AGRICULTURAL SECTOR SURVEY

NIGERIA

(in three volumes)

VOLUME I

THE MAIN REPORT

January 26, 1973

Agriculture Projects Division
Western Africa Regional Office
CURRENCY EQUIVALENTS

Currency Unit: Nigerian Pound (₦)

Prior to December 20, 1971:

\[
\begin{align*}
\text{US$ 1} & = \text{₦ 0.357} \\
\text{₦ 1} & = \text{US$ 2.80} \\
\text{₦ 1,000,000} & = \text{US$ 2,800,000}
\end{align*}
\]

Since December 20, 1971:

\[
\begin{align*}
\text{US$ 1} & = \text{₦ 0.329} \\
\text{₦ 1} & = \text{US$ 3.04} \\
\text{₦ 1,000,000} & = \text{US$ 3,040,000}
\end{align*}
\]

Fiscal Year

April 1 - March 31

Weights and Measures

Unless otherwise stated, the ton used in this report is the long ton.

\[
\begin{align*}
1 \text{ ton (t)} & = 2,240 \text{ lbs} = 1.016 \text{ metric (m) tons} \\
1 \text{ m ton} & = 2,205 \text{ lbs} = 0.98 \text{ ton}
\end{align*}
\]

\[
\begin{align*}
1 \text{ acre (ac)} & = 0.405 \text{ hectares (ha)} \\
1 \text{ ha} & = 2.47 \text{ ac}
\end{align*}
\]

Abbreviations

A list of abbreviations used in this report appears on the page following the Preface.
This report is based on the findings of an IBRD Agricultural Survey Mission which visited Nigeria from March 28 to May 8, 1971. The mission members were:

**Mission Leader**

D.G. Reese

**Consultants**

J.W.L. Bevan (Consultant)  
J.H. Cleave  
L.F. Herrmann (Consultant)  
C.J. Hoffman (Consultant)  
H. Naeff (Consultant, FAO)  
D.C. Pickering (Consultant)  
W. Struben  
J. Wyatt-Smith (Consultant, part time)

The overall purpose of the mission was to undertake a preliminary survey of the agricultural sector in order to (a) advise the IBRD on an agricultural lending program which would appear best suited to foster development in Nigeria and (b) identify policies and institutional features particularly critical to the successful implementation of such a future lending program.

The mission reviewed government development plans and relied heavily upon the comprehensive and extremely useful work of the FAO,1/ The Consortium for the Study of Nigerian Rural Development (CSNRRD),2/ the Commonwealth Development Corporation 3/ and the National Agricultural Development Seminar, held in Ibadan in July-August 1971.

As the mission took place at a time when the reconstruction plans were still being formulated and the major impact of developments in the petroleum sector on the country's resources and balance of payments prospects had not yet been assessed, the scope of the analyses was necessarily limited and mainly concentrated on the promotion of traditional export crops. Additional studies are now required with regard to the promotion of food crops for a rapidly growing domestic market and also in respect of marketing under conditions of accelerated urbanisation. Plans and policies adopted recently by the Government give indications of an intensive development effort in the agricultural sector. These have not been discussed in this report.

The General Report contains the main findings of the mission. In the first section, present plans for agriculture and the prospects for achieving targets are discussed. This is followed by sections which appraise the position of agriculture in the Nigerian economy, discuss the opportunity available and the problems to be overcome, outline a program for development, and detail possible projects and investments. Of necessity, these discussions have been kept brief. Outside of fisheries, which the mission was unable to cover, most topics are treated more fully in the Annexes, included in Volumes II and III. Six maps which provide further information are included at the back of this volume.

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ABBREVIATIONS USED IN THE REPORT

ARC - Agricultural Research Council
BUREC - Bureau of Reclamation (US)
CBP - Contagious bovine pleuropneumonia
CCTA - Commission for Technical Cooperation in Africa
CDC - Commonwealth Development Corporation (UK)
CRIN - Cocoa Research Institute of Nigeria
CSNRRD - Consortium for the Study of Nigerian Rural Development
DOS - Department of Overseas Surveys (UK)
ENOPRP - Eastern Nigeria Oil Palm Rehabilitation Project
ERLU - Extension Research Liaison Unit
FAO - Food and Agriculture Organization of the United Nations
FDAR - Federal Department of Agricultural Research
FDFR - Federal Department of Forestry Research
FDVR - Federal Department of Veterinary Research
FFA - Free Fatty Acid
FFB - Fresh Fruit Bunches
FDL - Federal Livestock Department
FOS - Federal Office of Statistics
GBH - girth at breast height
IAR - Institute for Agricultural Research
IIITA - International Institute for Tropical Agriculture
IRHO - Institut de Recherches pour les Huiles et Oléagineux
IRSG - International Rubber Study Group
LDA - Licensed buying agent
LUU - Land Use Department
MANR - Ministry of Agriculture and Natural Resources
MMR - (State) Ministry of Agriculture and Natural Resources
MOWS - Ministry of Works and Surveys
NADC - National Agricultural Development Committee
NEDECO - The Netherlands Engineering Consultants
NIFOR - Nigerian Institute for Oil Palm Research
NISER - Nigerian Institute for Social and Economic Research
NISPR - Nigerian Institute for Social and Economic Research
NFLDC - National Livestock Development Committee
NNDC - New Nigerian Development Corporation
NPMP - Nigerian Produce Marketing Company
NSMB - Northern States Marketing Board
OAU - Organisation of African Unity
RERU - Rural Economics Research Institute
RSS - Rubber Research Station
SBR - Styrene-butadiene Rubber
SNDC - Second National Development Plan, 1970-74
SSVD - Swollen Shoot Virus Disease
THU - Tractor Hire Unit
USAID - United States Agency for International Development
UNDP/SF - United Nations Development Programme / Special Fund
WAIFOR - West African Institute for Oil Palm Research
# NIGERIA

# AGRICULTURAL SECTOR SURVEY

# VOLUME I - THE MAIN REPORT

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td></td>
</tr>
<tr>
<td>ABBREVIATIONS</td>
<td></td>
</tr>
<tr>
<td>BACKGROUND DATA</td>
<td></td>
</tr>
<tr>
<td>SUMMARY</td>
<td>i-iii</td>
</tr>
<tr>
<td>I. INTRODUCTION: PLANS AND PROSPECTS</td>
<td></td>
</tr>
<tr>
<td>The Present Position</td>
<td>1</td>
</tr>
<tr>
<td>Second National Development Plan (1970-74)</td>
<td>1</td>
</tr>
<tr>
<td>Long Term Prospects</td>
<td>2</td>
</tr>
<tr>
<td>Government Plans</td>
<td>2</td>
</tr>
<tr>
<td>Overall Growth</td>
<td>3</td>
</tr>
<tr>
<td>II. AGRICULTURE IN THE NIGERIAN ECONOMY</td>
<td></td>
</tr>
<tr>
<td>Agriculture in the Economy</td>
<td>5</td>
</tr>
<tr>
<td>Features of the Agricultural Sector</td>
<td>6</td>
</tr>
<tr>
<td>III. AGRICULTURAL DEVELOPMENT: REQUIREMENTS, OPPORTUNITIES AND CONSTRAINTS</td>
<td></td>
</tr>
<tr>
<td>Role of Agriculture</td>
<td>10</td>
</tr>
<tr>
<td>Opportunities</td>
<td>11</td>
</tr>
<tr>
<td>Market Prospects</td>
<td>11</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>12</td>
</tr>
<tr>
<td>Available Technology</td>
<td>13</td>
</tr>
<tr>
<td>Constraints</td>
<td>14</td>
</tr>
<tr>
<td>Price Incentives for Producers</td>
<td>14</td>
</tr>
<tr>
<td>Marketing Problems</td>
<td>17</td>
</tr>
<tr>
<td>Transport Bottlenecks</td>
<td>18</td>
</tr>
<tr>
<td>Planning and Coordination</td>
<td>20</td>
</tr>
<tr>
<td>Manpower Shortages</td>
<td>21</td>
</tr>
<tr>
<td>Use of Inputs and Mechanization</td>
<td>21</td>
</tr>
<tr>
<td>Credit Needs</td>
<td>22</td>
</tr>
<tr>
<td>Population Pressure</td>
<td>23</td>
</tr>
<tr>
<td>Climate and Diseases</td>
<td>23</td>
</tr>
<tr>
<td>Traditional Cattle Management</td>
<td>24</td>
</tr>
<tr>
<td>Land Tenure</td>
<td>24</td>
</tr>
<tr>
<td>Conclusion</td>
<td>25</td>
</tr>
</tbody>
</table>
IV. A PROGRAM FOR DEVELOPMENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Strategy</td>
<td>26</td>
</tr>
<tr>
<td>An Action Program</td>
<td>26</td>
</tr>
<tr>
<td>Planning and Coordination</td>
<td>28</td>
</tr>
<tr>
<td>Pricing, Marketing and Infrastructure</td>
<td>30</td>
</tr>
<tr>
<td>Pricing Policies</td>
<td>30</td>
</tr>
<tr>
<td>Marketing Arrangements</td>
<td>31</td>
</tr>
<tr>
<td>Storage</td>
<td>32</td>
</tr>
<tr>
<td>Transport</td>
<td>33</td>
</tr>
<tr>
<td>Inputs, Services and Credit</td>
<td>33</td>
</tr>
<tr>
<td>Improving Supplies of Inputs</td>
<td>33</td>
</tr>
<tr>
<td>Mechanization</td>
<td>35</td>
</tr>
<tr>
<td>Agricultural Services</td>
<td>36</td>
</tr>
<tr>
<td>Credit</td>
<td>37</td>
</tr>
<tr>
<td>Subsector Programs</td>
<td>38</td>
</tr>
<tr>
<td>Tree and Annual Crops</td>
<td>38</td>
</tr>
<tr>
<td>Livestock</td>
<td>39</td>
</tr>
<tr>
<td>Forestry</td>
<td>40</td>
</tr>
<tr>
<td>Extended Tsetse Eradication</td>
<td>41</td>
</tr>
<tr>
<td>Irrigation</td>
<td>42</td>
</tr>
<tr>
<td>V. PROJECTS AND INVESTMENTS</td>
<td>44</td>
</tr>
<tr>
<td>Tree Crops</td>
<td>44</td>
</tr>
<tr>
<td>Cocoa</td>
<td>44</td>
</tr>
<tr>
<td>Rubber</td>
<td>45</td>
</tr>
<tr>
<td>Oil Palm</td>
<td>45</td>
</tr>
<tr>
<td>National Seed Program</td>
<td>46</td>
</tr>
<tr>
<td>Agricultural Supply Organization</td>
<td>46</td>
</tr>
<tr>
<td>Crop Production</td>
<td>47</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>47</td>
</tr>
<tr>
<td>Cotton</td>
<td>48</td>
</tr>
<tr>
<td>Livestock</td>
<td>48</td>
</tr>
<tr>
<td>Tsetse Eradication</td>
<td>49</td>
</tr>
<tr>
<td>Breeding and Fattening Ranches</td>
<td>49</td>
</tr>
<tr>
<td>N'dama Cattle</td>
<td>49</td>
</tr>
<tr>
<td>Pigs and Poultry</td>
<td>50</td>
</tr>
<tr>
<td>Forestry</td>
<td>50</td>
</tr>
<tr>
<td>Irrigation</td>
<td>52</td>
</tr>
<tr>
<td>Mixed Farming in the Middle Belt</td>
<td>53</td>
</tr>
<tr>
<td>Preinvestment and Other Studies</td>
<td>53</td>
</tr>
</tbody>
</table>

CHARTS

- Retail Prices, 1960-1970 .................................................. following 9
- Cocoa Prices, 1960-1975 .................................................. following 11
- Groundnut Prices, 1960-1975 ............................................ following 11
- Palm Oil Prices, 1960-1975 ............................................ following 11
- Palm Kernel Prices, 1960-1975 ........................................ following 11
MAPS ......................................................... following 56

Settlement and Communications
Population Density
Ecological Zones and Research Stations
Major Cash Crops
Cattle Routes and Tsetse Areas
Irrigation - Existing and Potential Projects

Volume II
Annex 1 - Land, Climate and Soils
Annex 2 - Demand Projections
Annex 3 - Annual Crops
Annex 4 - Tree Crops
Annex 5 - Forestry
Annex 6 - Irrigation Plans and Prospects

Volume III
Annex 7 - Livestock
Annex 8 - Marketing and Processing
Annex 9 - Agricultural Planning, Supporting Services and Manpower
Annex 10 - Agricultural Credit
Annex 11 - Preinvestment Study Proposals and Existing Studies
Annex 12 - Statistical Annex
**Country:**

**Libya**

**Population:** 68 million (1971)

**PPG as % of GDP:**

**Health:**

Population per physician 174

Population per hospital bed 0.00

**Nutrition:**

Calorie intake as % of requirements 100

Protein intake (gram) 0.0


<table>
<thead>
<tr>
<th>Value Added</th>
<th>$</th>
<th>Labor Force</th>
<th>$</th>
<th>Value Added Per Worker</th>
<th>$</th>
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<tr>
<td>Agriculture</td>
<td>250</td>
<td>10.0</td>
<td>25.0</td>
<td>10.0</td>
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<td>Industry</td>
<td>160</td>
<td>18.9</td>
<td>9.1</td>
<td>13.3</td>
<td>9.1</td>
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<td>Services</td>
<td>158</td>
<td>23.1</td>
<td>4.5</td>
<td>10.1</td>
<td>4.5</td>
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<tr>
<td>Total Average</td>
<td>570</td>
<td>10.0</td>
<td>25.4</td>
<td>10.0</td>
<td>25.4</td>
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</table>

**Public Expenditure (1970/71):**

<table>
<thead>
<tr>
<th>All Governments (Federal and State)</th>
<th>$ of GDP average</th>
<th>$ of GDP average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Revenue</td>
<td>1,000</td>
<td>1,000</td>
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<tr>
<td>Current Expenditure (incl. transfers)</td>
<td>1,000</td>
<td>1,000</td>
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<tr>
<td>Capital Expenditure (2)</td>
<td>250</td>
<td>25.0</td>
</tr>
<tr>
<td>External Assistance (3)</td>
<td>15</td>
<td>0.0</td>
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**Balance of Payments (1972):**

<table>
<thead>
<tr>
<th>Item</th>
<th>1971</th>
<th>1972</th>
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<tbody>
<tr>
<td>Exports of Goods, NPS</td>
<td>1,233</td>
<td>1,297</td>
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<tr>
<td>Imports of Goods, NPS</td>
<td>901</td>
<td>941</td>
</tr>
<tr>
<td>Balance (deficit -)</td>
<td>-36</td>
<td>-40</td>
</tr>
<tr>
<td>Interest Payments (net)</td>
<td>-21</td>
<td>-21</td>
</tr>
<tr>
<td>Workers' Remittances</td>
<td>-17</td>
<td>-17</td>
</tr>
<tr>
<td>Other Factor Payments (net)</td>
<td>-28</td>
<td>-28</td>
</tr>
<tr>
<td>Net Transfers</td>
<td>-29</td>
<td>-29</td>
</tr>
<tr>
<td>Capital Account</td>
<td>-229</td>
<td>-252</td>
</tr>
<tr>
<td>Direct Foreign Investment</td>
<td>237</td>
<td>232</td>
</tr>
<tr>
<td>Medium and Long-term Loans (net)</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Disbursements</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Incurrence</td>
<td>-29</td>
<td>-29</td>
</tr>
<tr>
<td>Official Grants</td>
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<td>-1</td>
</tr>
<tr>
<td>Other Capital (net)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Increase in Official Reserve</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>All Other Items</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Gross Reserves</td>
<td>360</td>
<td>385</td>
</tr>
</tbody>
</table>

**Debt Service Ratio (1972):**

<table>
<thead>
<tr>
<th>Item</th>
<th>1971/72</th>
<th>1971/72</th>
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</thead>
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<tr>
<td>IBRD</td>
<td>14.0</td>
<td>14.0</td>
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<tr>
<td>IDA</td>
<td>14.0</td>
<td>14.0</td>
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**Currency and Exchange Rates:**

<table>
<thead>
<tr>
<th>Currency</th>
<th>1972/73</th>
<th>1972/73</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egyptian Pound</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>US Dollar</td>
<td>3.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**Additional Information:**

1. Because of the civil disturbances, the coverage of the three Eastern States for the period 1964-66 is uneven and incomplete.
2. Official estimates: other estimates are as much as 10 million lower.
3. Foreign capital expenditure includes current expenditure, statutory transfers of foreign aid, and the proceeds of loans.
4. Includes loans to statutory corporations.
5. Excludes transfers of public and publicly guaranteed aid.
6. At the 7/30 exchange rate ($1 = 1.00) at the current exchange rate this would be $717 million.
Despite the growing importance of oil and other non-agricultural sectors of the Nigerian economy, agriculture will continue to play a key role in the country as the largest employer of labor, as a provider of foodstuffs for a rapidly growing urban population, and as a major earner of foreign exchange.

Generally there are expanding markets for most of Nigeria's agricultural exports. Land and labor resources, which could be devoted to increasing agricultural production, are available; improved production techniques are known; and farmers have shown themselves responsive to profitable opportunities to expand production.

There are, however, a number of problems which have to be faced if the potential for growth in the agricultural sector is to be realized. The most important of these is finding means of increasing incentives to producers to expand output. This is in the face of generally declining world market prices for agricultural products, and rising costs of inputs. Second, the task of planning and co-ordinating agricultural investments in a large country, which is composed of twelve states, is formidable. Each State has considerable autonomy in this field, and adequately-trained staff who can undertake planning at state and federal level are in short supply. This will continue to limit the ability of the agricultural sector to absorb investments on any scale. Finally, although means of increasing productivity and production are known, little use is made of improved seeds, agricultural chemicals, mechanization, or credit. The reasons for this lie partly in organizational problems arising from the nature of Nigerian agriculture and the lack of sophistication of the smallholder farmers; but are also related to the problems of incentives and planning already noted.

Major policy issues arise directly from this analysis. First is how to increase returns to producers so as to encourage greater resource investment and production. A considerable portion of farmers' potential income is removed in the form of taxes; goes into surpluses of the marketing boards which handle major export commodities; or is absorbed in marketing expenses. Critical considerations are, (a) how far other sources can provide the governments, particularly the state government, with revenue which traditionally has been taken from agriculture, and (b) what reorganization in the marketing system (including more efficient transport and storage) is needed to reduce costs and enable it more accurately to relay market opportunities to producers. The report recommends major reductions in revenue-raising from export crops, and increasing participation of the private sector in competitive marketing operations. A review of marketing board policy and staffing should take place in the interim.
v. The second policy issue is how to direct development efforts towards national issues while retaining the advantages of local initiative and enthusiasm created by the formation of the states. The report looks to a strengthening of the authority of the Federal Ministry of Agriculture and Natural Resources both through enabling legislation on matters such as water resource development, which are inter-state in nature, and also by the creation of a number of bodies with federal and state representation to deal with specific problems of national importance. The report also stresses the need for a major input of technical assistance into project and sector planning, preferably by a coordinated team operating simultaneously in all states and at federal level.

vi. The third major issue is how best to ensure that improved techniques and inputs are taken up by the agricultural sector, given a reasonable price incentive. The problem has several facets. Research results have to be translated into extension advice which can be applied; and extension personnel, adequate in skills and numbers, must be in contact with the farmers. There is a need to ensure that improved planting material is available and that this, fertilizers, and other inputs reach the farmers. Credit may be required for these inputs or to help marketing, and market outlets have to be available in the form which suits the farmer. These are largely organizational problems. The report recommends increased use of the private sector for input supply and marketing services, but recognizes that an interim supply organization may be necessary to build up the market and establish distribution channels for inputs. A strengthening of existing institutions (partly achieved by divesting extension staff of work which diverts them from their primary role), and the creation of a national extension/research liaison service are seen as approaches to enhancing the impact of extension services. The National Agricultural Bank, now being organized, will cope with the organization of institutional credit.

vii. Subsector programs which should be developed within this strategy and which are dependent on the opportunities it presents, include the development of cocoa, rubber and groundnuts mainly for export; and an expansion of cotton production and timber, mainly for local processing but also for export. An increase in palm oil production will be absorbed by the local market and developments of cattle and other livestock will be wholly for domestic consumption. It is envisaged that the present pragmatic approach to the organization of production will continue. Reliance will be principally on smallholders, but an outgrower system should be studied for rubber and oil palm development. Both expansion in area and intensification of production are anticipated for all the major crops. A continuing tsetse clearing program will make more land available for livestock and crops, but the major intensification will be from yield-improving inputs. Major investments in irrigation – for which a research effort is recommended or in mechanization are not envisaged for some time.

viii. Attention is directed to a need to assess planning and manpower requirements and to collect key data for agricultural sector planning.
Pre-feasibility studies are suggested on the organization of input supply, marketing and storage; and into investment opportunities in forestry, livestock, groundnuts, cotton, kenaf, sugarcane, oil palm, rubber and cocoa. Studies are suggested to identify possible irrigation investments. Preliminary estimates indicate a total investment approaching US$400 million could be applied to these developments, over the next 15 years, provided the capacity to absorb such a sum were developed.
NIGERIA

AGRICULTURE SECTOR SURVEY

I. INTRODUCTION: PLANS AND PROSPECTS

The Present Position

1.1 Nigeria at the present time (early 1971) is beset with rising prices in the urban areas and local shortages of foodstuffs. Major causes are the disruptive effects of the disastrous civil war of 1967-70, especially on food production in the eastern states and on transport links; unfavorable weather in the last two crop seasons; and inflationary pressures generally. As conditions return more to normal and transport is improved, however, much of the current problem should disappear. The prevailing high prices, too, will make use of fertilizer and other improvements more attractive -- provided that supplies are readily available to farmers -- and encourage wider cultivation and larger output.

1.2 Outside of these factors, however, only the weather and producer price incentives can be expected to make much impact on agricultural performance in the immediate future. Investments to expand the production base have lagged over the past several years. In the 1962-68 National Development Plan, for example, public capital expenditures were less than 60% of planned levels. Due largely to the war, subsequent investments also have fallen far short of expectations.

Second National Development Plan (1970-74)

1.3 The Second National Development Plan (1970-74) states a high priority to agriculture but allocates only 13% of public sector capital investments to the sector (including livestock, forestry and fishing) and projects annual growth in value added at less than 2% between 1968-69 and 1973-74 -- in contrast to 6.2% for the economy as a whole (see Table 1.1).

Table 1.1: SECOND NATIONAL DEVELOPMENT PLAN

<table>
<thead>
<tr>
<th>Public Sector Capital Investment (EN Million)</th>
<th>% Total</th>
<th>Annual % Real Increase in Gross Domestic Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>132.7</td>
<td>13</td>
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<tr>
<td>Transport</td>
<td>242.6</td>
<td>24</td>
</tr>
<tr>
<td>Mining</td>
<td>2.6</td>
<td>-</td>
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<tr>
<td>Industry</td>
<td>86.1</td>
<td>8</td>
</tr>
<tr>
<td>Education</td>
<td>138.9</td>
<td>14</td>
</tr>
<tr>
<td>All other</td>
<td>422.5</td>
<td>41</td>
</tr>
<tr>
<td>Total Plan</td>
<td>1,025.4</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Second National Development Plan, Chapter 27, Table 5 and Chapter 6, Table 7.
1.4 The Plan also lays down the following broad objectives for agricultural development:

(a) insuring adequate food supplies;
(b) expanding export crop production;
(c) producing raw materials for domestic industries;
(d) creating rural employment opportunities; and
(e) evolving appropriate institutional and administrative machinery.

1.5 According to the First Progress Report in the Plan, actual investments in agriculture over the first eighteen months of the plan period have fallen considerably short of targets. Contrasted with the target of EN 43 million actual public sector expenditures on agriculture, forestry and fishing totaled only EN 18 million over this period. Many state governments short of financial resources and preoccupied with rehabilitation and organizing their administrative machinery, managed little capital expenditures on agriculture in the past three years. Given the sector's limited capacity to plan and carry out programs, the prospects for stepping up public sector investments markedly in the near future are not encouraging.

1.6 If the 3.3% annual increase recorded during 1958/59-1966/67 is to be obtained in agricultural growth over the next four or five years then marked improvements will have to be made. If immediate steps are taken to restore transport and output in the eastern states, improve price incentives, and supply farm inputs, it should be possible, nevertheless, to achieve an average growth of around 3.0% through 1975, depending, once again, on weather and the ability of food output to respond to present demand. According to the 1970 Economic and Statistical Review, agricultural value added in 1969-70 and 1970-71, the first two years of the Plan, already increased by 13%.

Long Term Prospects

1.7 Government Plans. The recent National Seminar for Agricultural Development considered the earlier FAO and CSN RD reports and laid the base for planning development through 1985. Using this base, the Federal Ministry of Agriculture has drafted a "Perspective Plan for Agricultural Development to 1985" for approval by the Governing Council and has outlined a preliminary version of the agricultural portion of the Third National Development Plan. The seminar called for large expansions in agricultural output and in most cases endorsed steps for achieving these expansions.

1.8 Projections of production of major export crops proposed by the seminar are outlined in Table 1.2.
Table 1.2: PROPOSED INCREASES IN MAJOR EXPORT CROPS PRODUCTION 1970-85 ('000 long tons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocoa</td>
<td>202</td>
<td>285</td>
<td>350</td>
<td>425</td>
</tr>
<tr>
<td>Rubber</td>
<td>67</td>
<td>102</td>
<td>116</td>
<td>140</td>
</tr>
<tr>
<td>Palm Oil</td>
<td>500</td>
<td>689</td>
<td>761</td>
<td>920</td>
</tr>
<tr>
<td>Palm Kernels</td>
<td>295</td>
<td>435</td>
<td>454</td>
<td>407</td>
</tr>
<tr>
<td>Groundnuts (shelled)</td>
<td>1,143</td>
<td>1,300</td>
<td>1,558</td>
<td>1,819</td>
</tr>
<tr>
<td>Seed Cotton</td>
<td>228</td>
<td>295</td>
<td>380</td>
<td>450</td>
</tr>
</tbody>
</table>

/1 1974.
/2 High estimate. Low estimate - 1,700.

Source: National Agricultural Development Committee Reports.

Based upon projected demand and supply, the seminar also noted possible substantial shortfalls in millet, sorghum, maize, yams, fruits, vegetables, sugar and livestock products.

1.9 Without new policies some of the projected increases will be difficult to achieve by the target dates. The oil palm program, for example, calls for planting and rehabilitating almost 1.3 million ac during 1971-85, an average of more than 80,000 ac yearly, and it is most unlikely that this level can be approached. The planting program for cocoa is also very optimistic -- it calls for more than 690,000 ac of cocoa to be planted and replanted in the same period. Production totals in the 1970-71 and 1971/72 seasons are estimated to be in the region of 300,000 tons, which makes the 1975 estimate appear conservative. It will still take a vigorous effort to reach the 1980 target, however, and that for 1985 is very high. Plans for planting 135,000 ac of rubber are achievable but only if early action is taken on planting and replanting. The groundnut target is realistic and the cotton target is relatively conservative. The requirements for any major overall expansion of Nigerian agriculture, however, are formidable -- in terms of policies, planning and administration, farm inputs, agricultural services and credit. Improvement will need vigorous and sustained action. The Federal Government is aware of these problems and as a first step in the formulation of a green revolution in Nigeria it commissioned a team of international experts to report on the requirements for an accelerated cereal production scheme. An administrative framework for this scheme is being set up and field work for scheme preparation will begin 1973/74.

1.10 Overall Growth. Over the longer term, at least through the 1970's, overall growth will tend to be restricted by three factors: (a) improvements in tree crop output probably will not be rapid enough to offset continuing declines in the existing stock; (b) increases in food and feed crops will depend mainly on extending the cultivated area -- improved technology for food and feed crops will not be sufficiently widespread by that time to
affect production widely; and (c) the livestock sector will still be limited by inadequate grazing lands and grazing practices, shortages of stock, and high-cost feed grains. Policies and programs are discussed in this report which should make it possible to step up agricultural growth sharply, possibly with yearly increases of 5% or larger after 1980.

1.11 To get these results will require vigorous and early action. The sooner policy decisions are taken on program priorities, and the means of coordinating activity, the better. The aim must be the benefit of Nigeria as a whole: to achieve this, state interests may need to be subordinated to national interests in both project priority and resource use. Given energetic action and full cooperation between the parties involved, the developments outlined in this report could become realities: without such a will progress will be slow, and the report proposals will serve little purpose.
II. AGRICULTURE IN THE NIGERIAN ECONOMY

Agriculture in the Economy

2.1 Nigeria stands at the threshold of a new economic era. In spite of the setback of the civil war, the economy has shown considerable strength. Between 1962-63 and 1966-67, the gross domestic product (GDP) grew almost 5 percent annually, although there were large fluctuations from year to year. GDP declined in 1967-68 and 1968-69, largely as a result of the war, but picked up rapidly with the restoration of peace, registering increases of 13 percent in 1969-70 and 10 percent in 1970-71.

2.2 Although most of this growth was sustained by agriculture, the rapid expansion of mining and manufacturing heralds the changes taking place in the economy. Mining, mainly petroleum, grew 38 percent yearly between 1963-1970. With production of 1.5 million barrels daily in mid-1971, Nigeria now is the world's tenth largest petroleum producer. Output is expected to double by the end of the 1970s. Although petroleum at present contributes less than 5 percent of GDP, its rapid expansion over the next 3 or 4 years will make it one of the leading growth sectors of the economy. Net foreign exchange receipts from petroleum are expected to rise from US$364 million in 1970 to about US$2 billion by 1975, and payments to the Government from US$245 million to around US$1.9 billion.

2.3 These developments are hastening the structural transformation which is characteristic of countries at Nigeria's stage of development. Agriculture's contribution to GDP has dropped steadily -- from 61 percent in 1962-63 to 50 percent in 1970-71 -- while the share of mining and manufacturing and crafts has risen from 8 percent to 20 percent. Similarly, agricultural exports (mainly cocoa, oil palm products, groundnuts and groundnut products), which accounted for 70 percent of the total value in exports in 1962, were less than one-third of the total in 1970. Crude oil exports in the same time climbed from 10 percent of the total in 1962, to 58 percent of the 1970 total of US$1,240 million.

2.4 Nonetheless, Nigeria still is predominantly an agricultural economy. More than 80 percent of the population is rural and about 70 percent of all employment is in agriculture. The low average per capita GDP (about US$100 in 1971) reflects both this predominance and the low productivity of Nigerian agriculture. The output per head of the economically active population in agriculture is only 45 percent of that in other sectors -- some $50 a year compared with over $110 in 1969/70.

2.5 Nigeria's economic growth in the past was fueled mainly by agricultural output destined for export. Not only did agricultural exports generate income domestically and provide a major part of public revenues, but they also supplied the foreign exchange for importing capital goods needed to launch industrialization. Imports of machinery, transport equipment and
manufactured goods during 1962-67 generally were more than 70% of the total. Foodstuffs, mainly cereals, dairy products and sugar, amounted to less than 10% of 1970 imports.

2.6 Nigeria's population, variously estimated at 55 to 66 million in 1970, is growing between 2.6 and 3.0% annually. The urban population, currently about 20% of the total, is expanding faster (probably 6% or more yearly), due in large part to migration from rural areas. As a consequence, urban unemployment, estimated at about 8% of the labor force in 1970, is rising and constitutes a source of growing concern for the government. Among the rural population only 2% have full primary education and can be considered functionally literate.

Features of the Agricultural Sector

2.7 The total annual value of agricultural output in 1970 was about N 990 million (US$2.8 billion). Approximately 78% of this output was in crops, with 9% in livestock products, 8% in fishing and 5% in forestry. Production is carried out almost entirely by small farmers, who grow a variety of crops on holdings which are typically between one and seven acres in area. In 1963, about 40% of farmers in the northern states and almost two-thirds in the southern had less than 2.5 ac. Yams, cassava, cocoyams, and kola nuts are grown widely in the south, and sorghum, millet and beans in the north. Maize and rice also are major food crops. Cash crops, mainly for export, include groundnuts and cotton in the north, and cocoa, oil palm, and rubber in the south. The distribution of major crops, and the ecological zones of Nigeria, are shown on maps at the end of this volume.

2.8 Although there is regional specialization in cash crops cultivation -- the tree-crop belt in the south and the groundnut and cotton-belts in the north -- virtually every farm family, even in areas specializing in cash crops, also grows at least some of its own subsistence. Relatively little enters commercial trade for shipment to other areas. That which does consists mainly of yams, rice, sorghum and cowpeas, which are sent from the food crop belt in the middle of the country to the urban centers and other food deficit areas in the south.

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1/ See Annex 12, Tables 1.3 to 1.9, and maps of Settlement and Communications, and Population Density.

2/ More than 70% of farm families in the south are estimated to grow yams and more than half cassava. Almost 70% of northern farm families are estimated to grow sorghum and more than 60% millet. See Table 1.11, Annex 12.
2.9 Cereals and starchy roots and tubers are the principal items in the average Nigerian diet. Although little reliable data are available, the National Agricultural Development Committee placed the average daily per capita intake at 2,200 kilocalories in 1968-69, compared with an estimated requirement of 2,200 to 2,500. Proteins, of which animal protein probably was less than one-third, were only about one-tenth of the total intake. Diets vary considerably between the northern states — where millet and sorghum predominate — and the southern states, which depend mainly upon cassava, yams and cocoyams. Maize is eaten in all areas. Cattle provide the main source of meat in the Muslim-north, while the south relies more heavily on goats, sheep, pork and fish. Poultry and various domestic and wild animals are consumed throughout the country, and small stock are the source of 50-60% of Nigeria's meat supply.

2.10 The livestock sector accounts for only about 5% of total GDP, compared with more than 40% for crop production. Livestock population estimates vary widely, but cattle probably number about 8 million, sheep and goats 23 million, poultry 38 million, and pigs 300,000. More than 95% of the cattle and two-thirds of sheep, poultry and goats are in the six northern states. Most of the pigs, mainly small local breeds, are in the south. Since most of Nigeria is infested with tsetse fly during the wet season, the majority of cattle live in the fly-free far north. During the dry season, they move south-westerly when water and grazing run short and the limit of tsetse infestation retreats southward. Rangeland is insufficient and deteriorating, due in large part to uncontrolled grazing by nomadic herds and encroachments of cultivation. There is an important trade in livestock in Nigeria. Over 90% of southern states consumption moves from the north, mainly on hoof. Imports from Niger and Chad are about one-quarter of total annual cattle consumption. (See Annex 7, and map of Cattle Routes and Tsetse Areas.)

2.11 Recent estimates show that approximately 17 million persons, 72% of the total employment, are gainfully employed in agriculture. Although rural unemployment was estimated at less than 1% of the labor force, there is seasonal unemployment and considerable underemployment. Because of migration to urban areas, the rural population growth rate is probably only about 2% annually. A high proportion of those migrating to urban centers are school leavers. There is a significant gap in the most economically active age group in rural areas, and in some areas there are shortages of agricultural labor at peak times.

2.12 Nigeria's 1962-68 National Development Plan, its first as a sovereign country, allocated £92 million (US$2.6 billion) to primary production. This was only 14% of total public sector capital expenditures; 15% went to electricity and 21% to transport. Plan execution was interrupted by the 1966 crisis and subsequently by war. Due to these disruptions as well as to the lack of leadership, planning and coordination at the federal level, only 57% of the amount allocated to agriculture was spent, compared with 79% for the Plan as a whole.
2.13 Agricultural growth during the first four years of the Plan averaged about 2% yearly, while the entire economy grew an average of almost 5%. Within this period, however, the rate of agricultural growth declined sharply from an initial high rate of 8% in 1963-64 to -0.5% in 1964-65 and virtual stagnation in the succeeding two years. Preliminary estimates for 1967-68 through 1970-71 show expansion picking up, averaging over 3% annually for the four years, but still below the 4% rate of the total economy at this time. Much of the decline and stagnation in the agricultural sector was due to falls in export crop production as a result of unfavorable weather, transportation bottlenecks and declining market prices. Also important was the disruption (and in some cases exclusion from the data) of economic activities in the three eastern states most affected by the civil war.

2.14 Food output in the past generally kept pace with population growth through expansion of the area cropped. Very little increase in any crop came from higher yields per ac. Although improved seed and wider use of fertilizers and insecticides may have had some impact on cash crops, their net effect was too small to make any pronounced impact on the overall picture. Unfavorable rains and smuggling were responsible for much of the recorded decline in the 1970 groundnut and cotton crops.

2.15 Both cocoa and rubber production increased up to 1965, mainly as a result of earlier plantings. Relatively high prices in the 1950's encouraged cocoa farmers to plant large areas. In addition, extremely effective programs of cocoa pest and disease control, launched in the late 1950's, raised levels of output. The situation in rubber is less clear. Estate production, while still a small proportion of the total, has increased markedly. Out of a total of around 450,000 ac, only about 30,000 ac of plantation rubber were in estate production in 1966, but produced approximately 20% of Nigeria's output.

2.16 The civil war had a serious impact on oil palm, a major part of which is in the eastern part of the country, and on rubber. Even before the civil war, production of palm oil and palm kernels was largely stagnant. During the crisis, all rehabilitation and new plantings of oil palm ceased and, in the case of rubber, contracted sharply. Many palm groves and rubber plantations were destroyed or neglected.

2.17 On the whole, however, agriculture was the sector least affected by the war. Food production in the eastern states, insufficient in normal times to supply the population, declined as the war progressed. Output in the other states was little affected and, without the eastern market, domestic foods were in ample supply, despite restrictions on imports, expansion of the armed forces, and swelling urban demand. As hostilities wound down, though, demand for foodstuffs caught up with and exceeded supply. Food prices in the cities have risen far more rapidly than the prices of other items. The overall consumer price index in cities increased by about 50%

\[1/\] Fertilizer imports climbed rapidly -- from 6,000 tons of product in 1961 to a peak of 65,000 tons in 1967 and 43,000 tons in 1969. Imports in 1967, however, would have allowed less than 5 lb of product per acre of cultivated land.
NGERIA
AGRICULTURE SECTOR SURVEY
RETAIL PRICES, 1960-1970
INDEX NUMBERS, 1960 = 100

INDEX 1960 = 100
LOGARITHMIC SCALE

SOURCES: ANNUAL ABSTRACT OF STATISTICS, NIGERIA, AND
MONTHLY REPORT, CENTRAL BANK OF NIGERIA
IBRD - 6015
between 1960 and the first half of 1970 (see figure on following page). The increase for food items accounted for more than one-half of the general rise. Retail food prices in all cities rose 19% in 1969 and another 19% in the first half of 1970, while prices of all items increased only 10% and 12%. Much of the rise was due to disruptions in transportation and marketing and to inflationary expansion of the money supply. Insofar as the first two factors apply, the extreme price rise in the cities is unlikely to be found in rural areas which are capable of supplying the larger part of their own food requirements.
III. AGRICULTURAL DEVELOPMENT: REQUIREMENTS, OPPORTUNITIES AND CONSTRAINTS

Role of Agriculture

3.1 While the non-agricultural sectors can be expected to be increasingly important in the future, agriculture will continue to be the mainstay of Nigeria's economy. In the first place, agriculture still will have to furnish the bulk of employment and income for the nation's population. By 1985, Nigeria probably will have 100 million or more people. Urban jobs will not be enough to employ more than a small fraction of the work force. Greater opportunities for work and better relative incomes in rural areas will be essential to slow the migration to cities and towns and at least allow the government breathing space to handle the influx. Equally important, accelerated agricultural growth will be needed to provide the market to stimulate development in the other sectors of the economy. Sustained growth in the rural sector, for example, would stimulate the growth of wage-good industries which would benefit from economics of scale to the fullest extent and generate in turn the growth of localized markets for small-scale industries. Failure to accelerate rural development, on the other hand, would likely lead to a concentration of urban-based industries processing luxury products for a small market.

3.2 Second, agriculture will have to meet most of Nigeria's rising demand for foodstuffs and raw materials. With population expanding around 3% yearly, urbanization increasing, and incomes projected to rise sharply, the demand for more, and higher quality, food and for raw products such as cotton and kenaf will grow quickly.

3.3 Finally, agriculture will have to continue as a major earner of foreign exchange. Revenues from Nigeria's oil exports are not large compared to the size of the population, with net earnings from oil exports amounting to only US$4 per capita in 1970, and expected to be roughly US$12 per capita in 1971. Moreover, after 1974 or 1975, oil earnings are expected to level off, so that further needs of the economy for foreign exchange will have to be met from other sources including agriculture.

3.4 Accelerating Nigeria's agricultural growth, then, is essential to the country's future progress. For such growth there are both major opportunities and serious constraints which are each discussed in detail below. The opportunities center about three factors: (a) the existence of growing markets, both foreign and domestic, for Nigeria's agricultural products; (b) an abundance of land and human resources whose productive capacities presently are underutilized; and (c) the availability of improved technology, applicable to major cash crops, which, if adopted, could significantly raise productivity in agriculture.
NIGERIA
AGRICULTURE SECTOR SURVEY

COCOA PRICES, 1960-1975

SOURCES: ANNUAL ABSTRACT OF STATISTICS
COMMONWEALTH SECRETARIAT
FEDERAL OFFICE OF STATISTICS
NIGERIA
AGRICULTURE SECTOR SURVEY

GROUNDNUT PRICES, 1960-1975

NIGER, AGRICULTURE SECTOR SURVEY

UNIT VALUE OF EXPORTS, NIGERIA

PRODUCERS PRICES, NIGERIA

C.I.F. EUROPE

SOURCES: ANNUAL ABSTRACT OF STATISTICS
COMMONWEALTH SECRETARIATE
FEDERAL OFFICE OF STATISTICS
NIGERIA
AGRICULTURE SECTOR SURVEY
Palm Oil Prices 1960-1975

C.I.F. Europe

Unit Value of Exports, Nigeria

Producers Prices, Nigeria

Source: Annual Abstract of Statistics
Commonwealth Secretariat
Federal Office of Statistics
NIGERIA
AGRICULTURE SECTOR SURVEY

PALM KERNEL PRICES 1960-1975

C.I.F. EUROPE

UNIT VALUE OF EXPORTS, NIGERIA

PRODUCERS PRICES, NIGERIA

SOURCE: ANNUAL ABSTRACT OF STATISTICS, NIGERIA
COMMONWEALTH SECRETARIAT
FEDERAL OFFICE OF STATISTICS

*N 22-25
3.5 The constraints are several, but the most serious include: (a) low producer incentives; (b) marketing and transport bottlenecks; (c) inadequate machinery for planning and carrying out agricultural development on a coordinated country-wide basis; (d) shortages of qualified manpower in key areas; (e) short supply of improved seeds, fertilizers, chemicals, credit, and other farm requirements; and (f) traditional management of, and attitudes to, cattle which inhibit change in this sub-sector.

Opportunities

3.6 Market Prospects. Nigeria presently is the world's largest exporter of groundnuts and the second largest of cocoa. Until recently, it was the largest exporter of oil palm products. Rubber and cotton exports, though only a small part of world trade, are also important foreign exchange earners. In 1970, these five items accounted for 30% of Nigeria's total exports and 70% of non-oil exports.

3.7 World demand for agricultural products which Nigeria exports is projected to continue rising over the next ten to fifteen years at a rate of about 2% to 3% annually for most commodities. (Annex 2 contains demand projections for each major commodity.) Prices, however, are expected to decline due to even greater increases in world supplies. For example, the average world price for cocoa is expected to decrease from US$.34 per lb 1/ in 1970 to between US$.25 and .30 by 1975, continuing at that level, probably nearer the lower limit, through 1985. Projected prices through 1975 of cocoa, groundnuts, palm oil and palm kernels are shown in the charts on the pages following.

3.8 Because of price declines, exports will have to expand substantially over the next several years, if total earnings are not to decline. Moreover, given lower unit prices, unless productivity is increased and the margin between export prices and producer prices is narrowed, the returns to producers -- and incentives to greater output -- will continue to fall.

3.9 For most products, the largest increases in demand will be for domestic consumption. Under the impetus of population growth, urbanisation, and rising incomes, demand - particularly for sugar, animal products, fish and paper products - is expected to grow quickly. Export demand for Nigerian cocoa and rubber is also expected to increase by over 100% by 1985.

3.10 In fact, the large increase in local demand for palm oil and cotton, coupled with constraints on expanding supply (see Annex 4), can be expected to absorb most local production before 1985, leaving little

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1/ New York spot Accra.
or no surplus for export. At present price levels, Nigeria could well become a net importer of palm oil by that time. Growth of the textile industry already threatens to outrun local cotton production. The prospects for meeting demand for beef and dairy products from local sources during the next decade also are dim. Consumption has steadily increased in the northern states, resulting in less meat available for export to the south, where the rise in prices has been marked. On the basis of projected growth in population and income, demand for beef at present prices is expected to increase almost 6% yearly between 1970 and 1985. In the absence of increased imports, pressures on prices will continue to rise.

3.11 Natural Resources. Nigeria is a large and populous country, possessing a variety of natural and human resources. Occupying a land area of almost 357,000 sq mi (228 million ac), the country lies within the tropical zone, but has an ecological range varying from swamp and tropical high forest in the humid south to open savanna verging into the arid borders of the Sahara desert in the extreme north (see Map of Ecological Zones and Annex 1).

3.12 Most of the country's agricultural production is concentrated in a relatively few areas -- mainly in the tree crop belts in the south and in the groundnut and cotton belts of the north. These areas also have the highest population densities (see Maps of Population Density and Major Cash Crops). Despite densities in some places of more than 1,000 persons per sq mi, the country overall has a large amount of cultivable land per head of population. Based upon FAO estimates, the area cropped probably is little more than one-third of the land judged presently suitable for agriculture and less than one-fourth of that judged potentially suitable. Thus, land -- potentially good land -- is still abundant. An extensive belt of savanna land, relatively unpopulated and underfarmed, stretches across the middle of Nigeria between the more densely farmed areas to the north and to the south. Other areas of low population are mainly in the Niger Delta and south and east of the Cross River. Much of the 179 million ac classified by the FAO as potentially of medium to very high productivity would benefit from irrigation. Over three million acres have been identified to date as irrigable, and a number of potential dam and reservoir sites tentatively located but the economic justification for development at this time has not been assessed. Annex 1 discusses land and water resources. A list of potential irrigation and storage sites is included in Annex 6, and sites are shown on a map at the end of this volume.

3.13 The resources available to agriculture are not used intensively. Traditional shifting cultivation is practiced widely with the result that much of the land at any time is in bush fallow. The general level of technology is low -- cultivation is usually with hoes and a few other hand tools, and ox-drawn implements are used only in limited areas. There is little use of manure, chemical fertilizers and pesticides. On-farm capital invested in fences, irrigation, wells, roads or buildings is small. Most investment is in trees and livestock, but the productive quality in
both usually is poor. Despite the importance of export crops, very little medium- and long-term capital is employed. There is relatively little specialization in production. Even in many areas of specialized cash crops, production is often directed first to satisfying family food needs. The effective demand for farm labor is limited so that the available supply of family and hireable labor exceeds demand except, in some areas, at seasonally peak times.

3.14 **Available Technology.** Improved planting materials and cultural practices suitable for farmer application have been developed for several crops. If adopted, they could raise present yields significantly (See Annexes 3 and 4). Those with the best prospects of immediate application are for tree crops, groundnuts and cotton. Possible increases in yields of these crops are outlined below:

<table>
<thead>
<tr>
<th>Crops</th>
<th>Technology</th>
<th>Present Yield (lb/ac)</th>
<th>Improved Yield (in Projects) (lb/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Crops</td>
<td>Replacement of existing trees with new higher-yielding varieties; improved cultural practices, including more fertilizer use and disease and pest control; better tapping and use of stimulants (in rubber).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocoa</td>
<td></td>
<td>360</td>
<td>750-850</td>
</tr>
<tr>
<td>Rubber (smallholders)</td>
<td></td>
<td>250-350</td>
<td>1,000</td>
</tr>
<tr>
<td>Oil Palm (fresh fruit bunches)</td>
<td></td>
<td>2,240</td>
<td>6,720-10,000</td>
</tr>
<tr>
<td>Groundnut (shelled)</td>
<td>Use of higher-yielding varieties, more fertilizer, seed dressing.</td>
<td>500-700</td>
<td>1,000</td>
</tr>
<tr>
<td>Seed Cotton</td>
<td>Use of improved seed and practices, early sowing, insecticides, fertilizers.</td>
<td>200-250</td>
<td>800-1,000</td>
</tr>
</tbody>
</table>

3.15 Improvement in processing also could bring important gains in rubber and oil palm. Adoption of facilities to process technically classified crumb-rubber will be essential for strengthening Nigeria's competitive position in world markets. In the case of palm oil, introducing improved processing facilities could raise the extraction rate markedly.

3.16 There also are possibilities for increasing yields of other crops -- sorghum, maize, rice, yams and cassava -- through improved technology, although the outlook for immediate widespread application is more limited.
In some instances, varieties and improved practices have not been sufficiently developed to resist diseases or have not proved economically or technically feasible for incorporation into existing systems of farming. In other instances, production programs, which could multiply new varieties in sufficient volumes and get them out to farmers with improved practices and needed inputs, are missing.

3.17 Given work already done or currently underway in Nigerian institutions and the possibilities opened up with the new International Institute of Tropical Agriculture (IITA), the prospects for marked improvement, however, are good. By the mid-1970's, suitable high-yielding varieties of sorghum, maize and rice should be available for multiplication. Provided that facilities for multiplying the seed and distributing it to farmers are in place and an adequate system for providing farm inputs is ready, there could be a major breakthrough in cereal production in the early 1980's. The outlook for a similar break-through in yams and cassava is less promising and probably will require longer time.

3.18 Much of the problem in research, which is handled by several semi-autonomous institutions, has been the absence of overall direction and coordination. Hopefully, this situation will be improved by the recently-created Agricultural Research Council. Export crops have received the major emphasis, while food and feed crops have been comparatively neglected. Most of the research has sought technical optima for individual crops instead of focusing on the total farming system and on integrating improvements within that system.

Constraints

3.19 **Price Incentives for Producers.** A major influence in the production of all crops is prices paid to producers. In the tree crops, prices influence the extent of new planting and replanting (whose effects are not felt for several years). To a lesser extent they influence annual output as well, since relatively low prices discourage farmers from hiring or using their own labor for maintenance or harvesting or tapping, and from use of other inputs which would increase productivity because the risk involved in expenditure on them is increased relative to the returns.

3.20 Table 3.1 shows the changes in producer prices of major export crops since 1960. The price declines in all of the crops probably reduced producer incomes and certainly lowered incentives for production. In terms of real income, the downward pressures were even greater than the table shows since prices overall increased during the time. Consumer prices in cities 1/, for instance, rose 48% between 1960 and 1970.

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1/ The only price indices available are for the cities. It is unlikely that such marked price changes noted in the cities have also occurred in the rural areas, but there is no reason to expect the trend to be opposite to that of the cities.
Table 3.1: Indices of Selected Agricultural Commodity Prices, 1965-71

<table>
<thead>
<tr>
<th>Year</th>
<th>Cocoa</th>
<th>Rubber</th>
<th>Palm Oil</th>
<th>Groundnuts</th>
<th>Cotton</th>
<th>Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/1</td>
<td></td>
<td>Prices/2</td>
</tr>
<tr>
<td>1965</td>
<td>74</td>
<td>81</td>
<td>78</td>
<td>90</td>
<td>83</td>
<td>117</td>
</tr>
<tr>
<td>Producer price</td>
<td>74</td>
<td>81</td>
<td>78</td>
<td>90</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>World price</td>
<td>58</td>
<td>67</td>
<td>118</td>
<td>103</td>
<td>105</td>
<td>117</td>
</tr>
<tr>
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<td>78</td>
<td>94</td>
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<tr>
<td>World price</td>
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<td>62</td>
<td>102</td>
<td>94</td>
<td>104</td>
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<td>1968</td>
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<tr>
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<tr>
<td>World price</td>
<td>115</td>
<td>54</td>
<td>111</td>
<td>112</td>
<td>148</td>
<td>(Jan-Jun)</td>
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<tr>
<td>1971</td>
<td>n.a.</td>
<td>n.a.</td>
<td>83</td>
<td>93</td>
<td>99</td>
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<tr>
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<td>n.a.</td>
<td>83</td>
<td>93</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>World price (Jan-Oct)</td>
<td>93</td>
<td>47</td>
<td>114</td>
<td>129</td>
<td>132</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

/1 Producer prices for crop year ending in calendar year shown.
/2 Index of consumer prices for all cities.

Sources: Annex 12, Tables 7.1, 7.2, 7.5, 7.7, and IBRD.

3.21 There was, of course, a gap between producer and world prices at the base date, 1960. These were made up of marketing expenses, export and produce sales taxes, and marketing board surpluses or exporters' profits, as applicable. In 1960 they accounted for 30-40% of the sales price: a breakdown for three crops handled by boards if given in Table 3.3.
Table 3.2: RELATION OF FARMERS PRICES TO MARKETING COSTS AND DEDUCTIONS, 1960

<table>
<thead>
<tr>
<th></th>
<th>Board Producers Surpluses Marketing Costs</th>
<th>Ratio of Sales: Producer Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(EN/Ton)</td>
<td></td>
</tr>
<tr>
<td>Cocoa</td>
<td>150.6</td>
<td>51.5</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>36.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Seed Cotton</td>
<td>57.0</td>
<td>-2.0</td>
</tr>
</tbody>
</table>

3.22 The gap has generally enlarged, however, which implies increased taxation, higher marketing costs, higher board surpluses, or a combination of these. The effective rates of export duty in 1960 were 10% of FOB price, or slightly over 1/. In 1969/70 the base rates were raised 50% and remain at this level. Produce sales taxes have not changed and continue to take 2-3% of producers' gross returns. Internal marketing costs in the last three to four years are not known and could have risen sharply: but appear previously to have stayed at about the 1960 level (see Annex 8, Appendix 2). Where the gap has increased, therefore, this is apparently a reflection of marketing board surpluses, recent details of which are not available, and increased export taxes.

3.23 Also investment costs have risen sharply due mainly to higher wage rates. As a consequence, there has been little expansion of tree crops production capacity through investment in new planting and replanting. In the case of cocoa, from 1961, when the producer price of cocoa was reduced from £1N 160 per ton to £1N 112, prices were too low to encourage enough planting and replanting to expand the productive acreage. Any planting done served only to offset old cocoa which went out of production. As a consequence, an estimated 70% of the Western States' cocoa is over 30 years old, and many areas have been abandoned as yields decreased with age.

3.24 A similar situation prevails in rubber. A large part of the smallholders' rubber was planted between 1919 and 1925 and has passed its productive peak. Probably little more than 20% is in good tapping condition. The FAO judged that, by 1973-74, about one-half of the acreage on smallholdings would go out of tapping. Oil palm cultivation also is essentially smallholder, with some 90% of output coming from semi-wild oil palm groves. The production from these wild groves will decline as the palms grow taller and become more difficult to harvest. In the absence of a vigorous planting and replanting program, the decline in wild grove output will more than offset increases from improved plantings and result in a net drop of total output.

3.25 The effects of producer prices for cotton and groundnuts are more difficult to trace. An almost continuous drop in prices paid to cotton growers from 1960 to 1968, however, was the major factor in keeping acreage static, or declining, so that yearly output remained below 1960 levels until 1969. In that year, acreage and output expanded in response to a price increase of 30% in 1968-69. Although prices of groundnuts also declined after 1960, the relative decline, until 1968-9, was not as large as it was for cotton. In that year, however, the price of groundnuts dropped about 1/

Duties are levied on a sliding scale and therefore depend on prices obtained.
10%, while that of cotton rose sharply so that there was a shift from producing groundnuts to cotton.

3.26 While the foregoing analysis is not conclusive, it does indicate that (a) comparatively low producer prices have reduced farm incomes and export crop production; (b) Nigerian farmers are highly responsive to price incentives; (c) prices paid to producers of export crops frequently have been considerably and increasingly below the world market level due to taxes and marketing board margins.

3.27 Marketing problems. Closely connected with the problem of pricing is the marketing system. Export crops, excepting rubber and some minor crops, are handled by six state marketing boards 1/. These boards, are the sole purchasers of the designated crops. They set basic producer prices each year in consultation with the Nigerian Produce Marketing Company (NPMC), their export sales outlet, and the Central Bank. Food crops, livestock, fishery and forest products are marketed largely through traditional private channels, although the Livestock and Meat Authority, created in 1968 by the northern states, is involved in producing, handling, slaughtering and marketing livestock.

3.28 The operations of the marketing boards have come in for widespread criticism in recent years, mainly in regard to (a) inefficiencies and consequent high marketing costs and (b) use of the boards as a means for collecting revenues through accumulating surpluses -- the differences between prices paid farmers and those received by the boards in their sales.

3.29 Annex 8 records that over 1958-67, expenses of the Western State Board averaged 11% of cocoa sales and Northern States Board expenses averaged 32% of groundnut sales. Major items of expense are the buying allowance to licensed buying agents (which covers the buying agents' purchases from producers, their expenses, commissions, and other charges), transport costs, and general and administrative expenses. The annex concludes that (a) buying allowances are excessive and (b) determined efforts to improve efficiency might reduce expenses by as much as 20%. CSNRD studies 2/ reported serious inefficiencies in marketing board operations, due in part to inadequately trained licensed buying agents and arrangements which make it difficult to recover funds advanced to cover marketing costs.

3.30 The marketing boards, until recently, have been an important source of revenue for the state (and previous regional) governments. In the Western State, for example, capital transfers from public corporations, mainly the Western Nigeria Marketing Board, accounted for more than 40% of total capital receipts and 10% of total receipts in 1964-65. Marketing boards accumulated surpluses which were transferred to the state (or regional) governments as grants and loans, were loaned to or invested in various enterprises and development activities, or were used to purchase UK or Nigerian Government securities. Up-to-date information is not available, but the boards, other than the Western Board, reportedly have realized little surpluses in recent years.

1/ The Western, Mid-Western, East Central, South-Eastern, Rivers and Northern States marketing boards.

2/ Cocoa Marketing in Nigeria, CSNRD 21; Groundnut Marketing in Nigeria, CSNRD 19; Cotton Marketing in Nigeria; CSNRD 24.
3.31 Marketing boards, by fixing prices and allowing only licensed buyers to deal in the controlled commodities, probably have helped stabilize internal markets and offer some protection to the producer in dealing with traders. The extent of such protection, however, is debatable. The boards have little effective control over the licensed buying agents, and there are frequent reports of malpractices on their part. More serious, domestic groundnut and cotton processing industries, because of the boards primary commitment to exports, frequently have found themselves without adequate materials to meet domestic requirements. Finally, the system of separate state-based marketing boards has contributed to a fragmented approach to development, with state interests emphasized often at the expense of those of the country as a whole.

3.32 For those products, principally foodstuffs, outside the control of marketing boards, the traditional marketing system has worked reasonably well in Nigeria. Looking at gross and net margins as indicators, CSNDRD and other studies concluded that the many small traders, utilizing existing infrastructure, were reasonably efficient and achieved a considerable degree of intermarket coordination between supply and demand. Any large seasonal price variations tend to occur in small isolated markets. The proportion of output marketed, of course, is small -- probably no more than 20%. Except for cattle, cowpeas, kola and gari (processed cassava), few foodstuffs move large distances. For those which do, prices generally are highly correlated with distances between supplying and consuming areas. (See Annex 8, particularly the figure relating the retail price of beef to distances from Lagos.)

3.33 Generally, the traditional marketing system has demonstrated an ability to respond to changing conditions. The principal limits to further development at present are the extent of the market, transport links and storage. The urban population, although growing rapidly, is still only a small proportion of total population, and farmers are generally self-sufficient as far as food is concerned. Poor transport facilities restrict trade among rural areas, so that markets tend to be small and isolated. A further problem, and a source of substantial losses in produce each year, is the lack of local facilities which would allow storage at reasonable costs.

3.34 Transport Bottlenecks. Because of the distances from producing areas to consuming centers, transport is a major marketing expense. In the case of cotton, transport costs from collection point to port generally have ranged between 30% and 40% of total marketing costs, and for groundnuts between 35% and 55%. The proportion for cocoa, grown closer to ports, has been generally about 20%. Transport difficulties at present are a serious bottleneck in agriculture -- and probably an important factor in recent price rises. They also have made distribution of farm supplies uncertain. In many cotton-growing areas, especially in North-Eastern State, the poor condition of minor roads has restricted the distribution of seed for planting and in evacuating seed cotton from markets, and poor road conditions have been a major problem facing rubber development in Mid-West State (Annex 4).
3.35 An IBRD transport sector mission recently reviewed the situation in Nigeria. The mission found that the civil war severely affected transport. Although military action was confined in general to relatively small areas in the east, the repercussions on transport have been felt throughout the country. Road transport, which carries a major proportion of agricultural trade 1/, has been hard hit, not only in the east, but elsewhere as well.

3.36 Many roads are in good condition and often of a high standard. Other main arterial roads, however, have failed completely or are breaking up rapidly because of inadequate maintenance, traffic loads in excess of original design standards, or physical damage or destruction. Many state and local roads have deteriorated as a result of inadequate maintenance. There has also been a shortage of load-carrying vehicles caused by import restrictions and the diversion of units to military use, but this situation is now improving rapidly.

3.37 The country's two major ports also have been adversely affected. Serious congestion mounted in Lagos 2/, while traffic through Port Harcourt in the east, has declined sharply because of war damage and general disruption. The railways are unable to meet traffic demands, and rail services are slow, unreliable and inadequate.

3.38 The deterioration in service is well illustrated by the progressive decrease in slaughter cattle moved from northern to southern states by rail. In 1966-67, almost 176,000 head, 46% of the total, were shipped by rail. In 1969-70, the number was only 82,000 head, 24% of the total. The proportion shipped by lorry rose in the same time from 2% to 13% in spite of high direct costs and mortality rates. Movement of cattle on hoof, however, increased from 199,000 to 214,000 head, from 52% to 63% of the total, although the time consumed in such movement -- around seven to eight weeks from Maiduguri to Lagos -- caused losses in liveweight of around 20% and mortality rates of about 5%.

3.39 Planning and Coordination. Agricultural development in Nigeria is the responsibility of thirteen separate governments -- the Federal Government and the twelve state governments. Within each government, there is not only at least one ministry (usually a ministry of agriculture and natural resources) charged primarily with agriculture, but there are others

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1/ The proportion of agricultural produce carried by rail has steadily declined over the past eight to ten years, while that carried by road has climbed sharply. In 1961, for example, 100% of groundnuts and cotton and their products were shipped to Lagos and Port Harcourt by rail. By 1968, the proportion of groundnuts and cotton lint carried by rail had declined to 59% and 30% respectively. In 1969, the Nigerian Ports Authority reported that of all export produce shipped to ports, only 42% arrived by rail.

2/ This problem is now (October 1971) reported to have been fully resolved.
such as finance, planning, and trade, which also impinge on agricultural development. To these should be added several state agricultural development corporations, six marketing boards, the Nigerian Produce Marketing Company, and a number of agricultural cooperative and credit institutions, including the fledgling Nigerian Agricultural Credit Bank.

3.40 While constitutionally the states have prime responsibility for agriculture, the Federal Ministry of Agriculture and Natural Resources is responsible overall for coordinating agricultural development. The Ministry, however, has little precedent and even less authority or manpower to effectively discharge such a responsibility. Until recently, the Ministry's principal responsibility was restricted to research, for which Federal capital expenditures in SNDP is rather over N 4 million (US$13.5 million). Although the Ministry is creating planning units for each of its four operating departments (agriculture, fisheries, livestock and forestry) and a land and water resource division, obtaining suitable personnel is difficult. To a large degree, much of the Ministry's capability for planning and coordinating country-wide agricultural development is only on paper.

3.41 Moreover, the extent to which the Federal Government's writ extends, or will extend, in agriculture has yet to be determined. Since the states are largely autonomous in many areas of development, and in many cases fairly independent financially, the Federal Ministry's ability to direct and influence them is limited. However recently its Federal Ministry has started a process of establishing a small Federal Office along side each State Ministry of Agriculture in the hope of providing greater co-ordination between state and Federal Governments in general planning policies and project developments that may call for Federal financial assistance.

3.42 Besides research, SNDP identifies three areas of Federal capital assistance to agriculture: (a) N 17 million (US$47.6 million) in grants to states for such items as seed multiplication, improving extension services, fertilizers, tractors, irrigation and fishing equipment and storage; (b) N 3 million (US$8.5 million) for federal participation in special schemes, namely those which cut across state boundaries, involve pre-investment surveys and studies, or clearly serve the federation as a whole in providing food supplies or raw materials; and (c) N 6 million (US$16.8 million) for the National Agricultural Bank. The total assistance in these three areas, which comes to N 26 million (US$72.8 million), would be about 40% of combined state and federal expenditure.

3.43 In the absence of federal-level planning and coordination in agriculture, each of the states plans its own development, seldom looking beyond its borders. Since little or no consideration is given to comparative economic advantages on a country-wide basis, regional specialization is not encouraged. Ecological zones, water catchment areas, drainage basins, and natural forest stands usually do not conform to state boundaries. As a consequence, the allocation of resources represented in the state plans
(which is not necessarily the same as that reflected in the national plan) frequently does not serve the best interests of the nation as a whole. Frequently, there is unnecessary duplication, and the effectiveness of available scarce resources, particularly trained manpower, is reduced by dispersion.

3.44 The Federal Government and most states recognize the problem and are taking steps to strengthen the Federal Ministry and improve the machinery for planning and coordinating agricultural development on a country-wide basis. By late 1972, Federal Agricultural Officers had been appointed in most states to work closely with State Agricultural Officials. These steps are discussed further in Section IV.

3.45 **Manpower shortages.** Closely related is the shortage of qualified personnel, especially for planning and project preparation. Not only is there a serious shortage at the federal level, but in most states as well. With few exceptions, state staffs have had little experience in planning or project work, and there is little guidance available from the Federal Government. The result, in general, has been inadequate planning and project preparation. Many in Nigeria -- at least at the federal level -- realize that development in the agricultural sector is being restrained not so much by any shortage of finance, but more by the sector's absorptive capacity -- due in large part to a planning bottleneck and the consequent lack of well-prepared projects.

3.46 Although there are general shortages of qualified personnel in other areas of agriculture (notably irrigation), the real problem lies more in the way in which existing staff are used. The diversion of scarce agricultural staff to supplying fertilizers and other farm inputs, for instance, is questionable. Some projects also seemingly receive greater concentration of staff than their importance warrants. As an example, in the Mid-Western State, at a time when the cadre of staff was some 37% under establishment, one-fifth of the total strength was engaged in Farm Settlement projects affecting only 3,400 farmers -- at a ratio of one officer to 57 farmers.

3.47 Extension workers generally lack incentives to improve their operations. Operating budgets usually are inadequate for supporting them in the field. From 1963-64 to 1966-67, the extension services expanded 10% yearly, but funds for logistic support, dropped from the equivalent of 90% of enrolled personnel costs to 52%. Consequently, staff frequently are unable to carry out their work because of lack of official transport or of funds for paying mileage claims.

3.48 **Use of Inputs and Mechanization.** Despite marked increases over the past few years, the use of improved seed, fertilizers, pesticides and farm implements in Nigeria still is limited. In varying degree this situation is caused by inadequate supply channels, a lack of credit accessible to farmers, problems of applying modern inputs to small farms in a traditional agricultural system, a largely uneducated farmer population, and shortcomings in research and extension partly stemming from a lack of knowledge of the
intricacies of the traditional system. The state governments are starting to take more positive action and commercial interests are being drawn into the distribution network. In some states "Food Companies" are being established by State Governments to handle input supplies where the channels are otherwise inadequate.

3.49 Procurement and distribution of seed and chemicals generally is handled by each state government. Fertilizers, for instance, are imported in bulk and distributed through the extension service and local agents, by ministries of agriculture or natural resources. Even with the small amounts presently handled, however, supplies frequently do not reach farmers when they need them. Supplying farmers with some improved planting materials also is becoming a serious concern. Transport problems effecting the distribution of cotton seed have been referred to, but the availability of seed is not a problem -- improved varieties are issued annually to farmers, free of charge, through ginneries, the state agricultural ministries, and the Northern States Marketing Board. The producing states currently issue improved groundnut seed, too, but except for a limited program in Kano State (one of the largest producers) the programs are small and widely scattered.

3.50 For tree crops, the supply of suitable planting materials may be a major bottleneck. The Cocoa Research Institute of Nigeria (CRIN) breeds and produces improved planting materials. Seeds are multiplied on CRIN plots and on state MNR plots. Seed production, however, is insufficient even to meet present planting requirements and will have to be stepped-up markedly to meet future needs. A similar shortage threatens any large expansion of rubber and oil palm. The Mid-West State Rubber Research Station (RRS), which it is proposed to upgrade into a national institute, and the Nigerian Institute for Oil Palm Research (NIFOR) are primarily responsible for developing and supplying improved planting materials.

3.51 In the case of most food and feed crops, supplies of improved materials scarcely extends beyond those used for research and experimentation.

3.52 There is little application of improved hand-tools or animal and tractor power to Nigerian agriculture. There is scope for development of each of these although the impact of improved hand tools is unlikely to be great and the use of ox-powered implements is confined to particularly difficult tsetse-free areas in the north. In new areas, freed of tsetse, acceptance of ox-drawn implements is likely to be slow because the agriculturalists will not be accustomed to handling animals. The little scope that exists for mechanization in Nigeria therefore lies with tractor-powered cultivations. This is limited by a highly seasonal demand for tractor use and by the nature of African smallholder agriculture which inhibit economic use of tractors. Problems of mechanical cultivation are discussed in detail in Annex 9.

3.53 Credit needs. Annex 10 calls attention to the problem of agricultural credit in Nigeria. Demand for capital to invest in agricultural development generally has been limited due to the comparatively low returns to such investment under the existing economic environment. Recently, however, the lack of agricultural credit has been increasingly singled out as a handicap. As in most developing economies, local moneylenders, friends and families are still the chief sources.
3.54 Institutional credit has been available for the past two or three decades, but has not been successful, and currently no active programs are operating. Few agricultural cooperatives are functioning at present and reach less than 5% of the farming population. Most of them provide finance for marketing produce, but negligible credit for production purposes.

3.55 There are some very small state-run credit programs for the supply of fertilizer in some of the northern states, but these are hampered by lack of adequate funds. A tobacco manufacturer operates a small but successful credit program in Western State, supplying annual farm inputs which are paid for at the tobacco harvest. A small, and partially successful, program in the north has for some years provided animal-drawn plows to individual farmers. Commercial banks have experienced little success in financing small-scale farming, but have extended credit to larger-scale operations of plantations, and are showing interest in finding means of lending to small farmers.

3.56 Many of the problems in agricultural credit have been due to failures of organization and management -- not establishing and/or enforcing eligibility requirements of farmers, particularly their repayment ability; excessive and time-consuming procedures; and giving inadequate loan supervision. Losses from borrowers not repaying loans have been large. In these failures, the lack of adequate numbers of qualified personnel has been a major factor. Outside pressures and political considerations have been another. As a consequence, farmers' access to credit has shrunk in recent years, while institutions in many instances experience difficulty in finding suitably "credit-worthy" borrowers.

3.57 Population pressure. With the growth of population, pressures on land in much of the south and in Kano State in the north are forcing a reduction in the fallow period. The original cropping cycle of 10-15 years in large segments of the tree crop belt already has been reduced to five years. In densely-populated areas, the average fallow period is down to two years, or is eliminated altogether. More extensive cultivation in parts of the north also has reduced grazing areas, which increasingly are overgrazed and deteriorating. Land is available, particularly in the middle belt, but is not developed because of labor immobility, partly caused by tribal history and by tsetse infestation of the less settled areas.

3.58 Climate and diseases. Although there is scope for expanding the area for farming and livestock, and for using much of the land in the north more intensively, climate and widespread tsetse fly infestation are serious constraints. About 30% of the entire country receives less than 40-in of rain yearly, and much of the far north receives less than 4-in in each of as many as 7 to 9 months of the year. Double cropping is infrequent, even in the heavier rainfall areas of the south. Yields frequently are low as a result of variations in the amount and timing of the rainfall. Much of the remainder of the country -- an estimated 80% at the end of the rains each year -- is subject to the tsetse fly. Thus permanent grazing and regular use of livestock is limited to the relatively unproductive dry lands of the north (see Annex 7).
3.59 In the case of livestock, these factors not only limit grazing areas, but also reduce animal productivity and inhibit improvements which are possible elsewhere. Within tsetse-free or tsetse-cleared areas, inadequate quantity and quality of pastures in the dry season limits the productivity of range land. Pastures can be improved by clearing bush and introducing grasses and legumes. However, such practice is limited because it is not economic to clear natural shrub and tree cover by existing techniques. Exotic breeds, which might provide genetic improvements for Nigerian herds, do not readily adapt to local climatic and edaphic conditions or develop resistance to local diseases.

3.60 Traditional cattle management. Development of cattle production is also constrained by traditional management practices and attitudes to cattle -- regarded as a store of wealth and as conferring prestige rather than as a means of production -- among the nomadic herdsmen responsible for most of Nigeria's beef production. These practices are a rational response to a harsh environment, given the knowledge and conditions of the period in which they have developed, but today they are leading to deterioration of the land resource and are designed for survival rather than productivity. New pressures on resources and new demands for beef make these practices and attitudes inappropriate. They are, however, deep-rooted and difficult to change at the pace necessary to match demand. The approach to livestock development must therefore not only seek to accelerate change among traditional producers (including research into how this can best be promoted) but must also explore ways of introducing modern, commercial, production techniques, probably utilizing a new group of settled stock farmers.

3.61 Land Tenure. As at now the communal form of land tenure (see Annex 1) prevalent in Nigeria is not a serious constraint to agricultural development. However, as land becomes scarce, the system may fail to give adequate incentives to individuals to put their effort and money into land to conserve or improve it, to introduce permanent cash crops and better farming methods. The system also makes it difficult for a farmer to obtain loans using his land for security. A different problem arises from the absence of rights by the nomadic cattle herders of the north in the land on which they graze their cattle. Not only does this result in an exploitive use of the land resource; it also means that grazing lands and access routes are being lost to settled agriculture, leading to friction between herders and farmers. Although crop production will probably increasingly become the most economic use of the land, more fairly balanced rights in land would ease the transition and encourage change among the Fulani and other herdsmen.

3.62 Many of the difficulties associated with the land tenure system probably will recede as development proceeds and land becomes increasingly valuable in monetary terms. In many parts of the country, the system apparently is already in transition, moving from communal to recognized individual tenure. There are no large landlords nor masses of landless peasants in Nigeria, and a major program of land reform is not needed. What are required, however are (a) changes in local legislation where these run counter to a spontaneous move towards individual tenure, so that laws guide the transition rather than oppose it, (b) policies that will
promote improvement of traditional grazing areas, (c) studies of optimal use for land throughout the country, and (d) policies to encourage that use.

Conclusion

3.63 The scope for developing agriculture in Nigeria is large. There are growing foreign and domestic markets for most of Nigeria's agricultural products. The country has resources whose productive capacities are not fully utilized -- resources which could, with better use, expand output and provide greater employment and incomes for a large segment of its people.

3.64 Approaching agricultural development on a country-wide and natural-region -- rather than a state--basis would help insure that the country realizes the maximum benefits from these resources. With the development of markets in the various parts of the country and improvement of the links among them, production for the market could be increased and subsistence farming reduced. Encouraging farmers to specialize more in growing those crops best suited to their particular areas, for local and foreign markets, could greatly stimulate output, consumption, and trade.

3.65 Not the least among the country's assets are its more than five million farmer families. Although they work only small holdings and have limited cash resources, they have shown themselves highly responsive in their farming to economic opportunities offered them. Given the projected income from oil, which can allow the country to reduce its fiscal dependence upon agriculture, it should be within Nigeria's grasp to transform agriculture and lay a sound foundation for future progress in the entire economy. The following paragraphs attempt to indicate an approach to this.
IV. A PROGRAM FOR DEVELOPMENT

The Strategy

4.1 Given the opportunities and constraints outlined in the previous section, there are several lines of approach to stepping up the pace of Nigeria's agricultural development. The long term aim should be to transform Nigerian agriculture from its present low-technology, semi-subsistence character to a more modern, market-oriented one, based upon greater regional specialization.

4.2 Broadly, this necessitates (a) providing incentives that will encourage farmers to increase productivity and expand output, and (b) ensuring that the means to enable them to respond—the technology, inputs, credit, investments, and infrastructure—are readily accessible. Within this overall framework, priority should be given to policies and programs which will give comparatively quick returns. Thus, steps to restore transport links disrupted by the civil war, and to supply the eastern states with materials and financial resources for reestablishing agricultural output, are important. These measures would also materially help the present food situation.

4.3 Next, since markets are well established and the technology for increasing yields of many crops is readily available, efforts should focus on expanding export crop production and providing farmers with price incentives, farm supplies and credit. At the same time, an intensive program for developing technology and production plans for food and feed crops more suitable for widespread farmer adoption should be initiated. Any extensive land and water development, including possible large-scale tsetse eradication and promotion of mixed farming in the middle belt, should be preceded by adequate investigations and planning to insure technical, economic and social feasibility.

4.4 The strategy should aim at more intensive use of resources and creation of new productive capacity, particularly by the farmer himself. Public investments and agricultural credit, if used judiciously, could be effective instruments in this process—not as substitutes for, but rather as complements to capital creation and investment by the farmer.

4.5 Finally, underlying the whole strategy are two key elements: (1) creation of an effective machinery for planning and carrying out agricultural development on a coordinated country-wide basis, and (2) obtaining qualified manpower for particular critical areas.

An Action Program

4.6 In summary, an action program based upon this overall strategy would consist of the following:
(a) establishing machinery for sector and project planning and carrying out agricultural development on a coordinated country-wide basis, with full account taken of regional economic and natural advantages;

(b) adopting price policies and improvements in marketing arrangements and infrastructure to encourage greater productivity and geographical specialization; and

(c) improving the supply of farm inputs, agricultural services and credit, using private agencies where appropriate.

4.7 The emphasis in the program for subsectors would vary:

(a) output of tree crops, groundnuts and cotton could be expanded mainly through the application of available technology, and the development and application of such technology to other crops would be stepped up;

(b) in livestock, production could be increased by (i) accelerating the present tsetse eradication program in the north and bringing cleared areas under controlled grazing and range management, (ii) organizing commercial beef fattening operations based on supplemental feedstuffs, and (iii) supplying low cost feed concentrates to the local pig and poultry industry; (iv) devising ways of increasing the integration of nomadic herders into the market economy;

(c) expansion of forestry output would be by (i) using existing forests more intensively, (ii) establishing plantations of quick-growing trees, and (iii) setting up integrated industries using existing hardwood forests, and pulp and paper mill complexes based on quick-growing plantations; and

(d) for the longer term, emphasis should be on preparing investigations and plans for possible development of (i) new land opened to livestock and/or cultivation through tsetse eradication, and (ii) irrigation.

4.8 Because of Nigeria's size and diversity, no one institutional or organizational channel for reaching farmers will suffice for the entire country. In the past, the northern states have emphasized extension, while the southern states have emphasized government-directed investments, notably farm settlements and plantations operated by public corporations, or as joint ventures with the private sector. All areas have emphasized cooperatives in varying degrees. There is increasing interest in nucleus plantations, which combine commercial with small-holder farming, and in group farming. Any successful development strategy in the future will need to be an amalgam of several channels; which, as experience accumulates and conditions change, would vary in composition.
4.9 What does remain constant, however, is the fact that small farmers dominate Nigerian agriculture and are likely to continue doing so for years to come. Any real development ultimately will depend upon reaching these farmers and improving their production methods and living conditions.

4.10 With this objective, and given the various constraints of organization and manpower, attention in the immediate future could profitably focus on (a) nucleus plantations for crops such as rubber, oil palm, and sugar; (b) integrated projects providing for extension, inputs, credit, and infrastructure— for cocoa, groundnuts, cotton, food and feed crops and cattle breeding and fattening ranches; and (c) in all programs, small farmer organizations, such as cooperatives or farmers associations, to facilitate marketing and the farmer’s access to inputs and services.

Planning and Coordination

4.11 Agricultural development in Nigeria cannot proceed far on a state-by-state basis without regard for the country as one, or for the inter-relationship between different regions of the country, or the need in specific cases to look at river basins as entities. Thus, the Federal Government, generally, and the Ministry of Agriculture and Natural Resources, specifically, must provide both direction and coordination. This, in turn, will require: (a) strengthening both the authority and administrative capacity of the Federal Ministry of Agriculture and Natural Resources; (b) increasing the capacities of state governments for planning and executing development programs; (c) improving the links between the federal ministry and state ministries dealing with agriculture and among the federal agencies impinging on agricultural development, mainly the Ministries of Agriculture and Natural Resources, Economic Development, Finance, Trade and Industries, the Niger Dams Authority and the Central Bank; and (d) developing sufficient numbers of qualified personnel to staff agricultural organizations and programs.

4.12 Fortunately, there is growing recognition, both in the federal and state governments, of the problem and the need to take steps to solve it. The recent National Agricultural Development Seminar noted the need to strengthen the authority and capacity of the Federal Ministry and improve coordination generally and recommended specific actions toward this end, including national legislation regulating interstate allocation and conservation of water resources, and similar legislation in forestry. 1/ The seminar also recommended that the Federal Ministry have constitutional authority to participate more directly, as a partner of state governments, in extension and other development activities. The National Agricultural

1/ A recent decree gives the Federal Government responsibility for enacting regulations managing sea fisheries; and similar regulations for exploiting fishing waters common to more than one state are proposed.
Bank and the Agricultural Research Council, plus the suggested national seed multiplication scheme and agricultural supply organization (see section on Inputs, Services and Credit, below), will offer further opportunities for better guiding and coordinating development on a nation-wide basis. The recently established National Council for Agriculture and National Resources, on which all State Commissioners of Agriculture sit, is a further step towards increased coordination in agricultural policy. Separate committees for agriculture, fisheries, forestry and livestock have been established, reporting to the National Council. The appointment of Federal agricultural officers in the States (referred to in para. 3.44) is to be followed by appointment of Federal agricultural planners in each State to improve further the Federal/State links.

4.13 Besides the need for better coordination, there also is general agreement that the organization and staffing of the Federal MANR and the state ministries must be greatly improved—if they are to step up the flow of investment in the agricultural sector. To expand the capacity of the Federal Ministry, a Land and Water Resources Division is being established and planning units added to each of the four operating departments. These measures ultimately should strengthen the Ministry and enable it to play a more effective role in planning and coordinating Nigeria's agricultural development. Steps also should be taken to strengthen the state ministries.

4.14 In view of the shortage of qualified personnel, building up these organizations will take time. Thus, a program for recruiting and training suitable personnel for staffing both federal and state ministries should have high priority. As an interim measure, the government should consider employing outside assistance in the form of individual experts for specific jobs. Unless the assistance is sufficiently large, probably at least five people at the federal level and two to three in each state, the impact will be too small to be effective.

4.15 Such assistance, which might be financed by the UNDP, should provide experts in planning, project preparation and implementation who would work in the Federal Ministry and in each of the state ministries. To obtain maximum performance, these experts should work as a single team, under the direction of a project leader responsible to the Federal Ministry, with adequate back-stopping from a parent organization. At this stage the experts should actively assist in sector and project planning and evaluation, and not be merely advisory. It is equally important, however, that training, both local and overseas, of suitable counterparts be an integral part of the program.

4.16 The wider problem of manpower generally must also receive greater attention. At this juncture, Nigeria should stress short-term measures to improve the effectiveness of available staff. The Committee on Manpower and Training of the Agricultural Research Council has examined existing conditions of service and has set up a body to coordinate manpower requirements in all sectors of agriculture. Definite action has also been taken on movement of key staff from surplus to deficit states.
4.17 Although there are shortages, particularly at the intermediate and technical levels, which may call for some expansion, training facilities basically are sufficient to meet planned increases in staff. In the not too distant future, a more adequate supply of manpower will be forthcoming from the educational system. States can, therefore, rely on ad hoc, temporary training measures. In-service training centers will always have a role to play, but they need not be established as formal institutes requiring large capital outlays. As a final suggestion, federal and state governments should examine possibilities for (a) pooling available federal and state technical personnel or establishing federal services for such personnel particularly in irrigation and forestry, and (b) setting-up joint federal-state development agencies such as has been proposed for rubber. Annex 9 gives further details on organization, planning and manpower needs.

Pricing, Marketing and Infrastructure

4.18 Pricing Policies. A major aim of Nigerian agricultural price policy should be to provide the incentives necessary for fully utilizing available agricultural resources. It is clear that price policies for most crops handled by marketing boards have in effect operated in the opposite direction.

4.19 Given declining world prices for many of Nigeria's agricultural exports and rising production costs, it will not be possible to maintain farm incomes nor encourage sufficient planting and replanting to expand output unless there is (a) substantial reduction or elimination of present export duties on agricultural produce (cocoa, oil palm produce and groundnuts), and state produce sales taxes, and (b) improvement in and reorientation of marketing board operations. For products consumed locally, expansion will depend upon increasing internal effective demand - which in turn will be a function of income generation. An increase in export earnings reaching farm producers will be an important factor in this expansion.

4.20 It is impossible to judge exactly what price levels for the various commodities would be necessary to provide adequate producer incomes and incentives and how far tax levels need to be changed, because declining prices can often be offset by increased productivity. Thus a 25% decline in price projected in the evaluation of the Bank's Western State cocoa project is assumed to be compensated for by higher yields, which would enable farmers to repay their loans and retain a satisfactory income, but still allow the marketing board a trading surplus and government to collect both export tax and produce sales tax. In the case of oil palm and rubber, however, the continued imposition of produce sales tax and export duty at current levels probably would allow little repayment capacity or financial incentive for investment and provide relatively low producer incomes (see Annex 4).
4.21 Revenue raising via these sources should be modified or discontinued. It has borne too heavily upon tree crops, whose delayed supply responses gives little guidance as to what levels of taxation are tolerable. With increasing commercialization of agriculture, it should be possible to develop alternative tax sources within the sector, but the anticipated increase in revenues from petroleum dictate that a review of the tax burden on agriculture, from the viewpoint of what is desirable and equitable in the country's development, is needed.

4.22 Marketing Arrangements. The need to change the present marketing system is widely recognized in Nigeria. An International Conference on the Marketing Board System was held at Ibadan University in April 1971. A committee, appointed by the National Council of Agriculture and National Resources, has examined the marketing of foodstuffs, and has made recommendations to the Federal Ministry of Agriculture. The National Agricultural Development Seminar has also recommended changes in both the marketing board and traditional systems.

4.23 In light of its shortcomings, the system should be revamped drastically. The long-term objective should be for the private sector gradually to expand its operations in marketing agricultural products. A modified marketing board system would continue in the interim. Ultimately it should restrict its operations to supervising the market to prevent abuses and supporting the market by standing ready to purchase produce from farmers or agents at guaranteed floor prices.

4.24 In the meanwhile, consideration should be given to modifying the present system to (a) rid the marketing boards of unnecessary functions, (b) increase efficiency and (c) achieve better coordination among the federal ministries (agriculture, trade and industry, finance, economic development), the Central Bank, the Nigerian Produce Marketing Company and the state governments and marketing boards. Fuller use could be made of the private sector to provide services as board agents, in such fields as transport and storage. There is some evidence that board expenses could be cut by 10 to 20% by improving transport arrangements, modifying the buying allowance and uniform pricing systems, and reviewing Board's staffing levels. Selling policy has not always achieved maximum values and increased use of specialist international selling organizations might help to achieve better results. There may also be scope for sales promotion efforts under boards' auspices. It is important that timely and regular publication of boards' accounts is re-established both to enable public scrutiny of operations and as a form of discipline on board management. The accounts should contain sufficient data for appraisal of both financial and technical efficiency in operations.

4.25 The objective of improved coordination should be to ensure that Marketing Boards' operations are to the benefit of producers and of the country as a whole. In particular, the Federal Government must be able to better exercise its responsibility for external trade and fiscal and monetary policies. Better coordination between the NPMC and state boards on crop forecasting could help the sales effort, and closer discussions on the setting of prices appear to be called for.
4.26 The proposal of the Federal Ministry of Agriculture and Natural Resources to establish a minimum guaranteed price program should be given serious consideration. A move in this direction would not be justified, however, until private participation has increased. All staple non-perishable products and not just those which are exported should be eligible for support under such a program. With care in fixing the minimum price, no long-run subsidy should be needed. A reconstituted marketing board system might administer the program, with boards making outright purchases, or loans on stocks held on approved storage, to make the minimum price effective. The proposals, referred to in para. 1.10 for an accelerated cereal production scheme include measures aimed as improving pricing and marketing arrangements. This is expanded upon in Annex 8.

4.27 A further matter requiring attention is that domestic users of groundnuts, cotton and palm kernel should be given priority in the purchase of board controlled products or should be allowed to procure supplies directly from growers or private traders.

4.28 Facilities appropriately designed for the efficient movement and handling of produce, and the servicing of clientele, would significantly reduce marketing costs and lessen traffic congestion in Nigeria's cities, and it would be advantageous for the municipal authorities in Lagos, Ibadan, and the rapidly growing towns in the petroleum-producing area to plan now for the establishment of smoothly functioning wholesale market facilities. Surveys will also be needed to determine the optimum size of area to be served by a city retail market center, or centers, and engineering studies to determine optimum layout and construction designs. The Federal Government could assist the larger cities in these efforts.

4.29 Storage. With increasing volumes of produce entering domestic trade, the infrastructure supporting the marketing system will need to be strengthened. Storage requirements will expand sharply, particularly for cereals and grains. Seasonal peak storage of grain (other than quantities held by producers for their own use) now approximates 1.5 million tons. By 1985 it may reach 3.3 million tons, so that about 2 million tons of additional storage capacity may be needed over the next 15 years.

4.30 While all storage at present is in small amounts at scattered locations, there may be a role for larger central warehouses or silos -- provided such storage can be provided cheaply enough, without offsetting disadvantages. It also should be possible to lower present storage costs -- about 2-1/2% to 3% per month of the value of the produce stored -- through adaption of known improved techniques. The Nigerian Stored Products Institute can be a useful source of innovations.

4.31 For groundnuts and cotton, local and central storage will require expansion, too. Particular attention may have to be given to constructing special warehouses at ports for groundnuts to prevent aflatoxin and facilitate pest and disease control. The existing capacity of Northern States Marketing Board stores is only 260,000 bales of lint cotton; so additional storage will be needed for lint and seed awaiting evacuation. At the local levels, stores for seed and fertilizers will be required for seed cotton, groundnuts and
food and feed crops. The private sector can supply much of the additional storage needed, although credit may have to be made available. In addition, particular projects may need to include storage facilities as an integral part of the project.

4.32 Transport. Section III briefly pointed out some of the transport problems affecting agriculture in Nigeria. Over the longer-term, expanding agricultural production -- of which large amounts will be for the market -- will place new demands on the transport system.

4.33 At some point in time, greater attention will have to be paid to feeder roads. Since there is little animal transport, a farm family's agricultural output, where there are no roads, is limited largely to the amount of goods which can be moved by human power. Where there are feeder roads, their poor condition in many areas restrict the ability of farmers to meet growing demands for food and export crops and to reduce the cost of marketing. Given the substantial increases in output anticipated for most crops, feeder roads will become more important both to move farm supplies in and to move produce out. Production programs for each crop should include provision for feeder road surveys and construction. Initiative for local action on the upgrading of feeder roads and the development of new ones could be encouraged by matching grants from Federal and State Governments.

4.34 The long distance and easy topography in Nigeria would suggest a continued important role for the railways in agricultural commodity traffic. The major problems with the railways appear to be a matter of poor management and low staff productivity, not shortages of rolling stock relative to the demands of the agricultural sector.

Inputs, Services and Credit

4.35 Improving supplies of inputs. Estimated requirements of planting materials, fertilizers and pesticides are not available for all crops. From those which are available, however, it is clear that the volumes used need to be increased enormously. For groundnuts, cotton, and rice alone, fertilizer use would be over 200,000 tons of single superphosphate and nearly 120,000 of sulphate of ammonia if current acreage was treated as recommended. Government planned expansion programs for groundnuts and cotton involve requirements which could rise to 47,000 tons of equivalent of ammonium sulphate and single superphosphate in 1975 to 129,000 tons in 1980, and almost 200,000 tons in 1985. 1/ If tree crops and other crops were added in, total requirements in these plans could very well triple. The figures should be viewed against the relatively small volumes of fertilizers (all imported) handled in Nigeria so far. Peak imports, in 1967, of all fertilizers totalled only 65,000 tons.

1/ In terms of nutrients, about 10,000 tons in 1975, 27,000 tons in 1980, and 42,000 tons in 1985.
Equally important is supplying farmers with improved planting materials. On the basis of present government plans, more than 45 million cocoa and 10 million oil palm seedlings would have to be available each year for planting during 1975-80. The need for improved groundnut seed would climb from about 1,000 tons in 1971 to 44,300 tons in 1980 and 55,800 tons in 1985. With the possible exception of groundnuts in Kano State and cotton, the supply of improved planting materials threatens to be a serious bottleneck.

Insecticides and other farm chemicals are important for several crops, particularly cocoa, oil palm, rubber, and cotton. For cotton alone, the NADC forecasts requirements of 167 tons in 1975, rising to 1,500 tons by 1985. The Institute of Agricultural Research is studying the use of herbicides to ease the labor bottleneck in cotton cultivation. While no recommendations have yet been made, a presowing application of granular herbicide may give sufficiently high returns -- reducing labor required for preparing land at the peak time of labor demand, thus permitting earlier sowing--to warrant extensive use. Further study is required both of its technical and economic feasibility and of possible harmful effects on the environment.

Present systems of procuring and distributing fertilizers, planting materials, and pesticides will have to be changed in order to cope with projected future requirements. In the immediate future, effort should be concentrated on expanding the supply and distribution of improved planting materials of cocoa, rubber, and oil palm. Larger facilities and additional personnel will be needed for local production; possibilities for importing planting materials also should be explored.

Nigeria should consider ultimately placing responsibility for procuring and distributing fertilizers and chemicals in the hands of the private sector, including cooperatives. The limited size of the market at present and the absence of any local manufacture probably would limit suitable private sector participation for the time being. (The longer-term market potential and proposals for constructing both nitrogenous and phosphatic fertilizer factories, though, suggest that possible private sector participation should be explored at an early time.)

In the meanwhile, the government should, on a priority basis, take steps to (a) implement the national seed multiplication scheme, and (b) create a national agricultural supply organization which would be responsible for procuring and distributing fertilizers, seed and seedlings, and farm chemicals wherever required. The Second National Development Plan includes a National Seed Multiplication Scheme, which would initially handle the scheme and should cover not only food and feed crops, but groundnuts and cotton, as well as sorghum, maize, rice, pulses and cassava. The operation of any scheme obviously will have to be tied closely with the availability of improved varieties and practices suitable for farmer application and should concentrate its efforts initially upon those crops for which these are readily available.
4.41 The seed multiplication scheme probably would need a central
headquarters and production and processing facilities in at least three
locations: one each in the groundnut, cotton, and food crop belts. The
proposed agricultural supply corporation would procure seed from the scheme
and distribute it to farmers. Each facility might be responsible for
producing seed on the following basis:

<table>
<thead>
<tr>
<th>Groundnut Belt</th>
<th>Cotton Belt</th>
<th>Food Crop Belt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundnuts</td>
<td>Sorghum</td>
<td>Maize</td>
</tr>
<tr>
<td>Grain legumes</td>
<td>Maize</td>
<td>Rice</td>
</tr>
<tr>
<td>Sorghum</td>
<td>Grain legumes</td>
<td>Grain legumes</td>
</tr>
<tr>
<td>Millet</td>
<td></td>
<td>Cassava</td>
</tr>
</tbody>
</table>

4.42 Direction of the scheme and coordination with other programs could
be accomplished jointly by federal and state officials. Some of the managing
staff probably would need to be expatriates initially.

4.43 The proposal for an agricultural supply organisation is a new one.
Such an organisation, possibly a parastatal corporation, would be responsible
for the procurement and distribution of agricultural fertilizers, other
agricultural chemicals, and seeds until the time when the private sector can
undertake this task. Fertilizers would be imported or obtained from proposed
local manufacturing plants. Other agricultural chemicals would probably be
imported. Seed would be procured from the proposed national seeds program.
Distribution would be arranged by the organisation's head office and area
headquarters to State depots and then through existing trading channels,
including private traders and particularly Cooperative Unions. The use of
trained extension staff as distributors would be avoided. The State Food
Companies now being established (see para 3.48) may be the interim solution
to the distribution problem and private enterprise the long-term solution.

4.44 Mechanisation. Successful tractor mechanization requires a
flexible organization and requires many changes to agricultural management
if high unit costs are to be avoided. Rather than expand government-run
tractor hire units the encouragement of private tractors, which is an
approach widely advocated in Nigeria, is supported. Governments' role
should be to ensure that fiscal and legal impediments do not discourage
this development, and to make available adequate training courses for drivers
and mechanics, and to support services which encourage intensification of
farming. Mechanization should not be subsidized so as to encourage the
uneconomic substitution of scarce capital for labor; the aim should be to
remove impediments to a spontaneous move towards mechanization, particularly
by facilitating maximum operational hours (and therefore cheaper unit
costs) in a limited season. (See Annex 9.) The proposal that a National
Agricultural Engineering Institute be responsible for adaptive research
is supported, but moves to legislate an after-sales service by dealers
and to protect local manufacture of agricultural machinery would be counter-
productive.
Agricultural Services. A change in the institutional framework for research has been proposed with the creation of the Agricultural Research Council (ARC), which is to formulate agricultural research policy and allocate Government funds for its implementation. The ARC has a unique opportunity to shape programs for obtaining closer coordination of research activities by the different organizations concerned than is the case at present. This is needed most urgently in respect of food crops such as maize, rice, root crops, and grain legumes. Research on these crops is handled by Federal, State, and University organizations and an external agency, the International Institute of Tropical Agriculture (IITA), with some duplication of effort. The ARC should also ensure that research programs for groundnuts, cotton, sorghum and millet, for which IAR is responsible, continue to be directed towards the needs of the regional belts.

In addition to obtaining the coordination of research programs among institutions, the ARC should ensure that the direction of these programs is oriented to meet the agroeconomic requirements of the farming populations in each of the production belts. Results of many research programs have been, and in many cases still are, of little practical value to farmers because they have been geared mainly to the technical considerations of production. The basic economic limitations, such as shortage of labor at key periods in the cropping year, are a key factor in the production systems. A limited number of studies to establish and quantify economic constraints in annual cropping systems has been carried out, but agroeconomic data of this kind are inadequate to provide complete guidance for reorientation of technical research programs. Additional studies -- of the type carried out by the Rural Economic Research Unit (RERU) at IAR -- rate a high priority in the programs of all agricultural research centers.

Geographical coverage by research institutions is adequate in all areas except the eastern part of the Southern Guinéa and Derived Savanna zones (which comprise the so-called middle belt). An additional research center should be located in the southern part of Benue Plateau State, at a site to be decided following completion of land capability surveys currently underway. The center should concentrate on food crop and grain legume production problems and should also investigate the technical and economic aspects of animal production in the middle belt.

Extension is the responsibility of the state ministries of natural resources (MNR) and is carried out on a state basis, utilizing such research information as can be provided from the different agencies involved. MNR have a number of other functions which tend to impinge on extension activities and, though MNR extension responsibilities should continue, they should be more clearly defined, better organized and afforded a higher priority than is generally the case at present. The solution to the problem of communications between the farmer and the research worker lies in strengthening existing institutions. A national extension research liaison section should be created in the Federal Ministry of Agriculture and Natural Resources, with units located at major research centers to work in close collaboration with research and extension workers. Staff should specialize in the crops and cropping systems of each belt of specialized production. The greatest need is in the middle and Tree Crop Belts, but staff are short in all
areas. While some redeployment is possible from MNR and research agencies, Government is presently recruiting expatriates on contract for periods of up to four years to meet staffing needs and provide on-the-job training for inexperienced Nigerians.

4.49 Development of extension services, under the MNR, should concentrate on the package demonstration approach, whereby a range of recommended practices are applied to the crop and their effects compared with an equal area grown in the traditional manner. Techniques and organization of extension developed in the northern states should be adopted with appropriate modifications to meet local needs in the south of the country. Removal of responsibility for input procurement should result in the release of staff for extension work, which should be the prime function of MNR.

4.50 Credit. The lack of credit in Nigeria will become increasingly serious as farmers apply improved technologies more widely. Although with their labor farmers can create much of the capital they require, they will need to purchase planting materials, fertilizers, pesticides, and labor, and need funds to carry themselves over the initial non-productive period in tree crop planting. Increasing output of agricultural produce for the market also will require more financing of both marketing and of processing facilities.

4.51 In the absence of data, it is not possible to estimate the agricultural credit which could usefully be absorbed at the present time in Nigeria. Some rough indications, however, are illustrative. For presently-planned planting and replanting programs in cocoa, rubber and oil palm, medium-term requirements could run as high as \( EN 4.0 \text{ million} \) annually in 1970-80 and \( EN 10.7 \text{ million} \) annually in 1980-85, assuming that farmers' needs are covered wholly by credit and there are no direct subsidies to growers. Yearly production credit required (for materials) for cotton and groundnuts could reach \( EN 1.9 \text{ million} \) in 1975, \( EN 5.5 \text{ million} \) in 1980, and \( EN 8.8 \text{ million} \) in 1985.

4.52 While these figures are no more than illustrative, they do argue for prompt attention to expanding institutional agricultural credit. At present, no federal institutions are directly concerned with financing agriculture. Organization of the National Agricultural Credit Bank, presently underway, should be completed as quickly as possible. Recruitment of management experts under a UNDP grant (for which the Bank is executing agency) is proceeding, and the Federal Government reportedly has released \( EN 3 \text{ million} \) of the \( EN 6 \text{ million} \) earmarked for the bank during 1970-74.

4.53 Besides working out its own organization, capital structure, and overall credit policies, a major task of the new bank will be developing suitable lending channels to farmers. These channels will include (a) lending directly to larger farmers, groups of farmers, estates and companies; and (b) lending to state governments and institutions for on-lending to individual farmers, cooperative societies and groups of farmers.
4.54 Interest rates should be high enough to meet the full costs of management (including debt service) and to allow adequate sums be set aside for general and bad debts reserves. It is not possible in advance to suggest what the interest rates should be, but one CSN RD study suggested rates of 12% for short and 8% for medium and long-term loans. The rates will depend upon management costs, which, in turn, will depend to a large extent upon the average size of loans and the extent of supervision; upon costs of bank borrowings; and upon bank's dividend policies. Farmers presently pay high-interest rates, and rates which will cover operating expenses should be readily accepted.

4.55 The newly-created bank will need to advise state governments and credit institutions on their credit policies, help them prepare projects, and assist the latter to develop their capacities to administer credit programs effectively. Finally, the bank should undertake itself, or commission, a survey or series of surveys to assess the country's credit needs and the best ways of meeting these needs. Annex 10 contains details of the proposed National Agricultural Credit Bank.

Subsector Programs

4.56 Tree and Annual Crops. Some estimates of the increases in yields for tree crops, groundnuts and cotton which might be possible with the application of presently available technology are given in Section III. Success in applying this technology will depend largely upon overcoming likely bottlenecks in the supply and distribution of improved planting materials and in insuring that needed technical advice, inputs and credit are available in the amounts and at the time farmers require them. Preceding paragraphs have outlined possible programs for each of these elements.

4.57 Compared to export crops, improved technology in most food and feed crops is not as readily available for widespread farmer application, nor have adequate programs for encouraging and supporting increased output been drawn up. With rising incomes and urbanization, demand is expected to increase most rapidly for "higher quality" foods, particularly wheat, rice, fruits, vegetables, sugar, oils and animal products. On the other hand, per capita consumption of items such as cassava and yams will decline, although they still will be major items of diet. Demand for sorghum and millet, the most widely consumed grains, is projected to rise slightly faster than population. If current high costs of growing grains could be reduced substantially, demand for use as both human and animal feed would increase.

4.58 The recent increases in prices of most foodstuffs should encourage production, from both yield increases, through wide fertilizer use, and from expanded cropping. Given the prevailing low level of technology, significant progress on yields is not likely until (1) research is stepped up to develop improved varieties and cultural practices which can be widely adopted by farmers; (2) production of improved seed is sufficient; and (3) programs are drawn up for disseminating the improved technology and supplying farmers with necessary supplies of inputs, agricultural services,
and credit. However, production increases from expansion of area are likely to be increasingly high cost as marginal areas are taken up, and intensification will be the ultimate solution. Under the Government's plan for an accelerated cereal production a general plan of action has been formulated to rectify some of the above deficiencies.

4.59 Livestock. Intensification will also be necessary in cattle and small-stock production. Any program for increasing beef production should aim to maintain and increase offtake from the traditional, extensive sector (while at the same time encouraging changes in management techniques and attitudes to cattle within it), and also developing new, intensive, production units. As a first step towards increasing overall productivity, it is essential that the economic feasibility of improved methods of production should be demonstrated. This could be done by establishment of commercial ranches for breeding and fattening of cattle, initially on a pilot basis. The major problems to be overcome in this regard are political and administrative rather than technical and economic. Decisions will have to be taken as to the organization to operate the pilot ranches and the method whereby land will be acquired. Acquisition of foundation livestock will be a problem also but this is probably not insurmountable.

4.60 The program of eradication of tsetse fly has already made available about 29,000 sq mi of tsetse free land in northern Nigeria. The program provides for treatment to clear an additional 56,000 sq mi over the next 15 years, most of which would be available for grazing by livestock. This will not be the net addition of grazing land, however. Some of this land is already used for grazing during the dry season, and also, the addition of new tsetse free land will be counterbalanced over the next 15 years to some degree by conversion of some existing grazing lands to cultivation. Nevertheless, the program will result in a substantial increase in grazing resources in the north.

4.61 While the availability of additional land will allow an increase in overall livestock population, it will be some years before this is translated into an increase in offtake of cattle for slaughter. Under the present system of livestock management, the rate at which the livestock herd can be increased is relatively slow (about 2% per year) because of low fertility and high mortality rates, especially in calves.

4.62 In the short term, the measure which could have the greatest impact in increasing beef output is the fattening of a proportion of the cattle now marketed in poor condition from the traditional herds. This is done to some extent now by an arrangement between livestock traders and individuals who fatten cattle on crop residues or by-products such as cottonseed meal and bran. It could also be done on improved pastures or fodder crops. Fattening of cattle from northern Nigeria on improved pastures in southern Nigeria is an attractive possibility but there are problems in the susceptibility of northern cattle to trypanosomiasis and streptotrichosis. Cattle can be protected against the former condition over a 3- to 6-month fattening period with drugs. The problem of protection against the latter disease should be investigated thoroughly.
4.63 Cattle population in the southern states is limited to about 200,000 cattle of the trypano-tolerant breeds, Muturu, N'dama and Keteku which must be used because of the heavy infestation with tsetse fly which transmits trypanosomiasis. There are extensive areas of savannah country in the southern states which can be developed for beef cattle raising using trypano-tolerant cattle, preferably the N'dama. The Western State Development Corporation operates one commercial ranch with these cattle and there are numbers of them on Government breeding stations and individual farms in the Western State. Further development of this type of production could be expanded through provision of credit and technical assistance. The speed of development, however, will be limited by the initial shortage of breeding stock.

4.64 While there are prospects in the long term for substantial increases in production of beef, expansion will not be able to meet the growth in demand for meat over the next ten years. Because of this, increasing emphasis will have to be given to meat production from goats, sheep, pigs, and poultry. Very little attention to date has been directed to prospects of increasing production from them. Since goats and sheep are grazed on a communal basis, improving productivity will be subject to considerations similar to those for cattle.

4.65 Given the economic value of Red Sokoto goat hides, the source of Moroccan leather, priority should be given this breed. Because of their high reproductive rate and short generation period, pigs and poultry offer the best prospects for increased meat production in the short term. Highly intensive commercial systems of pig and poultry production, as adopted in developed countries, probably could be applied in Nigeria. Alternately, pig and poultry production could be encouraged on the basis of semi-intensive production by individual farmers. This would need to be supported by a well organized extension service, credit facilities and marketing organization, related both to supply of inputs and purchase of output.

4.66 Since the major constraint to rapidly increasing pig and poultry production is the supply of reasonably priced feed, emphasis should be given to expanding output of grains such as maize and sorghum. In the short term, the government should consider importing feedgrains until the means are available to increase local output. Such a program, however, should be closely monitored and prices controlled through tariffs so that imports do not discourage local production.

4.67 Forestry. Annex 5 points out that forestry output can be expanded substantially by (a) using existing forests more intensively, (b) establishing plantations of quick-growing trees, and (c) setting up integrated industries using existing hardwood forests, and pulp and paper mill complexes based on quick-growing plantations. Although permanent forest estates will have to furnish most of the country's wood in the future, natural forest, or untreated logged-over forest, will continue to be an important supply source. Present yields from natural and untreated logged-over forest usually are only 300-500 cu ft per ac. These yields could be doubled by the end of this century by more intensive utilization.
No cultural treatment, however, should be carried out in these forests since the benefit of such treatment is marginal and they will produce improved yields through future increased intensity in utilization of the growing stock. Replacement of the forests should be by plantations, rather than by natural regeneration, and the taungya 1/ method should be used wherever it can be operated on a sustained basis, to reduce costs.

4.68 Plantations for pulp, fuel and poles can be harvested on a relatively short cutting cycle. Fuel and pole wood can be produced in five to fifteen years, and for pulp, rotations of seven years should be possible with *Gmelina arborea* and certain Eucalyptus species on good sites. A total area of about 30,000 acres will be needed by 1985, when the estimated annual consumption of pulp will require 50 million cu ft roundwood. The location of these plantations will depend upon current feasibility studies of pulp mills. Plantations to supply poles and firewood should be located close to main demand centers, and wherever possible every encouragement should be given to villages and local farmers to create their own plantations. Plantation areas should be concentrated, as far as is possible, to form economic management units.

4.69 *Gmelina arborea* is a quick-growing species of high potential with which there is much experience in Nigeria. It is extremely versatile in its properties and, in addition to yielding good quality pulp suitable for wrapping, writing and printing paper, it produces a general utility timber. It grows at a very fast rate on the better sites and produces trees of timber size in 20 to 25 years. It is an ideal species on which to launch a substantial annual regeneration program. In appropriate areas of the high forest, efforts should be concentrated on another quick-growing species, *Terminalia ivorensis*; but because seed supplies are limited, the program would be restricted to about 2,000 ac per annum.

4.70 Extended Tsetse Eradication. As pointed out earlier, there is scope for expanding the area for farming and livestock grazing through tsetse eradication. With the elimination of the tsetse fly, the extensive under-utilized middle belt could be opened both to livestock and farming -- provided the areas were settled and the land brought into continuous and intensive use. The middle belt could become the mixed-farming area par excellence in Nigeria. North of the economic limit for tree crops, the region is ecologically suited to field crops. With relatively high rainfall and short dry season, it can grow a wide range of crops, including annual and perennial fodder. A system of permanent farming, which will maintain fertility and avoid erosion without falling back on traditional shifting cultivation and "bush" fallowing, would be required. Thus, livestock, for both manure and draft power, would be an essential element.

1/ See Annex 5, paragraph 18.
4.71 Eliminating tsetse has been demonstrated to be technically feasible in the Sudan and sub-Sudan zones through selective insecticide application. Its feasibility, however, has not been fully established in the more densely-vegetated areas to the south. While tsetse eradication probably can be a major vehicle for Nigerian agricultural development over the longer-term, several factors argue against any immediate large-scale tsetse eradication in the middle belt. First, since such eradication requires sizeable capital investments, it will depend upon relatively intensive and high-level production to be economic. Second, the studies and investigations -- the planning needed for eradication and for achieving such production -- have in most cases not yet been completed. The tsetse-infected areas have not been surveyed and techniques for eradicating tsetse in these higher rainfall areas have not been fully established. Technically and economically feasible farming systems and cropping patterns have yet to be devised.

4.72 Irrigation. The case of large-scale irrigation is similar. Given the relatively high capital requirements and the absence of necessary data, careful investigations and planning will be necessary before large-scale development can be implemented. Most of the emphasis for the time being is on investigations and small-scale and pilot projects.

4.73 There are, however, some pressures to move ahead with irrigation investments without adequate preparation or co-ordination of basin-wide development. Steps to make federal control over irrigation development possible are therefore being taken. The establishment of a Land and Water Resource Division and proposed national water legislation was mentioned previously. Additionally, the Ministry of Agriculture and Natural Resources has set up a National Water Resources Institute, which will carry out country-wide studies and train irrigation workers. Completing and extending present land-use surveys to cover the entire country is being given high priority. Such a survey and a similar survey of water resources would be carried out by the Land and Water Resource Division or, in the case of the latter, by the Water Resources Institute. It also is planned to more fully investigate the possible use of groundwater resources. There are a number of other preinvestment studies already completed or underway (see Section V and Annex 11).

4.74 The Second National Development Plan proposes expanding the irrigated area from 36,000 ac at present to 160,000 ac by 1974. Subsequent plans call for adding 450,000 ac between 1975 and 1980, bringing the total area under irrigation to 610,000 ac by 1980 and over 1 million ac by 1985. Given the need for completing general surveys and preinvestment studies, strengthening organization and institutions, and training personnel, this rate of development would be difficult to achieve.

4.75 Before embarking on large-scale development, the urgent tasks are to (a) speed-up data collection, investigations and studies; (b) continue present emphasis on pilot projects and small-scale irrigation works, monitoring
them carefully to record experience relevant to larger-scale development 1/; (c) obtain federal legislation to: (i) enable coordinated basin-wide planning, (ii) control water allocation among users and geographical areas, and (iii) conserve watershed and catchment areas; and (d) begin planning water resource development on basin-wide basis. Also, to preclude possible disputes in the future, steps to obtain international agreement on riparian rights for Lake Chad and streams which flow to or from countries outside Nigeria should be taken at an early stage.

1/ It must be emphasized that the opportunity to develop experience with cropping patterns and to establish economic levels of application of agricultural chemicals in those pilot projects is of equal or greater importance than testing engineering techniques and water application.
V. PROJECTS AND INVESTMENTS

5.1 Nigerian farmers will respond positively to economic opportunities given them. The program outlined above aims at providing both incentives and the means for farmers to respond to them. Besides institutional, organizational and policy changes, the program lends itself to implementation through a series of projects requiring major investment outlays. The projects discussed below represent such investment in key areas; they should have a catalytic effect in stimulating new investments and agricultural expansion generally. There are, of course, other investment needs in the agricultural sector, and more will arise, but the projects suggested here should have high priority in the allocation of available resources, both financial and human. They constitute a core of concrete and specific activities around which further agricultural planning can proceed.

5.2 Where estimated investment requirements are given, they are only approximations and are highly tentative. Preinvestment studies in almost all cases will be necessary to formulate the projects, estimate costs and benefits, and determine timing. The latter will depend in large part upon how quickly plans and projects can be prepared, how fast they can be implemented, and, most important, how farmers respond to them.

5.3 Taking into account the constraints of organization and manpower, the following would represent a reasonable program over the next 10 to 15 years.

Tree Crops

5.4 There are immediate possibilities for projects in planting and replanting cocoa, rubber and oil palm. Assuming that producer prices are sufficient to provide incentive, the pace of development will be determined largely by: (a) the capabilities of the state governments, or other authorities, to plan, organize and manage projects; (b) the adequacy of supplies of planting materials and other inputs; and (c) the availability of credit and, in supervised projects, finding "credit-worthy" farmers.

5.5 The projects listed below include staff and other overheads, credit, subsidies, and a fairly high degree of services to and supervision of farmers in defined project areas. In addition to these particular projects, the supply of planting materials and other inputs available to farmers generally should be increased through expanding seedling production and improving procurement and distribution of all farm inputs.

5.6 Cocoa. Priority should be given to projects in the present cocoa belt, principally in the Western State. The Bank-financed Western State Cocoa project, presently getting underway, aims at planting 16,500 ac of new and replanting 27,000 ac over the next five years. The project also provides for surveys to identify additional projects. Assuming that the present project is successful, it should be possible in 1975 to initiate another project which would cover up to 75,000 ac in five years. Subsequent
projects of the same size in 1979 and 1981 may also be possible, but before these are proceeded with a full survey of existing cocoa potential should be undertaken. From this a policy decision needs to be taken on the most economic mix of planting, replanting and intensification which should be aimed at. The actual investments needed would depend upon the pre-investment surveys and project preparation. As an indication only, estimates based on area expansion alone are given in Table 5.1. The amounts could be large, possibly running more than US$65 million. On the basis of the present project, about one-half of the total would be in credit to farmers.

Table 5.1: COCOA PROJECTS : ESTIMATES OF AREA AND COST

<table>
<thead>
<tr>
<th>Period</th>
<th>Area Covered ('000 ac)</th>
<th>Estimated Cost (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-76 (Present Bank Project)</td>
<td>43.5</td>
<td>10.4</td>
</tr>
<tr>
<td>1971-76 (Other Projects)</td>
<td>32.0</td>
<td>6.6</td>
</tr>
<tr>
<td>1976-80</td>
<td>75.0</td>
<td>15.4</td>
</tr>
<tr>
<td>1979-83</td>
<td>75.0</td>
<td>15.4</td>
</tr>
<tr>
<td>1981-85</td>
<td>75.0</td>
<td>15.4</td>
</tr>
<tr>
<td><strong>Total 1971-85</strong></td>
<td><strong>300.0</strong></td>
<td><strong>63.2</strong></td>
</tr>
</tbody>
</table>

5.7 Rubber. Planting/replanting projects might consist of nucleus plantations, with modern processing facilities, servicing large numbers of surrounding smallholders. Annex 4 contains a model project consisting of a 10,000 ac nucleus plantation, with a factory of 70-ton per day capacity, serving 20,000 ac of smallholdings. Planting of the plantation is accomplished over two years, while smallholdings are planted/replanted over seven years. Priority should be given to projects in prime rubber-growing areas, particularly in the Mid-West State. Since preinvestment studies and preparation would have to precede each project, it is assumed that the first project would not begin before 1974. The program shown in Table 5.2 is an ambitious one.

Table 5.2: RUBBER PROJECTS : ESTIMATES OF AREA AND COST

<table>
<thead>
<tr>
<th>Area Covered</th>
<th>Estimated Cost (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>Nucleus Small-Plantation Holdings Total</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>1974-79</td>
<td>10</td>
</tr>
<tr>
<td>1976-81</td>
<td>10</td>
</tr>
<tr>
<td>1978-83</td>
<td>10</td>
</tr>
<tr>
<td>1982-87</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

5.8 Oil Palm. Projects for planting and replanting oil palm would be similar. In this case, priority should be given to projects in East Central,
South-Eastern, and River States. The model in Annex 4 has a nucleus plantation of 10,000 ac planted over four years, with a central mill initially of 9 tons per hr capacity but expanding to 36 tons. The plantation and mill would serve 20,000 ac of smallholdings planted over seven years. The projects shown below are on this basis. Larger areas of smallholdings, bigger mills, and some speed-up in planting rates are assumed to begin with the third project.

Table 5.3: OIL PALM PROJECTS: ESTIMATES OF AREA AND COST

<table>
<thead>
<tr>
<th>Period</th>
<th>Nucleus Plantation</th>
<th>Smallholdings</th>
<th>Total</th>
<th>Estimated Cost (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974-80</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>11.2</td>
</tr>
<tr>
<td>1976-81</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>11.2</td>
</tr>
<tr>
<td>1978-83</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>14.3</td>
</tr>
<tr>
<td>1980-84</td>
<td>10</td>
<td>40</td>
<td>50</td>
<td>15.4</td>
</tr>
<tr>
<td>1984-87</td>
<td>12</td>
<td>48</td>
<td>60</td>
<td>20.7</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>158</td>
<td>210</td>
<td>72.8</td>
</tr>
</tbody>
</table>

It should be stressed that these projects and their phasing are little more than illustrative. A master-plan will be needed for setting optimum combinations of plantation and smallholdings in programs for planting/replanting rubber and oil palm. In view of likely low prices and escalating production costs, rubber and oil palm projects may well need to employ a combined system of grants and credit to enable farmers to participate. To offset administered wage rates, subsidies also may be necessary for nucleus plantations and processing facilities to be financially viable. Provided that such projects give adequate returns to the economy (including the benefits from greater employment opportunities), however, it should be possible to devise suitable means for insuring adequate financial returns.

National Seed Program

A possible national seed program was outlined in Section IV. The project would require offices, staff accommodations, and production, processing and storage facilities at three locations, plus headquarters offices and staff accommodations. Transport and seed processing equipment also would be needed.

Agricultural Supply Organization

Creation of a national agricultural supply organization to procure and distribute farm inputs also was outlined in the previous section. An
interim parastatal corporation may be the best form of organization for the task. Such a corporation would require office buildings and equipment, storage, transport and handling facilities but should as far as possible rent all facilities. The head office probably would have to be in Lagos, with area offices in Ibadan, Kaduna, Benin and Enugu. Expatriates probably would be needed for most of the key posts (general manager, chief accountant, procurement manager, area managers and area accountants) during the initial three to five year period. Legislation would be required to establish a corporation and this should make provision for its dissolution and transfer of functions once its task of building up the market to a point where the private sector could take over, was completed.

Crop Production

5.13 There is scope for integrated projects for improving groundnuts and cotton production initially, and possibly food and feed crops production in the later 1970's. Because these projects should be sited in the areas best suited for growing each crop, they would cut across state boundaries. They would have to be administered jointly by the federal government and state governments concerned. To facilitate control, projects could be divided into subprojects, each of which would be located in and administered by a state government.

5.14 Each project should include extension and administrative staff, plus vehicles, equipment and buildings. Seeds, fertilizers and other farm inputs could be supplied through the proposed agricultural supply corporation and credit through the National Agricultural Bank and local institutions. Provisions for developing cooperatives or farmer groups, and constructing village stores and feeder roads, where and if required, would also need to be included, either as an integral part of each project, or through coordination with agencies outside the project. Consideration also should be given to improving and/or expanding storage, transport and processing facilities.

5.15 Groundnuts. A groundnut production project might include subprojects in the four major producing states: Kano, North-Eastern, North-Central and North-Western. The government plan to supply farmers with improved seeds, fertilizers and seed dressing, along with advice on cultural practices, on more than 3 million ac in these states by 1985, is outlined in the following table.

<table>
<thead>
<tr>
<th>Year</th>
<th>Kano</th>
<th>North-Eastern</th>
<th>North Central</th>
<th>North Western</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-75</td>
<td>392</td>
<td>520</td>
<td>58</td>
<td>63</td>
<td>1,033</td>
</tr>
<tr>
<td>1976-80</td>
<td>865</td>
<td>1,141</td>
<td>333</td>
<td>167</td>
<td>2,506</td>
</tr>
<tr>
<td>1981-85</td>
<td>1,000</td>
<td>1,199</td>
<td>672</td>
<td>310</td>
<td>3,181</td>
</tr>
</tbody>
</table>
5.16 No cost estimates are available. Annual production credit requirements, assuming that credit were provided for the full cost of materials, however, could run to £N 1.4 million (US$3.9 million) in 1975, rising to £N 3.6 million (US$10.1 million) in 1980 and £N 4.4 million (US$12.3 million) in 1985.

5.17 In view of likely delays in organization and staffing, a somewhat lower rate of development probably would be more realistic. Thus, projects might be identified and prepared covering 500,000 ac of groundnuts, initially, with subsequent projects covering 750,000 and 1.0 million ac.

Table 5.5: GROUNDNUT PROJECTS : ESTIMATE OF AREA

<table>
<thead>
<tr>
<th>Period</th>
<th>Area Covered (’000 ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual</td>
</tr>
<tr>
<td>1971-75</td>
<td>500</td>
</tr>
<tr>
<td>1976-80</td>
<td>750</td>
</tr>
<tr>
<td>1981-85</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,250</td>
</tr>
</tbody>
</table>

5.18 Cotton. The prime cotton-growing areas are located in North-Central, North-Eastern, and North-Western States which account for the bulk of cotton output. The areas scheduled to receive improved inputs and follow recommended cultural practices in these three states are shown below.

Table 5.6: AREA USING IMPROVED PRACTICES IN COTTON PRODUCTION : CUMULATIVE FIGURES (’000 ac)

<table>
<thead>
<tr>
<th></th>
<th>North-Central</th>
<th>North-Eastern</th>
<th>North-Western</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971-75</td>
<td>21</td>
<td>20</td>
<td>17</td>
<td>58</td>
</tr>
<tr>
<td>1976-80</td>
<td>87</td>
<td>82</td>
<td>69</td>
<td>238</td>
</tr>
<tr>
<td>1981-85</td>
<td>187</td>
<td>175</td>
<td>149</td>
<td>511</td>
</tr>
</tbody>
</table>

5.19 Projects also would include feeder roads, additional ginning capacity, storage and other facilities as required. The government estimates that ginning capacity for an additional 300,000 bales (54,000 tons), costing US$4.2 to US$5.0 million, would be needed by 1985. Additional storage for lint and seed awaiting shipment also would be required, either by expanding Northern States Marketing Board stores or those at textile mills.

Livestock

5.20 Annex 7 gives details of possible projects in the livestock sector, which include tsetse fly eradication; establishing commercial ranches for cattle breeding and fattening; expanding pig and poultry production. A Bank
livestock appraisal mission recently visited Nigeria and is currently preparing its report.

5.21 **Tsetse Eradication.** By 1986, the government plans to clear an additional 55,700 sq mi in the low-rainfall Sudan and sub-Sudan, on the following schedule:

- 11,950 sq mi during 1970/71-1973/74
- 13,760 sq mi during 1970/71-1975/76
- 14,560 sq mi during 1975/76-1979/80
- 15,430 sq mi during 1979/80-1985/86

Achieving this target will depend in large part on obtaining additional needed technical personnel. Estimated project costs are summarized below.

<table>
<thead>
<tr>
<th>Table 5.7: TSETSE ERADICATION PROJECT COSTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(US$ million)</td>
</tr>
<tr>
<td><strong>Total Foreign Exchange</strong></td>
</tr>
<tr>
<td>Capital</td>
</tr>
<tr>
<td>Recurrent</td>
</tr>
<tr>
<td>Total (including contingencies)</td>
</tr>
</tbody>
</table>

These costs do not include an additional EN 4.5 million (US$12.6 million) for headquarters buildings and staff accommodations.

5.22 An essential adjunct to tsetse clearance is the establishment of an organization to control use of cleared land and to allocate it on a land use basis. Government proposes this should ultimately come under the proposed Land Use Department of MANR, but as the immediate task a Federal Land Use Institute is being set up at Samara.

5.23 **Breeding and Fattening Ranches.** The establishment of breeding and fattening ranches initially would have to be on a pilot demonstration basis. Here the economic feasibility of improved production methods could be demonstrated. Breeding ranches might be started on 60,000 ac each, with an initial herd of 2,000 breeding cows and a total herd of 5,000. These could later be expanded. They could be established in groups of 12 or more ranches to facilitate management. Fattening ranches could be of two kinds: (1) those in the market areas and (2) longer-term projects in higher-rainfall areas cleared of tsetse. An initial pilot ranch could be followed by larger operational units of 5-6,000 head capacity.

5.24 **N'dama Cattle.** Other possible livestock projects include development of disease-tolerant N'dama cattle in more southerly areas. The Western State already has made progress in using N'dama herds for beef production. A proposal has been made to extend this program throughout the Derived
Savanna Zone by expanding the existing Upper Ogun Ranch and to create farmer breeding units to absorb surplus stock as it becomes available. The rate of these developments will be slow due to shortages of breeding cows.

5.27 **Pigs and Poultry.** There also should be possibilities for pig and poultry projects based on intensive commercial lines or semi-intensive production by individual farmers. Extension, credit, marketing facilities, and an adequate supply of reasonably priced feedgrains would be required.

5.28 Tentative costs of potential livestock projects are summarized in Table 5.8:

<table>
<thead>
<tr>
<th>POSSIBLE LIVESTOCK PROJECTS AND COST ESTIMATES - 1971-86</th>
</tr>
</thead>
<tbody>
<tr>
<td>(US$ million)</td>
</tr>
<tr>
<td>Tsetse eradication</td>
</tr>
<tr>
<td>Breeding ranches</td>
</tr>
<tr>
<td>Fattening ranches</td>
</tr>
<tr>
<td>Upper Ogun Ranch and Farmer N'dama Units</td>
</tr>
<tr>
<td>Pig and Poultry production</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

**Forestry**

5.29 Annex 5 discusses investments in forestry in some detail. Three main areas likely to require substantial investment in the future are:

(a) integrated mechanical conversion units based on existing tropical hardwood forest;

(b) quick-growing man-made plantations in strategic blocks to supply future requirements of saw logs and pulp wood; and

(c) pulp and paper mill complexes based on quick-growing plantations.

5.30 Technoforest of Rumania is considering integrated industries for domestic and overseas markets in both the Western and the South-Eastern States. Each industry would comprise a sawmill; plywood, chipboard and veneer mills; and furniture and wood-working sections. Adequate timber is available in both areas. The estimated cost of each industry is EN 5-6 million (US$14.0-16.8 million).

5.31 To meet the mounting demand for timber and pulpwood, an extensive planting program of *Gmelina arborea* and *Terminalia ivorensis* could be undertaken. *Gmelina* plantations for timber should be grown wherever possible, but until the exact locations of future pulp mills have been determined, extensive plantings for pulp specifically should be avoided (see below).
5.32 A number of gmelina plantations of 20,000 ac each should be established in East-Central, South-Eastern, Kwara, Mid-Western, and Western States, where there are suitable sites and the species is known to grow well. These plantations can be established at an overall cost of between EN 35 and 50 (US$98 and 140) per ac. At the rate of 1,000 ac planted annually in each plantation, 15 such units would require approximately EN 55,000 (US$1.5 million) yearly.

5.33 Plantations of terminalia should be given priority in the high forest area of Mid-Western State to the extent that seed is available. Preinvestment studies would have to determine the extent and cost of plantings. Opportunities for further investments in plantations in the northern states, using mechanical equipment, should become available during 1975-80. By then, the research of the Savanna Forestry Station should be fairly advanced and the various forestry services better staffed with qualified personnel.

5.34 The government proposes to set up an integrated pulp and paper mill to produce 40,000 tons of kraft pulp and 70,000 tons of industrial papers. The cost would be approximately EN 10 million (US$28 million). Studies, financed by Finnish technical assistance, are being undertaken to establish the locations, numbers, types and capacities of pulp mills. A paper mill, which would depend initially on imported pulp, is also under study. The most likely locations are near Calabar in South-Eastern State and near Epe in Western State. The Commonwealth Development Corporation also is making pre-feasibility studies of a pulp and newsprint mill based on gmelina plantations near Epe. Some 5,000 ac of gmelina, planted between 1967 and 1970, already are available. In the initial stages, a 50,000 ton pulp mill is envisaged which would require wood from 8,000 ac of gmelina yearly.

5.35 In summary, possible forest projects over the next 15 years would include:

<table>
<thead>
<tr>
<th>Table 5.9: FOREST PROJECTS AND COST ESTIMATES - 1971-85</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$ Million</td>
</tr>
<tr>
<td>Integrated forest industries (2 units)</td>
</tr>
<tr>
<td>Quick-growing plantations</td>
</tr>
<tr>
<td>1971-75 - 75,000 ac</td>
</tr>
<tr>
<td>1976-80 - 75,000 ac</td>
</tr>
<tr>
<td>1981-85 - 75,000 ac</td>
</tr>
<tr>
<td>Pulp and paper mills (2 units)</td>
</tr>
</tbody>
</table>

5.36 Some preinvestment studies are needed, although much work has been done. Most of the high forests were systematically enumerated in a sample census during the early 1930's. A Canadian team enumerated a 1,600 sq mi area in South-Eastern State immediately prior to the civil war. The extensive Niger Delta mangrove and freshwater forests were being covered in the mid-1960's, but work was interrupted by the civil war. The Federal Government has requested the UNDP to assess the extent and quality of resources
south and west of the Niger River. (This area contains the bulk of the country's productive high forest.) The proposed UNDP/FAO project also would assist the Federal Government and the governments of the Mid-Western, Western and Kwara States in planning and managing the development of these resources.

**Irrigation**

5.37 Given the uncertainties involved, it is difficult to foresee the extent and pace of irrigation development and possible projects over the next several years. Much should depend on the outcome of preinvestment surveys, studies and pilot projects; upon the federal government's obtaining needed legislation and international agreements; and upon the government's being able to draw up suitable plans.

5.38 For the immediate future, emphasis is on small-scale and pilot projects. A 1,500 ac pilot project is being established at Kadawa in conjunction with the Kano River Project. As part of the South Chad Irrigation Scheme, CDC will help establish and manage a 1,000 ac pilot project for three years, which includes both plantation and smallholder farming. In the North-Western State, a 3,000 ac pilot project on the Bobo River is to be developed as the first stage of the Sokoto River Valley Project. The CDC, in a joint venture with the federal and the North-Eastern State governments, also is developing a 140 ac pilot plot as the basis for the proposed 20,000 ac sugarcane plantation and factory at Numan. Finally, in preparation for the Gongola River Project (which ultimately is to irrigate 200,000 ac and generate 230 million kwh), the North-Eastern State government will set up a 1,200 ac pilot irrigated farm in the project area.

5.39 Other small-scale schemes planned for immediate execution include developing 5,000 ac in the Kainji Lake area, 13,000 ac in the Niger Valley, the 1,000 ac Ganaawuri Pilot Scheme, and minor schemes along the Benue River and in various parts of Kwara, East-Central, South-Eastern, Mid-Western and Western States. About 85,000 ac in small-scale and pilot projects are programmed for development by 1974.

5.40 Preliminary studies have been completed or are presently underway for a number of irrigation projects. The more important ones are listed below. Most, however, require further investigation before substantial investments can be made.
Table 5.10: PRELIMINARY STUDIES FOR IRRIGATION COMPLETED OR UNDERWAY

<table>
<thead>
<tr>
<th>Project</th>
<th>Type of Study</th>
<th>Conducted by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Chad Basin</td>
<td>Reconnaissance</td>
<td>BUREC</td>
</tr>
<tr>
<td>Sokoto-Rima Valley</td>
<td>Pre-feasibility</td>
<td>UNDP/FAO</td>
</tr>
<tr>
<td>Kano River</td>
<td>Pre-feasibility</td>
<td>NEDECO</td>
</tr>
<tr>
<td>Hadejia Valley</td>
<td>Identification</td>
<td>BUREC</td>
</tr>
<tr>
<td>South Chad</td>
<td>Soils investigation and feasibility</td>
<td>UNDP/FAO</td>
</tr>
<tr>
<td>South Chad Pilot</td>
<td>Area selection</td>
<td>CDC</td>
</tr>
<tr>
<td>Gongola River</td>
<td>Reconnaissance</td>
<td>NEDECO</td>
</tr>
<tr>
<td>Niger Valley (below Kainji Dam)</td>
<td>Land Classification</td>
<td>NEDECO</td>
</tr>
<tr>
<td>Numan Sugar Project</td>
<td>Pre-feasibility</td>
<td>CDC</td>
</tr>
<tr>
<td>Cross River Basin</td>
<td>Reconnaissance</td>
<td>USAID/Ford Foundation</td>
</tr>
</tbody>
</table>

5.41 As results from the pilot projects and investigations become available over the next several years, planning for possible larger-scale development might be undertaken. Possible projects might be located in the Sokoto-Rima, Benue-Niger, Kano-Hadejia-Yobe River Basins, and include the Gongola River Project and Numan and Lafiagi Sugar Estates. Basin-wide master plan studies, including multi-purpose system analysis, for these basins should be given high priority. Technical and economic feasibility would need to be established for each project.

Mixed Farming in the Middle Belt

5.42 Also in the long-term category would be possible projects of mixed farming in areas of the middle belt cleared of tsetse. Once again, these projects would depend upon surveys of possible areas, and development of feasible eradication techniques, farming systems and cropping patterns.

Preinvestment and Other Studies

5.43 To support the projects and investments outlined above, major preinvestment studies and other preparations would be needed. In Table 5.11 the more important preinvestment studies are summarized. Further details of projects can be found in part I of Annex 11 and the appropriate subject annexes. No credit study has been included, as the newly established National Agricultural Bank, with UNDP/IBRD technical assistance will be surveying existing and possible channels for credit disbursement and assessing credit needs. Feeder roads will be an integral part of projects aimed at increased crop and timber production, and studies covering feeder road needs, construction costs, and financing should be included in the project investigations. Ad hoc examinations of local requests for matching
grant assistance would cover minor needs. No separate survey of feeder road requirements is recommended. A list of completed investment studies and additional relevant literature is given in part II of Annex II.

Table 5.11: PREINVESTMENT STUDY PROPOSALS

1. INFRASTRUCTURE/ORGANIZATION

   (a) Agriculture Input Supply
       Study of best means of improving availability to farmers of seed, fertilizer and other inputs.

   (b) National Seed Program
       To recommend organization and program for multiplication and distribution of improved seed.

   (c) Marketing and Storage
       Evaluation of future roles of marketing boards and private sector in agricultural marketing, and estimation of urgent storage needs.

   (d) Irrigation
       Studies, within the framework of high-priority basin-wide investigations, of irrigation potentials of:
       Benue valley,
       Niger valley below Kainji,
       Sub-surface storage in Sokoto-Rima,
       Kano-Hadejia-Yobe.

2. FORESTRY

   Forest Industry and Plantations
   Studies of opportunities for integrated plants, including sawmills and manufacture of plywood, chipboard, veneers and furniture, and location of quick-growing plantations.

3. LIVESTOCK

   (a) Livestock Census
       Country-wide count.

   (b) Tsetse Eradication
       Survey of southern distribution and program for eradication.

   (c) Nomadic Herdsmen
       Socio-economic study to suggest means of hastening acceptance of beef development programs.

   (d) Beef Fattening, Marketing and Slaughter
       Evaluation of alternative approaches and improvements needed.

4. CROP PRODUCTION

   (a) Groundnuts and Fibers
       Production feasibility studies.

   (b) Sugarcane, Cotton and Rice
       Location studies for expanded production, processing requirements, and storage needs.
5. TREE CROPS

(a) Oil Palm and Rubber

Feasibility studies for 150,000 acre oil palm planting program and 200,000+ acre rehabilitation program for rubber. To include research, training and fiscal policy considerations and alternative forms of organization.

(b) Cocoa

Study to cover existing and potential cocoa areas: to provide basic data and recommend organization for coordinating development.

Source: Annex 11, Part I.

5.44 There are several pre-requisites to the successful development of an investment program in Nigeria, which need early attention. These are an internal assessment of planning and manpower resources and needs, and the collection of key data for agricultural planning. Government should evaluate the need for, and size of, a team or teams to actively assist in sector planning, project identification and preparation, taking account of the needs of both the Federal Ministry and state governments. It will need to decide the source and composition of the assistance, and how the team(s) should be integrated within the ministries. An assessment is also needed of economic means of achieving effective use of available manpower in the agricultural sector and the possibilities of a geographical and functional redistribution of existing staff to match project priorities. The scope for increased contract recruitment, and the extent to which the private sector could be encouraged to take over a greater role in functions which can be performed on a business basis should be examined.

5.45 A sample census of agriculture under the FAO 1970 World Program should be considered a priority call on staff resources. The census should cover the whole country and should be designed to provide benchmark data on agricultural holdings, farm families and labor, crop areas and yields, and livestock. FAO technical assistance should be available from the preliminary planning stage. Complementary to a census are land resource surveys such as those being carried out in Nigeria by the Land Resources Division of the UK Directorate of Overseas Surveys. The surveys map and describe the land resources classified by their agricultural potential. About two-thirds of the country is included in existing or completed programs, and a continuation of the surveys to cover the entire country is recommended. Also recommended are major enlargements of the number and coverage of economic studies of the type being carried out by the Rural Economics Research Unit at Zaria. These are aimed at identifying constraints in traditional agriculture and obstacles to its improvement. They provide key material on which research and extension policy should be based and are needed for all zones of the country.