	6
	1,000 acres						
Maize	1,455	17	304	793	24	151	166
Rice	715	464	80	—	20	85	66
Millet	4,672	4,648	24	—	—	—	—
Guinea corn	5,352	3,741	1,611	—	—	—	—
Wheat	24	24	—	—	—	—	—
Cassava	1,517	185	530	318	90	165	229
Potato, Irish	5	2	3	—	—	—	—
Sweet Potato	18	6	12	—	—	—	—
Cocoyam	228	—	—	66	29	133	—
Yam	2,451	457	462	468	163	534	367
Cowpea	2,763	1,015	1,453	—	—	—	295
Groundnut	2,810	2,415	305	—	—	—	90
Soya bean	154	—	—	—	—	—	154
Melon	320	13	26	90	47	106	38
Okra	156	—	—	88	30	20	18
Cotton	690	288	400	—	—	—	2
Tobacco	23	10	13	—	—	—	—
Oil palm	4,035	—	—	1,050	185	2,000	800
Cocoa	1,143	—	—	1,100	43	—	—
Rubber	460	—	—	20	400	40	—
Total specified arable crops	23,353	13,285	5,223	1,823	403	1,194	1,425
Total specified arable & tree crops	28,991	13,285	5,223	3,993	1,031	3,234	2,225

Source: CSNRD field notes compiled by John Whitney for use in Smith, V.E., "Optimal Resource Allocation for Income and Nutrition", CSNRD Working Paper No. II, April 1, 1969.

tion development from streams in southern Nigeria, and some opportunity for irrigation in the North from surface and groundwater sources. The UN Development Program has a pilot irrigation project near Sokoto[15], and the U.S. Bureau of Reclamation has recently completed a reconnaissance study in the Lake Chad Basin in northeastern Nigeria.[16]

Estimates of acreages in the major crops for each ecological zone are shown in Table II.6. These figures were developed by CSNRD from a variety of official and unofficial sources. Considerable attention was given to acreage requirements needed to supply the quantities of foods that are thought to be eaten by Nigerians. The total acreage of cropland used for these crops is considerably greater than the estimate presented by Oyenuga in "Agriculture in Nigeria."[17] However, CSNRD estimates of acreages of several crops are smaller than the acreages cited by Oyenuga.[18]

Figures shown in Table II.6 are in terms of harvested areas on a sole crop basis. Acreages estimated to be grown as mixed crops have been reduced by 60 percent to allow for an estimated use of such land by an average of 2.4 crops during the year. The estimated cassava acreage has been reduced by half to allow for the acreage newly planted and not harvested the same year. The tentative nature of these acreage statistics and the probability of large errors should be kept constantly in mind.

Table II.6 shows the dominant importance of millet and guinea corn and cowpeas in the dry and intermediate savannah areas, the similar predominance of yam in the three southern moist-forest areas and the forest-savannah transitional area and the widespread distribution of cassava among all areas. Groundnuts are grown mainly in the dry savannah. Cocoa is found mainly in the western moist-forest area, rubber in the central moist forest area and oil palm mainly in the eastern and western moist forest areas but also of importance in the forest-savannah and central moist forest.

Among the crops of lesser importance, rice is grown mainly in the dry savannah area with some acreage also in the intermediate savannah and the eastern and western moist forest. Most of the rice in Nigeria is grown under upland conditions. Cotton is primarily a crop of the savannah zones.

Nigerian agriculture is composed mainly of smallholders who produce a variety of crops. Even in specialized cash crop areas, the cocoa belt, for example, most farmers also produce some food crops as well.

On the basis of very fragmentary data, we estimate that in 1965 there were almost 5 million farm families in Nigeria with approximately 8 persons in each family unit.[19] It will be seen from Table II.7 that over one million farmers grow one or more of the following crops: guinea corn, millet, groundnuts, yams, maize, cassava and beans. Approximately one million produce oil palm products, although many of these cannot properly be called growers as they merely harvest the fruits from trees growing naturally.

Table II.7—Estimated Number of Farm Families and Number of Families Growing Specified Crops, Nigeria and Former Regions, 1963[1]

Kind of farming	Total Nigeria	Former Region: Northern	Eastern	Western	Mid-western
			(000)		
Farmers growing[2]					
Guinea corn	1,876	1,841	–	35	–
Millet	1,671	1,654	–	17	–
Groundnuts	1,174	1,063	85	13	14
Yams	2,060	460	962	452	186
Rice	169	99	22	33	15
Maize	1,459	195	682	444	138
Cassava	1,366	166	720	349	131
Beans	1,214	1,097	43	58	16
Cocoyam	816	18	603	202	38
Melons	394	44	216	64	70
Cotton	252	244	–	4	4
Cocoa[3]	343	NA	NA	NA	NA
Rubber[3]	100	NA	NA	NA	NA
Oil Palm[3]	1,000	NA	NA	NA	NA
All farm families[1]	4,810	2,600	1,090	900	220

[1]Estimated on basis of FAO, Agricultural Development in Nigeria 1965-80. Appendix, Tables II-13, and II-15. Estimate of number of families assumes 8 persons per family unit.

[2]Proportion of farmers reporting each crop in FOS sample survey applied to CSNRD-derived number of farm families, except for tree crops, for which see Footnote 3.

[3]Rubber farmers estimate based on Anschel, K., *Nigerian Journal of Econ. and Social Studies*, Vol. 9, July 1967. Cocoa farmers estimated by applying FAO estimate of 3-1/2 acres cocoa per holding (FAO report) to CSNRD estimate of 1,140,000 acres of cocoa. Oil palm farmers estimated on basis of statement by Kilby that there are nearly one million oil palm producers. (Kilby, *The Oil Palm Industry of Nigeria*, Food Research Institute Studies.)

The wide dispersion of the Nigerian staple crops among many producers has obvious significance for the planning of development strategies in view of the need to involve large numbers of growers in programs and the opportunity to effect widespread improvements in incomes through improvement in production practices and prices. The problem of strengthening public services so as to reach large numbers of scattered farmers is a major one.

Land tenure

One of the important aspects of economic development is the presence of institutional structures which permit and facilitate the combination and recombination of factors of production in a changing technical

[15]Food and Agriculture Organization of the United Nations, *The State of Food and Agriculture*, 1963 (Rome, 1963).

[16]United States Department of the Interior, Bureau of Reclamation Reconnaissance Study, *Food and Water Resources, Lake Chad Basin*, Washington, D.C., 1968, p. 393.

[17]*Op. cit.*, p. 68.

[18]*Op. cit.*, p. 153.

[19]FAO, *op. cit.*, p. 401 presents estimates of number of farm families at assumed levels of 6, 7 and 8 numbers per family. We have taken the FAO estimate for 8 persons per family.

and economic environment.[20] In many less-developed countries, land reform has been a prerequisite for agricultural development to permit this kind of adjustment. In Nigeria, land tenure and law systems and institutions appear flexible enough not to be important constraints on economic development. Unlike many South American countries, land ownership is not highly centralized in the hands of a few individuals and families.

Land law, tenure and customs have been analyzed by numerous authors. In part, these studies are an outgrowth of colonial preoccupation with administration of law and order. Land disputes arising out of "rigidities" imposed by colonial administration were the most frequent cause of litigation. Anthropologists studied land tenure because of its importance in understanding village life. Also land tenure was studied, in part, because its documentation constituted a domestic and foreign challenge as the administration of legal land matters was transferred from the British to Nigerian authority. This research has created some confusion. Coker[21] summed up this position as follows:

> "There has been a silent conspiracy among these writers to exaggerate the divergences in the land tenures and to depict the country in the atomistic stage (Maine, p. 20). In fact, as Lord Lugard recognized, land tenure systems in Nigeria have a unifying trend of developments (Lugard, p. 173): 'In its earliest stages, the land and its produce is shared by the community as a whole; later, the produce is the property of the family or individuals by whose toil it is won, and the control of land becomes vested in the head of the family. When the tribal state is reached, the control passes to the chief who allots unoccupied land at will, but is not justified in dispossessing any person or family who is using the land. Later still, when the pressure of population has given to the land an exchange value, the conception of proprietary rights emerges and sale, mortgage and lease of the land apart from its users is recognized. These processes of natural evolution, leading up to individual ownership may, I believe, be traced in every civilization known to history.' "

This trend of development and institutional change in land tenure structure was observed by CSNRD researchers. Purvis,[22] in eastern Nigeria, found that progressive farmers were able to acquire control over new land by purchase, rent or other means even for the planting of tree crops (oil palm). Okurume[23] made similar observations among cocoa farmers of western Nigeria. The position taken by CSNRD staff members on land tenure and land markets was summarized by Johnson:[24,25]

> "Though it is commonly said that Nigeria has a difficult land tenure problem growing out of tribal and community ownership of land, it is my observation that the extended family and community ownership of land is not the main problem. Wherever, to my knowledge, it has been profitable for land to pass into individual ownership, Nigerian institutions have been flexible enough to permit this . . ."

In most Nigerian villages the nature of the land tenure system is essentially communal. In the towns, however, the sentiments which embody a view that land should be handed over intact to younger generations are receding. To sell land is no longer regarded as a sacrilege, and individual rather than communal ownership is gaining ground. Olatunbosun[26] discusses Nigeria land tenure as follows:

> "The Native Lands Acquisition Ordinance was passed in 1900 in southern Nigeria to prevent the exploitation of the indigenous peoples by foreigners. 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, with various amendments, remains one of the pillars of land legislation in southern Nigeria.[27] In 1917, however, the Public Land Acquisition Ordinance which governs the acquisition of land for public purposes in southern Nigeria was enacted. This Ordinance provides that the government may acquire lands required for public purpose either in fee simple terms or on lease. In respect to unoccupied land, no compensation should be given. This Ordinance, which can be regarded as a breakthrough in the land tenure system of southern Nigeria, was followed by the Nigerian Town and Country Planning Ordinance of 1946 empowering a Planning Authority to purchase land for approved schemes either by agreement or compulsorily. In addition, extensive new statutory powers, relating to the use and alienation of interests in land, were conferred on Native Authorities. These new powers enable the Native Authorities to make wide departures from the customary forms of tenure and to grant occupancy rights to strangers, though not to the exclusion of members of the indigenous tribes.
>
> "In Northern Nigeria, however, the Fulani rulers allowed everybody to occupy as much land as was necessary for his support. Emirs, chiefs and village

[20] "The conditions under which land is held is of far-reaching importance to the development of agriculture" in: Meek, C.K. "Land Law and Customs in the Colonies," H.M. Stationery Office, London, 1949.

[21] Coker, G.B.A. "Family Property amoung the Yorubas". London: Sweet and Maxwell, 1958. See also Lugard, F.D., "The Dual Mandate in British Tropical Africa", London 1926, and Maine, H., "The Origin and Growth of Village Communities in India"; London, 1907.

[22] Purvis, Malcolm J., *Report on a Survey of the Oil Palm Rehabilitation Scheme in Eastern Nigeria*, 1967, CSNRD 10, 1968

[23] *Op. cit.*

[24] Johnson, Glenn L., *A Strategy for Rural Development in Nigeria*, CSNRD, 1966, mimeo.

[25] For analysis of government policies on land and investment by some CSNRD researchers, see CSNRD reports by R. G. Saylor and Dupe Olatunbosun. (See also Udo R. K., Sixty Years of Plantation Agriculture in Southern Nigeria, *Econ. Geog.*, Vol. 4, January 1965. pp. 53-67.

[26] Olatunbosun, Dupe, *Nigerian Government Policies Affecting Investment in Agriculture*, CSNRD-16, July 1968, pp. 2-3.

[27] Oluwasanmi, H. A., "Agriculture and Nigerian Economic Development". Ibadan, Oxford University Press, 1966.

> councils were empowered to grant land to strangers. Soon after the British occupied northern Nigeria, foreigners there claimed overlordship to land by right of conquest. 'The Land and Native Rights Ordinance,' which was sharply criticized in the South 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, was accepted in the North. This Ordinance provides that 'all native lands, and all rights over the same, are hereby declared to be under the control and subject to the disposition of the Governor and shall be held and administered by him for the use and common benefit of the Natives of Northern Nigeria, and no title to the occupation and use of any such lands shall be valid without the consent of the Governor.' "[28]

This ordinance makes the land of the whole of the Northern Nigeria the sole property of the government. It empowers the governor to grant rights of occupancy to natives as well as to aliens, to demand and revise rents for such grants, to render null and void any attempted alienation by an occupier of his right of occupancy without the governor's consent, and to revoke the grants to occupiers for "good cause" shown.

This ordinance has played a significant role in reducing the hold of the community on the land in northern Nigeria. Other laws such as the Minerals Ordinance, the Unsettled Districts Ordinance, and the Forestry Ordinance all tend to reduce the hold of the community on the land throughout Nigeria. Today, one notices a growing commercial sense with regard to land for which rents are now demanded. Pledges and sales of land are now widely recognized throughout Nigeria's larger towns. It has become a widespread wish that communal ownership as an institution should wither since it does not lend itself readily to the demands made by the processes of economic development. Because of the theory of inalienability of land which is fundamental to the indigenous land system throughout Nigeria, it has been impossible to consider redistributing people and providing them with opportunities lacking in their own crowded areas. It has also been impossible to give land to any enterprising Nigerian farmer regardless of place of origin.

> "Government Land Acquisition Ordinances have been useful only in those circumstances in which Government has an interest since land can be acquired only for public purposes under these Ordinances. In Northern Nigeria, a policy of allowing Limited Liability Companies to develop plantations for growing approved crops was sanctioned in September, 1966. This enables land to be sub-leased to foreign investors by the Northern Nigeria Development Corporation. Where indigenous companies, cooperatives, and others require plantation land, it will be leased directly by the government."[29]

However, the communal form of land tenure prevalent in Nigeria is not without its dangers. It has sometimes been argued that as land becomes scarce, the communal tenure system may endanger the whole community by (1) failing to provide adequate incentives to individual effort or money put into land, conservation, improvement, the introduction of permanent cash crops and better farming methods, and (2) making it difficult for the farmers to raise loans on the security of his land for purposes designed to increase its productivity.

As a result of this concern with the possible, but not proven, inadequacy of the land market and institutions there has been some pressure for various kinds and degrees of land reform in Nigeria.[30]

Difficulties with land tenure seem to become less pronounced as land takes on greater monetary value. Even when land tenure difficulties are present in Nigeria, there does not seem to be a land tenure problem *per se*—instead, land tenure questions seem to be subproblems of more practical problems such as establishing a university or a plantation or of getting a production campaign underway for some particular crop. Thus, CSNRD has not had a specific research project on tenure and would not advise that concentrated tenure studies be conducted or a land tenure institute be established. We feel that Nigerian land tenure difficulties should be tackled as they arise in connection with development projects and problems and that many of the difficulties will disappear if the economy is operated so that land takes on more value.

Land earnings and values

The value of Nigerian land has been held down by, first, colonial and, then, Nigerian procedures, programs and policies which have depressed prices received by producers of export crops. In effect, Nigerian marketing board and export crop tax programs now collect a high proportion of the economic rent of land. As a consequence, less attention is paid by individual farmers to the problems of maintaining *economic* as opposed to *political* control over land. Nor is much attention paid by farmers to increasing the productivity of land either for (1) export crops for which effective demand is greatly reduced by taxes and marketing board levies, or (2) domestic food crops for which effective demand is limited to traditional diets by low per capita incomes.

In the Ivory Coast, one acre of improved palm grove is worth about £140. In Nigeria, governmental revenue collection (including that collected by marketing board and tax officials) is over £15 per acre. At an interest rate of 10 percent, such a rent would

---

[28] *Ibid.*, p. 45.

[29] Olatunbosun, *op. cit.*, pp. 3, 4.

[30] See FAO report; also Adegboye, R.O. An Analysis of Land Tenure Structure in Some Selected Areas in Nigeria. *Nigerian Jour. Econ. and Soc. Studies* Vol. 8 No. 2. pp. 259-268.

have produced land values in Nigeria comparable to those in the Ivory Coast. Such values would, in turn, have provided a substantial rural equity which could be pledged by individuals, families and/or villages for loans to rehabilitate old palm groves and plant new groves as well as to engage in other income-producing activities. Still further, such values would become, in turn, the basis for a much less-damaging tax program than the present system of export duties and marketing board levies imposed directly on product prices. Similar reasoning applies to cocoa and groundnuts.

It is our position that land reform programs are unnecessary. Nigeria does not have a landed aristocracy and a mass of unlanded peasants. What is required, in our opinion, are proper policies toward agriculture to facilitate more optimal resource use. These would include as a major element more favorable price policies which would raise the equity value of land, thus making it easier to raise credit and strengthen the desire of farmers to increase the productivity of land from available but currently largely unused technologies and management practices. More favorable prices would help Nigeria's "poor and lower middle class peasants" (she has few if any upper middle class ones).

The Agricultural Labor Market and Trained Manpower

Though little is known about such specifics of the Nigerian agricultural labor force such as distribution by age, sex, seasonality, etc., there is a considerable amount of general information. In some senses, this general information is more crucial for policy decisions than are the missing details.

Without doubt, Nigerian smallholders have overcommitted labor to agricultural production. The overcommitment is in the sense that they are using so much labor relative to effective demand reaching them for both exported and domestically consumed products that returns to labor are low at the margin. Welsch[31] found that the marginal earnings of labor in yam and rice production in the Abakaliki area were about one yam a day. Rural per-capita incomes are below urban levels, yet the national per-capita income of Nigeria is less than 2 shillings a day. With any allowance for the earnings of land and such capital items as livestock herds, cocoa stands, palm trees and rubber trees, the marginal earnings of labor have to be very low. Indeed, the marginal earnings of land and capital as well as labor must be low. This indicates, in turn, that the low productivity of labor is not one of imbalance in the use of resources; instead, the problem is one of imbalance between forthcoming supplies and effective demand. In Nigeria, effective demand for farm labor is constrained by (1) the taxes and marketing board revenues exacted on export commodities and (2) the low per-capita real incomes and low levels of nutrition knowledge.

As we turn now to the Nigerian agricultural labor force, we see that few details are known about the use of manpower in Nigeria with respect to size of the labor force, the amount of work done by different age and sex groups and the extent of unemployment and underemployment. The FAO has estimated that there were 25.1 million economically active persons in 1963-64. Of these, 20.1 million were in agriculture with perhaps 12 million males and 8.1 million females.[32]

There are no reliable statistics on the number of persons entering and leaving the Nigerian labor force each year. Therefore, an assumption is made by CSNRD that the labor force grows by the same proportion as the total population.[33]

There are various assumptions as to the rate at which the Nigerian population is growing. CSNRD assumes a rate of 2.3 percent per annum for 1963-67. If this rate is applied to the labor force, the annual increase appears to be about 577,000 persons, which is far more than can be absorbed by the nonfarm sector.

Education and World Affairs (EWA) researchers have estimated that about 1.80 persons enter the labor force for each net additional person added to the force.[34] Applying this factor to the estimated increase in labor force gives an estimate of about 1,040,000 new entrants into the Nigerian labor force each year as of about 1963-64, a large proportion of whom will have to find employment in agriculture.

Obviously, Nigeria has to take steps to provide remunerative employment in agriculture for large numbers of persons. She needs both jobs for them and the products they can generate. Part of their present low earning power is attributable to low product prices, part to poor technology and part to poor training.

An idea of the training now received by this new labor supply may be gained by an estimate of the 1965 output of the Nigerian educational system prepared by EWA.[35] Although the output of the educational system in 1965 (net of internal movements out of primary into secondary school) was almost 669,000 persons, EWA estimated that only about 475,000 entered the labor force. If the primary school dropouts are deducted, only 200,000 or about 20 percent of new labor force entrants had any appreciable schooling.

A comparatively small number were contributed by schools in the North, particularly at post-primary levels.

---

[31] *Op. cit.*

[32] *Op. cit.* This estimate is based upon the number of persons in the 15- to 60-year age group adjusted for an estimate of the proportion economically active and with an allowance for additional persons in other age groups who are in the labor force. See Table I.6, p. 383, and discussion on page 385.

[33] Education and World Affairs, *Nigerian Human Resource Development and Utilization*, 1967.

[34] *Ibid.*

[35] *Op. cit.*, Table 10.

Table II.8—Estimated Labor Force Entrants From the Nigerian School Systems by Former Regions, 1965[1]

Educational level	Total Nigeria	Former Region				
		Northern	Eastern	Western	Mid-western	Lagos
	Number					
Primary (dropout)	274,169	18,927	159,980	62,723	31,703	836
Primary completed	146,501	27,115	55,751	38,040	21,873	3,722
Jr. secondary	30,874	325	395	23,104	6,781	269
Sr. Secondary	19,546	2,442	6,123	6,033	2,125	2,823
Tertiary non-degree	2 114	344	628	720	94	328
University (1966)	2,114	171	948	805	177	13
TOTAL	475,318	49,324	223,825	131,425	62,753	7,991
Total excluding primary dropouts[2]	201,149	30,397	63,845	68,702	31,050	7,155

[1]From Tables 2 A-F, *Nigerian Human Resource Development and Utilization* (New York: Education and World Affairs, 1967). Data on total school output reduced by EWA to allow for estimated number entering the labor force. Number shown for levels above primary combine dropouts, persons completing without certificate and persons receiving certificate. Totals slightly altered to correct arithmetic.

[2]Underestimated at the post-primary levels due to lack of information on dropouts.

A crude attempt to compare available labor force with employment opportunities helps clarify the relationships between growth in output and labor earnings on the one hand and aggregate numbers of additional workers needed on the other. We note, however, that the social and status attractions of urban areas in recent years and lack of incentives in agriculture have made the problems of the unemployed and underemployed much more visible. Although the growth of some agricultural exports from Nigeria has been spotty in recent years, the long-term trend has been quite favorable for agricultural exports as a whole and for most of the commodities exported. This suggests high labor absorptive capacity of this sector. Food crop output has expanded roughly in line with population growth. Food imports have remained relatively constant over the past 15 years, at about 10 percent of the value of all imports. In addition, food prices have increased only moderately with the exception of the maladjustments associated with the civil war. All the available estimates on manpower and employment are subject to a wide margin of error, but the apparent balance between the EWA estimates and the above discussion seem credible. We conclude that growth in employment is not far out of line with growth in population and that food and export crops have not been constrained by a lack of labor. The critical problem in most underdeveloped economies and in Nigeria is overcommitted labor and not prolonged unemployment. Callaway[36] suggests that before the present war, the total number of unemployed persons in Nigeria 15 years of age or over and actively seeking work amounted to at least a half million. Of these, 75 percent were school leavers. However, the number of unemployed is a relatively minor problem compared with the pervasive overcommitment of labor throughout the Nigerian economy.

The EWA study indicates that there is manpower trained at elementary and (in the South) at secondary levels that cannot find jobs at salaries and working conditions considered acceptable by this group of school leavers. This may be only a temporary labor surplus that will disappear as the aspirations generated by unrealistic education become tempered by the realities of the labor market.

> "Thus, most of the primary school leavers and an increasing number of secondary school leavers are not absorbed by the sector to which they aspire. The school leaver . . . usually remains in the city, to continue his search for wage employment . . . Over time he may slowly lower his aspiration for permanent high sector employment . . ."[37]

The problem is not so much one of eventually finding employment as it is one of earning power (productivity and wage rates) once a job is found or self-employment is created.

The usual product of Nigerian primary and secondary schools has little vocational skill. It is generally accepted that there are shortages of skilled workers for trade and industry and of modern agriculturalists for employment in governmental, academic and research organization. This feeling is supported by CSNRD studies of agricultural education.[38] A CSNRD study of the nutrition-resource use balance indicates that labor in critical months will be a more limiting resource than land in expansion of output in several ecological areas.[39]

The general conclusion that there is rough equilibrium between employment and available workers says nothing about the existing degree of overcommitment of labor to agricultural enterprises and to tasks where output per man-hour is lower. Such overcommitment (on private account) in an economy like that of Nigeria is probably very high as a result of several factors: taxes, marketing board revenues, lack of mobility arising from lack of information, the wide divergencies between acquisition costs and salvage values for such capital items as trees, cultural and institutional resistances to change in job or location, inadequate capital to permit changes in occupational status, and others.

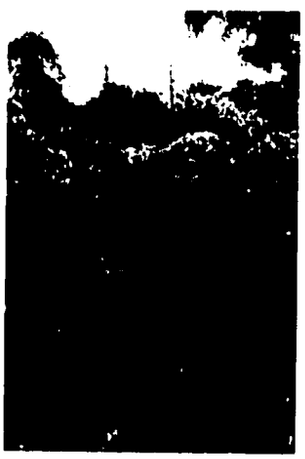
[36]Callaway, Archibald, Jobs for School Leavers. *Nigerian Opinion*, December 1967—January 1968. p. 265.

[37]EWA, *op. cit.*, p. 25.

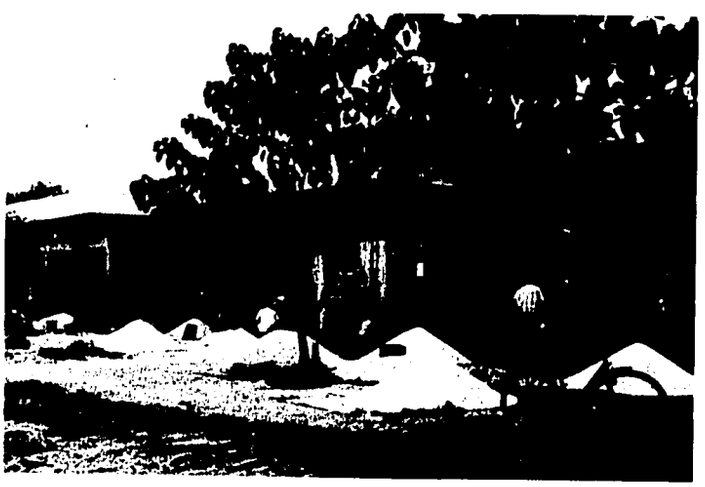
[38]See Long, James S., *Analysis of the Needs and Resources for University Education in Agriculture in Nigeria*, CSNRD 28, December 1968, Kincaid, James, *Strategies for the Improvement of Agricultural Extension Work and Non-degree Agricultural Training in Nigeria*, CSNRD 13, December 1968, for particulars.

[39]Smith, V., *op. cit.*

Nigeria Has Great Capacity to Produce Food and to Compete in World Markets



- *How do we educate people as to their nutritional needs?*
- *How do we generate the income for large numbers of people to purchase a better diet?*
- *How do we lower the cost of producing food?*



-- How do we provide incentives to the actual producer to expand production?

-- Which export crops should be promoted?

-- Does Nigerian rubber have a long-term place in world markets?

HOW DO WE MANAGE THE EXPORT ECONOMY SO THAT IT --

-- generates its own investment capital,

-- distributes its income widely to build up demand for manufactured goods and food,

-- contributes to the development of industry?

One immediate critical manpower problem in Nigeria arises from the preoccupation of the educational system with training for the small, modern, nonrural economic sector and the inability of that sector to absorb more than a fraction of the labor supply becoming available. The modern sector, capable of paying high wages and justifying investment of substantial sums per pupil in education, has been estimated to comprise about 700,000 jobs, and to require about 40,000 new employees a year.[40] Yet almost the entire school system caters to this market at an annual cost that grows at 15 percent a year and by 1967 was equal to 4 percent of GNP. In 1966-67, combined federal and regional recurrent expenditures for education were budgeted at £41.3 million.[41]

Though a major share of the 200,000 school leavers (Table II.8) probably aspire to jobs in the modern sector, 80 percent of them will have to adjust themselves to employment in traditional activities for which their training is of little advantage. Though the largest opportunity for absorbing large numbers of workers is in agriculture, they will not be productively absorbed there unless substantial steps are taken to develop that sector and unless the nature of Nigeria's agricultural training and educational system is changed substantially.

As traditional economies become modernized, one of the first effects is seen in improved conditions of health and nutrition, resulting in an increase in the rate of population growth. The sketchy population statistics available suggest that Nigeria entered this stage some years ago and that the growth rate of population is indeed increasing. Increased population pressure on the land is becoming apparent through shortened rotations particularly in the densely populated areas, and increased underemployment and unemployment can be expected to appear if the rate of creation of new jobs is not also accelerated.

Agricultural Capital and the Credit Market

The evidence is that Nigerian agriculture uses small amounts of capital relative to other countries despite Nigerian eminence as an exporter of groundnuts, cocoa, palm products and rubber. Her use of agricultural power equipment and machinery is almost nil. Very little animal capital is used to provide draft power. Of the hand tools used, a high proportion is manufactured locally by craftsmen and artisans. Biological capital (such as cocoa bushes, cattle, palm trees, sheep, rubber trees, goats, kola trees and fruit trees) is present in large amounts (probably over £1 billion worth) but is often of poor quality.

Capital investments are not great in land in the form of wells, fences, irrigation and drainage facilities, terraces, farm lanes and buildings. Most of the capital is owned by smallholders and is of a traditional (as contrasted to modern) form. Private returns to capital are low at the margin, probably being higher for tobacco, cocoa, kola and groundnuts than for palm trees, rubber trees and livestock. On the other hand, marketing board revenues and taxes introduce such wide differences between social and private returns that social returns are high for palm trees and still higher than private returns for cocoa and groundnuts.

Private and social returns for capital invested in subsistence food production are thought to be nearly equal and low. Thus, generally speaking, private returns to capital are low at the margin. As returns to labor and land are also low, the difficulty is not one of imbalance in the use of land, labor and capital; instead, all of these are overcommitted (on private account) relative to the level of effective demand reaching the owners of Nigerian agricultural capital. Before private and social returns for investments in agricultural capital can be equalized, divergences between world and domestic prices will have to be eliminated by changing taxation and pricing policies. Insofar as returns to capital invested in producing domestically consumed farm produce are concerned, the problem is one of increasing returns by expanding effective domestic demand. Two avenues open for expanding domestic demand are (1) the wider distribution of income (for instance, to the 80 percent of the population in the rural labor force, many of whom are also smallholder entrepreneurs) and (2) improved nutritional education.

With substantial agricultural growth, there would be an expanded need for capital and credit for investment in processing and marketing facilities and in transportation infrastructure. In Nigeria these needs are likely to materialize first for the export crops and later, as incomes rise, for food crops. The civil war has taken a heavy toll of roads, lorries, bridges and port facilities, some of which need immediate replacement. The capital required in this connection is equipment to build roads, port facilities, processing plants, lorries, rolling stock, etc. In general, this sort of capital can be acquired from external sources without inflating internal wage rates and land values, and external agencies are inclined to finance this capital.

Credit for financing investments in agricultural capital by Nigerian farmers[42] has been available in one form or another for many centuries, particularly from local lenders, friends and families who are the chief sources of credit for the individual farmer. Institutionalized agricultural credit, from sources with varying objectives, has been available for the last two

[40] EWA, *op. cit.*, pp. 21, 22.

[41] *Ibid.*, pp. 88, 89.

[42] This material is largely adapted from, *A Situation Report of Agricultural Credit in Nigeria*, CSNRD 3, June 1966, and *A Proposed Agricultural Credit Program for Nigeria*, CSNRD 4, August 1966, supplemented by more recent information.

or three decades. The cooperative movement has been in existence for over 25 years, but its credit impact has not been great, being available only to some 4.5 percent of the present-day farmers. Several other institutions have been organized, operated for a few years with limited success, then reorganized with much the same personnel and policies for additional years of unsuccessful operation. Responsibility for institutionalized lending operations has in the past been with each region. A sum of £3 million was allocated for agricultural credit in the 1962-68 Development Plan.

Agricultural credit in the former Eastern Region was mainly provided from the Fund for Agricultural and Industrial Development (FAID) and the Cooperative Bank of Eastern Nigeria (CBEN). FAID was established in 1963 to provide a source of credit, in addition to existing commercial institutions, for small-scale private agricultural and industrial development activities.

FAID was allotted £1 million for agricultural loans under the 1962-68 Development Plan. Apart from a small headquarters office, FAID did not have a staff of its own. All loans for agriculture were processed by the Ministry of Agriculture which had a Supervised Agricultural Credit Section with some 50 staff members exclusively working on FAID agricultural loans.

As of 31 May 1966, after 3 years of operation, 119 loans totalling £162,000 (average £1,400 per loan) had been approved but only 73 totalling £53,000 had been disbursed. At the same date, some 700 additional loans were under consideration. In terms of meeting the known demand for loans, FAID's performance has been extremely disappointing. This is thought to be due primarily to overcentralization and dependence on two government ministries for the investigation and processing of loan applications. Furthermore, FAID's forms and procedures were exceedingly cumbersome and time-consuming. It is understood that many applications were more than one year old. There appeared to be a lack of continuity, both of staff and committee members, leading to poor *esprit de corps*. At the same time, the Supervised Credit Section of the Ministry of Agriculture appeared to be well directed and capable of excellent work in its field.

The Cooperative Bank of Eastern Nigeria (CBEN) was established in 1954. It became a commercial bank in 1962, accepting deposits and making loans outside the field of cooperatives. Its issued and outstanding share capital was £40,000 in 1966. Limited capitalization prevented aggressive support of development in the cooperative sector and CBEN's growth was slow. All loans for cooperative purposes were investigated, approved, supervised and collected by the Registrar of Cooperatives (ROC). Shortage of qualified personnel in the ROC's department precluded any significant early expansion of loans through CBEN for cooperative purposes. Such loans proved to be difficult to collect, although more stringent controls were introduced. Loans for agricultural purposes have been mainly to marketing societies. In 1965, some 80 percent of its loans of £221,000 were for agricultural purposes.

Agricultural credit in the Mid-West State is nominally the responsibility of the Mid-Western Nigeria Agricultural Credit Corporation (MNACC) and the Registrar of Cooperatives through the Mid-Western Nigeria Cooperative Federation Ltd. (MNCF).

MNACC was established July 1, 1964, with authority to make any type of agricultural loan. After two years of operation, no loans were made because no funds were available. In effect, MNACC became the loan collection agency for those loans in its territory passed over to it from the Western Regional Finance Corporation when the Mid-West State was formed.

MNCF was formed a few years ago with the objective of developing and maintaining the cooperative movement in the Mid-West, and performing the functions of a cooperative bank. It is closely regulated, assisted and supported by the ROC. Late in 1965, arrangements were made to borrow up to £200,000 from the African Continental Bank Ltd. for the annual marketing operations of cooperative societies, mainly in palm produce and cocoa. This operation constitutes the most significant development to date in the agricultural credit field in the Mid-West.

Agricultural credit in the North was covered mainly by a credit program conducted by the Registrar of Cooperatives under which the government guarantees a loan from Barclays Bank to cover produce purchase advances and preseason loans through the cooperatives. The program started in 1962 and through 1965 showed repayment rates of only 85 percent and 66 percent on the two kinds of loans. Later policy required a society to repay the whole of its current loan and not less than 50 percent of any previous loan before a new loan was granted. Loan activities under the program were restricted to those crops under the control of the marketing board (mainly groundnuts, cotton and benniseed) and no assistance was given with domestic crops. Shortage of trained personnel in the cooperative movement was said to be the most immediate limiting factor to further expansion.

The Northern Ministry of Agriculture operated a credit program through the Native Authorities for mixed farming, fisheries, horticulture and fertilizers. The most important has been the mixed farming project, for which £1.8 million was provided in the 1962-68 development program. A total of £200,000 had been allocated by 1966. Most of this was used to provide Emcot plows (£17 each) to individual farmers. MOA extension workers were responsible for approval of farmers for mixed farming loans, but the Native Au-

thorities were responsible for collections and served as quasi-guarantors.

In addition, there has been continuous and rapid growth in fertilizer consumption and in the Tractor Hire Service of the Northern Ministry of Agriculture. Both of the latter projects generally involved 50 percent subsidies and expenditures of large amounts of time by extension workers.

Agricultural credit in the West was provided largely by the Agricultural Credit Corporation of Western Nigeria (ACCWN) and the Cooperative Bank of Western Nigeria Ltd. (CBWN). ACCWN was established in 1964 with the responsibility for all agricultural credit operations in the West.

Loans to small farmers were to be administered through the CBWN, but the program has not been implemented. Loans to medium and large-scale farmers are administered directly. ACCWN had made approximately 740 loans of £192,000 total value (average £260 per loan) by 1966. Although intended to be a supervised credit program, virtually all of the loans were made through cooperative societies with little or no technical analysis of borrowers' farming operations, and even without clear-cut identification of borrowers as being farmers.

The supervised credit program for 1966 was operated under completely revised procedures—the first year of operation 350 loans were made for £48,035. The credit staff numbered 114 or one for every three loans made. By September 30, 1967, delinquencies amounted to 49 percent of the money due.[43]

CBWN was established in 1954 and became a commercial bank in 1962, accepting deposits and making loans outside the field of cooperatives. Its issued and outstanding share capital was £0.50 million in 1966 and it had £40,000 in reserves. Outstanding loan balances fluctuate according to the season, but at peak periods exceed £1.5 million, with its capital revolving about three times annually. As of Feb. 28, 1966, total loans outstanding were £1.8 million, but it was not known how much of this sum had been outstanding for long periods.

CBWN considers that substantially more funds could be utilized. The relative shortage of funds means that cooperatives have been forced to collect loans more efficiently from their members before asking for further advances. CBWN claims that one-fourth of the entire population of the West has been reached by its funds over a period of 10 years, but this cannot be verified. However, it is undoubtedly the primary source of institutional rural credit in the West. The bulk of its loans are used for produce marketing and only a small percentage is used for other purposes.

Commercial banks have had little success in financing small-scale farming operations, but some help has been given to large-scale plantations. However, the commercial banks represent an increasingly large source of the funds required for financing export crops. Details of the loans and advances made for agricultural purposes show that the maximum advances increased from some £13 million in 1957 to £53 million in 1965. Table II.9 shows the peak loans for the various crops in 1965.

Table II.9—Peak Loans From Commerical Banks for Various Crops in Nigeria, 1965

Crop	Amount
	£ million
Cocoa (April)	5.4
Groundnuts (December)	17.3
Palm products (December)	3.3
Other export crops (Janaury)	8.4
Other agriculture (November)	1.9
Discounted produce paper (December)	19.2
Total peaks	55.5

Source: Jones, Ted L., Gans, A. R., Hoover, Robert G., Maxey, Richard P., Stoneham, A. H., Smith, Mervin G., *A Proposed Agricultural Credit Program for Nigeria*, CSNRD 4, 1967.

One private bank has helped to finance credit for the cooperative movement in the North, and another in the Mid-West. Most appear to be interested in helping with credit for agriculture, particularly in the commercial sector, provided it can be given under normal commercial banking procedures.

Since most of the credit obtained by small farmers comes from moneylenders or friends, much of it does not bear interest in the accepted sense. Probably half of the loans are in kind, with the balance in cash. Whether in cash or kind, the borrower usually signs a receipt for more than he receives, so that the interest rate is hidden. In general no time limit is specified, but most loans are repayable at the end of the harvest. They may be deferred for a further harvest without extra interest if the crop has been poor. It seems likely that the interest rate is higher on loans in kind than on those in cash. Cash loans tend to be used more for consumption purposes. Loans in kind usually are for seeds.

Interest rates are generally high and appear to vary considerably over the country. The average rate charged by moneylenders is probably somewhere between 25 and 50 percent per annum. FAID loaned at 5 percent for its direct projects and at 7½ percent to cooperatives. Cooperative banks lend at 8 to 10 percent to the unions, unions at 12 to 15 percent to the societies and societies at 18 to 20 percent to members. Loans to cooperative banks by commercial banks are from 7 to 7½ percent. All figures above are rates per annum.

Among the most frequent shortcomings in existing credit programs are the following:

[43] From quarterly reports of USAID credit advisors.

Failure to establish eligibility of borrowers and/or enforce eligibility standards,
Excessively rigid and time-consuming procedures for processing loan applications, resulting in loan proceeds not being available when needed by farmers,
Inadequate consideration of borrower's repayment ability,
Ineffective follow-up on use of loan proceeds,
Ineffective supervision of loans,
Inadequate or complete absence of financial projections and planning,
Failure to recognize the importance of having adequately trained personnel,
Failure to establish clearly the line of demarcation between policymaking and management functions within the credit organization,
Failure to provide the necessary insulation against outside pressures, with resultant departure from the purpose for which the credit institution was established,
Division of responsibility for loan making and for loan servicing and collections, and
Lack of continuity of personnel and of committees responsible for making credit decisions.

However, shortcomings in existing credit programs probably deter the use of credit less than does the lack of effective demand, as that lack makes it unprofitable to invest agricultural capital. Should there be a correction of the adverse pricing and taxation policies which have been reducing the earning power of Nigerian agricultural capital, the demand for agricultural credit should be expected to expand rapidly and to such an extent that it may exceed the capacity of existing public agricultural credit institutions.

Another characteristic of the Nigerian agricultural capital market should be noted. Presently and in areas of high prospective social returns to capital in the decades immediately ahead, the need is, and will continue to be, for biological capital to be generated in Nigeria mainly with Nigerian labor, land and capital and with minimal but strategic outside technical assistance. Thus, the problem of financing expansion of the Nigerian agricultural credit system to serve producers of primarily agricultural products is largely an internal problem capable of being solved by internal Nigerian financial transactions. To the limited extent external technical assistance, power equipment, pesticides, fungicides, fertilizers, etc. are required, external sources have an opportunity to provide assistance.

Savings, agricultural capital formation, agricultural investment and farmers' incomes are all interrelated. As noted above, much of the capital required to expand export and food crop production in Nigeria is farm-produced and biological in nature, consisting of trees and breeding stock produced mainly with Nigerian labor on Nigerian land. When such capital is produced it is real income. The ratios of savings to investment to earnings for such income are all one or close to one. Such capital is produced in response to prospective income opportunities. If the income opportunities are not present, the income from producing such capital does not become available for reallocation to other uses unless the land and labor which produces it can be reallocated more easily than in Nigeria. The alternative uses for land outside of export crop production is constrained by a lack of effective demand while the nonfarm economy is unable to absorb the excess population generated in agriculture.

External donors and lenders should be careful about providing funds to finance the creation of Nigerian agricultural capital with Nigerian labor and capital for the following reason: if the internal profitability of the capital to be created is not high, external assistance will merely increase wage and land rents to levels not maintainable without external assistance. This is an important reason for both Nigerian and external agencies to insist that either (1) the gap between social and private returns be closed by equalizing domestic and world prices or (2) agricultural investment in processes which cannot be sustained with present and prospective private investments be placed entirely in governmental hands.

The demand for credit and the kind of capital needed to *market, process and export* the primary products is quite different from that needed to *produce* primary agricultural products. Much of such equipment and supplies is imported and much of the financing could be obtained with some effort from available external sources. This is discussed in the following section on marketing.

The Marketing System for Product and Factors of Production

Agricultural marketing in Nigeria is part-modern and part-primitive. There are many examples of modern distributive techniques and the marketing of agricultural products can often be described and analyzed within the conventional frameworks used for advanced economies.

Product markets

On the product side, most cash crops being produced for the export market are channeled to the ports under an administered system characterized by the marketing board, an institution found in many parts of the world.[44,45,46]

---

[44]Thodey, *Op. cit.* and Whitney, *Op. cit.*

[45]Helleiner, *op. cit.* Also see CSNRD 3, 4, 15 and 16.

[46]Johnson, Glenn L., *Factor Markets and the Problem of Economic Development*, Chapter 6, "Economic Development of Tropical Agriculture," W. W. McPherson (ed.), U. of Florida Press, 1968. Reproduced as a working paper, 1967.

The marketing of staple food crops within Nigeria falls in another category characterized by many buyers and sellers between producer and consumer, each acting with considerable freedom and efficiency in the classic tradition of the entrepreneur. The market for staple foods in Nigeria is national in the sense that legal barriers are minimized, and it is known that some commodities move great distances, such as cowpeas and cattle from the far North to the great metropolitan centers of the far South. In considering the ability of this atomistic structure to adjust to change and permit new institutional arrangements, it may be well to consider some of the rigidities in the present system, some possible changes of direction and the policy choices to consider in the coming years.

It is often emphasized how the eating habits of Nigerians embrace the traditional food items of cassava, yam, cowpeas, the millets and a few other traditional commodities. Old habits may be difficult to change, but it must be recognized that nearly all of the major and popular food items used today were introduced into Nigeria mostly from other continents. As per-capita incomes and the general level of education rise in Nigeria, and as nutritionists convince people of the need for improved diets, a fairly rapid adjustment in food preferences may develop. High starch diets will be reinforced with proteins and vitamins. Alternative sources of starch will be explored as it becomes clear that starch is a high-cost item in Nigeria. Need for substitute sources may be partially offset merely by adjusting the production areas of the traditional items so that specialization and cost reduction will occur.

The question of trade among Nigeria's biological areas is of growing importance. CSNRD research indicates that the gains from internal trade on the basis of world prices for export crops and food prices determined by market forces are very substantial. The picture of the future which emerges is one of the southern rain forest areas more specialized in export tree crops with the derived savannahs and savannahs concentrating on food crop production for the south as well as cotton, groundnut and livestock production. Technological advance for food crop and livestock production further increases the social advantages of such specialization. In view of this and the lack of effective demand previously noted, current attempts to promote state self-sufficiency with trade barriers and food production campaigns appear highly questionable from an economic standpoint as well as from the standpoint of the civil war being waged to obtain, among other objectives, the advantages of one unified Nigerian economy.

As mentioned in the FAO report[47] the lack of appropriate food storage facilities does contribute to losses of product. However, Thodey's[48] detailed findings and the analysis of his data present some conclusions different from those reached in the earlier FAO work. Thodey's study in Western Nigeria did support the view that there are wide swings in price of domestic food crops reflecting the supply situation throughout the year. However, there is commodity storage on farms. The yam barn is a prominent example and cassava roots are actually stored in the ground, or can be, until needed. Furthermore, merchants, particularly at the wholesale level, have shown considerable ingenuity in gathering information about sources of supply of staple food crops, and seem to be very flexible in transferring their assembly jobs several hundred miles to open up a new supply area.

In addition to being innovative in uncovering new sources of supply, Nigerian merchants of staple foods seem to make effective use of existing transport to collect large wholesale lots and move them over the road for many miles. These observations tend to negate the conventional view that domestic food markets are static, and that the market institutions and merchandizers have a low capacity for adjusting to changes in supply and demand.

A review of Thodey's findings for the staple food crops also shows that the competition between wholesalers and between retailers within a certain market is such that neither gross margins nor net margins reflect the alleged siphoning-off of monopoly profits by any middleman, but that on the contrary, the margins in any one market can be well explained by examining such cost items as transportation and rent of facilities. Examples of these margins are shown in Tables II.10 and II.11.

Traditional beef marketing appears to be something of an exception to the above generalization concerning staple food crop markets. Strong allegations are made that beef "cattle rings," other more or less organized groups and, perhaps, local governments collect taxes and tolls from the migrating herdsmen in such a way as to increase marketing costs unduly. If this condition exists, it is reflected back to the producer in lower prices for his animals and forward to the consumer in the form of fairly high prices (quality considered) for meat.

As observed in the FAO report[49], it would be very desirable to have more market news information available to producers, merchants and consumers. Here, again, the Stanford study in Western Nigeria shows price differences between markets which often can largely be explained by assuming the lack of market information. Yet, the Stanford study also shows that some of the price difference between markets could be explained in terms of demand, in that consumers from different income levels seem to patronize different

[47] *Op. cit.* p. 352
[48] *Op. cit.*
[49] *Op. cit.*

Table II.10—Percent Distribution of Traders by Total Net Margin as Percent of Total Sales and by Type of Seller (Ibadan, Nigeria), August-September 1966

Total net margin as percent of total value of sales	Type of seller		
	Retail only	Retail—wholesale	Wholesale only
	-----	*Percent*	-----
0 and under	8	9	6
Over 0 and under 2	22	15	16
2 and under 4	24	36	26
4 and under 6	27	13	23
6 and under 10	15	16	14
10 and under 20	3	9	13
20 and over	—	2	3
Total percent	99*	100	101*
Average net margin (percent)	7.0	4.6	6.4
Number of responses	131	55	70

*Rounding error

Source: Thodey, Alan R., *Marketing of Staple Foods in Western Nigeria* Stanford Research Institute, Menlo Park, California: March 1968, p. X-171.

Table II.11.—Average Gross Margin of Traders as Percent of Selling Price by Commodity and by Type of Seller (Ibadan, Nigeria), August-September 1966

Commodity	Type of seller			
	Retail only	Retail—wholesale	Wholesale only	All sellers
	----------	*Percent*	----------	
Yam	14.3	23.7	23.2	21.6
	(6.0)*	(12.1)	(19.6)	(15.2)
Gari	5.9	7.9	9.7	7.3
	(2.5)	(3.5)	(4.6)	(3.6)
Maize	9.1	14.8	16.8	12.7
	(2.4)	(6.4)	(5.7)	(5.7)
Rice	4.1	7.6	6.1	5.1
	(1.9)	(6.4)	(2.2)	(3.7)
Cowpeas	3.9	5.5	8.7	5.4
	(2.6)	(3.5)	(3.1)	(3.5)

*Standard deviation.

Source: Thodey, p. X-154, Table 10.36.(see also CSNRD Table II.10)

markets, and retailers and wholesalers within those markets adjust their services accordingly.

Within the scope of Thodey's report, cooperatives do not have a good record in servicing the marketing of staple foods.[50]

Recent studies such as those by FAO,[51] Stanford Research Institute,[52] and CSNRD,[53] discuss the need for additional infrastructure to facilitate the marketing function in Nigeria. The effective use of existing and proposed new infrastructure investment will require the search for economic efficiency on the part of investors. Thodey's work shows that the middlemen and their business activities in the private sector, utilizing existing infrastructure, were reasonably efficient by Western standards, shown by gross and net margins.

The studies by Kriesel[54] and others show that there are some glaring inefficiencies in the marketing of commodities handled by public agencies. Part of the inefficiency grows out of inadequately trained licensed buying agents. Further, funding arrangements often make it difficult to obtain repayment of monies advanced to cover marketing costs. Thus the efficiency of public firms compares unfavorably with that of most of the agencies operating in the private sector. Beef, again, is an exception, though in some cases it is difficult to distinguish elements of the marketing system from local government in which case the generalization about governmentally controlled markets holds for the traditional as well as the modern sector.

In addition to reducing returns to producers by inefficiencies and undesirable practices not subject (in the past) to complete elimination by either competition or (in the past) by political and legal procedures, the marketing boards also extract legal revenues in the form of marketing board surpluses. Still further, agricultural export products are heavily taxed.

Analyses to date indicate that the public operations with respect to marketing are insulating domestic producers from substantial amounts of effective demand, and further, that effective demand is needed to provide remunerative employment for Nigerian farm labor and underutilized Nigerian land and to provide employment opportunities for capital easily produced domestically, with currently underutilized labor and land. Much of what will be recommended in the pages to follow will have to do with overhauling public marketing agencies and operations so as to make it possible to utilize Nigerian farm labor and Nigerian land more effectively. Attention will be focused on marketing agencies for export crops and on the markets for modern factors of production.

Factors of production

On the factor market side, the business of supplying modern inputs to agriculture is just emerging and appropriate institutions need to be strengthened. The literature describing these three major aspects of the agricultural marketing system in Nigeria is growing.[55] However, just as in highly developed countries, the markets and market systems of Nigeria must be subjected to continuing analysis.

State-operated systems for producing and distributing modern factors of production such as improved planting materials for rubber, cocoa and palm, improved seeds, baby chicks and fertilizers have met with only moderate success. As extension services and

[50] *Op. cit.*, p. VIII-55

[51] *Op. cit.*

[52] Thodey, *op. cit.*

[53] *Preliminary Strategies and Recommendations for Nigerian Rural Development, 1968-85.*, CSNRD. East Lansing, July 22, 1968.

[54] Kriesel, H. C. *Cocoa Marketing in Nigeria*, CSNRD 21, *Groundnut Marketing in Nigeria*, CSNRD 19, *Cotton Marketing in Nigeria*, CSNRD 24.

[55] FAO, *op. cit.*

research institutes have tried to produce and distribute these materials, limited numbers of qualified civil servants have been overburdened.

Nigeria's fairly large private sector has demonstrated competence to work well with expatriate agencies where necessary in the case of automobiles, fuel, lubricants, electrical equipment, etc. Yet the production and distribution of modern biological agricultural inputs has been kept in state hands by (1) adverse produce pricing policies which often make it unprofitable for the producers to use these and, hence, for marketing agencies to acquire and distribute them and/or (2) programs which pre-empt these areas with government subsidies and operations which discourage its private sector, both foreign and domestic.

The conclusion is that Nigeria's export crops markets and pricing policies are in severe need of revision in order to improve the operation of both her product and factor markets.[56]

The State of Nigerian Agricultural Technology

Agricultural research in Nigeria began in 1899 with the establishment of Moor Plantation, a general crop research station. Other colonial institutions followed. A West African Cocoa Research Station was established in Ghana with a substation in Ibadan now known as the Cocoa Research Station Institute of Nigeria (CRIN). The West African Institute for Oil Palm Research, established near Benin City, became Nigerian with Independence and is now known as the Nigerian Institute for Oil Palm Research (NIFOR).

After World War I, research stations were established at Umudike in Eastern Nigeria and Samaru in the North. Umudike was concerned with tree crops and food crops, Samaru with groundnuts, cotton and the cereals. The Federal Department of Veterinary Research was established at Vom at about the same time; however, its major role has been the training of animal health workers and the production of vaccines. Around the time of World War II, research was started in fisheries and on the storage of export crops.

Several research stations and numerous substations have been initiated in recent years. Research on rubber began in 1964 with development of a station at Iyanomo near Benin City.

The International Institute for Tropical Agriculture (IITA) is being established near Ibadan by the federal government in cooperation with the Ford and Rockefeller Foundations. Its objectives are to: (1) do research on tropical food crops, (2) help provide professional training in agricultural research, (3) publish research findings and recommendations, (4) distribute improved plant materials to other research centers for use in plant improvement programs, (5) establish and operate for interested agricultural scientists an information center and library of the world's literature on tropical agriculture and (6) organize international, regional and local conferences to discuss current policies and programs in the field of tropical agriculture.

It should be stressed that IITA is international in scope, not Nigerian alone, or for that matter only Western or rain-forest Nigeria. Thus it is not a replacement for present or future Nigerian institutions.

Research results produced to date have been good to excellent in the case of oil palm and cocoa. Consequently, Nigerian producers are potentially able to compete strongly in the world markets for these products. Nigerian rubber research is of such recent origin that it has made little difference; however, substantial rubber research results are available from abroad and Nigerian rubber producers could move forward considerably, using such results. Nigerian groundnut, cotton and tobacco seem to have fairly adequate technological bases. Maize, millet, and grain sorghum, however, suffer from inadequate research results to date in the form of improved adapted varieties. As a consequence, internal real costs and, hence, prices of starches and proteins are high relative to world prices.

Nigeria cannot compete at present in either world feed or food grain markets. In fact, internal Nigerian costs of production must remain high relative to the effective demand of most Nigerians for pork, eggs, poultry and grain-fed beef until research increases yields and, hence, reduces per-unit costs of producing millet, grain sorghums and cassava to world food and feed grain price levels.

IITA, the Institute of Agricultural Research at Samaru, Umudike and Moor Plantation (federal), and the agricultural faculties have important roles to play in bringing about these biological advances which will be necessary for Nigeria's second forward thrust in agriculture.

Responses to Price and the Danger of Misusing Supply Elasticities

Our review of agricultural resources and institutions suggests that the basis exists for agricultural growth. We now consider whether farmers will respond to improved prices to realize the potential of those resources. The question of whether or not agricultural producers respond to changes in prices has now been answered positively. On the Asian scene Prof. T. W. Schultz states:

> "The controversy over the relevance of economics in explaining the behavior of farmers in Asia as producers and consumers is becoming passe." ... "In this respect, let me comment . . . The responses of farmers in Asia to improvements in economic opportunities are rational in economic terms. Their responses

[56] Johnson, G.L., *op. cit.*

> to changes in product and factor prices are significantly positive. Moreover, the observed lags in these responses are closely akin to the observed lags on the part of farmers for example, in the United States. There are still some intellectuals, very few of them are economists, who, despite the growing body of evidence against them, remain committed to their anti-economic analysis. The elegant prose of a Kusum Nair, enriched by travel over India, the United States and Japan, has farmers saying, 'Economics is dead.' But for all that, it is no longer necessary to spend more time testing the proposition that farmers in Aisa are indifferent to economic incentives, in view of competent studies now available which leave little room for doubt that this is a false proposition."[57]

On the Nigerian scene, survey evidence accumulated by Okurume[58], time-series data, general observations and discussion with agriculturalists indicate that Schultz's conclusions also apply in Nigeria. Okurume's work indicates that cocoa producers would respond to more favorable prices, a conclusion entirely consistent with time-series data on cocoa production. The response of palm producers to the Oil Palm Rehabilitation Scheme subsidies indicates that palm product producers do respond to favorable price relationships and incentives. The same is true for fertilizer distribution subsidies in the North.

When civil servants and other members of Nigeria's new elite are asked why they have not invested in agriculture, and why they have invested in housing and urban enterprises, their answers have indicated great responsiveness to price and income incentives. Among civil servants who know agriculture well are many who would like to demonstrate their capacity to own and operate a successful agricultural enterprise. The difficulty, however, is that they *do know* Nigerian agriculture (and her prices) well enough to know that private investments in Nigerian agriculture are unprofitable. They have found this out with simple budgeting and observation of the experiences of others. Conversely, and also by simple budgeting and observation of the experience of others, they have concluded that the high private payoffs are in the nonfarm economy, in residential and business building construction and in trade. Thus, their investments go to provide profitable housing and building for the new elite and expatriates or for business establishments but not to expand agricultural production!

CSNRD researchers do observe, however, that the responses of Nigerian agricultural producers and investors do not follow the supply response analysis commonly presented in college text books. Instead, the responses are more similar to those observed in agriculture around the world, these responses being quite consistent with the more advanced thought about supply responses used by many economists, both agricultural and general.

We can start to distinguish the difference between the usual elementary and more advanced thought by noting that the usual supply curve relates output to price in a fully reversible manner. According to the usual approach, the decrease in production resulting from a decrease in price is the negative of the response to an increase in price. The upward slope of the supply curve is regarded as the consequence of inefficiencies encountered when producers apply successive units of variable resources to sets of resources not subject to variation in the usual elementary analysis. The usual elementary analysis rests on the often unstated and misunderstood assumptions of (1) perfect knowledge and foresight, (2) equal acquisition costs and salvage values for variable resources, and (3) infinite acquisition costs and zero salvage values for fixed resources. In the real world in general, and in Nigeria in particular, these assumptions are not met. As a consequence, supply responses differ markedly from those in the general economic text books used by university sophomores.[59]

In Nigeria these differences between assumptions and reality are particularly striking. First, Nigerian producers are very imperfectly informed as to the prices they can expect for their produce. Also, they are not well informed about institutional arrangements for marketing their products or for supplying them with inputs. Still further, they know little about the rapid changes taking place in agricultural technology.

As far as factor prices are concerned, acquisition costs are typically greater than salvage values for the very items of capital which planners try to get farmers to increase—cocoa stands, palm groves, rubber trees and breeding stock. However, acquisition costs are seldom infinite, and salvage values are seldom zero. Hence, such resources may be either fixed or variable, depending on current price relationships and the past mistakes of imperfectly informed producers.

It is crucial to keep in mind that supply responses

---

[57] Schultz, T.W., Production Opportunities In Asian Agriculture: An Economists Agenda, in *Development and Change in Traditional Agriculture: Focus on South Asia*, Occasional Paper, Asian Studies Center, Michigan State University, East Lansing, 1968.

[58] *Op. cit.*

[59] Some of the references dealing with this development include: Johnson, Glenn L. and Hardin, Lowell, *The Economics of Forage Evaluation*, Purdue Agr. Exp. Sta. Bul. 623, 1955; Edwards, Clark, Resource Fixity and Farm Organization, *Jour. Farm Econ.*, Nov. 1959; Johnson, Glenn L., Supply Function—Some Facts and Notions, Agricultural Adjustment Problems in a Growing Economy", Iowa State University Press, 1956; Johnson, Glenn L., Implications of the IMS for Study of Responses to Prices, in "A Study of Managerial Processes of Midwestern Farmers", (ed.) by Johnson, *et. al.*, Iowa State University Press, 1961 and Vincent, Warren (ed.), "Economics and Management in Agriculture", Prentice Hall, New York, 1962.

Recent examples of policy and farm business applications of this theory include Hathaway, Dale, "Government in Agriculture," The MacMillian Co., 1963, and the Phase II model of the North Central Publication 54 study, of *Feed Grain and Livestock Production in the Midwest*. Other applications are by Heidhues, Theodor, *A Recursive Programming Model of Farm Growth in Northern Germany;* Young, Robert, *An Economic Study of the Eastern Beet Sugar Industry*, Michigan State University Agr. Exp. Sta. Bul. 9, 1965; and *Over-Committment of Resources in the Production of Farm Products*, Report 29, Center for Agriculture and Economic Adjustment, Iowa State University of Science and Technology, Ames, Iowa, 1967.

are influenced by whether a producer finds it advantageous to invest or disinvest in such things as palm trees, cocoa seedlings or a groundnut decorticator. Little response should be expected from producers to small increases in prices, if low prices have been holding the earnings of such durable capital items near their salvage values. In such instances, investment and output responses should not be expected until product prices increase enough to raise earning power to levels equal to, or in excess of, acquisition costs for such durable capital items as palm, cocoa and rubber trees and breeding stock. In addition there are the effects on supply responses of extension efforts, subsidies and campaign information.

The analysis is further complicated in the case of palm by the problem of switching from natural regeneration of wild palms with virtually zero acquisition costs and negative salvage value (it is expensive to clear them from land) to man-controlled rehabilitation of the wild groves with trees having substantial acquisition costs. A similar complication is involved in replacing groves of seedling rubber having negative salvage value with expensive new planting material. The case of cocoa is similar. Thus, in the case of all three crops little disinvestment should be expected in response to adverse prices. This is what has been observed. Conversely, little investment response should be expected from modest increases in prices though price increases large enough to cover the acquisition cost of modern planting materials should be expected to increase investment and, with maturity, output. With imperfect knowledge of the new technologies, extension work should also be effective in getting potential investors to see the implication of more favorable prices.

Some annual cash crops not dependent on substantial investments in durable equipment and facilities are produced in competition with subsistence crops, and employ simple, well-known technologies. For these crops, responses to prices should be expected to be quick and rather symmetrical for both price increases and decreases. These are the types of response observed in Nigeria for groundnuts and cotton which are produced with hand tools in competition with food crops with simple technologies.

Labor committed to a career in agriculture often becomes fixed in the industry whether the country be in Western Europe and North America or in Africa. After young men make the mistake of committing themselves to agriculture, they often are forced to make loss-minimizing adjustments which expand production to the point where total output presses hard on effective demand. These loss-minimizing adjustments include the acquisition of more capital and the use of more land in order to increase labor earnings. The consequence is lower product prices (real or monetary) relative to costs and simultaneously low returns at the margin for capital, land and labor as observed for Nigerian subsistence agriculture (see the sections of this report dealing with the labor, land and capital markets).

In support of the supply projections and production campaigns to be presented later, it is important to note that the above theory and empirical data lead to a rejection of many simple elasticity computations. For instance, both the theory and observations indicate that it would be inaccurate to use the same upward elasticity for both small and large price changes and even more inaccurate to use the same elasticities for both increases and decreases in prices. Thus, instead of relying on simple supply coefficients to trace the consequences of changes in prices over time, CSNRD researchers adopted another method of analysis. The method included the projection of the consequences of specific production campaigns (including changes in prices) through time in order to arrive at estimates of aggregate output, income to farmers, public revenue and foreign exchange earnings.

CHAPTER III

Growth and Change in Nigerian Agriculture

THE FOLLOWING SUMMARY OF NIGERIAN AGRICULTURAL development history provides a background for visualizing in the following chapters some of the important, different, broad strategies which Nigerian agricultural development could follow in the years ahead. These different strategies will be described and studied in later sections of this report. This summary also compares development experiences of some other tropical countries with the Nigerian experience to illustrate advantages and disadvantages of the alternative strategies which Nigeria might follow.

Growth Rates

Nigeria is unique among most African nations in that it has been growing rapidly without major dependence on large-scale foreign investment in the production of agricultural, mining or manufacturing products. The dynamic of Nigerian development has been small, indigenous farmers who have produced export crops on a major scale since World War I.[1] On the other hand, many African countries, such as Liberia, have achieved "growth without development" via foreign-owned and foreign-directed mining operations and plantations. An enclave of foreign-owned petroleum and manufacturing interests was developed slowly in Nigeria in the late 1930's and early 1940's but did not achieve significance until the petroleum expansion of the 1960's.

Though agricultural output in Nigeria has not attained its full potential, Nigeria's agricultural growth rate compares favorably with that of many other developing countries. Since 1950, output of agricultural products for domestic use is believed to have increased approximately in line with population growth, and agricultural exports have grown by about 4.5 percent annually in the past 15 years as shown in Table III.1. Most of this growth has been accomplished by smallholders who pay heavy taxes on their export crops. To date, very little of it has originated with government-supported projects engaged in direct agricultural production.

While these rates are more favorable than for many more-fully developed countries, their significance must be viewed in the context of the Nigerian situation. Impressive rates of growth for smallholders of the economy have had little immediate effect on the average welfare levels, as a substantial amount of the income generated by smallholders has been drained off by marketing board surpluses, export duties and purchase taxes.

Policies and Programs

Colonial period

During the 1900-60 period of colonial agricultural policy, three important policies influenced agricultural development in Nigeria: (1) around 1910 the government began to encourage farmers to increase output per acre, (2) governmental marketing boards were established in 1947 and (3) the government began to involve itself directly in productive processes in agriculture around 1949.

As the Regional governments gained influence in the late 1950's they shifted their attention from merely providing social overhead and administrative services to an active role in direct investment in agricultural plantations and in directing other investment schemes such as farm settlements. The 1962-68 plan documents this shift.

During the colonial period and as the need to increase output became more important, the govern-

[1] Oluwasanmi, H.A., "Agriculture and Nigerian Economic Development" Ibadan: Oxford University Press, 1966; Oyenuga, V. A., *Agriculture in Nigeria: An Introduction.* Rome: Food and Agriculture Organization of the United Nations, 1967; Helleiner, G. K., "Peasant Agriculture, Government and Economic Growth in Nigeria", Homewood, Ill. Richard D. Irwin, Inc., 1966, and Eicher, C. K. The Dynamics of Long-Term Agricultural Development in Nigeria, *Jour. Farm Econ.* Vol. II Dec. 1967. 1150-70, See also FAO, *Agricultural Development in Nigeria 1965-1980* Rome, 1966.

Table III.1.—Value of Nigerian Exports of Principal Agricultural Products, 1950-67

Item	1950		1960		1962		1964		1966		1967	
	£Mil.	*Percent*	*£Mil.*	*Percent*	*£Mil.*	*Percent*	*£Mil.*	*Percent*	*£Mil.*	*Percent*	*£M.*	*ercent*
Cocoa	19.0	21.0	36.8	21.7	33.3	19.8	40.1	18.7	28.3	9.9	54.7	22.6
Oil palm products	28.8	31.9	40.0	23.6	25.8	15.3	31.7	14.8	37.8	13.3	13.8	5.7
Groundnut products	15.5	17.2	28.9	17.5	41.0	24.3	47.0	21.9	55.5	19.5	46.9	19.4
Rubber	2.8	3.1	14.2	8.3	11.4	6.7	11.0	5.1	11.5	4.1	6.3	2.6
Cotton	3.0	3.2	6.2	3.6	5.9	3.5	6.1	2.8	5.2	1.8	6.5	2.7
Other agricultural exports	8.8	9.8	10.2	6.0	7.2	4.3	6.4	3.0	9.7	3.4	n.a.	n.a.
Subtotal agriculture	77.9	86.3	136.3	80.3	124.6	73.9	142.3	66.4	148.0	52.1	128.2	53.1
Petroleum	—	—	4.4	2.6	16.7	9.9	32.1	14.9	92.0	32.4	72.1	29.8
Other nonagricultural exports	12.3	13.7	29.0	17.1	27.2	16.1	40.0	18.6	44.1	15.5	41.4	17.1
TOTAL	90.2	100.0	169.7	100.0	168.5	100.0	214.4	100.0	284.1	100.0	241.7	100.0

Source: Helleiner, Gerald, *op. cit.*; Federal Office of Statistics, *Digest of Statistics* and *Economic Indicators*.

ment directed its attention mainly to *research* and *education* rather than to direct involvement in agricultural production. The Department of Agriculture encouraged private farmers to raise output per acre by distributing higher-yielding seed varieties and by teaching them better methods of cultivation. Between 1909 and 1917, around 5,400 acres of rubber were planted in midwestern Nigeria. This has been attributed to the encouragement given by the Department of Agriculture to private farmers by distributing seedlings and providing advice on cultivation processing.[2]

In 1929, the Oil Palm Research Station was launched; and in 1951, the Cocoa Research Institute (Nigeria), and 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.[3] 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 1950-60, and perhaps as much as 40 to 50 percent to the 200,000-ton jump in 1960-61.[4]

In addition to the establishment of commodity research institutes, in 1957 the government began to teach farmers proper rubber 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 product prices received by private farmers and because the value of the fertilizer was not effectively demonstrated to the farmers.

More recently, another fertilizer scheme has grown rapidly in Northern Nigeria partly because the Northern Nigerian government subsidized the fertilizer sold to private farmers. Also, the Northern Nigerian government has had an aggressive program to encourage fertilizer use as part of a package of practices. 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.[5] In 1966-67, the tonnage distributed was around 33,000.

The cocoa marketing boards, set up in 1947 with the primary objective of preventing short-term fluctuations in cocoa prices, have had considerable effect on cocoa producers in Western Nigeria. The groundnut, oil palm and cotton marketing boards, set up in 1949, have also affected the production of these commodities. Though designed to stabilize prices, the marketing boards have also endeavored to stimulate development and have served as revenue-raising agencies of government.

By annually prescribing producer prices averaging much below world prices, the marketing boards have influenced existing as well as potential producers. While these operations have not prevented all expansion in production over the years, it is also clear that they have discouraged substantial expansions. The marketing boards 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. For example, Anschel[6] reported that because a substantial proportion of the commercial value of oil palm products was withheld from the producers, they directed their resources from oil palm production to rubber which is not under the marketing board.

By 1951, the marketing boards controlled 69 percent by value of all Nigerian exports and 78 percent of all nonmineral exports. For these export crops, producer prices were generally kept between two-fifths and three-fifths of world market prices. The groundnut producers often received less, generally one-third

[2] Anschel, K.R., *Economic Aspects of Peasant Rubber Production in Midwestern Nigeria*. Unpublished Ph.D. Thesis. Michigan State University, East Lansing 1965, p. 56.

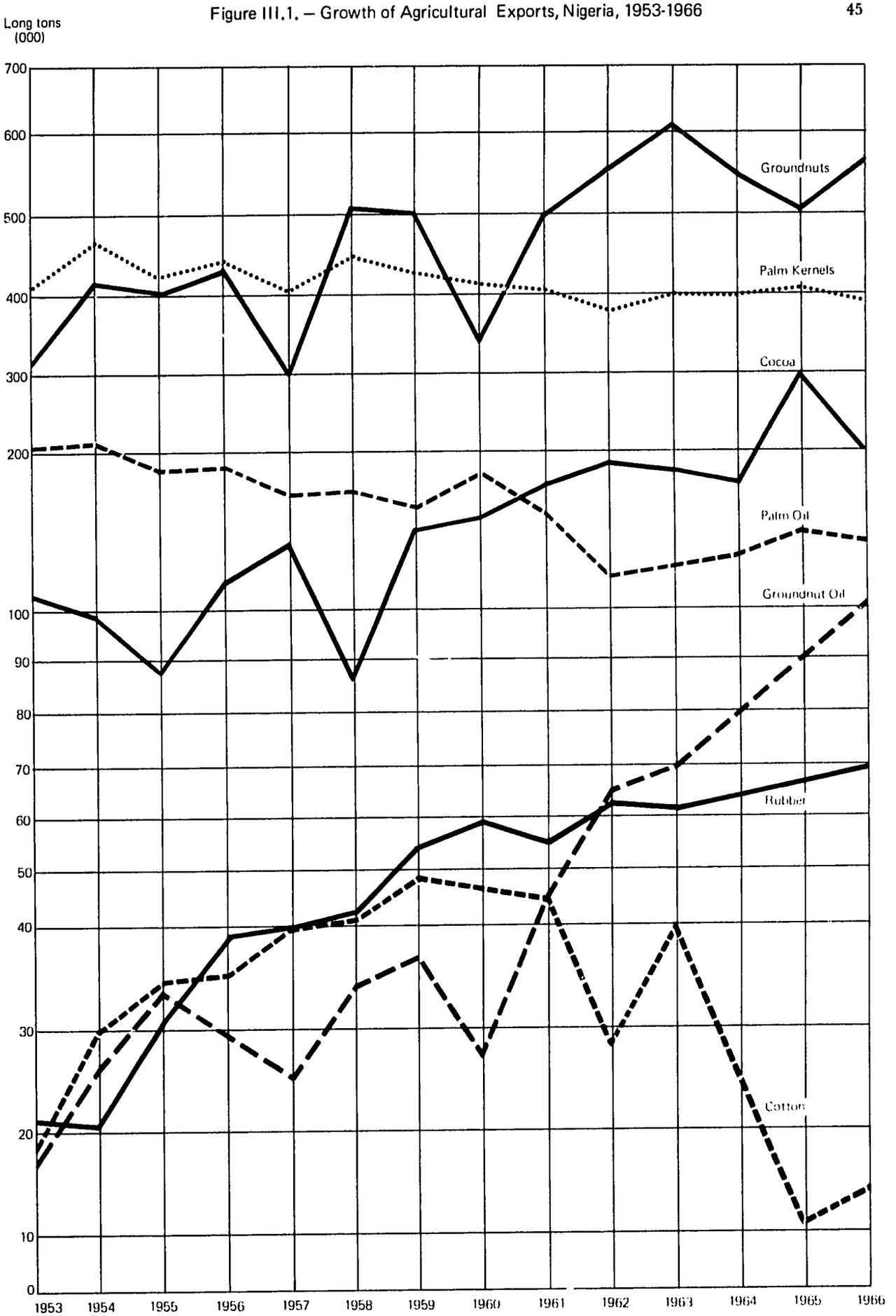
[3] Welsch, D.W., *The Rice Industry in the Abakaliki Area of Eastern Nigeria* Unpublished Ph.D. Thesis. Michigan State University, East Lansing 1964.

[4] FAO, *Agricultural Development in Nigeria* 1965-80. p. 9.

[5] *Ibid.* p. 9.

[6] *Op. cit.*

Figure III.1. – Growth of Agricultural Exports, Nigeria, 1953-1966



Sources: Helleiner, ***Peasant Agriculture, Government and Economic Growth***, Table IV-A-8, FOS Economic Indicators, May 1968. Kriesel, CSNRD unpublished data.

to two-fifths.[7] By paying producer prices far below worldwide commercial values, the marketing boards made the crops under their control less attractive to potential producers compared to other crops or, indeed, to other forms of activity.

Historically, Nigerian export crop producers have long competed successfully in world markets for palm oil, cocoa and groundnuts despite export taxes and marketing board operations; therefore, the problem of low returns to land, labor and capital in producing export crops is one of low prices artificially imposed by government instead of a lack of comparative advantage stemming from inadequate technology and poor natural resources.[8] Nigerian smallholders of export crops as well as of subsistence crops have pressed their investments to the point of loss at the margin and are expanding production despite adverse prices.

Lewis[9] has noted:

> "Producer prices have now been driven so low that the farmer's income is much less than it was 15 years ago. The incentive to plant export crops has been diminished, and the engine of growth is in danger of being slowed down. Young men are leaving the countryside because the terms of trade are heavily against farming. Since the first priority of development planning must be to make farming profitable, the governments should abolish the export duties and recoup the same revenue from import and excise duties instead."

Nigeria is the No. 1 exporter of groundnuts, No. 2 for cocoa and a major exporter of palm oil. Cotton exports are declining as cotton moves through an import substitution phase and imported cotton goods are replaced with domestic products. Growth rates have been substantial even for export crops in some years, but are highly variable in response to prices received by farmers and weather fluctuations. The trends shown in Figure III.2 are for tonnages of crops exported. This tends to give a distorted view of cotton and palm production since increasing quantities are being consumed.

Post independence

The government of Nigeria has developed heavy taxation policies and adverse pricing programs for Nigerian agriculture and has become more deeply involved in direct agricultural projects. At the same time, however, it also expanded its support for projects to improve the country's infrastructural service to agriculture.

The first Nigerian Development Plan which covered the 1962-68 plan accorded priority to agriculture, industry and technical education. The planners correctly and explicitly recognized that agricultural and industrial expansion are not alternatives to development but are complementary and interrelated. The First Plan called for an expansion of export crops. Specific acreage and output targets were laid down for these crops while the increase in food supplies was handled in a vague manner—mainly on account of a lack of knowledge and inability to influence outcomes in this area.

1962-68 period

In this period 13.5 percent of funds proposed for development were allocated to agriculture as compared with 3.5 to 5.6 percent of the total allocations in federal plus regional capital and recurrent budgets over the 1949-62 period. A considerable part of the increase went to expand projects rather directly involved in agricultural development.

In the First Plan, Wells noted that one-third of the resources devoted to agriculture in the federal and regional budgets were allocated to a category which he terms "government-directed investment projects."[10]

[7] Bauer, Peter. "West African Trade: A Study of Competition, Oligopoly, and Monopoly in a Changing Economy," Routledge and Keagan Paul, Ltd., London 1963. p. 276.

[8] See the earlier discussion (p. 38f) on producers' responses and elasticity for an explanation of low returns to land, labor and capital simultaneously.

[9] Lewis, W.A., *Reflections on Nigeria's Economic Growth.* Organization for Economic Cooperation and Development, Paris, 1967, p. 63.

[10] Wells, J.C. Government Investment in Nigerian Agriculture: Some Unsettled Issues, *Nigerian Jour. Econ. and Soc. Studies* Vol. VIII, March 1966. p. 38.

Table III.2.—Development Plan Allocations to Agriculture, Federation of Nigeria, 1962-68

Government	Government directed projects	Extension	Credit	Research	Education and training	Processing and distribution	Others or unclassified	Total
				£ millions				
Federal	1.000	—	3.000	7.466	—	—	10.000[1]	20.466
North	4.859	10.992	2.850	1.710	.729	.668	.691	22.499
East	18.114	5.958	1.400	.400	1.761	—	2.846	30.479
West	8.677	4.203	5.000	.399	.160	—	—	18.439
Total	31.650	21.153	12.250	9.975	2.650	.668	13.537	91.883[2]
Percent	34.4	23.0	13.3	10.9	2.9	0.7	14.7	100

[1] Grants to Regions for unspecified uses.

[2] Total does not add to that in plan (£91.76 million) because of slight disparity in Eastern Region figures.

Source: Wells, J.C., Government Investment in Nigerian Agriculture: Some Unsettled Issues. *Nigerian Jour. Soc. and Econ. Studies*, Vol.III, March 1966. p. 47.

(See Table III.2.) Projects in this category include farm settlements, plantations, irrigation schemes, etc. Thus the approach to agricultural development changed in the 1960's as compared with the 1900-1960 period. Over 34 percent of the government's allocations to agriculture in the current plan was allocated to government-directed projects such as farm settlements, while 23 percent was allocated to extension, 13.3 percent to credit, and 10 percent to research. It is interesting to note that the government is allocating one-third of its agricultural investment in the First Plan to government-directed agricultural projects as a means of expanding agricultural output. This new approach runs counter to the economic history of Nigeria prior to 1960, during which period agricultural growth came largely from the actions of myriad independent smallholders. To date, the payoffs for these governmental investments in agricultural products have not been great and it is becoming exceedingly difficult to mobilize public revenues for this purpose.

In the years ahead, some governmental long-term investments in rubber, cocoa, palm oil (farm settlement schemes, state-owned plantations and rehabilitation schemes) will come into production. In view of the lack of success to date, the policy and programs which put Nigerian governmental agencies in the business of producing agricultural products must be questioned. Are there adequate payoffs? Can profitable investments be financed? The answer appears to be "no" to the first question because of management problems and "no" to the second because of (1) difficulties in raising revenues and (2) competing uses for funds including the cost of materials to fight and recover from the present civil war.

On the other hand, there is the creditable record of export expansion by smallholders despite adverse pricing and taxation policies. In their case, the financing of expansion has been done privately without substantial drains on the treasury or on foreign exchange reserves (except for a few subsidies). Much of the required capital is produced in the Nigerian agricultural system itself from resources not easily reallocated to other uses for reasons discussed earlier (See pp. 31f.) Thus, there are good reasons for looking rather directly to the smallholders of Nigeria for substantial expansions in production. Their record is good even under a tax levied directly on the prices of their products; their record would be even better if this tax burden were shifted or changed. Their ability to finance expansions would improve if their land were permitted to yield private rent as a basis for higher land values.

While Nigeria is an exporter of raw cotton and also supplies nearly all of the cotton used in her textile mills, large quantities of cotton piece goods are imported. In 1966, the value of imports of piece goods was £12 million. Clothing—mainly used clothing—was another import, amounting to almost £4 million in 1966.

Historically, the responsibility of Nigerian government agencies to agriculture has been limited to the introduction of the new planting materials, fertilizer, baby chicks, etc. More recently, government agencies, including statutory corporations, have established farm settlement schemes, government-operated plantations, hotels, breweries, etc. A substantial part of the money for these schemes has come from agricultural taxes.

A commonly used argument favoring this pattern of taxing and spending is that the Nigerian farmer is a primitive person, unresponsive to economic incentive, who would mismanage the money if it were left in his hands. Advocates of taxing agriculture contend that higher producer prices would merely result in money being spent on dubious consumer goods—more wives and bigger burial ceremonies—not productive investments. Perhaps the advocates of taxation and government investment are partly right. However, the productivity of the Nigerian peasant, his historically demonstrated willingness to press the use of his labor and capital to low levels of return at the margin and the unfavorable record of governmental investment projects do not lead us to that conclusion.

The Coker Commission Report[11] on the management of Western Nigeria's marketing board surpluses from cocoa has been widely cited as evidence that at least one marketing board acted unwisely in dissipating its reserves. Less well known to the public are the 1967 White Papers on Northern Nigeria's Development Corporation and the Northern Nigeria Marketing Board.[12]

The government investigation of the Northern Nigeria Marketing Board noted an annual board turnover of £60,000,000. "The committee reported with considerable surprise that there is no one with the requisite financial expertise on the board, nor is there a financial advisor to the board."[13] The committee further noted that "the executive's (chairman's) incompetence and possible dishonesty has led to irrecoverable losses on a fantastic scale."[14] The committee further noted that "although accounts are not complete, the committee with the cooperation of the banks has estimated the shortfall for the last (1966)

---

[11]Federal Ministry of Information. *Report of the Coker Commission of Inquiry into the Affairs of Certain Statutory Board Corporations in Western Nigeria 1962.* Lagos, 1963.

[12]Northern Nigeria, *A White Paper on the Military Government's Policy for the Reorganization of the Northern Nigeria Development Corporation,* Kaduna: Government Printer, 1967 and Northern Nigeria, *A White Paper on the Northern Nigeria Military Government's Policy for the Comprehensive Review of the Past Operations and Methods of the Northern Nigeria Marketing B[illegible]d.* Kaduna: Government Printer, 1967.

[13]*White Paper* (in re: marketing board) *op. cit.* p. 2.

[14]*Ibid.* p. 11.

buying season to be of the order of £2,000,000."[15] Finally, the committee noted that "the low standards and poor performance left the board's accounts with heavy debit items, large sums of which are still not cleared. Figures supplied by the board on October 31, 1966, show that in the latter part of 1965, the then chairman allocated guaranteed overdrafts to 34 licensed buying agents totaling £6,794,000. Of this, the board's accounts show that £1,347,470 was still outstanding at the banks."[16]

The Northern Nigeria Development Corporation has been the main recipient of Northern Nigeria's marketing board "surpluses" or profits. The White paper on the Development Corporation examined the commercial ventures in which the Corporation had a commercial interest and concluded that:

1. "Out of the twelve projects examined which are wholly financed by the Corporation, only one of them (The Jema Fiber Estate) is considered to be developing according to plan and to be worthy of every encouragement."[17]
2. "Of the twenty-seven commercial ventures examined in which the Corporation has financial interests . . . only six can be regarded as successful so far."[18]

The committee also examined the loans made by the Development Corporation to Native Authorities, cooperative societies, private companies, partnerships and individuals, and noted numerous discrepancies in loans.

In summary, there is enough Nigerian-supplied evidence of management problems in marketing boards and development corporations to indicate that Nigerian farmers probably manage productive investments in agriculture as effectively or more effectively than those Nigerian agencies which have been taxing farmers to make investments in direct production.

To date, Nigeria's First Development Plan has been evaluated by numerous researchers in terms of whether the projected government capital and recurrent expenditures exceeded, equaled or lagged behind the targets in the 1962-68 Development Plan. However, we contend that policies, especially those which affect the motivation of 5,000,000 Nigerian farmers, are much more important in determining the performance of the agricultural sector than the mere expenditure of government monies. For these reasons, we stress strategies and policies in this report rather than evaluation of governmental expenditures—capital and recurrent—on agriculture.

Less-developed countries such as Mexico, Taiwan, Pakistan and the Philippines have achieved rapid agricultural development by shifting to agricultural policies which have placed heavy reliance on price incentives and public programs to support individual farmers. On the opposite side, however, Argentina in the midthirties elected to exploit, instead of develop, her agricultural producers with inadequate returns and by not competing aggressively for world markets. Argentina lost substantial revenues needed to expand both her farm and nonfarm economies. Ghana, under a leftist regime, did much the same thing from 1957-67. The results were similar; both countries lost earnings from natural resources having high comparative advantage. The lesson to be learned is that *poor agricultural policy is poor policy* and that it has the same results whether practiced by rightist or leftist countries.

War and reconstruction

As a result of the civil war, agricultural trade has been disrupted; some transport facilities have been overloaded and improperly maintained; other transport facilities have been destroyed or diverted to war use; research stations, university teaching and extension services in the former Eastern and Midwestern Regions have been disrupted; the important advances being brought about in oil palm production have been seriously interrupted at both the farm and research station (NIFOR) levels, and the organization of smallholder subsistence production in the former Eastern and Midwestern Regions has been disturbed and partially destroyed, though recovery has proceeded rapidly in the new Mid-West State.

This war-time loss in productive capacity has created a temporary food famine in the former Eastern Region for which relief is required. In this connection much is to be gained from re-establishing former Nigerian trading patterns for food as rapidly as possible. This action would minimize the further disruption which would result from the long-term injection of external relief food supplies in an economy suffering in the long run from an excess of production capacity relative to effective demand for foodstuffs.

We have seen that Nigeria has great opportunities to expand its production of export crops and that she must rely on agriculture to create employment opportunities for large numbers of her laborers.

Freed of Nigerian-imposed institutional constraints, Nigerian production of cocoa, groundnuts, palm produce, rubber and cotton can be expected to expand rapidly. Such an expansion would provide much-needed employment, income and foreign exchange, but would also place large additional burdens on Nigeria's agricultural transport, marketing and processing facilities. In short, Nigerian agricultural reconstruction and development are highly interrelated and best reviewed as joint operations. The opportunities for growth and development are so good and so exten-

[15] *Ibid.* p. 12.
[16] *Ibid.* p. 16.
[17] *Ibid.* p. 2.
[18] *Ibid.* p. 2.

sive that reconstruction investments can be directed towards growth and development to accomplish both objectives. Thus, growth and development opportunity overshadow purely reconstruction and relief needs.

Summary

The historical record of Nigerian agricultural development indicates that we should note the following:

1. Until Independence in 1960, Nigerian agricultural policy emphasized export crops expansion via small private Nigerian farmers.
2. Government has taxed export agriculture heavily to finance industrial development in recent years.
3. Historically, the government policy towards food crops has been aimed at allowing the market mechanism to guide the production of food by small farmers and the marketing of food by small Nigerian traders.
4. Nigerian agricultural policy has been focused on export crop expansion and, since Independence, import substitution, especially in tobacco, cotton goods, sugar and kenaf.
5. Nigerian agricultural policy has been based upon production by smallholders but, since Independence, increasing attention has been given in the South to government-sponsored land settlements and government-owned plantations.
6. Nigeria's tax and pricing policy has been adverse to export crops. This has partially offset extension, research and other efforts to expand crop production.
7. Nigeria's subsistence sector has grown at about the same rate as her population while her export sector has grown at a rate of about 4.5 percent per annum.
8. Agricultural lands in Nigeria are traditionally held in communal or clan ownership, but adaptations are being made in tenure to meet needs of a modernizing agriculture, and tenure does not appear to be a serious institutional barrier to growth.
9. Government policy in recent years has tended to move in the direction of greater emphasis of food production, increasing import substitution of raw materials, and lower production prices of export crops. Preliminary discussions are underway about government price ceilings on some staple foods which could be a start toward adverse pricing of foods from the standpoint of producers, a development which would tend to offset other actions to encourage food production.
10. A movement was started by states in 1968 to emphasize area self-sufficiency in the production of some crops such as cotton and to diversify their agriculture by moving away from the traditional export crops such as cocoa.
11. The processes of reconstruction and development are closely related in Nigerian agriculture with a good potential for growth-creating investment opportunities in excess of those required for reconstruction.

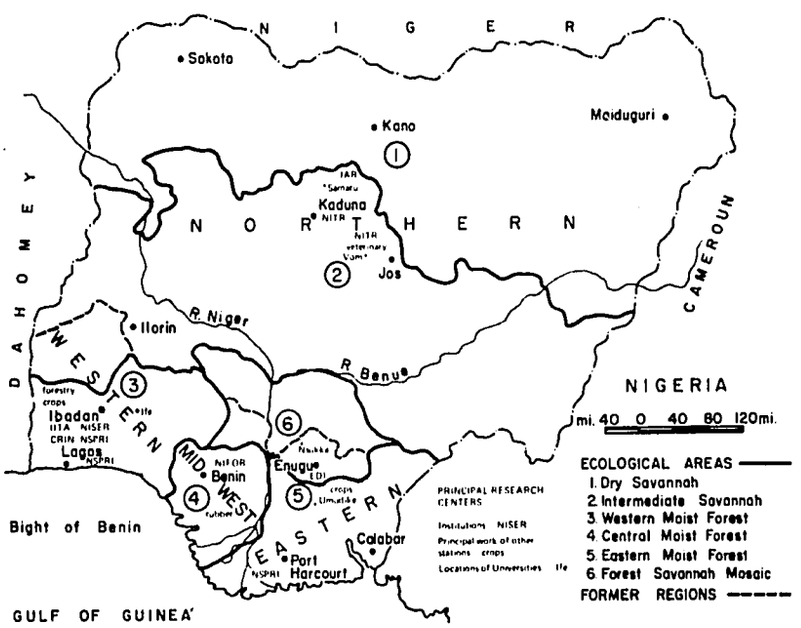


Figure III.2. – Principal Research Centers Related to Ecological Areas

CHAPTER IV

CSNRD's Approach to the Problems Facing Nigerian Agriculture

IN THIS CHAPTER we first outline some of the important problems facing Nigerian agriculture as a basis for stating the cr ial agricultural policy issues before the country. We then outline CSNRD's approach to these problems and issues.

The Problems

One group of problems concerns the reconstruction and development period including, but not restricted to, the re-establishment of internal trading patterns, expansion of food production in areas affected by the crisis, provision of employment for soldiers and establishing sources of revenue for each of 12 new states within the context of one market and one Nigeria.

Another group of problems involves the question of appropriate roles for federal, state and local governments in the following areas:

Directly productive investment in agriculture, i.e., government plantations, state farms, government processing plants, etc.
Developing and distributing improved factors of production
Agricultural research
Agricultural extension
Agricultural education
Regulating interstate trade
Credit
Marketing
Reconstruction

Still more problems are suggested in the following list of questions:

1. How can the 12 new states be encouraged to plan for one Nigerian market rather than be concerned about making each state self-sufficient in cotton, yams, guinea corn, etc. which will lead to unwise economic fragmentation? In this area, what is the appropriate role for the Federal Ministry of Agriculture and Natural Resources?

2. What is the appropriate role for private investment in the production and marketing of agricultural products and factors of production? How can producer incentives be improved? What modifications should be made in the taxing and pricing of export products and of factors of production to more fully utilize the productive capacity of Nigeria's large resources of land and agricultural labor? How can Nigeria's export agriculture maintain a strong competitive position in world markets?

3. How can the internal cost of feed and food crops be lowered to permit improved diets, exports and livestock feeding?

4. How can effective demand be generated for the masses to enable them to pay producers the cost of providing a more adequate diet?

5. How can discovery and adoption of improved agricultural technology be generated on a systematic basis over the 1970-85 period?

6. How can employment in agriculture be expanded, underemployment reduced and the earning power of agriculture be increased?

7. How can land values be built up to serve as a credit base for agriculture?

8. How can the earning power of agricultural capital be increased? How can emphasis be placed on the use of Nigerian-generated agricultural capital in order to conserve foreign exchange by minimizing offshore financing?

9. How can Nigeria's rural manpower and her educational and training institutions for agriculture be organized to take advantage of Nigeria's agricultural opportunities?

10. What public and private services are needed to support agricultural development, i.e., credit, produce inspection, etc.?

Nigeria's People Have Great Capacity

HOW DO WE:

-- create enough farm employment for them until Nigeria gets her industry developed?

-- make rural life attractive enough to keep them in the villages until industrial employment opportunities are expanded?

-- give them control of enough other assets to increase their real income?

-- increase the real prices and wages they receive?

Published with permission of The Rockefeller Foundation

11. What should be Nigerian policy with respect to population control?

In a sense, the above list of problems is only illustrative of the myriad problems to be faced by those persons responsible for forging Nigeria's agricultural policies and programs in the years ahead. In order to help focus thinking, these and other problems have been examined to determine the crucial policy issues to be settled by Nigerian agricultural policymakers before program planners can get on with planning.

Crucial Policy Issues

In this section each of several policy issues will be presented and positions will be taken with respect to them. Support for CSNRD positions will be presented later in this report following methods outlined in the following section. In any event, it is a CSNRD conviction that true policy issues are never settled by an outside research agency such as CSNRD; instead we view it as our task to mobilize data and arguments so that we may supplement, interact with and assist the policymakers and program planners of Nigeria as they settle policy issues and plan programs.

Federal ministry

One of the first policy issues to be settled grows out of FAO recommendations to establish a Federal Ministry of Agriculture and Natural Resources. While such a ministry has been established, its development is still embryonic. It seems obvious that such a ministry must be rather fully developed if the Nigerian federal government is to help handle the broad range of problems listed above. In a subsequent section we present programmatic suggestions concerning roles, functions and organization of that ministry with respect to economic planning, marketing board operations, agricultural credit, agricultural research, both university and subuniversity level education in agriculture and possible production campaigns.

Private and public effort

A crucial issue for all countries, including Nigeria, is involved in finding an appropriate combination of private and public effort in developing their agriculture. This is not an "either/or" question. All countries use a combination. Those which are successful find combinations which fit the capabilities of both their public and private sectors. Overburdened, limited numbers of civil servants have never been successful in handling the detailed operations of millions of small farmers or, for that matter, of a few large state-operated farms.

On the other hand, no country (regardless of how competent and well educated its farmers) has gotten along without publicly supported agricultural research and education, some regulation of product markets to at least insure the delivery of safe, wholesome products and at least enough regulation of factor markets to provide for enforcement of contracts and other obligations. Still further, many quite democratic countries operate price support, subsidy and market order programs to attain policy objectives.

Thus, CSNRD will endorse and urge policy decisions and programs which involve both the private and public sector in view of the situation faced by Nigeria and prospective capabilities of her resources. Nigerian history, present practice and the capabilities of her resources all dictate, as we see it, substantial reliance on a publicly assisted private agricultural sector.

Smallholders

Within the private sector, a crucial policy issue involves emphasis on smallholders versus large scale public operations. Related to this issue is the question of farm settlements versus state-owned plantations.

The major part of Nigeria's agricultural production is in the hands of smallholders who make their own production and marketing decisions. Some consider this to be a disadvantage since they feel that illiterate farmers are slow to adopt modern ways and that, as a result, agricultural progress lags. Opponents of the smallholder system assert that plantations afford the best opportunity for modernizing agriculture because all modern techniques can be brought together and operated on a scale that will give optimum results, labor can be put under supervision, quality standards can be maintained and new sources of capital mobilized. However, one must consider several factors when attempting to evaluate the respective advantages of smallholder and large-scale farms.

First, all groundnut, cotton and food crop production, practically all cocoa production, 98 percent of oil palm and 80 percent of rubber production are in the hands of smallholders. Although most of these are illiterate, they have demonstrated their capacity to make major changes in production and marketing. For example, smallholders in the East planted about 50,000 acres of oil palm under the rehabilitation scheme over a 5-year period, exceeding the target by 6,000 acres. In the Western State, the sprays for capsid and swollen shoot control were rapidly adopted once their benefits were apparent. The introduction of a fertilizer subsidy in northern Nigeria in 1961 resulted in an increase in the use of fertilizer from around 2,000 tons to almost 35,000 tons in 1967.

Second, one needs to consider the value of a system in which a large portion of the labor force makes its own production decisions and adjusts to changing conditions in contrast to one where most of the laborers are wage earners working under a centralized management.

A review of studies[1] of smallholder production indicates clearly that smallholder production in tree crops gives very satisfactory returns, whereas another study[2] indicates that most plantations in Nigeria give marginal returns under the conditions that exist. A significant aspect of the return on investments to smallholders is their low investment in social overhead in contrast to the very sizeable investments required by plantations. Capital investments in housing, hospitals, schools and recreation facilities all add to the cost of operating plantations. Also, smallholders have considerably more flexibility in the use and payment of labor, most of which is family labor.

Plantations, on the other hand, must often pay higher than local wage rates in order to attract workers and have less flexibility in reducing the work force because of seasonal variations in production. Even though wage rates on plantations are higher than those prevailing in the area and social amenities are provided, Saylor found that labor turnover on plantations often exceeded 100 percent per year.[3] Wells reported that for oil palm, plantation revenue must exceed smallholder revenue by 50 percent in order to justify the higher costs of the plantation form of organization.[4] This would mean a yield difference of about 1 to 1.2 tons of fresh fruit bunches per acre. Wells estimated the actual difference to be only 0.6 tons in the area of his study,[5] but he admitted that plantations might achieve such a margin, especially if smallholders do not modernize their practices.

For rubber, Wells found that smallholders had more favorable benefit cost ratios for development than plantations even with smallholder yields of 950 pounds per acre compared with plantation yields of 1,370 pounds.[6] Saylor[7] estimated that mature yields on three Nigerian rubber plantations might be around 1,100 pounds. FAO has estimated present rubber yields in Nigeria to be around 200 to 300 pounds per acre, but estimates a potential smallholder yield of 1,000 pounds, assuming an intensive program of education and development assistance.[8]

Prices and taxes

There is a complex set of policy issues in Nigeria involving prices and taxes on Nigeria's strong export crops, mainly cocoa, oil palm produce and groundnuts. Nigerian policies and programs in this area have been severely criticized by many groups preceding CSNRD and from both within and outside of Nigeria. We concur with many of the critics and will present projections and reasons for believing that Nigeria would obtain much more from her human, natural and man-created agricultural resources if she changed to a policy which would tip the terms of exchange much more in favor of her private agricultural producers. Within agriculture, important questions involve the way in which agriculture is taxed.

Marketing boards

Our earlier discussion of the markets for land, farm labor and agricultural capital have revealed the crucial roles of export taxes and marketing board revenues as they determine the profitability of investing in the production of export crops. Thus, crucial policy decisions involve the roles which the marketing boards should play.

Nigerian cash crop surpluses in the past 20 years have been captured by the marketing boards and largely transferred to government for infrastructure expansion. A little has been transferred back to agriculture via subsidized inputs (fertilizer, cocoa sprayers), support of agricultural research and university instruction.

Although the marketing boards can be criticized for repressive pricing policies in recent years, on balance the marketing board was a useful institutional innovation in the 1940's in an agriculturally dominated economy where: (1) inflationary pressures generated by the shortage of consumer goods during and immediately following World War II had to be checked; (2) the export trade was controlled by a few large foreign firms who could easily exert monopolistic influences on the economy; (3) foreign firms had been unable to establish plantations which could have been easily taxed; and (4) administrative facility was lacking to inaugurate a land tax, income tax, etc.

For the above reasons, marketing boards have been used since 1948 to perform a fiscal role in taxing farmers by paying them less than the world price and channeling some of the "surpluses" to the nonagricultural sector. In brief, the marketing boards carried out a repressive tax policy for agriculture and until petroleum revenues became significant in 1965, economists were unable to advance an alternative instrument to reduce marketing board taxes on farmers.

Marketing boards can be strongly criticized for setting prices so low that producers have not harvested all of their palm crop and investments have been shifted to other crops and other countries. Also, marketing board surpluses have been used to sponsor many dubious projects as spelled out in the Coker

[1] Laurent, C.K., *Investment in Nigerian Tree Crops: Smallholder Production*, CSNRD 18, October 1968.

[2] Saylor, R.G., *A Study of Investment in Oil Palm and Rubber Plantations*, CSNRD 15, August 1968.

[3] *Ibid.*

[4] Wells, J.C. Government Investment in Nigerian Agriculture. Some Unsettled Issues. *Nigerian Jour. Soc. and Econ. Studies* Vol. III. March 1966.

[5] *Ibid.*

[6] *Ibid.*

[7] Saylor, *op. cit.*

[8] Food and Agriculture Organization of the United Nations, *Agricultural Development in Nigeria*, 1965-1980 (Rome, 1966) p. 83f.

Commission Reports[9] and in the Northern Region's 1967 White Papers on the Northern Nigerian Marketing Boards and Development Corporation.[10]

The important point is that there is now an urgent need to re-examine the broad spectrum of producer incentives in order to achieve more rapid agricultural development in the 1970's.

Some considerations are:

1. An early objective of marketing boards, which was unfortunately abandoned, was to announce producer prices one to three years in advance. Even for annual crops, most prices now are announced only a matter of weeks, if not days, in advance of the actual marketing seasons. Advanced pricing should be resumed. For annual crops, prices should be announced before planting time and at least for cocoa, among the tree crops, one to three years ahead coupled with sufficient reserves to minimize otherwise quite violent price fluctuations which interfere with planting and grove maintenance and therefore depress subsequent output.
2. Since Independence in 1960, the boards have given somewhat more recognition to the role of price in influencing production, although political considerations also helped focus on the producer price. However, as recommended below, marketing board surpluses as well as other forms of direct taxation on produce must be reduced if the optimum rate of agricultural growth is to be achieved.
3. The marketing boards and the NPMC, as now constituted, are not sufficiently farmer-oriented. This particularly is the case with NPMC. There is no motivation for the agency as it is presently constituted to exert effort to obtain adequate prices for farmers. If an inadequate price is obtained, NPMC merely passes less money to the marketing board which, in turn, passes less to farmers. Likewise neither the boards nor NPMC have any particular motivation to achieve economy in rendering services to farmers. A system for establishing a higher degree of accountability for prices paid by licensed buying agents should be established to insure that farmers' produce is properly and accurately graded and that farmers are paid the full gazetted price by grade.
4. The marketing board is one agency, along with produce inspection services, extension services, credit agencies, licensed buying agents, cooperatives, etc., which provides services to farmers. These agencies operate quite independently and there is a noticeable lack of coordination in performing the total marketing functions. There is a particularly compelling need to integrate credit functions closely with marketing so as to have an effective procedure for granting credit and collecting loans.
5. The whole fee-setting procedure of the licensed buying agents should be re-evaluated now that indigenous individuals and firms have largely replaced former expatriate firms, and their basis and capacity for doing business is somewhat different. A system of selecting three or more tenderers for purchasing and transporting produce from given areas might be considered to allow competition to assist in determining optimum rates. Also, the agents should be authorized and enabled to pay farmers by check which the marketing board or banks would then stand ready to cash at frequent intervals at reasonably nearby points.
6. The marketing boards could do more in the way of publishing their paying prices. Recent investigations by CSNRD workers and others show very few groundnut or cotton farmers know the gazetted price for their area. These should be publicized not only in terms of value per ton but also in terms of a locally used unit of measure or preferably a volume measure provided by the board with the requirement that the amount of produce it contains be painted on its exterior.
7. The recent division of the country into additional jurisdictions and some indication of possible further splintering of the marketing boards suggests it is timely to review the boards and the NPMC with a view to possible consolidation and combination of functions. Overhead costs and operational efficiency probably would be enhanced and scarce talent utilized more efficiently by reverting to nation-wide commodity boards, or possibly, a single marketing board for the entire marketing function, including overseas sales.
8. That aspect of the marketing board-NPMC institutional capability that centers on product and price control has been developed on the product-buying side to a much greater degree than on the selling side. Much more could be done to improve both buying and selling practices. For example, commodity forecasting could be established as an important part of marketing board work. Good forecasts could vastly improve the ability of the marketing boards to comply with the stated objective of announcing producer prices well in advance of harvest. The same "outlook" information could improve Nigeria's negotiating strength in world

[9] See Chapter Three, p. 46ff

[10] See Chapter Three p. 47ff

markets. The conduct of sales activity in external markets by Nigeria needs to be examined to assure that a broad assortment of selling and risk-reducing techniques are available for use. Examples are forward contracting, broader uses of grades and frequent reviews of demand and supply estimates.

9. The new Federal Ministry of Agriculture and Natural Resources should have a substantial institutional control over the operation of the marketing boards and the NPMC. Presently, these agencies are controlled primarily by groups interested in financing government and in investing in nonagricultural projects. The Federal Ministry of Agriculture and Natural Resources should be developed to a point which will permit it to represent effectively the interests of Nigerian agriculture. This will require both technical competence in agriculture and contact with producers via the extension, research, teaching and service functions of the federal, state and university organizations serving agriculture.

Ownership patterns

Nigeria has crucial policy decisions to make with respect to the distribution of resource ownership and, hence, income among her people. These decisions are closely related to decisions concerning pricing, taxation and marketing boards. Obviously, prices affect the distribution of income. As prices also affect the earnings of resources, prices affect the value of the resources owned or controlled by different groups within the Nigerian economy. The distribution of income and of resource ownership has important secondary consequences for Nigerian rural development. These include:

1. The increase in effective demand for domestically used farm products which accompanies wider, more even distribution of income in the population.
2. The greater ease in financing private production which accompanies wide distribution of the ownership of reliable productive resources, including the labor of individuals.
3. The salutary effect on motivations and hopes resulting from receipt of more income by broad segments of the rural population for whom the urban economy of Nigeria is not going to be able to provide employment.
4. Increasing the demand of farm peoples for the products of Nigeria's expanding indigenous industry.

Financing development

Nigeria has crucial policy decisions to make concerning the financing of development which (1) involve far more than agriculture but which (2) will influence her ability to provide more favorable terms of exchange to her farmers (see 3 immediately above). These decisions involve the relative emphasis to be placed on petroleum revenues versus revenues from agriculture.

Nigeria's growth in government revenue has followed the classical pattern of an open economy where foreign trade provides a major share of the foreign exchange earnings and of tax revenue (from exports and imports). Since export agriculture has been the mainspring of growth of the Nigerian economy from 1900-1965, a variety of taxes on agricultural exports—marketing board taxes, producer sales taxes and export duties—have been major sources of government revenue. However, export taxes have remained relatively constant and declined as a proportion of export value over the past 14 years as shown in Figure IV.1, while import taxes have grown rapidly since the 50's (p. 58).

Nigeria has increased its taxes from approximately 5 to 14 percent of GDP from 1950-66.[11] This is a remarkable achievement. Any evaluation of Nigeria's economic planning must take this important point into consideration—namely, the planning process has been greatly facilitated by the expansion of government revenue relative to GDP.

In historical perspective, the increase in government revenue as a percent of GDP was partially accomplished by turning the domestic terms of trade against the agricultural sector through marketing board surpluses, producer sales taxes and export duties. However, as W. A. Lewis and CSNRD analysis indicate, taxation of agriculture by marketing board and export duties threatens to kill the goose that lays the golden egg as indicated by the stagnant palm oil exports over the past 20 years, large rural to urban migration, and the low effective demand or purchasing power of millions of Nigerian farmers for the products of Nigeria's budding industry. Moreover, the almost certain increase in population growth rates will simply add to the underemployment and unemployment problems in the 1970's. As Harbison's studies[12] have shown, the rate of employment expansion in the industrial-urban centers cannot possibly absorb the newcomers to the labor force. For these reasons a rural transformation is required on a massive scale. It is the judgment of CSNRD researchers that a massive rural transformation cannot be achieved unless the domestic

[11] Lewis, W.A. *Reflections on Nigeria's Economic Growth*. OECD, Paris, 1967.

[12] Harbison, F., From Ashby to Reconstruction: Manpower and Education in Nigeria, in "Growth and Development of the Nigerian Economy," Eicher, C. and Liedholm, C., eds., Michigan State University Press, East Lansing, 1969.

terms of trade are made more favorable to agriculture in the 1970's. Improved terms of trade for agriculture mean, in short, that the price incentives for agricultural development should be improved.

Fortunately the dramatic rise in petroleum exports from 1963-66 and the projected spectacular jump in Nigerian petroleum exports in the early 1970's provide policy makers with the leverage to turn the domestic terms of trade in favor of agriculture by shifting part of the collective tax burden from export agriculture to petroleum.

From 1963 to 1967, Nigerian government revenues from petroleum expanded from £5 to 27 million per year. Pearson's careful analysis of Nigeria's petroleum industry indicates that government revenue from petroleum could increase to £200 million by 1973 and thus represent up to 50 percent of total government revenues by 1973 without any change in the present rate of taxation or profit-sharing (Table IV.1). Moreover, petroleum exports are projected to remain at a high level throughout the 1970's. The implications of the petroleum boom are of major significance for agricultural policy. Government revenue from petroleum can remove the foreign exchange constraint and enable Nigeria to pursue a positive set of agricultural policies in the 1970's.

Strengthening producer incentives by shifting from a restrictive tax policy on agriculture to a set of positive policies for agricultural expansion is central to the implementation of improved policies and programs for Nigerian rural development. Nigeria will achieve rapid growth rates via petroleum in the 1970's as Venezuela, Libya, etc., have done in recent years. However, the petroleum industry in Venezuela employs only about one percent of the labor force and unemployment in Venezuela is running at 12 to 15 percent.

Table IV.1 The Impact of Petroleum Revenues on Total Government Revenues, for Nigeria, 1963-73

Item and Year	Revenues			Petroleum revenues as percentages of total revenues
	Petroleum	Nonpetroleum	Total	
	£ Million			*Percent*
Historical				
1963	5	142	147	3
64	12	161	173	7
65	13	177	190	7
66	19	180	190	9
67	27	136	163	17
Low Projection				
68	14	140	154	9
69	30	150	180	17
70	45	165	210	21
71	65	180	245	27
72	90	190	280	32
73	120	200	320	38
High Projection				
68	14	140	154	9
69	40	150	190	21
70	100	165	265	38
71	145	180	325	45
72	170	190	360	47
73	200	200	400	50

Sources: Pearson, Scott, Nigerian Petroleum. Implications for Medium-term planning, in "*Growth and Development of the Nigerian Economy*," Eicher, C. and Liedholm, C., eds. Michigan State University Press, 1969.

Venezuela's agricultural policy supports a haphazard group of programs which is unofficially called "sowing" the oil money in rural areas to keep down peasant unrest. Likewise, Libya, a country with 2.5 million people which started exporting petroleum in 1961, has not achieved the development of her people through production investment or increased employment. Though Nigeria will probably achieve rapid rates of economic growth in GNP via petroleum in the 1970's, the real challenge is to use petroleum revenue to induce structural change in the economy and assist the masses, mainly rural, in improving their social and economic life.

In short, the primary challenge for planners in the 1970's will not be the usual problems of balance of payments and import substitution but one of redistributing petroleum revenue into productive investments to generate income and employment for the masses. The goal of growth and development is possible in Nigeria if petroleum revenues are wisely invested rather than being dissipated on recurrent expenditures, or sown hapazardly as in Venezuela.

The exploitation of natural resources such as petroleum characteristically grows rapidly and then levels off. It is realistic to assume that the petroleum boom will continue throughout the 1970's which will be sufficient time to move a considerable distance in developing a new approach to agricultural taxation by the early 1980's.

Land taxes are an obvious fiscal improvement which should be kept uppermost in the minds of planners, as land taxes do not carry the inequities or disincentives which are implicit in export taxes or sales taxes on productive inputs. However, before land taxes can be developed in the early 1980's, numerous other methods can be used to tax agriculture in the 1970's. For example, if the commodity campaigns as outlined later in this report are carried out in the 1970's the greatly expanded producer incomes could be taxed by a variety of ways such as excise taxes on consumer goods purchased by farmers, personal income taxes and other taxes which do not carry the inequities and disincentives which are implicit in taxes on product prices.

In summary, petroleum is the key variable in discussions of Nigerian public finance and of agricultural development in the 1970's. Although, there are numerous opportunities to improve the revenue system

by improving tax administration at all levels, petroleum has the immediate potential in the 1970's of (1) removing the foreign exchange constraint, (2) providing for an increasing share of government revenue relative to GDP and (3) enabling the domestic terms of trade to be turned in favor of agriculture by substituting taxes on petroleum for taxes on export crops.

A petroleum boom is a windfall gain which occurs only once in many generations. Therefore, Nigeria has an opportunity and a challenge to harness petroleum as an engine of growth for its economy and for the development of its people. Much of the discussion which follows in this report focuses on how agricultural development can contribute to the overall growth of the economy and the development of the masses who are now in agriculture. We have indicated that petroleum production *per se* will not scratch the surface in dealing with problems of unemployment, underemployment, rural to urban migration and inadequate effective demand of the masses, etc.

In a later section, we estimate the effect eliminating marketing board profits, export duties and product sales taxes will have on the financing of development programs and indicate the amounts of new revenues which will need to be obtained from less damaging taxes and petroleum revenues.

Credit

A policy decision needs to be made with respect to the role of federal and state institutions in a Nigerian agricultural credit program. Nigerian agriculture has been able to make a reasonable degree of progress with access to mainly traditional sources of borrowing. Our studies in oil palm and cocoa areas lead us to believe that traditional sources of finance could provide sufficient capital for a somewhat accelerated rate of expansion.[13] But, if agriculture is to expand to the extent we shall recommend, new credit institutions will need to be created to tap new sources of loanable funds and to make them available in producing areas on acceptable terms. Past unfavorable experience with Regional credit agencies suggests that a national institution would have more freedom from political pressure. A national institution also could use capital more efficiently, since peak lending seasons would vary among the states. There would also be economies in the training of staff with one central institution.

A related credit policy issue concerns the role to be played by cooperatives. These institutions have not been major lenders and have had such limited success that it does not appear major reliance should be placed on them. The Nigerian Tobacco Co. has had good success with the use of small farmers groups in connection with loans and distribution of farm supplies. Such quasi-cooperative groups might be considered for other lending programs. Success of the NTC loan program also suggests that consideration be given to means of enlisting the help of produce-buying agencies in the collection of agricultural loans.

Attention also should be given to making greater use of the private banks, either in making direct loans to farmers or in lending to public credit agencies, cooperatives or groups of farmers.

Because of the scarcity of trained manpower, limited availability of capital and lack of success with credit programs, we recommend that public credit activities be limited initially to productive loans in support of the commodity campaigns described later in this report.

Our specific recommendations for an agricultural credit program appear in Chapter Eight

Agricultural education

In agricultural education, Nigeria has important decisions to make and programs to establish. There is the question of whether there will be separate university-level agricultural faculties and ministerial training schools in each of the new states or whether some form of interstate cooperation will evolve. There is also the question of how extension (both educational and service) would relate to state ministries and any production campaigns to be molded by state and or federal authorities. In general, CSNRD sees advantages in ecological centers for agricultural education and research with substantial control of extension service (as contrasted to extension education) in the hands of state ministries of agriculture and natural resources. More detailed CSNRD recommendations will be found in Chapter Eight.

Agricultural research

In agricultural research, there are a number of crucial policy and program decisions to make. These involve the role of the federal research stations vis-a-vis the agricultural faculties and the federal and state ministries of agriculture and natural resources. The mobilization of support for research also involves decisions as to what resources should be used for what purposes.

The subject matter of agricultural research should be a balance between emphasis on export and cash crops versus subsistence crops. Timing is important. In both the short and long run, continued support is needed to maintain and improve the fairly advanced state of technology for Nigerian export crops. In the case of food and feed crops, major support must be sought first to obtain an advanced technology and, second, to maintain and further advance it, once an advanced technology is attained. Nigeria's stance vis-

[13] Purvis, M.J., *Report on a Survey of the Oil Palm Rehabilitation Scheme in Eastern Nigeria, 1967*, CSNRD 10, June 1968.

a-vis the new International Institute of Tropical Agricultural Research must also be considered. See Chapter Eight for our detailed recommendations.

CSNRD's Approach

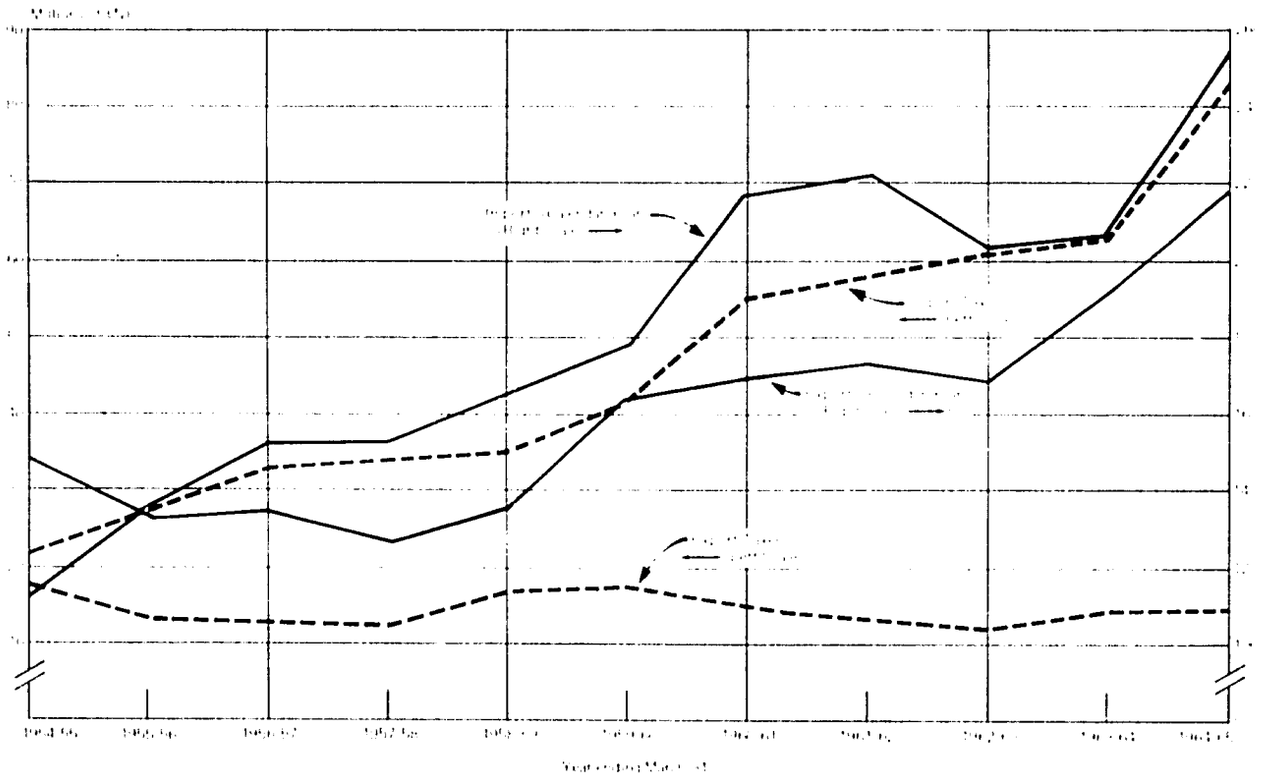
In order to provide information to the government of Nigeria and to external agencies in resolving the foregoing problems and policy issues, CSNRD researchers have used the FAO report on Nigeria[14] as a point of departure and have undertaken numerous studies in Nigeria over the past three years. Eventually, the CSNRD team organized its research under the following subprojects:

1. The economics of university level agricultural education.
2. The economics of subuniversity level agricultural education.
3. The economics of public and private investment in agricultural production and marketing with special attention to the livestock human nutrition balance.
4. The economics of agricultural research.
5. The economics of agricultural credit.

The policy issues and the problems which were examined in the first part of this chapter are so numerous, complex and interrelated that separate analysis of each was beyond the resources of CSNRD. However, our discussions of the above problems and issues with Nigerians and others were simplified by a tendency to group possible approaches to Nigeria's agricultural problems into three broad strategies. Our knowledge and studies in Nigeria and studies of agricultural policy in other countries, i.e., Colombia, Thailand, Mexico, the Argentine, Taiwan, India, Pakistan, the United States, Norway and Ghana, to give an incomplete list, indicated that these broad strategies were alternatives open to and relevant in Nigeria. The availability of studies from other countries and our own studies of Nigeria provide considerable help and evidence to use in estimating and projecting the consequences of following each of the three strategies through time.

[14]Food and Agriculture Organization of the United Nations. *Agricultural Development in Nigeria 1965-1980.* Rome, 1965.

Figure IV.1. – Taxing Foreign Trade Imports and Exports with Tax Revenues Generated, 1954/55 - 1964/65 NIGERIA



Part Two
The Consequences of Three Alternative Agricultural Development Strategies—1969-1985

This part presents projections concerning consequences of following three strategy alternatives which Nigeria might consider in developing her agriculture. These alternatives were introduced in Chapter Four and are described in more detail in Chapter Five below. The purpose in making three sets of projections is to quantify the likely consequences of following each of the three alternative strategies so that the overall superiority of the second may be more clearly envisioned. The projections are then followed in Part Three by a presentation of the policies and priorities implied by the second strategy. Detailed program and project suggestions will appear in Chapters Seven and Eight. Neither the projections nor the program and project suggestions should be regarded as final or immutable—instead, they should be viewed as but one step in the never-ending interaction between investigators and researchers, on the one hand, and Nigerian and donor agency decision makers on the other, in the quest for an appropriate role for agriculture in Nigeria's development for the welfare and benefit of all her people.

CSNRD has made such projections and presents them in Chapter Five of this report. The three broad strategies considered for Nigerian agriculture are:

1. Continue present strategy for export agriculture while allowing food production and marketing to be guided by the market mechanism.
2. Moving from the present strategy to (a) higher producer prices and improved producer incentives and services for the production of export and selected import substitution crops and (b) vigorous research to find new technologies for the high-cost staple foods.
3. A harsher strategy than at present for private producers of export crops with a relatively large public agricultural sector involving the possible imposition of price ceilings, resource allocation controls and food rationing with the objectives of cheap foods for city dwellers and heavy extraction of government revenues from agriculture.

In the next chapter we present estimates and projections of the consequences of following each of the above three strategies at three points in time: 1970, 1975 and 1985. These projections and estimates have been used in CSNRD discussions with both Nigerian and non-Nigerian policy and decision makers, and are, in fact, consequences of those discussions. This is particularly true of the projections and estimates for the second strategy, many of whose detailed projects and programs were suggested by discussion of the estimated consequences through time of following earlier versions of the second strategy.

CHAPTER V

Three Alternative Strategies

WE HAVE EXAMINED the history and characteristics of Nigerian agriculture and the history of agricultural development in other countries. We have also appraised Nigerian current progress, problems and policy issues with respect to agricultural development. The perspective we have gained suggests that countries such as Nigeria tend to follow one of three general routes. These are defined as follows:

The First Strategy – Continuation of Present Policies

Tax export agriculture in order to finance the non-agricultural sector while (1) permitting food production and marketing to grow within the context of normal market forces and (2) giving some extension, research and subsidy assistance to agriculture.

The Second Strategy – The Present Strategy Modified to Encourage More Balanced Rural and Urban Development

Follow a set of policies and programs which provide incentives for agricultural producers while supporting them with infrastructure, research and modernizing services in the full recognition that a healthy, viable, productive agriculture is a valuable national asset which can be acquired only at a substantial cost even with wise policies. Such a dynamic strategy for agricultural growth would imply a forward step in the evolution of Nigeria's agricultural policies and programs. This strategy would have the following features:

1. Taxes and marketing board margins on export crops would be eliminated systematically (and with deliberate haste) allowing prices to farmers to rise from recent levels to world price levels, even after allowance is made for the price effects of expanded outputs and marketing costs. Eventually, some of the loss in public revenue would be recouped by taxes on agricultural property and by local, income and excise taxes but these would not be levied in ways that would stifle investment and initiative. The first main thrust for agricultural growth and development would come from "venting the surplus" output generated by correcting maladjustments now caused by inappropriate pricing and taxation policies and programs.
2. The agricultural marketing system would be improved through better market information to producers, better surveillance of licensed buying agents and strengthening of selling cooperatives or farmers groups. For some commodities, marketing improvements would be worked out through arrangements with private agri-business firms, including contract pricing and forward buying.
3. Credit would be provided to farmers through a nationally supported and supervised credit system. However, that system should not be expanded more rapidly than its components can be perfected and staff recruited and trained.
4. The extension program would expand moderately and would be significantly reoriented. Much of the increased outlays would go for logistic support of existing staff. In the early years, there would be little increase in staff. There would be increased emphasis upon university/ministry coordination, program-building, staff training, specific production orientation, and the development of farmer leadership.
5. The service orientation of universities would be increased through reorganization of curricula, increased opportunities for work-experiences by students and junior faculty, applied short courses and continuing education activities, and increased involvement and coordination in

research and extension. Three university centers for agriculture would be supported: (1) in the Ibadan/Ife area, (2) Samaru-Vom and (3) in the Nsukka/Enugu/Umudike area.

6. Total support to agricultural research would be increased to the limit set by available competent manpower. Considerable research effort would be concentrated on adaptive research with high short-run payoffs, but heavy support would be given to strengthening longer-run, relevant, fundamental research at the universities and institutes. The role of the universities in research would be identified and supported. Nigerian institutions and donor countries would coordinate their activities with the International Institute of Tropical Agriculture with emphasis on yield-increasing, cost-reducing improvements in food and feed crops and livestock production. Adequate economic research would be supported to permit evaluation and interpretation of the results of natural science research. Heavy, long-run dependence would be placed on biological research to substantially reduce the cost of food and feed grains as the basis for a second thrust in agricultural growth and development. This second thrust is projected to be possible in about 10 years but is not reflected in the projections to be presented here.
7. Public programs of general education would be critically reviewed to see where economies on expenditures for less productive forms of education are possible and to make major revisions in the objectives and course of study in elementary and secondary schools so that they might contribute to agricultural development.
8. Land settlement activities would be re-evaluated; operating costs, overcentralized services, and unrealistic training would be pruned, and new settlement schemes along the lines of the "school-leavers farms" might be inaugurated.
9. There would be no further public investment in plantations.

The Third Strategy — A Policy of Taxing and Pricing Agricultural Products Adversely in the Hope of Getting Nonfarm Development

This strategy is followed by many countries and is often purported to be the enlightened result of careful planning; however, it represents essentially a considerably more negative strategy for agriculture than Nigeria presently follows. Typically, it provides for heavy, direct public investment in such projects as resettlement schemes, uncoordinated research, extension and training centers, service organizations with large staffs of civil servants to serve agriculture, and publicly managed marketing facilities.

Part of the motive for these expenditures is the desire to provide abundant and cheap food for the urban-industrial consumers. This concern for cheap food prompts policies and programs which maintain low prices for the products farmers sell relative to prices of the products they buy. This is done in various ways, i.e., with export taxes, marketing board surpluses, price ceilings and rationing, governmental buying and processing monopolies, import duties on agricultural inputs, high governmental profits and/or revenue-raising governmental schemes for the production and distribution of fertilizer, seed, planting material, fuel, equipment and machine services.

These techniques are also designed to provide large governmental revenues from agriculture to be used by planners more concerned with industrial and governmental expansion and cheap food than with rural development. As adverse prices prompt young school leavers and others to migrate to the city, additional pressure arises for expenditures to create nonfarm jobs. The rates of off-farm migration from a primarily agrarian economy become such as to defy the ability of planners to collect enough money from the agrarian sector to create enough urban employment, particularly as extraction of money from the rural economy serves to speed up off-farm migration. Nor is this the end of the matter, for taxation of the numerically dominant, agrarian segment dries up the potential market for the products of those seeking urban employment. The consequence tends to be retardation of development in both sectors. Instead of increasing rural employment and output to support reasonable rates of urban growth, such countries exploit agriculture and leave a high proportion of their rural people poor, while unemployed, politically unstable and underfed urban masses accumulate in the cities.

Projected Consequences of Following The Three Alternative Strategies

For simplicity, we have concerned ourselves with only these three strategies. Obviously an infinite variety of policy choices are open to Nigeria. The second strategy is not considered to be unique; adaptations can and should undoubtedly be made in it and new features can and should be added. Knowledge of the economic and social effectiveness of new governmental institutions and new technologies is too imperfect to permit writing an immutable prescription for growth.

We hope that this report is but the start of a continuous dialogue among researchers, policy-makers and planners concerning Nigerian agricultural policies and programs. We hope further that this dialogue will become increasingly Nigerian, involving NISER, a reconstituted EDI at the University of Nigeria, RERU

at Ahmadu Bello University and departments or sections of agricultural economics at all four of Nigeria's agricultural faculties and at IITA.

We will recommend the second strategy and its implied policies and programs on the basis of careful appraisal of the future consequences of following a variety of government programs, of the dynamics of various kinds of existing farm producing units, of the potentials of known and emerging technologies and of the complementarities among development approaches. Additional supporting data, information and analysis are reported in other CSNRD studies.

We have attempted to project the consequences of following each of the above three strategies for Nigeria in quantitative terms at three points in the future—1970, 1975 and 1985. Such projections are crucial in planning the proper future course for Nigerian agricultural development.

It should be stressed that projections of this type cannot be highly objective statistical forecasts to which probabilities of different-sized errors can be attached. Nigerian data are not that good (nor for that matter, are those of the developed countries). More importantly, historical data on traditional agricultural economies are not very relevant for projecting how those economies would perform if modernized. The problem is not unlike that of the architects who designed the Independence Building in Lagos. They could not rely on historical data on the strength and performance of mud walls and thatched roofs accumulated from a study of bush hut builders; instead, the architects had to use knowledge of modern technology and modern experience along with a great deal of creativity and originality to create and design that particular building for its particular use. Only then could they visualize and project the consequences of different modern designs for the future.

For these reasons we have drawn heavily on the experience of developed countries as well as on the experience of other less-developed countries in modernizing their agriculture such as Mexico, Pakistan, the Philippines and others which have attempted to be both original and creative in envisioning designs for the future.

The technique used by CSNRD researchers (both expatriate and Nigerian) to make these projections was to start out with (1) available data on the present Nigerian agricultural economy, (2) information on the performance of other agricultural economies, (3) information on research, plant and animal breeding and on the performance of agricultural education systems, credit organizations and resettlement schemes and (4) the judgment of informed economists and agriculturalists, both Nigerian and expatriate. Simplistic computations based on elasticities were rejected for reasons given in the last section of Chapter Two.

Our studies and many other sources of information were used in working out the detailed implications of the three alternative strategies and in producing a very tentative set of projections for each commodity or commodity group. From the commodity and commodity group projections, secondary national account projections were examined by a national accounts expert for logical consistency and modified by taking into account some of the interactions between the farm and nonfarm sectors. Meanwhile CSNRD investment and infrastructure studies went forward; more information became available on each commodity problem and on the operation of the major educational, research and government service agencies dealing with Nigerian agriculture. Subsequently the three strategies were revised and the basic projections were changed and run through the national income analysis again and again. Though the results presented below should be subjected to still further refinement as a result of further research and as a result of the suggestions, comments and criticisms which will be generated in Nigeria by the present report, we feel that they do represent the quantified judgments of competent analysts as to the likely results of implementing or failing to implement two rather substantially different alternatives to the way Nigeria now manages her agricultural sector.

The CSNRD projections for three alternative strategies are presented for 1970, 1975 and 1985 in Table V.1. The three alternative sets of policies are labeled, simply, I, II, and III. To repeat:

I refers to a continuation of present policies for agricultural development.

II refers to a modification of the present Nigerian strategy and leads to rapid increases in agricultural output by improving producer incentives through better price and tax policies and more effective provision of extension, credit and new technology for farmers as a first thrust and through biological research as the second thrust for agricultural growth and development. This set of policies and programs represents a direction or target toward which we think Nigerian agriculture should be directed.

III stands for the set of repressive policies previously described.

CSNRD favors a modification of the present strategy to encourage a more balanced pattern of rural and nonrural development. By 1985 we estimate that Strategy II will generate a GDP which is £515 million per year greater than for Strategy III and £420 million greater than for Strategy I as shown in Table V.1. This should not surprise anyone, for the second strategy was designed to be superior to the first and would have been dropped had it not been superior to III. However, the magnitudes of the differences are important and the superiority of I over III

Table V.1.--National Income Projections under three Alternative Strategies, Nigeria, 1970-1985[1]

	Item	1967	Strategy	1970	1975	1980	1985
I	GDP at market prices (£ millions)	1,731	I	2,145	2,882	3,696	4,734
			II	2,171	2,991	3,933	5,154
			III	2,138	2,835	3,620	4,639
II	GNP at market prices (£ millions)	1,697	I	1,995	2,627	3,395	4,423
			II	2,021	2,734	3,632	4,843
			III	1,988	2,580	3,319	4,328
III	Changes in GDP per capita at market prices (£) as compared with present policy—CSNRD I	27.8	II	.4	1.4	2.7	4.2
			III	–.1	–.6	–.9	–.9
IV	Consumption (£ millions)	1,580	I	1,939	2,514	3,153	4,038
			II	1,945	2,494	3,355	4,396
			III	1,941	2,494	3,104	3,957
V	Value added in agriculture and livestock (£ millions)	899	I	988	1,138	1,348	1,604
			II	1,009	1,207	1,492	1,846
			III	981	1,108	1,305	1,550
	Domestic consumption (£ millions)	791	I	862	1,001	1,200	1,446
			II	867	1,033	1,267	1,563
			III	862	987	1,177	1,418
	Raw materials (£ millions)	10	I	12	15	19	24
			II	12	16	21	29
			III	11	14	17	20
	Agricultural exports (£ millions)	98	I	114	122	129	134
			II	130	158	204	254
			III	108	107	111	112
VI	Value of agricultural exports (£ millions)	135	I	122	123	128	128
			II	140	163	213	277
			III	116	105	100	97

[1]These projections are somewhat higher than those developed by John Cownie in CSNRD paper No. 14, *Nigerian National Income Accounts: Historical Summary and Projections to 1985*, August 1968, as Cownie used a lower estimated population base.

Table V.2.—Projected Export Earnings, Farmers Incomes, Government Revenues, and Government Expenditure from Export Crops, under three Alternative Strategies, Nigeria, 1970-1985

Item	1970			1975			1985		
	Strategy			Strategy			Strategy		
	I	II	III	I	II	III	I	II	III
					£ millions				
Export earnings from agriculture	122	140	116	123	163	105	128	277	97
Projected government revenues from marketing board surpluses, producer purchase tax and export duties from export crops.[1]	24	17	26	24	—	23	23	—	19
Projected government expenditures for agriculture	27	23	26	33	25	32	42	27	40
Excess of expenditures over revenues listed in second entry above	3	6	0	9	25	9	19	27	21
Farmers' income from exports	66	83	59	66	117	54	68	192	50
Farmers' income from domestic use of export crops[2]	24	30	23	32	41	30	43	62	43
Farmers' total income from export crops	90	113	82	98	158	84	111	254	93
Projected export earnings from petroleum	---	275	---	---	500	---	---	550	---
Projected revenue from petroleum	---	100	---	---	220	---	---	240	---

[1]Government revenues are calculated for cocoa, groundnut products, palm products, and cotton only.

[2]Included here to show the effects of Marketing Board policies on the amounts of "export" crops marketed domestically. This includes oil palm, cotton and groundnuts only.

Source: Scott R. Pearson, "Working Paper on the Historical and Possible Future Economic Impact of the Petroleum Industry on the Nigerian Economy," AID economic consultant, March 1968 (mimeo.) for petroleum estimates, and John Cownie, *"Nigerian National Income Accounts: Historical Summary and Projections to 1985"*, CSNRD No. 14. for other data.

is particularly instructive.

On a per-capita basis, projected per-capita GDP in 1985 is estimated to be £4.2 higher annually for Strategy II than for a continuance of the present policy. By 1985, per-capita annual income for Strategy III would be expected to be £.9 below that for Strategy I. Agricultural exports are also substantially higher under the second alternative—£254 million as compared to £134 million under the present policies (Alternative I) and £112 million under the third alternative.

Under the second alternative, incomes would be widely and more equitably distributed than under the other alternatives, i.e., there would be more opportunities for both smallholder farmers and urban industrial and service employees to earn higher incomes. As a consequence, there would be greater effective demand for food as well as greater capacity to produce food, and both the quality and levels of nutrition would improve.

Partially offsetting the gains from adopting the second strategy, however, would be a loss of government revenues as the present produce purchase and export taxes, as well as marketing board trading profits on export crops would be reduced and eventually eliminated. By 1970, CSNRD projections indicate that annual government revenues from these taxes on export crop output would be £7 million less under the recommended second strategy than under a continuation of present policies (Table V.2). On the other hand, by 1970, the harsher taxation strategy would bring in £2 million more than present policies continued. After 1975, no revenue would be obtained from taxes on export crop output under our recommendations, amounting to £24 million less in government revenue by 1975 than under Strategy I. Production under the harsher taxation policy would begin to decline by 1975 so that revenues would then be £1 million less than under the first alternative. By 1985, our recommended strategy would yield £23 million less government revenue than the first alternative and the harsher taxation policies would yield £4 million less. These losses of government revenue under our recommendations would be offset by (1) increased reliance on petroleum revenues and (2) new and increased income, excise, land and local taxes on agriculture. (See Chapter Nine for a discussion of the crucial policy issue of financing development.)

Table V.2 spells out some of the results of carrying out second strategy policies over the 1970-1985 period with respect to farmers' incomes, government revenues from agriculture and government expenditures on agriculture. Strategy II produces more income, more employment and more foreign exchange than either of the other alternatives. Further, it does this with a lower level of governmental expenditure on agriculture. Still more details are found in Chapter Nine.

Part Three

Policies, Campaigns and Programs for Implementing Nigerian Rural Development

The three chapters in this part focus on methods for attaining the overall results projected under Strategy II. Chapter Six, the first in this part, concentrates on recommended policies. The next chapter deals with a set of campaigns and programs for promoting the production of a carefully selected list of products, mainly export crops. The last of the three chapters in this part has to do with programs to provide administrative, educational, research, financial and other support for both short- and long-run objectives.

CHAPTER VI

Three Major Policies for Implementing CSNRD'S Recommended Strategy

THE OVERALL STRATEGY which we recommend is twofold in nature. In the *short run*, we recommend that Nigeria: (1) concentrate on opportunities to expand agricultural export crop production and export earnings (these opportunities arise out of restrictive pricing and taxation programs and marketing board practices which can be corrected), (2) distribute the resultant increases in income widely over a large number of rural people to provide the means of financing the expansion in production, to generate additional effective domestic demand for both farm and nonfarm products and to obtain a substantial increase in welfare for masses of her rural people.

In the *long run*, Strategy II involves much greater support for biological research to develop economically superior varieties of plants and animals. Here the need is particularly urgent with respect to food and feed crops, particularly the high protein food sources. Success in obtaining new biological technology will open up new opportunities particularly in the savannahs of the middle belt and northern areas to produce staple food and feed crops to supply the greater quantities which will be taken by domestic and foreign outlets at the lower costs of production and prices resulting from the improved technology.

Strategy II can be expressed in terms of three major policies which we think Nigeria should adopt.

The first policy is that of providing her agricultural producers with favorable price relationships in order to provide *private* motivation to expand production to *socially* desirable levels.

The second policy is that of concentrating direct, short-run, public support to agricultural producers on the production of commodities having high payoffs. This should be done in a highly coordinated, systematic manner involving heavy reliance on local agencies and state ministries of agriculture and natural resources as well as reliance on a strengthened Federal Ministry of Agriculture and Natural Resources. This policy also involves encouraging and placing heavy reliance on private sources of inputs, financial agencies, and marketing services.

The third policy should be one of providing infrastructure support (including research, extension, and resident instruction) for both the short- and long-run strategies outlined above.

The remainder of this chapter is devoted to a discussion of each of these three policies.

More About the Three Major Policies to Implement the Second Strategy

Providing Nigerian farmers with better prices and incentives

It has become increasingly evident in the course of CSNRD studies that a major constraint on growth of agricultural output is the low level of effective aggregate demand for agricultural products at the farm level. An increase in effective demand at the farm level and, hence, more favorable prices for farmers, is imperative to provide incentives for Nigerian farmers.[1]

Prices now received by Nigerian farmers for export commodities are below world price levels because of marketing board revenues, export duties and certain inefficiencies and practices associated with the monopolistic (state-controlled) marketing system for export crops. In effect, a significant proportion of the foreign demand for Nigerian farm produce is rendered ineffective as far as farmers are concerned by taxation and marketing board programs.

Further, there is a lack of effective demand, as well as high costs of production, for domestically consumed

[1]This problem of effective demand is not the same as the one discussed by Wolfgang Stolper in "Planning Without Facts", Harvard University Press, Cambridge, Mass., 1966 pp. 197f. It is not an imbalance between supply and demand in an overall sense; instead it is an imbalance at the subsector level (see Chapter II, Section 3).

farm products. The evidence is overwhelming that Nigeria is not a long-run food-deficit country; basically most of the people most of the time have adequate diets at least in quantity if not in quality.[2] Desirable improvements in quality of diet (particularly protein) are effectively limited by low levels of income, lack of nutrition knowledge and the high cost of producing starch and protein. Attempts to expand greatly the production of food crops in Nigeria will not result in much long-run improvement of real, per-capita standards of living or income unless either (1) effective demand is increased for a large proportion of Nigeria's poor people or (2) the costs of producing food are substantially reduced. A rate of increase in food supplies much above the population growth rate would result in an overall reduction of food prices which would, in turn and in the absence of advances in biological technology, tend to cut back the increase in food output to about the population growth rate. By contrast, in food-deficit countries such as India, an increase in domestic food supplies does result in increased per-capita consumption and hence to large increases in per-capita real incomes.

The market for domestically consumed farm products, *at present low levels of effective demand*, is being satisfied and foreign demands for Nigerian farm products are not being fully permitted to reach Nigerian farmers. Thus, it is clear that the short-run key to more favorable prices and income for Nigerian farmers involves mainly the export products instead of domestically consumed products. We contend that selected traditional export crops offer the best hope for sustained growth of the Nigerian rural economy. Our analysis of the demand for domestically consumed farm products indicates that the immediate opportunity is not in the production of these crops. The demand prospects are more promising for most of Nigeria's export and some import substitution crops. Social returns, as contrasted to private returns, are high for cocoa, oil palm, cotton, groundnuts and, probably, rubber. Yet, most of the production decisions are in the hands of private producers. As a consequence, the pattern of production determined by private investors does not take full advantage of the social opportunities open to Nigeria. The differences between social and private rates of return are caused by taxes and marketing board "surpluses" (or state monopoly profits) and undesirable practices by licensed buying agents.

The answer is to close the gap between social and private returns by reducing and eliminating taxes and marketing board surpluses. Such equalization of private and social returns would make it privately profitable for individual farmers to do what is socially advantageous. This simple procedure has the further advantage of not burdening Nigeria's small corps of competent civil servants with the impossible task of trying to induce literally millions of smallholders to produce commodities which are now privately less profitable than alternative uses for their time and resources regardless of their high social payoffs.

CSNRD research by Victor Smith has used a large-scale electronic computer to assess the productivity of reorganizing along these lines. In general, the calculation[3] shows that it would pay off handsomely, in the next few years, to (1) expand export crop production in the southern states to the limits established by the life cycles of trees and other rigidities on the production side, (2) expand food and feed grain production in the northern states for sale in southern areas and (3) expand groundnut and cotton production in the northern states. The northern states, southern states and the country as a whole would all benefit substantially. These results were obtained independently of the projections reported in Chapter Five. In general, the computer agreed with our recommendations, and for the same reasons, as both estimate the consequences of freeing the Nigerian economy from the unwise taxing and pricing policies which cause producers to make decisions at variance with the social welfare of Nigeria.

CSNRD researchers believe that moving from taxing and pricing policies that deal harshly with agriculture to a positive set of *producer incentives* is a very important and necessary step. We recommend that some part of the massive projected government revenues from petroleum (see Chapter Nine) be channeled to replace revenues from the agricultural sector. Other major considerations are:

1. Export duties, producer purchase taxes and marketing board surpluses on farm products should be:
   a. reduced to raise producer prices of export crops,
   b. used to cover the cost of conducting production campaigns to expand production of export and carefully selected import substitution crops but not as a source of general government revenue,
   c. used to provide short-run subsidies for certain carefully selected agricultural inputs under specified conditions, i.e., to stimulate early adoption or until farm prices are adjusted upward to world levels,
   d. eliminated by 1975 and replaced with increased income, excise and local taxes on

[2] There are, of course, serious problems of protein intake, seasonal hunger and deprivation for certain geographical and age groups and in connection with the present civil war. But the problem is not so much one of increasing aggregate food supplies, but of improving nutritional knowledge, seasonal distribution through improved storage, transportation, etc. (See Chapter Two, Section three, on Food Production, Nutrition, etc.)

[3] Smith, Victor E., *Optimal Resoure Allocation for Income and Nutrition*, CSNRD working paper II, 1969.

farmers and petroleum revenues and with land taxes later in the 1970's and early 1980's, (taxes on income, the use of income and on property values based on income are all to be preferred to taxes which directly reduce prices and, hence, private incentives to do what is socially desirable).

2. We recommend a subpolicy of improving marketing institutions (marketing boards) to eliminate the inefficiencies and leakage which also reduce prices to producers of export crops.
3. Other subpolicies for strengthening and maintaining effective demand at the farm level include:
   a. improving the nutritional knowledge of Nigerians, particularly with respect to the nutritional value of protein, vitamins and minerals,
   b. exploiting opportunities to provide productive employment and ownership of resources to enable low-income Nigerians to increase their incomes. Such opportunities will arise in connection with demobilization of soldiers, public construction and war reconstruction projects, agricultural credit programs, revisions of price and tax programs, and in the production and distribution of such new inputs as planting materials, seeds and baby chicks,
   c. rejecting temptations to use food relief commodities from donor nations to reduce internal food prices after reconstruction emergency as this, too, would reduce effective demand at the command of Nigerian farmers. (See the section on Rural Development, Food, etc., Chapter Eight.)

Along with increasing effective demand for and incentives to produce export crops, subpolicies 1, 2, and 3 above will (1) increase the demand of farmers, themselves, for domestically consumed farm crops and (2) increase the demand of Nigerian farmers for Nigerian manufactured products to increase, in turn, the employment of, and income received by, Nigerian urbanites which will increase the demand of urbanites for farm products. All of these increases in demand for farm products will stimulate agricultural production by giving farmers more favorable price relationships. (See the last section of Chapter Two for a discussion of responses to prices.)

Concentrating direct, short-run public support to farmers on the production of high-payoff commodities

While private Nigerian farmers will respond to higher prices within the limits of their technical knowledge and resources, their responses can be furthered with production campaigns conducted by government and designed to make new technical information and resources available to them.

In addition to production response considerations, we also call attention to the social desirability of helping large numbers of disadvantaged smallholders become more productive and increase their incomes. It is socially desirable for large numbers of farm people to be given the means of creating productive employment for themselves, particularly when the nonfarm economy cannot grow fast enough to provide employment. The alternative is to maintain a large mass of peasants who will neither be productive nor share in the fruits of the lower level of economic development which will take place without their help.

Major initiative in developing production campaigns should come from the state level. However, close federal-state working relationships should be maintained to ensure that pricing, credit and trade policies are coordinated to meet both state and federal development objectives. This implies a stronger Federal Ministry of Agriculture and Natural Resources than at present. Details on proposed production campaigns are presented in Chapter Seven and on the role of the Federal Ministry of Agriculture and Natural Resources are presented in Chapter Eight.

On the basis of CSNRD investment studies, we recommend a policy of conducting production campaigns for the major export crops, for carefully selected import substitution crops, and for carefully selected nutritionally superior crops over the 1970-85 period. This order of priorities is based upon extended CSNRD analyses of the Nigerian agricultural economy and upon as much as six years of study by some CSNRD researchers.

We place major emphasis on export crops because an effective world demand already exists for these crops which can be easily opened up to Nigerian producers by simply reducing Nigeria's export taxes and marketing board revenues.

We are convinced that only minor initial expansions of Nigerian agriculture can be obtained from the production of staple and nutritionally superior foods. Profitable opportunities for investment in staple and superior foods will arise slowly as incomes and effective demand are increased. (See the third section of Chapter Two.) Increases in effective demand require high rates of growth in income by large numbers of persons.[4] Large, broad-based opportunities to produce for large effective markets are to be found mainly in export and, to a lesser extent, in import substitution commodities.

We recognize that the world market for primary products is growing less rapidly than the incomes of

[4]Obviously, a 5 percent rate of growth in cocoa exports will do more to increase per-capita income than a 15 percent rate of growth of poultry production because of the relative size of the industries.

developed economies and that the development of primary product exports for all underdeveloped countries does not offer a universal panacea. However, Nigerian policymakers are reminded that:

1. Effective demand for Nigeria's export products grows faster than internal Nigerian demand for domestically consumed crops and that the rate of growth in domestic demand depends directly on the generation of income by export-crop production by large numbers of farmers as well as on population increases.
2. Nigeria has a strong, not fully exploited comparative advantage in producing export crops.
3. Nigeria has diversity in export crops and thus is more favorably endowed than countries that have to depend on only one crop.
4. Nigeria has major fixed natural resources and an expanding rural labor force not wholly employable in the nonfarm economy for the foreseeable future which will yield substantially higher returns from export crops than from other uses.
5. Global income elasticities of demand for export and subsistence products are not the only criteria for making investment decisions; instead, the individual demand-and-supply situations for Nigeria favor expansion of export and selected import substitution crops and, then nutritionally superior staple food crops (see pages 72 to 74f).

In the case of industrial raw materials and import substitutes there is an existing domestic market for cotton, rice and kenaf. However, only in the case of cotton is there a domestic market with enough growth possibilities and a domestic cost of production low enough to permit a large enough volume of production to furnish enough income to benefit very many people. For most other raw materials, the existing market is not very large. Once the domestic product has replaced current imports and the point of self-sufficiency is reached, the market can only support a modest rate of growth of output. Sugar, kenaf and industrial starch from cassava are examples of such products.

In general, we must warn about import substitution for its own sake. A country gains nothing by forcing itself to produce goods which would be cheaper to import in both the short and long run. This is even truer if (1) it must tax the products it can produce at a comparative advantage and which would provide employment for large numbers of people not employable elsewhere in order to force production of import substitutes which can be produced only at a comparative disadvantage and which often use capital-, not labor-intensive technologies, (2) the taxation and reinvestment process places still greater burdens on a small staff of competent but overworked civil servants who are operating in an overall environment where it is difficult to maintain administrative efficiency and financial integrity.

The effective demand for domestically consumed superior foods in Nigeria is also limited. Expansion in the production of broilers, eggs, milk, citrus and other commodities is also limited by the lack of purchasing power and effective demand for these commodities. These industries can occasionally show a period of rapid growth (from initial low levels of output) to satisfy the limited market for expensive foods among Nigeria's new elite and expatriates. For example, poultry expanded very rapidly in southern Nigeria, but has remained a small industry, catering mainly to high income elites and expatriates even though the price of eggs has been halved (from 7 to 4 shillings a dozen). The period of rapid expansion in poultry was short-lived and there is now some contraction and squeezing out of inefficient producers because the market of poultry products grows slowly and is incapable of supporting a continued rapid rise in output.

Similar instances could be cited for citrus, pineapple, dairy, etc. The markets for these and most other products of Nigerian agriculture are so thin that they cannot provide the basis for a significant, *sustained growth* in the output which might lift the economy from its present low levels of income and effective demand. This, in turn, limits the rate of growth of agricultural production and hence the increase in farmers' incomes which might permit an expansion of effective demand.

At this point, some international comparisons are relevant. The high income countries of Europe and North America, Australia, New Zealand, etc. try very hard to develop the full potential of their fixed natural resources which have a comparative advantage in the production of particular crops. Such countries provide incentives to producers, invest heavily in relevant agricultural research and compete aggressively for world markets for their products. The United States, for instance, values her fixed supply of Corn Belt land highly, invests in it heavily, and competes aggressively in the world food-grain, vegetable oil and feed-grain markets so as to maximize the income which can be earned from this natural resource. She does not worry about being a producer of primary products or about the elasticity of world vegetable oil prices. Instead, she competes aggressively to get as much out of the world market for her resources as she can. CSNRD researchers believe it to be to Nigeria's advantage to do likewise with her palm oil, cocoa, rubber and groundnut producing resources. Those resources are worth what they can be made to produce. We believe it to be to Nigeria's advantage to produce and market everything those resources will economically produce.

The production campaigns involve expansion and improvement of the whole gamut of both public and

private services to agriculture, including improved factors of production, nonfarm inputs, seed multiplication schemes, technical advice and assistance from the extension services, produce inspection services, market news service, market intelligence service to search for new markets for Nigerian products, agricultural planning and, importantly, coordination and national support through the Federal Ministry of Agriculture and Natural Resources. (See Chapter Seven for program details on production campaigns.)

The production and distribution of new factors of production for agriculture in Nigeria has been partially or exclusively in the hands of government or quasi-government agencies. Exceptions include the importation of fertilizers, vaccines, pesticides, etc. Government production or distribution of factors of of production is frequently defended by citing lack of private profitability until a certain minimum size of market is developed. However, profitability would be increased by letting farmers receive higher prices. In view of Nigeria's overburdened civil servants and the management problems of government-operated agencies to produce and distribute modern factors, CSNRD recommends that Nigeria adopt a policy of increasing product prices to producers and of turning the production and distribution of modern factors over to private firms at the earliest feasible date. This does not preclude public and private coordination.

Another set of services deserving special policy attention are the regulatory, marketing and credit services – especially those connected with the major export and import substitution crops such as cotton, groundnuts, cocoa and oil palm. The produce inspection system and the licensed buying agents often operate in a way to dampen producer incentives and undermine programs such as the fertilizer distribution scheme in Northern Nigeria. It is important to correct the weaknesses of government-sponsored buying monopolies at the earliest possible date either by eliminating monopolies or by properly supervising and inspecting them. Elimination of the government's dependence on marketing board surpluses would eliminate (1) the need for the buying monopoly of the licensed buying agents and, (2) the gains obtainable by private manipulation of the state-maintained monopoly.

Early policy attention should be devoted to improving the produce inspection services, licensed buying agent system, and marketing board operations. Major production campaigns to increase export and import substitution crops will obviously require reappraisal of Nigeria's agricultural credit policies.

Providing infrastructural support for both long-run and short-run courses of action

The *short-run* effort to expand production of export crops, selected import-substitution commodities and selected superior foods will require a policy of providing infrastructure in the form of: better administrative arrangements; improved public and private transport, marketing, processing and evaluative facilities; research organization; teaching facilities; extension organizations, and credit institutions. The *long-run* effort requires a major build-up of research facilities to produce the crucial biological advances required to lower Nigeria's cost of producing protein and food and feed crops. In a sense, this tertiary line of support for the *short-run* effort of expanding the production of selected crops is basic.

Public services, trained manpower and technology are all crucial and are needed in addition to favorable prices, technical assistance and private control over productive resources provided under the campaigns. Infrastructure programs will be needed to provide (1) administrative support, (2) transport and marketing services, (3) trained manpower, (4) technical advances and (5) credit.

On the assumption that the production campaigns will organize the existing and forthcoming supplies of resources, manpower and techniques into appropriate packages and see that they are distributed to farmers, the main issues under a policy of providing infrastructure services in support of the *short-run* (until 1985) effort involve:

1. Provision of an administrative structure in the federal government capable of (a) coordinating state efforts without destroying state and local initiative, (b) making the case for rural development so as to attract sufficient sympathy for (1) more appropriate and favorable prices for agricultural producers and (2) financial support for the production campaigns and infrastructure program. (In this connection agricultural planning and policy formation will be important.)
2. Redirection of Nigeria's agricultural education system to produce the kinds and quantities of manpower required to execute the policies and programs implied by the short-run strategy advocated in this chapter.
3. Redirection of Nigeria's agricultural research to produce the adaptive and more fundamental research results required in executing the short-run strategy advocated in this chapter.
4. Encouragement of appropriate combinations of public and private and of foreign and domestic investment in providing transport, marketing and processing facilities. In this connection, a policy of carefully coordinating reconstruction with development projects in rural areas will be important.
5. Evolution of appropriate agricultural credit institutions.

6. Elimination of competition between programs to produce income and programs which cannot succeed until income is produced to support them. (See the section on Rural Development, Food aid, etc. in Chapter Eight.)

Detailed programs for executing the above policies, all of which have to do with the short-run (until 1985), are found in Chapter Eight.

The *long-run* effort should start now, but is not expected to have programmatic impacts other than for research for about 5 years and, perhaps, not for 10 to 15 years. This effort calls for the production of a new technological base for food and feed crops production as the foundation for a subsequent second major production effort. New "models" of maize, millet, grain sorghums and legumes should be developed for Nigeria in the next 5 to 10 years to contribute to her technological base. Increases in yields realizable through research will substantially lower production costs for proteins and for food and feed crops. With lower production costs, Nigerian feed and food producers should be able to sell more output domestically, enter new export markets and support a livestock feeding industry which can sell livestock products at prices low enough to permit a higher proportion of the Nigerian rural and urban masses to enjoy more and better quality proteins as their real income increases. Nigeria's population may reach 100 million by 1985. Since it takes a minimum of 4 to 15 years for plant breeders to develop new varieties, it is extremely important to accelerate research on staple food crops now. In addition, Nigeria may very well become an exporter of meat products in the next 15 to 25 years.

The cereals research program at the Institute of Agricultural Research, Ahmadu Bello University, is one example of the type of research that should be expanded. The new International Institute of Tropical Agriculture will also produce research results and increase research opportunities for Nigerian research agencies along this line. Agricultural scientists, internationally recognized as highly competent, assure us that new "models" of dwarf guinea corn and millet can be produced which will increase farmer yields by a conservative 50 percent and perhaps 100 percent. These should be available to farmers in the Northern State by 1973 or 1975 by the latest. While farmers respond very slowly to new crop varieties which increase yields by only 15 to 20 percent, particularly if prices are unfavorable, Nigeria can count on substantial response in output to such large increases in yields if, at the same time, prices are maintained at levels favorable to the lower costs of production resulting from the anticipated research results. In Mexico, Kenya, Taiwan and elsewhere prices have been lower after creation and adaption of new, cost-reducing varieties than before but more favorable relative to cost of production.

Detailed program suggestions for obtaining the necessary long-run technical advances are presented in Chapter Eight.

CHAPTER VII

Recommended Production Campaigns

AGRICULTURAL DEVELOPMENT IN NIGERIA by its nature is a decentralized process involving the decisions of 5 to 6 million farmers, plus the decisions of thousands of government officers who provide supporting services, and the numerous private individuals engaged in processing, marketing, transportation, storage, etc.

The decentralized nature of decision-making in a country with wide variations in ecological zones and systems of farming requires that the overriding concern of federal, state and local governments should be the formulation and execution of sound policies for its millions of farmers. In the past, government effort has favored diffuse different narrow spectra of activity in the agricultural sector such as the development and operation of farm settlements, government plantations, government processing plants, etc. Often an evaluation of government effort to promote agricultural development has been focused on whether government expenditures on a particular project such as farm settlements were on schedule. The primary concern of government in an economy with a dynamic smallholder agriculture must be in the formulation of policies and priorities which induce millions of private farmers to invest their family labor and savings in agriculture.

In our concern for the formulation of sound policies for agricultural development in Nigeria over the 1970-85 period, we have used a production campaign approach as a device for integrating the policy issues affecting the major crops and affecting the bulk of Nigeria's farmers. Production campaigns immediately imply decentralized planning because these campaigns are developed on a commodity basis according to the profitability of producing selected crops in selected geographical areas of Nigeria.

Planning involves a careful appraisal of priorities. The process of assigning priorities to specific crops through the use of production campaigns is similar to the process that planners in any one of Nigeria's states will most likely follow.

Special attention in the preparation of production campaigns was given first to the past performance of agriculture in a specific ecological zone in order to identify the sources of increase in output such as expansion in land acreage, increased productivity through modern inputs such as pesticides on cocoa, fertilizer on groundnuts, etc.

Next, we analyzed the future domestic and world demand and supply of the major crops grown by Nigeria with special attention to the projected output of crops such as oil palm, etc. from competing nations such as Malaysia and Indonesia and on the prospective competition from substitutes such as synthetic rubber, etc.

The next step involved a careful assessment of the likely technological advances coming from agricultural research stations in Nigeria or technology which Nigeria can import with modest local adaptation programs.

Finally, we attempted to assess the profitability of producing various crops under expected prices and technology over the 1970-85 period in order to compute the payoffs or profitability on investment both from the private farmer's point of view and the returns to society or Nigeria (social returns). The profitability of investment in specific crops was then incorporated into 15-year production campaigns under Strategies I, II and III and the resulting total volume and value of output were estimated for 1970, 1975 and 1985.

The interdependence of the campaigns and supporting services such as extension and credit are a key feature of each campaign. In the past, extension manpower targets have been based on broad ratios of one extension worker to 1,000 farm families in the South and 1 to 2,000 in the North. These ratios are somewhat

meaningless as one extension worker cannot effectively work with 1,000 or 2,000 farm families. Consequently, CSNRD recommends concentrating extension efforts on small groups of responsive farmers and properly teaching them new farming techniques in the hope that they can then serve as demonstrators for other farmers. Concentration of extension workers means that initially one extension agent would be expected to work with about 40 responsive farmers in the tree crop campaigns and one agent for about 50 to 75 responsive farmers in the annual crop campaigns. As extension agents and farmers gain experience, an agent can be expected to serve a larger number of farmers. For this reason it is important to analyze each proposed campaign within the context of the entire package of policies and programs under the second alternative strategy.

The production campaign approach has several advantages. For example, it permits us to focus on detailed policies and recommendations concerning a wide range of subjects on a limited number of campaigns. The campaign approach has the further advantage of introducing the concept of priorities in an operational manner and of linking comments and recommendations closely to the state and local interests of those who may ultimately administer these campaigns.

Among the general subjects which come into specific focus in considering the production campaigns are the role of smallholders, the acquisition and distribution of improved planting materials and other factors of production, and investments in facilities to process and market produce. In this introductory section on production campaigns, these subjects are discussed in brief, general terms while the details are left for consideration under the campaign discussions which follow.

While the campaign recommendations place primary emphasis on smallholder production, we do not rule out the possibility of some expansion in plantations owned and operated by private firms. Government policies to improve producer prices would be helpful to both plantations and smallholders. We think that the nucleus-plantation concept provides a means of using a private plantation to help smallholders through provision of production supplies, technical services, marketing facilities and training of prospective smallholders. We will recommend that the federal and state governments cooperate in some instances with private firms in setting up such arrangements.

CSNRD investigations have established the importance of providing producers with such modern factors of production as improved planting materials, pesticides, herbicides and fertilizers. Present Nigerian facilities for producing, acquiring and distributing these materials are (1) largely in the hands of government and (2) strained nearly to the limits set by the availability of qualified civil servants and government finances. Private firms are producing or distributing only a small part of these modern factors because of the (a) highly subsidized government programs of production and distribution of these factors, and (b) low returns to modern factors of production as a result of high export and other taxes. Removal of these subsidies, taxes and marketing board revenues would do much to make it profitable for private entrepreneurs to provide the modern factors of production which have such large social payoffs (benefits to the entire economy). The shifting of the load from Nigeria's overburdened civil servants to private firms would free the civil servants for other more important tasks which cannot be performed efficiently by private firms.

This report could have included a separate chapter on providing modern factors of production; instead, the problems of providing modern factors of production are discussed in each of the production campaigns outlined on the following pages.

Nigeria's facilities for assembling, transporting, processing, storing and selling its agricultural exports are strained to the limits of their capacity. Yet we recommend policies and programs which will expand production of export crops very substantially. As a result, major additional investments will have to be made in marketing and processing. Policy makers should explore ways of fostering creative uses of managerial talent. Innovative management is particularly needed in the field of marketing. However, we do not recommend that an independent program be set up to expand or improve present facilities or develop new facilities. Instead, we feel that it is essential to develop guidelines for the expansion of these facilities by closely linking this expansion to the expansions spelled out in the production campaigns.

The planning and implementation of agricultural development depends heavily upon sound policy formulation both at the federal and state levels in order to ensure that planning will proceed on the basis of one Nigerian market (rather than state self-sufficiency approaches on a commodity-by-commodity basis) and on the basis of Nigeria in a world economy. In order to achieve this coordination of federal and state policies for agriculture, both the federal and state ministries of agriculture will have to take on new functions. The new states will be required to develop a capacity to prepare feasibility studies for specific agricultural products such as groundnut campaigns for the North Eastern State or pilot rubber processing plants in the Mid-West State. For this reason we recommend that each state develop or expand the present agricultural projects unit in its ministry of agriculture so as to include a minimum of two or three economists or agricultural economists engaged in the identification and

preparation of agricultural projects for the state's agricultural sector plan.

The federal Ministry of Agriculture and Natural Resources has a major role to play in the planning and coordinating of the recommended production campaigns and in the coordination of agricultural policies in general. The recommended reorganization of the federal ministry to enable it to carry out this job is spelled out in Chapter Eight.

In order to incorporate all of the above considerations into programs meaningful at local, state and national levels, we recommend that the governments of Nigeria consider the following three product categories for rural development in the 1970's:

(1) Export crops
(2) Selected import substitution crops
(3) Selected nutritionally superior crops.

For each product category we have designed a specific set of development programs which will be presented below. These programs include considerable details with respect to smallholders, plantations, improved planting materials and modern inputs, investment in processing and marketing, credit, etc. and local, state and federal relationships.

Export Crop Expansion

The CSNRD team has analyzed the economics of export crop production and prospective world market trends and considers that an expansion of export crops via smallholders should be given major attention in Nigeria's rural development strategy. Export crops expansion based on enlightened farm price and taxation policies would increase incomes of the masses of farmers and, secondarily, those of low income urbanites to generate enough effective demand to permit farmers to cover the cost of producing more food. In short, export crops grown by small farmers can provide a continued engine of growth and can raise the income of the masses of farmers, directly, and of low income urbanites, indirectly. Detailed production campaigns for cocoa, oil palm, rubber and groundnuts follow.

Cocoa campaign

The world cocoa market is likely to expand substantially in the next two decades. The FAO has estimated that world consumption by the mid-1980's may reach 2.2 to 2.4 million tons compared with 1.3 million tons in 1965.[1] Although consumption is expected to increase rapidly in Eastern Europe, USSR and some other areas of the world, the largest increase in consumption on an aggregate basis will occur in the traditional markets of Western Europe and North America. Even if Nigeria only maintains her share of the world cocoa market, there will be an outlet for nearly 200,000 additional tons of Nigerian cocoa by 1985. Nigerian cocoa production as a percentage of world output rose from around 14 percent in the early 1950's to 18 percent in the mid-1960's. Nigeria could further improve her position in the world market if a vigorous production campaign were launched in the 1970's.

References to a country's share in the world trade of a commodity offer little guidance to policymakers on how to allocate resources within a nation and within the nation's agricultural sector. Nigeria's share of world cocoa exports has no policy significance for Nigeria's 350,000 cocoa farmers. The relevant question is, how does the profitability of cocoa production in Nigeria under present and future price and technology assumptions compare with alternative crops? If cocoa is more profitable to Nigerian farmers than alternative crops, then Nigeria's share of world cocoa trade may increase. Economic research by CSNRD workers indicates that there are no known crops as profitable to farmers in the cocoa belt as cocoa even if world prices were to decline slightly in the 1970's. However, it is projected that world cocoa prices will remain relatively high throughout the 1970's. For these reasons we feel the Western State should devote few of its valuable resources to such alternatives to cocoa as fish ponds, mango trees and cotton.

Approximately 350,000 farmers produce cocoa in Nigeria. Cocoa is *the* dynamic feature of Western Nigerian economic development. An effective program for cocoa production, marketing and transportation must be the No. 1 concern of policy makers in Western Nigeria. Cocoa can be the vehicle for expanding the growth of the Western State by distributing increased incomes to numerous farm families as well as contributing to the growth of the Nigerian economy by greatly expanding foreign exchange earnings

Recommendations on how to organize a cocoa campaign for the 1970-85 period were formulated after carefully evaluating Nigeria's cocoa industry. The volume of cocoa exports has grown from approximately 100,000 tons per year in the mid-1950's to 2. 9,000 tons per year over the 1963-67 period. However, exports fluctuate sharply from year to year and annual statistics are of uncertain quality. In order to offset the wide annual variations in cocoa output and exports, we used a 3-year moving average of the volume of cocoa exports with 1957-58 as the base period. The volume of cocoa exports over the most recent 10 years—1956-58 to 1965-67—has grown at a compound average growth rate of about 7 percent per year.

In spite of this growth rate, Nigeria's cocoa industry is poorly managed and in need of substantial investments. The Cocoa Research Institute of Nigeria (CRIN), for example, concluded in mid-1968 that approximately 200,000 acres or one-sixth of the 1.2 million acres were infested with disease and needed to

[1] Food and Agriculture Organization of the United Nations, *Agricultural Commodities Projections for 1975 and 1985.* Rome, 1967. p. 242.

be replanted. Also, a substantial acreage needs to be replanted as cocoa trees have reached the unproductive stage in their life cycle.

Given the need to replant unproductive cocoa and the relatively favorable long-term world price forecast, the FAO in 1966 recommended a £31.4 million cocoa development program for Western Nigeria over the 1968-83 period.[2] The FAO drew on the 1952 cocoa survey, *Nigerian Cocoa Farmers*,[3] to formulate its development program. As the 1952 study is now outdated, any recommended cocoa campaign for the 1970's should be based on up-to-date information on productive practices and expectations of Nigerian cocoa farmers.

To supplement existing information, a CSNRD economist, Godwin Okurume, interviewed 175 farmers in 16 villages in Western Nigeria in early 1968,[4] with the primary goal "to provide a framework for assessing the relative emphasis that Nigeria should place on the expansion of export crops and food crops."[5] The farmers he interviewed were located in three different farming belts: (1) a predominantly cocoa-producing area (Ife, Ondo and Gbongan), (2) an intermediate area where tree and food crops are produced but cocoa is in the background (Abeokuta), and (3) a savannah area (Oyo North) which is ecologically unsuited for cocoa and other food crops.

Okurume found, among other things, that:

1. As far as land is concerned, potential capacity is considerable and would not prevent agricultural production from being expanded on all fronts (both cocoa and food crops) simultaneously even with present techniques of production.

2. Labor was the limiting factor in production, but the supply can be increased through a reduction of leisure and, when farmers receive higher cocoa prices, by either hiring workers or by introducing labor saving capital.

3. Farmers expressed a keen interest in credit programs to help them hire labor to expand cocoa acreage.

4. Of the farmers interviewed, 90 percent would expand cocoa acreage if producer prices were increased.[6]

From Okurume's analysis, CRIN's research, FAO analysis and consultation with numerous civil servants, we conclude that low producer prices and inadequate credit are among the key bottlenecks to expanded cocoa production and that the labor constraint would yield if farmers received higher prices and had access to credit in order to hire more labor.

Therefore, we recommend that the Western and Mid-Western States launch major cocoa campaigns to approximately double cocoa output (229,000 to 420,000 tons) over the 1970-85 period. We further recommend that the campaign emphasize smallholder production and that it include higher producer prices, input subsidies (pesticides and fertilizer) and loans in the 1970-75 period and loans during the 1975-85 period when subsidies will have been phased out.

Several approaches to expanding smallholder production are very promising. These include expanding the use of pesticides and fertilizer to improve yields on present acreage, replacing old and infested trees with new trees and bringing new land into production. Continued research is needed, however, to further improve and perfect these production approaches, especially in determining the economics of fertilizing mature cocoa trees. However, because of inadequate knowledge about fertilizing cocoa and the possible improvements in production approaches from continued research, CSNRD's cocoa recommendations must be tentative at this stage and subject to modification as more research results become available.

The specifics of our recommended cocoa campaign follow:

1. Cocoa production campaigns should be drawn up by Western, Mid-Western and South-Eastern States for the 1970-75 period to assist smallholders in the expansion of cocoa production.

2. The campaigns should include three techniques for expanding cocoa production: (a) increased application of pesticides and fertilizer on present cocoa acreage;[7] (b) planting new cocoa acreage with the assistance of increased producer prices, input subsidies (pesticides and fertilizer) and loans to smallholders; (c) replanting (remove old and diseased trees) with new varieties with the assistance of input subsidies and loans to smallholders and the incentive of increased producer prices.

3. For the 1970-75 period, mature cocoa acreage should continue to receive subsidized pesticides and fertilizer. The subsidy will continue to cost about £500,000 a year. If CRIN results on fertilizing mature cocoa acreage reveal a high payoff on this type of investment, this approach should be given high priority by government.

4. For the 1970-75 period a new planting and replanting scheme modeled after the Western State's 1964-65 proposal to IBRD should be put into operation in 1970. However, the scheme should be far more ambitious than the proposal to the World Bank which included only 23,000 acres to be planted or replanted over 7 years.

---

[2] Food and Agriculture Organization of the United Nations, *Agricultural Development In Nigeria, 1965-1980*. Rome, 1966. p. 416.

[3] Galletti, R., Baldwin, K. D. S. and Dina, I. O., "Nigerian Cocoa Farmers." Oxford Press, London, 1956.

[4] Okurume, Godwin, *The Food Crop Economy in Nigerian Agricultural Policy*, CSNRD 31, 1968.

[5] *Ibid.*

[6] Cocoa farmers were very knowledgeable about cocoa prices. In fact, 95 percent of the farmers in the Ife-Ondo area knew that the producer price of cocoa had increased from 1966-67 to 1967-68.

[7] Wessel, W., *Second Progress Report on CRIN-MANR Fertilizer Trials*. CRIN, Ibadan, April 1968. (mimeo)

The scheme for the Western and Mid-Western States should aim at replanting or planting 12,500 acres of cocoa in 1970 and 25,000 acres per year from 1971-75. The scheme for the South-Eastern State should set up a target of 2,000 to 3,000 acres per year in 1970 and build up to 8,000 acres in 1975 and 10,000 acres per year after 1975 until available cocoa land is used up. Farmers who replant cocoa could be offered a £22 subsidy per acre. Farmers who plant cocoa on new land could receive a £16 loan and £16 subsidy per acre. (See Recommendation No. 7 below for further discussion of acreage expansion and credit proposals.)

As in the case of palm produce, external financing should be restricted largely to levels necessary to pay for overseas procurement of fertilizers, pesticides, fungicides, equipment, etc. The costs of using Nigerian labor, land and materials should be internally financed. Further repayment schemes should be confined to repayment of loans and the covering of subsidies in kind to the exclusion of governmental "profits" or "surpluses." As with oil palm, involvement of an international lender would have the ancillary benefits of providing technical assistance and supervision.

Both the replanting and new planting schemes should be administered by the federal and state ministries of agriculture and natural resources and by CRIN.

5. Extension and allied staffs should concentrate on working with responsive farmers and expanding their program to serve a larger number of farmers as experience is gained.

At the beginning of the campaign, an extension agent is needed for approximately 40 farmers. Since it is assumed that each farmer will plant or replant an average of 5 acres, one extension agent would be responsible for about 200 acres of cocoa. As farmers gain experience, each agent can serve more farmers and supervise more acreage. Extension agents will, in effect, offer educational assistance to farmers and supervise credit on a farm-by-farm basis. Plans should be made to train the required number of extension and allied staff.

6. CRIN research on fertilizing mature trees should be expanded and the economics of this experiment should be incorporated into the cocoa development programs as they become available. CRIN now has a large number of relatively young Nigerian scientists who will play a major role in modernizing Nigeria's cocoa industry. CRIN could effectively benefit from the technical assistance of a small number of senior scientists for a minimum of 3 to 5 years.

7. Cocoa prices to producers should be increased by about £25 per ton early in 1970 by reducing export, producer purchase and marketing board taxes. An increase in producer prices—according to Okurume's study and all available evidence—should result in a substantial expansion in replanting and new planting of cocoa as well as investments in better management practices, i.e., weeding, application of pesticides, insecticides, etc.

8. In order to give farmers an incentive to modernize their cocoa holdings, it is recommended that a fund be established to stabilize the price of cocoa to producers for the period 1970-75. World cocoa prices will likely continue to be the most volatile of all of Nigeria's export crop prices. This stabilization fund could be financed by setting aside roughly £5 per ton of marketing board surplus per year (£5 x 200,000 tons will provide a minimum annual fund of £1 million) from 1970-75. A stabilization fund of £5 million should be adequate to offset sudden year-to-year reductions in world prices. This fund should be so established that it can be used *only* for stabilizing prices for cocoa farmers and not "tapped" for financing other schemes.

9. For the 1975-85 period it is proposed to eliminate all export duties and marketing board taxes on cocoa and pay the producer the world price of cocoa less internal transport and marketing charges. As farmers receive higher prices after 1975, they will be in a position to pay the economic costs of all inputs such as pesticides and fertilizer. This means that the input subsides should be eliminated by no later than 1975. However, even though farmers receive world cocoa prices after 1975, they will need access to substantial credit if they are to plant or replant a large acreage per year.

In our judgment 40,000 acres per year could be replanted by private farmers after 1975. Okurume's study indicates that credit is needed by farmers to pay for additional hired labor. It is therefore proposed that the credit system which will be started over the 1970-75 period be greatly expanded after 1975. The credit requirements could easily reach £500,000 per year after 1975 if only half of the acreages (20,000 of 40,000) is financed by credit. The credit program should incorporate both credit and extension assistance.

The credit agent working with farmers should be in a position to prepare farm plans and develop credit requirements on a farm-by-farm basis. The marketing board may serve as a convenient means of collecting the cocoa loans as virtually all cocoa is exported and farmers will sell their cocoa to marketing board buying agents.

Several tables have been developed to illustrate the multiple impacts of carrying out the cocoa campaigns over the 1970-75 and the 1975-85 periods. Major attention is devoted to the impact of expanded production on producer earnings, foreign exchange earnings and governmental revenues.

Table VII.1 illustrates that production may increase from a base of 229,000 tons in 1963-67 to 292,000 tons in 1975 and 435,000 tons by 1985 if our recommended policies and programs are carried out.

Table VII.1.—Selected Aspects of Cocoa Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985

Year and alternative strategy	Acres	Yield per acre	Production	Prices to farmers	World prices (f.o.b. Nigeria)
	1,000	*Pounds*	*1,000 long tons*	*£/ton*	*£/ton*
1963-67 average	1,200	427	229	50-116	150-220
1970					
I (Present)[1]	1,200	427	229	100	170
II (Recommended)[2]	1,200	463	248	120	170
III (Harsher)[3]	1,200	409	219	92	170
1975					
I (Present)[1]	1,200	467	251	95	160
II (Recommended)[2]	1,275	513	292	138.4	160
III (Harsher)[3]	1,200	386	207	92	160
1985					
I (Present)[1]	1,200	450	242	95	150
II (Recommended)[2]	1,515	643	435	128.4	150
III (Harsher)[3]	1,250	364	187	92	150

[1]Tax take per ton of product is calculated at the 1961-65 average rate throughout all projections.

[2]Producer and export taxes are figured at one-half the 1961-65 average rates for the period 1970-75 and then eliminated as of 1975.

[3]The average 1961-68 producer and export taxes are increased by 10% for all the Strategy III projections.

Table VII.2 spells out the various aspects of the three alternative cocoa producer strategies. Producer income under our recommended strategy and policies will increase from £29.7 million in 1970 to £40.4 million in 1975 and £55.8 million in 1985. Likewise, foreign exchange earnings will increase from £42 million in 1970 to £65 million by 1985.

Government revenues from taxes on cocoa in 1970 under a continuation of the present strategy and programs are approximately £11 million as shown in Table VII.2. If producer prices are raised by £25 per ton in 1970 (£95 to £120) government revenues would fall from £11 million to approximately £7 million.

This decline in government revenues of £4 million can easily be offset by two methods: (1) elimination of unproductive government expenditures on farm settlements and plantations could result in £2 million savings in 1970, and (2) expansion of producer earnings from £22.9 million under a continuation of present policies in 1970 to £29.7 million under our recommended strategies and campaign could provide £7 million which could be taxed to yield £1 to 2 million in revenue from cocoa farmers, marketing agents, etc. through excises on consumer goods and income. Thus, for 1970 the immediate decline of £4 million in government revenue resulting from a shift from present to our recommended strategies could be offset through reduced government expenditures on farm settlements and plantations and revenue collected with indirect taxes which directly reduce producer prices.

In 1975, government revenue from cocoa will decline by about £11 million if CSNRD recommended policies are pursued. This is shown in Table VII.2. The reduction of government revenue could be partially offset by a further reduction in government expenditure on plantation and input subsidies as they are phased out by 1975. In addition, producer incomes would be increased £18 million in 1975 from cocoa (£40.4 million under Strategy II compared with £23.8 million under Strategy I). The multiplier impact of increased producer incomes should allow the government to tax the increased producer incomes through a variety of taxes—excise, income, import—which will not carry the disincentives on output which are inherent in export duties, producer purchase taxes and marketing board taxes. However, some of the £11 million loss in government revenues will have to be made up through other sources, most likely gov-

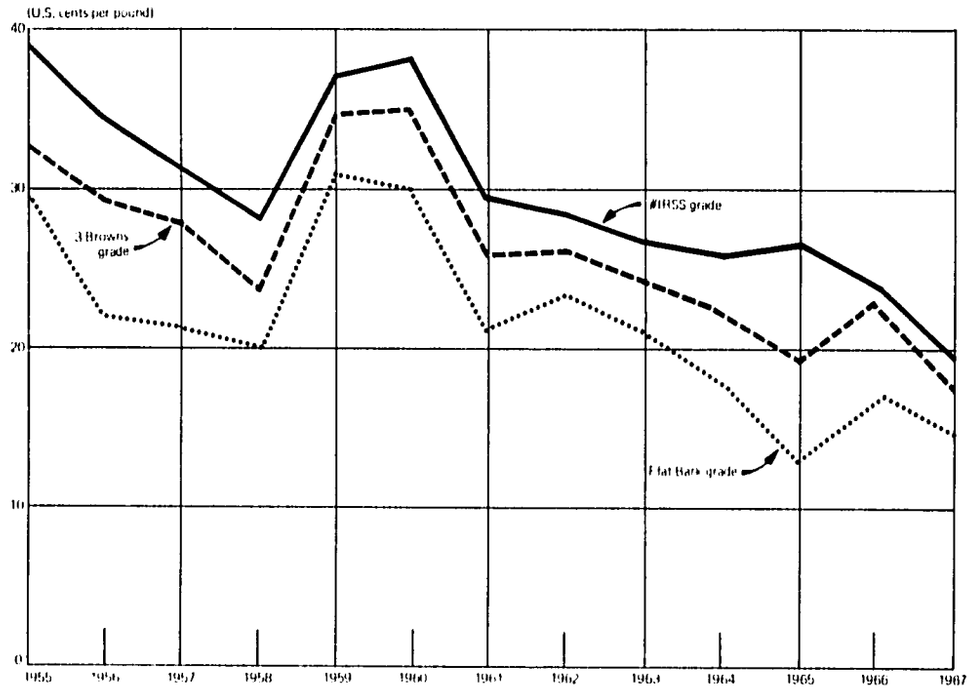
Table VII.2.—Cocoa Projections Under Alternative Strategies and Programs: Payments to Farmers from Exports, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985

Item	1970			1975			1985		
	Strategy			Strategy			Strategy		
	I	II	III	I	II	III	I	II	III
					£000				
Nongovernment revenues generated									
Payments to farmers	22,900	29,760	20,148	23,845	40,413	19,044	22,990	55,854	17,204
Transportation and marketing[1]	4,946	5,357	4,555	5,422	6,307	4,471	5,227	9,396	4,039
Government revenue[2]									
Producer purchase tax	916	496	963	1,004	—	911	968	—	823
Export duties	4,695	1,612	4,927	5,145	—	4,957	4,961	—	4,207
Marketing board surplus	5,473	4,935	6,637	4,744	—	4,037	2,154	—	1,777
Total government revenues	11,084	7,043	12,527	10,293	—	9,605	8,083	—	6,807
Exchange earnings	38,930	42,160	37,230	40,160	46,720	33,120	36,300	65,250	28,050

[1]This item may include monopolistic income as well as costs of producing marketing and transportation services.

[2]Tax take per ton of product (including marketing board trading profits) under Strategy I is calculated at the 1961-65 rate for all projections. Taxes under Strategy II are one-half the 1961-65 rate for 1970 and eliminated by 1975. Tax take per ton of product under Strategy III is increased by 10% over the 1961-65 average for all projections.

Figure VII.1. – Natural Rubber Prices on New York Market, 1955 - 1967



ernment petroleum revenues which are expected to reach over £200 million by 1975. (See Chapter Nine.)

An additional important means of financing the expansion of cocoa will be the increased value of land and cocoa stands resulting from the policies recommended by CSNRD. An extra £25 per ton on 500 pounds of cocoa per acre per year increases economic rent by about £6 per acre. At a 10 percent rate of interest this rent should be expected to convert into an increase in land values of £60 per acre. When applied to 1,300,000 acres the result is an increase in property value of about £80,000,000 due to the price increase alone. Coupled with the direct increase in capital value as a result of investing say, £50 (including operator's family labor) per acre in the planting of cocoa, this would provide for an overall value per acre of £110 as security for private or commercial borrowing of the approximately £40 per acre needed to replant or rehabilitate cocoa.

Improving the domestic terms of trade for agriculture will provide a basic step in solving many of Nigeria's pressing social problems, including unemployment and underemployment and the accompanying excessive rural to urban migration. Higher prices and incomes to 350,000 cocoa farmers will stimulate effective demand for Nigerian-produced goods and provide a profitable occupation for many young school leavers.

Rubber campaign

The world rubber market has changed radically in the past 10 to 15 years. Synthetic rubber output has increased rapidly and accounted for 63 percent of the total world rubber output in 1967 as compared with only 38 percent in 1952. In 1967, natural rubber accounted for only 37 percent of total rubber output. In other words, in 15 years—1952 to 1967—the nature of rubber output has been completely reversed with natural rubber's share of the world output dropping from two-thirds in 1952 to about one-third in 1967.

The second important aspect of change in the world rubber market is the overall decline in prices of both synthetic and natural rubber prices. The decline in natural rubber prices is shown in Fig. VII.1. The New York price of No. 1 ribbed smoked sheet of natural rubber fell by one-half, or 33 pence per pound, in 1952 to 19 pence per pound in 1967.

The decline in natural rubber prices has been primarily caused by the reduction in the cost of producing synthetic rubber and the increasing substitutability of synthetic rubber for natural rubber as the technical qualities of some types of synthetic rubber have been improved to the point of being completely substitutable for natural rubber. Polyisoprene synthetic rubber now duplicates the qualities of natural rubber and the new polybutadiene synthetic exceeds natural rubber in the key characteristic of abrasive resistance which is so highly desired by the tire industry. For these reasons the prospects for natural rubber have been pessimistic in the 1960's. In fact, the world's largest natural rubber producer, Malaysia, has given priority to oil palm production in this decade because the steady decline in world rubber prices has made oil palm more

profitable in Malaysia than rubber.[8] Private rubber estates in Malaysia retrenched in 1966-67 and some estates reduced their labor force by 20 percent. However, natural rubber producers have shifted from pessimism in 1960-67 to modest optimism in 1968, largely because of the technological breakthroughs which have been developed by the Rubber Research Institute of Malaysia.

Improved rubber clones offer promise of increasing rubber yields. Experiments are underway in Malaysia to tap latex into polyethylene (plastic) bags containing a coagulant. Tapping is still required every 1 to 2 days but the coagulum needs to be collected only once every 10 to 14 days instead of every 1 to 2 days. The plastic bag technique offers possibilities of reducing labor costs by 50 percent and increasing quality.

Turning to processing, a new system of crumb processing has been developed in Malaysia which eliminates the need to prepare smoked rubber sheets. The crumb-processing technique has led to major reductions in processing costs in Malaysia and is discussed below in some detail.

The decline in the world price of palm oil from £71 per ton in 1967 to £50 in 1968 and a long-run projected world price of £57 per ton now suggest that natural rubber can be competitive with oil palm on soils suitable for both rubber and oil palm. Also, since world rubber demand is expected to grow by 5.5 percent per year at least until 1975, the overall demand for natural rubber is expected to remain moderately strong. For the above reasons there is some discussion in Malaysia of the opportunities for opening up one million acres of new land for rubber by planting 200,000 acres per year over the next 5 years.

Most economists predict the world price of rubber will not fall below 14 pence a pound (c.i.f. New York) within the next 5 to 7 years and perhaps through the 1980's. However, the increasing substitutability of synthetics for natural rubber implies that the demand for natural rubber will be highly responsive to changes in its prices relative to the price of the synthetic substitutes. The question now remains one of whether natural rubber through cost reductions in production and processing can compete with synthetic rubber at a floor price of 14 pence and with alternative crops such as oil palm with a long-run price of £57 per ton of palm oil. Our discussion now turns to the future of natural rubber in Nigeria, particularly in the Mid-West and South-Eastern States.

Nigeria's rubber is produced primarily by smallholders in mid-western Nigeria. Most of Nigeria's rubber is produced by wild trees which yield from 300 to 400 pounds of dry rubber per acre and is harvested by itinerant tappers.[9]

In spite of the low level of technology in producing, tapping and processing natural rubber in Nigeria, rubber exports have achieved an annual compound growth rate of 6.25 percent per year between 1956-58 and 1964-66. Nigeria's rubber exports increased from 20,900 tons in 1954 to 72,100 tons in 1964. Nigeria is the largest producer of natural rubber in Africa.

There are two questions facing planners who are focusing on the rubber-oil palm belt in Nigeria:

1. What can be done economically to increase yields, quality of rubber, farmers' incomes and foreign exchange earnings from the present 460,000 acres of wild rubber trees?
2. What is the relative profitability of producing hybrid oil palm as compared with rubber under improved rubber technology, improved tapping techniques, high yielding clones and improved processing?

On the basis of the foregoing CSNRD research, it is the judgment of CSNRD researchers that Nigeria should:

1. Introduce the new crumb-processing technology to improve the quality of wild rubber and thereby increase producer incomes and foreign exchange earnings from wild rubber.
2. Launch a pilot rubber production-research campaign which utilizes improved (a) clones, (b) tapping techniques and (c) processing technology and
3. Strengthen rubber research at the Rubber Research Station at Iyanomo, Mid-West State.

An improvement program for wild rubber obviously involves choices of investment in methods of improving tapping, processing and marketing. Since the results of tapping campaigns in Nigeria to date are not very promising, we recommend that priority be devoted to improved processing by installing two or three rubber-processing centers which utilize the new processing techniques of producing block rubber by a crumb process. The crumb process has been developed by the Rubber Research Institute of Malaysia and some private international firms. Under this process, latex, coagulum and lower grades of rubber such as lumps are turned into small crumbs using either a special chemical crumbing agent or a machine with special cutting blades. The crumbs are then dried and pressed into blocks. The blocks can normally meet the standard Malaysian Rubber grade. Approximately 100,000 tons of block rubber are now produced annually in Malaysia by this technique. The crumb process is commercially used in Liberia. A pilot crumb pro-

---

[8] Bevan, J.W.L., and Goering, T.J., The Oil Palm in Malaysia: An Estimate of Prices and Return to Investment, in *Oil Palm Development in Malaysia*. Proceedings of the First Oil Palm Conference, P. D. Turner (ed). Kuala Lumpur, Malaysia, 1967.

[9] Akhurst, C. G., *Natural Rubber Production*, EPTA Report No. 1560 (Report to the government of Nigeria, FAO, Rome 1962); Anschel, Kurt, Problems and Prospects of the Nigerian Rubber Industry, *Nigerian Jour. Econ. and Soc. Studies* Vol. IX, No. 2 (July 1967), 145-159; FAO, *Agricultural Development in Nigeria 1965-1980* (Rome, 1966), Chapter 5.

cessing center is being installed at the Rubber Research Station in Iyanomo, Mid-West State. This research installation should be extended to field applications immediately.

A crumb-processing center with a capacity to process "rubber" from a minimum of 500 acres of wild rubber can be installed in Nigeria for about £4,000.[10] We recommend that two or three of these processing plants be installed by the Mid-West government. Nigeria should carefully study the Malaysian experience of setting up crumb-processing centers to serve smallholders. The Rubber Research Institute of Malaysia has installed two large central crumb factories which are surrounded by a network of collection stations. Smallholders take their latex and off-grade materials to these collection stations and thereby eliminate the traditional method of selling unsmoked sheets to middlemen. Farmers are receiving 4 to 5 cents more per pound of dry rubber than from the traditional system.

For the above reasons we believe that block rubber-processing technology holds promise for improving both farmers' incomes from wild rubber and foreign exchange earnings by selling a high-quality block rubber on the world market.

We now turn to grading rubber and note that Malaysia has developed a chemical technique of grading rubber to replace the visual grading system. This chemical technique enables rubber to be graded on technical characteristics, notably dirt content, and allows rubber to be packed in bales according to technical characteristics which world consumers can count on. This technique is used in large rubber-processing plants in Malaysia but is not immediately adaptable for smallholders as there is no way to conduct chemical tests for small quantities of rubber sold by individual smallholders.

Substantial improvement in the quality of rubber produced by smallholders will not likely be forthcoming unless farmers shift from lumps to latex. This changeover requires a system of collection stations to be developed to receive the liquid latex from farmers. A collection system will likely take some time to develop and is beyond the scope of this report. However, the system of collecting latex in plastic bags should be explored on a pilot basis as the sealed bags are attached to the trees, and the coagulum which forms in the bags is kept free from dirt and impurities. Also, the plastic bags can be picked up every 10 to 14 days, thereby substantially reducing labor costs of harvesting.

Improving the quality of rubber by a chemical grading technique or collection of coagulum in plastic bags should receive urgent research attention by the Rubber Research Station in Nigeria with special emphasis on how these techniques can be adapted for economical use by smallholders.

It is important to note that improved processing of wild rubber does not increase rubber yields per acre, but rather increases farmers' incomes by eliminating the preparation of rubber sheets. The crumb-processing technique produces block rubber of uniform quality which can earn higher foreign exchange earnings. The quality improvement approach has great potential for Nigeria and we recommend that extension and research attention be directed to this approach.

As indicated, the outlook for natural rubber in world trade has moved from pessimism in the 1960-67 period to modest optimism in 1968. Some of this optimism is relative, as it stems from the unexpected 25 percent reduction in oil palm prices in 1968 and the fact that the reduced oil palm prices—£57 per ton—are projected to persist throughout the 1970's. In addition, modest optimism for natural rubber in world trade stems from new tapping and processing technology which has been developed in Malaysia, not in Nigeria. For these reasons we believe that the long-run outlook for natural rubber in Nigeria depends upon whether Nigeria can borrow the new Malaysian technology and produce 1,000 pounds of dry rubber per acre, under well-managed smallholder production, and process this rubber by the improved processing technology proving so successful in Malaysia. However, if oil palm prices should increase from £57 to £65 or to £75 per ton in the 1970-75 period, the future of agriculture in the oil palm-rubber belt in Mid-West and South-East States may be in oil palm and not in rubber.

In order to achieve research results as rapidly as possible, we recommend that the Rubber Research Station personnel at Iyanomo work closely with managers of Commonwealth Development Corporation's nucleus plantations in the South-East and Mid-West States in introducing new clones, improved tapping and collection techniques and improved processing technologies. In addition, we recommend that a pilot 5,000-acre block of land be planted to new rubber in the Mid-West State. This pilot production-research campaign can be modeled after the pilot scheme drafted by the Western Region in 1963-64 for possible external financing.[11] The 5,000-acre pilot campaign can serve as a training ground for farmers and may be eventually turned over to 833 farmers who each have a 6-acre rubber farm.

The pilot rubber campaign will generate input-output data on yields from improved clones, labor costs in using improved tapping techniques, etc. These actual data on rubber are essential for sound long-run planning, as much more field data on improved oil

---

[10] Based on correspondence from K. Kopf, USAID/Lagos, June 7, 1968.

[11] *Western Nigeria Development Project, Project Analysis No. 2,* Premier's Office, Rubber Economics Department, Western Nigeria: undated, Ibadan.

Table VII.3.—Selected Aspects of Rubber Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985

Year and alternative strategy	Acres	Yield per acre	Total production	Prices to farmers	World price (f.o.b Nigeria)
	1,000	*Lbs.*	*Long tons*	*£/ton*	*£/ton*
1963	480	317	68,000	165	196[2]
1966	480	328	70,270	130	160
1970					
I (Present)[1]	485	320	70,000	93	120
II (Recommended)[2]	485	325	71,000	93	120
III (Harsher)[3]	485	318	69,000	93	120
1975					
I (Present)[1]	414	325	60,000	93	120
II (Recommended)[2]	414	330	61,000	93	120
III (Harsher)[3]	400	320	57,000	93	120
1985					
I (Present)[1]	355	315	50,000	93	120
II (Recommended)[2]	355	345	55,000[3]	93	120
III (Harsher)[3]	320	300	43,000	93	120

[1]Assuming 1967-68 price was £135 per ton, the January-September 1967 average.

[2]1961-65 average CSNRD calculations from FAO data.

[3]The 55,000-ton production output in 1985 is not a projection. It is a conservative estimate which may be substantially increased if Nigeria demonstrates an ability to adopt new rubber technology.

Table VII.4.—Rubber Projections Under Alternative Strategies and Programs: Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985

Item	1970 Strategy			1975 Strategy			1985 Strategy		
	I	II	III	I	II	III	I	II	III
					£000				
Nongovernment revenues generated									
Payments to farmers[1]	6,510	6,603	6,417	5,580	5,673	5,301	4,650	5,115	3,999
Transportation and marketing	1,890	1,917	1,863	1,620	1,647	1,539	1,350	1,485	1,161
Government revenues									
Export duties[2]	—	—	—	—	—	—	—	—	—
Exchange earnings	8,400	8,520	8,280	7,200	7,320	6,840	6,000	6,600	5,160

[1]Under Strategy II, cost reductions in production and processing will increase the net income share of the payments to farmers over the share in Strategies I and III.

[2]There is no export duty when the price is less than 18d per pound.

palm production are available to planners than on improved rubber production. Planners who are trying to decide on rubber vs. oil palm in a state such as the Mid-West State are forced to rely heavily on synthetic data generated from rubber-producing countries such as Liberia, Malaysia, etc.

High yields and improved quality are the *sine qua non* of a competitive natural rubber industry in Nigeria. There is considerable guessing about potential rubber yields in Nigeria. Although the dry season in West Africa is supposed to be a major constraint on high rubber yields, it is reported that Firestone of Liberia is now achieving an average of 1,300 pounds of dry rubber per acre from all its separate rubber plantations. This 1,300-pound yield exceeds the average yield from all plantations owned by any single private firm in Malaysia.

Rubber experts have advised CSNRD workers that smallholder yields of 1,000 pounds per acre can be achieved in Nigeria.[12] The pilot rubber campaign proposed herein offers promise of helping determine what are feasible yields and producing and processing costs under Nigerian conditions. Moreover, a proposal for such a pilot campaign is the type which may attract outside financial assistance from such agencies as the World Bank which is usually reluctant to finance large (50,000 to 100,000 acre) production campaigns unless a pilot campaign is progressing satisfactorily.

CSNRD workers, therefore, recommend a two-pronged attack:

1. Improve the quality of natural rubber from ex-

[12]A CSNRD economist reports 1,100 pound per acre yields in some commercial plantations in Nigeria. See Saylor, R. G., *A Study of Obstacles to Investment in Oil Palm and Rubber Plantations*, CSNRD 15, August 1968.

isting wild rubber trees by introducing new processing technology.

2. Develop a pilot-research production campaign to determine the profitability of producing natural rubber in Nigeria under improved production and processing technology.

The impact of CSNRD's major recommendations, summarized in the projection tables, should be considered highly tentative. Technology is fluid and long-run price prospects for products of the major competitive crop, oil palm, are uncertain. We note in Table VII.3 that if Nigeria follows the present system of producing and processing wild rubber, total rubber output will decline by 1975, as old rubber trees are taken out of production. On the other hand, if CSNRD recommendations for quality improvement of wild rubber and the pilot production-research campaigns are successful, total rubber output may begin an upward trend in the early 1980's. This increased production, however, has not been indicated in Table VII.3 under Strategy II because of the present and future uncertainties concerning the ability of Nigeria to utilize the new technology. Table VII.4 lists projected returns.

Oil palm campaign

By late 1968, world palm oil prices had declined by 25 percent to £60 per ton from a 1967 price of £80. The price decline was caused by large increases in sunflower oil exports from the USSR and Eastern Europe and the large increase in output of soybeans in the U.S.[13] World exports of palm oil reached a peak in 1960 at 586,000 tons. Nigeria held 31.2 percent of the world export market at that time. The Nigerian world market had fallen 5.7 percent to 25.5 percent by 1964. Malaysia has gained a larger share of the market while the Congo, Indonesia and Nigeria have all lost a portion of their share of the world market since 1960.

Palm oil exports from Nigeria have actually declined in recent years after having reached their peak of 208,000 tons in 1954. Exports in 1966 were 143,000 tons. Domestic consumption has continued to climb, however, and reached an estimated 394,000 tons, or 73 percent of all Nigerian palm oil production in 1966.

Another factor which adds to the depressed world outlook for palm prices is the fact that Malaysia is planning to increase palm oil output from 250,000 tons in 1967 to 800,000 or a million tons by 1980.

In summary, palm oil can expect major competition from sunflower, rapeseed, soybeans and other palm oil producers and fish oils. All of these will continue to apply pressure to world palm oil prices. For

[13] U.S. Department of Agriculture, *Foreign Agriculture*, October 14, 1968, pp. 3-5.

Nigerian Rubber Producers Need:

-- *better planting materials*
-- *better transport*
-- *better processing*
-- *better tapping*
-- *better marketing facilities*

Crepe rubber buyer and Nigerian producer

A "Slaughter" tapped rubber tree

these reasons we are using a long-run price projection of £52 per ton f.o.b. Nigeria for palm oil in the oil palm campaign which follows.

The oil palm industry in Nigeria has been a stagnant industry since 1954 as shown in Figure III.1. It suffered from a prolonged period of underinvestment which reflects (1) the complexity of converting semi-wild oil palm groves to high-yielding hybrid palms and (2) inadequate producer incentives resulting from marketing board policies and taxes levied on exports of oil and kernels.[14]

Exports of Nigerian palm oil and palm kernels have declined in recent years. If action is not taken to alter taxation policies with respect to palm produce, Nigeria's growing population may cause Nigeria to become an oil palm importer within 15 to 18 years. But this need not happen. Given her natural resources for producing palm products and technical research base, she can—with wise policies and substantial investment—profitably expand oil palm exports. CSNRD staff members have developed the essentials of a program to illustrate how to achieve this expansion of output.

Presently about 90 percent of Nigerian palm produce is harvested from semi-wild oil palm groves which produce about 1 ton of palm bunches per acre. Fortunately, Nigeria now has improved "tenera" hybrid palms[15] which can produce at least 6 tons of bunches per acre under experimental conditions and 3 tons per acre by small Nigerian farmers. The improved "tenera" hybrid palms were adapted for Nigerian growing conditions in the 1950's by the West African Institute for Oil Palm Research (WAIFOR) in Benin City (now Nigerian Institute for Oil Palm Research, NIFOR). WAIFOR researchers in the 1950's also achieved considerable advances in agronomic practices for producing palm seedlings and established fertilizer response coefficients under field conditions. The task facing Nigeria in the early 1960's was to move this impressive technological base to the farm level and replant semi-wild groves with hybrid palms.

For the most part, the problem of getting mass farmer adoption of the new hybrid palms is one of replacing an unplanned ecological process of semi-wild oil palm regeneration[16] in which man participates but does not consciously manage, with a new and undeveloped man-managed system of planting and managing hybrid palms. The new man-managed system includes the production of improved seeds, planting, caring for and fertilization of seedlings produced in nurseries after a germination process including both heat and humidity control, followed by planting, weeding and processing of the fruit so as to (1) efficiently extract oil of the high quality demanded by international markets and (2) recover the kernels for sale to kernel crushers either in Nigeria or abroad.

Clearly it is no simple task to take control of the almost automatic system of semi-wild palm grove regeneration in which man participates more as a biological organism than as a manager. The task was only begun when NIFOR systematized the process of producing thin-shelled, high-yielding (tenera) palms. Any program which achieves a *large* replanting of wild palm groves with hybrid palms requires, among other things, appropriate types of farm organization, improved inputs which are available at the farm level, extension and credit supervision, as well as producer incentives, etc.

What is an effective mechanism for encouraging wide-scale adoption of the hybrid palms? Nigerians are experimenting with land-settlement schemes, state-owned plantations and palm grove rehabilitation subsidy schemes. As pointed out earlier, research on the economics of alternative forms of farm production strongly supports the smallholder form of farm organization for Nigeria. Studies of oil palm production under various organizational patterns indicate that the record of the smallholder oil palm subsidy program is so remarkable that we recommend utilizing a smallholder subsidy and loan scheme as the central mechanism for wide-scale planting of the hybrid palms over the 1970-75 period.

Let us examine the mechanics of a smallholder subsidy scheme. We can gain a number of useful insights from the Oil Palm Rehabilitation Scheme (OPRS) inaugurated by the former Eastern Region. The OPRS was launched in 1962 to encourage smallholders and communities to convert their semi-wild palm groves to high-yielding hybrid palms. Farmers were offered an £18 subsidy per acre[17] provided they developed a minimum 5-acre plot and followed recommended agronomic practices including clearing the land, planting 60 palms per acre, applying fertilizer, maintaining weed control, etc.[18]

The OPRS was carried out by extension agents who were given a special 30-day crash training program. Farmers and communities responded eagerly to the OPRS and planted 50,000 acres under the

---

[14] Johnson, Glenn L., *Removing Obstacles to the Use of Genetic Breakthroughs in Oil Production: The Nigerian Case*, in "Agricultural Research Priorities for Economic Development in Africa," 1968, Washington, D.C.: U.S. Academy of Science, 1968.

[15] The great genetic advance was achieved by Beirnaert in the Belgian Congo in the 1940's when he crossed the *dura* fruit with *pisifera* fruit to produce a "tenera" hybrid palm, a thin-shelled fruit which increases the yield of palm oil per acre. See Hartley, C.W.S. "*The Oil Palm*", Longmans, London. 1967.

[16] Zeven, A. C. Oil Palm Groves in Southern Nigeria, Part I: Types of Groves in Existence, *Jour. Nigerian Oil Palm Res.*, Vol. IV, No. 15 (August 1965), pp. 226-250, *The Semi-Wild Oil Palm and Its Industry in Africa*, Centrum voor landbouwpubeikaties en landbouwdocu nentatie, Wageningen, 1967. Also see Johnson, Glenn L. *Removing Obstacles . . . op. cit.*

[17] The £18 was composed of a £10 per acre cash grant which was paid over 5 years and £8 in kind. The in-kind payment included the palm seedlings, fertilizer, etc.

[18] Purvis, Malcolm, *Report on a survey of the Oil Palm Rehabilitation Scheme in Eastern Nigeria, 1967*, CSNRD-10, August, 1968.

scheme in the first 5 years, 1962-66. Since more than 20,000 acres were planted in the 1966 planting season, the 60,000-acre target for the 1962-68 plan would have been exceeded if the war had not broken out in 1967.

A CSNRD economist, Malcolm Purvis, after studying the OPRS carefully, concluded that the OPRS had stimulated private investment in hybrid oil palm production, that average farm yields would likely be 3 tons of bunches of palm fruit per acre and that internal rates of return on investment to Nigeria would be between 11 and 17 percent under "normal price and yield assumptions."[19]

If smallholder units are chosen as the form of organization for the expansion of palm production, the success of a smallholder scheme depends upon (1) the availability and proper use of improved inputs—hybrid palm seedlings, fertilizer, credit, etc., and very importantly, on (2) maintaining the prices received by farmers at the 1966 level of £40 per ton of palm oil by eliminating all taxes on palm products.

With respect to the first point, agronomic technologies having a critical effect on long-term oil palm yields are: proper spacing of seedlings, timely fertilization, weed control, replanting palm seedlings destroyed by fire or rodents and prevention of planting food crops too near the base of the palm seedlings.

Improper care of palm seedlings during the development phase (years 1 to 5) will not only delay the time of reaching a mature yield but, more importantly, they will never achieve the total yield over the typical 33-year cycle that can be obtained from palm seedlings properly managed during the development period (years 1 to 5). For these reasons, it is recommended that oil palm campaigns over the 1970-75 period include both subsidies in kind (seedlings, fertilizer) and loans to ensure that the proper agronomic practices are carried out. The subsidies and loans would be extended to farmers on an annual basis contingent upon a farmer's carrying out a minimum level of agronomic practices.

With respect to the second point—maintaining prices at £40 per ton at the farm level—in light of the recent world price decline and projected continuation of this price at £52 f.o.b. Nigeria, there is little that can be done to raise prices to farmers. However, palm oil prices at the farm level can be maintained at the 1966 level of about £40 per ton, if marketing board surpluses and export and produce purchases taxes are eliminated. Maintaining palm oil prices at this level is extremely important because at this price (1) Nigerian farmers have demonstrated that they will invest in improved palms and continue harvesting semi-wild palms and (2) the higher yields from improved palms will increase profitability of palm production and allow resources used in this production, such as land, to take on sufficient capital value to serve as collateral for loans. On the other hand, if all or most of the world price reduction is passed on to the farmer, it will be unprofitable to invest in hybrid palm and harvest many of the semi-wild trees.

We recommend that the oil palm campaign be organized on a subsidy-loan basis over the 1970-75 period and then shifted to a loan scheme after 1975, provided producer prices are maintained at about £40 per ton of palm oil which is equivalent to the long-term projected world price less transportation and marketing charges. If farmers receive £40 per ton they will find it profitable to pay for the new inputs (fertilizer and seedlings) to repay their loans. Farmers producing improved palms will also have increased effective demand to purchase goods from the nonagricultural sector as well as increased quantities of nutritionally superior foods.

To summarize the discussion, we conclude that (a) smallholders should be given top priority in the expansion of oil palm production in the states where oil palm has a comparative advantage over other crops, (b) oil palm campaigns should be developed by states for the 1970-75 period which include both subsidy and loan components and (c) a loan program should be used after 1975 to finance oil palm expansion after having eliminated marketing board and export taxes on oil palm over the 1970-75 period.

The details of oil palm campaigns for the 1970-75 and 1975-85 year periods are as follows:

1. Oil palm production campaigns for the 1970-75 period should be drawn up by each of the major oil palm-producing states.
2. Palm seeds must be germinated 18 months ahead of the time palm seedlings are desired. It is assumed that NIFOR should continue to produce the seeds. However, oil palm research at NIFOR has been badly disrupted by the civil war. Although the physical facilities are intact, there has been a serious loss of experienced scientists, both Nigerian and expatriate. The effective functioning of NIFOR is essential for the success of the oil palm campaigns in the 1970's as it is the source of hybrid palm seeds as well as the developer of new agronomic and processing technology. Therefore, we urge that NIFOR be brought back to at least its pre-war level of operation as rapidly as possible.
3. As seeds are released from NIFOR, it is assumed that the states will produce the palm seedlings and distribute these to farmers. However, there is considerable scope for communities, young farmer clubs, prisons and especially private firms to produce seedlings. Therefore,

[19] Key assumptions are a peak yield of 3.125 to 3.6 tons of oil palm bunches per acre in the tenth year. The price assumptions are £40 per ton of palm oil and £36 per ton of palm kernels after deductions for internal marketing and transportation.

positive action should be taken to foster interest among communities and private entrepreneurs in the production and distribution of seedlings and other inputs.

4. A combination subsidy-loan scheme should be developed by each oil palm-producing state for the 1970-75 period. The subsidy should include an in-kind payment of palm seedlings, fertilizer, etc. worth approximately £12 per acre. A loan of approximately £10 per acre should be made available to farmers desiring credit to pay for labor charges in clearing land and maintaining the palm fields over the 5-year development phase (1970-75). The subsidy and loan should be released annually to farmers contingent upon following recommended agronomic practices. Earlier the World Bank had expressed interest in funding such a loan program; the Bank should be asked for a loan to finance mainly that part of the scheme involving external procurement of fertilizers, equipment, etc. Internal procurement of land, labor, seeds, seedlings, etc. is best financed from Nigerian funds as external financing to purchase services of Nigerian resources will tend to be too inflationary. The loan arrangements and repayment scheme should provide only for recovering the cost of the program from the producers. Too often, loans to finance subsidization schemes serve as an excuse for maintaining repressive, profit-making (for government) taxes and or pricing policies. As there would be advantages from World Bank supervision of the loans and repayment, limited external financing of on-shore procurement may be justified.
5. The state campaigns will need to be coordinated with respect to agronomic features, subsidy conditions and loan policies. Such coordination could be facilitated by the oil palm marketing board, a Federal Office of Extension (if established) and an external lender such as the IBRD, all under some degree of control by the Federal Ministry of Agriculture and Natural Resources.
6. Extension and allied field staffs should concentrate their efforts on responsive farmers and expand their service to a larger number of farmers as experience is gained. It is assumed that each farmer will plant on the average 10 acres of hybrid palms. Initially one extension agent would supervise approximately 40 farmers and 400 acres. Extension agents would, in effect, offer educational assistance to farmers and supervise credit on a farm-by-farm basis. As farmers gain experience, the extension advisor-farmer ratio can be widened.
7. A vigorous effort should be made by government to distribute Stork hydraulic presses and to offer concerted extension and marketing education and services to promote their use, including the latest modifications proposed by NIFOR.
8. Pricing policy should move from a subsidy-loan campaign (1970-75) to a loan campaign (from 1975 on):
   a. In light of the 25 percent drop in world oil palm prices and the projected continuation of this level, the central task of price policy is one of maintaining prices to farmers at about £40 per ton of oil. Producer prices can be maintained only by eliminating all taxes on palm products.

Table VII.5—Suggested Oil Palm Campaign, Acreage 1970-75.

Year	Eastern states	Mid-West state	Kwara, Lagos and Western states	Total
		Acres		
1970	10,000	500	500	11,000
1971	20,000	1,000	1,000	22,000
1972	30,000	5,000	5,000	40,000
1973	40,000	10,000	10,000	60,000
1974	40,000	15,000	15,000	70,000
1975	40,000	20,000	20,000	80,000

   b. By 1975, and on a previously announced schedule, all taxes on oil palm should be eliminated. With a plentiful supply of new seedlings, stable prices, higher palm grove values and an effective credit program, a high planting rate should be forthcoming with no direct subsidy.
9. Oil palm expansion from 1975-85 can be financed directly by farmers through loans and higher profits from hybrid palms. The amount of the loan will be determined on an individual farm basis. The loan could range from £10 to £20 per acre of new hybrid palms planted, depending on whether a farmer wanted to borrow money to pay only hired labor costs or to pay for fertilizer, seedlings and hired labor.

Following the pattern of the oil palm rehabilitation scheme in the former Eastern Region, we suggest in Table VII.5 that palm campaigns be inaugurated in the three Eastern States, Mid-West, Kwara, Lagos and Western States in order to plant the indicated acreage of oil palm over the 1970-75 period.

It is proposed that this oil palm campaign be financed initially by subsidies and loans. Thus, when replanting is resumed following cessation of hostilities, it is proposed that farmers be offered subsidized inputs (fertilizer and seedlings) and loaned £10 per acre to pay for some of the labor costs over the 5-year development period.

Several tables have been developed to illustrate the multiple impacts of carrying out oil palm campaigns over the 1970-75 and 1975-85 periods. Major attention is devoted to the impact of expanded production and producer earnings, foreign exchange earnings and governmental revenues.

Table VII.6 spells out various aspects of the three alternative strategies and associated policies and programs. Table VII.6 illustrates that the major expansion of output from 560,000 to 800,000 tons of palm oil can be achieved under the second strategy mainly through replanting wild with hybrid palms and through improved processing. The total acreage will increase only slightly. Prices to farmers under the second and recommended strategy can be maintained at £40 per ton of oil by eliminating all taxes. Table VII.7 illustrates how payment to farmers from palm exports may reach £49 million in 1985 under our recommended strategy as compared with £28 million in 1985

Table VII.6.—Selected Aspects of Oil Palm Production Under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985

Yield and alternative strategy	Acres	Yield per acre		Production		Domestic Consumption	Price to farmers		World price (f.o.b.) Nigeria)	
		Oil	Kernel	Oil	Kernel	Oil	Oil	Kernel	Oil	Kernel
	1,000	*Lbs.*	*Lbs.*	*1,000 long tons*		*1,000 long tons*	*£/ton*		*£/ton*	
1963	5,600	206	160	495	400	350	42.0[1]	27.0[1]	81.5[1]	51.7[1]
1967	5,600	208	160	520	400	376	41.0	27.0	n.a.	n.a.
1970										
I (Present)	5,600	196	160	490	400	420	31.5	26.0	52	43
II (Recommended)	5,600	224	162	560	405	420	40.0	31.0	52	43
III (Harsher)	5,600	196	160	490	400	420	30.5	25.0	52	43
1975										
I (Present)	5,600	200	152	500	385	480	31.5	26.0	52	43
II (Recommended)	5,740	236	160	605	410	477	40.0	36.0	52	43
III (Harsher)	5,600	192	148	480	370	480	30.5	25.0	52	43
1985										
I (Present)	5,600	210	144	525	360	600	31.5	26.0	52	43
II (Recommended)	5,800	310	180	800	465	626	40.0	36.0	52	43
III (Harsher)	5,600	204	136	510	340	600	30.5	25.0	52	45

[1]1961-65 average. CSNRD computation from FAO figures

Table VII.7.—Palm Products Projections under Alternative Strategies and Programs: Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985

Item	1970 Strategy			1975 Strategy			1985 Strategy		
	I	II	III	I	II	III	I	II	III
					£000				
Nongovernment revenues generated									
Payments to farmers from palm products exported	12,600	18,155	12,135	10,640	19,880	9,250	9,360	23,700	8,500
From domestically consumed palm products	13,230	16,800	12,810	15,120	19,080	14,640	18,900	25,040	18,300
Total payments to farmers from palm products	25,830	34,955	24,945	25,760	38,960	23,890	28,260	48,740	26,800
Transportation and marketing of exported palm produce *(not computed)*									
Government revenues									
Producer taxes[2]	2,462	283	3,578	2,477	—	2,608	2,535	—	2,686
Export duties[1]	2,120	1,053	2,320	2,040	—	2,146	1,908	—	1,972
Market board surplus[2]	1,609	648	1,757	1,326	—	1,295	1,152	—	1,190
Total government revenues	6,191	1,984	6,655	5,843	—	6,049	5,595	—	5,848
Exchange earnings	20,840	24,695	20,840	17,595	24,286	15,910	15,480	29,043	14,620

[1]Export duties are eliminated for palm oil exports for Strategies I, II, and III for 1970, 1975 and 1985. Export duties for palm kernels under Strategy I are calculated at the 1961-65 average rate for all projections, at one-half the 1961-65 average rate for Strategy II in 1970 and then eliminated in 1975, and at 110 percent of the 1961-65 average rate for Strategy III, for all projections.

[2]Produce purchase taxes and marketing board profits per ton of both palm oil and kernels under Strategy I are calculated at the 1961-65 average for all projections. These taxes are calculated under Strategy II at one-half the 1961-65 average for 1970 for *kernels* but then eliminated by 1975. No taxes are calculated for palm oil under Strategy II for any projection. Produce taxes and marketing board trading profits for both palm oil and kernels under Strategy III are increased by 10 percent over the 1961-65 average for all projections.

Much of the Capital Used in Nigerian Agriculture is

- *biological in nature*
- *can be produced in place with Nigerian land and labor.*

Other capital, such as that in the Abakaliki Rice Coop can be generated locally.

under a continuation of the present strategy. Foreign exchange earnings in 1985 will be £14-15 million higher than under either the present or a harsher more exploitative strategy. Losses in government revenue from reduced marketing board produce purchase tax and export duties will total approximately £6 million by 1975 under our recommendations.

However, substantially expanded producer incomes over the 1975-85 period will enable the government to recapture tax revenues through excise taxes on consumer goods—tobacco, beer, etc. purchased by farmers. The more important point, however, is that reduced taxes and higher yielding palms will provide incentives to farmers and increase land values which can be used as collateral for loans and provide a basis for a possible land tax in the 1980's.

Under our recommended strategy and campaigns for smallholders, production of palm oil and kernels may rise by 1985 to well over a million tons so that even with domestic consumption of over a half million tons, exports would be around a half million tons compared with little, if any, under either a continuation of present or a shift to harsher strategies and programs.

Groundnut campaign

Nigeria is the largest exporter of groundnuts in the world followed by Senegal, another West African nation. Groundnuts have been the commodity responsible for growth of agricultural and economic development in the Kano area of northern Nigeria since the Ibadan-Kano railroad was opened in 1912. The railroad link was championed by Winston S. Churchill, then Under-Secretary for the Colonies, as a means of accelerating cotton production in northern Nigeria for British textile mills. However, major improvements in margarine quality in Western Europe between 1906 and 1914 expanded the demand for edible oils and the price of groundnuts to farmers increased sharply after 1912. Farmers in northern Nigeria seized this external vent for their surplus productive capacity and rapidly expanded groundnut output. As a result, the railroad served to promote groundnuts while cotton remained in the background.[20] Farmers producing groundnuts have demonstrated a continued keen response to economic incentives since 1950 and have doubled groundnut output within a period of 10 to 12 years. Groundnut exports (including groundnut oil equivalents) grew at a 5.2 percent compound annual growth rate between 1956-58 and 1964-66.

Groundnuts are produced by small farmers who grow between 2 and 4 acres and obtain average yields of about 700 pounds of decorticated nuts per acre. Groundnut expansion until recently has been primarily through acreage expansion. However, a program of improved varieties, fertilizer and extension along with limited use of bullock power has been partially responsible for increases in output in the 1960's.

Groundnut processing in Nigeria has increased rapidly in the past 10 years. About 450,000 tons of groundnuts were processed in 1968.

We have established the point that groundnuts are a key foreign exchange earner for the nation, that groundnut farmers have eagerly responded to economic incentives and that groundnuts affect more lives in the four upper northern states of Nigeria than any other economic activity.[21] For these reasons, state and federal policies for the groundnut industry—production, marketing, processing, and evacuation—are central to the agricultural planning process in the main groundnut-producing states.

CSNRD researchers have examined the world outlook for fats and oils, including shelled groundnuts, groundnut oil and groundnut cake, Nigeria's competitive position in the world market and the economics of groundnuts vs. alternative crops in the groundnut-producing areas in Nigeria. On the basis of this analysis we conclude that groundnut production will be profitable to Nigerian farmers, and total output can be greatly accelerated during the 1970-85 period—perhaps from 1 to 3 million tons or at an annual compound growth rate of 6.3 percent. However, there are major problems facing Nigeria's £60 million industry and we now turn to these problems or constraints.

There are six major constraints on a significant expansion of groundnuts:

1. Evacuation problems—rising costs of evacuation of groundnuts to the ports and deterioration in quality resulting from a long storage period,
2. Labor shortage during planting season, especially in June,
3. Inefficient supply system—particularly fertilizer,
4. Shortage of seasonal and intermediate credit,
5. Inefficient produce inspection and marketing system, and
6. Declining marketing board prices to farmers.

The combination of these six factors results in significant disincentives to producers which can slow down Nigeria's groundnut expansion.

Before we discuss removal of constraints and some innovations which may be necessary to remove some of the more intractable constraints, let us briefly discuss each constraint.

The evacuation of the recent groundnut crop has been exacerbated by the civil war which has reduced

[20] Hogendorn, J. S., The Origins of the Groundnut Trade in Northern Nigeria, in "Growth and Development of the Nigerian Economy," C. Eicher and C. Liedholm (eds). Michigan State University Press, East Lansing, 1969. Chapter 3.

[21] Kano State has consistently produced about half of Nigeria's groundnuts.

the two rail outlets to the sea to one. The shift from rail to lorry evacuation of groundnuts in recent years has been dramatic. About two-thirds of the groundnuts were evacuated by lorry in the 1966-67 season as compared with one-quarter in 1964-65. The internal transport rates, however, have increased from roughly £8 per ton in 1964-65 to £14 per ton in 1966-67. In addition to rising internal transport costs to ports of evacuation, the delay in evacuation has resulted in a deterioration in quality with the aflatoxin problem[22] increasing in severity in the past year. We note that the year-end inventory of groundnuts of 20,000 tons in 1964-65 had risen to 400,000 tons in 1966-67. Groundnuts in the Gusau area, which were being evacuated in May of 1968, were 2 years old. The evacuation delay has increased the aflatoxin content of the shelled groundnuts and puts Nigeria in a weak trading position vis-a-vis countries such as South Africa who are now exporting aflatoxin-free nuts to Europe.

The rising internal transport costs to port of evacuation and reduced quality of groundnuts held in storage lead to the inescapable conclusion that the proposed production campaign cannot move forward without substantial investments being made to improve groundnut evacuation.

The second constraint is the shortage of labor during the planting season—especially in the month of June—as food crops are planted before cotton and groundnuts. Researchers at Samaru indicate that early planting of groundnuts in June could increase yields by 20 to 25 percent. The new hybrid sorghum and millet varieties offer a possible key to earlier planting of groundnuts.

The third constraint is found in input supplies with special emphasis on fertilizer supply problems. Although fertilizer use in northern Nigeria increased from 3,000 tons in 1960 to 35,000 tons in 1967, the very success of the program has overburdened the government at the local level. Although the rate of growth of fertilizer use since 1960 is impressive, fertilizer is still being used in token amounts by a token number of groundnut farmers, and there is a need for improvements in the administration of the fertilizer distribution system.[23]

The fourth constraint involves a lack of seasonal credit—namely to purchase fertilizer. The credit needs of farmers for one input, fertilizer, are very modest—perhaps £2:10 per farmer. Since the cost of operating a loan program for £5:10 loans is high, one method of breaking the credit constraint would be to (1) increase producer prices of groundnuts or (2) reduce the price of fertilizer to farmers by increasing the fertilizer subsidy.

The inefficient and questionable produce inspection, licensed buying and marketing systems are the fifth constraint on an expansion of groundnuts. We shall not dwell on this point as it is common knowledge.[24] Also, exhortations on the need to reduce corruption and inefficiency in order to raise effective prices to producers will be to no avail. Innovation is required to break the corruption circuit and reduce marketing costs; we shall propose several innovations below.

Groundnut farmers received low marketing board prices of about £30 per ton for groundnuts for 1961-65, £32 in 1966-67, and £27-£29 in 1967-68 while average f.o.b. Nigeria price was about £64 from 1960-67.[25] After deducting an average of £8 per ton internal transport charge from £64, we find that £26 per ton were still skimmed off to pay for licensed buying agents, marketing board taxes, produce purchase taxes, etc.

Although policy makers can focus on the detrimental impact of reduced world prices of fats and oils in the Nigerian economy, the prices which producers receive for groundnuts are partially determined by the level of Nigeria's marketing board taxes and the efficiency or inefficiency of the operation of (1) Nigeria's produce inspection service, (2) Nigeria's licensed buying agents, (3) Nigeria's internal transport system, and (4) Nigeria's storage system. For these reasons, producer prices can be increased not only by reducing marketing board taxes but also by improving the efficiency of the producer inspection system, licensed buying agents and evacuation system.

We have emphasized a pragmatic aproach to planning for groundnut expansion by focusing on constraints which can be broken in the short- and intermediate-run time periods. Essentially we are saying that planners have an ability within the next few years to exert leverage on three constraints—evacuation, fertilizer distribution and increased producer prices. The other three constraints—labor bottlenecks in June, increased credit, undesirable practices and inefficiency in marketing—involve fairly major institutional changes and cannot be implemented without technological progress in food crop production, determined government action over a period of years and support by the political system.

In the following discussion of our recommended strategies and policies for groundnuts, we shall focus on measures to expand groundnut production from 1 to 3 million tons or an annual compound growth rate

---

[22]Aflatoxin is a general term for the micotoxins (poisonous substance) produced by *aspergillus flavus*, a soil-borne fungus which multiplies under warm, humid conditions. Some of the aflatoxin have proven to be highly carcinogenic (cancer producing).

[23]Laurent, C. K., *Problems Facing the Fertilizer Distribution Program in The Six Northern States*, CSNRD 27, January, 1969.

[24]Northern Nigeria, *A White Paper on the Military Government's Policy for the Reorganization of the Northern Nigeria Development Corporation*, Kaduna: Government Printer, 1967.

[25]However, the government's fertilizer subsidy program of about £500,000 in 1967 to £1,000,000 per year in 1968-69 has been paid from marketing board taxes.

of 6.3 percent over the 1970-85 period. However, unlike tree crops, groundnut farmers can rapidly shift resources from groundnuts to cotton or other crops as relative prices change and new technology becomes available. For these reasons the following groundnut campaign focuses on the 1970-75 rather than the 1970-85 period. Nevertheless, there are massive investments in infrastructure and institutional reforms required to treble groundnut production and evacuate the shelled nuts or oil; these innovations can only be discussed intelligently in the long-run context of a 10-to 15-year period. Planning for this long-run period requires close working relationships between federal and state agencies, the Common Services Council and external lenders who may be able to assist in financing the investments in transport, storage and processing which are needed to treble and evacuate groundnut output.

Our discussion for the 1970-75 period shall devote attention primarily to removing three constraints (1) input supply—particularly fertilizer, (2) producer incentives, and (3) evacuation.

The specifics of our recommended groundnut campaign are as follows:

1. Each major groundnut producing state should draw up a groundnut production campaign for the 1970-75 period.
2. The package approach of offering intensive extension service and new inputs—mainly fertilizer to small groups of responsive farmers should be the major focus of the production campaign for the 1970-75 period. Extension agents would be concentrated in the major groundnut producing areas and work with a limited number of farmers—say 50 to 75. The key to the extension support of the groundnut campaign lies in getting a limited number of responsive farmers to adopt the recommended practices within a short period of time and then in using these innovations to convince hundreds of other farmers to adopt the practices. The number of farmers served can be increased as farmers and extension agents gain experience. The 1966-67 preliminary investigations into turning over government fertilizer distribution to private firms should be pursued as it is unlikely that the four upper northern states will be able to handle the expanded fertilizer consumption in the amount envisioned under the more favorable producer incentives we propose. It seems reasonable to assume that the entire fertilizer distribution function could be turned over to a private firm(s) by 1973. It is proposed to reduce the level of fertilizer subsidies in 1973 and eliminate the subsidy in 1975 as producer prices are increased in both 1973 and 1975.
3. Improved producer incentives are a central component in the groundnut production campaigns prepared by the states. These incentives can be achieved by reducing export duties, producer purchase taxes and marketing board taxes and by improved marketing efficiency. However, it is our judgment that reduced taxes on groundnut farmers within the next few years—say 1970-72—will not be transmitted into increases in groundnut production in light of the shortage of real resources, namely fertilizer and labor, during the optimum planting period, and in light of opportunities for corruption within market service and buying agencies. For these reasons, substantial improvement in expansion of the fertilizer distribution scheme should be given priority for the 1970-72 period and hopefully turned over to private firm(s) by 1973. In 1973, we propose to raise producer prices by £5 per ton and to raise producer prices another £5 per ton in 1975. The £10 increase in producer prices can be achieved by eliminating export taxes, producer purchase marketing board taxes of £8 per ton and improving marketing, particularly evacuation, and thereby reducing marketing costs by £2 per ton. Improved producer prices of £10 per ton by 1975 or from an average of £27 per ton in 1967-70 to £37 in 1975 will give producers expanded incentives to bring more land into groundnut production, particularly in the North-Eastern State, bring more family labor into groundnut production and provide incentives to use more modern inputs, namely fertilizer, bullocks and bullock-drawn plows.
4. As pointed out above, lack of credit constrains groundnut production. However, the record of cooperatives supplying credit to groundnut farmers has not been very satisfactory to date. For these reasons we are reluctant to recommend an expansion in cooperatives to supply seasonal credit. An alternative to financing seasonal credit is to continue fertilizer subsidies until 1973 or 1975 and to raise producer prices by lowering taxes on groundnut producers in 1973, completely eliminating export, producer purchase and marketing board taxes by 1975. However, an expansion of intermediate credit to finance bullocks and bullock-drawn implements, etc., is necessary. We shall suggest a method of organizing and financing intermediate credit in a discussion of an experimental production-research campaign.
5. Although urgent steps are being taken to solve the evacuation crisis, most attention has been necessarily focused on overcoming day-to-day and week-to-week bottlenecks. Trebling of

groundnut production from 1970-85 requires major investments in transportation, storage, etc. For this reason we recommend that a task force be formed to develop overall plans for the evacuation of groundnut products over the 15-year period, 1970-85. The transport studies of the Economist Intelligence Unit and the A. D. Little studies of the groundnut industry can serve as a useful starting point for the long-range analysis.

6. The economics of the £60 million groundnut industry must be given priority research attention, especially by the major groundnut-producing states. The economics of groundnut production has not seriously been studied to date. The FAO devotes only five pages of their 512-page report to groundnuts.[26] Although the Rural Economy Research Unit (RERU) of Ahmadu Bello University has demonstrated a capacity to undertake relevant research, their resources do not permit them to devote adequate attention to research on the groundnut industry. For this reason we recommend that financial assistance be secured from federal, state, and external sources to expand by several-fold the capacity of RERU within the next one or two years. Priority of RERU research on groundnuts should be directed to the collection of farm management data on the present farm organization, possibilities of expanding productivity through modern inputs, namely fertilizer, and the economics of food grain, cotton and groundnut production as the new hybrid guinea corn and millet varieties are released to farmers in the early 1970's.

We have identified at least three major constraints on greatly expanded groundnut production which can be solved only by concerted federal, state and local effort over a number of years. These constraints are:

1. Labor shortage in the planting season which results in groundnuts being planted after food crops,
2. Inefficient and poorly controlled produce inspection and marketing system and
3. Shortage of intermediate credit for financing animal-powered mechanization.

We have also asserted that Nigeria's £60 million groundnut industry has not received any systematic attention by economic researchers and that the above constraints cannot be solved without substantial experimentation and field research. For these reasons we are recommending that one or several of the key groundnut-producing states follow Senegal's example and launch a concerted production and research campaign over the 1970-75 period which is designed to search for methods of breaking the three constraints—delayed planting of groundnuts, intermediate credit, and produce inspection and marketing. This production and research campaign supplements the general production campaign outlined for all the major groundnut-producing states in the previous section. The production and research campaign could be carried out by one or more states or by a political or geographical subdivision of a state over the 1970-75 period in order to provide useful information for long-term planning from 1975-85. The proposed production and research program may appeal to external financial and technical assistance agencies such as the World Bank.

As a starting point we suggest that an RERU research team of an agricultural economist, agronomist and agricultural engineer join forces with an operational team in the Ministry of Agriculture and Natural Resources in one of the interested groundnut-producing states. We suggest that the joint team pay an early visit to Senegal and closely analyze how Senegal is rapidly expanding groundnut production with French and World Bank assistance. Special attention should be devoted to the organization of the 76 cooperatives in the groundnut campaign area which serve some 90,000 of the 163,000 farmers in the campaign area in Senegal. Members of the cooperatives receive a credit limit of 25 percent of previous year sales of groundnuts and the loans are repaid when groundnuts are sold to the cooperatives. Farmers receive credit in the form of chits (slips of paper). These chits are then exchanged for specific inputs such as hoes, fertilizer, etc. Credit is not extended to the farmer in the form of cash. Farmers are able to borrow for seasonal and intermediate credit needs. Intermediate credit is used to finance the purchase of bullocks and bullock equipment, including plows. Farmers receive intensive extension assistance in learning how to use the new package of inputs. One extension agent works with an average of 230 farmers.

The production campaign in Senegal has been successful far beyond the expectations of the usual critics of cooperatives in Africa. The Senegalese experiment is a package program *par excellence* as it incorporates a variety of approaches to meet the needs of farmers for seasonal and intermediate credit, animal mechanization, distribution of improved inputs and the marketing of produce. In addition, it relies heavily on local farmer leadership to develop their own organization—cooperatives—to meet the needs of groundnut farmers.

Returning to Nigeria, we suggest that the RERU-MANR team focus on one state and develop a joint research and operational program to determine how the new hybrid guinea corn and millet varieties can speed up the planting of groundnuts, how animal

[26] FAO, *op. cit.* pp. 161-166.

mechanization may be introduced more rapidly especially in conjunction with the new hybrid grain varieties, and what types of organizations can be developed to introduce modern inputs at the village and farm level.

Special attention should be directed to methods of improving the produce inspection service and insuring that farmers are informed about the prices of groundnuts which they should receive from licensed buying agents or their subagents at the farm level.

Some experimentation should be directed to the types of organizations such as selling cooperatives which could be developed and eventually become licensed buying agents in order to increase the bargaining power of farmers.

In summary, we have outlined a production and

Table VII.8.—Selected Aspects of Groundnut Production under Alternative Strategies, Nigeria, 1963, 1966, 1967, 1970, 1975, 1985

Year and alternative strategy	Acres	Yield per acre	Total production	Prices to farmers	World price (f.o.b. Nigeria)
	1,000	*Lbs.*	*1,000 Long tons*	*£/ton*	*£/ton*
1963-64	3,100	705	991	30.0	59.3[1]
1966-67	3,700	777	1,291[2]	32.0	
1967-68	n.a.	n.a.	620	29 Grade I 27 Grade II	
1970					
I (Present)[3]	3,330	740	1,100	27	53
II (Recommended)[4]	3,500	765	1,200	27	53
III (Harsher)[5]	3,275	710	1,040	26.2	53
1975					
I (Present)[3]	3,500	800	1,250	27.0	53
II (Recommended)[4]	4,080	880	1,600	37.0	53
III (Harsher)[5]	3,400	720	1,090	26.2	53
1985					
I (Present)[3]	4,125	900	1,600	27.0	53
II (Recommended)[4]	5,830	1,330	3,200	37.0	53
III (Harsher)[5]	3,650	760	1,240	26.2	53

[1]1961-65 average price calculated from NPMC and marketing board data.

[2]The average yield in 1966-67 was substantially above normal because of exceptionally favorable weather. A yield of around 700 pounds and production of about 1,000,000 tons are considered more realistic averages for the late 1960's.

[3]CSNRD I. Tax take per ton of product is calculated at the 1961-65 average rate throughout all the projections.

[4]CSNRD II. Producer and export taxes are figured at the 1961-65 average rates for the period of 1970-73 and then eliminated by January 1, 1975.

[5]CSNRD III. The average 1961-65 producer and export taxes are increased by 10 percent for all the projections.

Table VII.9.—Groundnut Products Projections under Alternative Strategies and Programs: Payments to Farmers from Exports, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975, 1985

Item	1970			1975			1985		
	Strategy			Strategy			Strategy		
	I	II	III	I	II	III	I	II	III
					£000				
Nongovernment revenues generated									
Payments to farmers from groundnuts and groundnut products exported	22,788	25,434	20,450	25,758	48,285	20,698	30,564	103,674	20,200
From domestically consumed groundnuts and groundnut products	5,454	5,454	5,292	6,345	8,547	6,288	8,505	11,470	8,384
Total payments to farmers from groundnuts and groundnut products	28,242	30,888	25,838	32,103	56,832	26,986	39,690	115,144	28,584
Transportation and marketing	15,193	16,956	14,115	17,263	20,880	14,225	20,377	44,832	13,880
Government revenues[1]									
Producer tax	1,181	1,319	1,206	1,335	—	1,212	1,584	—	1,186
Export duties	5,064	5,652	5,174	5,724	—	5,214	6,792	—	5,088
Marketing board surplus	506	565	517	572	—	521	679	—	509
Total government revenues	6,751	7,536	6,897	6,631	—	6,947	9,055	—	6,783
Exchange earnings	44,732	49,926	41,550	50,502	69,165	41,870	59,996	148,506	40,863

[1]Tax take per ton of product under Strategy I is calculated at the 1961-65 average rate for all projections. Taxes, including marketing board levies, are calculated for Strategy II at the 1961-65 average rate for 1970 but eliminated by 1975. The average 1961-65 rates are increased by 10 percent under the Strategy III projections.

research campaign which one or more states might adopt over the 1970-75 period as a supplement to the major production campaign which was outlined for all major groundnut-producing states in the previous section. As the results of this intensive experiment become available, this information can be considered for adoption for groundnut areas not previously included in the initial experiment.[27]

Two tables illustrate the multiple impacts of carrying out our recommended strategy and campaigns over the 1970-85 periods.

Table VII.8 illustrates that groundnut production may increase from 1.2 million tons in 1970 to 1.6 million in 1975 and 3.2 million tons in 1985 under our recommendations. The world price of groundnuts is assumed to be around £53 f.o.b. Nigeria for the 1970-85 period. Nigeria is assumed to be a "price taker" in the world fats and oils market. Even though Nigeria's groundnut production may treble over the 1970-85 period, we assume that this expansion of output will not influence world prices because Nigerian groundnut exports today and in 1985 will still be a small share of the total world trade in fats and oils.[28]

Table VII.8 also summarizes groundnut price policy for 1970-85. Producer prices are increased from £27 to £32 in 1973 and to £37 in 1975 as £8 per ton of taxes are eliminated and improvements are assumed in marketing efficiency which will add an additional £2 per ton to the producer price.

Table VII.9 summarizes payments to farmers, government revenues and foreign exchange earnings resulting from Strategies I, II and III. Payments to farmers from groundnut sales are projected to approximately double from 1970 to 1975 and to quadruple from 1970 to 1985 under our recommendations. Likewise, foreign exchange earnings are projected to increase from around £50 million under our recommendations in 1970 to £69 million in 1975 and £148 million in 1985. In 1970, government revenue from producer taxes, export duties and marketing board surpluses will average around £7 million under all three strategies. However, under our recommendations government revenues will be eliminated in 1975. The £7-million loss in government revenue in 1975 resulting from pursuing Strategy II rather than I or III will have to be weighed against the £23-million increase in farmers' gross incomes and £20 million increase in foreign exchange earnings by following our recommendations rather than present or the harsher strategies and programs. This trade-off will have to be arbitrated through the political process. However, a substantial portion of the £7-million loss in government revenue under our recommendations in 1975 can be recaptured through excise taxes, head taxes and through the operation of the multiplier impact of increased producer incomes. The rest of the loss in government revenue will likely have to be made up by petroleum revenue. (See Chapter Nine.)

Improving the profitability of farming in the groundnut areas is a significant policy issue which must occupy the attention of planners if they are going to come to grips with unequal development in Nigeria. The petroleum development in the South and the high incomes to cocoa farmers through the favorable cocoa prices in the 1970's will move the southern states ahead of the cotton- and groundnut-producing states in terms of rate of growth of per capita income unless urgent steps are taken to improve incentives for farmers in the groundnut and cotton producing areas.

Import Substitution Crops

There are good prospects for selective expansion of a few import substitution crops such as sugar, kenaf, cotton and rice. Investment studies made by CSNRD and other agencies document these opportunities in detail. A suggested production campaign for cotton is outlined in a later section. In addition to the above crops, research should be expanded for wheat as it is a large food import and present irrigated wheat schemes in Nigeria are heavily subsidized by the government. At present, there is little justification for wheat irrigation schemes. Nevertheless, new wheat varieties and research on wheat breeding should be continued until it can be determined whether to (1) abandon government-subsidized wheat schemes. (2) continue limited production (about 7,000 acres were in production in the northern states in 1968) or (3) expand production.

Cotton

Production of cotton textiles is increasing rapidly in Nigeria. The textile industry, started in 1957, used 14,000 tons of cotton lint (raw cotton) in 1964-65 and over 30,000 tons of lint in 1966-67.

Cotton production has also grown rapidly in Nigeria in the past 20 years. Cotton production increased at an annual compound growth rate of 9.5 percent from 1949-50 to 1964-65; the source of this increase in output is almost entirely acreage expansion.[29] Cotton grown under natural rainfall, however, is subject to great fluctuations in yield and output. For example, cotton output fell from 152,000 tons in 1960-61 to 84,764 tons in 1961-62. Likewise, cotton output declined abruptly from 149,000 tons in 1967 to 70,000 tons in 1968, mainly on account of unfavorable weather and shift of acreage to food grains, etc.

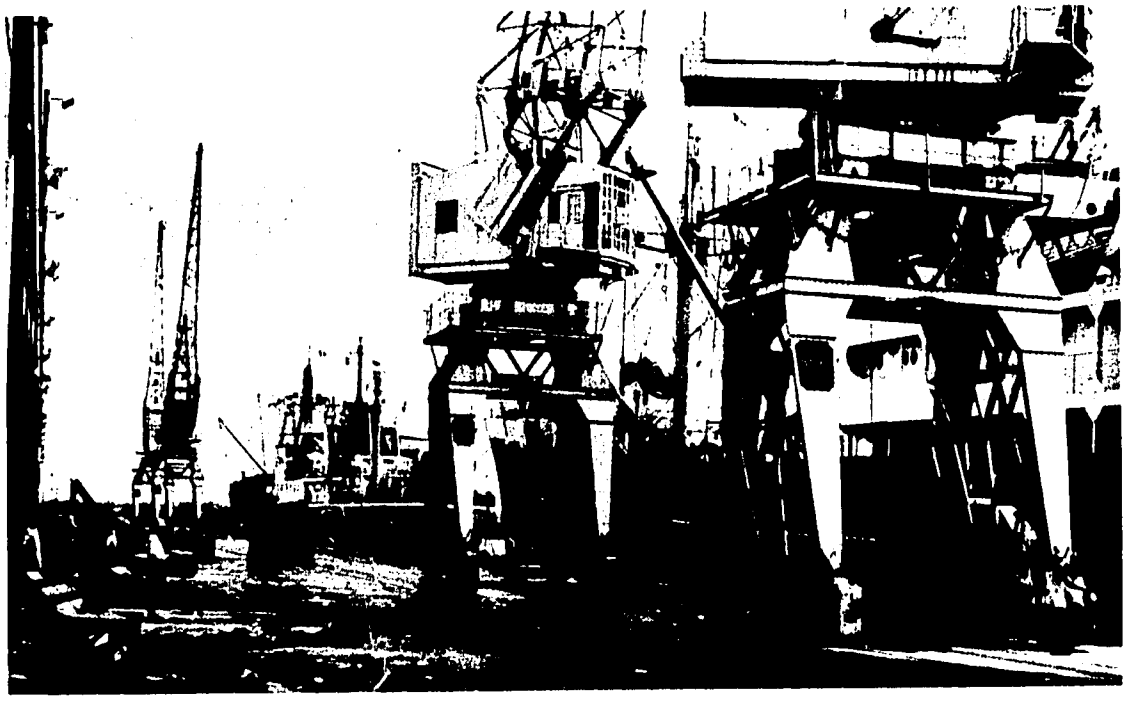
---

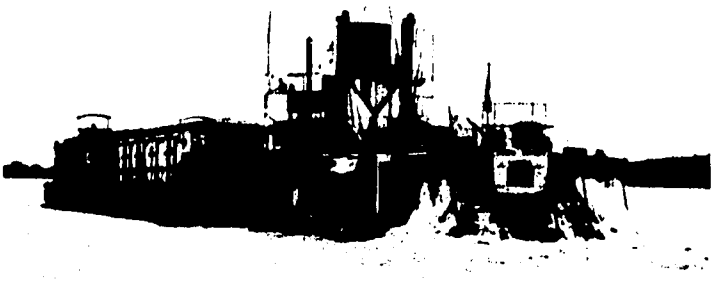
[27]Research results from this experiment, such as animal powered mechanization and selling cooperatives, might also be of great importance to cotton producers, etc.

[28]The most significant factor affecting world prices of fats and oils in the 1970's will likely be U.S. soybean exports which will be greatly influenced by U.S. policies for soybeans.

[29]FAO, *op. cit.* p. 505.

Industry Should Be Self-Sustaining





Cotton represents approximately three-fourths of all textile consumption in Nigeria. Cotton consumption is projected to grow rapidly, perhaps by 60 percent, during the next 15 years. The two major determinants of cotton consumption are population and per-capita income.

We have pointed out that the population is projected to increase by 33 million over the 1970-85 period or from 67 million in 1970 to 100 million in 1985. An important variable influencing per-capita consumption of cotton is the growth in per-capita income of the masses. If our recommendations are implemented, the value of agricultural exports could double from 1970 to 1985. Since Nigeria's agricultural exports are produced by millions of small farmers and export earnings are widely distributed to the masses who produce export crops, it seems reasonable to assume that per-capita consumption of cotton will increase at the rates projected by the FAO, or from 2.25 pounds in 1970 to 3.6 pounds in 1985. The specific assumptions about per-capita consumption of cotton are spelled out in Table VII.10.

Table VII.10.—Projected Per Capita Consumption of Textile Fibers And Cotton in Nigeria

Year	Projected population[1]	Projected total fiber consumption per capita	Projected consumption of cotton lint (raw cotton per capita under CSNRD II)[2]	Projected total consumption of cotton under CSNRD II[5]
	Million	*Pounds*	*Pounds*	*long tons*
1963	55.6	2.3[3]	2.05	51,000
1966	60.8	2.8[3]	2.02	55,000
1970	67.0	3.0[4]	2.25	67,000
1975	75.9	3.6[4]	2.70	91,000
1985	99.6	4.8[3]	3.60	160,000

[1]CSNRD estimates.

[2]Cotton consumption estimated as three-fourths of total textile fiber consumption.

[3]CSNRD estimates.

[4]Total fiber consumption per capita, 1966-1975 from FAO, *op. cit.*, p. 167.

[5]Includes some imports of cotton cloth.

The above discussion indicates that cotton can be a major source of income, employment and overall growth of the Nigerian economy—especially in cotton-producing and textile-manufacturing areas. However, the underlying factor in our analysis is our assumption about income distribution. If our strategies and policies are carried out, incomes of the masses will be improved and these improved incomes will be transmitted into effective demand for products such as cotton textiles. The expanded demand, in turn, will provide employment in textile plants and associated firms.

Our analysis has led us to be optimistic about cotton as a large and profitable import-substitution industry which can benefit cotton farmers, cotton textile mills and Nigerian consumers.

The key to efficiency in cotton production in the northern states lies in higher yields. Researchers in the IAR at Samaru contend that cotton yields can be stepped up readily through earlier planting. Since cotton is frequently planted after food crops and sometimes after groundnuts, a cotton production campaign must break the food-crop bottleneck. The research on millet and sorghum breeding at Ahmadu Bello University indicates that dwarf hybrid sorghum varieties will be available to farmers by 1973 and dwarf hybrid millet varieties by 1975 to increase sorghum and millet yields by 40 percent. The increased sorghum and millet yields will require 30 to 40 percent less acreage per farm family in order to meet family staple food needs. The labor released from planting a smaller land area in sorghum and millet can then be turned to planting cotton or groundnuts earlier in the season.

The above discussion illustrates the close interdependence between the improvement of cotton production and agronomic research on millet and sorghum and the need to coordinate the extension and credit assistance offered to farmers producing cotton, millet and sorghum. The extension-credit agents can, at one and the same time, encourage farmers to plant cotton earlier by focusing on rapid farmer acceptance of the hybrid sorghum and millet varieties as they become available during the 1973-75 period. Earlier planting will also be facilitated by increased adoption of bullock power, and the increased use of fertilizers and pesticides. These modern practices should also be part of the extension promotion campaign.

The Ivory Coast has demonstrated that cotton production can be increased rapidly through an intensive campaign approach. Cotton output has increased in the Ivory Coast from 5,000 to 50,000 bales within the past five years. Since Ivory Coast farmers have been receiving about the same price as Nigerian farmers received in 1968 — about 6 pence per pound of seed cotton—there are good indications that cotton yields in Nigeria can be more than doubled in Nigeria from 1970-85.

We recommend that the growers' price for seed cotton be continued at a little over 6 pence a pound—the price to which it was advanced by the cotton marketing board in 1968, and that the increase in farmers' price be paid by raising the marketing board price of seed cotton to the domestic mills. This is equivalent to an increase in price to local mills of 5 pence per pound of lint over the 1961-62 to 1965-66 average, and makes the cost to the mills approximately the 1968 Liverpool price less transport and handling costs. It is recommended that marketing board producer prices be announced to farmers well in advance of the planting season.

We propose, however, that such a price increase be accompanied by greatly improved inspection service to insure that farmers receive gazetted prices. In general, the produce inspection and marketing systems for cotton are not performing efficiently, and it is reported that farmers are receiving from 20 to 40 percent less than the gazetted price. Increasing gazetted prices without first improving produce inspection and marketing procedures would result in little real improvement in actual prices to farmers. Hopefully, the lessening of leakages and increases in gazetted prices would give farmers an increase of as much as 50 percent in realized price over levels of recent years.

The main thrust of a cotton production campaign should be through extension demonstration plot programs embracing improved practices and varieties for cotton and for the food grains. There is ample room for raising average yields merely by applying existing knowledge. At present, for example, with normal late July or August planting, use of no fertilizer, no spraying and weeding only after the end of the rains, the yield is believed to be in the range of 200 to 250 pounds of seed cotton per acre. By planting in the first week of July, applying fertilizer and moderate spraying, the yield can be increased to 500 to 600 pounds. With mid-June planting, 6 timely sprays, proper weeding and spacing and 2 cwt. of fertilizer per acre, yield can be increased to about 1,000 pounds of seed cotton.

Farmers need loans to purchase trained bullocks as well as fertilizer and sprays for their cotton if efficient production is to be realized. In the early years, emphasis should be upon better food grain varieties to encourage smaller acreages, thus permitting earlier cotton planting.

Before launching any kind of cotton program, an economic appraisal should be made to determine the areas having a comparative advantage in producing cotton. At present, cotton is produced in widely scattered locations, much of it on soil better suited to groundnuts. Parts of the North-Eastern State appear to offer superior long-term advantages for cotton production. The Western State, nevertheless, is considering intensive efforts to develop cotton production. Preliminary appraisal by CSNRD indicates that the Western State should obtain competent economic advice on the profitability of cotton and alternative crops before rushing ahead with major cotton production campaigns. It is almost certain to be much cheaper to produce cotton in the northern states for use throughout Nigeria as the cost of transporting lint from the north to the seacoast is only 1 pence per pound.

Tables VII.11 and VII.12 point up the projected cotton production, export earnings from cotton, government revenues and payments to farmers under the three alternative strategies. The most significant aspects of Table VII.11 are the potential to greatly increase the productivity of cotton farmers under our recommendation and the prospect of increasing the use of domestic cotton lint in Nigerian textile firms by more than three-fold or from 46,000 tons in 1970 to 150,000 tons by 1985.

However, it is important to note that per-capita and total domestic cotton consumption as outlined in Tables VII.10 and VII.11 will increase as a result of the favorable general economic policies for the country under our recommendations, including expanded effective demand and increased per-capita incomes. This discussion illustrates the close interdependence between agricultural and general economic development policies.

Foreign exchange earnings from cotton in 1985 as projected in Table VII.12 are maintained at about 1967 levels under our recommendation, whereas they disappear under either a continuation of present or a shift to a harsher strategy and programs. Payments to the one-quarter million cotton farmers under our recommendations would be almost double the £16 to £17 million paid under the other two strategies in 1985.

Kenaf[30]

Historically, Nigeria has been an importing country for hard fiber bags (chiefly jute) used for packaging of its chief exports: agricultural products such as groundnuts, palm kernels, cocoa, coffee, rice, maize, cotton, beans and other agricultural products, as well as some nonagricultural uses. In 1952, 20 million bags were imported at a cost of £2 million. By 1966, bag requirements had grown to 40 million bags costing £6½ million in foreign exchange.

A recent FAO report on the fiber situation pointed out that needs for fiber are expected to increase substantially in Africa until 1975. The report does not expect inroads from bulk handling facilities, paper or plastics to be significant in Africa prior to 1975.[31]

Three reasons could be given for the development of a bast fiber industry in Nigeria: (1) diversification of agriculture with the addition of another crop for which a ready market is obviously available; (2) the creation or expansion of a labor-intensive manufacturing industry by the fiber industry; and (3) reduction of imports of packaging materials which could save Nigeria a substantial quantity of foreign exchange.

The establishment of a fiber industry in developing areas can be approached in one of two different ways, both of which are being used in Nigeria: The crops can be grown on large plantations where mechanical

---

[30]The material on hard fiber presented here was written by Dr. Anita Whitney, Department of Agricultural Economics, Michigan State University.

[31]Tomy-Martin, P. *Prospects for Jute, Kenaf and Allied Fibers in African Countries* CCP:JU 68/Working Paper 1 August 1, 1968 FAO, Rome.

Table VII.11.—Selected Aspects of Cotton Production under Three Alternative Strategies, Nigeria, 1963, 1967, 1970, 1975, 1985

Year and alternative strategy	Acres	Yield per acre in seed cotton	Production seed cotton	Imports of cloth (in lint equivalent)	Lint		Price to farmers seed cotton
					Export	Domestic	
	1,000	*Lbs.*	———	*1,000 long tons*	———		*Pence/lbs.*
1963	1,112	260	129	43	—	—	4.7
1967	1,284	260	149	23	19	32	4.6
1970							
I (Present)	1,200	260	139	21	6	40	4.9
II (Recommended)	1,500	300	200	21	21	46	6.2
III (Harsher)	1,100	255	125	21	2	40	4.8
1975							
I (Present)	1,325	280	165	20	—	55	6.9
II (Recommended)	1,600	400	285	10	14	81	6.2
III (Harsher)	1,150	270	139	23	-4	50	7.2
1985							
I (Present)	1,700	350	265	31	—	88	6.5
II (Recommended)	2,300	500	513	10	21	150	6.2
III (Harsher)	1,800	325	260	34	—	87	7.2

Table VII.12.—Cotton and Cotton Products Projections under Alternative Strategies and Programs:[1] Payments to Farmers from Exports and Domestic Consumption, Government Revenues and Exchange Earnings, Nigeria, 1970, 1975 and 1985

Item	1970 Strategy			1975 Strategy			1985 Strategy		
	I	II	III	I	II	III	I	II	III
	———	———	———	———	*£000*	———	———	———	———
Nongovernment revenue generated									
Payments to farmers from cotton exported	811	3,521	258	—	2,385	—	—	3,578	—
From domestically consumed cotton	5,430	7,714	5,242	10,428	13,802	8,976	15,735	25,560	16,765
Transportation and marketing[2]	—	—	—	—	—	—	—	—	—
Government revenues									
Producer tax[3]	14	10	14	16	—	15	27	—	28
Export duties	19	26	7	—	—	—	—	—	—
Exchange earnings	2,914	6,946	1,844	908	6,700	1,109	3,042	12,366	2,774

[1]No allowance has been made for a possible program to substitute domestic production for gray cloth imports.

[2]Not calculated.

[3]Taxes, including marketing board trading profits under Strategy II are calculated at one-half of the 1961-65 average rates for 1970 and eliminated by 1975. Tax take per ton of produce under Strategy I is calculated at the 1961-65 average rate for all projections. The average 1961-65 rates are increased by 10 percent under the Strategy III projections.

means are used for the production of ribbons which are retted in water impoundments such as concrete catchments and canals or by smallholder production. The second more primitive method is used in Pakistan, India, Thailand and Ghana. Farmers grow fiber on small acreages, doing the retting in local water holes, ponds or small rivers. The manufacturer then purchases the retted fiber from the farmers.

The NNDC found in 1965 that local farmers could produce the traditional hand-stripped kenaf ribbons (used for local ropes) more easily than retted fiber because of the shortage of water in the Jema area. Spinning and weaving tests using the unretted fiber to make bags gave excellent results, and it was decided to promote a bag-manufacturing industry in northern Nigeria. A sack mill with an annual capacity of 11 million bags utilizing 11 thousand tons of raw material was built at Jos and went into production in 1967.

Unretted fiber is produced around Jema where commercial production first started during the 1964-65 season. A total of 700 tons of ribbon was produced and bought by the Fiber Scheme for the Jos factory. Most of this crop was grown in fields of less than a quarter acre on which the average grower produced less than ½ ton of ribbons. This meant at least 1,500 farmers in the North-Central State were producing kenaf as a cash crop. It was found that ½-acre plots were beyond the capacity of individual farmers and that ¼-acre plots were a more manageable size.

In 1967 it was found that satisfactory quality retted kenaf fiber could be produced by farmers along the Benue river. Unfavorable market conditions for soya beans and benniseed encouraged the adoption of a new cash crop with a ready market. As with the unretted

fiber, ½-acre plots were found to be too large for individual farmers to manage. However, some good quality retted fiber was purchased by the mill at Jos, especially from the Makurdi area. During the 1968-69 season, both the retted and unretted fiber were purchased under a grading system for the first time. During the 1967 season, 200 tons of good quality retted fiber were obtained, with more than 1,000 farmers involved in its production. In the future, seed for only ¼-acre plots will be distributed to farmers, especially along the Benue river. Other areas along the Niger river also appear to be suitable for the growing of retted fiber.

The government of Western Nigeria, in cooperation with an Italian firm, built a sack factory at Badagary in 1966 with a maximum capacity of 10 million bags per year. The choice of site is unfortunate; the centers for production are located at some distance and hauls of bulky fiber of up to 200 miles are not uncommon. It is currently operating, utilizing a very small percentage of locally grown fiber, with the bulk of the raw material being imported from Thailand.

In Western Nigeria the decision was made to produce fibers using a plantation scheme. In 1965 and 1966, approximately 13,000 acres were planted to kenaf in the savannah areas around Ilaro, Shaki and Oyo. To date, not more than 3,000 acres have been harvested for fiber in a year from a much larger planted acreage. With the existing harvesting difficulties, much of the crop has been utilized for seed production, resulting in a successful seed multiplication program. Considerable acreages of dry and overly mature kenaf were lost to fire in the last three seasons.

Several other problems have been evident with the large-scale plantations in Western Nigeria. Mechanized preparation of land for kenaf production requires significant organization to allow timely planting schedules. Fertilizer supplies and application must be coordinated with planting dates. With an optimal harvesting period of about 10 days (using mechanical decorticators) it is desirable to spread out the harvesting period by planting at intervals of about a week, which means that 6 to 10 plantings should be spread over a 60-day period in the Western State.

If present production and harvesting problems are solved, other negative attributes of mechanized large-scale production remain. Agricultural employment is minimal; production returns will be limited to owners of large acreages utilizing the machinery necessary for large acreage land preparation and harvesting. Foreign exchange earnings must be utilized for purchasing and maintaining machinery.

Utilizing good management techniques and attracted by the possibility of adequate returns, two farmers in the West have purchased and are using their own machinery on approximately 40 acres each. These farmers had planted 200 acres each in prior years, but had only been able to harvest utilizable quality fiber from 80 acres. Data from some of these experiences will enable further evaluation of the plantation approach to kenaf growing.

In eastern Nigeria, trials for growing hard fiber were started at Umuahia in 1965. The trials have mainly involved jute varieties. Of these, B.Z.4 was found to yield both good seed and fiber, although it is mainly suitable for the northern zone of eastern Nigeria. Trials were conducted in both the Ogoja and Ikom areas. At Ogoja, yields of 1½ tons of fiber per acre were obtained which was very satisfactory.

It was felt that costs of production would not exceed £25 per ton and that farmers could obtain very satisfactory cash returns from growing this crop in the eastern states. The establishment of a factory for sack-making in the eastern states would appear to be a commercially feasible project, given the very favorable costs of production anticipated. Bag requirements in the East are sufficiently high to justify a factory with an annual production capacity of approximately 10 million bags.

The future of bast fiber production in Nigeria looks most promising for smallholder schemes. Production of fiber in the North has been found to offer sufficient cash returns to a large number of farmers, and a high rate of adoption of the new cash crop has been achieved. It has been demonstrated that good quality material can be delivered at the factory at commercially feasible prices.

Successful operation of commercial plantation production of fiber as practiced in Western Nigeria has still to be proven. The location of the factory 100 to 200 miles from the major growing area adds substantial transport charges to the cost of production. The skill necessary to manage the required machinery, labor and supplies involved in kenaf production has not been attained.

Jute production and processing appear to offer distinct possibilities for the eastern states. With the present manufacturing capacity only capable of meeting 50 percent of Nigeria's requirements for bags, another factory could be established. Experiences under Nigerian conditions would encourage the adoption of a smallholder scheme for the eastern states. If further expansion of domestic manufacturing of bags is desired, enlargement of the capacity of the Jos factory would also appear to be indicated.

There are several negative factors that should be considered. First, there is a world-wide tendency to go to bulk handling rather than using bags. If Nigeria gears up to handle bulk products (by railroad, lorry, barge and ship), the demand for bags could fall sharply. Secondly, the use of plastic bags is becoming widespread for fertilizer, etc. Thirdly, insufficient eco-

nomic studies have been made of the real costs and returns to Nigerian farmers. Recommendations for future development of fibers in Nigeria would include the following:

1. Local research and development of fiber varieties in conjunction with quality seed multiplication,
2. Adequate extension efforts to teach farmers better planting techniques, use of fertilizers, field cultivation, hand-stripping methods, retting, washing and handling techniques,
3. Encouragement of purchasing graded fibers with initially a high reward for a quality fiber production,
4. Development of a "bulkers" role in assembling fiber,
5. Research and development of low-cost, mobile, hand-operated decorticators,
6. Government testing of bags for use by the marketing boards with establishment of specifications for use in purchasing, and
7. Closer government coordination of imports of hard fiber and manufactured bags with Nigerian production.

Sugar

The only one of the "big four" food imports—fish, milk and cream, sugar and wheat—which in the judgment of CSNRD should be a major target for domestic expansion is sugar. Imports were still substantial in 1967 even though the Bacita sugar complex is in production. High priority should be given to expanding sugar production in Nigeria.

Wheat

When a flour mill was opened in Lagos in 1962, import duties on flour were increased and wheat quickly replaced flour imports. Wheat imports have increased steadily and bread consumption is increasing rapidly especially in the cities of southern Nigeria.[32]

In 1968 about 7,000 acres were planted to wheat in Nigeria, mainly in the North-Eastern, Kano and North-Western States. Most of this acreage is irrigated, and yields of only 1,500 to 2,000 pounds per acre have been achieved. Preliminary studies indicate that wheat production is heavily subsidized by the Nigerian government. The current enthusiasm for developing irrigation systems for planting tens of thousands of acres to wheat in the Kanji, North-Western Dam area, North-Eastern and Kano States should be meticulously analyzed by economists and a visiting wheat expert from, say, the Rockefeller Foundation group in Mexico. IITA could probably cooperate on this. Some scholars justify subsidizing local wheat production on the basis of foreign exchange savings. However, the projected dramatic jump in petroleum will most likely remove the foreign exchange constraint and eliminate this justification for subsidizing crops such as wheat.

Meanwhile, increased research attention should be devoted to plant breeding and importation of improved varieties from Mexico and East Africa, in order to determine if a new "model" of wheat can be developed to produce 4,000 to 6,000 pounds per acre. Unless considerably higher wheat yield than the present 1,500 to 2,000 pounds under irrigation can be attained, it will most likely be cheaper for Nigeria to import wheat at about £30 per long ton in Lagos than it would be to invest in large capital schemes to promote irrigated wheat production.

Rice

Rice is a superior food which is being substituted for cassava and yam in the diets of urban consumers and to a limited extent in the diets of rural people. However, Nigeria is virtually self-sufficient in rice production with the exception of a small quantity of package rice. The major problems of the Nigerian rice industry are constraints on demand imposed by the lack of consumer purchasing power and the high cost of rice production. Field research is urgently needed to identify means of reducing the cost of producing rice in order that Nigeria's surplus land and labor resources can be used to produce rice for the West African market.[33] Several countries, e.g. Senegal and Liberia, import rice from outside of West Africa. For the above reasons we recommend a greatly expanded research program for rice, including an analysis of the means of lowering the cost of producing rice in Nigeria and the consumer preferences for rice in West African importing countries.

Nutritionally Superior Foods

In addition to vigorous production campaigns for export and import substitution crops, we recommend limited production and research programs for a few nutritionally "superior foods" such as eggs, maize, beans, millet, grains, soybeans, meat and milk, etc. for the domestic market. We stress limited production campaigns for these foods because, as pointed out earlier,[34] present effective demand for these products is very limited. Prospects for demand expansion are linked to population growth, nutrition education and growth in per-capita income. In addition to limited effective demand, the cost of producing some of these superior

[32] Kilby, Peter, *African Enterprise: The Nigerian Bread Industry*. Stanford: Hoover Institution, 1965 and Patterns of Bread Consumption in Nigeria, *Food Research Institute Studies* Vol. V, No. 1 (1965), pp. 3-18.

[33] Reese, James, *et.al. Rice in West Africa* U.S. Dept. of Agriculture and U.S. Agency for International Development, Washington, 1968.

[34] See Food Production, Nutrition, etc. Chapter two.

foods such as eggs and poultry meat are relatively high —mainly because of the high cost of feed grains.[35]

Superior foods other than beef

The combination of limited effective demand and relatively high cost of producing nutritionally superior foods calls for the following action:

1. Modest production campaigns should be developed for nutritionally superior foods within the limits of effective demand constraints.
2. Nutrition education programs should be expanded by home economics extension agents, public health agencies, etc.
3. Research should be expanded to reduce the cost of producing nutritionally superior foods.

As incomes are increased, there will be a market for increased production of selected nutritionally superior foods. States have a capacity to develop these production campaigns. The danger, in our judgment, may be in states allocating too much attention to the production of superior foods.

For example, the poultry industry in southern Nigeria quickly moved through an import substitution phase from 1960-66 and locally produced eggs replaced egg imports. Although the price of eggs has fallen from 7s to around 4s per dozen of large eggs, the masses are not reached by 4s eggs. The markets for superior foods such as eggs are very limited and, as such, will not provide either a major dynamic for overall growth of the agricultural sector or major benefits for the masses of Nigerian poor people until incomes are increased.

In addition to limited production campaigns we recommend that greatly increased research attention be directed to the development of new crops such as high-lysine maize and pulses and to lower the cost of producing such commodities as meat, etc. We shall comment only on such an applied research program for livestock, as it is a large and complex industry which urgently requires attention of applied researchers.

Meat from grazing animals is among the superior foods that must receive major consideration in development planning. Large acreages in the northern states are useful primarily for grass or forage production; and large numbers of people are engaged in range livestock production, in the handling of milk from Fulani cattle, and in the marketing and processing of cattle and goats.

There will be demand for increased quantities of high-quality proteins to make up for the protein deficiencies in the Nigerian diet as incomes of consumers improve and as nutrition education becomes more general. The extent to which this demand will be met by the red meats will be influenced by the comparative costs of the various competing sources of proteins and the level of incomes.

The Nigerian beef industry

Nigerian beef production is characterized by fluctuations in feed and water supplies resulting in lengthy migrations of herds, losses in weight and fluctuations in sales. As the human population increases, range resources become less adequate, resulting in overgrazing. Management problems are further complicated by the presence of tsetse-infested areas which preclude the use of large acreages by livestock, and results in infection of cattle moving from the North to the southern consumption centers.

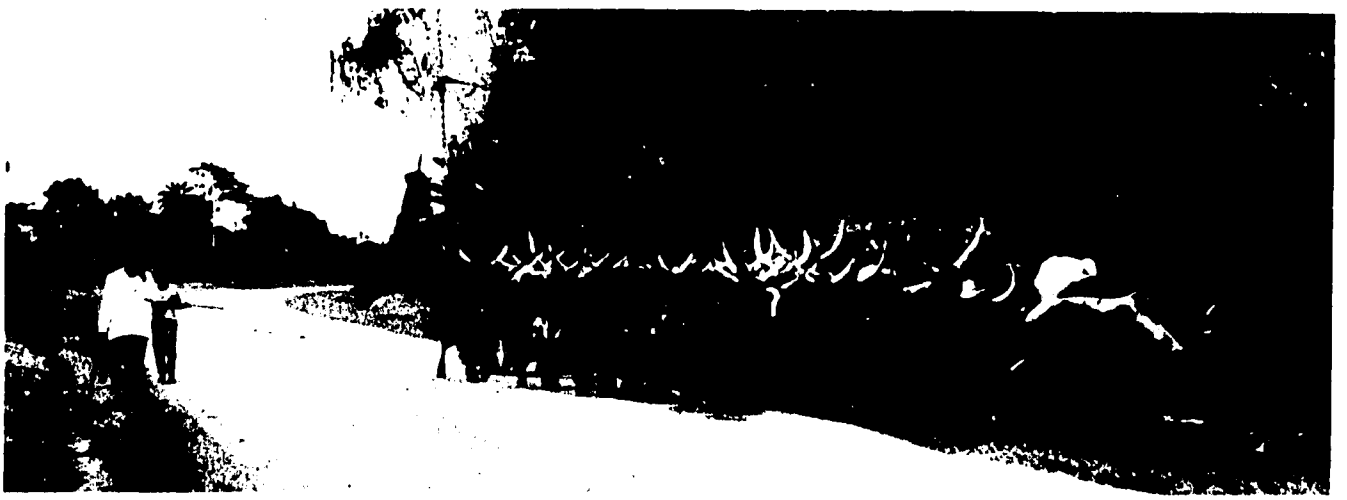
The livestock industry has developed a number of institutions which seem to impede modernization, such as the traditional arrangements for marketing, slaughter and meat distribution. The processing and marketing of beef appears to be dominated by strong butchers' unions which can often forestall changes introduced into the marketing system.

The tastes of the mass public have been oriented for many years to undifferentiated, relatively tough, low-quality beef which has been bought "hot" to assure freshness, and needs to be thoroughly cooked in order to assure sanitation. By-products are effectively utilized as human consumption items. There currently appears to be only a small percent of the market—primarily expatriates and some of the "new elite"—oriented toward the consumption of high quality beef processed under modern, sanitary conditions and sold as cuts differentiated both on a price and quality basis. Increasing the market for better-quality beef in the domestic market will require some consumer education even if incomes increase to the point where this kind of product can be afforded.

The possibility of exporting beef is presently limited by the prevalence of many diseases in Nigerian cattle. Further, the unacceptability of the current low-quality, tough Nigerian beef as fresh or frozen products in many potential importing countries will block exporting efforts until quality is improved. The processing of low-quality beef as corned beef, dehydrated beef, stew etc. —and selling it as an import substitute enforced with controls on the importation of meat to save foreign exchange—is being expanded now. The level of import duties, transport costs, and comparative advantage of production and processing relative to other countries is crucial to determining whether exporting Nigerian beef will be commercially feasible.

The Livestock and Meat Authority (LMA) is the central agency for determining policies and programs for modernizing the beef industry. However the LMA will have to develop close working links with the states

[35]Research in the northern states of Nigeria by USAID Advisor Arthur Hannah indicates that input-output coefficients for feed grain conversion of poultry are at least as good or better than those on well-managed poultry farms in the United States. Hence, the main problem on the supply side is not one of breeding poultry for the Nigerian climate but one of reducing the cost of the main input—feed grains. Likewise, the problem on the demand side is one of generating effective demand by the masses.



The Nigerian Beef Industry Needs:

- *improved breeding stock*
- *improved pastures and feed supplies*
- *better water supplies*
- *better transport facilities*
- *an international market*

in order to develop policies and programs which will be implemented by the states and local governments. For these reasons we recommend that a production and research campaign for livestock be developed by the LMA and the states which focuses heavily on applied research on grazing and water management.

Major guidelines for the LMA include the following:

1. The LMA should be used to coordinate, plan and promote the livestock industry and actively engage in solving practical research problems. Specifically:
   a. Existing production and marketing ventures under LMA control should be screened to dispose of any that are not viable. Efforts should be made to find private and cooperative firms that can take over some of the successful ones.
   b. No new ventures such as livestock feeding should be undertaken without careful prefeasibility study.
   c. Present efforts to expand statistics and market intelligence activities are commendable and should be encouraged. However, a farm management expert is needed to collect data on the economics of beef production under present and alternative range management techniques.
   d. LMA should establish national linkages, improve marketing and transport channels, and rationalize procurement and processing activities.
   e. LMA should sponsor a demand study of meat consumption in the southern cities to ascertain prospects for producing and selling more high quality beef.
   f. The LMA should encourage and support a careful study of export potentials for Nigerian meat and meat products, taking into account world market trends and the competitive position of Nigeria with other African countries and the major meat-exporting countries.
2. Present moves to establish grazing reserves by the northern states should be expanded and followed up by increased work on range control and range management on pilot ranges where experience can be gained.
3. More socio-economic studies are needed of means of assisting the Fulani, before rushing into settling them in communities.
4. Applied research should include some attention to the economic and institutional problems of expanding the controlled grazing scheme which looks so promising under pilot operation to date.

In summary, the Nigerian beef industry is a large and complex system which requires heavy applied research inputs in the 1970's. The LMA is the logical focal point for expanded programs of applied research. However, this applied research should be developed in close coordination with state agencies, university researchers and other organizations such as the proposed livestock research project for West Africa.[36] The LMA can effectively utilize three or four technical assistance experts over the 1970-75 period.

Research and Development Program for Staple Food Crops and Feed Grains

Since the production of the four major staples—guinea corn, millet, cassava and yams—satisfies effective demand at present low levels of incomes and is growing about as rapidly as population, there is little economic justification for Nigeria to launch major food production campaigns in the early 1970's unless: (1) it becomes possible, through new technology, to reduce the cost of production of staples (starch) to world price levels and enable Nigeria to become a food, livestock feeder and exporter and/or to reduce the cost of production of livestock, or (2) Nigeria succeeds in expanding effective demand rapidly. Instead of being concerned with mere self-sufficiency as a target, Nigeria should explore how it can use its surplus productive capacity in agriculture to begin to export selected feed and food items as, for example, Kenya has become a maize exporter and has developed a livestock feeding industry.[37] However, present low Nigerian yields of the major staples do not enable her to compete in the world feed and food market.

Donor nations can best help Nigeria with feed and food grain production by strengthening the capacity of Nigeria to undertake sustained research to develop new varieties of food and feed crops and improved practices which will substantially increase farmer yields in the same way the Mexican dwarf wheat and IRRI rice varieties have revolutionized farming in Pakistan, India and Mexico. Since the Ford and Rockefeller foundations are now establishing the International Institute of Tropical Agriculture (IITA) in Nigeria to do research on food crops, prospects for similar biological break-throughs in food and feed crops are improved. Nigeria can help herself by using her own resources for similar research and by taking steps to increase the effective per capita demand of her poor people for food. As CSNRD researchers envision it, the second main and long-run thrust in Nigerian rural development is likely to grow out of biological advances for food and feed grains. This thrust is likely to materialize in from 5 to 10 years time and production campaigns will then have to be developed by the

[36] See Chapter Eight, p. 124; also, Herrmann, Omer W., *Livestock Research Center for West Africa: A Research Proposal*, CSNRD-23 April, 1969.

[37] President's Science Advisory Committee, *The World Food Problem*. The White House, Washington, D.C., May 1967. Vol. II, pages 221-222, 225.

states to promote food production (see pages 70-71).

As a final note, it should be added that food production in the tree crop zones will decline if the production campaigns for cocoa, oil palm and rubber are pushed forward as outlined in this chapter. This means that area specialization will be facilitated and the southern states will purchase an increasing amount of food from the middle belt and upper northern states. The results of Victor Smith's research illustrate the profitability of increasing food production in the northern states in order to supply more food to the tree crop zones. For these reasons pilot food production campaigns should be developed in the middle belt and northern zones in the early 1970's in order to identify through applied research the obstacles to major expansion of food production in that zone. The FAO pointed out in their 1966 report that the middle belt could become "the bread belt" of Nigeria. However, not enough has been done in the past 3 years to follow up this challenge and find some of the technical and economic coefficients in producing food under improved technology in the middle belt. Federal-state experts should investigate this opportunity over the 1970-75 period.

CSNRD Recommendations also Require Curtailment of Ineffective Programs

In this chapter we have dwelt on the opportunities for agricultural development through carefully laid-out production campaigns. In stressing these opportunities for development, there is a danger of leaving the impression that it will be easy to move from the present agricultural and fiscal policies to our recommended strategy, policies and programs. However, moving from present policies and projects to our recommendations will be difficult in light of reluctance to save resources by abandoning government agricultural schemes even after years of unsatisfactory performance in order to pay for new development projects. Though it will be difficult to move from present policies to our recommendations, we must point out that human and financial resources will not be adequate to continue many of the present government direct-investment agricultural schemes while the production campaigns spelled out in this chapter are being launched.

The transition from present policies and programs to those we recommend can be achieved only by phasing out some government schemes such as farm settlements, by modifying government policies such as marketing board and pricing policies, and by revamping such programs as the produce inspection service, etc. To achieve this transition from present policies, major initiative will have to be taken by the states in close cooperation with appropriate federal agencies. For example, the states can no longer afford to formulate agricultural policies in isolation from the federal government, especially in light of petroleum and the opportunities for shifting some of the tax burden from agricultural exports to petroleum.

In summary, a new era in federal-state relations will have to be developed in order to make the transition from present to our recommended agricultural and fiscal policies. This transition implies a careful review of present projects and programs and the necessity of making many tough decisions to phase out some schemes, such as farm settlements and governmentally operated plantations, in order to release human and financial resources for the production campaigns. Unless these tough decisions are made, the opportunities as outlined in the production campaigns will turn out to be elusive opportunities, scarcely transferable from paper to reality.

CHAPTER VIII

Programs to Reinforce Production Campaigns and to Provide Long-Run Support to Rural Development

We have reported that enlightened agricultural policies and programs can achieve significant increases in GDP, export earnings and farm income of Nigerian farmers. We advocated that the major investment and promotional effort in agricultural development should be given to production campaigns for export and import-substitution crops, with more limited campaigns for nutritionally superior foods and with vigorous research and development work on staple foods to reduce production costs. In this connection we have stressed the importance of policies that will stimulate growth and concentrate the use of scarce administrative resources in production campaigns. We have argued that the long-run gains for Nigerian agricultural growth should be sought through research to obtain technological advance, mainly with respect to crops but also with respect to beef production. All of these steps deal rather directly with production.

This chapter, by contrast, deals with administrative arrangements, institutions and infrastructure for support of the production campaigns in the short run, and for the support of general rural development in the long run. As such it has sections on (1) strengthening the Federal Ministry of Agriculture and Natural Resources, (2) strengthening agricultural planning units in the State Ministries of Agriculture and Natural Resources, (3) education for agriculture, (4) agricultural research, (5) an agricultural credit program, (6) rural community development, food aid, infrastructure and reconstruction projects, (7) family planning, (8) strengthening managerial and private financial resources and (9) changing federal, state and local relationships as they affect rural development.

Strengthening the Federal Ministry of Agriculture and Natural Resources

CSNRD heartily endorses the earlier recommendation by the UN Food and Agriculture Organization that a Federal Ministry of Agriculture and Natural Resources be established in Nigeria. Though the considerations which led FAO to make this recommendation are for the most part still valid, the case is further strengthened by the creation of new states and the unsettled issues of the present civil war. As many of the new states have limited financial and manpower resources, federal financing will be of increased importance. Thus, it is now even more imperative that an effective central agency exist to help represent Nigerian agriculture at the national level even though the state ministries of agriculture and natural resources will, and should, bear major responsibility for designing and executing programs.

Though a Federal Ministry of Agriculture and Natural Resources has been established, it has not yet been developed to the extent anticipated by the FAO report. Further, though some of the detailed FAO recommendations as to the relationship between the Federal Ministry of Agriculture and Natural Resources and the ministries in the former Regional governments have been rendered obsolete, the need to perform the functions which the FAO investigators had in mind is even more pronounced than at the time that report was written.

CSNRD research has revealed the advisability of having still other functions performed by the Federal Ministry of Agriculture and Natural Resources. For instance, CSNRD research has revealed the crucial role played by marketing board operations in limiting effective demand for Nigerian agricultural products. This suggests that the Federal Ministry of Agriculture and Natural Resources should be in a position to have substantial influence on the operation of marketing boards in order to bring out the full potential of Nigerian agriculture. Further, CSNRD research with respect to agricultural credit has indicated the importance of linking production campaigns with agricultu-

ral credit programs, linked in turn, to marketing board operations, state ministries of agriculture and extension services. This suggests that any federal agricultural credit agency to be created should be so located in the federal structure that the Federal Ministry of Agriculture and Natural Resources will be able to influence its operation.

The existence of several state ministries of agriculture and natural resources suggests that each state ministry will not have enough resources to operate an effective research and extension training program. In subsequent sections of this report, CSNRD recommends the development of three university-level agricultural centers—one at Samaru, one in the East, and one in the Ibadan/Ife area. In turn, this suggests the need in a Federal Ministry of Agriculture and Natural Resources for an organization which will permit that agency to support and influence agricultural research, agricultural training at the subuniversity level and university-level agricultural education in the university centers. With the Federal Ministry of Agriculture and Natural Resources engaged in these, plus the functions recommended by FAO, it becomes apparent that a very strong agricultural planning unit will be needed in that ministry to help coordinate and integrate its programs with the activities of the Federal Ministry of Economic Development, the National Universities Commission and the activities of the Federal Ministries of Trade and Industry as well as the activities of the various state ministries of agriculture, of finance and development.

This, in turn, suggests a strong role for the Federal Ministry of Agriculture and Natural Resources with respect to the collection of primary data and the processing of primary data with secondary measures of agricultural economic activity.

As the Federal Ministry of Agriculture and Natural Resources is new and is still being organized at this point, CSNRD sees the advisability of having external donor agencies provide technical assistance to that ministry in the fields of (1) agricultural planning, (2) agricultural education, (3) agricultural research administration, (4) agricultural credit and (5) agricultural commodity organizations for marketing, pricing and taxation policies. In the sections to follow, these subjects will be taken up in turn.

Agricultural planning unit

Good agricultural policies can be evolved and applied only if there are appropriate agencies of government with the responsibility and resources to assemble and interpret needed facts, to counsel with public and private agricultural leaders, to examine alternative courses of action and to make recommendations about policies that will most effectively encourage agricultural growth. Evaluation at local, state and federal levels of the effects of agricultural policies should continuously feed back to the policy makers the consequences of public policy.

If economically viable plans are to be developed, and if the economic and social consequences of public actions are to be evaluated, there must be planning agencies at federal and state levels that continually interact with each other. State agricultural planning and policy bodies need to be established or strengthened in ministries of agriculture or of finance or perhaps in both.

As a nerve center for the whole agricultural planning effort, we strongly recommend that an agricultural planning unit be established in the Federal Ministry of Agriculture and Natural Resources. This unit should help the ministry and the federal government of Nigeria carry out the functions and exert the influences necessary for the advancement of Nigerian agriculture. Its work should also be concerned with the international, national and interstate aspects of state agricultural development projects.

What we have in mind is a planning unit which will help the federal ministry develop appropriate policies and programs for Nigerian rural development in close cooperation with the various state ministries of agriculture and natural resources and the Federal Ministry of Economic Development. This planning unit could serve to assist the Permanent Secretary of the Federal Ministry and his Minister or Commissioner in preparing projects.

It is extremely important that this unit be of high competence and report directly to the Federal Ministry of Agriculture and Natural Resources. Further, it should be conceived as a unit which will help the Federal Ministry of Agriculture and Natural Resources coordinate and integrate its activities within the overall development policies, programs and projects being planned and executed by other ministries, particularly the Ministry of Economic Development. The planning unit in the Federal Ministry of Agriculture and Natural Resources, as we see it, would not duplicate the kinds of research done at such agencies as the Nigerian Institute of Social and Economic Research, the Rural Economic Research Unit at Ahmadu-Bello University, or some future reconstituted Economic Development Institute at the University of Nigeria. These research agencies should continue to expand their overall research program with respect to Nigerian agriculture, while the planning unit in the federal ministry would be the servant of the Federal Ministries of Agriculture and Natural Resources and of Economic Development.

There is a scarcity of qualified agricultural economists (despite the presence of several well-qualified Nigerian agricultural economists) to staff the Nigerian research agencies and both the Ministry of Economic

Development and the Ministry of Agriculture and Natural Resources. Thus, the Federal Ministry of Agriculture and Natural Resources should probably seek external assistance in providing an agricultural economic planner and two or three associates to the federal ministry. This person and his associates should report directly to the Federal Ministry of Agriculture and Natural Resources and should be without obligation to any external agency. The requirement of Nigerian and donor agencies for the financing of projects is such that projects have to be prepared in a professional manner in order to win support both within the Nigerian government and internationally.

Not all agricultural economists in the world are well-trained in project development and evaluation and many of them do not understand the relationships between ministries of agriculture and natural resources, on one hand, and ministries of economic development, on the other, in the British-oriented, less-developed countries. In Great Britain, the United States, Canada and Australia the legislative branches of government have not seen fit to grant powers to ministries of economic development comparable to the powers granted such executive agencies in the less-developed, British-oriented countries. Therefore, agricultural economists selected for this purpose should have had substantial experience with British-oriented governments of less-developed countries or have been given careful orientation by agricultural economists with such experience.

Other ministerial agencies

In the following main sections of this chapter, it becomes increasingly clear that the Federal Ministry of Agriculture and Natural Resources has a major additional role to play in mobilizing federal funds for different activities, in attaining cooperative coordination of the activities of state, credit and commodity research marketing organizations.

In the section on education for agriculture, we see the need for a Federal Advisory Council on Agricultural Education to be administered in the Federal Ministry of Agriculture and Natural Resources and to be advisory to the National Universities Commission (see pp. 110-112). We also see the need for a Federal Office of Extension to be administered by the Federal Ministry of Agriculture and Natural Resources (see pp. 117-118).

In the section on research, we see the need for an Agricultural Research Council to be administered from the Federal Ministry of Agriculture and Natural Resources (see pp. 127-130).

As for agricultural credit, we see a longer-term evolving role for the Federal Ministry of Agriculture and Natural Resources involving first the marketing boards, then the creation of an agricultural credit organization in the Central Bank and, perhaps, finally, a more or less autonomous federal agricultural credit institution (see pp. 130-132).

Our recommendation that Nigerian agricultural pricing and taxation policies and programs be changed suggests a need for changes in Nigeria's institutional structure to give ministries of agriculture and natural resources more control over the functions of the marketing boards and of the Nigerian Produce Marketing Company, Ltd. (NPMC).

If the central functions with respect to agricultural pricing, taxation and marketing are to be performed effectively, they must be coordinated by an agency both (1) knowledgeable about Nigerian agriculture and (2) willing to relate programs to develop Nigerian agriculture to national needs and aspirations. In the past, marketing board and NPMC pricing and revenue-generating policies have been controlled by forces primarily interested in extracting revenue from agriculture for use in public sector programs. Little attention has been paid to the impact of their pricing policies and taxation programs on the productivity and welfare of agricultural producers. Nigeria is dependent on the productivity of her farm producers. Nigeria must create more productive employment in farming since her population is growing more rapidly than nonfarm employment can be developed. Further, Nigeria is made up primarily of farmers, and their welfare must condition thinking about social welfare, justice, and equality in the distribution of income and economic development. If the welfare of this large, dominant sector of Nigeria's people is not kept in mind, then Nigeria will be developed for the benefit of her new urban elite rather than for all of her people.

Thus, we believe that Nigeria's central institutional structure controlling her agriculture must be changed. And, the changes which are needed amount to more than the creation of the agricultural planning units and educational, research and credit coordinating units in the Federal Ministry of Agriculture and Natural Resources called for in the sections above. That ministry must be in a position to act, to influence and to exert control over the pricing and taxation policies for agriculture. We recommend that steps be taken to place such powers in the Federal Ministry of Agriculture and Natural Resources.

Strengthening Agricultural Planning Units in the State Ministries of Agriculture and Natural Resources

With the exception of the Western State the state ministries of agriculture and natural resources have meager minimal staffs for agricultural planning, yet the Western State was among the first to seek and obtain external planning assistance. We recommend that such assistance be sought by all states and that it be

coordinated through the Federal Ministry of Agriculture and Natural Resources and the Federal Ministry of Economic Development.

In this connection, one hard, cold fact must be kept in mind. The world supply does not have even 12 available, competent, senior and personable agricultural planning experts for Nigeria. Nigeria will have to make do with one or two really good mature agricultural planning experts, one of whom should be available to work with less experienced but carefully selected younger men in the state Ministries of Agriculture and Natural Resources. Several of these younger men should be Nigerian in order to build up a corps of expert Nigerian agricultural planners.

We feel that it would be hard to overstress the need for planning assistance at the state level and recommend that all bilateral and multilateral donors assist in this area under the coordination of the Federal Ministry of Agriculture and Natural Resources and the Ministry of Economic Development.

Education for Agriculture

With the formation of several new states in Nigeria, strategies for supporting and directing agricultural education must be reappraised. The separate states do not have enough staff and financial resources to develop their own individual universities and subuniversity training centers. And, from the standpoint of the country as a whole, it would be unwise for the federal government to finance separate university and subuniversity training centers for each state even if personnel were available to staff the new institutions. When the need for decentralized decision-making noted in the previous chapter and the last section is considered in the light of the financial and staff constraints noted above, it is clear that some combination of federal support and state control must be sought between the state and federal levels. In general, we feel (1) that federal support for agricultural education is best obtained via the Federal Ministry of Agriculture and Natural Resources, an agency which should be made technically competent to do the job and one which should have the manpower needs of Nigerian agriculture constantly on its agenda and (2) that the states should be in position to influence educational programs in area educational centers designed to serve the needs of more than one state.

B. Sc. level

Four universities in Nigeria give instruction in agriculture. The University of Ibadan is a federal university. The others were established by the former regions: The University of Nigeria at Nsukka and Enugu, the University of Ife at Ile-Ife and Ibadan, and Ahmadu Bello University at Zaria.

If the four universities with agricultural faculties carry out their expansion plans as scheduled, the number of first degree graduates in agriculture and veterinary medicine will exceed the employment opportunities for graduates, given present salary levels, taxation and pricing policies and expected levels of worker productivity. However, if positive steps are taken to encourage Nigerian agriculture, effective private and public demand for trained agricultural manpower may well exceed capacities to produce trained agricultural personnel at all levels. If this favorable situation does develop, and we feel it may if our recommendations are carried out, the higher productivity of Nigerian agriculture will provide the wherewithal to expand agricultural faculties, and the directions of needed expansion will be clearer than at present.

We recommend: (1) that plans for additional capacity to train students at the first degree level in agriculture and veterinary medicine at ABU be implemented, (2) that some of the present and planned-for facilities in agriculture at the four universities be used for vitally needed subuniversity agricultural education, (3) that some facilities be used for (a) graduate education and (b) training students from other West African countries, (4) that donor agencies be encouraged to assist in strengthening the continuing education of graduates in agriculture and the agricultural research component of the four universities, (5) that the agricultural faculty at the University of Nigeria be reactivated at the earliest possible date, (6) that salary policy for the civil servants and academicians be reviewed in terms of economic productivity and demand factors and (7) that Nigerian agricultural manpower requirements be examined periodically vis-a-vis Nigerian changes in demand for trained manpower in response to changes in taxation and pricing policies and in response to advances in biological technology.

We further recommend that: agricultural faculties cooperate with research and governmental action agencies in the development of three *agricultural centers*:

1. *Ibadan/Ife*—to give special attention to the cocoa belt and the area immediately north.
2. *University of Nigeria (Nsukka and Enugu) Umudike*—to give special attention to the palm belt and the middle belt zone north of the palm belt.
3. *Ahmadu Bello University/Vom*—to give special attention to the northern area in its needs for teaching and research in groundnuts, cotton, cereals and livestock.

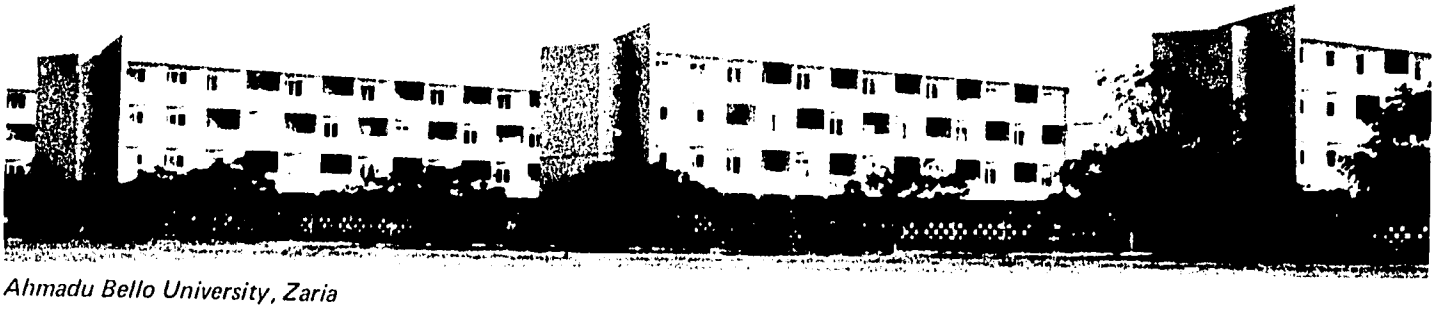
However, by the inherent nature of a university, one which accepts responsibilities for a broad ecological zone should not be precluded from teaching, research and service with respect to national and international problems.

Physical and human resources of research institutes

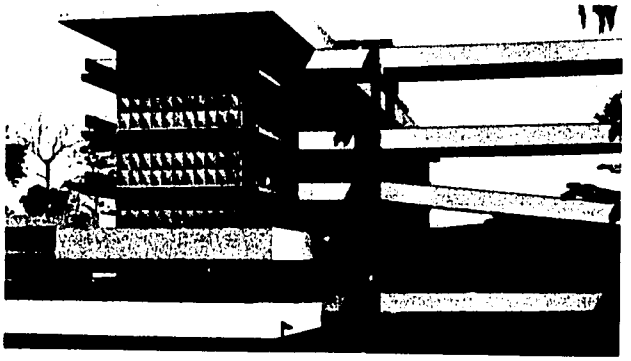
Nigeria Has Four Agricultural Faculties

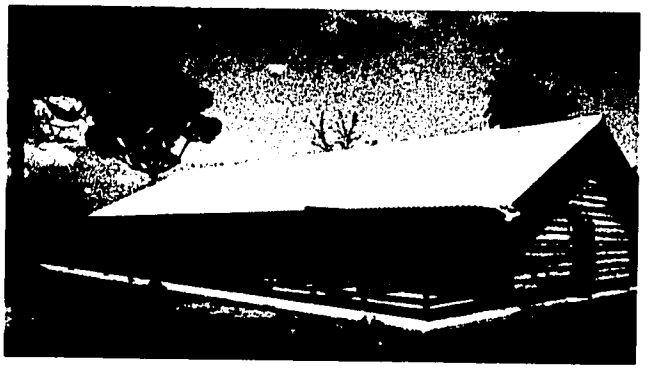
1. *How do we organize their teaching and research to further Nigerian rural development?*
2. *How do we reorganize and reconstruct the University of Nigeria agricultural faculty to serve the eastern middlebelt and eastern rain forest areas of Nigeria?*

University of Nigeria

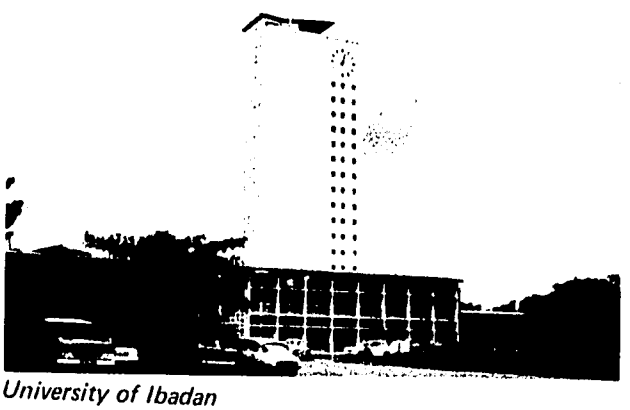


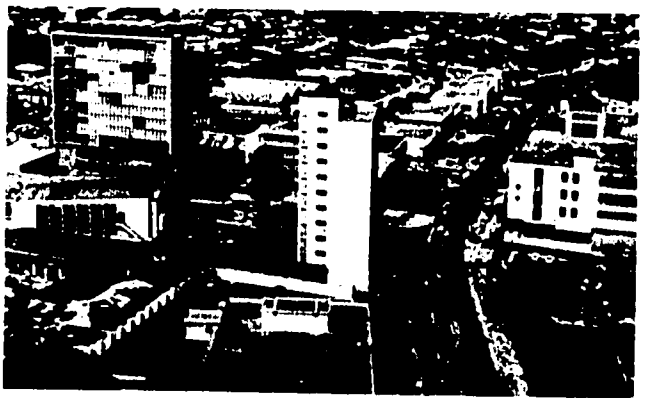
Ahmadu Bello University, Zaria





University of Ife





University of Ibadan

and ministries affiliated with each center should be utilized to teach university students at both undergraduate and post-graduate levels.

Extension specialists should be headquartered at these agricultural centers as needed by the area served by each center[1] and employed by the Federal Ministry of Agriculture and Natural Resources, state ministries of agriculture and natural resources, the universities and other agencies as appropriate.

New employment opportunities for first degree graduates in agriculture will be greatest in (1) crop production, (2) agricultural administration, (3) food storage and processing and in nutrition extension (to staff nutrition programs to expand effective demand), (4) animal husbandry, particularly in extension, range management and animal product utilization, (5) agricultural economics-cooperatives, credit, marketing, planning and policy and farm management, (6) agricultural engineering, particularly testing and development of field equipment and irrigation in the northern states. Movement of graduates into positions now occupied by nongraduates, as in extension work, will create some additional opportunities though the substitution is expected to proceed slowly at present salaries and levels of logistical support, even though the supply of graduates is abundant.

The following proposals are suggested for consideration in developing the agricultural centers.

1. Consider each of the three agricultural centers as the focal point of a subsystem which would include the state and federal agricultural institutions around it.

2. Each center would be supported by both federal and state revenues. Federal contributions might be channeled to universities for teaching through the Nigerian universities commission, perhaps in the manner proposed in early 1968 by the National Universities Commission with adequate representation of the Federal Ministry of Agriculture and Natural Resources. Accordingly, the National Universities Commission (NUC) would be counseled by a Federal Advisory Council of Agricultural Education (ACAE) representing each of the major disciplines or fields in agriculture and related subjects and administered by the Federal Ministry of Agriculture and Natural Resources. Also, support should be extended to the agricultural faculties for research on the basis of contracts with federal and state agencies (see the section on agricultural research below, pp. 122 to 130).

3. Each university would have an agricultural service area which would include a broad ecological/commodity zone with appropriate membership from the zone on the university council to represent the farmers and agricultural agencies within it. In particular, the Mid-West State would develop working relations with the Ibadan/Ife and University of Nigeria complexes to support the goals of the Mid-West State and permit the abandonment of plans to develop expensive, new agricultural education facilities in the state.

4. The agricultural research responsibilities, personnel and physical facilities of the former Regional governments would be integrated with those of universities. The reorganization would be based primarily on the division of responsibilities and resources among the university centers according to ecological and commodity areas.

5. The responsibility of the former Regional ministries for agriculture training schools together with their personnel and physical plants would be integrated into the respective agricultural research-teaching-continuing education centers. CSNRD researchers feel that this function should be directly under Nigerian control with the Federal Ministry of Agriculture and Natural Resources playing an important role in mobilizing both internal and external support. Technical assistance personnel from external agencies can be successfully placed within the Nigerian structure as demonstrated by a wide variety of successful past administrative arrangements between Nigerian and donor agencies.

6. Within the zone of each center there should be close cooperative development of research among the universities, the commodity research institutes and other existing agencies and also new agencies such as the International Institute of Tropical Agriculture. The Federal Ministry of Agriculture and Natural Resources should be expected to play a major role in obtaining this cooperation, a subject treated in more detail in the section on research (pp. 122 to 130).

7. If needed, additional schools of agriculture, branch campuses, and or branch experiment stations would be developed at other selected sites as additional facets of each "center." With the "positive" program for the development of agriculture advocated by CSNRD, such expansions are likely to be needed.

Several alternative approaches to organizing the Ibadan-Ife complex are noted:

1. Ife as well as Ibadan could become a federal institution and the development of a faculty of agriculture could be cancelled at one or the other university. In view of the established relationships between the University of Ife and the Western State, and in view of the physical facilities now available and being developed for agriculture at Ife, logic would point to the continued development of the agricultural faculty at the University of Ife. However, the existence of CRIN, Moor Plantation-Federal, and the IITA in Ibadan also argue for the con-

[1]Kincaid, James, M., Jr., *Strategies for Improvement of Agricultural Extension Work and Non-degree Agricultural Training in Nigeria* CSNRD 13, December, 1968.

tinued development of an agricultural faculty at Ibadan.

2. Develop both undergraduate and graduate agricultural programs in both faculties in a *complementary* manner. Professors and researchers in specialized areas could be shared between the two faculties as could specialized courses. The schools of agriculture and the extension responsibilities for the Western State served by the Ibadan/Ife center would be integrated most closely with Ife University.
3. Divide responsibility by level of training—allocating resources to both institutions for undergraduate training while concentrating graduate education at one faculty and subuniversity training functions at the other.
4. Assign certain subjects beyond a "core curriculum" to one faculty or the other; e.g., assign extension to Ife, nutrition to Ibadan.
5. We recommend alternative no. 2, the complementary development of agricultural education in both universities. A specialized agricultural teaching program will tend to follow the development of a strong research competency. Therefore, the allocation of research funds could be used as one means of coordinating the development of teaching between the two universities.

A mechanism to help implement this strategy may be forthcoming. The Agricultural Technical Committee has recommended the forming of an Agricultural Research Council to represent universities and other agricultural institutions. The National Universities Commission has proposed the appointment of an academic advisory committee in agriculture and related subjects. We have endorsed these recommendations and suggest that the role of the Federal Ministry of Agriculture and Natural Resources be strengthened in such a connection with the commission. Thus, the two universities would be represented in a national agricultural research planning agency, and agricultural faculties would be represented directly in a national university planning body.

We believe that the agricultural education facilities at Nsukka, Enugu and Umudike should be reactivated at an early date and that they should serve much of the eastern end of the middle belt (in the former Northern Region) as well as the eastern end of the rain forest. Agricultural education and research need strengthening throughout the eastern and southern portions of the former Northern Region and in the former Eastern Region. Great care must be taken to prevent animosities associated with the civil war plus progress made in programs at Ahmadu Bello and in the Ibadan/Ife area from crowding out high-payoff teaching and research opportunities in the Southeast for feed grains, oil palm and livestock production.

CSNRD believes that both the Agricultural Research Council (ARC) and the Federal Advisory Council on Agricultural Education (ACAE) should be administratively related to the Federal Ministries of Agriculture and Natural Resources and of Economic Development so that their planning personnel will have a positive interest and responsibility for supporting and relating educational and research projects to development plans for Nigerian agriculture. Therefore, it is suggested that consideration be given to the following approach:

1. That the ARC, as part of the Federal Ministry of Agriculture and Natural Resources, be permitted to allocate federal funds for agricultural research to agencies, including universities, perhaps on a contract basis, and that faculties be permitted to apply for funds from the ARC for specific research projects.
2. That the National Universities Commission, counseled by the ARC as administered from the Federal Ministry of Agriculture and Natural Resources, review applications for support of agricultural research in faculties from the point of view of its likely influence on coordination of teaching programs.
3. Part of the grants to the universities be made on a matching basis between state and federal sources which would tend to concentrate both federal and other research funds on priority problems as envisioned by state and local as well as federal and external authorities.
4. Means of encouraging the integration of research, teaching and continuing education include the following:[2]
   a. Expansion of agricultural research conducted directly by universities,
   b. Support for university research projects to employ undergraduate and graduate students, and
   c. Grants to nonuniversity and university research agencies to provide employment of graduate students under the guidance of senior research workers.
5. Full exploration of opportunities which will arise to cooperate with the new International Institute of Tropical Agriculture and other agencies in the development of training programs.

The following suggestions are made for *improvement in the general nature of the curriculum.*

1. A wider selection of elective courses and work experience should be offered to upper level stu-

[2]Federal Republic of Nigeria, *Report of the National Agricultrual Advisory Committee.* Federal Ministry of Information Printing Division, Lagos, October 1966 p. 105.

dents in agriculture to permit undergraduate specialization within a functional line of work.

2. The faculties should be supported in sponsoring intern programs and specially designed, university-supervised follow-up and consultative service for upper classmen and new graduates.
3. Faculties should cooperate with other institutions in developing new programs. For example, (a) food science, nutrition and agricultural mechanization could be developed cooperatively with Industrial Development Centers; (b) training in agricultural planning could be provided by cooperation among NISER, EDI and RERU, the Institutes of Administration and the ministries of agriculture and natural resources and ministries of economic planning or development at both state and federal levels; (c) farm management work should be developed cooperatively with private interests such as Pamol and the Nigerian Tobacco Company Demonstration Farm, (d) plant and soil sciences should be related to the new IITA so as to fully exploit it as a readily available international agency, but not to let the existence of that agency serve as an excuse for not developing Nigerian faculties and skills.
4. Faculties of agriculture and research agencies should be encouraged to prepare and publish classroom and reference materials for tropical agriculture. Nearly all printed materials for undergraduate students are adapted to temperate agriculture or are written as technical reports of research conducted in West Africa. Neither is entirely suitable for use in teaching.

Salaries received by Nigerian university graduates are attractive in comparison with alternatives; private returns to university education are high in government and academic employment if not in farming. About one-half of all agricultural students were on nearly full public scholarship in 1966-67. We suggest that the size of public scholarships be reduced gradually, using the public monies thus released to meet up to 50 percent of the costs of new educational programs —post graduate internship, short courses, consultative services, and work/study programs for undergraduates. The rate at which the students' personal financial responsibility is increased and, conversely, the rate at which the proportion on scholarship can be reduced depends on the speed with which part-time earning opportunities and student loan programs are initiated.

We recommend that *financial aid* for agricultural undergraduate and graduate students be used to expand part-time employment opportunities and student loans. We believe that a combination employment/loan program would assist a broad cross section of students, particularly students from rural schools where academic training may not have equipped them to win university scholarships. Also, the employment/loan program offers a realistic alternative to students who prefer not to accept a scholarship that commits them to serve an employment bond of several years with their sponsor.

Two characteristics stand out in Nigeria with respect to the wages and employment of high-level agricultural manpower. The first is that salaries in governmental and in academic institutions are quite favorable and comparable to salaries of persons with comparable education in other fields. The second is that the salaries of highly trained agriculturalists have exceeded what the Nigerian private agricultural sector could pay to use such people in private employment largely because of the heavy taxes on private agricultural producers. There is also some evidence that the pound and shilling productivity of agricultural researchers in public employment has been low relative to salaries. Reasons for this include (1) the marketing board taxes on palm produce and cocoa which have retarded the utilization of the results of oil palm and cocoa research and (2) the lack of a resource base (genetic banks for millet, grain sorghums, cassava, yams and maize) for researchers. As the new International Institute of Tropical Agriculture expands the resource base for Nigerian agricultural researchers, and if the restrictive taxes and adverse pricing policies are removed, employment opportunities for highly trained agriculturalists in both private and public sectors may expand beyond present projections and public employment opportunities for researchers may expand rapidly. At that time Nigeria will have the wherewithal to expand its agricultural faculties and research institute staffs beyond levels anticipated here and in directions which will become more apparent over time.

The cost and physical capacity of the university education system for agriculture are much less clearly defined than for subuniversity agricultural education. The capacity and costs are greatly affected by policies of the different universities and agricultural faculties with respect to allocation of facilities and lavishness of facilities. In such comparisons, both EWA and CSNRD research indicates that the University of Nigeria was using its physical and staff resources more effectively than the other universities at the outbreak of the civil war.

In 1966, total agricultural enrollment in all four faculties was 579 in basic departments plus another 189 in veterinary and pre-veterinary, forestry and home economics. The present capacity, however, is about 1,450 students in all departments and a potential for 295 graduates a year. The demand calculations indicate tentatively that this capacity will be sufficient for all three CSNRD alternatives. The maximum

needed is tentatively set under our recommended strategy at 150 to 300 graduates a year by 1985. Our recommendations will require modifications in curricula and building utilization to satisfy the demand for specific skills but the overall physical capacity appears to be sufficient. Under alternative Strategy I, surpluses of agricultural graduates will probably result quite soon.

Costs vary greatly among the universities, with total recurrent costs for all agriculturally-related fields reaching about £740,000 in 1966. These costs are increasing each year because of increased enrollments and higher-cost programs, and would reach about £1,345,000 by 1985 under policies recommended by CSNRD. With little additional large-scale capital expenditure needed, university funds should not be a limiting factor, especially if students pay a larger share of their expenses through loans and part-time employment. Even under Strategies I and III where the development of new universities and the corresponding agricultural facilities is considered, the former heavy emphasis in regional and federal budgets on education would indicate that sufficient funds could be found.

The problem facing the universities in the Western State is how to maintain existing facilities and utilize them more fully rather than how to expand them as is currently planned. From the standpoint of the nation as a whole the question must be raised as to whether the concentration and duplication of agricultural faculties and research resources in the West is a wise use of scarce resources. From the standpoint of both productivity and the desirability of obtaining more even development of the country, the needs of the Lake Chad/Maiduguri and other areas should be considered in relation to the Ibadan/Ife area before further concentration of investment is approved in the West.

By far the most critical element in *developing faculties* of agriculture in Nigeria is the training and maturation of teaching staff. Physical facilities are adequate; recurrent funds are likely to be forthcoming. Student supply is sufficient except in the North where this problem is being remedied. The curriculum improvements that need to be made hinge on certain administrative adjustments, but even more on the quality of teaching staff.

It is of highest priority to involve faculty staff in research and also to utilize the teaching resources of ministries and research institutes.

When a young man joins the staff, he should be encouraged to engage in teaching, research, consultative services, and developing in-service training programs for nonuniversity personnel. The most vital role that an external advisor can play in this connection is to assist young Nigerian staff members in developing their teaching programs, in outlining supportive research and in establishing liaison with the action and research agencies which serve Nigerian agriculture. If our other recommendations are executed, opportunities for Nigerian universities to be of public service will expand and change rapidly—and much will be expected from the universities.

Graduate level

Our assessment of university and subuniversity education in agriculture has shown that there is a demand for continuing education and post-graduate education in Nigeria. The capability of Nigerian institutions for offering graduate training in agriculture appears to have been underestimated by many donor agencies. The National Agricultural Advisory Committee has recognized the ability of Nigerian institutions to move rather quickly into graduate education in agriculture.[3] When the supply of trained manpower is assessed from the "system of centers" advocated above by CSNRD, it is obvious that outstanding Nigerian and non-Nigerian agricultural scientists now in Nigerian universities, commodity research institutes and government agencies could be used to permit universities to launch agricultural graduate programs in Nigeria. The establishment of the IITA in Nigeria will make this even easier. A graduate faculty composed of university scholars and government officers with adjunct appointments could supervise a considerable group of graduate students in a wide selection of studies.

Graduate study could be strengthened by systematically expanding the opportunities for 100 Nigerian students who go overseas for graduate work to return to Nigeria to do their field research. These plans, where tried, have proven beneficial to the student and the host institutions, both in Nigeria and abroad. Research topics which focus on Nigerian problems make results almost immediately available to Nigerians. Investment in research in Nigeria increases the prospects that the student will take employment in Nigeria at the end of his training. The major bottleneck in furthering this policy is not in the academic arrangements between Nigerian and overseas scholars or universities but is, instead, a lack of funding on a sustained basis of say 5 to 10 years and administrative difficulties imposed by donor agencies.

We recommend that Nigerian agricultural faculties take the initiative through cooperative arrangements with overseas institutions and the IITA to establish institutional means of providing graduate research experience in Nigeria. Stress should be placed on Nigerian graduate students though it should be remembered that students from other countries add balance and diversity to a graduate program.

Until Nigerian capacity to train graduate students is expanded, graduate training in agriculture should continue overseas at modest levels annually. Priority

[3] *Ibid.*

subjects should include livestock production, agricultural economics, agricultural engineering and food science. Though the numbers will not be large, it will be important also to develop Ph.D.-level competencies in plant breeding, animal breeding, agricultural economics, animal pathology, plant pathology and soils. As graduate training facilities are developed in Nigeria at the faculties and in conjunction with other agencies such as IITA, the relative, though not necessarily absolute, need for foreign training will decline. Nigerian faculties should be provided immediately with sufficient resources to permit them to help supervise the research of Nigerian Ph.D. candidates who return to Nigeria to conduct research with Nigerian data.

Training in veterinary medicine

The anticipated output of DVM's from Ahmadu Bello University (ABU) exceeds the employment forecasts for veterinarians in Nigeria. It is recommended that:

1. Present pre-clinical and clinical programs in Nigeria be merged into one program at ABU but that poultry, small animal and swine husbandry training be expanded at all agricultural centers and cattle husbandry training be expanded at ABU. The development of more than one full-fledged school of veterinary medicine in Nigeria is not justified.
2. Consideration be given to transferring nondegree veterinary training in all centers to the respective universities.
3. Nigeria continue inviting other West African countries to send veterinary students to ABU.

Subuniversity agricultural training

Technical training in agriculture at diploma and other nondegree levels[4] has been offered principally by the former Regional agricultural ministries. Enrollment has been limited primarily to the staff from these agencies. One consequence of this is that there has been little formal subuniversity agricultural training for Nigeria's private agricultural sector. For the training of extension workers, the Western State has schools at Akure and at Moor Plantation, Ibadan; the former Eastern Region had a school at Umudike for agricultural workers. In animal health, the former Northern Region trained its staff at Mando Road, near Kaduna; the former Western Region at a school affiliated with the agriculture faculty at Ibadan, and the Eastern Region at Nsukka through the University of Nigeria. There is also a federal school to train foresters at Ibadan and another federal institution at Vom for livestock superintendents and laboratory technicians. There is also an extension training center for the Mid-West Ministry of Agriculture at Agbadu which gives only short courses and in-service training. Other training institutions include the Cooperative Training College at Ibadan, the Irrigation School at the Technical Institute at Kaduna, several provincial farm training centers for lower-level extension workers in the North and numerous northern farm institutes to prepare young men to farm. There are a few agricultural training programs and positions supported by private industry, notably the Nigerian Tobacco Co. at Ago-Are in the Western State.

The institutions for technical training in agriculture at the nondegree level have not been as well-coordinated as possible. There has been little attempt to coordinate the course offerings of the different schools, or to coordinate nondegree training with university courses. There is need for a system which will: (1) provide greater flexibility in response to changing demands for different levels and kinds of skills, (2) facilitate mobility of trained manpower, particularly with respect to transferability of skills from one position to another, (3) provide more upward mobility for graduates in the government position structure, and (4) provide more skilled subuniversity manpower for the private sector.

Our study of nondegree education was limited principally to the ministry schools of agriculture. In 1966-67, these five schools had a total enrollment of 1,172 which was 60 percent larger than the enrollment 3 years earlier. The usual course of training for agricultural assistants required 2 years. A certificate was granted upon completion. Additional training was given for assistant agricultural superintendents or agricultural superintendents requiring two years in the West and East and one year in the North. They were given a diploma upon completion of their work.

Nigeria has made notable progress in the development of nondegree agricultural training. With rapid growth, problems have arisen in the organization, scope and operation of the program. We list a number of these problems in decreasing order of priority, and offer some suggestions for their solution.

There is critical need to improve the practical aspects of nondegree-level training particularly for those who are being prepared to assume field service responsibilities for extension, produce inspection, credit and marketing either at the supervisory or village work level.

> We recommend that certificate-level trainees receive a carefully planned and supervised field practice period of not less than 4 to 6 months as part of their formal training. We further recommend that diploma-level students experience at *least* 1 year and preferably 3 to 5 years of an on-the-job assignment before entry into a diploma course is granted. There is need also to improve the "practical" aspect of the in-school phase of the curriculum.

[4] For greater detail, see Kincaid, *op. cit.*

The diverse and separate institutional programs for agricultural training need to be integrated into a total agricultural educational and training component of agricultural development.

> We recommend the merging of nondegree agricultural training within the university framework, though, obviously, the induction training of staff should remain with the ministries. We also recommend that university credits be granted for satisfactory performance in academic-level, post-secondary, nondegree courses. We concur in a previous recommendation by Rowat[5] that a Federal Council of Agricultural Education be established to facilitate a more systematic and better-coordinated total agricultural education and training program. With nondegree agricultural training placed in the university framework, the Federal CAE would be in position to make the needs for agricultrual extension training clear to university administrators.

The overall duration of training programs should be reduced and training courses should be standardized.

> We recommend that an in-training period of 2½ years be established as the maximum duration of training to diploma level and that within this period not more than 2 years be taken "in-school" with the remaining 6 months in field practice during the certificate-level phase of training.

A continuing effort needs to be made to remove irrelevant subject-matter from the training curricula.

> We recommend that more attention be devoted to a determination of what is expected of the majority of trainees upon their completion of a particular training curriculum. In particular, training programs should be closely related to personnel needs for executing the production campaigns advocated in Chapter Seven. Once this is fully specified, the curricula and course syllabi would be planned so that the basic skills requirements for the work to be done are met. Specialized in-service training and/or short courses should be provided after the trainee has assumed his particular job responsibilities. The specialized training would be designed to meet special requirements for skills by limited numbers of persons. In addition, there should be a constant appraisal of what is being taught in each course to ensure that relevance to agriculture is being maintained.

The training staff cadre at the subuniversity training centers should be afforded career-potential opportunities. At present, the staff at these institutions feels isolated from the main current of ministry activities.

> The suggested merging of nondegree training into the university framework would be the most effective means of solving this problem. We also recommend that full recognition be given to the fundamental importance of training through selection of only the best-qualified and most-interested persons to serve in the training staff cadre. The training cadre should be given professional recognition in order to assure them of a career potential.

Subject-matter gaps in the total subuniversity training curriculum should be filled. Courses need to be offered in the theory and practice of planning and organization and personnel management and supervision. There is an immediate need to provide training for intermediate-level produce inspectors. The expected expansion of agricultural credit and marketing services, including cooperatives, indicates a need for additional training in credit, business management, and cooperative principles. We anticipate that our recommendations will lead to greatly expanded private activities in both the production of agricultural products and in the providing of goods and services to producers. Thus, nondegree training should include managerial training available to private individuals as well as to recruits of governmental agencies. Other apparent gaps are livestock husbandry training for the North, processing of agricultural products, farm machinery maintenance, soil survey and conservation, farm management, rural development and fisheries. There is a need for training of laboratory technologists and laboratory equipment repairmen.

> We recommend that these gaps in the total curriculum be filled as part of existing institutional programs rather than through the establishment of new and separate training facilities. Specialized skills of the different subject areas should be provided through supplementary special short courses and in-service training as the needs dictate. Such training courses should be developed in close cooperation with the universities. Incorporation of the schools in the university system would facilitate the expansion of curriculum and open the way for private as well as government personnel.

As trainees in the subuniversity schools are now given status as civil service employees, problems of motivation arise which make it difficult to screen out the disinterested and unadapted. The status of nondegree, post-secondary trainees should be changed to that of pre-employment "student" positions.

> We recommend that this problem be part of the consideration in support of the recommendation to transfer nondegree training to the universities. Another option open to the employing ministries is to establish explicitly a policy which places the in-training cadres on probationary appointment until satisfactory completion of the formal training curriculum. Such a policy must be rigorously enforced.

There is need to appraise existing and proposed institutional training programs in terms of avoiding unnecessary duplication of staff and facilities.

> We recommend that the opportunity to avoid duplication and to make more efficient use of existing training staff and facilities be a prime consideration in

---

[5]Rowat, R., *The Development of Education and Training in the Field of Agriculture and Related Subjects in Nigeria*, FAO, Rome, 1966, pp. 44, 100, 101.

decisions about improving the interrelationship of subuniversity and university programs. Every possible advantage should be taken within existing but geographically separated institutional programs to make efficient use of staff and facilities available at separate locations (e.g., at Moor Plantation where diploma agricultural and animal health training are located in an area where state and federal research facilities also exist).

From the point of view of skills requirements, we are of the opinion that the most critical nondegree level training problems in Nigeria are those of producing (1) graduates for public service who are "field practice" oriented and (2) graduates for the private sector who are oriented favorably toward both agriculture and private enterprise. Nondegree training, especially for those who are to work in field service activities, must strive to create a desire to "make things happen" in rural development at the village level. We believe that a more concerted effort must be made to introduce meaningful, practical field experience into the first (certificate) level of training while at the same time providing sufficient knowledge of basic principles and techniques of agriculture and of extension methodology. Armed with both the "experience of practice" and the required technical skills, newly trained staff members should approach their field assignment with greater feelings of security so that they can and, by education and demonstration, will "make things happen." This expectation assumes that improvements in the development and management of field operations as recommended elsewhere in this report also will be implemented.

Presently, many farm boys regard farming as a lowly occupation. Private judgments are re-enforced by taxation and pricing policies which restrict most of Nigeria's vast number of smallholders to lives of poverty. We have recommended that Nigerian agricultural taxing and pricing policies be revised to permit higher incomes for Nigerian smallholders. Higher incomes will increase the respectability of farmers. However, even the higher incomes from our recommendations would still compare unfavorably with those in governmental, academic and urban business activities. In addition to better prices, Nigerian agriculturalists will need to become more proficient. At present, there are few monetary (and even fewer nonmonetary) rewards for excellence in Nigerian agriculture.

European and North American countries have used prizes, awards, agricultural shows, expositions, etc. to motivate and give respect to excellence in farming. Russia, for years, motivated her nonfarm personnel with prizes, awards and public recognition, though for some unexplained reason she did not employ the same technique so extensively for agriculture. We recommend that Nigerian agencies institute a widespread program of awards, prizes and public recognition for excellence in agricultural production.

Within the domain of the formal nondegree education and training aspect of agricultural development itself, we strongly recommend shifting the nondegree training responsibility from ministries to universities except for indoctrination and some in-service training. Such a change could make the total agricultural education and training effort function as a "system" that would reduce the costs and increase the effectiveness of such training.

Recent events have created an opportune time for making such change. The two schools of agriculture of the former Northern Region are now part of the Common Services Organization (CSO) under the auspices of Ahmadu Bello University, an institution controlled, in part, by the CSO. Such a transfer has also been one of several alternatives being considered by the Western State.

Reasons for the recommendation for the change are: immediately foreseeable needs and resources for training manpower do not justify a proliferation of post-secondary, subuniversity training facilities for each state. Further, as Nigerian agriculture becomes more complex, more training in such subjects as chemistry, physics, genetics, botany, economics, sociology and law must be developed in close cooperation with faculties of agriculture in the existing universities. A change of the kind suggested would improve the universities' contact with the field extension operations of the ministries and would facilitate a university focus of teaching and research efforts on practical matters and problems in rural Nigeria.

Agricultural extension programs

The significant development of agricultural extension work by Nigerian ministries of agriculture began at least 15 years ago. It has been a program combining regulatory, educational and farm supply functions. The latter two of these have become relatively more important in recent years.

Nigeria has not had a well-developed, private, agri-business sector to supply inputs (seeds, plant materials, fertilizers, pesticides, etc.) essential to the adoption of recommended practices. Extension has attempted to fill this need probably, in part, because Nigeria has taxed her agricultural producers so heavily that input supply activities are unprofitable.

Numerous other activities have also been undertaken as part of extension operations in Nigeria. Production programs for cocoa (especially spraying for disease and pest control), cotton, groundnuts, maize, poultry, rice and rubber have received emphasis in one or more regions. Rehabilitation schemes for oil

palm and cocoa have been implemented in the East and West, respectively. In the desire to modernize through agricultural mechanization, tractor hire units have been operated as part of the extension effort. Home economics and young farmers' clubs programs have been undertaken, as has the development of supporting services for agricultural information (newsletters, radio posters, leaflets, bulletins, etc.) needed by the extension worker in the field. One other activity worthy of note has been the farm settlement scheme implemented strongly in the West and Mid-West and to a lesser extent in the East. As will be noted subsequently, a considerable amount of extension resources have been devoted to the settlement scheme.

Field extension workers have also been responsible for the collection of certain statistics, e.g., data regarding crop surveys, meteorological information, etc.

The production for export of cocoa, groundnuts, oil palm products and rubber has received the most attention in extension operations. Next in order of importance has been the emphasis on such cash crops or commodities as cotton, maize, poultry and rice for domestic consumption.

There have been several notable successes in extension programs in Nigeria which have gone beyond what is ordinarily considered education. The Oil Palm Rehabilitation Scheme in the East helped replant 70,000 acres of oil palm from 1962 to 1966. Many farmers in the Western State reported spraying their cocoa. Poultry programs were able to flood the limited domestic markets for eggs, and rice growing has caught on in certain areas, notably around Abakaliki, in the Ilushi flood plain on the Niger river and in the vicinity of Abeokuta. Dramatic increases in fertilizer sales in the northern states also suggest an initial success in the package program for groundnuts.

The importance which the former Regional governments attached to agricultural extension is indicated by the fact that authorized extension staff positions grew at twice the rate of all other Ministry of Agriculture activities between 1963-64 and 1966-67. Positions in the extension services increased by 10 percent a year during this period. The increase in positions, however, has not been matched by increased budgetary support. Funds allocated to logistic support of extension workers have dropped from being 90 percent of the amount allotted for personal emoluments in 1963-64 to only 53 percent of personal emoluments in 1967-68.[6] Problems are arising as a result of inadequate travel and other field support allowances.

The number of technical officers actually employed in the various Nigerian extension and related field services in 1966-67 is shown in Table VIII.1. These numbers are considerably below the number of positions authorized due to difficulties in recruiting and limitations of funds. The classes of officers listed combine the various official grades which have approximately the same training requirements. Senior grades usually are expected to be university graduates. The senior-intermediate class generally includes officers who hold a diploma from one of the training schools. The training level of the junior-intermediate class would generally be equal to the school of agriculture certificate, and the junior officers would mainly be young men with secondary school education and little technical training. The very heavy reliance of the North and to a somewhat lesser extent, the West, on the junior officer category will be noted.

Table VIII.1—Estimated Number of Technical Staff Employed in Extension and Related Field Services. Nigeria, by Former Regions, 1966-67[1]

Class of staff	Total Nigeria	Eastern	Mid-western	Northern	Western
			Numbers		
Senior	176	74	14	34	54
Senior-intermediate	467	56	47	155	109
Junior-Intermediate	1,453	653	156	400	244
Junior	2,071	395	230	835	611
TOTAL	4,167	1,278	447	1,424	1,018

[1]Kincaid, J.M. Jr., CSNRD 13.

The CSNRD studies of extension have revealed a number of problems in organization and operation. These are briefly described below with recommendations for action.[7]

There are three high-priority problems that relate to the organizational and administrative aspects of extension work in Nigeria as discussed on the following pages.

The fragmentation of extension into several separate state units suggests that the problem of coordinating and providing liaison among these units and institutions for agricultural education, research, marketing and credit will be greatly magnified in the future.

> We recommend that a Federal Extension Office be established as part of the Federal Ministry of Agriculture and Natural Resources. This office could help states to operate more effective field extension services by (1) coordinating extension activities within Nigeria, (2) assisting in extension staff training, (3) providing appropriate financial aid to cooperative extension programs throughout Nigeria, (4) perhaps posting some extension specialists at universities and research institutes, and (5) helping to arrange for donor agency and other nonindigenous activities to support Nigerian extension work. These proposals do not imply federal control and domination of extension. We think the Federal Extension Service should be a relatively small agency.

[6]Kincaid, *Op. cit.*
[7]Kincaid. *Ibid.*

A second way of coordinating and improving liaison among various agencies is to merge nondegree, post-secondary agricultural training within the university educational framework as recommended in detail on page 115. This would facilitate closer working relationships between ministry action programs and the educational institutions which train the manpower for those action programs and which provide some of the research information about improved technology and ways to adopt new technology.

Special attention needs to be given also to the opportunities for coordinating the educational aspects of federal and state government extension activities (as contrasted to the regulatory and service activities) with the university agricultural faculties, agricultural research centers and the Federal Ministry of Agriculture and Natural Resources. Placing some federal ministry staff members at the university centers would enhance the integration of ministry extension activities with the university agricultural faculties, agricultural research centers and the Federal Ministry of Agriculture and Natural Resources. A precedent of this type has already been established by the Extension Research Liaison Section of the former Northern Region Ministry of Agriculture located in the Institute of Agricultural Research at Ahmadu Bello University.

> Greater attention needs to be given to the improvement of "top-level" administrative competence in the planning and development of state-wide extension organization structures. This need has been intensified by the recent change from four Regional to the 12 State extension services. We recommend that Nigeria seek external technical assistance in the planning and development of extension organizational and administrative structures in each state.

Other types of expertise for field programming could also be included to assist in improving operation of each state's extension program.

> We recommend also phased streamlining of the overall extension organization and suggest that the numbers of supervisory levels in the chain of command be reduced ultimately from what has in the past been a five- or six-level organization structure to a maximum of three levels.

A change is needed in the philosophy of administrators (at all levels) regarding the application of their leadership to extension program implementation. We feel that extension as an organization with widely dispersed units at several levels and many geographic locations functions best when decisions are reached as close as possible to the point where the action is to be taken.

Nigerian extension services appear to rely largely on decisions made at the top and communicated downward through several levels, mostly by directive or memo with little, if any, direct face-to-face personal contact.

> We suggest that top-level extension administrators be more responsive to testing the competencies of lower level staff to assume additional responsibility and authority for the day-to-day conduct of their work.

Problems associated with planning, organizing, supporting and implementing extension field programs are the most vital to success. There are several specific problems which we believe must receive serious attention if the impact of extension work is to be markedly improved.

The proliferation of activities under the general heading of extension has created a situation wherein the limited human and material resources have been widely dispersed and fragmented. Part of this proliferation has been made necessary by taxation policies which have prevented the private sector from supplying inputs to Nigerian agriculture. The result has been to saddle an extension service, short of well-trained manpower, with responsibilities for importing or producing and distributing seeds, planting materials, feeds, fertilizer and equipment to farmers whose enthusiasm is so dampened by taxation and the lack of effective demand that subsidies and/or exhortation are necessary to attain adoption.

> We recommend that extension concentrate its resources on production campaigns that have the greatest potential for social and economic payoff. The CSNRD project dealing with investments in agricultural development has identified several commodities for which considerable expansion in production over the period 1970-85 is warranted. These commodities are cocoa, cotton, groundnuts and oil palm products. To a lesser extent, import substitution crops, e.g., sugar, rice and kenaf and certain nutritionally superior food items such as maize, milk and poultry also warrant attention.

This strategy suggests an intensive effort by extension and as such has implications for projections of manpower required. Table VIII.2 summarizes manpower requirements to staff these campaigns. Projections are made for the period 1970-75 and to 1985. In addition to the numbers of positions projected as required by the campaign are those required for the continuation of a general extension effort in those areas and commodities not included within the four major campaigns. The total projections are at a considerably lower rate of growth than that indicated by recent manpower planning by the former four regional governments.

A detailed description of the intensive extension effort in support of production campaigns is included in Chapter Seven on production campaigns. To further alleviate the problem of excessive fragmentation of extension resources, we have recommended an intensive package approach for implementation of the production campaigns. Such an approach would involve the use of particular sets of modern inputs (i.e.,

fertilizers, improved seeds and plant materials, agricultural chemicals, breeding stock, etc.). These inputs, when combined with improved management and production techniques, would require specific and well-organized extension teaching at the village farmer level. Such packages would necessarily include the availability of effective credit, input supply and market resources.

Implicit in this package approach are three important conditions. (1) The ministries must be able to plan effectively and organize their utilization of human and material resources. (2) They must follow through on these plans and strive to remove "crisis type" distractions and directives which tend to divert staff from their main job. (3) The intensive package approach will require seasonal step-by-step training of junior staff coupled with effective continuous supervision and evaluation of the progress being made.

Table VIII.2—Projections of Required Numbers of Positions for Nondegree Agricultural Extension (Technical) Manpower to Staff Recommended Intensive Campaigns and a Continuing General Extension Effort, Nigeria—1970, 1975 and 1985[1]

YEAR	Numbers of positions			
	Senior Intermediate (Agri. Supt.)	Junior Intermediate (Asst. Supt.)	Junior (Field Overseer/ Agri. Instructor)	Total
	Numbers			
By 1970:				
Campaigns	56	370	470	896
General Extension	474	1,909	1,582	3,965
Total	530	2,279	2,052	4,861
By 1975:				
Campaigns	181	1,800	1,787	3,768
General extension	413	2,109	589	3,111
Total	594	3,909	2,376	6,879
By 1985:				
Campaigns	150	2,250	600	3,000
General extension	517	4,060	794	5,371
Total	667	6.310	1,394	8,371

[1]Kincaid, J. M. Jr., CSNRD-13, Appendix D.

These package approaches have already met with moderate success, especially in the North where increased groundnut production and rather rapid adoption of fertilizer use has occurred, and in the West where it has been demonstrated that maize production can be readily increased. However, for the maize campaign in the West, the lack of effective demand severely hampered the program.

> There is need to create greater opportunities for program decisions to be made at the lowest possible organizational level and in close contact with farmers.

A conscious effort must be made to delegate a greater proportion of the daily operating decisions downward as close to the point where action will be implemented as is possible.

Another technique to create greater opportunities for making program decisions at the lowest possible level is to encourage more adequate collection and interpretation of benchmark data. Extension workers should be trained to make simple surveys of the general cultural, demographic and agricultural situation in the villages to provide useful data for planning and evaluation.

There is need to make a concerted effort to involve farm people more intensively in program planning and implementation. The rather widespread belief that farmers cannot adequately articulate their needs and interests is no longer valid in Nigeria. Our interviews with 850 farmers in 27 villages in the Western State showed that farmers are greatly concerned with improving their farming practices.[8] Most seemed receptive to change if they were assured that the change would improve their economic situation.

> The time is ripe to make a conscious and well-planned effort to help farmers develop new associations and groups or to improve existing ones that could serve as a focal point for extension activities in their village. In addition to their participation in the planning process, such groups should also be guided to assist in the implementation of the action programs and be encouraged to provide local support for extension work.

This recommendation implies that extension workers will need to be trained to identify organization and leadership competencies among their clientele. They will also need to be given practical experience in applying the principles of organizing and operating farmer associations.

There is need to improve personnel management procedures and practices within the extension organization.

> We recommend a policy of clearly establishing and communicating to all personnel in the service exactly what policies are to be applied with respect to promotions, transfers, advanced training, etc. The staff need to have more definite information about the criteria used when judgments are made about their personal performance and its relationship to personnel actions. Present policies and procedures are at best only vaguely understood by junior staff.[9]
>
> We also recommend improvement of the job descriptions for extension personnel. Our review of ministry personnel records revealed that the "schemes of service" which serve as descriptions of the work to be performed are much too general to be truly useful guides.[10] Such descriptions should not only provide the new employee with a fairly definitive understanding of what is expected of him, but they would also

[8]Kidd, D.W., *Factors Affecting Farmers' Response to Extension in Western Nigeria* CSNRD 30, 1968.

[9]*Ibid.*

[10]Ekpere, J.A., *Findings of the study of Midwest and West MANR Establishment* CSNRD Subproject 2, 1967-1968. (A background study)

serve as guidelines to those who plan and implement his training.

One of the most serious weaknesses in the personnel management aspect of extension operations is the lack of effective supervision of the junior-intermediate and junior levels of staff. Supervision tends to be too directive in its expression. The supervisory concepts of interpersonal, face-to-face relationships between a supervisor and his subordinates, as commonly understood in the highly developed extension services of the world, do not appear to have become culturally accepted by many Nigerians.

We recommend the incorporation of staff guidance and counselling as a major responsibility of those who hold supervisory positions in extension. This also implies the need to provide supervisory and management training (including practice) in the development of supervisory skills.

For the improvement of induction training, every new employee should receive a brief orientation to inform him about policies and procedures of the organization and how these affect him in a particular job. The description of his particular duties and responsibilities and how these relate to the broad objectives of extension and to the responsibilities of other positions should be discussed in detail.

One of the most serious obstacles to achieving extension program goals has been the inability on many occasions to provide the necessary logistic support. Field staff have all too often found themselves to be without the necessary production requisites and transportation at the time when they are needed.

Analysis of extension budgets shows that while total recurrent allocations for payment of personal emoluments (salaries and allowances) have increased steadily, recurrent allocations for other charges (transport, travel, expendable equipment, supplies, etc.) have decreased.[11] More specifically, allocations to emoluments increased by nearly 40 percent from 1963-64 to 1966-67, while logistic support allocations decreased by nearly 11 percent.

We recommend a thorough review of budgeting procedures in an attempt to re-allocate sufficient funds within the ministries' budgets to support staff logistically in the field.

One possibility for re-allocation of funds in the southern part of the country is to cut back on expenditures for farm settlements in favor of greater support to extension programs that will serve larger numbers of people. For example, the analyses of ministry of agriculture budgets for the period 1963-64 through 1967-68 for the former Western Region reveal that while £7.3 million was allocated to total extension recurrent and capital budgets, £5.2 million or 70 percent as much financial support was provided for the development of farm settlements. The analyses for the former Eastern Region for the 4-year period 1963-64 through 1966-67 revealed similar findings, i.e., £4.8 million allocated to extension as compared to £3.7 million to the farm settlement scheme. These data lead to a conclusion that a few individuals established in farming in the farm settlement scheme have been receiving a disproportionate share of the ministries' total investments in extension.

Opportunities exist to make more effective use of available resource allocations. There are instances where much more effective management of the utilization of funds should be possible. For example, tractor hire units have consumed a relatively large investment for the purchase of tractors and equipment, yet there is evidence that the efficiency of some units, as measured by hours of "machine time" in the field, was extremely low. Other opportunities exist in maintenance and use of motor vehicle transport and the planning of personal travel by staff.

The most important long-run opportunity for achieving a balance between staff members and logistic support is to be found in shifting functions from the public to the private sector. With the improved taxation and pricing policies we are recommending, the ministries of agriculture will be able to shift the burden of supplying improved planting materials, fertilizers, fungicides, baby chicks, etc. to the private sector and away from their own overburdened limited staffs. This will decrease the need for both staff and logistic support.

Some suggest reducing the numbers of extension staff and applying the resulting savings in personal emoluments to the support of those that remain. This alternative is vigorously opposed by those who look upon public agencies as sources of employment.[12] In addition, CSNRD manpower projections suggest that current levels of employment in extension are needed as a base upon which to build the required staffing pattern for the recommended production campaigns and general extension effort during the period 1970-75. Any severe cutback in staff numbers now would by necessity have o be reflected in a similar cutback of the goals established for those campaigns.

There is need to make more effective use of various forms of extension methodology and to improve the "teacher-learner" contact between the field level extension worker and the farmer. While all methods of extension-to-farmer contacts need to be employed, greater emphasis must be given to work with individuals and to result-demonstrations by farmers under close extension guidance.

---

[11]Analysis of budgets in four divisions of the Western State by Kidd, *op. cit.* revealed similar relationships between personal emoluments and other supporting funds.

[12]The goal of helping to reduce unemployment, as an objective for agricultural extension and other development programs, was often noted in discussions with Nigerian officials.

Mass media, particularly radio programs, have an important place in initiating farmer awareness of a campaign and for presenting pertinent facts about prices, markets, new varieties and techniques.[13] Meetings, a method used extensively in Nigerian extension programs, can help to stimulate interest and desire among some of the farmer participants to make a commitment to the trial of a new practice or package of practices. However, unless these more general contacts are followed closely by intensive individual effort with the few farmers who have "publicly" committed themselves to participation in the program or campaign, little, if any, persistent adoption of practices is likely to occur. And, without persistent adoption by a few farmers who are satisfied with their achievements, little, if any, multiplier effect may be expected to result. One of the major methodological weaknesses in the extension effort in Nigeria has been the failure to "follow through" effectively with individual farmers.

> We recommend encouragement of the extension staff to adopt an attitude of persuasion through demonstration and teaching of farmers rather than through an approach which directs farmers and is typified by such staff comments as "we told farmers to" and "we supervised farmers, directing them" in what was to be done.

Another tactic involves improvement of the extention worker's schedule so that his activities may be concentrated upon a few villages and with limited numbers of farmers in each village.[14] He could then work intensively with the few farmers who participate, spending a whole day at frequent intervals in a village showing farmers how to follow a new practice and then follow a regular schedule of village visits, particularly during the growing season.

There is need to improve the appliction and use of the result-demonstration on farms. The CSNRD Subproject 2 study of extension field operations in the Western State revealed that in all too many instances result-demonstrations were poorly laid out and not well-marked for passers-by to learn, by casual observation what was being demonstrated.[15] There was also evidence that farmers were not given sufficient opportunity to participate in the preparation and management of the demonstration. More emphasis needs to be placed on result-demonstrations both in pre-service and in-service training programs for staff development.

There is need to gradually expand the work with rural women and youth. There is considerable evidence that rural women in Nigeria play an important part, not only in the care of the family, but in the production activities on the family farm. Also, work with rural youth is a necessary part of the long-range objective of getting young farm people to take advantage of the new opportunities which CSNRD recommendations would create to lead productive, profitable lives on Nigerian farms.

> A crucial aspect of the recommended Strategy II is the generation of more effective demand for nutritionally superior foods. One way of doing this is through extension education in nutrition. We recommend that nutrition education be included as part of the extension programs dealing with adults, young people and organizations. What is needed is not highly technical nutritional information teachable only by highly trained nutritional specialists; instead, the desirable nutritional qualities of foodstuffs should be made known to and taught by all extension workers. Posters, radio programs and newspaper articles should be used extensively. This procedure will make it possible for only a small number of Nigeria's limited number of nutritionists to spread their knowledge widely over millions of Nigeria's poorly educated consumers.

While for some time to come the major extension effort will likely concentrate on the adult farmer to improve his farming practices, the beginning effort of recent years to focus more attention on the women of the farm family warrants a gradual expansion. The content of extension programs for rural women should emphasize production—particularly of improved foods—and nutritional education should stress such factors as preparation, use and storage of the food grown. Child care, home improvement and similar home economics subjects should be integrated into the total program to the extent compatible with the major production and food use emphases and as the needs of the rural family imply.

> We recommend that programs with rural youth be integrated to the extent possible with those implemented for adults including the proposed production campaigns' The major objective should be that of designing youth club programs that fit family or village needs and interest and that afford youth an opportunity to learn that farming and rural living can be economically and socially desirable.

There is need to improve the "grass-roots" impact of donor agency field program advisors.

> We recommend that more attention be given to strengthening interpersonal relationships of external-advisory and host-country counterparts in extension work. More definitive counterpart policies need to be formulated and implemented. There are too many instances of insufficient sharing of competencies of the advisor with his counterparts.[16] As a result, the advisor tends to operate more as an additional technician in

---

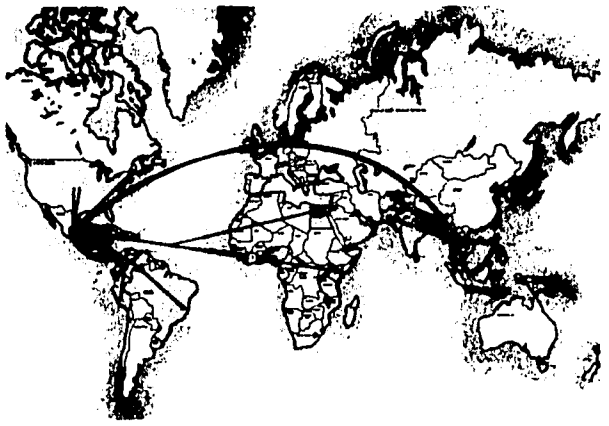
[13] Kidd, *op. cit.*

[14] Kidd *(op. cit.)* found that "concentration" was occurring in the four Western Divisions covered by his report in the form of staff working in only limited numbers of villages. However, the form of concentration due to lack of planning and organization of programs and to insufficient intensity of effort were limiting factors to success.

[15] *Ibid.* See implications section for more detailed suggestions about improving demonstrations.

[16] Ekpure *(op. cit.)* found little definitive advisor counterpart activity for the sample of staff members interviewed.

International Research Centers Serve World Agricultural Development

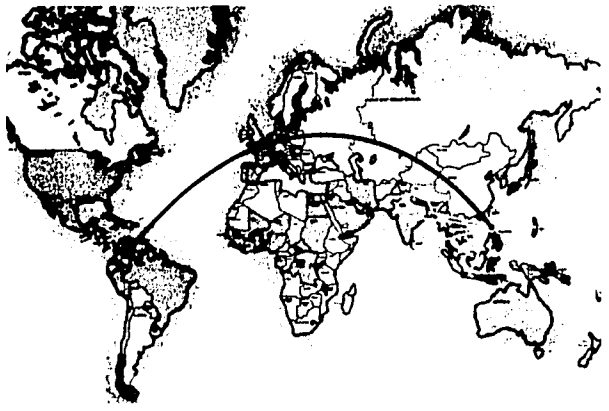


Corn research in Mexico

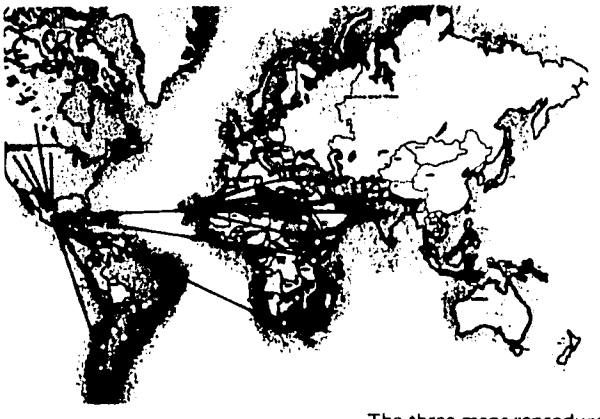
HOW WILL NIGERIA UTILIZE THE NEW IITA TO BE ESTABLISHED AT IBADAN? --

-- to complement her own research program?

-- as an excuse for not supporting Nigerian research?

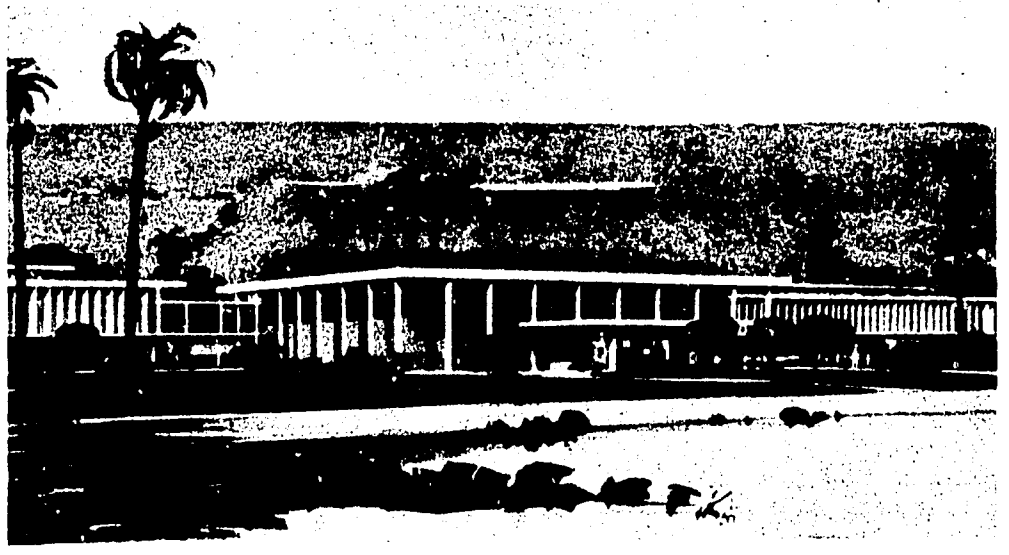


Rice research in the Philippines



Wheat research in Mexico

The three maps reproduced with permission of The Rockefeller Foundation



The new International Institute for Tropical Agriculture (IITA), Ibadan.

the ministries' extension programs than as a regular advisor to one or more Nigerian technicians who have been specifically assigned to work closely with that advisor.

The impact of donor agency advisors upon village level extension programs should be enhanced. We suggest that consideration be given to the attachment of volunteers—similar in nature and activities to Peace Corps workers—to each foreign extension advisor. Such volunteers, if chosen for aptitude and if suitably prepared and supported, could do very useful extension work at the village level.

Two possible sources of volunteer personnel might be explored: (1) bring in persons from the developed areas of the world such as Canada, Europe, Japan and the United States, (2) select, train and employ young Nigerians who express an interest in doing work similar to that by Peace Corps Volunteers. This second alternative would have a more far-reaching effect in developing Nigerian competencies.

The number of volunteers should probably be limited to a maximum of four or five per advisor—at least until a project has successfully passed through a pilot period.

This activity should be coordinated with ministry extension programs so as not to compete with nor duplicate efforts at the same location. However, since ministry staff cannot effectively service all villages in their areas, there should be plenty of opportunity for volunteers to reach those that would not otherwise receive attention.

Agricultural Research

This agricultural research section is divided into subsections dealing with (1) the need to focus research on the crops and livestock products assigned priorities in this report, (2) means of improving Nigeria's administrative structure for agricultural research and (3) means of strengthening Nigeria's agricultural research staff.

We are placing heavy emphasis on agricultural research to help implement Nigerian rural development. In the short run, our recommendations require research support for the production campaigns. Our recommendations require sustained research accomplishments in soil fertility, livestock and the economic aspects of development. Our second main thrust depends on substantial research accomplishments in the food and feed crops.

The need to focus agricultural research on priority crops and livestock products

Each of the commodity campaigns discussed in Chapter Seven, requires research support. In the crop campaigns, research must maintain the flow of new varieties and technologies to make the program profitable to the farmers. It must be able to meet new problems as they arise.

Nigeria has long-established and successful research institutions that can give valuable support to production campaigns for cocoa, oil palm, cotton and groundnuts.

We recommend that CRIN employ five to six additional senior scientists to provide adequate leadership and supervision to the present large staff of inexperienced research workers and to permit new work in quality control of cocoa and cocoa processing. Expanded laboratory facilities for testing pest control chemicals and fertilizers are also needed. This might be a function of CRIN or of some central ministry laboratory.

NIFOR research has been badly disrupted by the war. The facilities are intact, but there has been a serious loss of experienced scientists, both Nigerian and expatriate. This center is essential to the success of the oil palm campaigns since it is the source of improved seedlings and development of new varieties and new technologies. It should be speedily brought back to at least the pre-war staffing level. Historically, NIFOR has had a smaller staff than CRIN, and there have been fewer men with advanced degrees.[17] The international role of NIFOR justifies international support and cooperation.

Groundnut-research is well-established at the Institute of Agricultural Research, Samaru. It should be expanded to accelerate improvement in varieties, fertilizer use, pest control, cultural practices and product processing and storage. Recently begun work on quality improvement for the confectionery trade, and high-yielding varieties for oil-crushings should be encouraged. We are informed that "by 1975-85, new varieties from this program may be available to add to the beneficial effects of fertilizer use and improved agronomy."[18]

The Institute of Agricultural Research has a research program of some 20 projects that provide effective support to the cotton campaigns. However, more attention needs to be given to longer-staple cotton.

Increases in staff to support groundnut and cotton research would not need to be large. It is the feeling of the Institute that its needs for expansion are greater in the fields of agricultural economics, mechanization and animal science.[19]

We recommend a modest program aimed at increasing farmers' short-run incomes from existing rubber trees. This could be accomplished through experimental-demonstration plots designed to increase yields, improve quality and lower costs by reducing

[17] Pine, Wilfred. *A Survey of Nigerian Agricultural Research*, CSNRD 5, 1966.

[18] Letter to CSNRD from Mr. H. S. Darling, former Director of IAR. 17 Oct., 1968.

[19] Pine, *op. cit.* p. 159.

labor requirements. We also recommend a pilot-research production campaign to determine the profitability of producing natural rubber in Nigeria under improved production and processing technology. A moderate increase in technical staff at the Iyanomo rubber station will be needed and increased attention to station participation in the experimental demonstrations would be necessary.

A research activity which is virtually non-existent and badly needed to support production campaigns is the study and innovation of farm units that are efficient in management of production resources and capable of growth in output and productivity. Interesting innovations in farm organization tried are: the nucleus estate concept introduced near Calabar by the Commonwealth Development Corporation; the mixed farming schemes developed by the IAR and the former Northern Ministry of Agriculture and Natural Resources; the School Leaver farms organized by the Mid-West Ministry of Agriculture, and some of the community development agricultural projects tried in the former Eastern Region by the Ministry of Rural Development assisted by the Ford Foundation.

Farm unit experimentation should not be considered to be the private preserve of any one institution. Universities, extension services, research stations, business firms and private farmers should be encouraged to develop experimental farm units. Six or eight agricultural economists and sociologists should be posted to universities and ministries to initiate new farm organization projects in cocoa, oil palm, groundnut and cotton areas.

We have placed a secondary priority on production campaigns for food because of the need to generate effective demand through higher per-capita incomes and nutrition education. However, we feel that high priority must be assigned to research on these crops and livestock products. The prime needs are (1) to lower production costs through better varieties, strains and methods, (2) to improve product quality, (3) to appraise consumer acceptance and (4) to develop markets. Research for these crops needs to extend from laboratory and pilot work to field trials, farm scale adaptation studies, pilot processing plants and pilot marketing schemes.

One of the principal dietary needs in Nigeria is a low-cost source of protein. With limited incomes, and in the short run, the principal source of protein must be the edible grain legumes and the cereal grains and livestock products which depend upon roughages produced on land unsuitable for legumes and cereals.

We recommend the following action for superior food research:

1. Develop a comprehensive program for edible legume and high protein crops research, particularly in southern Nigeria where proteins are in short supply.
2. Improve the distribution of newly developed and proven strains of legume crops.
3. Develop a comprehensive program of research on small, inexpensive home and commercial drying and storage facilities for cereals and legumes, particularly in humid areas.
4. Provide for economic analysis to determine the extent to which the results of research can be successfully accepted as a part of improved cropping programs.

If the problems of disease and of livestock improvement and productivity in northern Nigeria can be solved, it will be possible to increase the availability of badly needed animal protein, develop acceptable crop-livestock farming systems, increase farm income and improve soil fertility. Demand for animal products is small, but grows with increasing incomes and population.

We propose that a Livestock Research Center for West Africa be developed in conjunction with Ahmadu Bello University at Samaru. Samaru is in the savannah area which is ecologically representative of many millions of acres of land adapted to livestock production and presently used largely for that purpose. The savannah belt cuts across much of West Africa.

The regional animal research center would be built around existing programs of animal science research and teaching and further supported by the crops research of the Institute of Agricultural Research. This proposal should not preclude support for poultry, swine, small animal and beef feeding research at southern locations.

One aspect of the research would deal with prevailing animal diseases of the areas that most urgently need research attention. Selected examples include:

1. *Contagious bovine pleuro-pneumonia*—coordinated with related research in East Africa and elsewhere.
2. *Streptothricosis*—a wide-spread skin disease.
3. *Animal parasite research*—with emphasis on internal parasites.
4. *Mucosal disease*—a complex of viral diseases.

Approximately 40 acres of land are now available at Samaru and 120 acres are scheduled to be added. Because of the nature of the research program, some confinement pens, corrals, etc., and maximum security buildings for infectious disease research on animals would be required.

The livestock production research program of the Center should consist of the following major segments:

1. Genetics and breeding of livestock for tropical conditions.
2. Nutrition and feeding with special attention to feeds and feeding during the dry season.
3. Animal physiology with special attention to

environmental adaptation, reproduction and metabolism.
4. Modern cattle management practices.
5. Marketing livestock and livestock products, including transportation.
6. Socio-economic studies related to land, cattle and people in a livestock economy.

The production improvement research program would be built around the present animal science program located at Shika, 5 miles from the Ahmadu Bello University campus. That location has 4,000 acres of land, 540 head of cattle, livestock buildings, limited laboratory facilities and farm equipment at its disposal. The proposed program would require additional land, livestock equipment, buildings, offices, laboratories and staff.

As a regional livestock center, this agency should be expected either to give attention to small animal, swine, poultry and beef feeding problems in rain forest and derived savannah areas, *or* separate research on these subjects should receive separate Nigerian and international support in more southern locations.

The need for low-cost feed and forage is closely allied to the need for improved knowledge of animai husbandry and animal diseases. Grain is an expensive feed throughout Nigeria. Forages are poor in quality and deficient in quantity, particularly in the dry season. We recommend increased emphasis upon the following lines of research:

1. Introduction and evaluation of additional grasses and legumes from other tropical and sub-tropical areas.
2. Improvement of cultural practices for pastures and forage crops, and improved pasture and range management. The demonstrations and soil conservation programs in the North should be brought into a research program for more careful evaluation.
3. Evaluation of grazing vs. confined feeding of grasses and legumes in the more humid areas.
4. Investigation of the feasibility of year-round supplies of feed for cattle and possibly sheep and goats in the North—on an individual ranch or local area basis.
5. Studying cattle finishing for market in both northern and southern locations with various combinations of pasture, forage and supplemental feeds.
6. Studying alternative storage methods for forage crops, such as hay and silage.
7. Cooperation in soil fertility research work to determine the possibility of economically growing feed crops on fallow land.
8. Studying the feed supply industry to determine if more economical concentrate rations can be developed.

Cereal, feed grain and root crops are important direct and indirect sources of superior foods. However, these crops, particularly food and feed grains, are so important for a second thrust in Nigerian rural development that they are given special separate consideration in the following paragraphs.

We have seen that production of subsistence crops has grown and should continue to grow in Nigeria under peace at about the same rate as population. We have noted the high cost of producing cereals and other concentrated food and feedstuffs. If this cost can be lowered, Nigeria will be able to improve the nutritional intake of her people, institute expanded livestock feeding programs and probably enter the export markets for food and feed grains. Recent advances in food and feed grain production in Mexico, Kenya, Pakistan, India and the Philippines have permitted similar developments in these countries, which were generally in worse straits than Nigeria now is. The key event for these countries has been the establishment of high-level specialized research agencies such as the new IITA now being established at Ibadan. We feel IITA will establish the prerequisite "critical masses" of genetic materials, facilities and staff to greatly increase the productivity of Nigerian research agencies dealing with food and feed crops, such as the Institute of Agricultural Research at Zaria, Moor Plantation (Federal and Western), Umudike and the developing faculties of agriculture. Our confidence in the productivity of research on food and feed crops causes us to anticipate a second forward thrust in Nigerian agriculture between, say, 1973 and 1980 based on much lower costs of producing feed and food crops.

Victor Smith's CSNRD study indicates, (1) that correction of Nigeria's unwise taxation and pricing policies and programs will tend to encourage southern Nigeria to specialize in the production of export tree crops and northern Nigeria to specialize in the production of food crops, groundnuts and cotton; (2) that a 50 percent increase in yields of maize, millet, grain, sorghum and rice would greatly accentuate regional specialization, increase incomes and permit much greater export earnings.

We conclude that Nigerian research on food and feed grain crops should:

1. Give added emphasis to genetic improvement and related research for sorghums, millet and maize. This should be done with added support for the cereal grains improvement project at the IAR at Ahmadu Bello and through close cooperation of Nigerian agencies and faculties with the new IITA at Ibadan.
2. Give added emphasis to rice and schistosomiasis control or mechanization of rice production. One avenue of cooperation to be explored is through IITA to the IRRI at Los Banos, the

Philippines. Another avenue which could develop is the proposed African Regional Rice Research Project.

3. Be based on expert evaluation of the prospects for wheat growing before deciding to invest extensively in wheat research. An expert from the International Maize and Wheat Improvement Center in Mexico should be brought to Nigeria for consultation.
4. Be based on further computations from the Livestock/Human Nutrition Study started with CSNRD resources and now supported with funds from the Rockefeller Foundation. The computational techniques and models developed in that study can help determine the potential payoffs of research accomplishments in the different feed grains, food grains, livestock products and export crops. One of the questions to be investigated is the relative reward for research accomplishments in root crops versus cereals. By exploring the advantageous geographic production patterns for cereal, root and tree crops, the Smith computational model could indicate the crucial locations for soil fertility, marketing and transportation studies.

We have identified two general fields of research that should have high priority for expansion because knowledge in these areas is essential to effective use of more specific research results. One deals with soil fertility and the other with economic analysis.

Our first general research proposal—the development of economically and socially acceptable soil management systems to take the place of shifting cultivation or bush fallow—deals with a major problem in Nigeria and in other tropical high-rainfall areas around the world. The problem in the rain-forest areas of Nigeria can be partially handled with increased specialization in tree-crop agriculture. Such specialization appears to be economically advantageous from our studies, particularly if our pricing and taxing recommendations are followed, but the complementary specialization in annual crops in the derived savannah and savannah areas would aggravate the problem in those areas.

Thus, an improved understanding of the management of tropical soils is essential to the long-run success of the production campaigns outlined earlier in this study and we propose a substantial research program in soil fertility and soil management. Since the findings would have international applicability, we recommend that this line of inquiry be developed in conjunction with IITA. On the basis of preliminary discussion, we estimate that funds would have to be found in addition to those which might be available from IITA to provide additional buildings and equipment worth about £125,000 and to finance five additional scientists. This staff, with supporting costs, would represent an annual outlay of about £125,000. The project would need to be continued for perhaps 20 to 25 years. If the work were extended to other substations, additional costs of around £70,000 per location are estimated, assuming that two men would be provided and that they would be attached to an existing research station.

Our second general research proposal—agricultural economics—is offered because of very limited available knowledge about the economics of production and marketing, and of the social conditions that influence development. Agricultural economic research is getting started in Nigeria. It has a high priority for expansion. Our recommendation to expand the functions and role of the Federal Ministry of Agriculture and Natural Resources requires a nation-wide strengthening of agricultural campaigns to place greater reliance on a decentralized decision-making process.

The small staff at NISER is doing creditable work in macro-economics and policy, but it does very little analysis of resource relationships at the farm level. The Rural Economics Research Unit (RERU) of the Institute of Agricultural Research has a smaller staff. It has been able to make some useful studies of village economics, but needs staff and funds to expand these studies and to make economic analyses of the experimental data at Samaru. The Economic Development Institute (EDI) at the University of Nigeria has made studies of several commodities including rice, rubber, palm, cashews and poultry. The present status of the staff and facilities of that Institute is not known to us but rehabilitation of EDI should have high priority. The few instructors in agricultural economics at the universities have had little time for research.

Against this background of scant resources and large need, we suggest expansion in the following areas of economic research:

1. Farm organization and management studies to identify resource crop and livestock combinations that will meet farmers objectives for income, risk, and use of family labor, including leisure.
2. Commodity studies to determine input requirements and related outputs and to accumulate local data on prices and cost-rates.
3. Research on marketing systems and marketing institutions to suggest ways of improving marketing for a modernizing agriculture.
4. Economic studies of transportation and storage. As agriculture becomes more specialized, it will require new arrangements for storage and transportation. Alternatives need to be studied before large sums are invested in costly facilities that are poorly designed, poorly located or unnecessary.
5. The thorough study of the organization and

practices of Nigerian commodity markets because of their key importance to the success of production campaigns for the export crops.

6. Economic studies of existing and potential agribusiness enterprises to ascertain the degree of success being achieved by these firms, importance of forward and backward linkages to development of various industries and optimum sizes of firms from the standpoint of economics of scale.
7. Agricultural statistics—the Federal Ministry of Agriculture and Natural Resources in cooperation with the Federal Office of Statistics (FOS) should develop secondary measures of farm income levels and distributions, farm expenditures, indexes of prices paid and received, indexes of farm output, measures of farm input, etc. Primary data on yields, acreage, prices and resource usage should probably be gathered by the FOS, but in close cooperation with the Federal Ministry of Agriculture and Natural Resources.
8. A wide variety of rural sociological or anthropolitical studies could most usefully be made as one aspect of a broader study where economists and sociologists would work together.

Improving administrative structures for agricultural research

Improving administrative structures for Nigerian research requires close cooperation between international, Nigerian federal and state agencies and Nigerian universities. As Nigeria moves ahead with 12 states, special attention should be given to research organization and institutions.

It would be prudent to establish strong research centers to serve geographic areas of ecological similarity rather than establish an agricultural research center for each new state. These can be of two types: one, a continuation of the federal research institutions, such as NIFOR or Moor Plantation, and the other, research centers at each of the universities with agricultural faculties. The federal research institutions would continue to emphasize certain national problems while university centers could emphasize problems indigenous to their service areas as well as national problems not covered by specialized federal institutes. To do this, it will be necessary for the universities to strengthen existing branch stations and develop new stations to study local problems. In some instances, these branch stations can be built around existing agricultural research stations of former regional ministries.

The key to long-term research personnel training and research program development lies with the Nigerian universities. However, the universities have not been employed effectively as agricultural research agencies, mainly because they have had only token funds for research. This has been especially true in the East and West, but is also true in the North for animal production research.

We strongly recommend that the Nigerian government and donors encourage and support, in every possible way, the transfer of the agricultural research responsibility from the former Regional Ministries of Agriculture and of Animal and Forest Resources to the universities which have agricultural faculties.

We recommend that, in addition to the federal agricultural research program and the several specialized institutes, three strong agricultural research centers be developed, one under the jurisdiction of each of the following:

a. Ahmadu Bello University
b. University of Nigeria
c. University of Ife and University of Ibadan

Since the University of Nigeria is strategically located to serve the neglected middle belt of the former Northern Region as well as the eastern derived savannah and rain forests, we regard it crucial to re-establish the agricultural faculty of that institution and to develop at the faculty a significant research program. Civil war problems and the ongoing momentum which have been maintained and increased in the Samaru and at the Ibadan/Ife complex should not be permitted to obscure important opportunities for research on feed and food grains, small livestock, beef feeding, root crops, export tree crops and agricultural economics in the Nsukka/Enugu/Umudike/Benin area.

Each area center should develop its agricultural research program to fit the special needs of the area in which it is located. Substations should be located to correspond to problem areas. Fragmentation of research activities should be avoided.

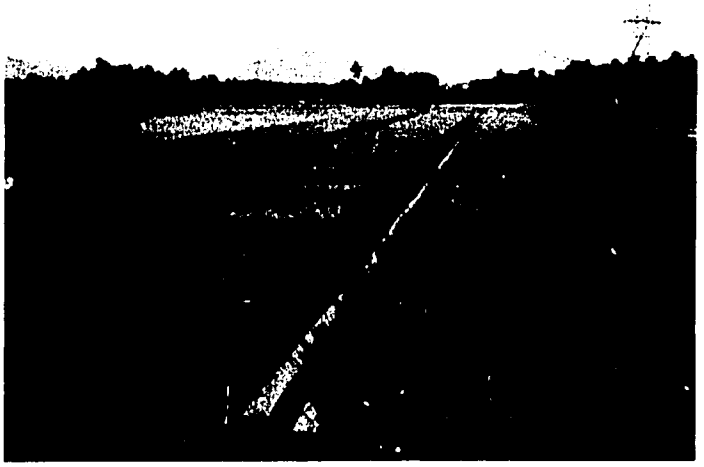
Agricultural Research Council

The added responsibility of the Federal Ministry of Agriculture and Natural Resources for financing research activities throughout the nation will require the creation of a new unit in the Office of the Permanent Secretary of that Ministry. This unit should be headed by an administrator-scientist responsible for overall program development and coordination of federally financed programs. He would be assisted by the proposed *Agricultural Research Council* (ARC). The administrator would also consolidate budget requests for the various agencies, develop the total program, and in cooperation with the Permanent Secretary, defend the budget before appropriate governmental committees.

In setting up the functions of an overall unit for research administration in the office of the Permanent Secretary of Agriculture and Natural Resources it is also recommended that, to the fullest extent possible, research proposals originate close to the users of

Research Holds Key to Sustained Development

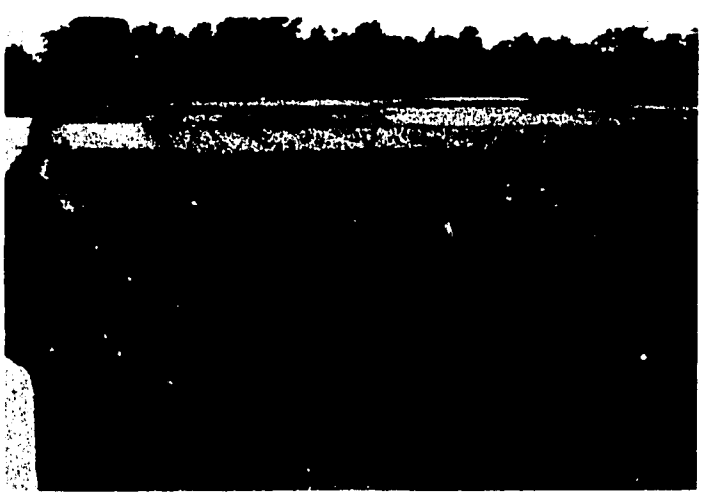
Improved rice in the Philippines



New rice varieties bred at Los Banõs ...

... are tested in other countries ...

Published with permission of The Rockefeller Foundation



... and finally produced and distributed to farmers.

Corn improvement at Ibadan.

The Institute of Agricultural Research at ABU, Samaru, conducts important cereals research.

the research rather than at the top ministry echelon. Each state, university center and research institute should submit its research problems and proposals through established channels and, wherever possible, participate in the financing.

Favorable consideration should be given to the establishment of the Agricultural Research Council recommended by the Agricultural Technical Committee in its February, 1968, meeting. The Council could assist in developing long-range plans and in coordinating broad research programs as noted above. The Advisory Committee on Agricultural Education which would advise the National Universities Commission on support for the agricultural faculties would be under the administration of the Federal Ministry of Agriculture and Natural Resources, a situation which would facilitate meaningful coordination of research and teaching at the university area centers.

We urge the development of a uniform research project system for presentation, review and approval of all research projects. This should include a Central Project Unit and the working files located in the Office of the Permanent Secretary.

We recommended that consideration be given to placing a member of the staff of IITA on the Nigeria Agricultural Research Council.

We recommend that Nigerian agricultural research agencies maintain close contact and cooperate with the IITA whenever the occasion arises. The IITA should be regarded as a helpful cooperator—complementary rather than competitive. When members of Nigerian research staffs are invited to work with the Institute, every effort should be made to arrange for this and to exploit the genetic banks, staff and facilities at IITA.

Action should be taken to provide Institute status for the present Federal Department of Agricultural Research. Under the current structure, it is in a relatively weak position to compete for research personnel.

The Federal Ministry of Agriculture and Natural Resources should consider strengthening and broadening the coverage of the Nigerian Stored Products Research Institute. To improve coordination, its headquarters staff and functions should be transferred from the Ministry of Trade to the Federal Department of Agricultural Research or to a university center.

Building a strong research staff

Although insufficient funds are being devoted to agricultural research in Nigeria, the shortage of well-trained senior research scientists is a still more serious factor limiting the development of Nigerian agricultural research programs.

The shortage of trained, experienced, competent research personnel is recognized as the most difficult problem which Nigerian agricultural research agencies will face during the next 10 to 20 years.

During the next 10 to 20 years, research directors should insist on the use of senior research scientists to provide guidance, develop sound work habits, methodology and productive experience for the new Master of Science and Doctor of Philosophy returnees. This guidance period for each new Nigerian research employee should continue for 3 to 10 years, depending on the individual, if Nigerian agricultural research agencies are to develop first-class research teams. If research directors and political leaders permit the "Nigerianization" of their research staff to proceed too rapidly, they will eliminate the essential ingredient on which sound research programs are built—experienced manpower—in both the long and the short run.

Donor and Nigerian agencies should orient trainees before they begin their graduate work. Also the universities and major professors of those Nigerians going to foreign universities should be selected, in part, on the basis of their capacity to counsel their students on what will be expected of them when they return to Nigeria.

Promotion of research scientists should be closely tied to their productivity. The record of each individual should be examined each year by a personnel evaluation committee of senior research scientists from agencies other than the one in which they are employed. Employment contracts should have a probationary period of 5 years. That is sufficient time for the employee to demonstrate his ability to produce research results and for the employer to evaluate his work as an individual and as a contributor to research team efforts.

Research directors, almost without exception, state that the younger group of Nigerian researchers too often overlooks opportunities to cooperate with each other or to talk with each other about their research. It is reported that they insist on working alone and frequently on problems of their own choosing which may be of low priority. When prospective graduate students are given orientation training by Nigerian and donor officials, major professors and, later, research directors, it should be stressed that this is the age of the research team.

Research agencies should emphasize diversity of background and training in building their staff. Although under current circumstances there may be a strong tendency, for example, for students from a certain area to return for employment, possibilities exist within this pattern to avoid staff inbreeding. It is not desirable to build a staff entirely from British-trained or American-trained returnees or all from a single university. The wider the training mix, the better possibility of obtaining a "cross fertilization" of talent, ideas, techniques and approaches to the solution of problems.

One of the many advantages of having major re-

search programs tied closely to a university is that such arrangements provide the possibility of using (1) faculty members in research activities and (2) researchers to do university teaching. Both teaching and research benefit from the arrangement. Also, this provides an excellent environment for graduate study under almost any top scientist in the country, significant research support for graduate students, and a much more relevant university teaching environment. The end result should be improved training for scientific personnel.

We recommend that some of the isolated one- or two-man research projects be moved to research centers or universities where the same work could be carried on with better support. The swine research at Fashola is an example of a one-man project that could be moved to a research institution or university, perhaps to the University of Ife, where the scientist could do some teaching, and students and faculty could help with the project.

Personnel and financial requirements

We have made rough projections of personnel and financial requirements for a research program to support Strategy II programs in 1975 and 1985. Our estimates appear in Table VIII.3. The costs shown are for recurrent expenses only. Capital costs of the program we have recommended, excluding the £15 million to be invested by IITA, might amount to an average of £600,000 to £700,000 annually. The manpower projections shown in the table indicate an approximate doubling of scientific staff in 15 years and a need for maintaining a core of experienced expatriate scientists for a number of years.

Costs for research under Strategy II conditions would increase considerably faster than under I or III.

Table VIII.3—Agricultural Research Agencies, Research Personnel and Expenditures, Nigeria, 1966 with Projections for 1975 and 1985

Year	Budgeted positions for research officers			Estimated total[3] annual recurrent expenditures in terms of 1966 pounds
	Nigerian	Expatriates	Total	
	------ *Numbers* ------			£
1966[1]	180	130	310	3,119,000
1975	363	115[2]	478	4,762,000[4]
1985	596	100[2]	696	6,760,000[4]

[1]Based on figures in CSNRD 5, *Survey of Nigerian Agricultural Research*, and published budgets of the different agencies, but with elimination of the FAO and ILO, and the Rural Economic Survey.

[2]In order to fully develop newly appointed M.S. and Ph.D. returnees, it is strongly recommended that not less than the indicated number of expatriate senior scientists be included in the research staff each year during the period up to 1985.

[3]Inflationary pressures would probably increase the required financial estimates for the period to 1975 and 1985 by 2 1/2 to 3 percent per year compounded annually.

[4]Projected on basis of 1966 average costs per scientists for each research institution which averaged about £10,000. Includes all recurrent costs, but no capital costs.

Public research expenditures would rise from 12 percent of all public outlays for agriculture in 1966 to 19 percent in 1985. The gains in productivity from the integration of research that we propose would be of greater significance than the projected rise in costs.

An Agricultural Credit Program

If the production campaigns are to succeed, agricultural financing will need to be improved and expanded. Close federal, state and local cooperation will be needed. Nigerian farmers will need increased quantities of seasonal and intermediate term credit to purchase additional nonfarm produced capital inputs such as pesticides, fertilizer, plows and bullocks in coming years. Nigerian farmers have demonstrated that present sources of credit can be expanded moderately. Thus, production campaigns can get under way while simultaneous efforts are made to develop better and cheaper sources of financing.

Our recommendations concerning major production campaigns to encourage increased output for cocoa, oil palm, cotton and groundnuts must be strongly supported by credit and technical assistance programs. Since farmers in these programs will be the primary users of purchased inputs, we recommend that major credit assistance be limited initially to these farmers. In the early years, up to one-half the necessary capital can best be furnished in loans with an equal amount supplied as improved seeds or fertilizer.

It is not realistic to assume that any agricultural credit institution can or should be expected to provide the public additional capital needed (through credit) to all of Nigeria's farmers (perhaps 5 million). Priority in the allocation of credit should be given to those farmers who have an effective demand for agricultural credit. These are the farm operators who have the ability to repay productive loans and recognize and accept their responsibilities to do so.

If Nigeria's taxation and pricing policies are restructured, monetary returns to land and land values will rise to create a base for mortgage credit. Before land can be used as additional collateral for credit, however, the land must be owned either by individual farmers or groups of farmers who have the right to mortgage this resource. Since there is ownership in individual trees, it might be possible, in the short run, to use trees as collateral for tree crop farmers.

Earlier in this report, it was indicated that profitable investments in Nigerian agriculture are present and will become more profitable if taxation and price policies are modified to raise producer prices. This implies that the *ability* of Nigerian farmers to repay agricultural loans will increase. However, agricultural loans will not be repaid unless the farm borrowers are also *willing* to honor their debts.

Agricultural credit can be an accelerator of the

economic development process, but the limitations of agricultural credit institutions must be recognized. This warning is noted here because, in the past, agricultural credit institutions in Nigeria and other developing countries have been assigned vague and unattainable goals in the development process. Failure to confine public credit to high-payoff economic opportunities has been a common weakness.

The great disparity in the quantity of capital per farm and per farm worker between less developed and more advanced countries has caused economic planners to over-emphasize the need for agricultural credit and to imply that once an agricultural credit institution was organized and functioning, the rate of economic development would automatically increase. Too often, factors other than a shortage of capital (credit) have restricted economic development.

The objectives of agricultural credit institutions should include the following:

1. To increase the rate of economic development by concentrating their loans on investments in production, marketing and processing of commodities for which there are profitable and adequate markets. Consumption loans should be made by private agencies and public welfare bodies where necessary.
2. To improve the organization and administration of the lending agency (a) to offer the kinds of loans needed by producers of each commodity, (b) to provide supervision for the use of its loans and (c) to provide efficient means for collection.
3. To upgrade the capabilities of the agricultural credit staff as well as to provide for an increased number of trained credit personnel.

Agricultural credit institutions will not attain their objectives until appropriate guidelines concerning the making, supervising and collecting of agricultural loans and training of credit personnel are devised for economic, social and political environments which are undergoing dramatic changes. Until a satisfactory credit program can be developed for major export crops, there is no reason to proceed with a larger credit organization. Once satisfactory credit programs are developed for commodity campaigns, then consideration can be given to a greatly expanded credit organization as proposed in CSNRD's credit report.[20]

We recommend that the feasibility of integrating agricultural credit (making, supervising, and collecting loans for individuals as well as groups of farmers) and managerial and technical assistance at the farm level with marketing board functions be carefully studied. We think the marketing boards could help with collections, but should not undertake to establish their own credit agency, in view of their limited administrative capability. A workable, integrated program will require strong support from federal, state and local governments. The availability at reasonable prices of necessary nonfarm-produced inputs through private and public suppliers must also be coordinated with the credit program.

It will be difficult to attain the central features required by a coordinated credit program such as (1) identification of borrowers (2) establishment of lines of credit for many thousands of borrowers and (3) coordination of lending and debt collection with the operation of the marketing boards and licensed buying agents. A well-organized, mechanized, accounting system in the marketing board system would be helpful, but will take time to develop. The coordination of credit institutions with the marketing agency and supply input systems merits early attention. It could be tried on a pilot basis, using some of the present credit agencies and some new experimental ones.

We urge that the proposal to coordinate credit activities with marketing board operations be discussed by federal, state and local governments because effective credit schemes cannot be operated solely from a federal or state capitol. They require prodigious work and cooperation at the local level. An attempt to establish a Nigerian agricultural credit bank should follow, rather than precede, the solution of the problems of profitability, collateral and repayment.

We believe that public programs in the area of credit should concentrate initially on those crops purchased by a limited number of buyers, such as marketing boards or processors. Since cocoa, oil palm, groundnut and cotton farmers are the main users of purchased inputs, we recommend that major credit assistance should be limited at present to these crops. The credit needs of tree-crop farmers would be primarily for intermediate-term loans, while growers and buyers of annual crops need seasonal credit.

Credit needs during these first few years would not be great since a large part of the new inputs required (other than labor) would be subsidized or provided as grants in kind. But after 1975, demand for credit would grow rapidly as farmers' prices increased to world levels and input subsidies disappeared. The estimated volume of credit related to the production campaigns is shown in Table VIII.4.

We have stated the need for a public farm credit program which would (1) focus its attention on the growers of the high-priority export and import substitution crops for the next few years, (2) work with suppliers of production inputs to improve availability and reduce costs and (3) work with produce-buyers to expedite collection of loans.

There appear to be four institutional alternatives

[20] Jones, T.L., Gans, A.R., Hoover, Robert G., Maxey, Richard P., Stoneham A.H., and Smith, Mervin G. *A Proposed Agricultural Credit Program for Nigeria.* CSNRD 4, 1966.

to follow in launching an agricultural credit program:

1. Building up the existing state or common services credit agencies,
2. Working through registrars of cooperatives of the states or common services to broaden the existing system of produce-buying and credit cooperatives,
3. Developing a credit function within the system of state or common services marketing boards,
4. Creating a new state or federal agency.

We do not recommend the first two of these alternatives because of the weak record of performance of the agencies involved, and the meager prospects for improvement.[21] We recommend utilization of some of the features of the marketing board system in a credit program, but we do not think the boards should be given responsibility for the credit system. Existing managerial capacity is fully utilized by present responsibilities. Complete control of a credit system by the boards would open up opportunities for misuse of marketing board surpluses. The boards might use the credit program to proliferate a whole new bureaucracy to supply credit, production inputs and loan supervision.

We feel that during the 15-year period of the proposed development program, Nigeria will need to establish an agricultural credit bank along the lines discussed in our study of agricultural credit.[22] In view of present administrative problems in Nigeria, and the past unfavorable experiences in collecting farm loans, we have recommended that such an institution be evolved out of experimental efforts.

We believe the Central Bank of Nigeria should be asked to take responsibility to develop an agricultural credit agency.[23] This could begin as a division of the Bank and remain under its administration until firmly established with a board of directors containing heavy representation from the state ministries of agriculture through the Federal Ministry of Agriculture and Natural Resources. As a division of the Central Bank, the agricultural credit agency could proceed at once to establish a training center, and develop a program which could be experimental and could vary among the states. Agreements could be worked out with the state credit agencies, the marketing boards, and the ministries of agriculture. Where cooperatives are strong, they can be used in the program. Particular consideration should be given to the 2,500 cooperatives which handle farm produce. Some selected LBA's could be used in an experimental program to see if the best of them could be trained to serve as country bankers *cum* production supply merchants. Arrangements for debt collection could be made between the lending agencies and the marketing boards. The farm planning capabilities and production supply activities of the ministries of agriculture could be coordinated with lending activities. The local lending agency could, for example, give a chit to a farmer, authorizing him to buy four bags of fertilizer. The MOA or other suppliers would take the chit in payment, and have it redeemed by the lending agency, which, in turn, would get its money back from the marketing board when the farmer sells his crops. In return for the provision of loan funds by the Central Bank, the various cooperating lending agencies would agree to inspections, audits and loan regulations.

After several years of experimental operations, a more or less uniform loan system and new viable institutions would emerge, and the National Agricultural Credit Bank could become a more or less autonomous body subject to control through its board of governors from the State and Federal Ministries of Agriculture and Natural Resources. We favor a national credit agency over several state banks because of the greater administrative efficiency possible, greater insulation from local pressures to make unsound investments, and more efficient and less hazardous use of capital. Since Nigeria's major cash crops tend to be concentrated in certain states, state banks would be faced with greater price and yield variability and with more seasonality in demand for loans.

We estimate that a credit program as outlined here would involve the staff numbers and recurrent expenditures to carry out Strategy II objectives as shown in Table VIII.4. It will be noted from the last column of the table that the credit program should be self-supporting after 7 or 8 years of operation.

Table VIII.4—Estimated Volume of Credit, Credit Agency Staff and Expenditures of a Credit Program to Support Strategy II, Nigeria, 1970-85

Year	Estimated loans outstanding in year indicated	Technical and executive staff[1]		Recurrent expenditures[2]	Net operating losses[3]
		Head-quarters	Field offices		
	£ (000)	*-- Number --*		*£ (000)*	*£ (000)*
1970	550	20	120	300	300
1975	7,000	25	337	675	400
1985	10,000	75	1,000	2,000	–

[1]Excludes administrative and clerical workers.

[2]Wages, bad debts, interest on loan funds, operating expenditures. Includes rental of quarters and depreciation on equipment, but no capital purchases.

[3]Recurrent expenditures minus operating income. This amount indicates the annual supplementation of bank revenues that would need to be made.

[21]See CSNRD 4 for a full discussion on this point.

[22]*Ibid.*

[23]The FAO Team recommended establishment of an Agricultural Credit Unit within the Central Bank. Food and Agriculture Organization of the United Nations (FAO) *Agricultural Development in Nigeria:* 1965-80. Rome, 1966. p. 362.

Rural Community Development, Food Aid, Infrastructure and Reconstruction Projects

Our approach to rural development has been via income, productivity and demand rather than via needs. We took this approach because it is obvious that Nigeria's rural communities have needs which simply cannot be met with resources from either external donors or Nigeria's nonfarm sector. The hard truth is that Nigeria's rural communities must be developed mainly by increasing the income they produce from the resources they have.

For this reason, we have placed little emphasis on rural community development projects to be funded from either external or Nigerian sources. This does not mean, however, that rural community development projects should be discouraged. To the contrary, local leadership should be encouraged to develop community projects to be financed from the extra income which should accrue to local people under the more favorable price relationships and higher levels of productivity resulting from following our recommendations. Examples of such projects include medical clinics, bridges, local roads, school buildings, water systems, community buildings, etc. In some instances as, for example, some of the community development projects of the former Eastern Region which were tied into the oil palm rehabilitation scheme, local community development projects can be tied directly to the production campaigns we recommend and, as such, can be an important source of extra income for the community and its inhabitants. State, university and federal technical assistance may sometimes be needed, but central regulations which stifle local initiative should be avoided.

Infrastructure projects involving major roads, public market facilities for export and interstate trade, irrigation, communications and electricity, however, are a different matter. National as well as local benefits are involved in such projects and their costs will often exceed local capacities even under the more favorable price and productivity levels CSNRD recommendations would produce. We suggest that all such projects submitted for state and federal financing be carefully scrutinized to see if they have a high payoff. In rural areas, the high payoffs are likely to involve marketing (both product and factor), processing and transport for the commodities for which we have recommended production campaigns.

Undoubtedly, many infrastructure projects proposed in the immediate future will fall into the category of "post war reconstruction projects." These should be carefully scrutinized. Prewar mistakes need not be reconstructed. Further, the prewar structure was not necessarily oriented to the geographic pattern of production which will exist in the post-war period. This is likely to be true if our recommendations are followed for (1) rationalizing pricing and taxation policies and (2) implementing positive production campaigns. Still further, the level of production as well as the geographic distribution of production will be affected. The kinds of output which we anticipate make it more appropriate to think in terms of development rather than reconstruction. New and better roads and bridges will be needed (the Lagos/Ibadan road was never adequate). Larger evacuation facilities will be needed. More and different rolling stock will be required. Required expansions and development will overshadow reconstruction. And, since needs will exceed financing capacity at least until agricultural productivity rises, all infrastructure projects should be carefully evaluated. Sentimental reconstruction of facilities which are not anticipated to be more productive than alternative projects should be avoided.

In other sections of this report, we have noted the need to distribute income more equitably and widely over the population. In addition to egalitarian considerations, another reason for stressing this point is the need to generate more effective demand for nutritionally superior foodstuffs. Thus, we recommend that public reconstruction and development projects be handled in such a way as to provide employment for large numbers of Nigeria's low income people, urban as well as rural, civilians as well as veterans and, among the latter, rebels as well as federals. These programs will afford real opportunities to display a social awareness of those not now sharing in Nigerian growth and development as well as magnanimity with respect to persons and regions participating in the present civil war.

In terms of processing, marketing and transport facilities, it is important to note that the private as well as the public sector has a role to play. Lorries, warehouses, oil extraction plants, abattoirs, and other facilities can be left to the private sector to (1) lighten the burden on civil servants and governmental budgets and (2) obtain much needed private employment and the efficiency which comes from private operations. Other projects, of course, must be done on public account since it is difficult, and perhaps impossible, to set up an environment which creates an identity or near identity between private and public interest. Examples of the latter sometimes include roads, bridges, electrical distribution facilities, produce inspection, etc.

In the reconstruction period, international food-aid of both unilateral and multilateral origins will have to be used and we urge that it be used. However, we must caution Nigerians and unilateral donors concerning both short- and long-run dangers for Nigerian agriculture which are inherent in using food-aid. In the short run, we note that certain areas in the middle belt and in the North have supplied beans, beef, goats

and cereal grains to people of the former Eastern Regions. Those supplies are still available and, in some instances prices for these products are depressed in the region producing them. The result is either a reduction in production or a failure to expand production with population. Thus Nigerians and external donors should be careful lest they reduce effective demand for products Nigerians have already produced and could continue to produce.

The long-run consequence of food-aid may also be quite undesirable. There may develop, for instance, a tendency on the part of "good thinking" Nigerian and donor agency personnel to obtain cheap food for the masses via this route. If this route is followed, the result will be a replacement of effective demand for the products of Nigerian farmers. This will depress Nigerian farm product prices, discourage Nigerian rural development and make Nigeria dependent on subsidized handouts of foodstuffs unintentionally (one might almost say accidentally) produced by the slight malfunction of larger, more developed economies. We feel that Nigeria should develop her own capacity to produce foodstuffs to the extent she can compete internationally on the basis of her own comparative advantage but not in competition with subsidized exports of other countries.

Family Planning

The length of this section is no indication of its importance. If Nigeria is to increase her per-capita incomes very rapidly in the next four or five decades, she must curtail her rate of population increase. While she has the capacity to produce sufficient food for some time to come, she simply does not have the capacity to secure substantial increases in per-capita incomes for a population increasing at current rates. Therefore, we strongly urge that steps be taken to inaugurate an effective family planning program at a very early date.

Strengthening Managerial and Private Financial Resources

Our studies of public and private agricultural and agri-business firms confirm the belief that Nigeria is critically short of managers and entrepreneurs in the modern sector. Academic training and in-service courses can help, but the most effective way to remedy this shortage is by encouraging an increase in the number of opportunities for potential managers to observe and participate in successfully managed firms. This period of training and experience must then be followed by adequate incentives to enter into a business career. Several means may be employed to accomplish these ends.

The program at Zaria combines technical and management assistance with limited amounts of credit and receives external support from USAID and Ford Foundation. Programs at this center should be evaluated to see if it would be advisable to expand its work with agri-business firms.

Another approach would be to encourage the establishment of more foreign plantations or agri-business firms in Nigeria. The merits of such firms should be judged upon their prospective contributions to employment, income and the balance of payments, but their contribution to the production of Nigerian managers and entrepreneurs should be viewed skeptically. The experience of Liberia suggests that foreign plantations can develop and thrive without contributing significantly to the production of indigenous managers. Training and experience in management for Nigerians should be one of the topics of negotiation when arrangements are made for foreign firms to come in.

Another means of attracting overseas management, and capital as well, is through the establishment of joint companies in which the sharing and eventual Nigerianization of management can be more effectively pressed, since a part of the capital would be Nigerian from the beginning. Another variation is the hired management firms, exemplified by the Nigerian Joint Agency, which operates on a fee basis and has been successfully running rubber estates in Nigeria.[24]

With respect to this agreement, we suggest that the Western State government should develop with the Nigerian Joint Agency a concrete plan to expand the in-service training of Nigerian managerial and executive personnel.

One of the most effective ways of bringing in experienced foreign management and capital is through the activities of the socially oriented private or quasi-private development corporations. Three of these have come to our attention:

—The International Basic Economy Corporation (IBEC) of New York—a strictly private firm, but dedicated to development.

—The Commonwealth Development Corporation (CDC)—a semi-private agency.

—Caisse Central de Cooperation Economique—a semi-autonomous body.

IBEC has selected projects in 33 countries on all the continents. Its operating divisions include: (1) food (2) poultry, (3) housing, (4) industrial and (5) financial services, insurance and investments. In 1967, total assets were $160 million and total employees 10,000. Capital is provided through sale of common stock, most of which has been subscribed by the Rockefeller family.[25] Cooperating firms and countries also subscribe to shares in individual enterprises. In at least

[24]See R. G. Saylor, *A Study of Obstacles to Investment in Oil Palm and Rubber Plantation*, CSNRD 15, August 1968, for particulars.

[25]For more information see Laurent, C.K. *et al, Agricultural Investment Strategies in Nigeria;* CSNRD 26, and Overseas Development Institute "World III," Pergaman Press, London, 1964.

one housing project, homeowners contributed their labor, called "sweat equity."

IBEC has been in operation for 20 years. The parent company has never paid dividends, but it has made a profit in each of the past 10 years. Stockholders' equity per common share has doubled in the last 9 years.

Significant achievements of IBEC in several underdeveloped countries include the generation of some capacity to produce or distribute some basic goods and services more efficiently than previously. Examples of agricultural enterprises: food supermarkets in Venezuela; a hybrid seed corn firm in Brazil; a milk and dairy products firm in Venezuela; a soluble coffee firm in El Salvador; tunafishing vessels and a cannery in Puerto Rico; chicken farms in Latin America, Japan, Italy, Zambia and others; and a textile manufacturing firm in Thailand.[26]

The Commonwealth Development Corporation (CDC) is an investment and management firm that operates only in the British Commonwealth except for investments in the West Cameroons. It obtains funds mainly from the British government, supplemented by bank loans. It is required to earn enough to pay interest and principal on its loans. Dividends may be paid by subsidiaries to their stockholders, but CDC itself does not try to make a profit. At the end of 1966, CDC had 137 projects in 30 countries or territories. The total of invested capital was £109 million ($305 million at $2.80/£).

Established in 1948, CDC undertakes a wide variety of development schemes for which it furnishes part of the capital and usually provides major responsibility for management. It works in close cooperation with government agencies, private firms and international lenders, such as IBRD. Projects in agriculture and agri-business include cane and rice farming in Guyana, palm processing firms and oil palm plantations in Malaysia, the Kenya Meat Commission and various tea plantations in Kenya, sugar companies in Tanzania and Swaziland, rubber and palm plantations and textile printers in Nigeria, a plantation in Cameroon and numerous others.[27]

We do not have similar information for Caisse Central de Cooperation Economique.

Changing Federal, State and Local Relationships as They Affect Rural Development

The speed of agricultural development over the 1970-85 period will depend to a considerable degree on how well federal, state and local policies and programs can guide and assist the millions of small farmers in expanding commodity output.

The Market Situation and Area Specialization

Although superficially it appears that the new structure of 12 states will facilitate more decentralized planning, there are now grave dangers that, in practice, Nigeria will fragment into 12 markets and that there will be less, rather than more, cooperation on economic policies. A large market has obvious economic benefits in terms of specialization of production, according to the well-known principles of comparative advantage. If Nigeria is to be one country, she cannot settle for less than one market. There is a need to move rather quickly to determine desirable government actions at the federal, state and local levels to develop a strong economic base for each of the 12 states. Political stability, in the judgment of CSNRD, will be greatly influenced by how effectively a firm economic foundation can be developed for each state within an overall framework of one Nigerian market.

Since Nigeria now has 12 states, and since the federal-state-local relationships with respect to agricultural development are still fluid, we shall raise some preliminary questions with comments on how federal, state and local governments can cooperate and support each other in the (1) planning, (2) financing, (3) implementation and (4) evaluation of agricultural development.[28]

Agricultural Planning

Planning, as W. A. Lewis cogently argues, is a misleading word, for it suggests that government can make people do what it wants.[29] Instead of this view, Lewis suggests that the purposes of planning in a mixed economy are threefold:

"1. To help the government to pursue policies which encourage private individuals to make decisions which favor growth—to invest more, plant more, use fertilizers, undergo training, change jobs, etc.;
2. To determine priorities for its own expenditures on current and capital account, including investments in government enterprise;
3. To help ensure that adequate finance is mobilized for private and public investment."[30]

Point No. 1 above obviously is of central importance in discussing how federal, state and local governments can develop policies to encourage millions

---

[26] For more details on IBEC, see Broehl, Wayne G., Jr. *The International Basic Economy Corporation*, National Planning Association, Washington, D. C., 1968.

[27] For more information, see *Commonwealth Development Corporation Report and Accounts, 1966*, London, 1967 and Bederman, S.H., Background to the Cameroons Development Corporation, *Essays in International Business*, Vol. 1, No. 2, Georgia State College, Atlanta, 1967.

[28] Although the problems discussed in this section were not the subject of a special CSNRD study, the changing political relationships require us to comment on how agricultural development can be facilitated within this new power structure.

[29] Lewis, W.A., *Reflections on Nigeria's Economic Growth*. OECD, Paris, 1967, p. 63.

[30] *Ibid.*

of Nigerian farmers to make decisions which favor growth.

We have emphasized the need for a strengthened Federal Ministry of Agriculture and Natural Resources, for a planning unit in that ministry and for stronger roles for that ministry in formulating policies for, and in controlling the operation of, the marketing boards, agricultural faculties, state extension services, credit agencies, etc. However, we must also emphasize strongly that major initiative should remain with state agencies, local agencies and individual institutions; that improved producer incentives involve a range of policies far broader than price policy.

When producer incentives for export crops are considered, state and local governments, as well as the Federal Ministry of Agriculture and Natural Resources should carefully review the efficiency and integrity of the produce inspection system, licensed buying agents, management of cooperatives, credit organizations, marketing board administrative processes and, of course, the prices actually received by the farmers. CSNRD contends that increasing producer incentives involving the above organizations requires urgent attention by local as well as federal and state governments. Unless prompt attention is taken to increase the efficiency and integrity of organizations serving farmers, many external donors will find their agricultural loans, grants and technical assistance efforts being offset to the point where their aid is mainly of token assistance to farmers.

Financing new States

As we have pointed out, a federal system of 12 states requires sound planning and financing at the state level. Although it is reported that a federal revenue allocation committee will analyze and make recommendations on federal-state revenue allocations, an equally important problem is that of local financing of the new states. The successful financing of new states will require, among other things, that local people pay taxes toward local services such as education, roads, water schemes, etc.

Evaluation

The final point of our discussion of federal, state and local relationships concerns the need for evaluation of development policies, programs and projects by appropriate federal, state and local agencies. Nigeria has a wide range of soils and ecological zones. Considerable experimental effort will have to be undertaken over the 1970-85 period on (1) alternative types of farming organizations, (2) the economics of increasing producer incentives via subsidizing factors of production or higher product prices and (3) alternative farm credit organizations, etc. Therefore, CSNRD suggests that the evaluation process be institutionalized at the state and federal levels so that it becomes a routine part of government activity rather than something that is done on an *ad hoc* basis, as for example, in response to a World Bank Mission or preparation of a development plan.

CHAPTER IX

Overall Financial and Manpower Requirements for Agricultural Programs under the Three Alternative Sets of Policies[1]

THIS FINAL CHAPTER summarizes the manpower and financial implications of (1) our recommended policies and (2) the two sets of policies outlined in Chapter Five as alternatives to our recommendations. The first portion of this chapter presents the main points and demonstrates the superiority of our recommendations through comparisons of expenditure, returns, needed revenue, and manpower requirements with the other two sets of policies. It also examines the internal manpower and financial consistencies and the general feasibility of our recommendations. In the last portion, manpower needs, costs and revenue sources for our recommendations are examined in detail to show that this agriculturl policy can indeed be staffed and financed in Nigeria now and in future years.

Comparisons among the Three Alternative Strategies as to Public Expenditures on Agricultural Programs

It has been seen in Chapter Five that our recommended strategies and programs greatly exceed the two other strategies in producing income, employment and foreign exchange from agriculture. In addition to the high returns from our recommended programs, the public costs of operating them would be much less than those of either continuing the present strategy or shifting to a strategy emphasizing more government control and cheap food. The differences in costs given in Table IX.1 show that by 1985 costs for our strategy are £12.5 million less than for the harsher, more exploitative strategy and £14.2 million less than for a continuation of the present strategy.

The low level of expenditure under our recommendations is achieved by concentrating expenditures on high payoff areas and reducing them in areas where returns are low. The emphasis of public expenditure is on direct assistance to small farmers, increased incentives for production, and expanded supporting services with an early transfer of responsibility for supplying modern factors of production to private hands. At the same time, grants in kind and cash would be replaced gradually with credit which farmers will be able to repay through higher prices and profits. Expensive public investments in direct agricultural production and most input subsidies are to be curtailed under the recommended policies. Thus, expenditures under our recommendations are redirected from farm settlements, public plantations, questionable development projects and subsidies into extension and livestock recurrent expenditures, production campaign outlays and such supporting services as research, teaching, and credit. Since the savings in direct agricultural investment are substantial, government-appropriated public sector expenditures under our recommendations are less in 1975 than in 1966, and only £1.6 million more in 1985 despite the great expansion in agricultural output anticipated by that date.

Estimates of expenditures under a continuation of the present strategy, on the other hand, reveal the consequences of continuing to place strong emphasis on direct government investment. In compiling these estimates, recurrent expenditures for the Ministry of Agriculture and Natural Resources have been increased moderately at about 3 percent per year (the approximate population growth rate) and programs and services to encourage smallholder production have been slowly decreased. Farm settlements and development corporation plantations have been kept near the 1966 level, or slightly increased, and large-scale irrigation schemes have been introduced for the northern states without waiting for superior food and feed crop varieties to be produced. These programs have been

[1]This chapter is largely the work of George L. Brinkman, consultant to the field leaders of CSNRD sub-projects 1, 2, 3 and 4. The discussion was developed from studies he made in Nigeria while doing field research as a graduate student in Agricultural Economics at Michigan State University. His work in Nigeria was supported by CSNRD, the Midwestern Universities Consortium for International Activities, Michigan State University and, informally, by USAID/Lagos. See also Brinkman, George L., *Reconciling Proposed Public Investments in Agricultural Education, Infrastructure and Production in Nigeria, 1969-1985.* CSNRD 32, June 1969.

Table IX.1—Annual Government-Appropriated Public Sector Agricultural Expenditures Under Three Alternative Strategies, Nigeria, 1966-85

Year and set of policies	MOA or MNR recurrent (1)	MOA or MNR campaign outlays (2)	Farm settlements or irrigation schemes (3)	Other MOA or MNR capital (4)	Total MOA or MNR capital (5=2–4)	Development corp. plantations (6)	Marketing board subsidies (7)	Total agricultural production expense (8=1, 5–7)	University agricultural education (9)	Research (10)	Credit (11)	Grand total ag. expense (12=8–11)
	£000 in 1966 prices											
1966	9,124	1,673	2,238	4,593	8,504	2,622	1,848	21,680	740	3,225	131	25,776
Continuation of Present Strategy and Programs												
1970	10,263	850	2,300	4,287	7,437	1,900	2,700	22,300	885	3,300	100	26,585
1975	11,860	1,300	3,300	4,314	8,614	2,600	5,350	27,424	1,120	3,540	300	33,384
1985	15,967	800	4,100	4,314	9,214	2,800	7,750	32,731	1,510	3,900	500	41,641
CSNRD Recommended Strategy and Programs[1]												
1970	10,333	600[2]	0	4,574	5,174	300	2,300	18,107	838	3,788	275	23,008
1975	12,771	1,728[2]	0	4,574	6,302	0	0	19,073	1,100	4,452	622	25,247
1985	15,447	0[2]	0	4,674	4,674	0	0	20,121	1,345	5,750	200	27,416
Harsher, More Exploitive Strategy and Programs												
1970	10,568	0	2,400	4,190	6,590	1,900	2,300	21,358	1,355	3,225	130	26,068
1975	12,662	0	3,800	3,690	7,490	3,600	4,100	27,852	1,160	3,225	130	32,367
1985	17,699	0	4,700	3,690	8,390	3,800	5,100	34,989	1,520	3,225	130	39,864

[1]Additional expenditure details are given in Table IX.7.

[2]Includes grants only; additional costs have been shifted to loans. See page 146 and Table IX.7, footnote 3.

budgeted at high levels because (1) they have appeal to government officials as they include a package with housing, health care and other social amenities and, hence, can compete politically for petroleum and other revenues and (2) adverse pricing policies will make it difficult for private smallholders and others to expand agricultural production. Marketing board input subsidies would be another big expenditure as such subsidies will be necessary in order to get output from the private sector, given adverse produce prices. As a result, annual expenditures under a continuation of present policies are estimated to increase over the 1966 level £7.6 million by 1975 and £15.8 million by 1985.

Under the still more adverse pricing and taxation policies of the third strategy, expenditures would be used to expand government production and marketing control over agriculture and to finance a large government bureaucracy. Expenditures would be even greater than under a continuation of present policies for farm settlements, public input supply schemes, public plantations and irrigation schemes without, as well as with payoffs. Recurrent and capital budgets for the ministries of agriculture and natural resources will increase faster than under present policies at 3 to 4 percent each year as more jobs would be created for untrained and poorly trained personnel. Research and credit expenditures would remain at about the 1966 level but utilized for projects less closely related to the production of high-payoff commodities. The extension service increasingly would be used to service government-controlled investment schemes. As a result there also would be a large increase in public expenditures for services of poorly trained personnel, often engaged in low-payoff activities. This increase in expenditures would amount to £6.6 million by 1975 and £14.1 million by 1985.

The advantages of our recommendations can be seen by comparing the public expenditures under each of the three strategies with foreign exchange earnings and farmer incomes from export crops shown in Table V.2 and with GDP and the total value added from agriculture given in Table V.1. The increases or decreases from the 1966 level of costs and the returns to export crop production are presented in Figure IX.1. Our recommended policies and programs provide the greatest relative and absolute returns to agriculture. The comparisons for 1985 are striking. Our recommendations would provide annually by 1985 £149 to £180 million more in foreign exchange earnings from agriculture and £143 to £161 million greater farmer incomes from just export crops than would the other two strategies. The CSNRD recommendations would also contribute a greater increase by 1985 in the total value added in agriculture from livestock and food, feed, and export crop production of £242 to £428 million annually than would either of the other two strategies. Furthermore, these figures do not recognize benefits to be gained from long-run programs of developing and using superior varieties and techniques for food, feed and livestock production. These large increases in rural incomes will also have a spill-over effect into the non-agricultural sector, increasing income there by £87 to £178 million more than under the other two alternate strategies. Altogether, by 1985 our recommendations would increase rural and urban incomes by £420 and £515 million greater than under the continuation of present trends in agriculture of Strategy

I or switching to a harsher, more exploitative Strategy III. The total increase in income under our recommendations that is greater than the increases in income under the alternative strategies is nearly equal to the entire portion of GDP that would be provided by petroleum, and emphasizes the importance of following our recommendations.

It should be noted that the above data on expenditures and returns do not include either the costs or returns to the food, feed and/or livestock production campaigns that CSNRD's long-run recommendations are expected to make socially and privately profitable in the late 1970's and 1980's. If the long-run program is successful in providing the necessary technological breakthroughs, a very small increase in annual expenditures (£1 to £3 million) could result in returns nearly equal to those from the crop campaigns, credit, and increased economic incentives included in CSNRD's short-run recommendations.

Needed tax revenue

New sources of revenue will be required to finance agricultural programs under all three sets of policies because of the rapidly increasing program costs under both (1) a continuation of present strategy or the harsher, more exploitative alternative, and (2) the removal of direct taxes on agricultural output under our recommended strategy. The higher incomes under CSNRD recommendations, however, would enable much of the revenue lost by the elimination of export and producer taxes and marketing board surpluses to be recovered by other less-damaging taxes on agriculture, such as income and land taxes and indirect taxes in the form of excise and import taxes. As a result of these new sources of agricultural revenue and the lower costs of our strategy and programs, CSNRD-recommended programs should be able to eliminate completely the present agricultural taxes on agricultural output while requiring only £7 million more from nonagricultural sources than under either of the other two alternatives by 1975. By 1985, the greater prosperity in agriculture can increase revenue from the new agricultural taxes to such an extent that our recommendations would require less nonagricultural revenue than the other two strategies. (Revenue calculations are presented later in Table IX.8). The levels of nonagricultural revenue required to finance agriculture under each alternative are given in Figure IX.2.

With the low level of revenue from nonagricultural sources required to finance our recommendations in the long run, they are financially the most feasible. The additional revenue needed from nonagricultural sources should be readily available, as only 6 percent of total projected petroleum revenues could provide the £13 million needed from nonagricultrual sources in 1975 and 4 percent could provide the £10 million

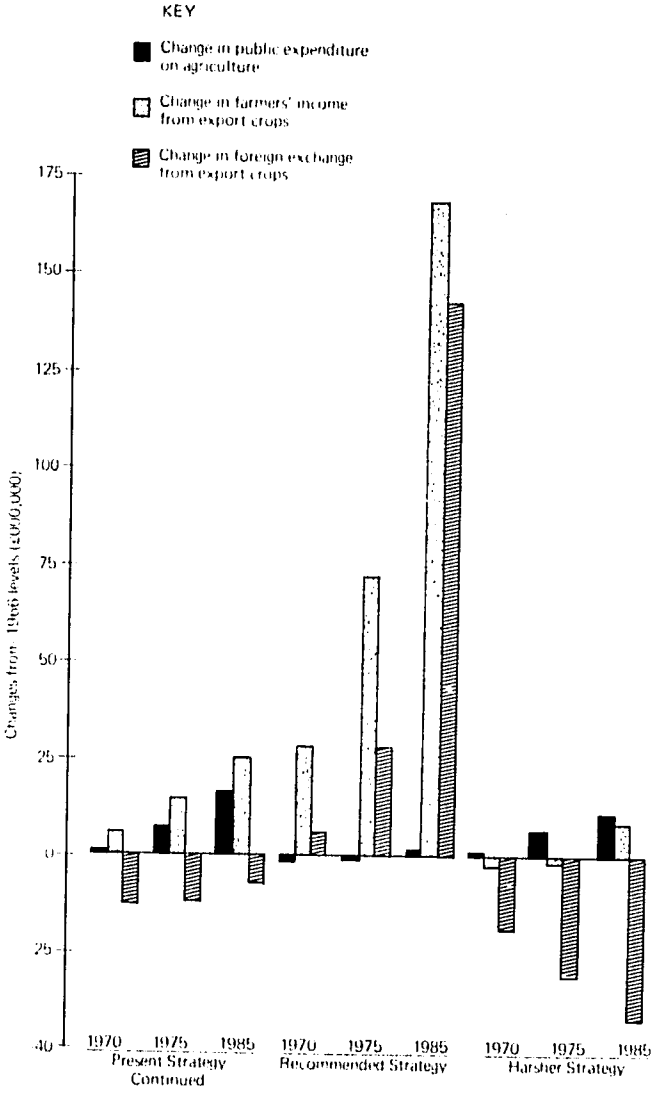


Figure IX.1 – Changes from the 1966 level of Public Expenditure in Agriculture and Farmers' Income and Exchange Earnings from Export Crops Under Three Alternative Strategies, Nigeria, 1970, 1975 and 1985.

Source: Tables V.2 and IX.1.

needed in 1985. In fact, the entire costs of the CSNRD recommendations by 1985 could be financed by only (1) 11 percent of total petroleum revenues, (2) 1.5 percent of all agricultural incomes or (3) 10 percent of the increase in agricultural income under our recommendations that is greater than under Strategy I or III.

Manpower

From the comparison of the public agricultural sector expenditures it is apparent that the CSNRD-recommended programs would require the smallest public sector. Our programs would employ the highest number of trained personnel but would employ far fewer untrained people. Under a continuation of present policies, employment in the public agricultural sector would be increased considerably but with a higher proportion of untrained and nonagriculturally trained people. The largest public agricultural sector would be required under Strategy III. With harsh, adverse pricing policies, private returns in agriculture would be low relative to social returns. As a consequence there would be even greater pressure than under present policies for public investment programs. With educational programs unfocused on the needs of society, employment of untrained personnel would be high.

In the private sector, the opposite would be true with CSNRD-recommended programs providing for the largest private employment and the harsher strategy the smallest. Our set of policies would create extensive opportunities and incentives for private farmers and firms to produce commodities and make investments with high social payoffs.

Some idea of the magnitude of increased employment under our recommendations can be acquired if we reason in terms of £45 per-capita gross income in agriculture. For a family of eight, this implies £360 gross income per year per income-earning family head. Thus, the increase in GDP of roughly £480 million could provide the equivalent of employment for 1.3 million new families made up of over 10 million persons.

Comparisons of total employment in the public and private agricultural sectors and total employment of agricultural university graduates (including expatriates) and of MOA subuniversity crop extension workers are given in Table IX.2. Although employment figures for agricultural university graduates and MOA subuniversity crop extension workers under our recommendations are considerably larger than for the other two alternatives, the required numbers can be trained in existing institutions with only minor modifications. The details of the manpower balances with the training school capacities are given in Tables IX.4 and IX.6. It should be noted that we have not carried out a manpower analysis of the pro-

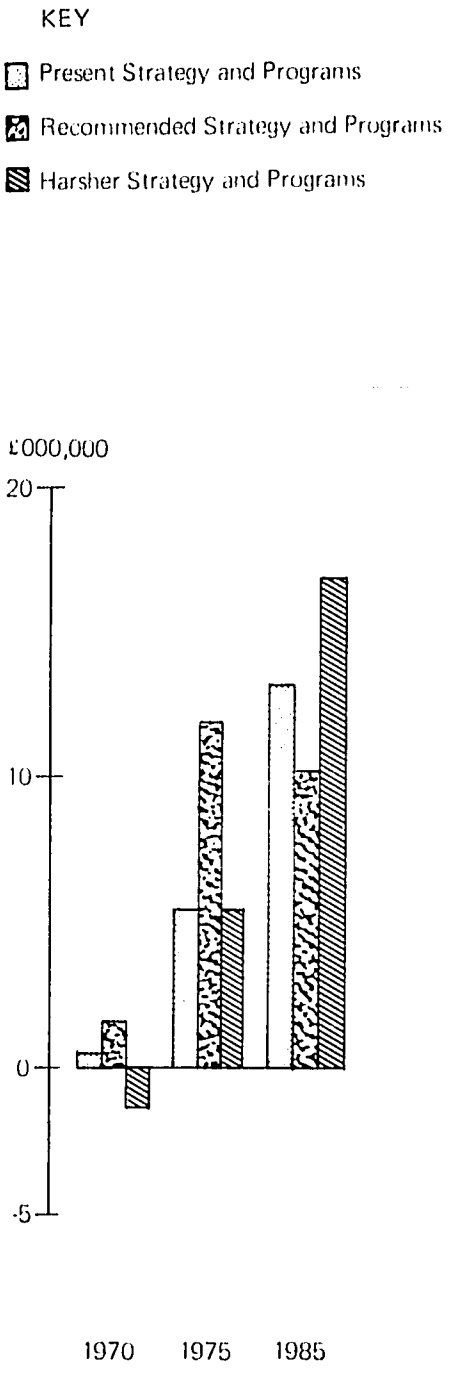


Figure IX.2 -- Revenue Required from Non-Agricultural Sources to Finance Public Agricultural Programs under Three Alternative Strategies, Nigeria, 1970, 1975 and 1985.

Source: Table IX. 8.

duction campaigns which would follow success in the long-run research phase of our strategy of developing and using superior varieties and techniques for food, feed and livestock production. However, some allowance has been made for these campaigns in the manpower figures by 1985. We are confident that any additional trained manpower requirements can be supplied by the present Nigerian agricultural education system.

Manpower, Expenditure and Revenue Details for CSNRD Recommendations (Strategy II)

A closer examination of the details of our recommendations for future agricultural policy in Nigeria is very important. Since this policy is a substantial modification of the present agricultural policy, questions about its workability must be considered. We now examine the necessary manpower requirements, expenditures and needed revenue in more detail.

Table IX.2—Relative Employment in the Public and Private Agricultural Sectors and the Employment of Selected Trained Agriculturalists under Three Alternative Strategies, Nigeria, 1966-85

Item and year	Employment		
	Strategy I	Strategy II	Strategy III
	Relative size		
Relative employment in the public agricultural sector			
1966	------	same	------
1970	smallest	middle	largest
1975	middle	smallest	largest
1985	middle	smallest	largest
Relative employment in the private agricultural sector			
1966	------	same	------
1970	middle	largest	smallest
1975	middle	largest	smallest
1985	middle	largest	smallest
	------ *Numbers* ------		
Total university agricultural graduates employed[1]			
1966	------	1,112	------
1970	1,301	1,489	1,212
1975	1,534	2,082	1,413
1985	2,007	3,080	1,765
Subdegree agricultural crop extension workers employed[2]			
1966	------	3,991	------
1970	4,493	4,861	3,590
1975	5,203	6,879	4,162
1985	6,994	8,371[3]	5,581

[1]Includes both public and private employment. Details of the employment of university graduates and crop extension workers under Strategy II are given in Tables IX.3 and IX.5.

[2]Public employment only. In addition to these subdegree staff, a few university agricultural graduates (176-308) would be hired for crop extension work.

[3]Includes moderate staff allowances for food, feed and livestock production campaigns from 1976-1985.

This examination shows that our strategy and programs would not only provide greatly expanded incomes and development for both the agricultural and nonagricultural sectors of the Nigerian economy, but also would be workable from the standpoint of providing the necessary manpower and revenue for agricultural programs. This has been assured by first determining the needed manpower for our recommendations and then reconciling them with (1) the capacity of the Nigerian educational system to provide the necessary personnel, and (2) the capacity of the Nigerian economy to finance both the educational services and the investment programs.

Manpower under CSNRD recommendations

One of CSNRD's strong pushes is to provide sufficient trained agricultural personnel to staff both the public and private agricultural sectors with competent persons. This manpower is trained at three levels. The first level is university B.Sc. graduates needed for top level positions in agricultural ministries, marketing, credit, research, university education, development corporations, and private industry. Most of the required people with B.Sc. degrees can be produced by the faculties of agriculture in Nigerian universities. A second level is subuniversity training and is required for most agricultural extension and livestock personnel, and some development corporations, research, credit and other agricultural ministry department personnel. The most important subuniversity schools are the agricultural and livestock schools. In addition, and at a third level, M. Sc. and Ph.D. degree people are needed by the agricultural faculties and research organizations. These may be trained both in Nigeria and overseas.

The details of the employment of university gradates in agriculture are given in Table IX.3. These figures represent all agricultural degrees, and include both plant and animal specialists. Emphasis in the public sector is on expanding the top-level staff in most categories, except for development corporations, as their plantation operations function would be transferred to private firms wherever possible. The largest expansion would occur in the northern states because of their present low numbers of top-level manpower. Some expatriates would be retained in public service where their skill and experience are not easily or readily replaced. In the private sector, most of the expansion would be in agricultural input supply firms as subsidies are eliminated and private firms take over the supply functions. Some university graduates would be employed in processing firms and in production either for themselves or for private firms. Again, most of the expansion in numbers would be in the northern states which contain most of the land area.

The required output of university graduates in

agriculture has been calculated from these employment figures and is presented in Table IX.4. This calculation has been made for the three university training areas recommended by CSNRD which correspond with the areas we recommend be served by the universities in the Ibadan-Ife, Nsukka-Enugu and Zaria areas. The total training requirement consists of new positions plus replacement for a normal attrition rate of 3 percent per year. Because of the war in the eastern states, 35 percent of the 1966 staff in this area was taken as the attrition rate for the 1967-70 period only, with the remaining time calculated at 3 percent annually.

The projected average annual output requirements of university graduates in agriculture ranges from 150 for the 1967-70 period to 172 for the 1976-85 period. This output is considerably above the level of persons graduated in 1966 when some of the universities had been established for only a few years and none had reached full enrollment. The future physical capacity of the Nigerian university system for agricultural graduates ranges considerably, depending on how efficiently presently underutilized space and staffs will be used in the future. However, at least 300 could be turned out annually from the present buildings. A target of 150-200 graduates a year could be achieved through modest increases in teaching staff and even higher numbers of graduates could be trained for possible food, feed and livestock campaigns with little difficulty.

The second level of agricultural training that we are very concerned about is subuniversity technical training. Agricultural extension personnel trained in crop production is the most important staff category at this level for the CSNRD programs because of our heavy emphasis on production campaigns and direct assistance to smallholder farmers. We have recommended strong efforts to expand field staff numbers and to provide them with better training and logistic support.

The extension staff requirements for our recommendations are found in Table IX.5 and have been calculated on the basis of (1) the number of staff persons necessary to staff the recommended export crop production campaigns together with (2) enough staff to provide suitable general extension work, including food crop promotion. Instead of expanding staff numbers by some desired ratio of extension workers to farm families, CSNRD researchers utilized a more practical approach by determining how many workers would be required to effectively serve the recommended programs. In staffing the export crop campaigns, consideration has been given to the size of the program, the number of farms, the number of years the farmers would be in the program and the difficulty expected in getting farmers to adopt the new technology. Initially each extension worker should concentrate on working with about 50 responsive farmers for the cotton and groundnut campaigns and with about 40 responsive farmers for the tree crops. As the campaigns gain momentum and farmers gain experience with the new technology, each extension worker could work with more farmers, reaching a maximum of about 250+ farmers for cotton and groundnuts and about 90 farmers for tree crops.

A strong effort is recommended to upgrade quickly the untrained field overseers in the southern states and to eliminate this staff category. The majority of the agricultural instructors in the northern states should be upgraded after 1975. Nearly all of the overall increase in staff would be in the agricultural assistant and agricultural instructor categories for field work.

In addition to extension workers in the production campaigns, other agriculture school graduates will be needed for credit and research functions and by other divisions of the Ministry of Agriculture and Natural Resources. If the agricultural schools are coordinated with the university centers in the manner recommended by CSNRD, private firms as well as agricultural ministries could both obtain and have employees trained at these schools. With higher profitability in agriculture, private firms also could hire away employed extension agents and bring about additional training at these schools for their replacements. The total training requirements of agricultural school graduates for the public and private sector is given in Table IX.6. Again, the training requirements have been calcualted for three regional areas because of the original organization of the agriculture schools. The total training requirement is the sum of (1) new positions, (2) a normal 3 percent attrition, and (3) promotions of one category staff to a higher category. The attrition rate for the eastern states was taken at 35 percent of the 1966 staff for the 1967-70 period only.

By comparing the 1966 output with that required in future time periods for each training area, it appears that the 1966 capacity would be sufficient or nearly sufficient to satisfy the total demand for agricultural school graduates from all sources in each area and year to 1985. It is emphasized that the 1966 output was only 80 to 85 percent of maximum capacity. Except for agricultural assistants for Western, Mid-western and Lagos States in 1971-75, the required future output for all time periods and for each category of staff would be less than the 1966 output or would not exceed it by 10 percent. Training costs also would be nearly the same as in 1966, unless the CSNRD recommendation for shortening the training period for agricultural assistants is followed. This recommendation also could nearly double the capacity of the training schools for agricultural assistants by cutting their training time nearly in half.

Table IX.3—Employment of University Graduates (B.Sc.'s M.Sc.'s and Ph.D.'s) Under CSNRD Recommendations by Areas Nigeria, 1966-85

Year and area		Ministries[1]		Development corporations		Marketing[2]		Credit		Cooperatives		Universities	
		N[3]	T[4]	N	T	N	T	N	T	N	T	N	T
		Numbers											
1966	Western & Lagos	175	183	8	8	4	4	3	3			28	59
	Mid-western State	43	45	4	4	2	2	3	3				
	Eastern States	160	166	8	8	3	3	8	8			12	29
	Northern States	71	135	5	5	3	3					6	29
	Total	449	529	25	25	12	12	14	14			46	117
1970													
	Western & Lagos	220	225	9	9	7	9	7	12			35	60
	Mid-western State	53	55	4	4	4	5	3	5				
	Eastern States	203	207	11	11	7	9	7	12			15	30
	Northern States	120	190	6	6	7	9	7	18			21	55
	Total	596	677	30	30	25	32	24	47			71	145
1975													
	Western & Lagos	243	250	4	5	11	14	16	19	15	15	45	70
	Mid-western State	76	80	1	1	5	7	6	8	5	5		
	Eastern States	268	270	5	6	11	14	21	25	15	15	26	40
	Northern States	225	290	5	6	11	15	17	32	(30)[5]	(40)[5]	39	70
	Total	812	890	15	18	38	50	60	85	35	35	110	180
1985													
	Western & Lagos	318	320	4	5	18	22	25	28	20	20	66	75
	Mid-western State	111	115	1	1	9	11	16	17	10	10		
	Eastern States	345	350	5	6	18	22	36	40	30	30	34	43
	Northern States	400	420	5	6	20	25	48	60	(50)[5]	(60)[5]	65	82
	Total	1,174	1,205	15	18	65	80	125	145	60	60	165	200

[1]Federal level manpower has been included in the area totals on the basis of their place of training.

[2]Includes marketing boards, NPMC and miscellaneous marketing functions.

[3]Refers to Nigerian staff.

[4]Refers to total Nigerian and expatriate staff.

[5]Included in the ministries for the northern states and not in the totals for cooperatives.

Under our recommendations, moderate allowances have been made for private firms, sending their employees through the schools of agriculture or hiring away extension agents. In the past, private firms have provided very successful private programs of training for their employees and may expand this training as agricultural services and production become more profitable under our recommendations. However, if the schools of agriculture become more accessible to nongovernment employees, the private industries may more freely use the schools and hire their graduates. Thus, if there is increased demand by the private sector for agricultural school graduates in response to possible higher product prices and new technological breakthroughs, the demands on the agricultural schools will be somewhat greater than listed above.

Additional agricultural school graduates also may be required from 1975-85 in campaigns for food and feed crops and livestock production following technological breakthrough provided by research. However, about one-third to one-half of the crop extension workers listed in Table IX.5 for 1975-85 have been staffed for possible use in such campaigns. More of the crop extension staff could be used if payoffs were high. In addition, much of the assistance in a livestock-feeding campaign should be provided by livestock extension agents who are trained at separate livestock schools. Consequently, many of the personnel for these food, feed and livestock campaigns would be readily available or would require training in institutions other than the agricultural schools. It should be possible to train the additional manpower requirements for agriculture school graduates in these campaigns with small expansions of present facilities or by shortening the required training time.

In summary, a substantial rate of expansion in staff positions is projected for agricultural university and agricultural school graduates under our recommendations for rural development in Nigeria. However, the overall demand for staffing new positions and for filling vacancies created by promotion, retirement, death, etc. appears to be well within the capacity of the present universities and training schools. Our recommendations, while ambitious, should not run into difficulty in obtaining the needed manpower.

CSNRD-recommended programs also provide the greatest possibility for providing increased employment and improving the standard of living for the great numbers of unskilled rural people. Because of improved educational services, new technology, increased economic incentives and better access to modern factors of production, farmers will be able to earn

Table IX.3 (Continued)

Year and area	Research institutions		Total public sector		Private production		Processing & agr. supply Firms		Church missions		Total	
	N	T	N	T	N	T	N	T	N	T	N	T
	Numbers											
1966 Western & Lagos	79	98	297	355	2	6	10	48		3	309	412
Mid-western State	5	7	57	61	1	5	4	22		1	62	89
Eastern States	34	47	225	261	3	13	6	24		9	234	307
Northern States	17	100	102	272	1	6	4	17		9	107	304
Total	135	252	681	949	7	30	24	111		22	712	1,112
1970												
Western & Lagos	90	113	368	428	5	10	18	80	1	4	392	522
Mid-western State	8	10	72	79	3	6	7	20			82	105
Eastern States	32	57	275	326	8	18	20	40	2	9	305	393
Northern States	40	120	201	398	2	12	20	50		9	223	459
Total	170	300	916	1,231	18	46	65	190	3	22	1,002	1,489
1975												
Western & Lagos	100	119	434	492	15	17	50	125	2	5	501	639
Mid-western State	13	17	106	118	7	10	15	20			128	148
Eastern States	76	92	422	463	20	28	40	75	3	10	485	576
Northern States	85	156	382	569	14	30	75	110	3	10	475	719
Total	274	384	1,344	1,642	57	85	180	330	8	25	1,589	2,082
1985												
Western & Lagos	160	180	611	650	22	28	110	200	3	6	746	884
Mid-western State	25	32	172	186	10	12	40	45			222	243
Eastern States	124	145	592	636	23	30	125	150	6	12	746	828
Northern States	151	200	689	793	55	70	200	250	6	12	950	1,125
Total	460	557	2,064	2,265	110	140	475	645	15	30	2,664	3,080

more from agriculture and therefore live better. As a result, as many as 10 million more Nigerian people could find satisfactory employment and earnings in agriculture, thus retarding rural-to-city migration and its accompanying severe social problems. This extra employment is extremely important in this period when Nigeria's urban sector simply will not be able to provide employment for the increase in the rural population.

Expenditures under our recommendations

From the comparison with the other two strategies, the CSNRD-recommended programs may be described as a "more for less" policy. The details of the government-appropriated, public agricultural sector expenditures under our programs are given in Table IX.7 for four geographic areas and the federal government. Explanations of the figures are given in the footnotes. From this table it can be seen readily that most of the overall increases in expenditures occur in the northern states and in the federal government. In the southern states, despite expenditure increases from expanded crop extension services, tree crop campaigns and expanded supporting services, the expenditure levels for all years have been maintained at about or below the 1966 level. This has been possible by placing half the burden of the input costs of the tree crop campaigns on the farmers through loans rather than grants, and eliminating government plantations and farm settlements. In the northern states, expenses have increased because there were no savings available from farm settlements and government plantations. Transferring the input supply function to private companies and eliminating the input subsidies after 1975, however, will eliminate these costs, which amounted to £1.8 million in the northern states in 1968.

A modest level of expenditures has been included for possible food, feed and livestock campaigns in the crop extension component of the Ministry of Agriculture and Natural Resources' recurrent budgets in the form of salaries and other charges for crop extension workers staffed for these campaigns from 1975-85 (see footnote 2 of Table IX.7). In addition, £.6 million annually has been included in the northern states from 1971-1975 to partially finance a livestock campaign. If the anticipated technological breakthroughs in food, feed and livestock research are substantial, the expenditures for these campaigns could be £1 to £3 million greater. The potential payoffs from expanded food and feed crops and livestock production for domestic use and export, however, may be nearly as large as

Table IX.4—Training Requirements for University Graduates in Agriculture and Their Output Under CSNRD Recommendations by Areas, Nigeria, 1966-85

Year and area	Nigerian graduates employed at end of period	New positions	Replacement[1]	Training requirements: Total period	Training requirements: Average annual during period
			Numbers		
1966					
Western, Lagos & Mid-West States	371				
Eastern States	234				
Northern States	107				
Total	712				
1967-70					
Western, Lagos & Mid-West States	474	103	51	154	39
Eastern States	305	71	82[1]	153	77[2]
Northern States	223	116	20	136	34
Total	1,002	290	153	443	150
1971-75					
Western, Lagos & Mid-West States	629	155	83	238	48
Eastern States	485	180	59	239	48
Northern States	475	252	54	306	61
Total	1,589	587	196	783	157
1976-85					
Western, Lagos & Mid-West States	968	339	240	579	58
Eastern States	746	261	184	445	45
Northern States	950	475	210	685	69
Total	2,664	1,075	634	1,709	172

[1]Replacement at 3 percent per year except 35 percent for 1967-1970 in the eastern states only.

[2]Represents two years output from 1969-70 for the eastern states only.

Table IX.5—Employment of Agricultural Crop Extension Staff Under CSNRD Recommendations by Areas, Nigeria, 1966-85[1]

Area	Year	Agricultural officer (AO)	Agricultural superintendent, asst. ag. supt. (AS+AAS)	Agricultural assistant (AA)	Agricultural instructor or field overseer[2] (AI/FO)	Total
				Numbers		
Western and Lagos States	1966	54	109	244	611	1,018
	1970	65	109	615	243	1,032
	1975	67	107	1,111	145	1,429
	1985	69	157	1,713	60	1,999
Mid-West State	1966	14	47	156	230	447
	1970	16	47	295	93	451
	1975	18	52	544	60	674
	1985	24	67	760	25	876
Eastern States	1966	74	156	653	395	1,278
	1970	84	169	750	516	1,519
	1975	100	170	1,438	115	1,823
	1985	105	191	2,500	60	2,856
Northern States	1966	34	155	400	835	1,424
	1970	50	205	619	1,200	2,074
	1975	85	265	817	2,056	3,223
	1985	105	252	1,337	1,249	2,943
Total Nigeria	1966	176	467	1,453	2,071	4,167
	1970	215	530	2,279	2,052	5,076
	1975	270	594	3,909	2,376	7,149
	1985	303	667	6,310	1,394	8,674

[1]These figures include moderate staff allowances for food, feed and livestock campaigns from 1976-1985.

[2]Field overseers are used in southern states while agricultural instructors are employed in the northern states.

the payoffs under the first strategy and would easily justify the increased expenditures.

Needed tax revenue

As already pointed out, the rapidly increasing program costs for continuing present policies or shifting to a harsher strategy and the removal of direct taxes on agricultural export and import substitution crops under our recommended strategy will require new sources of revenue to finance agricultural programs under all three sets of programs, except in the near future for the heavy taxation policy. This is shown in Table

Table IX.6—Training Requirements for Agricultural School Graduates under CSNRD Recommendations by Training Areas, Nigeria 1966-85

Area, year and staff category	Agricultural crop extension	Other public sector	Private	Training requirements: Total for period	Training requirements: Average annual during period
			Numbers		
Western, Lagos and Mid-West States					
Staff employed in 1966					
AS & AAS	156	31	2		54
AA	400	123	26		197
FO	841	n.a.	n.a.		n.a.
Total	1,397	154	28		
New trainees, 1967–70					
AS & AAS	18	8	3	28	7
AA	615	30	33	678	170
FO	0	n.a.	n.a.	0	n.a.
Total	633	38	36	707	
New trainees, 1971–75					
AS & AAS	26	10	12	48	10
AA	977	145	125	1,247	249
FO	0	n.a.	n.a.	0	n.a.
Total	1,003	155	137	1,295	
New trainees, 1976–85[1]					
AS & AAS	141	27	22	190	19
AA	1,595	310	232	2,137	214
FO	0	n.a.	n.a.	0	n.a.
Total	1,736	337	254	2,327	
Eastern States					
Staff employed in 1966					
AS & AAS	156	10	2		28
AA	653	94	38		206
FO	395	n.a.	n.a.		n.a.
Total	1,204	104	40		
New trainees, 1967–70					
AS & AAS	71	4	0	75	38[2]
AA	400	40	14	459	226[2]
FO	309	n.a.	n.a.	309	152[2]
Total	780	44	14	838	
New trainees, 1971–75					
AS & AAS	26	3	14	43	9
AA	881	134	122	1,137	227
FO	0	n.a.	n.a.	0	n.a.
Total	907	137	136	1,180	
New trainees, 1976–85[1]					
AS & AAS	82	8	22	112	11
AA	1,753	285	215	2,253	225
FO	0	n.a.	n.a.	0	n.a.
Total	1,835	293	237	2,365	
Northern States					
Staff employed in 1966					
AS & AAS	155	12	3		19
AA	400	60	15		133
AI	835	56	10		272
Total	1,390	128	28		
New trainees, 1967–70					
AS & AAS	72	5	2	79	20
AA	356	23	20	399	100
AI	585	23	5	613	153
Total	1,013	51	27	1,091	
New trainees, 1971–75					
AS & AAS	95	7	17	119	24
AA	411	135	118	664	133
AI	1,250	35	62	1,347	270
Total	1,756	177	197	2,130	
New trainees, 1976–85[1]					
AS & AAS	65	15	29	109	11
AA	921	280	246	1,447	144
AI	288	79	263	630	63
Total	1,274	374	538	2,186	
Total Nigeria					
Staff employed in 1966					
AS & AAS	467	53	7		101
AA	1,453	277	79		536
FO or AI[3]	2,071	56	10		272
Total	3,991	386	96		
New trainees, 1967–70					
AS & AAS	161	17	5	183	65
AA	1,371	93	67	1,531	496
FO or AI	894	23	5	922	305
Total	2,426	133	77	2,636	
New trainees, 1971–75					
AS & AAS	147	20	43	210	43
AA	2,269	414	365	3,048	609
FO or AI	1,250	35	62	1,347	270
Total	3,666	469	470	4,605	
New trainees, 1976–85[1]					
AS & AAS	288	50	73	411	41
AA	4,269	875	693	5,837	584
FO or AI	288	79	263	630	63
Total	4,845	1,004	1,029	6,878	

n.a.—Not applicable as FOs in the southern states require no special agricultural training. The FO figures for extension were included to indicate staffing patterns.

[1]Moderate staff allowances have been made for food, feed and livestock production campaigns from 1976-1985.

[2]The output figures for the eastern states for 1967-70 represent an average for the two years 1969 and 1970 only. The average annual output figure for FOs was included to quantify these temporary positions in the eastern states from 1967-70 only.

[3]The figures for FO or AI personnel under extension include both FOs from the southern states and AIs from the northern states. In the columns for private and other public sector personnel these figures refer to AIs from the northern states only.

Table IX.7—Annual Government-Appropriated Public Sector Agricultural Expenditures under CSNRD Recommendations by Areas, Nigeria, 1966-85[1]

Area and year	MOA or MNR recurrent[2] (1)	MOA or MNR campaign outlays[3] (2)	Farm settlements or irrigation schemes[4] (3)	Other MOA or MNR capital[5] (4)	Total MOA or MNR capital (5=2–4)	Development Corp. plantations[4] (6)	Marketing board subsidies (7)	Total agricultural production expense (8=1, 5–7)	University agricultural education[6] (9)	Research[7] (10)	Credit[8] (11)	Grand total ag. expense (12=8–11)
						£000 in 1966 prices						
Western and Lagos States												
1966	2,429	600	1,143	1,082	2,825	768	953[9]	7,022	97	300	86	7,507
1970	2,578	186	0	942	1,128	300	500	4,506	110	329	120	5,065
1975	2,955	600	0	942	1,542	0	0	4,497	170	371	0	5,038
1985	3,671	0	0	942	942	0	0	4,613	235	395	0	5,243
Mid-West State												
1966	511	288	101	274	663	200	0	1,374	0	80	15	1,469
1970	671	46	0	324	370	0	0	1,041	0	101	25	1,167
1975	847	320	0	324	644	0	0	1,491	0	121	0	1,612
1985	1,062	0	0	324	324	0	0	1,386	0	136	0	1,522
Eastern States												
1966	2,596	785	994	1,299	3,078	1,654	0	7,328	200	241	30	7,799
1970	2,836	168	0	1,323	1,491	0	0	4,327	192	293	30	4,842
1975	3,262	608	0	1,323	1,931	0	0	5,193	245	283	0	5,721
1985	4,163	0	0	1,323	1,323	0	0	5,486	300	463	0	6,249
Northern States												
1966	3,209	0	0	1,938	1,938	0	430	5,577	125	688	0	6,390
1970	3,768	200	0	1,925	2,125	0	1,800	7,693	205	757	0	8,655
1975	5,047	200	0	1,925	2,125	0	0	7,172	320	895	0	8,387
1985	5,731	0	0	2,025	2,025	0	0	7,756	380	979	0	9,115
Federal												
1966	379	0	0	0	0	0	0	379	316	1,916	0	2,611
1970	480	0	0	60	60	0	0	540	331	2,308	100	3,279
1975	660	0	0	60	60	0	0	720	365	2,782	622	4,489
1985	820	0	0	60	60	0	0	880	430	3,777	200	5,287
Total												
1966	9,124	1,673	2,238	4,593	8,504	2,622	1,848	21,680	740	3,225	131	25,776
1970	10,333	600	0	4,574	5,174	300	2,300	18,107	838	3,788	275	23,008
1975	12,771	1,728	0	4,574	6,302	0	0	19,073	1,100	4,452	622	25,247
1985	15,447	0	0	4,674	4,674	0	0	20,121	1,345	5,750	200	27,416

[1]Excludes costs of marketing produce as these charges are deducted directly from sales revenue and do not require political appropriations. The base figures for 1966 were taken from the former regional budgets.

[2]Recurrent expenditures for agricultrual extension as well as a non-extension component. The extension component was calculated from the salaries necessary to pay the staff numbers in Table IX.5 including moderate allowances for food and feed crop campaigns from 1975-1985. The non-extension component generally includes administration, research, planning, irrigation, forestry, fishery and veterinary divisions. This component was increased yearly at 2 percent from 1966-1975 and 1 percent from 1976-1985 except in the northern states when it was increased at 4 percent from 1967-1970 and 5 percent from 1971-1975 to allow for expenditures for a livestock campaign. The nonextension component also includes the cost of sub-degree training and state MOA research. The Federal MOA expenditures have been increased to pay for expanded services discussed in Chapters IV and VIII, which include a federal extension service, development planning unit, produce selling agency and coordinating body.

[3]The campaign outlays for 1970 and 1975 represent only the grants in kind incorporated in the production campaigns, while expenditures for personnel are included in MOA recurrent costs and the cost of loans included under credit.

[4]To be phased into private ownership, and future expenditures curtailed.

[5]The 1966 level, except for (1) reductions for training schools and the Western State's cotton promotion program, and (2) increases of £100,000 annually for each area (£200,000 for 1976-1985 in the northern states) for marketing facilities.

[6]Includes university research.

[7]Research costs are for agricultural research by Nigerian Institutions. Includes the Institute for Agricultural Research and the Economic Development Institute, but excludes other research in the universities and all state agricultrual ministry research. In addition to Nigerian research, the International Institute of Tropical Agriculture located in Ibadan would provide substantial annual appropriations for West African agricultural research.

[8]Credit costs represent operating losses only, and are only a small percentage of the loans made and outstanding.

[9]Includes grants for cocoa warehouse construction of £453,000.

Table IX.8—Total Annual Government-Appropriated Expenditures, Needed Tax Revenues and Revenue Sources for Agricultural Programs Under Three Alternative Strategies, Nigeria, 1966-85

Strategy	Year	Total goverment-appropriated agricultural program expenditures (1)	Tax revenue from export crops[1] (2)	Other available revenue from 1966 sources[2] (3)	Additional revenue needed from new sources: Total (4)	Amount coming from indirect and direct taxes on agriculture[3] (5)	Amount needed from non-agricultural sources (6)	Percent of petroleum revenues to equal additional needed from non-agricultural sources (7)
		£000			£000			Percent
	1966	25,776	24,000	1,776				
Strategy I	1970	26,585	24,000	2,000	585	0	585	1
	1975	33,384	24,000	2,000	7,384	1,000	6,384	3
	1985	41,641	23,000	2,000	16,641	2,000	14,641	6
Strategy II	1970	23,008	17,000	2,000	4,008	2,000	2,008	2
	1975	25,247	0	2,000	23,247	10,000	13,247	6
	1985	27,416	0	2,000	25,416	15,000	10,416	4
Strategy III	1970	26,068	26,000	2,000	-1,932[4]	0	-1,932[4]	0
	1975	32,367	23,000	2,000	7,367	1,000	6,367	3
	1985	39,864	19,000	2,000	18,864	0	18,864	8

[1]Export and producer taxes and marketing board profits.

[2]Maintained at approximately the 1966 level and represents largely miscellaneous revenue from agriculture and nonpetroleum sources.

[3]May be obtained from new, less damaging tax sources from agriculture such as land taxes and income taxes and such indirect taxes as excise and import taxes. The figures for Strategy I represent largely indirect agricultural taxes as there is too little income in agriculture to extract much more by direct taxes. Under Strategy III there are also no significant increases in indirect taxes because of lower consumption of nonagriculturally produced goods.

[4]Used to support the nonagricultural sector.

IX.8 which compares annual costs with revenue needs and sources under the three strategies. As shown in column 4, the largest additional revenue from new sources is required for our recommendations because of the elimination of taxes on export and import substitution crops (column 2). By 1985 the needed revenue from new farm and nonfarm sources reaches £25.4 million, but is still only £9 million greater than from a continuation of present policies and £7 million greater than from policies of harsh taxes.

Offsetting the large increases in revenue needed from new sources, our strategy and programs present the greatest opportunity to obtain this revenue from new sources within agriculture as the production campaigns gain momentum. The increase in agricultural income provides a basis for income taxes, and higher consumption of taxable consumer goods by farmers will provide indirect taxation through excise and import taxes. Taxes may also be directly assessed on agriculture. We are not opposed to taxes on agriculture though we do oppose direct taxes on agricultural output and on the prices of productive factors, as such taxes act as strong disincentives to production. When taxes are necessary we recommend, rather, that they be placed on income, the use of income and on land, so that disincentives for increasing production would not be present. Our programs should increase the profitability for farming and should help establish land values and a market for land which, in turn, would provide the basis for a land tax and collateral for credit. Thus, our recommended policies and programs can replace much of the revenue lost through taxes on agricultural output. This is shown in column 5 of Table IX.8, where £15 million is projected annually from new tax sources in agriculture by 1985. Considerably more could be extracted if Nigeria is efficient in setting up good income and land tax systems.

Nigerians have had long experience in collecting local taxes and should be able to tax higher farmer incomes through this means. Excise and import taxes will present no difficulty in collection as these are passed on to the consumer in the form of higher product prices. Nigerians also have experience with recently imposed income taxes in urban areas which should be invaluable in establishing a good income tax system in rural areas.

Under our recommendations, there should be sufficient opportunity to raise these new taxes. By following the CSNRD-recommended programs, total GDP would reach £5,154 million by 1985 with £1,846 million of this total from agriculture. The £5,154 million GDP under our recommendations is £420 to £515 million greater than under the other two alternatives with £242 to £428 million greater value from agriculture. If only this greater increase in the value from agriculture were taxed at 10 percent, enough revenue would be available to finance all the public programs we recommend in 1985. However, the increased income in rural areas would have spill-over effects into the nonagricultural sector and increase incomes there as well. Therefore, if the greater increase in the value of GDP from the CSNRD-recommended programs were taxed

to cover the entire costs of the program, only 5 percent would be needed. Alternatively, if total agricultural income of £1,846 million by 1985 were taxed, only 1.5 percent would be necessary. Only 11 percent of petroleum revenues could also cover the entire costs of our recommended programs.

Since a large share of the reduced agricultural tax revenue can be offset by revenue from new sources in agriculture, our recommendations place the smallest financial burden on the nonagricultural sector of the three alternative sets of policies by 1985. Our recommendations, therefore, not only cost less and yield much higher returns, but should be the most feasible financially. In considering these new tax sources, however, it is essential that Nigerian decision makers recognize that taxes on goods consumed by farmers and taxes on farmers' incomes are a means of taxing agriculture and that these taxes can substitute for export taxes, produce purchase taxes and market board revenues with much less disincentive on production.

A major difficulty in raising revenue for future use arises from differences in resource endowments and the level of present and projected farm income between the southern and northern states. In the southern states, rural incomes are generally higher and the tree crop economy lends itself more easily to possible land taxes than the annual crops in the north. Consequently, a greater percentage of the revenue from new sources in agriculture will probably come from the southern states. This means that the northern states will have to place heavier reliance on nonagricultural sources such as petroleum, especially since their program costs increase considerably over 1966 levels rather than remaining constant or decreasing as is the case in the southern states.

Fortunately, the discovery and rapid exploitation of petroleum offers an unusual opportunity to provide Nigeria with large amounts of tax revenue and foreign exchange. Petroleum revenues will likely reach about £100 million by 1970, £220 million by 1975 and £240 million by 1985. However, under existing allocation procedures most of the petroleum revenues go to the federal government or to the state of origin as shown in Table IX.9. Since the northern states do not yet have petroleum discoveries within their boundaries, they can only count on a very small allocation through the distributable pool and will be dependent on grants from the federal government in order to obtain revenue from petroleum to finance agriculture and other development. These grants should be feasible as petroleum revenues are likely to be so large that only 4 to 6 percent of the total petroleum revenues could finance the entire additional revenue needed from nonagricultural sources for agricultural development in the entire country under our recommendations by both 1975 and 1985.

Summary

In summary it should be clear from this discussion of manpower details, expenditures and revenues that our recommendations are feasible and workable. The needed manpower can be provided largely within the capacities of the existing educational institutions. Also, the low financial requirements show that our recommendations can be financed. Finally, the very high

Table IX.9—Projected Approximate Petroleum Revenue Allocation, Nigeria, 1966-85[1]

State or federal	Source of petroleum	Value of petroleum revenues						
		1966	1970		1975		1985	
	Percent[2]	*£million*	*£million*	*Percent*	*£million*	*Percent*	*£million*	*Percent*
Each Northern State	0	1.5[3]	.6	.6	1.3	.6	1.4	.6
Lagos	0		.2	.2	.4	.2	.4	.2
Western	2	.9[4]	2.0	2.0	4.0	1.8	4.4	1.8
Mid-western	40	2.7	8.8	8.8	15.1	6.9	16.6	6.9
Rivers	50		10.5	10.5	17.9	8.1	19.8	8.2
Central Eastern	6	5.7[5]	2.8	2.8	5.3	2.4	5.7	2.4
South Eastern	2		1.1	1.1	2.1	1.0	2.3	1.0
Federal	0	4.4	71.0	71.0	167.4	76.0	182.4	75.9
Total	100	15.2	100.0	100.0	220.0	100.0	240.0	100.0

[1]These calculations are based on present allocation procedures for petroleum revenue. The most important sources of revenue are the petroleum profit tax, rents, and royalties. All petroleum rents go to the state or origin while the entire petroleum profit tax goes to the federal government. Half of the royalties go to the state or origin, 15 percent to the federal government, and 35 percent to the distributable pool. In the distriubtable pool, each northern state receives 7 percent, Lagos 2 percent, Western 18 percent, Mid-western 8 percent, Rivers 5 percent, Central Eastern 17.5 percent and South Eastern 7.5 percent. The source of petroleum is therefore very important as the only direct source of petroleum revenues for states without petroleum discoveries or exploration within their borders is through the distributable pool.

[2]The percentage figures for source of petroleum are based on 1966 knowledge and may change considerably as new fields are discovered. The changes most likely will be in the southern states.

[3]Represents the entire Northern Region in 1966.

[4]Represents the entire Western Region in 1966.

[5]Represents the entire Eastern Region in 1966.

returns produced within agriculture and the rest of the economy by following the CSNRD recommendations, together with low costs, should help Nigerian planners to recognize the merit and viability of CSNRD's recommended agricultural policy and encourage such a path for Nigerian agricultural development.

In closing, one comment should be made. Both of the alternatives to our recommendations appear to be so unviable that it is unlikely that they could be followed until 1985 without being modified, perhaps haphazardly. To continue present policies is to follow a route similar to that followed by Argentina—that route led to stagnation of one of the world's great agricultural incomes of the 1920's and 30's. The harsher exploitative alternative is similar to policies followed by such centrally controlled economies as those of the Soviet Union and Nkrumah's Ghana, both of which failed to obtain adequate rural development. The lesson is the same whether in Peron's rightist Argentina or Nkrumah's leftist Ghana: poor agricultural policy is poor agricultural policy—left or right—and it can bring even major agricultural export countries to disaster and the verge of starvation.

On the other hand, Mexico, which had little opportunity to follow the kinds of short-run policies and programs we recommend for Nigeria, has followed the long-run research phase successfully and is now self-sufficient in food. Japan did it earlier and with very meager resources. Even India and Pakistan appear to be having success with policies similar to those we recommend for Nigeria.

European and North American countries and Australia followed somewhat similar policies in their early underdeveloped days. The analysis underlying the policies and programs outlined in this report indicates that rural transformation is of urgent priority for policy makers, and that if Nigeria turns its creative leadership to this task, it can move down the road to successful rural development.

A Selected Bibliography of Nigerian Rural Development

BOOKS AND MONOGRAPHS

Aboyade, Ojetunji. "Foundations of an African Economy, A Study of Investment and Growth in Nigeria. New York: Praeger, 1966.

Adedeji, Adebayo. "Nigerian Federal Finance: Its Development, Problems and Prospects." London: Hutchinson, 1969.

Anthonio, Q. B. O. "Economic Problems of Peasant Storage." Ibadan: Ministry of Economic Planning and Community Development, Government Printer, 1963.

Baldwin, K. D. S. "The Niger Agricultural Project: An Experiment in African Development." Cambridge: Harvard University Press, 1957.

Callaway, A. and A. Musone. "Financing of Education in Nigeria." UNESCO: International Institute for Educational Planning, African Research monographs, 15, Paris, 1968.

Chubb, L. T. "Ibo Land Tenure," 2nd Edition. Ibadan: Ibadan University Press, 1961.

Coker, G. B. A. "Family Property Among the Yorubas." London: Sweet and Maxwell, 1958.

Diejomah, V. P. "Economic Development in Nigeria." Princeton: Industrial Relations Section, 1965.

Eicher, Carl and Carl Liedholm (eds.). "Growth and Development of the Nigerian Economy." East Lansing: Michigan State University Press, 1969.

Gallatti, R., K. D. S. Baldwin and I.O. Dina. "Nigerian Cocoa Farmers: An Economic Survey of Yoruba Cocoa Farming Families." London: Oxford University Press, 1956.

Gusten, R. "Studies in the Staple Food Economy of Western Nigeria." Ibadan: Nigerian Institute of Social and Economic Research, 1967.

Helleiner, Gerald. "Peasant Agriculture, Government and Economic Growth in Nigeria." Homewood, Illinois: Richard Irwin, 1966.

International Bank for Reconstruction and Development. "The Economic Development of Nigeria." Baltimore: The Johns Hopkins Press, 1955.

Lewis, W. Arthur. "Reflections on Nigeria's Economic Growth." Development Centre Studies, OECD, Paris, 1967.

Lloyd, P. C. "Yoruba Land Law." Ibadan, Nigerian Institute of Social and Economic Research, London: Oxford University Press, 1962.

Luning, H. A. "An Agro-Economic Survey in Katsina Province." Kaduna: Government Printer, 1963.

McFarlane, David and Martin Oworen. "Investment in Oil Palm Plantations in Nigeria: A Financial and Economic Appraisal." Enugu: Economic Development Institute, University of Nigeria, 1966.

Meek, C. K. "Land Tenure and Land Administration in Nigeria and the Cameroons." (Colonial Research Studies, No. 22). London: H.M.S.O., 1957.

Nigeria, National Economic Council. "Economic Survey of Nigeria, 1959." Lagos: Government Printer, 1959.

Okigbo, P. N. C. "Nigerian National Accounts 1950-57. Enugu: Government Printer, 1952.

———. "Nigerian Public Finance." Evanston, Illinois: Northwestern University Press, 1965.

Oluwasanmi, H. A. "Agriculture and Nigerian Economic Development." London: Oxford University Press, 1966.

———. and I. S. Dema. "Uboma: A Socio-Economic and Nutritional Survey of a Rural Community in Eastern Nigeria." Cornwall: Geographical Publications Ltd., 1966.

Oyenuga, V. A. "Agriculture in Nigeria: An Introduction." Rome: F.A.O., 1967.

Prest, A. R. and I. G. Stewart. "The National Income of Nigeria, 1950-1951." (Colonial Research Studies No. 11). London: H.M.S.O., 1953.

Stewart, Ian G., R. C. Ogley and W. D. C. Wright, "Nigerian Determinants of Projected Level of Demand, Supply, and Imports of Farm Products in 1965 and 1975." Washington: U. S. Department of Agriculture, 1962.

Stolper, Wolfgang F. "Planning Without Facts: Lessons in Resource Allocation from Nigeria's Development." Cambridge: Harvard University Press, 1966.

Uchendu, Victor. "The Igbo of Southeast Nigeria." New York: Holt, Rinehart and Winston, 1965.

United Nations, Food and Agricultural Organization, "Agricultural Development in Nigeria, 1965-1980." Rome: FAO, 1966.

OFFICIAL GOVERNMENT DOCUMENTS

"Investment in Education." The Report of the Commission on Post-School Certificate and Higher Education in Nigeria. Lagos: Government Printer, 1960.

Archer, J. N. "Educational Development in Nigeria, 1961-1970." Lagos: Government Printer, 1961.

"National Development Plan, 1962-68." Lagos: Ministry of Economic Development, 1962.

"Guideposts for Second National Development Plan." Lagos: Ministry of Economic Development, June, 1966.

"Report on the Sample Census of Agriculture, 1950-51." Lagos: Federal Office of Statistics.

"Population Census of Nigeria, 1952-53. Lagos: Census Superintendent, 1953.

"Economic and Functional Analysis of Government Accounts, 1958/59-1961/62." Lagos: Chief Statistician, 1965.

Expenditure Elasticities of Demand for Household Consumer Goods." Lagos: Federal Office of Statistics, February, 1966.

"Future Policy of the Ministry of Agriculture and Natural Resources." (Sessional Paper, No. 9 of 1959). Ibadan: Government Printer, 1959.

"Report of a Committee Appointed to Consider the Registration of Title to Land in Western Nigeria." (Sessional Paper No. 2 of 1962). Ibadan: Government Printer, 1962.

Adebo, S. O., "Report of the Agricultural Credit Committee and Government Statement." (Western Nigeria Official Document No. 9 of 1963). Ibadan: Government Printer, 1963.

"White Paper on Integrated Rural Development." (Western Region of Nigeria Official Document, No. 8 of 1963). Ibadan: Government Printer, 1963.

"Western Nigeria Development Plan 1962-68, First Progress Report." (Western Nigeria Official Document, No. 2 of 1964). Ibadan: Government Printer, 1964.

"Eastern Nigeria Development Plan, 1962-68." Enugu: Government Printer, 1962.

"Eastern Nigeria Farm Settlement Scheme." (Agricultural Bulletin No. 2). Enugu: Government Printer.

"Eastern Nigeria Farm Settlement Scheme." (Supplement to Agricultural Bulletin No. 2. Technical Bulletin No. 6). Enugu: Government Printer, 1963.

"Policy for Community Development." (Official Document No. 27 of 1963). Enugu: Government Printer, 1963.

"First Progress Report, Eastern Nigeria Development Plan, 1962-68." Enugu: Government Printer, 1964.

Werhahn, Hans, Werner Fricke, Friedrich Hunder, Friedrich Weltz, Udo-Herman Gottschalk and Hermann Saager. "The Cattle and Meat Industry in Northern Nigeria: Report of a Survey Concerning Production, Trade and Allied Industries." Frankfurt: Main, 1964.

"Development Plan, 1962-68, First Progress Report." Kaduna: Government Printer, 1964.

"An Evaluation of the Cottonseed Crushing Potential in the Northern Provinces of Nigeria." Kaduna: Ministry of Trade and Industry, June, 1966.

"A White Paper on the Military Government Policy for the Reorganisation of the Northern Nigeria Development Corporation." Kaduna: Government Printer, 1966.

"A White Paper on the Northern Nigeria Military Government's Policy for the Comprehensive Review of the Past Operations and Methods of the Northern Nigeria Marketing Board." Kaduna: Government Printer, 1967.

"Consolidated Annual Report of the Progress of Cooperation in Northern Nigeria: 1958/59-1964-65." Kaduna: Government Printer, 1967.

"Mid-Western Nigeria Development Plan, 1964-68." Benin City: Ministry of Internal Affairs, 1965.

JOURNAL ARTICLES AND CHAPTERS IN BOOKS

Aboyade, O. A General Critique of the Plan, Nigerian Jour. Econ. and Soc. Studies, Vol. IV, No. 2 (July, 1962), pp. 110-115.

———. Problems in Plan Revision, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 2 (July, 1965), pp. 121-30.

———. The Public Service and the Administration of Development Programs in Nigeria, Nigerian Jour. Econ. and Soc. Studies, Vol. VI (November, 1964), pp. 321-31.

Adegboye, R. O. An Analysis of Land Tenure Structure in Selected Areas in Nigeria, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 2 (July, 1966) pp. 259-68.

———. The Need for Land Reform in Nigeria, Nigerian Jour. Econ. and Soc. Studies, Vol. IX, No. 3 (November, 1967), pp. 339-50.

Aluko, S. A. Agriculture and Economic Development in Nigeria, Nigerian Jour. Econ. and Soc. Studies, Vol. I, No. 1 (May, 1959), pp. 27-38.

———. How Many Nigerians? An Analysis of Nigeria's Census Problems, 1901-63, Jour. Mod. Afr. Studies, Vol. III, No. 3 (October, 1965), pp. 371-92.

Anschel, Kurt R. Problems and Prospects of the Nigerian Rubber Industry, Nigerian Jour. Econ. and Soc. Studies, Vol. IX, No. 2 (July, 1967), pp. 145-59.

Anthonio, Q. B. O. The Supply and Distribution of Yams in Ibadan Markets, Nigerian Jour. Econ. and Soc. Studies, Vol. IX, No. 1 (March, 1967), pp. 33-49.

Are, L. A. An Assessment of Some Plantation Problems in Western Nigeria," Trop. Agr., Vol. XLI (1964), pp. 1-13.

Ayida, A. A. Contractor Finance and Supplier Credit in Economic Growth, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 2 (July 1965), pp. 175-88.

Bauer, Peter. The Economic Development of Nigeria, Jour. Pol. Econ. Vol. LXIII, No. 5 (October, 1955), pp. 398-411. (Review of 1955 World Bank Report on Nigeria).

Berry, Sara. Cocoa and Economic Development in Western Nigeria, in "Growth and Development of the Nigerian Economy." Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Callaway, Archibald C. Unemployment Among African School Leavers, Jour. Mod. Afr. Studies, Vol. I, No. 3 (September, 1963), pp. 351-71.

———. Nigeria's Indigenous Education: The Apprentice System, Odu, Vol. I, No. 1 (July, 1964), pp. 62-79.

Clark, Peter. Economic Planning for a Country in Transition. Nigeria, in "Planning Economic Development." Edited by E. Hagen. Homewood, Illinois: Richard Irwin, 1966, Chapter 9.

Cohen, Abner. Politics of the Kola Trade: Some Processes of Tribal Community Formation Among Migrants in West African Towns, Africa, Vol. XXXVI, No. 1 (January, 1966), pp. 18-36.

———. The Social Organization of Credit in a West African Cattle Market, Africa, Vol. XXXV, No. 1 (January, 1965), pp. 8-19.

Dema, I. S. Some Reflection on the Nutritional Problems of Dense Farm Populations in Parts of Nigeria, in "The Population of Tropical Africa." Edited by J. C. Caldwell and C. Okonjo. London: Longmans, 1968, pp. 307-11.

Eicher, Carl K. The Dynamics of Long-Term Agricultural Development in Nigeria, Jour. Farm Econ., Vol. XLIX, No. 5 (December, 1967), pp. 1158-1170.

———. Reflections on Capital Intensive Farm Settlements in Southern Nigeria, in "Agricultural Cooperatives and Markets in Developing Countries." Edited by K. Anschel, E. Smith and R. Brannon. New York: Praeger, 1969.

Eke, Ifegwu, I. U. Investment Allocation in the Nigerian National Development Plan 1962-68, Econ. Bul. of Ghana, Vol. X, No. 4 (1966), pp. 3-22.

———. Population of Nigeria: 1952-65, Nigerian Jour. Econ. and Soc. Studies, Vol. VIII (July, 1966), pp. 289-310.

Essang, S. M. The Middlemen in the Domestic Marketing of Palm Oil: Asset or Liability? Bull. Rur. Econ. Soc., Vol. 3, No. 1 (1968), pp. 38-68.

Ferguson, Donald S. The Nigerian Beef Industry. Cornell International Agricultural Development Bulletin No. 9, Ithaca, New York: Cornell University Press, August, 1967.

Goldsworthy, P. R. Responses of Cereals to Fertilizer in Northern Nigeria. I. Sorghum, Exp. Agr., Vol. III, No. 1 (January, 1967), pp. 29-40.

———. Responses of Cereals to Fertilizers in Northern Nigeria. II. Maize, Exp. Agr., Vol. III (1967), pp. 263-73.

———————. and R. Heathcote. Fertilizer Trials with Groundnuts in Northern Nigeria, Emp. Jour. Exp. Agr. Vol. XXXI (1964), pp. 351-66.

———————. and R. Heathcote. Fertilizer Trials with Soya Beans in Northern Nigeria, Institute for Agricultural Research, Samaru, Northern Nigeria. Emp. Jour. Exp. Agr., Vol. XXXII, No. 127 (July, 1964), pp. 257-62.

Gray, Clive S. Planning Without Facts—A Review Article, Nigerian Jour. Econ. and Soc. Studies, Vol. X, No. 1 (March, 1968), pp. 3-31.

Gusten, R. Can the Nigerian Economy Grow at 6% P.A. in the Near Future? A Pre-Planning Exercise, Nigerian Jour. Econ. and Soc. Studies, Vol. IX (March, 1967), pp. 11-32.

Hansen, L. M. Methods of Economic Programming and Analysis in the Plan, Nigerian Jour. Econ. and Soc. Studies, Vol. IV, No. 2 (July, 1962), pp. 92-109.

Harbison, F. From Ashby to Reconstruction: Manpower and Education in Nigeria, in "Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Hardcastle, J. E. Y. Development of Rice Production and Research in the Federation of Nigeria, Trop. Agr., Vol. XXXVI, No. 2 (1959), pp. 79-95.

Hartley, C. W. S. Advances in Oil Palm Research in Nigeria in the Last Twenty-Five Years, Emp. Jour. Exp. Agr., Vol. XXVI, No. 102 (April, 1958), pp. 136-51.

Hay, A. M. and R. N. T. Smith. Preliminary Estimates of Nigeria's Inter-regional Trade and Associated Money Flows, Nigerian Jour. Econ. and Soc. Studies, Vol. VIII, No. 1 (March, 1966), pp. 9-36.

Helleiner, Gerald K. The Fiscal Role of the Marketing Boards in Nigerian Economic Development, 1947-61, Econ. Jour., Vol. LXXIV, No. 295 (September, 1964), pp. 582-610.

Hogendorn, Jan. The Origins of the Groundnut Trade in Northern Nigeria, in "Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Ilori, C. O. Towards a Policy of Marketing Improvement in Western Nigeria, Bul. Rur. Econ. and Soc., Vol. II, No. 3 (1967), pp. 229-45.

Johnson, Glenn L. Factor Markets and Economic Development, in "Economic Development of Tropical Africa: Theory, Policy, Strategy and Organization". Edited by W. McPherson, Gainesville: University of Florida Press, 1968.

———————. Removing Obstacles to the Use of Genetic Breakthroughs in Oil Palm Production: The Nigerian Case, in "Agricultural Research Priorities for Economic Development in Africa—The Abidjan Conference". Edited by M. G. C. Dow, Washington, D. C.: National Academy of Sciences, 1969.

———————. Food Supply, Agriculture and Economic Growth, paper presented at Second Western Hemisphere Nutrition Congress, San Juan, Puerto Rico, August, 1968.

Mabogunje, A. L. Land, People and Tradition in Nigeria, in "Politics and Administration of Nigerian Government". Edited by F. L. Blitz. London: Sweet and Maxwell, 1965.

———————. Rice Cultivation in Southern Nigeria, Nigerian Geog. Jour., Vol II, No. 2 (March, 1959), pp. 59-69.

Mortimore, M. J. Population Distribution, Settlement and Soils in Kano Province, Northern Nigeria, 1931-62, in "The Population of Tropical Africa". Edited by J. C. Caldwell and C. Okonjo. London: Longmans, 1968, pp. 298-306.

Nixon, Charles R. An Analysis of Nigerian Government Expenditure Patterns, 1950-1962, in "Growth and Development of Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

———————. The Role of the Marketing Boards in the Political Evolution of Nigeria, in Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Norman, D. W. Preliminary Observations on Demographic Size of Holding and Mode of Tenure Relationships in Hanwa Village, Zaria Province, Bull. Rur. Econ. and Soc., 1966.

Nwanze, S. C. The Economics of the Pioneer Oil Mill, Jour. West Afr. Inst. Oil Palm Res., Vol. III, No. 11 (April, 1961), pp. 233-54.

———————. The Hydraulic Hand Press, Jour. Nigerian Inst. Oil Palm Res., Vol. IV, No. 15 (August, 1965), pp. 288-316.

Ogunsheye, Ayo. Marketing Boards and the Stabilization of Producer Prices and Incomes in Nigeria, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 2 (July, 1965), pp. 131-46.

Okiy, G. E. The Role of Research in the Development of Nigerian Agriculture, Proc. Sci. Assoc. of Nigeria, Vol. VI (1963), pp. 13-19.

Okonjo, Chukka. A Preliminary Medium Estimate of the 1962 mid-Year Population of Nigeria, in "The Population of Tropical Africa". Edited by J. C. Caldwell and C. Okonjo. London: Longmans, 1968, pp. 78-96.

Olakanpo, O. Distribution Trade—A Critique of Government Policy, Nigerian Jour. Econ. and Soc. Studies, Vol. V, No. 2 (July, 1963), pp. 237-46.

Oluwasanmi, H. A. Land Tenure and Agricultural Improvement in Tropical Africa, Jour. Farm Econ., Vol. XXXIX, No. 3, Part I (August, 1957), pp. 731-38.

———————. Agriculture and Economic Development in Tropical Africa, Nigerian Jour. Econ. and Soc Studies, Vol. I, No. 1 (1959), pp. 41-50.

———————. and J. A. Alao. The Role of Credit in the Transformation of Traditional Agriculture: The Western Nigerian Experience, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 1 (March, 1965), pp. 31-50.

Onitiri, H. M. A. Towards a West African Economic Community, Nigerian Jour. Econ. and Soc. Studies, Vol. V, No. 1 (March, 1963), pp. 27-54.

———————. The Role of International Organizations in Development of African Primary Products, in "African Primary Products and International Trade". Edited by I. G. Steward and H. W. Ord. Edinburgh: University of Edinburgh Press, 1965, pp. 8-18.

———————. Presidential Address—A Proposal for Nigerian Rural Development, Nigerian Jour. Econ. and Soc. Studies, Vo. VIII, No. 1 (March, 1966), pp. 3-8.

Ottenberg, Simon. Ibo Receptivity to Change, in "Continuity and Change in African Cultures". Edited by W. R. Bascom and M. J. Herskovits. Chicago: University of Chicago Press, 1959, pp. 130-43.

Pearson, Scott. Nigerian Petroleum: Implications for Medium-Term Planning, in "Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Purvis, Malcolm J. Annual Yield Variation in Oil Palm: Marketing Board Purchases in Eastern Nigeria, 1955-56, Jour. Nigerian Inst. Oil Palm Res. In press.

Smock, David R. Land Fragmentation and the Possibility of Consolidation in Eastern Nigeria, Bull. Rur. Econ. and Soc., Vol. II, No. 3 (September, 1967), pp. 194-210.

Stolper, W. F. Economic Development in Nigeria, Jour. Econ. Hist., Vol. XXIII, No. 4 (December, 1963), pp. 391-413.

———. Economic Growth and Political Instability in Nigeria: On Growing Together Again, in "Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Teriba, O. Development Strategy, Investment Decision and Expenditure Patterns of a Public Development Institution: The Case of Western Nigeria Development Corporation, 1949-1962, Nigerian Jour. Econ. and Soc. Studies, Vol. VIII, No. 2 (July, 1966), pp. 235-58.

Udo, R. K. Sixty Years of Plantation Agriculture in Southern Nigeria, Econ. Geog., Vol. IV, No. 4 (October, 1965), pp. 356-68.

Ugoh, S. U. Prospects for Some Nigerian Agricultural Products in the World Market, Nigerian Jour. Econ. and Soc. Studies, Vol. VII, No. 3 (November, 1965), pp. 237-44.

Wells, Jerome C. Government Investment in Nigerian Agriculture: Some Unsettled Issues, Nigerian Jour. Econ. and Soc. Studies, Vol. VIII (March, 1966), pp. 38.

———. Issues in Agricultural Policy During the 1962-68 Development Plan, in "Growth and Development of the Nigerian Economy". Edited by Carl Eicher and Carl Liedholm. East Lansing: Michigan State University Press, 1969.

Welsch, Delane. Response to Economic Incentive by Abakaliki Rice Farmers in Eastern Nigeria, Jour. Farm Econ., Vol. XLVII, No. 4 (November, 1965), pp. 900-14.

———. Rice Marketing in Nigeria, Food Res. Inst. Studies, Vol. VI, No. 3 (1966), pp. 329-52.

Williams, S. K. Taiwo. The Confluence of Extension Education, Agricultural Extension and Community Development, Bull. Rur. Econ. and Soc., Vol. II, No. 3 (1967), pp. 184-93.

Zeven, A. C. The Development, Retrogression and Rehabilitation of Oil Palm Groves, Proc. Sci. Assoc. Nigeria, Vol. VI (October, 1965), pp. 33-41.

CSNRD Publications

NUMBERED PUBLICATIONS

CSNRD-1, September 1965, Loerbroks, I.R., Special Report, *Agricultural Development in Nigeria 1965-1980* (A summary of the FAO study).

CSNRD-2, March 1966, Peterson, Everett E., *Survey of Nigerian Agricultural Research, September-October 1965.*

CSNRD-3, June 1966, Bauman, Harold; Connoly, Chan; and Whitney, John, *A Situation Report of Agricultural Credit in Nigeria.*

CSNRD-4, August 1966, Jones, Ted L.; Gans, A. R.; Hoover, Robert G.; Maxey, Richard P.; Stoneham, A. H.; and Smith, Mervin G., *A Proposed Agricultural Credit Program for Nigeria.*

CSNRD-5, October 1966, Pine, Wilfred, *A Survey of Nigerian Agricultural Research.*

CSNRD-6, October 1966, Finkner, A. L., *Statistics in Nigeria.*

CSNRD-7, May 1967, *Papers on Nigerian Rural Development Presented at the East Lansing Conference, May 1 and 2, 1967.*

CSNRD-8, May 1967, *CSNRD Reports to Date, Prospects and Implications for USAID Assistance to Nigerian Agriculture.*

CSNRD-9, December 1967, Olatunbosun, Dupe, *Nigerian Farm Settlements and School Leavers' Farm—Profitability, Resource Use and Social-Psychological Considerations.*

CSNRD-10, June 1968, Purvis, Malcolm J., *Report on a Survey of the Oil Palm Rehabilitation Scheme in Eastern Nigeria, 1967.*

CSNRD-11, July 1968, Kincaid, James M., Jr.; Butler, Robert O.; Kidd, David W., *Extension Priorities: A Critical Analysis of Selected Extension Questions and Issues for Nigeria.*

CSNRD-12, July 1968, Herrmann, Omer W., *Soil Fertility in the Tropics: A Research Proposal.*

CSNRD-13, December 1968, Kincaid, James M., Jr., *Strategies for the Improvement of Agricultural Extension Work and Sub-University Agricultural Training in Nigeria.*

CSNRD-14, August 1968, Cownie, John, *Nigerian National Income Accounts: Historical Summary and Projections to 1985.*

CSNRD-15, August 1968, Saylor R. G., *A Study of Obstacles to Investment in Oil Palm and Rubber Plantations.*

CSNRD-16, July 1968, Olatunbosun, Dupe, *Nigerian Governments' Policies Affecting Investment in Agriculture.*

CSNRD-17, September 1968, Purvis, Malcolm J., *A Study of the Economics of Tractor Use in Oyo Divisions of the Western State.*

CSNRD-18, June 1968, Laurent, C. K., *Investment in Nigerian Tree Crops: Smallholder Production.*

CSNRD-19, November 1968, Kriesel, H. C., *Marketing of Groundnuts in Nigeria.*

CSNRD-20, November 1968, Laurent, C. K.; Russell, D. C., *Cashew Production, Processing and Marketing in Nigeria.*

CSNRD-21, January 1969, Kriesel, H. C., *Cocoa Marketing in Nigeria.*

CSNRD-22, January 1969, Herrmann, Omer W., *Nigerian Agricultural Research: Review and Recommendations.*

CSNRD-23, January 1969, Herrmann, Omer W., *Livestock Research Center for West Africa.*

CSNRD-24, January 1969, Kriesel, H. C., *Cotton Marketing in Nigeria.*

CSNRD-25, December 1968, Laurent, C. K., *Agro-Industries in Nigeria.*

CSNRD-26, January 1969, Laurent, C. K.; Kriesel, H. C.; Olatunbosun, D.; Purvis, M.; Saylor, R. G., *Agricultural Investment Strategy in Nigeria.*

CSNRD-27, January 1969, Laurent, C. K., *Problems Facing the Fertilizer Distribution Program in the Six Northern States.*

CSNRD-28, January 1969, Long, James S., *An Analysis of the Needs and Resources for University Education in Agriculture in Nigeria.*

CSNRD-29, January 1969, Butler, Robert O., *A Study of Extension Leadership.*

CSNRD-30, December 1968, Kidd, D. W., *Factors Affecting Farmers' Response to Extension in Western Nigeria.*

CSNRD-31, January 1969, Okurume, Godwin, *The Food Crop Economy in Nigerian Agricultural Policy.*

CSNRD-32, June 1969, Brinkman, George, *Reconciling Proposed Public Investments in Agricultural Education, Infrastructure and Production in Nigeria, 1969-1985.*

CSNRD-33, June 1969, Johnson, Glenn L.; Scoville, O. J.; Dike, George K.; Eicher, Carl, *Strategies and Recommendations for Nigerian Rural Development 1969-1985.*

UNNUMBERED PUBLICATIONS AND WORKING PAPERS

Milne, M. Kathleen, *Annotated Bibliographies on Soil Fertility in West Africa*, mimeo, December 1967, released jointly with the Commonwealth Bureau of Soils.

Smith, Victor E., *Nutritional Requirements for Use in Diet Selection by Linear Programming*, Working Paper 1, November 17, 1967.

Smith, Victor E., *Comments on the Relationship Between Nutritional Needs and Development Planning in Nigeria*, Working Paper 2, November 17, 1967.

Johnson, Glenn., *Factor Markets and Economic Development*, Chap. 6, In Economic Development of Tropical Agriculture, W. W. McPherson (edit.), University of Florida Press, 1968. Reproduced as CSNRD Working Paper 3, November 17, 1967.

Johnson, Glenn L., *The USAID Program: Implications for CSNRD Research*, Working Paper 4, November 17, 1967.

Eicher, Carl K., *Recent Reports and Research Findings on Nigerian Agricultural Development*, Working Paper 5, November 17, 1967.

Kincaid, James M., *A Report on Preliminary Impressions and Findings from CSNRD Sub Project 2 Research: Sub-University and Extension Training in Agriculture*, Working Paper 6, November 17, 1967.

Harbison, Frederick H., *Critical Manpower Problems in Nigerian Agricultural and Rural Development*, Working Paper 7, November 17, 1967.

Johnson, Glenn L., *Food Supply, Agricultural and Economic Development*, paper presented to Western Hemisphere Nutrition Congress II, Puerto Rico, August 1968. Reproduced as CSNRD Working Paper 8, September 18, 1968.

Scoville, Orlin J., *The Twelve States of Nigeria: Background and Current Issues*, Working Paper 9, November 19, 1968.

Johnson, Glenn L., *Comments on Professor Oluwasanmi's Paper*, Conference on Reconstruction and Development, Ibadan, March 24-29, 1969, Working Paper 10.

Smith, Victor E., *Optimal Resource Allocation for Income and Nutrition*, Working Paper 11, April 1969.

Appendix I

The Consortium for the Study of Nigerian Rural Development

In 1965, the USAID Mission to Nigeria and AID/Washington sensed a need for study and evaluation of rural development in Nigeria which would consider the current Nigerian and USAID programs for agricultural development, analyze development potentials and make recommendations for planning improved agricultural programs. AID spokesmen felt that this work should be done by an outside agency and suggested to the four universities then engaged in rural development programs in the country that they should join in a consortium to carry out a study. It was also considered expedient to involve the other major U.S. agencies who were working on agriculture in Nigeria in the consortium.

Consequently, a consortium was formed, with four universities pledged to carry out the studies (financial and voting members) and three other institutions which did not receive financial support (voting members), but agreed to render advisory and collaborative assistance.

The four universities are:

Michigan State University,
East Lansing, Mich.
(which provided administrative management of the project)
Colorado State University,
Fort Collins, Colo.
Kansas State University,
Manhattan, Kans.
The University of Wisconsin,
Madison, Wis.

The other three participating institutions are:

Research Triangle Institute,
Raleigh, North Carolina
The United States Department of Agriculture,
Washington, D.C.
The United States Department of Interior,
Washington, D.C.

As plans were being developed for the research, Nigerian agencies were drawn into the planning and selection of research projects, especially the Federal Ministry of Economic Development, the Federal Ministry of Agriculture and Natural Resources and the National Universities Commission and various officials from the universities and regional ministries. As a result of joint Nigerian-American discussions, a work plan was developed and staff members were assembled.

The organization and staff of the CSNRD project are presented below:

The Consortium Council

Agency	*Member*	*Alternate*
Michigan State University	Dr. Kirk Lawton (replaced George Axinn and James Hendry)	Dr. L. L. Boger
Colorado State University	Dr. L. L. Hodgdon	Mr. Lowell Watts
Kansas State University	Dr. Glenn H. Beck	Dr. Joseph Hadja
The University of Wisconsin	Dr. Edwin Heizer	Dr. Glenn Pound
The Research Triangle Institute	Dr. A. L. Finkner	Dr. A. M. Huq
The United States Department of Agriculture	Dr. Lyle Schertz (replaced Gerald Tichenor)	Dr. John Beasley
The United States Department of Interior	Dr. James Rettie	Dr. John Black
Agency for International Development	Mr. James Emerson	

The Consortium Working Organization

East Lansing, Michigan

Dr. Glenn L. Johnson, Director
Dr. George K. Dike, Deputy Director
Mr. T. W. McGrain (Carlton Boutwell after December 1967), Administrative Officer

Nigeria

Dr. Orlin J. Scoville, Field Project Leader, Kansas State University
Mr. Bert M. Pulaski, Administrative Officer, Michigan State University
Dr. John Cownie, Consultant, Stanford

Professional Staff

Sub Project 1, University Education in Agriculture

Sub Project Director:
Dr. G. S. Pound, University of Wisconsin
Staff Member:
Dr. James S. Long, University of Wisconsin
Consultants:
Dr. Burton Krietlow, University of Wisconsin
Mr. George Brinkman, Michigan State University

Sub Project 2, Sub-university Education and Extension Work

Sub Project Director:
Mr. Lowell S. Watts, Colorado State University
Senior Staff Member:
Dr. James Kincaid, Colorado State University
Staff Members:
Mr. R. O. Butler, Colorado State University
Mr. D. W. Kidd, Colorado State University
Mr. Johnson Ekpere, Seconded from Midwestern Nigerian Ministry of Agriculture and Natural Resources
Mr. George Brinkman, Michigan State University

Sub Projects 3 and 4, Direct Public and Private Investment in Agriculture

Sub Project Director:
Dr. C. K. Laurent, Michigan State University
Senior Staff Member:
Mr. H. C. Kriesel, Michigan State University
Staff Members:
Dr. Malcolm Purvis, Michigan State University
Dr. Dupe Olatunbosun, Michigan State University, later Research Fellow, NISER
Dr. Carl Eicher, Michigan State University
Consultants:
Dr. R. G. Saylor, Michigan State University
Mr. Godwin Okurume, Michigan State University
Mr. George Brinkman, Michigan State University
Graduate Research Assistant:
Mr. Robert Gray, Michigan State University

Sub Project 3A, Human Nutrition and Resource Use

Sub Project Director:
Dr. Victor E. Smith, Michigan State University
Staff Member:
Mr. John Whitney, Michigan State University
Nutrition Specialist:
Mr. Ephraim Idusogie, University of Ibadan
Consultant:
Dr. Dena Cedarquist, Michigan State University
Graduate Research Assistant:
Mr. Ronald Singer, Michigan State University

Sub Project 5, Modernizing the Northern Beef Industry (Project not activated because of conditions in Nigeria.)

Staff Member:
Mr. Louis Thompson, Kansas State University
Consultant:
Dr. John McCoy, Kansas State University

Sub Project 6, Agricultural Research

Sub Project Director:
Dr. Glenn Beck, Kansas State University
Staff Member:
Dr. O. W. Herrmann, Kansas State University
Dr. W. H. Pine, Kansas State University
Graduate Research Assistant:
Mr. Norman Veliquette, Michigan State University
Consultant:
Dr. E. E. Peterson, University of Nebraska
Dr. Jake Krider, Purdue University

Sub Project 7, Agricultural Credit (Contracted to Ohio State University)

Sub Project Director:
Dr. Mervin Smith, Ohio State University
Staff Members:
Dr. H. D. Bauman, Ohio State University
Dr. C. C. Connolly, Ohio State University
Mr. John Whitney, Ohio State University
Mr. R. Hoover, Federal Reserve Bank, Cincinnati, Ohio
Dr. A. R. Gans, Ohio State University
Dr. T. L. Jones, Ohio State University
Mr. Richard P. Maxey, Ohio State University

Sub Project 8, Cultural Restrictions on Development (Project never activated because of conditions in the country.)

Sub Project Director:
Dr. L. L. Hodgdon, Colorado State University

Appendix II.

Table 1.—Federal Revenues from Agriculture[1]

Item	Actual 1965-66	Revised estimate 1966-67
	£	£
Benniseed	185,333	120,000
Cocoa Beans	4,028,208	3,380,000
Cotton Lint	496,180	660,000
Cotton Seed	166,455	178,000
Groundnuts	3,200,000	3,310,196
Groundnut cake	398,438	480,000
Groundnut oil	978,718	1,000,000
Hides, Cattle	126,242	130,000
Palm Kernel	2,734,861	1,600,000
Palm Kernel Cake	29,692	80,000
Palm Kernel Oil	62,688	230,000
Palm Oil, Edible	1,214,099	630,000
Palm Oil, Technical	193,000	222,195
Rubber, Crepe	655,764	650,000
Rubber, Paste	—	10
Rubber, raw	631,048	454,000
Sheanuts	58,908	20,000
Skin, Goat	204,364	220,000
Skin, Sheep	44,336	45,000
TOTAL Agriculture	15,408,334	13,429,401
Total Customs and Excise	105,104,320	112,513,651
Total Direct Taxes	11,794,937	14,147,450
Licenses	1,572,203	1,666,770
Fees and miscellaneous	15,550,382	17,743,260
Mining and Petroleum	26,488,138	14,148,476
Total Revenue	160,509,980	160,219,607

[1]Estimates of the Government of the Federal Republic of Nigeria, 1967.

Table 2—Regional Revenue from Agriculture[1]

Source	1966-67 Revenue estimate				
	North	West	Midwest	East	Total
			£(000)		
Cattle Tax	200	—	—	—	200
Produce Sales Tax	1,700	1,153	224	1,265	4,342
Total	1,900	1,153	224	1,265	4,542

[1]Estimates of the Regional Governments of Nigeria, selected, 1966-67.