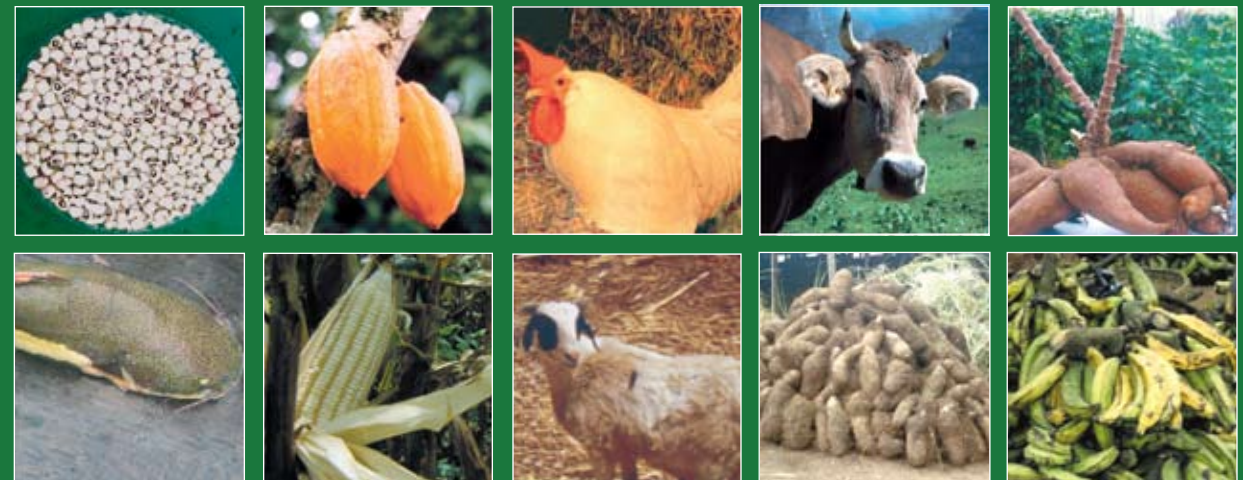


Agriculture in Nigeria: Identifying opportunities
for increased commercialization and investment

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V.M. Manyong, A. Ikpi, J.K. Olayemi, S.A. Yusuf,
B.T. Omonona, V. Okoruwa, and F.S. Idachaba



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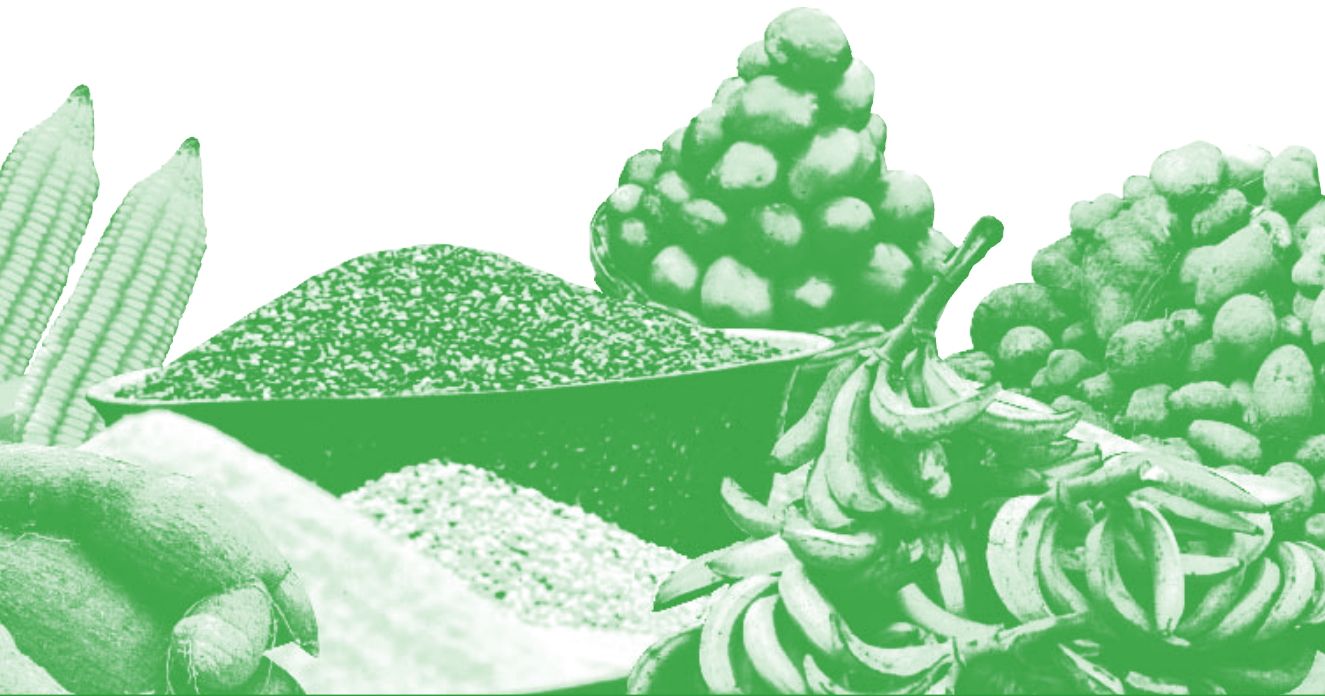


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Summary Report

V. M. Manyong, A. Ikpi,
and J.K. Olayemi



International Institute
of Tropical Agriculture



United States
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International
Development



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V.M. Manyong, A. Ikpi, and J.K. Olayemi

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USAID/Nigeria

Implemented by
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In collaboration with
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Executive Summary

The USAID/Nigeria Mission contracted the International Institute of Tropical Agriculture (IITA) to conduct a study on Agriculture in Nigeria (AIN). IITA teamed up with the University of Ibadan to implement the study. The International Food Policy Research Institute (IFPRI) provided timely support for some of the models used.

The key issues in the study were the identification of constraints to investment in the agricultural sector and the evolution of strategies and priority areas for intervention by USAID/Nigeria, other donors, the home governments, and the private sector to provide catalytic support for the flow of investment into the agricultural sector.

Nigeria was divided into six development domains, which coincided with the six geopolitical zones in the country. Two states selected from each development domain and the Abuja Federal Capital Territory (FCT) constituted the primary frame for data collection.

Primary data were collected from policymakers and implementers, the private sector, associations, and individual investors using a combination of field survey methods, such as in-depth interviews, focus group discussions, individual completion of questionnaires, and taped interviews. Secondary data were obtained from local and international publications and reports.

Methods of data analysis used included descriptive statistics, constraint mapping, development domain mapping, regression technique, and partial equilibrium models. The assessment of agriculture in Nigeria presented in this study covers an assessment of the performance of Nigeria's agriculture sector, a review of past policies affecting agriculture, an assessment of investment processes in Nigerian agriculture, an analysis of constraints to private sector investment in Nigerian agriculture, and an evaluation of investment options.

Evidence from literature generally indicated that there was inconsistency in the growth performance of the agricultural sector in the period 1981 to 2000, with some evidence of fluctuating trends, probably due to policy instability and inconsistencies in policies and policy implementation. Both literature and stakeholders' perception of the performance of Nigerian agriculture agreed that there had been improved performance in the last four years. Major reasons were an increased demand for agricultural products, better access to agricultural inputs, and a more favorable economic climate. Factors constraining agricultural performance in the country included those relating to technical, resource, socioeconomic, and organizational constraints.

A review of past government policies in agriculture showed that the pre-1970 era was characterized by minimum government intervention which changed to maximum intervention in the period before structural adjustment and back to minimum intervention in the period of structural adjustment. Identified constraints to the effectiveness of past agricultural policies were policy instability, inconsistency in policies, narrow base of policy formulation, and poor implementation of and weak institutional framework for policy coordination. The proposed new agricultural policy is not significantly different from the past policy as both are more focused on the primary production subsector than on the downstream subsector of agriculture. However, it is too early to make any meaningful evaluation of the new policy.

A review of past investment trends in the Nigerian economy revealed that both domestic and foreign flow of private investment into the Nigerian economy as a whole suffered a declining trend and wide variation which was worse for the agricultural sector. The patterns of domestic and foreign private investment over this period were highly correlated with the changing states of political and policy instability.

Thirteen categories of constraints to investment in the agriculture sector were identified from both the literature search and stakeholders' perspectives. Infrastructural constraints (poor or bad state of roads, poor processing facilities and marketing outlets, irregular power supply, poor state of telecommunication facilities, etc.) were ranked highest by more than 90% of respondents throughout the Federation. These were followed, in decreasing order of importance, by financial, technical, and economic constraints; macroeconomic policy and sociocultural constraints; labor, environmental, and political constraints; and microeconomic policy, institutional, health, and land tenure constraints. The severity of constraints was found to vary among development domains except for those relating to infrastructure. Those who gained from the persistence of constraints within Nigeria included some of the civil servants who derived benefits from fraudulent practices. At the foreign level, the main gainers were some of the foreign investors, technical partners, and foreigners who took advantage of the precarious situation. Among the losers as a result of these sharp practices were entrepreneurs, marketers, bankers and lenders, and government. Much more affected were the vulnerable groups in the society such as farmers and women.

There are thirteen types of economic activities in which investors (foreign and domestic) are willing to commit their resources. These are input production and supply, livestock production, fisheries, forestry, and commodity processing and storage enterprises. Others are commodity marketing, agroindustry manufacturing, agricultural commodity export, and agricultural support services. Investors (foreign and domestic) do not rush to invest in the upstream production activities. Small-scale farmers are likely to remain the major "investors" in primary crop production. Given the current level of the technology portfolio available to stakeholders, cassava is a priority commodity that gives the highest returns to investment and is worthy of investment to induce large-scale agricultural growth. The next nine ranked commodities are yam, maize, millet, groundnut, rice, sorghum, poultry, leafy vegetables, and cowpea. The priority commodities in the second group are pepper, beef, oil palm, fish, melon, tomato, soybean, onion, rubber, and cocoa. The lower ranked commodities are ginger, pork, goat meat, mutton, beniseed, and cashew nut. However, there are regional differences that need to be considered in targeting agricultural investments to a specific development domain.

The AIN study recommended the application of an integrated commodity chain approach with respect to the priority commodities to increase commercialization, mitigate negative effects on gender, and enhance equity. The study suggested three regional development hubs for consideration by USAID and other donors for investment in the Nigeria agricultural sector: the northern, the middle belt, and the southern. Subhubs could be defined as well depending on the interests and priorities for the investor. Three major interventions were considered critical to the attainment of the stated strategic objectives in the country's agriculture sector. They were not investigated during the course of this study. Therefore, they are recommended as future in-depth studies: a subsector concentration analysis study, a downstream agriculture activities' study, and an integrated monitoring and evaluation program design.

Chapter 1

Introduction

Socioeconomic and development challenges in Nigeria's agriculture
Agriculture constitutes one of the most important sectors of Nigeria's economy. The sector is particularly important in terms of generating employment and contributing to gross domestic product (GDP) and export revenue earnings.

Nigeria is rich in agricultural resource endowments; despite this, the agricultural sector has been growing at a very slow rate. It is recognized that agricultural commercialization and investment are the key strategies for promoting accelerated modernization, sustainable growth and development, and, hence, poverty reduction in the country. The USAID/Nigeria Mission contracted the International Institute of Tropical Agriculture (IITA) to conduct a study on Agriculture in Nigeria (AIN). IITA teamed with the University of Ibadan to implement the study. The International Food Policy Research Institute (IFPRI) provided timely support for some of the models used in this study.

The focus of Nigeria's agricultural development priorities has been the development and adoption of programs that tended generally to support only increased production.

Objectives of the study

The primary purpose of the AIN study was to provide USAID/Nigeria with the analytical basis for the Mission to design its new Agricultural Strategy that contributes to unlocking constraints to commercialization and investment in the Nigerian agricultural sector for sustained economic growth; enhanced food security; increased competitiveness of products in the domestic, regional, and international markets; sustainable environmental management; and poverty alleviation.

The specific objectives of the study were, therefore, to:

- Define development domains within the Nigerian political economy framework.
- Analyze the performance of Nigeria agriculture and make a review of agricultural policies.
- Identify, assess the effects, and explain the persistence of constraints to commercialization and investment in Nigerian agriculture.
- Evaluate returns to investment and identify priority commodities worthy of large payoffs.
- Design appropriate strategies to accelerate commercialization and investment in Nigerian agriculture.

The Interface among the AIN study and strategic objectives of IEHA and USAID/Nigeria

The AIN study is in line with the new US Presidential Initiative to End Hunger in Africa (IEHA) whose objective is to end hunger by 2015 through agricultural growth led by small farmers. The five pillars of the initiative are: (i) providing technological support, (ii) improving agricultural trade and market systems, (iii) building human capital, infrastructure, and institutional capacity, (iv) promoting sustainable environmental management, and (v) supporting community organizations. The study is also in line with the Mission Strategic Objectives for 2004–2008 about sustainable agricultural and diversified economic growth.

Chapter 2

Conceptual Framework and Methodology

Conceptual framework

In its broad perspective, the research issue in this study lies in the dynamics of investment flow for the development of the agricultural sector of the economy. The importance attached to this investment flow is derived from the theoretically and historically valid assumption that the sector requires an increasing dosage of investable capital from all feasible sources. This capital translates into investment, which, in turn, transforms various developmental variables in and outside the agricultural sector to create the ultimate impact, which is economic growth and sustainable development. The relationships among the variables are very complex and elaborate. To make it simpler, the link between commercialization and investment will form the core of the conceptual framework for this study. Investment in agriculture can or will lead to the commercialization of the agriculture sector while commercialization, on the other hand, can also spur investment. Investment and commercialization are the keys to sustained economic growth, enhanced food security, increased competitiveness of products, poverty reduction, and sustainable environmental management. Investment in this study is defined as the additions to stocks of capital that are the sources of future income streams. Commercialization is the movement from subsistence production to a market-based system of production. The conceptual framework used in this study indicates that investable capital, which is made up of both private and public capital, flows in from foreign private and public sources as well as from domestic private and public sources. This capital from various sources creates investment, which, in turn, creates increasing commercialization and employment and generates increasing output of various kinds as driven by the pattern of demands.

The study also recognizes the challenges and opportunities inherent in Nigeria's diverse agroecologies, resource endowment, and agricultural production systems, hence the study will define Nigeria's development domains based on a composite set of factors which include market access, population density, ecology, agricultural production systems, and geopolitical considerations. For each development domain and the Federation as a whole, the study will assess investment options and recommend priority commodities with the largest payoffs from investing in agriculture. Finally, appropriate strategies will be identified for facilitating the process of agricultural investment flow and commercialization in the development domains across the country.

Sources of data and methods of data collection

Study area

The defined development domains plus Abuja Federal Capital Territory (FCT) were adopted as the frame for data collection. Two states were then selected per domain for the survey, in addition to the Abuja FCT. The states were Benue and Kogi in the North-central zone, Borno and Adamawa in the Northeast zone, Kaduna and Kano in the Northwest zone, Abia and Ebonyi in the Southeast zone, Akwa-Ibom and Cross River in the South-south zone, and Oyo and Ondo in the Southwest zone.

Methods of data collection

For primary data, the respondents were selected in each zone to cover policymakers and implementers, the private sector, and other stakeholders such as associations and individual investors in agriculture. The combination of field survey methods employed included in-depth interviews, focus group discussions, individual completion of questionnaires, and taped interviews. Secondary data were collected from local and international publications and reports.

Methods of data analysis

Methods of analysis included development domain mapping, descriptive statistical analysis, constraint mapping, regression analysis, and partial equilibrium models using the IFPRI DREAM model.

Chapter 3

Results and Discussion

Defining the development domains of Nigeria

The AIN study based the defining development zones of Nigeria on such factors as ecology (potentials for agricultural production), population density and road density (potentials for agricultural intensification and diversification and the commercialization of both inputs and outputs), farming systems (potentials for conversion of natural resources into crop products), and the geopolitical divisions of the country (that are the basis for the overall guidance of investment and political decisions in Nigeria). Overlaying maps of the above features resulted in the definition of six development domains for Nigeria. These are North-west (NW), Northeast (NE), North-central (NC), Southwest (SW), Southeast (SE), and South-south (SS) (Fig. 1). These development domains match very well the current six geopolitical zones of Nigeria.

The performance of Nigerian agriculture

This summary is from chapter three of the main report. It assesses the performance of Nigerian agriculture from both the literature and stakeholders' perception. The analysis of data from literature (i.e., secondary data) on the performance of Nigeria's agriculture shows a mixed performance. The share of agriculture in both aggregate GDP and non-oil GDP increased only marginally in the period covered 1981–2000. The share of total bank

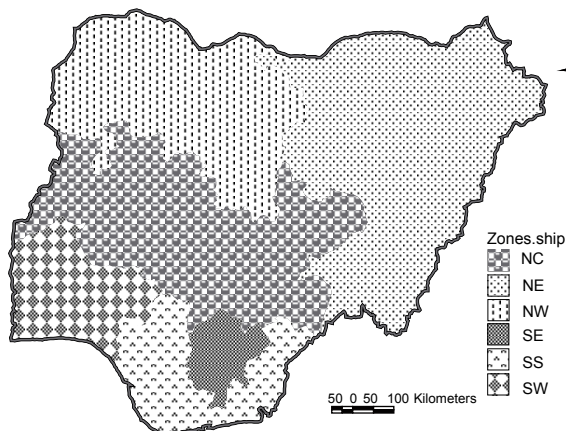


Figure 1. Development domains of Nigeria.

Table 1. Indicators of agricultural sector performance: mean annual values.

Indicators	1981–1985	1986–1990	1991–1995	1996–2000
Mean GDP at 1984 constant factor cost (₦ Millions)				
Crops	18 134.2	24 773.3	30 195.1	35 745.0
Livestock	4306.8	4959.0	5212.0	5825.0
Forestry	1258.7	1328.6	1290.0	1390.0
Fisheries	1322.1	1167.6	1379.0	1765.0
Total agriculture GDP	25 229.2	32 228.5	38 075.9	44 725.0
Total GDP	67 773.0	78 681.0	99 320.7	111 705.0
Total Non-Oil GDP	58 368.8	68 486.0	86 445.0	99 160.0
Share of agriculture in total GDP(%)	37	41	38	40
Share of agriculture in non-oil GDP (%)	43	47	44	45
Mean guaranteed loan under ACGSF (₦ Million)	44.2	103.4	104.6	228.2
Mean total bank credit (₦ Million)				
Total credit to agriculture	1000.5	3600.4	15 789.0	37 819.6
Credit to the economy	12 007.8	25 013.2	89 285.1	391 036.8
Agriculture's share of total (%)	8.3	14.4	17.7	9.7
Mean capital expenditure of Federal Government (₦ Million)				
Expenditure on agriculture	985.4	910.7	2125.2	6338.2
Expenditure on all sectors	6516.4	8529.4	24 644.1	159 591.6
Agriculture's share of total (%)	15.1	10.7	8.6	4.0
Share of total labor				
Force employed in agriculture (%)	59.4	55.6	57.0	45.0
Agriculture's share of export value				
Share of total export	2.9	4.7	2.0	2.4
Share of non-oil export	71.8	79.1	77.8	84.5

Source: Computed with data extracted from: Central Bank of Nigeria (CBN): Statistical Bulletin Vol. 11(2), December 2000.

credit going into the agricultural sector first increased rapidly between the 1981–1985 and 1991–1995 subperiods and then declined in the 1996–2000 period. The share of the Federal Government's total capital expenditure going to the agricultural sector declined almost persistently over the period. The share of the total labor force employed in the agricultural sector also declined over the period (Table 1). Another indicator of agricultural performance on growth rates of agricultural sector showed an improvement in the 1996–2000 period compared to the previous years (Table 2). Generally, there was a lack of consistency in the growth performance of the agricultural sector in the period 1981 to 2000, with some evidence of unstable or fluctuating trends, probably due to instability and inconsistencies in policies and in policy implementation. However, recent performance (1996–2000) was better than in the earlier periods (i.e., 1981–1985, 1986–1990).

Table 2. Indicators of agricultural sector performance: mean annual percentage growth rates.

Indicators	1981–1985	1986–1990	1991–1995	1996–2000
GDP at 1984 constant factor cost (% pa)				
Crops	2.5	4.7	3.1	4.9
Livestock	5.7	2.3	1.5	2.7
Forestry	0.4	-6.0	2.3	2.0
Fisheries	-16.1	24.6	-10.2	11.7
Total agriculture GDP	2.1	4.5	2.3	4.8
Total GDP	-1.5	6.7	2.2	2.8
Index of agricultural production (% pa)				
Staple crops	4.3	1.4	0.2	3.0
Other crops	-1.3	6.4	-0.8	5.3
Livestock	3.8	9.1	1.6	2.2
Fisheries	-16.7	5.2	-3.9	5.7
Forestry	-1.2	2.6	1.8	1.3
Sector aggregate	2.1	12.2	2.6	3.4
Guaranteed loan under ACGSF (%)		10.3	16.1	13.1
Total bank credit				
Credit to agriculture	22.0	26.4	48.6	5.8
Credit to the economy	10.2	15.4	37.0	21.3
Consumer price index (% pa)				
All items	20.1	33.6	57.5	6.8
Food items	21.3	38.4	54.6	3.8
Capital expenditure of Federal Government (% pa)				
Expenditure on agriculture		27.5	74.7	9.2
Expenditure on all sectors		26.5	36.3	47.8
Agricultural export value	31.0	70.5	68.5	18.2

Source: Computed with data extracted from: Central Bank of Nigeria (CBN): Statistical Bulletin Vol. 11(2), December 2000.

The stakeholders rated the performance of agriculture in the last four years better than in the past periods, thus supporting the results obtained from literature (Table 3). The main causes for the observed improvement were the increased demand of agricultural products due to higher purchasing power of workers (increased public sector salaries), better access to agricultural inputs, and a more favorable economic climate.

There are still factors that continue to hinder the performance of the agriculture sector in Nigeria. Those are related to technical, resource, socioeconomic, and organizational constraints.

Table 3. Stakeholders' perception on performance of Nigerian agriculture by development domains since 1999.

Indicators	NC	NE	NW	SE	SS	SW	All
Food security	3	4	4	4	4	4	4
Poverty status of farming households	3	4	4	4	3	4	4
Agricultural export	3	4	4	4	3	4	4
Employment in agriculture	3	4	3	4	3	4	3
Rate of return to agricultural enterprises	4	4	4	4	3	4	4
Economic climate for investment in agriculture	3	4	4	5	4	4	4
Bridging gender gap						5	
Overall average	3	4	4	4	3	4	4

Much better = 5; slightly better = 4; about the same = 3; worse than before = 2; worse than before = 1.

Key: NC = North-central; NE = Northeast; NW = Northwest; SE = Southeast; SS = South-south; SW = Southwest

Source: Field Survey, February/March 2003.

Review of agricultural policies in Nigeria

This summary from chapter four in the main report describes the past agricultural policies and the proposed new Nigerian agricultural policy. It also analyzes the stakeholders' perspectives on the effectiveness of policies, regulations, and institutions on the performance of Nigerian agriculture in recent years.

Past agricultural policies in Nigeria could be put into three distinct periods. These were the periods pre-1970, pre-structural adjustment, and during structural adjustment. In the pre-1970 era, the Government's philosophy of agricultural development was characterized by minimum direct intervention. As such, the government's attitude to agriculture was relaxed, with the private sector and, particularly, the millions of small traditional farmers bearing the brunt of agricultural development efforts. Government efforts were merely supportive of the activities of these farmers in the form of agricultural research, extension, export crop marketing, and pricing activities. In the pre-structural adjustment period (1970–1985), there was a fundamental change in the philosophy of Government towards agricultural development from one of minimum intervention to one of almost maximum intervention, particularly by the Federal Government. The decade of the 1970s and early 1980s witnessed an unprecedented deluge of agricultural policies, programs, projects, and institutions. The agricultural policy during the structural adjustment period conceived agriculture as essentially a private-sector business in which the role of Government must be largely facilitating and supportive of private-sector initiatives; market forces must be allowed to play a leading role in directing the economy.

Generally, each of the programs/schemes in the past agricultural policies succeeded in increasing food production only momentarily. There were no inbuilt components that purposely catered for the processing and/or commercialization of the food output.

Thus, understandably, they failed as efforts aimed at developing the agriculture sector. The effectiveness of past agricultural policies was constrained by policy instability, policy inconsistencies, a narrow base of policy formulation, poor policy implementation, and a weak institutional framework for policy coordination.

In 2001, a new policy document was proposed. The new policy proposal had most of the features of the old policies, but with a more focused direction and better articulation. The objectives of the new proposed agricultural policy were (i) the achievement of food self-sufficiency and food security, (ii) increased production of raw materials for industries, (iii) increased production and processing of export crops, (iv) generation of gainful employment, (v) rational utilization of agricultural resources, (vi) promotion of increased application of agricultural technology, and (viii) improvement in the quality of rural life. The new proposal spelled out definitive roles and responsibilities for federal, state, and local governments as well as the private sector to eliminate duplication of functions.

The results of the analysis of stakeholders' opinion on the effectiveness of agricultural policies revealed that current policies are more effective in the primary production sub-sector of agriculture than in the downstream subsector and in the commercialization of agriculture. Impact of policies on the welfare status of the people and on the environment remains weak.

Assessment of investment in Nigerian agriculture

This summary is from chapter five of the main report. The summary describes the levels and trends of investment in Nigerian agriculture and analyzes the determinants of investment in Nigerian agriculture.

Levels and trends of investment in Nigerian agriculture

In this subsection, levels and trends of investment were assessed from both literature and evidence from field surveys. Generally speaking, available data on investment in Nigerian agriculture are very scanty for both foreign and domestic investments.

The levels of total real domestic public investment by the three tiers of government indicated an increase. The Federal Government of Nigeria accounted for a very high share of about 86% in 1996, 1997 and 1999; 79% in 1998; and 53% in 2000. Local government contributed the least. As far as the attraction of foreign investment is concerned, agriculture's performance was worse than that of the whole economy during the review period. In general, the pattern of all types of investment in Nigeria was unstable and particularly bad for investment in agriculture.

The proportion of the gross fixed capital formation (GFCF), a measure of the real gross domestic investment, accounted for by the private sector declined over time such that the public sector's share was as high as 75% by 1985. Most public sector investments were in large-scale commercial enterprises that were mismanaged and failed. Public sector enterprises were competitive rather than complementary to commercial initiatives. Both the domestic and foreign flows of private investment into the Nigerian economy as a whole suffered declining and fluctuating trends. GFCF for the agriculture sector followed the same

pattern as the aggregate GFCF of the economy. However, an improvement was noticed in 1996–2000 compared to the 1981–1985 period though the agricultural sector share of the aggregate GFCF was very low, averaging only about 9% for the entire 1981–2000 period.

The results of primary data analysis from field surveys corroborated those of the above secondary data analysis. The flow of private investment (both foreign and domestic) improved more than that of public investment (both foreign and domestic). In general, domestic public investment, as claimed by respondents in four domains (North-central, Northeast, South-south, Southwest), was declining while two domains indicated that foreign public investment had improved a little in the country. On the other hand, foreign private investment flow was perceived to be increasing in five domains, with the strongest indication given by respondents in the South-south domain of the country. Domestic private investment was also perceived to be increasing in five of the six domains. But respondents in the North-central domain claimed that investment from different sources had either remained stagnant or had declined (Table 4).

The main factors responsible for the improved flow of private investment into agriculture were improved economic climate, high returns to investment, and the availability of markets. On the other hand, inconsistent policies and poor infrastructure combined to constrain the inflow of private investment. Public investment was constrained by political instability, poor grassroots participation, and insecurity. However, domestic public investment was positively influenced by the policies of government on food self-sufficiency and poverty eradication.

Determinants of investment in Nigeria’s agriculture

Extensive literature search revealed that investment flow into the economy and the agricultural sector within the economy was determined by a number of factors, such as size of public capital investment, growth of the economy, inflation rate, real exchange rate, economic instability, debt service, etc.

Paucity of data did not allow for a disaggregated analysis that could lead to the identification of key determinants of investment in agriculture. On an aggregated basis (i.e., for

Table 4. Summary of direction of foreign and domestic investment flows to agriculture by development domain*: respondents’ perception.

Type of investment	NC	NE	NW	SE	SS	SW	ALL
Foreign private	0	0.2	0.6	0.3	0.8	0.1	0.3
Foreign public	0	-0.1	0.3	0.3	0.5	-0.1	0.2
Domestic private	0	0.4	0.3	0.6	0.4	0.4	0.4
Domestic public	-0.1	-0.2	0.3	0.5	-0.4	-0.1	0

Notes: Negative (-) values imply decreasing investment; positive (+) values imply increasing investment while zero means no change in investment. Upper limit is +1 and lower limit is -1.

* Development domain: NC = North-central, NE = Northeast, NW = Northwest, SE = Southeast, SS = South-south, and SW = Southwest

the economy as a whole) and for domestic private investment, results indicate that investment in infrastructure positively influences domestic private investment, while variables on investment in non-infrastructure goods and on the inflation rate have a negative influence. The negative sign of the coefficient of non-infrastructure public investment confirms the crowding out of domestic private investment by public sector investment.

The variables that have a positive significant effect on foreign direct investment are public investment in infrastructure, the growth rate of the economy, and the inflation rate. Finally, the economic instability index and debt service ratio do not significantly influence either domestic private or foreign direct investment in Nigeria.

Constraints to private sector investment in Nigerian agriculture

Evidence from literature summarized constraints affecting investment in the Nigerian economy in general and the agricultural sector in particular into eleven categories: technical, infrastructural, economic, financial, political, social, policy, institutional, environmental, external environment, and labor market constraints.

The stakeholders identified five critical constraints affecting foreign and domestic investments in agriculture: infrastructure, financial, technical, economic, and macroeconomic policy/sociocultural, in that descending order of importance (Fig. 2). The other identified constraints were sociocultural, environmental, political, and institutional, also in labor, health, and land tenure.

The nature of constraints associated with infrastructure centers on poor or poorly developed infrastructure, poor state or condition of available infrastructure, etc. Infrastructure, in this instance, is construed to include physical infrastructure, such as the roads and railway systems, educational and health facilities, and social services such as potable water,

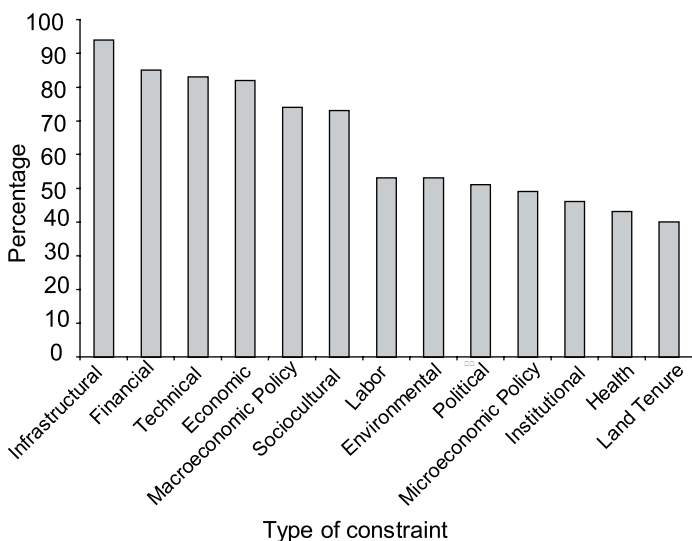


Figure 2. Relative frequency distribution of constraints to foreign and domestic investment in Nigerian agriculture (percentage of responses).

electricity supply, and communications systems. The infrastructural constraint has persisted due to government neglect, poor governance, poor political leadership, poor maintenance culture, and poor funding.

The financial constraint is mainly in the forms of inadequate supply of credit, inadequate financial services, and the high external debt burden. The financial constraint has many economic and social dimensions. Among the factors identified by respondents as being responsible for the persistence of the financial constraint in Nigeria's agricultural sector are ineffective financial policies, inefficient financial market, inadequate financial facilities, low credit supply, high risk of lending, corruption, bureaucracy, unstable exchange rates, poor agricultural funding by governments, and low returns from farming.

Technical constraints take the forms of poor technological base, inadequate availability of viable technology and inputs, low productivity, high production hazards, etc. The technical constraint in Nigeria affects both the upstream and the downstream segments of agriculture. The constraint manifests itself in poor technology, poor quality of raw materials, and an inadequate supply of inputs, in particular, of fertilizer. The main causes of the constraint include low support from government, poor government policy, poverty, low level of awareness, lack of adequate research, and increases in the prices of inputs.

The specific nature of the economic constraint includes the poor economic and investment climate, economic mismanagement, the high cost of production, poor access to market information, high investment risk, etc. The persistence of the economic constraint is a function of some socioeconomic factors. These factors, as identified by respondents, include political instability, poor governance, ineffective government policies, high inflation rate, low investment, inadequate flow of credit to agriculture, poor resource management, and corruption.

The macroeconomic policy constraint is associated with an unfavorable external economic/political environment. Its nature includes poor country credit rating, poor image of the country abroad, unfavorable perception by foreigners of the country's investment climate, and lack of confidence in the country's economy.

The sociocultural constraint is mainly in the form of corruption, indiscipline, insecurity of life and property, social instability/crises, etc. This has been a persistent constraint for a number of reasons that include the heterogeneous nature of the country in terms of religion and ethnic nationalities resulting in variations in attitudes and beliefs. The constraint is aggravated by unemployment, nepotism, corruption, gender discrimination, and poverty.

The labor market constraint consists of a lack of or an inadequate supply of human capital, inadequate skills, and low productivity. The labor constraint in agriculture continues unabated due to the rural-urban drift, lack of skilled laborers, poor technology, and high wages in other sectors of the economy.

The environmental constraint is the consequence of a combination of human activities and natural occurrences. These result in the pollution of the air, land, and water. Pollution of water from the extraction of crude oil in the Delta Region is a major manifestation of the environmental constraint. Others are soil erosion and deforestation.

The political constraint is mainly in the form of political instability, high country risk, and poor governance. The persistence of this constraint is a function of poor political leadership, political instability, poor governance, and nonparticipatory governance. In 43 years of independence, Nigeria has witnessed only 14 years of civilian rule with the remaining years spent under different military regimes. This is clear evidence of political instability.

The microeconomic policy constraint is associated with micro/macro economic instability, poor policy environment, unstable exchange rate, etc. The persistence of the microeconomic policy constraint derives partly from the macroeconomic policy constraint. There does not seem to be proper synergy between the different sectors of the economy, thereby leading to disjointed sectoral policies, which are sometimes contradictory or constitute duplications across the sectors.

The institutional constraint is largely in the forms of a weak legal and regulatory framework, instability of the national research system, market fragmentation, underdeveloped property rights, etc. The elements of institutional constraint that make it persistent are related generally to the banking sector. These include inefficient banking procedures for services, including cumbersome loan processing. Institutional instability, complexity, inefficiency, and weakness are the most often mentioned examples of the institutional constraint.

The health constraint has persisted due to government inaction/neglect, poor leadership, inconsistent policies, lack of good drugs, poor environmental management, and poverty. The land tenure constraint has persisted in the country principally because of rapid growth in population, the traditional land tenure system, weak enforcement of land policy, and gender discrimination.

The intensity of the above constraints differs across the six developmental domains as indicated by the respondents (Fig. 3). The five most important constraints, in descending order of importance, hindering foreign and domestic agricultural investments in the various domains are:

For the North-central: technical, infrastructural, financial, environmental, and political.

For the Northeast: technical, infrastructural, economic, financial, and microeconomic policy.

For the Northwest: infrastructural, technical, sociocultural, financial, and economic.

For the Southeast: infrastructural, economic, financial, sociocultural, and political.

For the South-south: infrastructural, environmental, labor, land-tenure, and financial.

For the Southwest: technical, financial, macroeconomic policy, sociocultural, and infrastructural.

The mapping of constraints showed a wide heterogeneity in the geographic distribution of the identified constraints. For example, infrastructural constraints were ranked very severe throughout the country while the severity of environmental constraints was assessed high only in the South-south development domain. Seven constraints to investment in agriculture with a very high level of severity (> 75% of respondents) in the Federation as a whole or part of it appear in Figure 4.

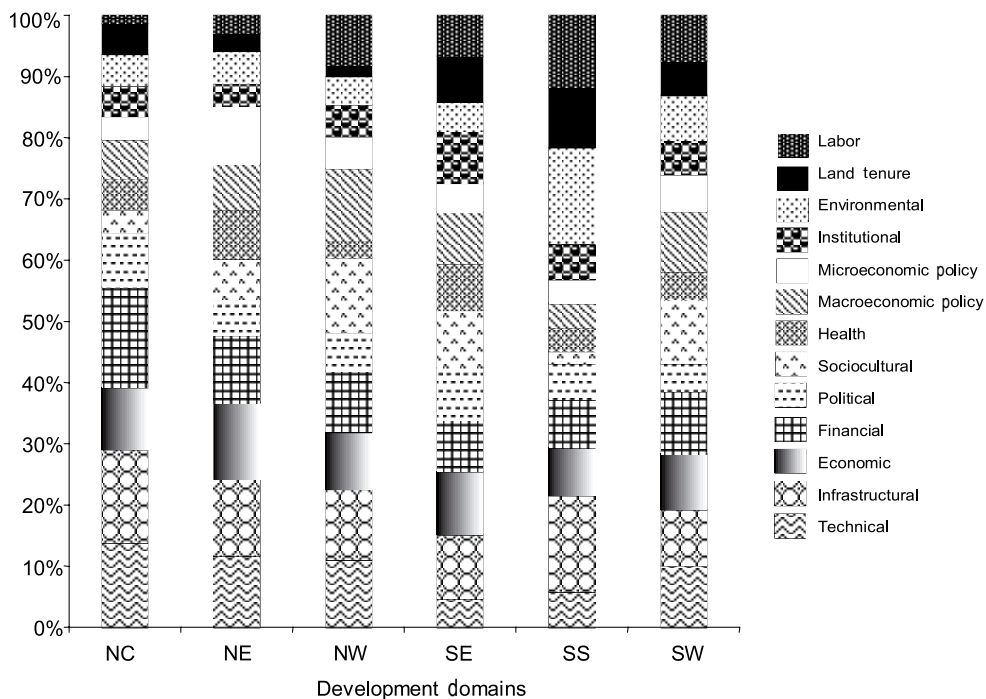


Figure 3. Intensity of constraint to foreign and domestic investments across development domains of Nigeria (% of responses by domain).

Gainers, losers, and nature of gains and losses from the persistence of constraints
 In Nigeria, gainers include some of the civil servants and local private entrepreneurs. These civil servants derive benefits ranging from fraudulent practices such as the receipt of financial kickbacks, traffic of documents, outright award of contract to their cohorts, access to hard currency, etc. Some of the local private investors, contractors, marketers, etc. gain through charging exorbitant prices, marketing low-standard products, reduced payment of taxes, etc. At the foreign level, the main gainers from the persistence of the above constraints in Nigeria are some of the foreign investors, technical partners, and foreigners who take advantage of the precarious investment climate in the country. This group imports all sorts of goods to derive undeserved maximum benefits. Some of the constraints benefit specific groups such as stakeholders.

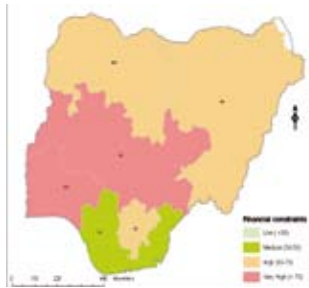
Losers include a wide range of stakeholders. Entrepreneurs, marketers, and processors are affected in the area of low capacity utilization, high cost of power generation, and reduced output. Bankers and lenders are also affected by the persistence of financial constraints. The nature of their losses includes high transaction costs, low investment, lack of investable capital, and loss of employment. Farmers and women are among the most vulnerable groups in the society. The government loses too from low returns to the economy.



Infrastructural constraints



Macroeconomic policy constraints



Financial constraints



Sociocultural constraints



Technical constraints



Environmental constraints



Economic constraints

Figure 4. Mapping of very severe constraints affecting investment in agriculture in Nigeria.

Farmers' losses take the form of low access to modern inputs, reduced outputs, low income, and high incidence of poverty. Consumers will have to bear high costs of food and other processed products.

Effects of constraints on commercialization and investment in Nigerian agriculture

The effects of the identified constraints on commercialization and investment in Nigerian agriculture are low output/productivity, high cost of production, low returns to investment, low/poor level of investment, high price of agricultural products, collapse/disruption of businesses, insufficient working capital, low capacity utilization, poor investment climate, loss and or poor quality of products, poor economic growth, loss of invested fund, loss of life, loss of assets or property, loss of confidence in the economy, high marketing costs, high transportation costs, excessive importation/dumping of fake and substandard products, uncompetitiveness of products in the world market, drudgery of farming, insecurity/violence, poverty and suffering, capital flight, sickness/poor health conditions, destruction of natural production resources, and loss of biodiversity.

As a result of above effects, the private sector is not encouraged to make substantial and sustainable investments in the Nigerian agricultural sector.

Investment options in Nigerian agriculture

This summary is taken from chapters six and seven of the main report. The summary describes the attractiveness of agricultural enterprises to private investors, the priority commodities for investment in Nigerian agriculture in terms of their comparative advantage, stakeholders' ranking of these commodities, and the returns to investment in them.

Attractiveness of agricultural enterprises to private investors

Investors are always willing to put their money in attractive enterprises. The general inference from analysis is that agricultural enterprises in Nigeria are fairly attractive to domestic investors while they are less attractive to foreign investors. This study identified thirteen types of enterprises or economic activities worthy of investment in Nigerian agriculture. These are: input production and supply, staple food crops, industrial crops, livestock, fisheries, forestry, commodity processing, storage, agricultural commodity marketing, agro industry/manufacturing, agricultural commodity export, and agricultural support services. Nine out of the thirteen enterprises are hardly attractive to foreign investors (Table 5). Foreign investors will be much more interested in input production/supply of inputs, processing of commodities, and agro industrial or manufacturing enterprises, all of which are downstream activities and highly capital intensive. Domestic investors will be willing to invest in input production and supply, commodity processing, commodity marketing, and agro industry/manufacture. The primary or upstream production activities seem not to attract much investment interest from either foreign or domestic private sectors. Therefore, small-scale farmers would remain the main investors in the primary production subsector. Regional differences in areas of investment interest were observed across the country.

Table 5. Attractiveness of agricultural enterprises to foreign and domestic private investors by development domain*.

Economic enterprises	NC		NE		NW		SS		SE		SW		All	
	FRN	DMT	FRN	DMT	FRN	DMT	FRN	DMT	FRN	DMT	FRN	DMT	FRN	DMT
Input production/supply enterprises	4	3	4	5	4	5	4	3	4	3	3	3	4	4
Staple crop production enterprises	1	4	3	3	2	5	4	4	3	4	3	4	3	4
Industrial crop production enterprises	5	4	2	4	3	4	3	3	4	4	4	4	3	4
Livestock production enterprises	2	3	4	4	3	4	4	4	3	4	3	3	3	4
Fisheries	3	3	3	4	3	4	4	3	2	3	3	4	3	4
Forestry	5	4	3	3	2	2	3	2	3	2	4	4	3	3
Commodity processing	4	4	4	4	4	5	4	3	4	4	4	4	4	4
Agricultural storage	3	3	4	3	2	3	4	3	2	3	3	3	3	3
Agricultural transport	2	2	3	4	2	4	3	3	2	3	3	3	2	3
Commodity marketing	4	4	3	4	2	5	3	3	3	4	3	3	3	4
Agroindustry/manufacturing	5	4	4	4	4	5	4	3	4	4	3	3	4	4
Commodity export	3	3	4	3	3	4	4	4	3	3	4	3	3	3
Support average	3	2	4	5	3	3	2	2	3	3	3	3	3	3
Overall average	3	3	4	4	3	4	4	3	3	3	3	3	3	4

Ranking: 1 = not attractive; 2 = weekly attractive; 3 = attractive; 4 = fairly attractive; 5 = very attractive

FRN = Foreign; DMT = Domestic

*NC = North-central, NE = Northeast, NW = Northwest, SE = Southeast, SS = South-south, SW = Southwest

Source: Field Survey, February/March, 2003.

In the North-central domain, the enterprises fairly attractive to foreign investors are input production and supply enterprises, processing, and marketing of agricultural commodities. Similarly, the economic enterprises of strongest attraction are industrial crops, forestry, and agroindustrial/manufacturing enterprises. On the other hand, staple crop production is not at all attractive for foreign investment while livestock production and agricultural transport service are only weakly attractive.

In the Northeast domain, seven agricultural enterprises have the potential to attract investment from foreign investors. These are agricultural input production/supply, livestock production, agricultural commodity processing, agricultural storage, agroindustry/manufacture, agricultural commodity export, and agricultural support services. Industrial crop production enterprises are weakly attractive to foreign investors. For the domestic investors, nine enterprises were found to be attractive for investment. In particular, input production/supply and the provision of support services could be very attractive for local

investment. Further, industrial crop production and agricultural transport are fairly attractive areas of investment to domestic investors.

In the Northwest domain, three areas fairly attractive to foreign investors are input production/supply, commodity processing, and agro processing/manufacturing. However, the areas weakly attractive to foreign investment are staple crop production, forestry, agricultural storage, transportation, and commodity marketing. For domestic investors, the most attractive economic enterprises are production and supply of agricultural inputs, staple crop production, commodity processing, marketing, and agro industry/manufacture. The fairly attractive enterprises are industrial crops, livestock, fisheries, agricultural transport, and commodity export. Forestry enterprises are adjudged to be weakly attractive for domestic investment.

In the Southeast domain, four fairly attractive enterprises for foreign investment are input production/supply, industrial crop production (in particular oil palm and rubber), commodity processing, and agro industry/manufacture. Three enterprises are considered to be weakly attractive for foreign investment: fisheries, agricultural storage, and agricultural transport service. The local investors can invest in staple crop production (high demand for food products), industrial crop production, livestock production, commodity processing, marketing, and agro industry/manufacture. Enterprises weakly attractive to domestic investors in the Southeast domain are forestry based.

In the South-south domain, the fairly attractive economic enterprises for foreign investment are input production/supply; production of staple crops, livestock, and fisheries; commodity processing; agricultural storage; agro industry/manufacture; and commodity export. The weakly attractive enterprises for foreign investment in the zone are those in agricultural support services. The domestic investors would find investment attractive in staple crop production, livestock production, and commodity export. They would, however, not invest in forestry and support services.

In the Southwest domain, four economic enterprises would be fairly attractive to foreign investors: industrial crop production, forestry, commodity processing, and commodity export. Similarly, local investors would be fairly attracted to invest in staple food crop production, industrial crop production, fisheries, forestry, and commodity processing enterprises.

Across the domains and enterprises, three main reasons stand out as accounting for the attractiveness of enterprises to foreign investors. These are a high level of demand for both primary and processed products, the availability of raw materials/inputs, and a high rate of returns. However, the huge capital requirement to begin a new business or run an old one is a disincentive for domestic investors' involvement in input production/supply enterprises and agricultural commodity processing. Similarly, land fragmentation is a major disincentive for domestic investors' participation in forestry enterprises in both the Southeast and South-south zones.

Priority commodities for investment in Nigerian agriculture: stakeholders' ranking
Under this subsection, the report identifies agricultural commodities of comparative advantage, describes reasons for the comparative advantage, and stakeholders ranking of commodities. The agricultural commodities in which the different domains have a comparative

advantage in the domestic, regional, or world market have been divided into two groups: processed and unprocessed commodities (Table 6).

For the unprocessed commodities, field survey results show that the southern domains have a comparative advantage in the production of root and tuber crops (cassava, yam, and cocoyam), palm produce, cocoa, and some other tree crop commodities plus timber. The Northeast and Northwest have their comparative advantage in the production of cereals and legumes, cotton, gum Arabic, vegetables (tomato, pepper, onion, etc.), and livestock products. The North-central is a transitional zone between the northern and southern domains. Hence, it has comparative advantage in the production of some commodities that are produced in the north and the south. These include soybean, yam, cassava, groundnut, maize, palm produce, citrus, and cashew. Although most of the commodities can be produced with comparative advantage in more than one domain, there are also some commodities that are specific to only one or two domains. Good examples of these are crayfish and shrimps in the South-south domain, shrimps in the Southwest, and gum Arabic in the Northwest.

The processed products in which the domains have a comparative advantage are derived from the unprocessed commodities listed above. In the North-central, these are

Table 6. Agricultural commodities in which development domains have comparative advantage in the domestic, regional or world market by development domain.

Development domain	Unprocessed	Processed
North-central	Soybean, yam, cassava, beniseed, groundnut, neem, fruits, honey, mango, cashew, palm kernel, maize, citrus.	Soy oil and meal, canned fruits, orange juice, vegetable oil.
Northeast	Vegetable production (tomato, pepper, onion etc); oil seed production (groundnut); Gum Arabic production, cotton.	Vegetable processing (tomato, pepper, onion etc); cotton lint; Gum Arabic products.
Northwest	Ginger, tomato, cotton, sorghum, groundnut, garlic, gum Arabic, soybean, sesame, cowpea, and wheat.	Textiles, beer, groundnut oil, hides and skins, tomato paste, resin, leather.
Southeast	Oil palm, cassava, yam, rice, poultry, cocoyam, plantain, banana, vegetables, ginger, timber, cashew nuts, cocoa, maize, melon, rubber, and copra.	Palm oil, cassava chips/gari, yam flour, fruit juice, canned fish, cocoyam chips, plantain chips, vegetable oil, cassava flour, honey, plantain flour, rubber products, cashew products, and kola nuts.
South-south	Cocoa, palm fruit, rubber, timber, nontimber forest products, cassava, fish, crayfish, and shrimps.	Cassava chips, palm oil, latex, cassava toasted granules (gari), cocoa powder and chocolate, and palm kernel oil and cake.
Southwest	Cassava, palm produce, cocoa, timber, oil palm, fish, and shrimps.	Fish and shrimps, yam, timber, cassava, and cocoa cake.

Source: Field Survey, February/March, 2003.

orange juice, vegetable oil, soy oil and meal, and so on. In the Northeast and Northwest, processed commodities in which there is a comparative advantage are processed vegetables, cotton lint, textiles, and hides and skins, among others. In the southern domains, processed commodities that are commonly produced across these zones include cassava products such as gari and fufu, and cassava chips, and elubo from yam. Those commodities that are specific to the Southeast include yam flour, rubber products, cassava products, and plantain chips. Those specific to the South-south domain are cocoa powder and chocolate, and rubber latex. The Southwest domain has, among others, timber, cocoa products, and cassava products.

Each domain attributed their comparative advantage to the availability of suitable agroclimatic conditions for production and of resources required in the production of the unprocessed commodities. Besides this, the Northeast domain mentioned that the high demand for the products, availability of infrastructure, and high rate of returns on investment were responsible for its competitive advantage. In the North-central domain, the relatively low cost of production and large local production base conferred on it the comparative advantage. The Northwest domain, identified the availability of irrigation and cheap labor as factors accounting for its comparative advantage. The Southeast domain recognized good high resource productivity, skilled labor, low cost of production, and the relatively large production base for the crops as the reasons responsible for its comparative advantage in the production of those unprocessed commodities. The good quality of soil was one of other reasons mentioned in the South-south domain, while the good quality of products was one of the reasons identified by the respondent groups in the Southwest as being responsible for their comparative advantage.

The most important commodities with the highest domestic consumer demand and the greatest potential for commercialization/trade, especially within the West Africa subregion, in Nigeria, and the various development domains are (in descending order):

- for the country as a whole: cassava, yam, maize, millet, groundnut, rice, sorghum, poultry, vegetables, and cowpea
- for the North-central: cassava, groundnut, maize, yam, oil palm, pepper, and soybean
- for the Northeast: maize, vegetables, sorghum, groundnut, and pepper
- for the Northwest: maize, sorghum, groundnut, vegetables, pepper, and soybean
- for the Southeast: cassava, maize, oil palm, pepper, plantain, and groundnut
- for the South-south: cassava, oil palm, cocoa, rubber, maize, and pineapple
- for the Southwest: cassava, cocoa, maize, pepper, and vegetables

Priority commodities for investment in Nigerian agriculture: ex-ante evaluations of returns to investments

This section presents results from a quantitative evaluation of returns to investment in agricultural commodities in Nigeria. This evaluation is based on the ranking of priority commodities in the previous subsection where stakeholders identified 46 commodities for which Nigeria or a development domain within the country could have a comparative advantage in the domestic, regional, or international markets (Table 7).

Table 7. Commodities with comparative advantage for investments as ranked by stakeholders in each development domain.

Primary production	North-central	Northeast	Northwest	Southeast	South-south	Southwest	
Staple crop production	<ul style="list-style-type: none"> • Rice • Maize • Sorghum • Millet • Cowpea • Cassava • Yam • Beniseed 	<ul style="list-style-type: none"> • Sorghum • Maize • Millet • Cowpea • Cassava • Rice • Beniseed 	<ul style="list-style-type: none"> • Millet • Sorghum • Maize • Cowpea • Cassava • Rice • Beniseed • Maize • Yam 	<ul style="list-style-type: none"> • Yam • Cassava • Rice • Maize • Vegetables • Cowpea • Soybean • Plantain 	<ul style="list-style-type: none"> • Yam • Cassava • Rice • Maize • Cocoyam • Vegetables • Cowpea • Groundnut • Soybean • Plantain • Cocoa • Oil palm • Rubber • Cashew • Orange 	<ul style="list-style-type: none"> • Yam • Cassava • Maize • Vegetables • Cowpea • Groundnut • Soybean 	<ul style="list-style-type: none"> • Cassava • Maize • Vegetables • Rice • Cowpea • Groundnut • Soybean • Pineapple • Oil palm • Rubber • Cashew • Ginger • Cocoa
Industrialcrop production	<ul style="list-style-type: none"> • Soybean • Groundnut • Cotton • Vegetables • Coffee • Oil-palm 	<ul style="list-style-type: none"> • Groundnut • Soybean • Cotton • Sorghum • Vegetables 	<ul style="list-style-type: none"> • Soybean • Vegetables • Groundnut 	<ul style="list-style-type: none"> • Cocoa • Oil palm • Rubber • Groundnut 	<ul style="list-style-type: none"> • Cocoa • Oil palm • Rubber • Cashew • Orange 	<ul style="list-style-type: none"> • Cocoa • Oil palm • Rubber • Cashew • Orange 	<ul style="list-style-type: none"> • Pineapple • Oil palm • Rubber • Cashew • Ginger • Cocoa
Livestock production	<ul style="list-style-type: none"> • Cattle • Sheep • Goats • Poultry • Pigs • Fish 	<ul style="list-style-type: none"> • Cattle • Sheep • Goats • Poultry • Pigs • Fish 	<ul style="list-style-type: none"> • Cattle • Sheep • Goats • Poultry • Pigs • Fish 	<ul style="list-style-type: none"> • Poultry • Sheep • Goats • Cattle • Pigs • Fresh fish • Smoked fish • Timber • Teak 	<ul style="list-style-type: none"> • Cattle • Small ruminant • Rabbits • Poultry • Pigs • Aquaculture 	<ul style="list-style-type: none"> • Cattle • Sheep • Goats • Rabbits • Pigs • Fish • Crayfish • Shrimps • Ginger • Cashew nut 	<ul style="list-style-type: none"> • Cattle • Sheep • Goats • Rabbits • Pigs • Fish • Crayfish • Shrimps • Ginger • Cashew nut
Fishery	<ul style="list-style-type: none"> • Fish 	<ul style="list-style-type: none"> • Fish 	<ul style="list-style-type: none"> • Fish 	<ul style="list-style-type: none"> • Fresh fish • Smoked fish • Timber • Teak 	<ul style="list-style-type: none"> • Aquaculture 	<ul style="list-style-type: none"> • Fish • Crayfish • Shrimps • Ginger • Cashew nut 	
Forestry	<ul style="list-style-type: none"> • Gum • Arabic • Ginger • Cashew nut 	<ul style="list-style-type: none"> • Gum • Arabic • Fuel wood • Gmelina 	<ul style="list-style-type: none"> • Teak • Mahogany • Gmelina • Ginger 	<ul style="list-style-type: none"> • Timber • Teak 	<ul style="list-style-type: none"> • Timber 	<ul style="list-style-type: none"> • Timber 	<ul style="list-style-type: none"> • Cashew nut

Ex-ante evaluation of returns to investment was completed for 26 commodities for which data were readily available to run the partial equilibrium IFPRI DREAM model (for example, all the forestry commodities or plantain for the South-south or cotton for the Northeast did not enter the analysis because of lack of data). Given the current level of technology portfolio available for each commodity and its consumption, elasticity of supply, and elasticity of demand, cassava emerged as commodity number one to invest in for estimated gross returns of US\$570 M per year over the simulation period of 17 years from 1999 to 2015. The next ten ranked commodities with returns greater than US\$1 billion are yam, maize, millet, groundnut, rice, sorghum, poultry, leafy vegetables, cowpea, and pepper. The second group of priority commodities (with returns of US\$100–1000 million) includes beef, oil palm, fish, melon, tomato, soybean, onion, rubber, and cocoa (Fig. 3.5). The lowest ranked commodities are beniseed and cashew nut (less than US\$10 million over 17 years).

Major regional differences were recorded in this priority setting exercise of commodities using the criterion of returns to investments (Table 8). For roots and tubers, cassava gives the highest returns in the North-central, South-south, Southeast, and Southwest in decreasing order of returns. Yam stands high in the North-central followed by the South-south. Patterns are uneven for cereals: rice is exclusive in the North-central, maize is better promoted in the Northwest, North-central, and Southwest. Millet is profitable only in the Northwest and Northeast, while sorghum is the crop for the three northern development domains. Grain legumes (groundnut, soybean, and cowpea) give high returns in the three northern domains. The patterns for grain legumes were also observed for the group of vegetables except for leafy vegetables that grow well throughout the country. As expected, tree crops such as oil palm (South-south and Southeast), cocoa (Southwest), and rubber (South-south) are produced better in the humid domains of the country. In contrast, cashew nut and ginger are commodities for the North-central and Northwest. There is an indication of specialization in livestock production across development domains. Ruminants (cattle, goats, and sheep) are important in the three northern domains although goats have a smaller but significant presence in the southern domains. Pigs and fish are important in the South-south. As expected, poultry are found everywhere with a major presence in the South-south.

As said earlier, there are some other commodities with great potential for international trade and which, though commercially important in certain development domains, did not show up in the partial equilibrium analysis either because of lack of data or their limited zonal-specific distribution and comparatively small total national output. These include:

- gum Arabic in the North-central and Northwest domains
- prawns, shrimps, and plantain in the South-south domain
- beef and dairy products and associated hides and skins in the Northeast and North-central domains
- cotton in the Northeast and Northwest domains
- other forestry trees in humid parts of the South-south and Southeast domains.

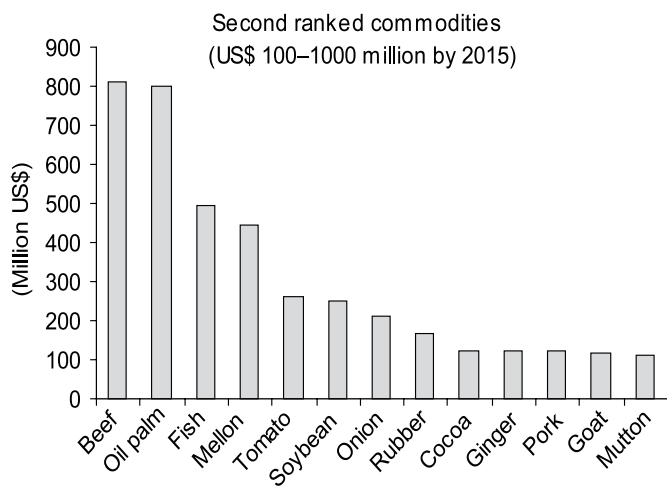
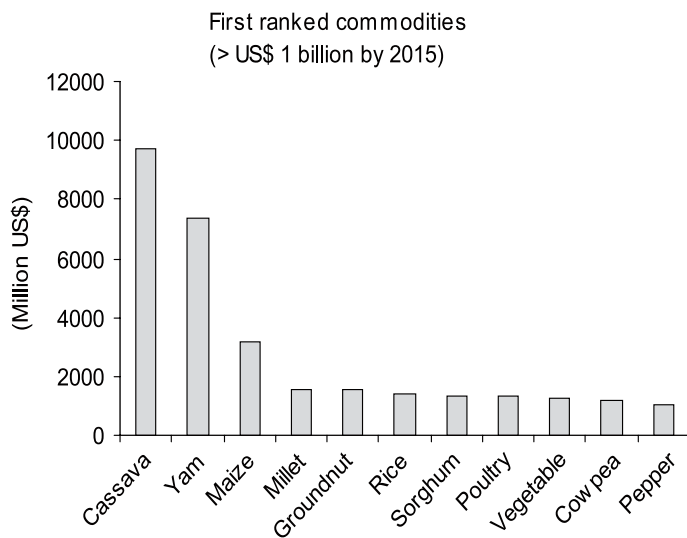


Figure 5. From DREAM analysis: identifying for investments in research and development in Nigeria—based on streams of benefits to producers and consumers by 2015 as a result of existing portfolio of technologies.

Table 8. Commodity ranking by total benefit in each development domain of Nigeria (relativity to crop ranked 1 in each domain).

Rank	Northwest		North-central		Northeast		Southeast		South-south		Southwest		Nigeria	
	Crop	Relativity	Crop	Relativity	Crop	Relativity	Crop	Relativity	Crop	Relativity	Crop	Relativity	Crop	Relativity
1	Millet	1	Yam	1	Millet	1	Cassava	1	Cassava	1	Cassava	1	Cassava	1
2	Sorghum	0.64	Cassava	0.85	Cowpea	0.75	Yam	0.72	Yam	0.63	Yam	0.48	Yam	0.70
3	Maize	0.62	Rice	0.32	Sorghum	0.66	Poultry	0.16	Maize	0.18	Maize	0.34	Maize	0.30
4	Groundnut	0.54	Maize	0.29	Groundnut	0.58	Maize	0.16	Oil palm	0.18	Pepper	0.19	Millet	0.26
5	Cowpea	0.52	Groundnut	0.22	Maize	0.57	Oil palm	0.12	Fish	0.09	Vegetable	0.14	Groundnut	0.20
6	Pepper	0.40	Sorghum	0.12	Beef	0.56	Rice	0.11	Poultry	0.07	Poultry	0.14	Rice	0.15
7	Vegetable	0.32	Pepper	0.09	Vegetable	0.38	Vegetable	0.07	Vegetable	0.06	Cocoa	0.06	Sorghum	0.11
8	Beef	0.29	Melon	0.08	Poultry	0.36	Melon	0.03	Rubber	0.06	Rice	0.06	Poultry	0.09
9	Cassava	0.29	Beef	0.07	Fish	0.31	Cowpea	0.02	Pork	0.03	Cowpea	0.04	Vegetable	0.07
10	Poultry	0.20	Cowpea	0.06	Cassava	0.22	Beef	0.01	Cowpea	0.01	Oil palm	0.04	Cowpea	0.05
11	Onion	0.15	Poultry	0.05	Tomato	0.20	Fish	0.01	Pepper	0.01	Fish	0.03	Pepper	0.05
12	Tomato	0.11	Vegetable	0.05	Melon	0.06	Groundnut	0.01	Melon	0.01	Tomato	0.02	Beef	0.03
13	Soybean	0.10	Millet	0.04	Goat Meat	0.06	Goat Meat	0.00	Goat Meat	0.01	Groundnut	0.02	Oil palm	0.03
14	Ginger	0.09	Soybean	0.04	Pepper	0.05	Pork	0.00	Rice	0.01	Melon	0.02	Fish	0.03
15	Mutton	0.06	Onion	0.01	Mutton	0.05	Pepper	0.00	Cocoa	0.01	Beef	0.01	Melon	0.02

Chapter 4

Recommended Strategies for Accelerated Commercialization and Investment in Nigeria's Agriculture

This summary is taken from chapter eight of the main report. It identifies the strategies for commercialization, mitigating negative impacts of commercialization on gender and equity, enhanced food security, sustainable environmental management, the sectoral policies for specific priority commodities, regional development hubs, and some recommended areas for future studies.

Strategies for commercialization

The AIN study recommended that intervention strategies for increasing investment in Nigeria's agriculture should apply an integrated commodity approach. As regards the selection of a priority commodity as the basis for investment activity support, its commercialization has to be encouraged through the adoption of any one or all of the following four suggested modules:

Module 1: The integrated commodity marketing system module

This requires a symbiotic link or association being formed between large operators (producers and/or processors of a named commodity) and small/medium enterprises (SMEs) in the same commodity subsector.

Module 2: The public-private sector agroindustry investment module

The state government initiates a commodity agroindustrial/marketing investment by leading in providing the basic infrastructure and "warehousing" of it for a limited period before handing the entire investment over to selected private-sector stakeholders.

Module 3: The cooperative enterprise module

This is purely for areas where there is a spirit of natural cooperation exhibited among certain commodity farmers. The module requires the members to form and register an association through which they establish simple, jointly owned, and low-scale processing and marketing facilities for their produce.

Module 4: The Songhai Project module

This involves the identification and use of really dedicated and knowledgeable agricultural investors to establish integrated, resource-recycling, multi-enterprise farm facilities/centers in the country for the short-term training of different commodity farmers. These, after completing their training, set up and/or operate their own agroenterprises with the understanding that they can sell their produce (raw, processed, or semiprocessed) through these centers.

Strategies for mitigating negative impacts of commercialization on gender and equity

Increased commercialization in the agriculture sector might result in negative impacts on gender and equity. This could be ameliorated by the promotion and facilitation of more involvement by women in the postharvest, economic, and marketing activities of commercialized agriculture; assisting women to get organized into marketing groups that can effectively carry out the commercialization of key agricultural commodities; and facilitating the establishment of other groups to empower women that will promote an early start to improve girls' access to education and training in modern technical skills as well as in leadership.

For the above-suggested strategies to be effectively implemented, it will be necessary for any donor agency promoting agricultural development in Nigeria to render supportive activities.

Strategies for enhanced food security

Food security could be enhanced by increasing a science-based agricultural productivity that reduces yield gaps; intervening in postharvest processing and preservation activities of the commodity continuum; promoting the establishment, hosting, and management of an easily accessible and comprehensive national database/center; and building the capacity of government officials from the various states of the country in monitoring the status of food security.

Strategies for sustainable environmental management

Increased investment in the agricultural sector of Nigeria will most likely pose an increased threat to the physical environment either through land degradation and the pollution of the ecosystem by the effluent of processed agricultural commodities, or through the exhaustion of agricultural resources. The agricultural environment will be sustained by the promotion and the adoption of proper cultural practices associated with various commodities, adoption of postharvest processing technologies, and the use of crop and/or livestock mixed enterprises that prevent erosion and minimize soil degradation.

Sectoral policies for specific priority commodities

In promoting investment in priority commodities through sectoral policies, effort should be directed at the following:

- Creation and promotion of lobbying groups to look after the interests of the commodity. A mixture of actors with a stake in the commodity will constitute the lobbying group.
- Design and adoption of grades and standards that favor the utilization of existing products and the development of new products with added value.
- Creation of an enabling macroeconomic policy environment for the commercialization of priority products, thereby contributing to their appeal to private investors.

Regional development hubs

In order to achieve a remarkable result, investments must be geographically concentrated in well-identified high potential areas. Three regional development hubs, northern, central and southern seem to be emerging with respect to the priority commodities for consideration by USAID or any other development investor.

- The northern development hub could be built on grain legumes and cereals. Cowpea, groundnut, soybean, maize, and sorghum are emerging as leading commodities. Rotating these commodities will be environmentally sound, especially if combined with livestock enterprises. Crops such as gum Arabic, ginger, and livestock (hides and skins) offer high potentials for export. This regional hub will greatly benefit from national research centers located at the extreme west of the area, such as Institute of Agricultural Research (IAR), and the extreme east, such as Lake Chad Agricultural Research Institute (LCARI).
- The central development hub is characterized by a mixture of cereals and root and tubers. Rice for cereals and yam for root and tubers could form the leading commodities for the hub, which will benefit from research centers such the National Cereals Research Institute (NCRI) located in the middle belt of the zone.
- The southern development hub would include many states of southern Nigeria. Cassava and yam are the dominant commodities. Cocoa, fish, and plantain offer additional opportunities for export, food security, and income generation. The National Roots Crop Research Institute (NRCRI) and Cocoa Research Institute of Nigeria (CRIN) are the national research institutions to back up the implementation of the strategy in this hub.

Subregional development could be defined as well, depending on the interests and priorities for the investor.

Recommended future studies

Three future in-depth studies are recommended in this section as action plans to be implemented by USAID/Nigeria and/or other development investors in the country. These studies are a natural follow-up to the present AIN report and would center on three

major intervention areas that are considered critical to the attainment of the stated strategic objectives in the country's agriculture sector.

1. A subsector concentration analysis study that will identify meaningful interventions for optimal project impacts along the major commodity continuum sections.
2. A downstream agriculture activities' study that specifies which products and processes are needed for increased high value-added outputs of the selected commodities.
3. An integrated monitoring and evaluation program design that will develop a strategic knowledge management and evaluation system with well-defined impact indices for each selected priority commodity in the regional hubs of the country.