Nigeria macro report

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O. Akande

Nigerian Institute for Social and Economic Research (NISER)

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INTRODUCTION

Focus of the Study

This study examines the continuing evolution of progressive agricultural development in Nigeria. It explores the process of agricultural intensification within the framework of the Green Revolution (GR) process, which may be perceived as a series of policies, programmes and projects initiated and directed by the state at modernising agricultural production practices.

One of the most critical development concerns facing Nigeria today is how the country can provide, from domestic sources, adequate quantities and quality of food to meet the needs of its teeming population. Consequently, the transformation of food production becomes a fundamental issue which the Nigerian state has had to address, because of the several macro and micro implications of food to the country, including curtailment of food imports and conservation of foreign exchange, raising the level of food consumption and nutritional status of Nigerians, reducing inequality, and stimulating the demand for industrial goods and services. This involves public policy in the agricultural sector and the macro economy as a whole, the supply and management of biological and mechanical inputs as well as the institutions, structures and administrative arrangements that attempt to establish a balance between supply and demand in food commodities.

The state has remained the motivating force in this regard. This is particularly so in strategy planning, implementation and administration. This report dwells largely on the role of the state in shaping and executing technology-based agricultural policies directed at increasing food production in Nigeria. The issues involved are examined within the economic, social and political milleau defined by the action and, indeed, inaction of the government of Nigeria. The analysis is in historical sequence, tracing the evolution of food policy before the amalgamation of Northern and Southern Nigeria in 1914, to as lately as 2003. During this period the Nigerian agriculture has witnessed a plethora of interventionist strategies and policy episodes which impacted for good or for ill on food production.

For convenience and focused discussions the following policy regimes are emphasised - the colonial period, that is, before 1960; the independence and pre-structural adjustment years, 1960-1985; the structural adjustment years, 1986-1993; and the post adjustment years, 1994 till the present time. Within each period, the building blocks for the exposition of the prevailing policy stance are some critical factors, which we may call the "six I's." These are Institutions, Incentives, Infrastructure, Information, Inputs/Investments and Innovations/Research.

Institutions are various creations, outfits or arrangements which address particular issues such as marketing and financing. They may also be implementation agencies and structures which give expression to state intervention and how the state plans to carry out particular policies. *Incentives* are those things which tend to encourage farmers to raise their production or achieve efficiency in carrying out particular functions. The incentive domain includes but not limited to

input and output prices, subsidies and some actions that grant market advantage to local producers such as import restriction on competitive products. *Infrastructure* are things that facilitate and create a conducive environment for productive activities to take place and generate economic growth (ADB, 1999). Infrastructure in a generic sense embraces adequate power, water, transport and communications, technological know-how, education, health and others which allow optimization of production process or locational advantages. *Information* deals with extension education and dissemination of knowledge or awareness to farmers. *Inputs/Investments* refer to direct government expenditure and patterns of spending in the agricultural sector. *Innovation/Research* refers to generation of knowledge, new technologies and better practices which raise efficiency, productivity and total farm earnings.

The status of the various elements described above has influenced the present state of food production and farmers' welfare. Apart from the six I's, the discussions also consider the issue of market mediation and the role of the market intermediaries, as well as specific food policies, regulations and legislations pursued by the various tiers of government in the Nigerian federation, with regards to the market (input, output and technology). Further still, the paper attempts a characterisation of the Nigerian small scale farmer with special emphasis on how and why he responds or fails to respond to state policies and information. The outcome of the various policy measures as reflected by crop output is also considered within the text.

Conceptual Issues

It is important at the outset to define what the Green Revolution (GR) is in the African context. In the development literature GR is defined in several general ways. One of these, albeit in a rather narrower perspective than we intend to achieve in this report, sees GR as ***a process of agricultural intensification driven by new technologies developed by crop breeders*.** The GR in its original context is associated with scientific breakthrough in Asia, Mexico and Latin America, a feat pioneered by Dr. Norman Borlaug. Essentially, the Asian GR refers to the high-yielding varieties of cereals (notable rice, maize and dwarf wheat) which, when planted and managed alongside all production percusites, resulted in unprecedented yield levels. The GR is, therefore, technology-driven and involves not only the breeding of high-yielding varieties but also the use of agrochemicals like fertilizers, herbicides, integrated pest management practices and timely farm operations.

The African GR certainly does not possess most of these attributes. That is, Africa has not yet experienced major breakthroughs in scientific research in agriculture that has led to the production of spectacular high-yielding crop varieties. Indeed, the African agriculture is characterised by insufficient availability of production inputs like fertilizer, herbicides and other crop growth agents that necessarily accompany high-yielding varieties. There is also lack of management knowhow and practices that could ensure sustainable agricultural output. However, in spite of the absence of these attributes and the obvious lack of all the essential ingredients of modern agriculture as defined by technological knowhow, Africa is determined to make significant strides in agriculture. The attempts being made reflect the concern with which the political class views the problem of agriculture and the urgency to make amendments that could lead to improved performance. These series of actions provide opportunities for systematic development of African agriculture. The African GR should, therefore, be perceived as having a

character of its own, possessing certain unique features which show the concern for food production, in particular, and which recognise the role of agriculture in the overall development of the African economy. Agriculture in Africa's development is expected to provide food for the teeming population, raw materials for the domestic agro-based industries, foreign exchange earnings through agricultural exports, household income for farmers and creation of employment opportunities for the active labour force.

Therefore, we could accept as working definition the proposition by Djurfeldt and Jirstrom (2002), that GR in the African context is a process of agricultural intensification aimed at increasing domestic self-sufficiency and security in food production, stimulated by state policies which encompass (i) protection of the domestic market against dumping and low- priced imported food, (ii) price guarantees for farm gate prices or subsidies of input prices, stimulating producers to adopt new technologies which lead to increased production; and (iii) facilitating the extension of technology required for farmers to increase their production, through the instrumentalities of improved seeds, chemical fertilizer, pesticides, irrigation and other agricultural technology.

Another concept that requires clarification and, indeed, some modification in the context of this report is "agricultural intensification". Conceptually, it denotes the use of the same piece of land for several years, a process which is made sustainable by the use of productivity-enhancing inputs such as fertilizers, pesticides and mechanical devices. Intensification in this context may be quite suitable in a land-scarce economy where increasing population further puts pressure on available arable land and limits the hectareage that may be available to a producer, irrespective of productive resources, other than land, available to that particular producer. In most African countries and particularly Nigeria, which accounts for a quarter of Africa's nearly 500 million population, land scarcity, in a way that severely constraints agricultural production, is an isolated case rather than a widespread occurrence. Consequently, intensification as an inevitable response to land scarcity may be an aberration in the African context. That is, intensification, in most cases, will be a choice rather than a practice imposed by land scarcity. This clarification does not detract from accepting the fact that most future agricultural growth would have to come from the intensification of agricultural production on land that is already in use. It also accepts that intensification leads to higher yields through the use of yield-enhancing agents and shifts to more profitable commodities.

The Nigerian Society and Economy

Nigeria is located between latitudes $4^{o}20'$ and 14° North, and between longitudes $3^{o}20'$ and $14^{o}30'$ East, covering a geographical space of 923,768 square kilometres. This, according to Awolowo (1968:295), makes Nigeria the ninth largest country in the world with the combined sizes of Belgium, France, and the United Kingdom. Nelson (1982: xxiii) has also equated the land mass of Nigeria to the combined sizes of Texas, Louisiana, and Mississippi in the United States. Nigeria's coastline stretches across a space of over 790 kilometres while the coastal to the northern limits is a distance of about 1,040 kilometres. The east-to-west distance is about 1,120 kilometres.

A multi-ethnic society, Nigeria is the most populous nation in Africa, having a population of well over 130 million people who belong to about 350 ethnic groups. The dominant groups are Hausa, Yoruba, Ibo, Fulani, Kanuri, Ibibio, Tiv, Ijaw and Edo. The Hausa, Fulani, Kanuri and Tiv occupy the northern parts of the country while the others live in the south, with the Yoruba and Edo, being predominant in the South West and Ibo and Ibibio dominating in the South East. Each of these groups exhibits unique dietary characteristics and food preferences, with the result that a diverse array of food commodities and food forms pervades the Nigerian food consumption landscape. For instance, from maize alone, over 250 different types of dishes and drinks have been identified among the various ethnic groups (Anthonio and Akinyosoye, 1985). The huge population, ethnic diversity and pluralism of culture make Nigeria Africa's most promising economic and political powerhouse. For most of its 42 years of existence, the country was under military dictatorship but since May, 1999 she has come under a participatory democracy and a market-oriented economy. The country has just concluded a general election in April, 2003. The preoccupation of the new Nigerian leadership is the promotion of equitable and sustainable development, with food self-sufficiency and food security as priority items in the agenda.

Nigeria is supposedly a rich country with a GDP of about $40 billion (41% of West Africa's GDP) and substantial human and natural resource endowment. The economy is, however, highly distorted. The number six oil producing country in the world, Nigeria exports over 80 per cent of its crude petroleum. Nearly 95 per cent of the country's foreign exchange earnings come from petroleum exports. Also, about 90 per cent of government revenue is derived from the oil sector. However, production activities in all sectors of the economy is heavily dependent on imported inputs, while the consumption patterns of the whole society have high import contents. Since petroleum export earnings provide the source of finance of the import-dependent production and consumption activities, it may be stated that the Nigerian socio-economic system as whole hinges on crude petroleum.

However, agriculture is the largest single sector of the economy, providing employment for a significant segment of the work force and constituting the mainstay of Nigerian's large rural community, which accounts for nearly two-thirds of the population. The proportion of the gross domestic product (GDP) attributable to agriculture hovers between 30 - 40%, well ahead of mining and quarrying, as well as wholesale and retail trade, which are the other two major contributors to the country's GDP.

While agriculture remains dominant in the economy, the food supply does not provide adequate nutrients at affordable prices for the average citizen. The nutritional status of both rural and urban dwellers in this largely agrarian country should normally be much higher than what has been the case. The daily per capita protein intake is under 7g/day, while calorie intake is under 2,600 calories per capita per day (Igene, 1991).

From the 1970s the Nigerian food sector has been characterized by excess demand over supply due primarily to high population growth rates of about 3.2 per cent per annum, high rates of urbanization, and rising per capita income, stimulated by an oil export revenue boom. Consequently, the pattern of food consumption has been changing rapidly in terms of

quantitative and qualitative adaptations to new food preferences and consumption habits. The increasing emphasis on agricultural growth and development amidst rapidly growing population, in part, reflects the concern with which policy makers have viewed the rising demand for food.

The other basic social indicators of Nigeria are equally sobering. She is among the poorest 20 nations in the world and the GDP per capita is only about $300 per annum. Poverty is pervasive, as nearly 65.6% of the population were estimated by the Federal Office of Statistics (FOS) to be under poverty line (earned less than $1 a day) in 1996. Given the scale of waste and mismanagement in the public sector, combined with the substantial level of domestic resources available, the overall challenge is to promote faster, sustainable and more equitable growth through supporting reforms in the agricultural sector and ensuring a more balanced development through effective economic management.

Agricultural resources of Nigeria

The principal components of Nigerian agriculture are crops, livestock, fisheries and forestry (which embraces wildlife). Although each component is important for the realisation of the nation's food supply objectives, the crop subsector is the most important as it contributes annually about 30 per cent of the total GDP and about 80 per cent of the agricultural GDP. It also accounts for about 90 per cent of the farming population. By its share size the crop subsector provides the bulk of agricultural income. It is the focus in this study.

The country has abundant natural resource potentials for sustainable growth of crops. Climate and land are the critically important resources for crop production. Nigeria's total land area is estimated at approximately 91.07 million hectares (Cleaver and Shreiber, 1994). The land use pattern shows that about 57% of the total land area is either under crops or pasture while the remaining 43% is under forest, rivers/lakes/reservoirs and others (Table 1.1). The land use involves three broad systems of production namely, rotational fallow systems, semi-permanent or permanent production system and mixed agriculture.

Table 1.1 Land Use Patterns in Nigeria

Land Use	Area (million ha)	% of total
Cropland	30.96	34
Pasture	20.94	23
Forest	14.57	16
Rivers/Lakes/Reservoirs	11.66	13
Others	12.93	14
Total	91.06	100

Sources: Cleaver and Shreiber, 1994 Reversing the spiral; FAO; WRI/IIED 1988 (p264-265); WRI 1992 (p262); Ita, 1993, Inland Fisheries Resources, CIFA Occasional paper No. 20, Rome FAO.

Rotational fallow agriculture involves the cultivation of land on a rotational basis under the bush fallow system or shifting cultivation system. Under the bush fallow system, a plot of land is

cropped for a few seasons and then is left uncultivated for two or more seasons in order to regain its fertility. The length of the fallow period depends on the quality of the soil and population density. Poor soils and low population density facilitate long periods of fallow, while good soils and high population density dictate shorter periods. The shifting cultivation or bush fallow system is fading out because of population pressure.

Semi-permanent or permanent agriculture is essentially an intensive system where a small piece of land is cultivated on a continuous basis. This system is usually found in densely populated areas, and supported by deliberate spreading of household refuse, animal droppings and ash on the land. Continuous or intensive agricultural systems include kitchen gardening, compound farming and horticultural or market gardening and may occur simultaneously with shifting cultivation.

Mixed agriculture is an integrated crop/livestock system; it combines the rotational grass fallow system of crop production with animal husbandry. Its frequency varies in different parts of the country. Where crops predominate, the farmer keeps only a few animals. In areas with livestock dominated systems, crop production is a minor activity.

Nigeria has a tropical climate which favours the production of a variety of industrial and food crops. The amount, incidence and variations of rainfall largely explain the differences in cropping patterns and farm management practices in various agro-ecological zones of the country. Based on its climate, the country has three distinct ecological regions which include the humid, sub-humid (with highlands) and semi-arid regions. The basic features in spatial area, population densities and farm sizes within the regions are as shown in Table 1.2.

Table 1.2: Areas, Population Densities and Farm Sizes of Ecological Regions in Nigeria

Ecological Regions	Area ('000 km^2)	Persons/ km^2 (No)	Population[b] (000)	Farm Sizes		
				Median	Average	Range
Humid	191	235	44,858	0.36	0.49	0.05-4.00
Subhumid (with highlands)[a]	402	107	43,146	0.78	1.13	0.08-7.00
Semi-Arid	302	138	41,795	1.10	1.59	0.08-9.00
Nigeria	924	140	129,800	0.70	1.14	0.05-9.00

[a] Highlands occupy 20,730 km^2, i.e. 2 per cent of total land area
[b] 2002 data estimated from 1991.

Source: (i) Federal Ministry of Budget and Planning (1990) Sectoral Study on Food Crops, Vol. II, p. 50.
(ii) Author's Estimation

The **humid region** consisting of south western and south eastern agro-ecological zones, covers about 20 per cent or about 1.9 million hectares of the country's land area. The region carries the highest population density of about 235 persons per square kilometre. It extends from the mangrove swamps of the coastal areas, passing through the lowland forest belt and terminates in the northern limits of the derived savannah vegetation belt. The soils in the region are generally of low to medium productivity and are subject, in places, to erosion menace and leaching as a

result of heavy rainfall. The major tree crops of the region are cocoa, oil palm, rubber, kolanut, citrus and plantain. The major arable crops are roots and tubers (yam, cassava and cocoyam), cereals (maize and rice) and grain legumes or pulses such as cowpeas and pigeon pea. Small farms are more predominant in the humid zone where thick forests and high population densities make opening up of large farms very costly and almost impracticable in several areas. Farm maintenance in this region is also very costly because of high infestation and fast growth of weeds.

The **sub-humid region** lies to the north of the humid region and it is the largest, occupying nearly 42 per cent or about 40 million hectares of Nigeria's total land area. More than 50 per cent of this is uncultivated land. It is a sparsely populated region, with about 107 persons per square kilometre. This is the famous "Middle Belt", which is more aptly described as the 'food basket' of Nigeria on account of the array of crops and the intensity of cropping activities going on in the area. The crops have include yam, cassava, sweet potatoes, sorghum, maize and rice as well as cowpea, soyabean, groundnut and onion. In the northern limits of the region, traditional irrigation practices on fadamas are widespread and facilitate dry season cultivation of vegetables of various types which are shipped to the southern cities. The average farm size in the zone is about 1.13 hectares.

Some notable highlands, that is, places above 1500m in altitude, dot the Nigeria landscape and are found in the sub-humid zone with which they are contiguous. They include the Adamawa highlands and the Mambilla, Jos and Obudu Plateaux. The highlands account for less than 2 per cent of Nigeria's land area. The highlands show prospects for intensive cultivation of subtropical and temperate crops such as tea, arabica coffee, irish potato and exotic vegetables such as lettuce, cabbage, cauliflower and beetroots.

The **semi-arid region** occupies the northernmost parts of Nigeria and covers about 36 per cent or about 33 million hectares of land. It consists of the north eastern and north western zones. The average population density here is about 138 persons per square kilometre. It embraces the Sudan and Sahel savannah vegetation zones. Average annual rainfall is about 750mm and may be as low as 200mm in its northern limits. With crop-growing days of just between 100 - 150, irrigation is inevitable to extend growing season. Thus, the large irrigation projects in Kano and Sokoto States and in Lake Chad, all of which are in the region, facilitate extensive dry season cultivation of a variety of crops especially maize, wheat and tomato. Other important crops in the region are millet, sorghum, cowpea and groundnut. The farm sizes here are larger than those of the other regions, the average farm size being about 1.59 hectares.

The other agricultural and natural resources of Nigeria include livestock, fish, forest and wildlife resources. In respect of *livestock*, for instance, Nigeria is considerably endowed. Although the exact livestock population is not known, available estimates indicate that there are about 12 million cattle, 10 million sheep, 22 million goats, 1.3 million pigs and 150 million of both exotic and indigenous poultry in the country (Bincan, 1990). Majority of the livestock especially ruminants are produced in the semi-arid and sub-humid zones. These two zones hold up to 90 per cent of the country's cattle herd and, together, they have about 28 million hectares of savanna land. This is well suited for cattle, sheep and goat production except that the land is unable to sustain animals round the year due to seasonal scarcity of grazing resources and water. The

climatic condition in the humid zone favours livestock production as the dry season is short and herbage and water are available almost all the year round. This potential is, however, hampered by heavy presence of 'tsetse' flies and helminth as well as very high human population density. Besides, cattle rearing tends to create conflict between crop farmers and migrating herdsmen.

The *fish resources* of Nigeria cover the vast inland fresh waters of several rivers and lakes, the brackish waters of the creeks and lagoons and marine waters from the coast of the Atlantic Ocean to the limit of its Exclusive Economic Zone (EEZ). The fish output potentials of the various ecosystems appear to be very promising. For instance, the resource potentials of the lakes and reservoirs have been put at about 150,000 tonnes per annum. Estimates of the annual fish resources obtainable from the marine capture fisheries have been put at about 120,000 tonnes in respect of the in-shore pelagic fin fish resources, 51,000 tonnes for the in-shore demersal fin fish resources and the same figure for the coastal shell fish resources. Potential annual output from the off shore demersal fin fish and offshore pelagic fin fish resources have been estimated at about 10,000 tonnes and 19,000 tonnes respectively (FISESCO, 1992). In addition, up to 1.8 million hectares of fresh and brackish water swamps in various parts of the country are available for viable aquaculture production systems. Furthermore, River Niger (after which Nigeria is named), Benue, Hadeija-J'amare, Rima, Gongola, Komadugoga, Ogun, Ose, Kaduna, Imo, Cross River and a host of other perennial rivers are homes to considerable fish and other water resources , in addition to the possibility of erecting dams on these rivers to provide irrigation and household water for many communities.

The availability of *forest resources* in the country is equally significant. There are some forest reserves in the high forest zone totalling about 18,688 km^2. There is also a large area (66,560 km^2) of savanna forest reserves in which usable but scattered quantities of timber are available. In addition, there are vast areas of forest land outside the reserves which are not under strict control but which supply up to 50 per cent of the total volume of timber produced in the country. However, the area of intensive logging is the lowland rain forest zone which constitutes only 9.7 per cent of the total land area of the country.

The availability and distribution of *wildlife resources* depend on the ecological zoning of the landscape. The class of wildlife inhabiting the mangrove and freshwater zone include crocodiles, sharks, hippos, crabs and other amphibians. A large number of birds, climbing animals (such as monkeys and apes), elephants, catlike carnivores, herbivores and reptiles are found mainly within the rain forest zone. The Sudan-Sahelian zone is the habitat for principal ungulates and hoofed animals, carnivores, wild dogs, ground-nesting birds, ostrich and others. The wildlife resources also include snails, caterpillars and silk worms all found in many communities throughout the land.

These depositories of physical and natural resources offer the Nigerian people opportunities to appropriate the endowments for socio-economic and political development of the country. The main issue concerning the agricultural resource endowment is not that of quantity but that of quality and the capability of turning the resources to alleviate the food problems of the Nigerian state. Efficient management is often hampered by inappropriate technology or rudimentary nature of the technology available for several crop production operations. Generally,

infrastructural facilities for effective input distribution, on-farm storage, product marketing and processing remain grossly inadequate or totally lacking.

The Nature of the Nigerian Food Crisis

Food supply from domestic sources and the efforts which accompany the quest for self-sufficiency and national food security, has become the political and economic challenge facing the Nigerian state. Given the burgeoning population of about 130 million people, and which is still booming at a growth rate of about 3.2 per cent per annum, feeding this mass of population constitutes a potential social, economic and political problem. Being the most populous black nation on earth and a leading power in Africa, Nigeria is also under considerable pressure to meet the food needs of its people in order to enable her exercise moral authority and significant political influence on the rest of the world, particularly in Africa, where the country epitomises the hope and aspirations of the continent. Currently, Nigeria is neither self-sufficient nor food secure.

To summarise the analysis to be made later, the emergence of the Nigerian food crisis has remote and immediate causes. The remote causes took roots in the colonial management and strategy of accumulation, which was inadvertently reinforced by the acceptance and continuation of this strategy by the founding fathers of independent Nigeria in 1960. The immediate causes are traceable to certain events which began so soon after independence. One of these was the acrimony which characterised the political space and which eventually developed into civil war, with the attendant dislocation of agricultural production. By the time the country emerged from the war as an indivisible single entity, the Sahelian drought overtook the nation, decimated livestock and obstructed food crop production and once again exposed the fragile structure of the Nigerian agricultural system which basically depends on rainfall. Fortunately, wealth was soon to overwhelm Nigeria, arising from a big boom brought about by petroleum exports in the 1970s. The oil wealth brought along with it an unprecedented speed in economic and construction activities leading to rural-urban migration by young people who took to the cities to seek greener pasture. The result of out-migration from rural areas was shortage of farm labour. The urban sprawl developed and raised the demand for food which was met by cheap imports and this further served as a disincentive to Nigerian farmers. The convergence of the above events is that today, Nigeria is enmeshed in a miasma of food insufficiency and food insecurity, the major dimensions of which are examined briefly as follows.

During the 1960s and 1970s, the indices of agricultural production revealed a tendency to stagnation after 1969, as Nigeria fell behind from the perspective of the world agricultural output and also in the performance of the African region (Appendix 1.1). Increased food output had all along been achieved through an expansion of area cultivated. However, with the probable exceptions of rice and cowpeas, there had been no significant increases in area cultivated in the 1960s and 1970s. Similarly, yield had remained stagnant and as a result the performance of output had also not been impressive as the growth of production was generally low except for rice. The situation was not too different in later years.

The calculations by Olayemi *et al* (1986) for the period 1985-2000 show huge national food deficits for all staple commodities (cereals, roots and tubers and legumes), with self-sufficiency ratios falling below 80 per cent in most cases. Similar findings were obtained by Ajakaiye and

Akande (1999) in their projection of food supply and demand for the period, 1996 - 2010. There have also been cases of regional and seasonal food deficits as a result of weather patterns or other causes of crop failure as happened, for instance, in the Sahelian drought of 1973 and 1980 and the recurring phenomenon of cassava output shortages for many years (Akande, 2002). At the household level, the rising food price inflation coupled with declining per capita income has meant inadequate feeding. The composite consumer price index for food had risen from about 348 per cent in 1976 to 1,180 per cent in 1994 (CBN, 1994). The nominal farmgate prices of various food commodities were simply horrendous, particularly between 1990 and 1995, as shown by the data in Table 1.3. Since these are staple food items of Nigerians, it is obvious that the low income earners faced starvation during the period. Indeed, the 1990 National Demographic and Household Survey conducted by the Federal Office of Statistics (FOS) showed that malnutrition was a serious national problem, with about 43 per cent of Nigerian children under five years of age having stunted growth, 36 per cent being underweight and nearly 10 per cent being wasted.

With respect to household income the average annual per capita income was about $1,500 in both the 1960s and 1970s. In the 1980s this fell to below $1,000 and fell further to about $300 in the 1990s. Today, Nigeria is ranked among the poorest countries of the world, with per capita annual income hardly reaching $300 in spite of its petroleum-dominated economy.

Food imports to make up for the deficits in domestic food supply also illustrate the food crisis Nigeria has faced over the years. Imports became quite significant since the mid-1970s. Over the years wheat, rice and maize dominated food commodity imports. Whereas annual rice imports barely reached 3,000 metric tons, in the 1970-75 period, imports of the commodity climbed to nearly 320,000 metric tons in 1976-80 period and higher still to about 388,900 metric tons annually in 1980-85. Maize imports showed similar pattern. It was the embargo imposed on maize and rice imports in 1985 that dampened the inflow of the commodities to the country since that year. However, the country has since resumed importation of rice for which the sum of over $600 million is now spent annually to import the commodity (Akande, 2003).

Table 1.3: Average Rural Market Prices of Selected Food Commodities, 1980 – 1995 (Naira/tonne)

Commodities	1980	1985	1990	1995
Maize	250	605	2,061	15,738
Millet	250	750	1,707	12,283
Sorghum	200	600	1,703	16,733
Rice	440	1,100	6,300	34,603
Gari	n.a	n.a	2,479	20,605
Yam	n.a	n.a	2,301	21,272
Cowpea	525	1,550	5,632	29,168
Palm Oil	n.a	n.a	6,472	-

n.a = not available
Source: Ajakaiye and Akande (1999): Characterisation of Industrial Demand. for Agricultural Commodities.

Organisation of the report

The report is in eight parts. Part 2 looks at the colonial state and its organisation and management of agriculture. It emphasises that the colonial state was concerned more with extracting agricultural surplus and producing raw materials for export to the metropolis than with the development of the agricultural sector or the economy as a whole. In part 3 a continuation of the policy of extraction by the new leaders of independent nations of Africa is discussed. The agricultural sector problem in Nigeria was compounded by the civil war which broke out in the second half of the 1960s. On the whole, the food sector received little or no attention at this period. The 1970-85 period which is the subject of Part 4 may be described as the golden age of green revolution in Nigeria when all known strategies were employed to change the food production landscape of the country. The quest for self-sufficiency in staple food was at the front burner of policy agenda. This part of the report examines in some details the various policy measures and projects undertaken at this time. In part 5, the structural adjustment programme (SAP), undertaken to allow the market system play the major role in the nation's economy, is discussed. This is followed in part 6 by a consideration of post-SAP events. A rhetorical question is raised about the efficacy of public policy in the agricultural sector, arising from what may be perceived as persistent agricultural and food crisis in Nigeria. Conclusion and proposals for a new orientation in green revolution efforts through appropriate food policy end the report in part 8.

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AGRICULTURE IN THE COLONIAL PERIOD

Agricultural development policies in Nigeria spanned a considerable period, dating back to the colonial era, 1861-1960. Over these many years significant policy issues and priorities occurred which created challenges and opportunities for GR efforts in later years and the outcome of these efforts. The colonial administration and management of agriculture and the entire economy laid the foundations for the agricultural production conditions met at independence by African leaders. It was these initial conditions of the economy that largely dictated the economic management orientation of the new leaders. Indeed, the early years of independence actually witnessed only a change in operators but not in policy content. In the following discussion, we have attempted to narrate and examine the main policy features of the colonial state with the hope of understanding the enormous responsibility which faced African leaders and why the GR efforts have generally produced modest results.

Africa-wide Perspective

An analysis of African food crisis and the emerging GR in the context of post independence era in Africa should be rooted in the way political power was exercised as well as in the economic and development strategies of the colonial state. While a huge body of literature exists on the contributions of colonialism to African development, particularly literature that tends to justify colonial influence on Africa's development, some are equally focal and present a picture of how Europe underdeveloped Africa (Rodney, 1974). Meier (1975) argued that the slow rate of economic growth during the colonial period should not be attributed to the fact that exports were the primary products, but more to the "absence of more active policy making" by colonial governments, since progressive policies to effect positive change in the colonies were lacking.

What is, perhaps, indisputable is that agricultural development in post-independent Africa has been significantly influenced by colonial policies, approaches and attitudes as regards the role of agriculture in development. The colonial influence may be perceived in four main areas (Eicher and Baker, 1982):

(1) the level and degree of participation or exclusion of Africans from colonial development programmes;
(2) the colonial record in respect of the training and education of Africans in agricultural disciplines;
(3) the degree and nature of attention paid to research on export crops as compared with the attention enjoyed by food crops and
(4) the beneficiaries (colonial authorities or the native) from colonial land grants and the surpluses generated from export agriculture.

Although the colonial strategies varied across Africa, there were some common strands. The intervention in the economic life of the colonies was basically to facilitate a flow of raw materials to the metropolis. It was also not a wholesale interest in all forms of agricultural products. Attention was focused mainly on the so called cash crops which in Nigeria included cocoa, palm oil, palm kernel, groundnut and cotton. Food commodities such as roots and tubers, cereals or legumes did not attract any attention. Furthermore, the reason for infrastructural development, particularly the construction of roads, railways and the sea ports was to facilitate evacuation of raw materials for export to Europe. There was little value-added such that agro-industrial enterprises were very few and consequently, little employment opportunities existed for the natives, who in any case lacked the required skills. Again, research and extension services were directed more rigidly at the export commodities, just to ensure that the right quality of raw materials was achieved in the production process.

However, the British colonial policy in Nigeria prevented private plantations from gaining long-term control over land, unlike in the other colonies such as Kenya where the British colonial policy promoted extensive European settlements and in Cote d'Ivoire where the French policy encouraged Europeans to establish coffee and cocoa plantations (Campwell, 1974). Also, in Tanzania (known then as Tanganyika), the thrust of German colonial and commercial policy was the development of plantation agriculture and establishment of export orientation (Iliffe, 1979).

There is considerable evidence that African farmers were either ignored or discriminated against when the interest of European settlers was at stake. Uchendu and Anthony (1975) described how colonialism excluded Africans from growing certain crops. The Kenyans, for instance, were not allowed to cultivate coffee until 1933, when they were permitted to do so on a limited scale and away from the plantations of European settlers (Heyer and Waseru, 1976). Colonial governments were also said to have prevailed upon the village chiefs to compel farmers to grow particular commodities, notably, cotton and to provide labour to maintain local roads.

A case has also been made of the little or no concern shown by colonial powers to provide training for Africans. As lately as 1963, there were very few African agricultural scientists who could assist in pushing the frontier of agriculture in the continent. At independence, English-speaking African countries including Nigeria were said to have only about 150 agricultural scientists while the Francophone countries had far less this number. (Mckevey, 1965 and Lele, 1981). In the area of research, a most obvious colonial legacy was the bias shown against research on food crops and small farmers. In most of the countries, colonial regimes concentrated research efforts and development programmes on export crops, plantations and farm settlement schemes and accorded no regard whatsoever to food commodities which they assumed were being produced in sufficient quantities.

At the time of transition to independence, most of the countries in Africa pursued mixed economies which emphasised foreign aid, nation-building industrial development and education. Most of the countries gave very low priority to the agricultural sector which the leaders saw as incapable of quickly transforming the entire economy into modernity. What they sought from agriculture was the surpluses (taxes and labour), which they harnessed to provide infrastructure and industrial development. In general, the newly emerging nations exploited and controlled agriculture in four principal ways: (1) taxation system and pricing policies which undercut

producers; (2) urban-bias in development and distribution of amenities; (3) top-down approach to development with little or no room for the peasant farmers who must be "developed" rather than being the agents of development and rural transformation; and (4) the control of the means of economic power as noticed in the creation and management of the marketing boards over which farmers had no control or influence.

Agriculture failed to enjoy priority consideration among political leaders in Africa during independence because of the perception with which these leaders interpreted development and the means to achieve it. Development was perceived as including but not limited to gigantic physical infrastructure in buildings, highways and industrial complexes and humming machines. Consequently, industrialization was the first choice of the means to achieve development and bring about structural and physical change which people could see and appreciate; a means to accelerate economic growth and achieve economic independence; and a means to provide employment opportunities for the nationals trained abroad and who were ready to take over from the departing colonial officers and skilled personnel. Agriculture received little consideration also because it was perceived as being important only in food supplies which, in any case, did not constitute a problem initially as there appeared to be some degree of stability in supply and demand at the time.

Features of Colonial Agricultural Policy in Nigeria

With specific reference to Nigeria, the most fundamental structural adjustment in the capitalist transformation of agriculture and food production in the country was initiated by the Colonial State. This was an adjustment which redirected the logic of Nigeria's agricultural economy into serving the interests of global capitalist economy. The colonial capitalist penetration and expansion seriously eroded the traditional social relationship to agricultural production by the Nigerian people. The capitalist expansion tended to have transformed Nigerian peasant producers, from resource owners and decision makers to suppliers of labour and dependants on the capitalist controlled markets and agencies. It also created class divisions in the local communities, similar to those of other capitalist societies. Further, the colonial era created a new dimension in production relation among the different ethnic groups in Nigeria. The economy was monetized in such a manner that the peasants were made to accept a new exchange relationship.

In order to sell their products, the peasants were compelled to use the new currency. There was an added effect in that the British required that the peasants paid taxes for the maintenance of the colonial territory. Tax default was visited with sanctions . Therefore, to enable them pay the tax the peasants were obliged to produce and sell specific commodities which the British trading companies could accept in cash payment. The commodities in this case were nonfood but industrial raw materials which included groundnuts, ginger, palm oil and kernel, cocoa, and later on, rubber and cotton These raw materials were sold at prices determined by the British buyers and the goods produced by the British companies were, in turn, sent to Nigeria and sold at prices that were also determined by the British.

The British effort to incorporate the entire colonial society into a unit led to the building of ports, railways, roads and telecommunications services. These were meant to ensure that all sectors of the ethnic groups that had some materials to produce were reached. The colonial policy towards

agricultural development in the country was total dependence on the peasants for the production of raw materials. In the North, West and Eastern regions of Nigeria where the chief class existed, the chiefs were collaborators in making the peasants produce the raw materials. The ruling class became allies in the exploitation of peasant labour thus furthering the colonial policy of the development of peasant agriculture for the maintenance of the colonial territory and for the furthering of the economic policy of the British colonial regime and the overall interest of British industries. With the concessions given to the trading firm, the United African Company (UAC), to establish plantation firms in the colony, oil palm, rubber and cocoa plantations became part of the agrarian policy.

Perhaps the key issue to hold in the colonial administration with particular reference to the agricultural sector was that it was the mainstay of the colonial economy but the emphasis was on export and not on food production. The present food crisis in Nigeria could, therefore, be traced partly to the advent of British colonialism which changed the focus and objective of production away from food. Prior to this period, there was enough food for the Nigerian people. But the incentive created by the demand for raw materials made the local population to be inadvertently complacent about food production. What was lacking was enough food surplus for accumulation and export (Ekpo, 1986). Following the emphasis on cash crop production by the colonial agricultural policy, land hitherto used for food cultivation was diverted to cash crop production. This shifted the attention and expertise of farmers from food crop to cash crop production. The Nigerian economic landscape became dominated by the groundnut pyramids in Northern Nigeria, cocoa warehouses in the West and the palm produce stores of the Eastern region. These features were detrimented to the production of adequate quantities of rice, maize and cassava for consumption by the people (Yayock, 1986).

Some specific agricultural initiatives in the colonial era

Although the focus of agricultural development initiatives during the colonial period was largely directed at expanding production of export commodities, certain other strategies were associated with colonial administration. For instance, the colonial administration encouraged native establishment of plantation of tree crops that were indigenous to the climate. However, the administration was against the development of Nigerian agriculture by foreign interests. To strengthen this policy, the government introduced legislation to control agricultural leases in 1917. Thus, agricultural leases of lands which covered the areas of Northern Nigeria and the colony of Lagos, were limited by statute to 1200 acres each with a term of 45 years. In the southern provinces, leases of lands other than crown lands were acquired under the provision of the law (the Native Lands Acquisition Ordinance, No 32 of 1917).

The recognition of the strategic importance of technological development in supporting Nigeria's agricultural development had a relatively early beginning. For example, in order to guarantee the availability of raw materials for oversea industries, the British Colonial Government had, in the early 1900s, evolved an implicit science and technology policy in respect of such export crops as cocoa, palm produce, groundnut and cotton. This led to the establishment of agricultural research stations in the early 1920s at the Moor plantation in Ibadan, at Umudike, Samaru as well as Vom. In the 1940s, the British colonial powers also set up several West African research institutions from which the Cocoa Research Institute, the Institute for Oil Palm Research and the Institute for

Trypanosomiasis Research emerged following Ghana's attainment of independence in 1957. These institutes served as centres for training of agricultural personnel, creation of research facilities and means of collecting, interpreting and disseminating new farming systems and techniques.

During the economic depression of 1930s, a committee set up by the Government to look into the problems of unemployment in Lagos and the surrounding districts recommended that the government should establish the farm settlement to ease unemployment and simultaneously enhance introduction of new system and techniques of agricultural production.

Production of high quality produce was desired and so, to prevent adulterated produce, a number of ordinances were passed. In 1927 Nigerian ordinance on adulteration of produce was made, which laid down the standard of purity for palm products. In 1928, a new adulteration of produce ordinance came into force introducing compulsory selection of produce. This was to ensure that all cocoa or palm kernels after being graded and passed were of required quality. Also, the government passed oil palm ordinance in 1935. By this, a grower was expected to register his plot with the government and produce oil of the required quality (5% of free fatty acid) before he could receive a full rebate of the export duty which was in force.

Establishment of the Marketing Board: This was clearly the most fundamental incursion of the colonial state to the real sector of the colonial economy. Marketing of export products was reviewed immediately after the World War II in 1946. A white paper stated that the experience of the war years showed that government could achieve stabilization of seasonal prices to the West Africa producers. Consequently, it was decided to set up statutory marketing organization for the major support of products which were formerly handled by the then West African Produce Control Board. The Nigerian Cocoa Marketing Board was established by ordinance in 1947, followed in 1949 by the cotton, groundnut and oil palm produce marketing boards. The boards were expected to provide funds for the economic development of the areas of production and for scientific research apart from its stabilization function. The accumulated funds were allocated thus: 70 percent for price stabilization, 7½ percent for research and 22½ for development.

As to the price policy, the Boards had absolute control of purchases of the major export products. They fixed the buying prices at the beginning of each crop season but the manipulation of prices came into play when the boards faced major fluctuations in the world prices. Tied up with this policy was the policy of adopting different grades for the same product and paying different prices for each grade. From the accumulated funds the boards provided the capital which financed the establishment of the regional production development boards, later known as development corporation. The Marketing Board also made direct grants and loans to the government for financing development projects e.g. the former Western Nigerian Marketing Board made outright grant of N20 million and loan of the same amount to the regional government to execute its development plan of 1955-1960.

The colonial era also witnessed the development of cooperatives. Co-operative ordinance was designed to recognise the need for farmers to combine production, sales and finances under sponsorship as a means of increasing farm sizes, farm efficiency and the available farm capital

under better management. Cooperative development was in essence meant to provide for the farmers the tool with which they could collectively fight any grievances against low farm prices arising from price depression. While co-operative activities started in Nigeria before 1935, the ordinance made added impact. It assisted in the consolidation of the various cocoa marketing organisations into government sponsored co-operative societies. Also, it encouraged the formation of palm produce marketing co-operatives and the formation of multi-purpose and thrift co-operative societies which later enhanced food commodity production and trade.

Development of the Food Sector: The colonial regime believed that Nigeria produced enough food for her population. However, this could not be correct because one of the dailies of the colonial era, ***West African Pilot*** of Monday, September 11, 1950 gave its opinion on then agricultural department, saying, "While the spate of food scarcity spreads gradually into the remote villages of Nigeria, the agricultural department fiddles before the nourishment danger of a country under famine, like Nero while Rome burns. We say so because we are not able to see practical steps the agricultural department is taking to ease the worsening food situations". However, a major effort made in the food subsector was in 1933, when the government invited an Agricultural Officer from Sierra Leone to examine and report on the possibility of growing rice in mangrove swamps in Nigeria, just at it had been successfully done in Sierra Leone. In his report, the officer advised that the first experimental station should be at Warri. As a result, a plot was obtained and in 1935, the Department of Agriculture experimented with rice growing there and got fairly good result. This increased rice production in the area.

By way of summary we need to take note of certain aspects of colonial administration that might have weakened the solid foundation for the development of the food sector then and presently. First, the colonial policy towards land achieved the objective of retaining the rights of the indigenous population, as perhaps was appropriate in view of the conception of British as a trustee. This was not oriented towards creating opportunities for economic development and this constituted hindrance to development of the food sector. Second, most of the research institutes established and the research carried out were geared towards export crops while only token effort was devoted to research on domestic food crops. Third, the Marketing Board system during the colonial period implied withholding substantial proportion of what ought to be the farmer's incomes either as a means of combating inflation or preparing for the foreign exchange balances. This was forced saving that ended up hurting the farmer and agriculture as a business. It would have been quite instructive to see what farmers could have done with their earnings if these were not withheld for other development purposes by the state. Fourth, the various institutional devices (marketing boards, cooperative institution, etc) later had significant impact on the direction of agricultural development at the end of the colonial rule.

2

THE FIRST DECADE OF INDEPENDENCE, 1960-1970

Transition to independence

Nigeria emerged as an independent Federation in October, 1960 from the British colonial rule. The political structure of the Federation consisted of three regional governments (Northern, Eastern and Western Regions) and the Federal Government. The federal constitution placed agriculture in the concurrent list, which meant the regional and federal governments had roles to play in the development of the sector. Indeed, the constitution allowed full system and principle of federalism to reign such that each region was obliged to develop at a pace and tempo of its own choosing. This tended to have engendered healthy competition among the regions as each shrived to meet the yearnings and aspiration of its citizens.

However, the decade of the 1960s was characterised by political and economic false steps. Both the political and economic miscalculations resulted in serious problems for agriculture and the food economy. On the political front, the political space was occupied by disagreeable and quarrelsome politicians who generated unmanageable acrimony which eventually led to a civil war in 1966. The war lasted for five years, 1966-1970 and disrupted agricultural production and regional trade in food commodities in two principal ways. First, the theatre of war, that is, the Eastern Region of Nigeria, could not concentrate on agricultural production, particularly the production of food commodities well known in the region - cassava, cocoyam, rice and palm oil. Not only did the agricultural land in this region become unsafe for production activities as battles ranged on, government could also not put its policies into effect in the region because of the war. Second, agricultural workers abandoned the farms and enlisted in the war efforts in the secessionist enclave of Biafra and in the loyalist side, Nigeria. This created labour shortages particularly in Nigeria, a situation which was further worsened by the migration of young school leavers to towns and cities in search of white collar jobs. In addition, existing markets and trade channels in food commodities were obstructed, creating a disincentive to regional trade and food distribution across regions and from areas of abundant supply to areas of need.

On the economic front, emphasise was placed on import-substituting industrial development as the framework for economic development. This was wrong because the required infrastructure and human resource base, in terms of skill, as a fulcrum on which to build industrial development were absent. Besides, Nigeria was and is still a predominantly an agrarian economy, an agrarian base that was largely undeveloped. The cause of the Nigerian people would have been better served if the leaders had decided to pursue agrarian revolution to generate raw materials required as inputs for industrial processing and manufacturing as well as produce abundant food for the rising population.

However, agriculture could not be totally neglected simply because it was the source of foreign exchange earnings through export of agricultural commodities. What the independence leaders did was to continue with the process of accumulation and surplus generation from agriculture.

The agricultural strategies pursued after independence were, therefore, akin to the strategies bequeathed by the departing colonial rulers, which strategies were characterised by the pursuit of external market oriented production programme. The focus was essentially placed on export commodities, such as cocoa, groundnut and palm produce which were foremost items in foreign exchange generation. In the arrangement, food crops hardly featured in the production calculation and strategic planning, ostensibly because food supply did not constitute a problem at the time and also because food export as a generator of foreign exchange, was neither contemplated nor thought feasible.

Strategy of the new leaders

The strategic approach to agricultural production was transformational process which involved fundamental changes in the structure of production was necessary if accelerated progress and demonstrable development would be obvious to the people. Attention was then focused on creation of farming systems that were based on more intensive use of the land and establishment of farms of economic size. That is, the transformation strategy adopted was anchored on creation of large scale farms and settlement schemes with the major proportion of the capital investment coming from the public sector and where farmers submit to a regime of discipline, in terms of the crops they could grow and the husbandry production practices they could adopt.

The first plan launched by the Nigerian state, the First National Development Plan, 1962-68 incorporated the transformatory concept in the agricultural strategy. Consequently, the bulk of agricultural investment in all the three regions went to the establishment of plantations and farm settlements, primarily for export crop production. The small farmer and producer of the nation's staples (yam, cassava, sorghum, etc.) was never considered relevant in the new dispensation and in the extensive plan to transform the agricultural sector from a state of backwardness to that of modernity and progressiveness. Some attempts were, however, made to improve the nutritional status of the people by promoting proteinous food commodities like livestock (beef, dairy and poultry) and fish and to introduce import-substituting crops like sugar and wheat. Even in these attempts, investments were undertaken mainly in the establishment of ranches, farm settlements, irrigation schemes and government supervised cooperative schemes.

To a considerable extent, agriculture in the first decade of the transition to independence witnessed the continuation of the colonial strategy of accumulation and exploitation of the Nigerian peasant farmers to provide development funds, through taxes and payment of commodity prices that were inferior to the ruling prices in the international market. Government withdrawals from producers income were estimated to vary between 20-25 percent during the 1960s (Hill, 1972). The entire amount was committed to 'development', with little or nothing going to the rural sector to help the peasants. The instrument for generating these surpluses remained the marketing boards. In addition to produce tax and other development deductions from peasants' income, the emergent Nigerian ruling class continued with the colonial policy on land, which imposed the ceiling of 1,200 acres on agricultural lands.

With the military taking over power in 1966, the era of panterritorial agricultural policy measures began to emerge. This was easily made possible by the command structure in the military. The advent of the military also marked the beginning of the dismantling of native

authorities and their replacement with local authorities. The courts, police and the prison were all bought under the Federal Government supervision. The power relations were gyrating to the centre as constituted by the Federal authority, even though the states and local government authorities had specific roles in the constitution, which usually is the first casualty in a military coup d'etat.

Towards the latter parts of the 1960s and in spite of the civil war which started in 1967, a new vision in agrarian transformation through large dams and irrigation systems began to gain attention of the military rulers. Studies were commissioned for the establishment of a number of projects, including the Kano River Project (Palmer-Jones, 1987). However, these materialised only in the 1970s when burgeoning oil revenues accrued to the nation.

In general terms the development of agriculture during the first decade of independence was perceived only in terms of export crops, while the food crops received scanty attention. The green revolution efforts at this period were not dispensed to make knowledge, inputs and marketing opportunities available to staple crop producers but to enhance the productive capacity of export crop producers. The policy makers did not see the apparent discriminating practice as having any long run repercussions on the ability of the nation to feed itself and achieve self-sufficiency in its most readily consumed foodstuffs. The seed of future food crisis, which was laid in the colonial period was, therefore, nurtured during the early years of independence as no concrete effort was made to redress the shortcomings of the earlier period in the area of food production.

Having said this, however, the Nigerian leaders could be excused for showing little concern about food for the people. This is so because food shortages just did not exist and Nigeria was not expending any significant amount on food imports, during this period. It was also not obvious that food problem would arise in a manner that could impair the peace of the state. Available statistics show that Nigeria was doing relatively well in the production of staple crops; achieving significant annual rate of growth (Table 3.1). Food imports did not exceed 10 per cent of the total imports throughout the 1960s. The imports were also limited to commodities that were perceived as European foods but which nutritional value was considered merely complimentary to local foods. Imported food included wheat, flour, sugar, milk and fish. Food prices were also stable during the period and planners did not have to worry about food inflation which would need to be addressed by increased local production. Indeed, it made much economic sense for the leaders and planners to keep running the inflow of foreign exchange earnings, which agricultural exports constituted and which the leaders required to implement development programmes. Agricultural export crops were essentially the strategic products that fuelled and propelled the economy for most of the 1960s, including the prosecution of civil war. Agriculture provided the needed foreign exchange to pay for capital goods and skill acquisition. At independence exports of cocoa and other produce generated as much as about 75 per cent of the total export earnings, which explains why the political leaders and planners could not afford to ignore or shut down this avenue of government revenue. It is also important to note that during this period all the monies derived from the export of the various commodities went to the government of the region where particular produce was being produced. For instance, the Western region depended on cocoa, Northern region on groundnut and Eastern region on palm

produce. Since these commodities constituted the main source of revenue to the regional governments they inevitably created the main ingredient of regional economic power, which the

Table 3.1: Average Annual Rate of Growth 1960/61 - 1966/67

	cassava	Yams	sorghum	millet	maize	cowpeas
1960/61 - 1966/67	3.0	5.7	4.8	9.9	11.5	7.1
1960/61 - 1970/71	-1.7	3.6	6.8	14.1	9.1	10.1

Source: FOS: Rural Economic surveys (several issues)

regions could not ignore without losing their competitive leverage in the face of regional rivalry that existed.

By way of concluding the discussion here, it is obvious that the 1960-70 period should be regarded simply as a period of transition to independence when not much happened to inspire confidence either in governance style or in the management of the economy by local leaders. Agriculture was in the agenda only as a long as it provided the funds for oiling the system of state. The idea of green revolution which had started to gain attention in Asia was unknown in Africa, where import-substituting industrial development was seen and employed as a panacea to socio-economic and poverty problems in the continent. Later events proved the leaders wrong.

V

FOOD POLICY IN THE 1970-1985 PERIOD

Economic Upbeat

When the war ended in 1970, Nigerian leaders adopted a policy of "No victor, No vanquished" and embarked on a process of "Reconciliation, Rehabilitation and Reconstruction," aimed at rebuilding shattered confidence and reengaging Nigerians in accelerated development of their country. This enthusiasm became enhanced with the new role of petroleum in international commerce. As early as 1973, there was a tremendous turnaround for the Nigerian economy, following the dramatic increases in the price of crude petroleum in the international market, occasioned by Arab-Israeli war and the response of the Organisation of Petroleum Exporting Countries (OPEC) with increased petroleum prices. The OPEC quota for Nigeria during the 1970s stabilised between 1.5-2 million barrels per day (mbd). This translated to an unprecedented export earnings of about ×5 billion in 1975 and nearly three times this figure, that is, about ×14 billion, at the end of the decade. The petroleum component of export earnings was above 90 per cent, dwarfing the contributions of agriculture that was once the main foreign exchange earner of Nigeria.

With such a huge revenue accruing from petroleum exports alone, the Nigerian development problem became not that of lack of investible funds, but of identifying growth poles and investment opportunities which would have significant impact on the entire economy and the welfare of the people. The petroleum earnings strengthened the role of the state which assumed a commanding control and influence on the economy, engaging in virtually all areas of the economic system including production, services, manufacturing, security and so on. The major instruments of control were the macroeconomic and sectoral policies enunciated to guide the conduct of economic agents. The investment behaviour of the state also changed in the face of unprecedented resources.

The period under consideration here coincided with the Second and the Third National Development Plans, 1970-74 and 1975-80 respectively. The 2nd Plan was focused on reconstruction of the ravages left by the war and a relaunch of a new Nigeria. Infrastructural development gained prominence as substantial allocations went for providing electricity, water, roads, railway and general construction works. However, agriculture did not get the proper attention it so deserved, even when attention later shifted to economic sector and investments were being made in car assembly plants, textile mills and chemical industry. But, the 3rd Plan and with more petrol dollar rolling in, this time in torrents, public investments went up ten-fold over the 2nd Plan allocations. The economic sector of which agriculture is one, received priority attention, with nearly two-thirds of the allocations. This attention should not be construed to mean that agriculture, within the economic sector distributions, received any substantial allocations. Besides, sufficient evidence exists to show that not all the allocations going to agriculture were actually spent for agricultural purposes. NISER (2001) has reported funds diversion and fungibility to areas other than agriculture-related activities.

Meanwhile, a few events inevitably drew the attention of policy makers' to the need to promote agriculture and ensure food production for the people. First, the findings and recommendations of FAO 1966 report had emphasised the long-term problems of food production and the need for Nigeria to effect production plans for both food and export crops. The document was still on the table clearly drawing attention to the need for the state to take action on the recommendations. In a similar vein, in 1969 an American Consortium from the Michigan University for the study of Nigerian Rural Development (CSNRD) had emphasised the need for Nigeria to jettison the transformatory strategy of large-scale plantations or farm settlements while recommending that the country should concentrate efforts on smallholder farming. Thus, both the FAO and Michigan University studies drew attention to the need for increased food production. Second, there was an unexpected natural disaster, the Sahelian drought of 1972-74, which caused untold production setbacks and leading to local shortages of staples like yam, cassava, maize, sorghum, millet and cowpeas. While inflation was generally high during this period, food inflation was worse, reaching levels that were three times those prevailing in the 1960s. The fall in food production and the growing urban demand made imports inevitable and because import rose rather sharply, from about 5 per cent of total imports in 1970 to about 10.3 per cent in 1973, the attention of policy makers was drawn to the emerging food problem and were, therefore, concerned about addressing the agricultural production problems. A third factor which attracted policy makers attention to agriculture was the rapid urbanisation fueled by rural-urban migration and a large number of demobilised soldiers after the war. In order to re-engage many people in productive enterprises farming was identified as a likely haven for unskilled labour that was now available.

These events which occurred at different times and in the early 1970s informed a series of food policy measures throughout the decade. Thus, the period, 1970-1985 witnessed what may be perceived as the most elaborate, extensive and ambitious agricultural programmes ever undertaken anywhere in the African continent during this period. The huge earnings coming from petroleum exports served as a great fillip for a country just emerging from a debilitating civil war. The government, therefore, went to great lengths to initiate the Third National Development Plan, 1975-1980. Although, the solution to the emerging food crisis was partly understood, the long-run panacea was seen to be in internal production based on scientific and technology-oriented production practices. This thinking was reflected in the various agricultural policy objectives enunciated from one plan to the other and in the strategies stated to achieve the objectives (Table 4.1 and 4.2). The objectives had targeted nutritional requirement of the population, food output, raw material production, rural employment and institutional environment conducive to participation of private economic agents. Food production, obviously, was the priority objective. As many strategies and projects that could be tried were embarked upon, but curiously without allowing one to fully mature or fail outrightly before embarking on the other.

Basically, the state in the Nigerian agriculture adopted two main strategic pillars of intervention namely, macroeconomic and sectoral policy intervention and the implementation of specific investment activities in the form of projects, programmes and provision of infrastructure. Therefore, the ensuing discussions will be in these two parts. The first part looks at the various policy measures which created the enabling environment for participants in the agricultural

sector during the period of investigation and the second part examines the actual activities undertaken also by the state.

Table 4.1: Agricultural Policy Objectives in Nigeria: 1970 - 1985

Second Plan Objectives (1970-74)	Third Plan Objectives (1975-80)	Fourth Plan Objectives (1981-85)
- To increase the calorie and protein intakes of Nigerians especially in the south	- To increase calorie intake and a crude protein consumption of between 60 and 65 grams - To increase animal protein relative to protein from other sources	- To attain a per capita intake per day of 2,073 Kcal and 49.7 grams of crude protein by 1985
- To ensure food supplies to keep pace with increasing population - To expand production of export crops in order to diversify foreign exchange earnings	- To ensure food supply in adequate quantity and quality to the increasing population - To increase production of food and export crops	- To increase food production in order to attain self-sufficiency - To increase production and processing of export crops - To increase the output by smallholders
- To create rural employment opportunities for the growing labour force	- To expand employment opportunities to absorb the increasing labour force	- To expand employment opportunities to absorb the increasing labour force
- To propagate agricultural materials production	- To guarantee adequate returns to farmers and ensure reasonable prices to consumers - To provide adequate storage and processing facilities - To expand and improve extension services	- To encourage private entrepreneurs to establish large-scale farms - To make farm inputs more accessible to farmers - To induce commercial banks to give more loans for agriculture
- To evolve appropriate institutional apparatus for integrated agricultural development		- To promote the evolution of appropriate institutional and administrative apparatus for rapid agricultural development - To properly organize cooperative farming, processing and cash crop farming

Source: P. Kassey Garba (2000): Original data from Federal Government of Nigeria, Second Third and Fourth National Development Plans

Macroeconomic and Specific Agricultural Sector Policies

Throughout the 1970-1985 period government was concerned about establishing an enabling environment for the agricultural sector to promote its roles. This necessitated a host of specific agricultural sector policy initiatives to complement or enhance the various programmes and projects initiated. These complementary policies involved pricing, subsidy, credit, research and extension, land and investments. The main elements of these measures and their effectiveness are examined in what follows.

Table 4.2: Selected agricultural policies in the second, third and fourth Nigerian National Development Plans

Second Plan (1970 - 1974)	Third Plan (1975 - 1980)	Fourth Plan (1981 - 1985)
• Small motor-powered implements and animal-drawn implements • Emphasis on food crops	• Increased government participation in direct food production and processing • World Bank assisted small holders programme • Integrated Agricultural Development Programme	• Farm services centres set up to deliver inputs to smallholders • Establishment of National Agricultural Cooperative Management Centre • Expansion of World Bank assisted ADPs • Reduction of government's direct involvement in food production • Introduction of River Basin and Rural Development Authority
• National Seed Multiplication Centre • National Accelerated Food Production (NAFPP)	• NAFPP de-emphasized • National Grains Production Company • National Root Crops Production Company established	• Joint ventures by National Root Crops Production Company, National Grains Production Company and National Beverages Company Limited • Cocoa, Cotton, Rubber and National Oil Palm rehabilitation schemes
• Nigerian Agricultural Credit Bank (NACB) proposal	• Agricultural credit guarantee scheme	• More resources to the NACB and Agricultural Credit Corporation
	• Price and tax incentives, guaranteed minimum price introduced, subsidies on inputs	• Input subsidy to be continued • The guaranteed minimum prices to be reviewed more frequently
• Fixed exchange rate policy, interest rate regulation	• Fixed exchange rate policy • Interest rate regulation • High public investments • High fiscal deficits	• Fixed exchange rate policy • Interest rate regulation, high public investments • High fiscal deficits • Rising debt service

Source: Federal Government of Nigeria, second, third and fourth National Development Plans

The Guaranteed Minimum Price Scheme

Getting the farm prices right received early attention as a means to getting green evolution initiated on a proper footing. The agricultural pricing policy objectives included ensuring fair, stable and competitive prices for farmers and establishing a degree of parity between agricultural and non-agricultural commodity prices (FMANR, 1987). One of the instruments deployed during the Third National Plan (1975-1980) for this purpose was the establishment of the Guaranteed Minimum Price Scheme (GMPS). Government applied the minimum price guarantee scheme to assure farmers of floor prices and purchase of their products in case the open market failed to absorb the output they put on the market. It provided for the first time the food crop farmers with the so-called "benefits" that the export crop farmers had enjoyed for a fairly long period under the marketing board system. By fixing these minimum prices for the major staple crops of the country, it was hoped that the scheme would assist in eliminating seasonal price fluctuations

as well as serve as a means of achieving a better income distribution to the advantage of rural areas.

However, the scheme was ineffective because the prices fixed were less than the prevailing markets prices. In fact, the buying agents and merchants were unable to purchase at the guaranteed price levels even in the rural areas. Consequently, the scheme could not eliminate seasonal price fluctuations nor was it able to redistribute income in favour of the farmers. Two main reasons were responsible. First, the basis chosen for arriving at the minimum price which used production costs to arrive at a minimum price was fraught with several shortcomings. (See Okuneye, 1985) Second, the inadequacy of storage facilities in many parts of the country truncated the strategic grain reserve concept incorporated as part of the minimum pricing policy.

Subsidy policy

Most of the special programmes for boosting food production in Nigeria since the 1970s relied on farm input subsidies as the main channel of providing incentives to farmers. Subsidies were extended to a wide range of farm inputs such as fertilizers, improved seeds, herbicides, pesticides and agricultural machinery obtained from government institutions. In addition, a range of farming services such as clearing, irrigation, farm credit and extension services were subsidized. This was partly intended to offset the bias against agriculture and rural life caused by the heavy implicit taxation of farm incomes as a result of the existing produce and marketing arrangements, and partly to improve the competitiveness and productivity of farming enterprise. It was hoped that through subsidy, farmers would be induced to adopt new technologies, which were believed could help shift upwards the production function of the small holder farmers. In the late 1970s up to early 1980s, the level of subsidies ranged from about 75 per cent on fertilizer to almost 100 per cent on pesticides (CBN/NISER, 1991). The proportion of annual budget expended on subsidy stood at between 10 per cent and 33 per cent in the late 1970s and early 1980s (Table 4.3).

Table 4.3: Agricultural Input Subsidy Estimates (in million ₦)

Year	Fertilizer	Bush clearing	Agric. Mech. & Tractor Hire	Equipment Sale	Pesticide	Seeds	Total	Total as % of Agric. Expenditure
1977/78	34	9.1	3.0	-	-	2.0	48.0	10.2
1981	199	29.5	6.0	7.5	1`3.5	1.0	256.5	33.1
1982	135	48.3	6.0	5.0	21.2	1.3	216.8	27.4

Source: World Bank (1984)

The cost-benefit analysis of subsidy schemes shows some aberration. In terms of the burden, the budgetary costs of the subsidies incurred by the various governments on subsidized inputs was enormous and put a lot of stress on the finances of both the Federal and State Governments, and the efficiency of implementing institutions. In terms of benefits, subsidized input seemed to have been monopolised by a few influential urban-based farmers, while the peasant farmers who constitute the majority of farming households in Nigeria had restricted access to these inputs. Apart from the financial burden on government, accessibility to input subsidies has the potential of distorting the cost structure of farming enterprise and could adversely affect the choice of

crops and farming techniques. There had been cases of massive wastage including outright dumping of fertilizers in some parts of the country largely because the product was cheap and the distribution was politicised. In terms of impact on farming technique, available information also showed that while rural farmers were confined to growing traditional subsistence crops such as yams, cassava, sorghum and millet which hardly required subsidized innovative and yield-improving inputs, the urban-based farmers took advantage of the subsidised inputs to engage in modern, commercial maize farming and poultry keeping.

Agricultural credit policies

The principal objective of agricultural credit policy over the years had been to make adequate credit available to farmers at the right time. Monetary policy had emphasized concessionaire interest on agricultural loans as a form of incentive. The strategy for executing the policy involved compelling banks and other financial intermediaries to support agricultural activities through the credit quotas and ceiling on interest rates with implied implicit subsidies. This was based on the perception that left on their own, the banks were likely to discriminate against agriculture which is a risky enterprise. In addition, a specialised lending institution, Nigerian Agricultural and Co-operative Bank (NACB) was established to supply credit specifically to agriculture at concessionaire terms. Furthermore, in order to assist banks to aggressively support agriculture, the Agricultural Credit Guarantee Scheme (ACGS) was introduced in 1978 to guarantee banks exposure to high risk lending which agriculture posed. Finally, a rural banking programme was initiated in 1977 directing banks to build specified number of rural bank branches to help mobilize rural savings and channel them for rural development.

The results of these policy pursuits were mixed. Annual loans to agriculture actually increased. However, to a large extent credit allocation failed to comply with policy stipulations. Where credit allocation actually followed the prescribed requirements, it was generally believed that such credits were not put to the intended uses and furthermore, that the real peasant farmers rarely benefitted. Influential persons benefitted from credit allocations meant for agriculture at the expense of peasant farmers who were often unable to meet the usually stiff collateral requirement of the banks, despite the ACGS. It was also evident that specialised banks, like NACB, lacked reliable access to loanable funds; they faced high incidence of loans delinquency while the low interest rate they charged constrained their overall effectiveness and financial viability. With regards to the rural banking scheme, available data showed that only a small fraction of rural deposit were actually being lent to bonafide rural enterprises (Akande and Oni, 1999).

Investment in Agriculture and Food Production

Prior to 1964 when agriculture was transferred from the exclusive to the concurrent legislative list, responsibility for public financing of agricultural services in the country fell almost entirely on the Regional Governments. This was achieved by direct financing of agricultural production through public corporations such as the Eastern, Northern and Western Nigeria Development Corporations. The Federal Ministry of Economic Development at that time housed some departments and had responsibility for agricultural development and related matters. These were later brought together to form the Federal Ministry of Agricultural and Natural Resources.

Investment in agricultural and food production during the period was undertaken by all tiers of government, apart from foreign investment in agriculture. Direct government spending on agriculture amounted to ₦152.0 million during 1962/63 to 1966/67, ₦601.4 million during 1970/71 to 1974/75 and ₦1,2015.5 million during 1975/76, with the Federal Government accounting for 51.2 per cent of total spending during the period. In terms of the volume of financial resources flowing into the agricultural sector, there was a significant increase in the 1980s. Agricultural lending by the commercial banks grew tremendously during the period. Total loans and advances extended by commercial banks increased from ₦7.0 million at the end of December 1970 to ₦266.3 million at the end of June 1979. Loans and advances for agricultural production as a proportion of total loans and advances also increased from 0.5 per cent in 1970 to 6.3 per cent at the end of June, 1979. Although it was difficult to estimate the volume of resources going into agricultural production through the state agricultural credit corporations, total funds extended by the corporations to farmers were, however, estimated at about ₦25 million between 1970 and 1980.

In its entirety, public fund allocated to agriculture throughout the 1970s was only 6.5 per cent of the total budget. Watts (1987) pointed out that the amount of money actually disbursed to agriculture during the period was only 3 per cent. Furthermore, he indicated that a significant portion of the ₦1 billion allocated to agriculture by the Federal Government in the 1976-80 period was channeled away from agriculture through manipulations by the state governments who gave more emphasis to "contractors, road construction and housing". Thus, when federal allocation rose to 13 per cent of the total budget in 1981, the state governments spent less than 5 per cent of their budget in the sector. Indeed, while the actual expenditure incurred in the industrial sector rose from 8.5 per cent in 1971 to 28 per cent in 1981, the actual allocation to agriculture declined from 7 per cent of the total budget to less than 4 per cent in the same period.

However, as argued by Nwosu (1991) relative allocations do not tell the whole story, neither do they highlight the fact that given the upsurge of government revenue, huge sums of money were pumped into agriculture and that if the monies were judiciously spent, agriculture could have been transformed. The large-scale mechanised farms embarked upon by the various governments had gulped ₦58.3 million by 1978. The Nigerian Agricultural Credit and Cooperative Bank (NACB) disbursed ₦423 million (Watts, 1987) to farmers between 1973 and 1983. The first three Agricultural Development Projects (ADPs), which we shall discuss more fully later, cost at least ₦40 million each. These ADPs were projected by the World Bank to cost five billion US Dollars in the 1980s (Beckman, 1987, p. 113). It was estimated that each of the first three irrigation and River Basins Development Authority Projects (RBDA) cost between ₦135 million and ₦330 million and that the actual completion of the phase one of the projects cost over ₦1 billion. The RBDAs accounted for₦2.5 billion between 1979 and 1983 (Beckman, 1987, p. 114). The government also made efforts to stimulate domestic crops production by subsidizing non-labour inputs and through output price support (Richards 1987, p. 100). Input subsidy was a major incentive in all the projects incepted in the 1970s.

The main problem posed by public sector spending on agricultural development during the period under review was the lopsided nature of the projects undertaken. The bulk of government agricultural development project was in "direct investment projects" such as irrigation schemes,

plantations, ranches, fishing projects and food production schemes. Perhaps the rationale behind government participation in some of these projects is that private financing may not forthcoming due largely to low returns from such projects in the short run. But such government projects four main drawbacks, which did not justify the existence of many of them at the same time (Yayock, 1986). First, their capital requirements and the low output even after several years of gestation made them rather unsuitable in a capital scarce economy. Moreover, the low labour utilization in an environment of surplus labour reduced their linkage effects. Secondly, they were frequently faced with manpower problems due to the perennial shortage of skilled administrative and technical personnel. These problems became more pronounced when several of the projects were simultaneously embarked upon at the same time. Thirdly, the foreign exchange component of these projects was high and this had to be related to the high demand for the limited supply of foreign exchange. Fourthly, the establishment of such projects tended to create some unwelcome impression about government strategy of agricultural development. One of such notions is that large farm units are the answer to production problems, while it also engenders the feeling that government is expected to produce the bulk of the nation's requirements of agricultural products.

Research and Extension

Experience of technologically advanced economies of the world which also have a very strong agrarian sector indicates that advances in their agriculture were powered and are being sustained by technological innovations and practices. The Asian miracle and the green revolution which defused the potentially food-disaster situation in south-east Asia had their roots in technology, research and development. Therefore, the evolution of a sustainable and productive agriculture in Africa and Nigeria in particular cannot be achieved in the absence of scientific research capable of producing new technologies and practices which raise productivity, shorten production cycle, put pests and diseases in check, produce new varieties, make possible new uses of food types, raise quality of food and enhance storability and other desirable characteristics in the staple food items.

However, experience has also shown that generation of agricultural innovations *per se* is not a sufficient condition for agricultural development. New findings and practices also must be transferred to farmers in the form, manner and circumstances in which farmers can make use of these innovations. It becomes important, therefore, not only to examine the generation of innovations through research in Nigeria, but also see how these innovations are transferred or made available to the farmers. The performance of agriculture so far indicates that farmers have neither adopted nor absorbed most of the technologies being introduced to them. Thus, it is also important to examine not only the processes of technology transfer but also why adoption rate has been very low.

The objectives of agricultural research in Nigeria over the years include the development of improved and high yielding production material (seeds, seedlings, fingerlings, and the like); the development of appropriate technologies in all areas of agricultural production and post-harvest activities; the development of appropriate technologies for optimum use of fertilizer, herbicides, pesticides and so on; and the provision of appropriate technology and practices which ensure improved quality of life of the farming population. The state has been the moving spirit in the generation and transfer of new crop technologies to the farmers. The private sector and the

market have played minimal role in the mediation process. Public-owned agricultural research institutes (ARIs) in Nigeria are twenty two in number. The ones that focus on technological issues relating to staple crops and green revolution activities are five in number and are spread across agroecological zones of the country where the mandate crops predominate in the farming system. Nigeria also has the benefit of the presence of the International Institute of Tropical Agriculture (IITA), West Africa Rice Development Association (WARDA), and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). The mandate crops of the national and international research institutes in Nigeria are as shown in Table 4.4.

Table 4.4: Research Institutes and Their Mandate Crops

Crop Research Institute	Location	Mandate Crops
Institute for Agricultural Research (IAR)	Zaria	Sorghum, Maize, Groundnut, Cotton and Cowpea
National Institute for Horticultural Research (NIHORT)	Ibadan	Vegetable and Horticultural Seeds
National Cereals Research Institute (NCRI)	Badeggi	Rice and Soybeans
Lake Chad Research Institute (LCRI)	Maiduguri	Wheat and Millet
Institute of Agricultural Research and Training (IART)	Ibadan	Maize
National Root Crops Research Institute (NRCRI)	Umudike	Cassava, Yam, and Irish Potato
International Institute of Tropical Agriculture (IITA)	Ibadan	Cowpea, Yam Maize, soybeans and Cassava
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	Kano	Sorghum, Millet, Pigeon Pea, Groundnut
West Africa Rice Development Association (WARDA)	Ibadan	Rice

Source: NSS, 2000.

The primary aim of research in the crop subsector has been to increase productivity and to breed varieties of crops that are suitable to different agroecological zones as defined by physical factors, rainfall and other agroecological and climatic factors. Particularly, crop research is concerned with producing varieties and cultivars which are not only resistant to diseases and of high productivity but which also display desirable characteristics and qualities for direct consumption and agro-industrial processing activities. New high-yielding varieties (HYVs) were introduced and these considerably displaced local varieties which most farmers were planting in the past. Although the yield levels may not be impressive when compared with achievement in more developed countries, Nigerian farmers are beginning to appreciate the effects of new practices on their yield levels (Erinle, 1994).

After several years of technology trials on experimental and actual farm conditions in various parts and across agroecological zones of the country, a broad perception of the yield potential and spread of various crops have emerged as summarised in Table 4.5. Specifically, substantial gains were recorded in cereal production. The technologies introduced here included optimum fertilizer requirement, high-yielding cultivars of maize particularly the Open Pollinated Varieties

Table 4.5:: Major Areas of Production and Potential National Average Yields from Improved Varieties of the Different Mandate Crops

Crop	Areas of Production		Remarks
	Distribution	Most Suitable	
1. Rice			Improved varieties (vars)
(a) Lowland	Countrywide	Countrywide (inland swamps, irrigable lowlands, natural river flood-plains)	Transplanted and direct seeding. Avg. yield 2t/ha paddy. 4t possible
(b) Upland	Countrywide	Humid, south sub-humid	Improved vars, direct seedling, rain-fed, Avg. yield 0.84t paddy; 2.5t possible. Improved vars Transplanted. Avg. yield 2t paddy; 4t possible
(c) Mangrove swamp	Niger Delta	Niger Delta (humid)	Transplanted and direct seeding Aveg. Yield 2t/ha paddy, 5t possible
2. Maize	Countrywide	Sub-humid	Improved vars, including streak resistant hybrids available. Avg. yield 1.5t grain; 4t possible
3. Millet	Sub-humid, semi-arid	Sub-humid, semi arid	Improved selections and some hybrids. Avg. yield 0.4t grain; 2t possible
4. Sorghum	Sub-humid, semi-arid	Sub-humid	Improved vars, including early vars, dwarfs and hybrids. Avg. yield 0.7t grains; 3t possible
5. Cassava	Humid, sub-humid	Humid	Improved vars. Avg. yield 10t fresh tuber, 25-30t possible
6. Yam	Humid, sub-humid	Humid, south sub-humid	Local cultivars; some selections available; white yam types most popular. Labour demanding (mulching and staking) Avg. yield 10t fresh tuber; 25t possible. Note: New mini-sett technique is reducing sett supply problem.

Sources: PCU, ADPs, RBDAs, Research Institutes, Ministry of Agriculture and Universities.

(OPVs) , rice and other grains which are resistant to streak and downey mildew, irrigated/swamp and upland varieties of rice, and general weed control practices in grain-crop farms.

In the legume category, the famous Ife Brown cowpea released by IAR&T (Institute of Agricultural Research and Training) and OAU (Obafemi Awolowo University) and other varieties released by NCRI (National Cereal Research Institute), IITA (International Institute of Tropical Agriculture) and IAR (Institute for Agricultural Research) have significantly improved the yield of cowpea. The yield formerly was about 150kg per ha. In recent times, yield of between 500 and 800kg per ha is being realised. The various varieties also adapt favourably to local environmental conditions and show remarkable resistance to diseases. Several varieties of soybean have been released which make possible significant expansion in the land area under soybean especially in the south-west Nigeria as well as in Benue and Kaduna areas. In the same vein, groundnut varieties released by IAR have led to increased productivity of about 20 to 30 per cent.

For roots and tubers, cassava and yam have enjoyed the most attention. Cassava varieties introduced in the last five to ten years have led to tremendous increases in yield and shortened production cycle which was formerly two to three years to between six and nine months. There has also been a great improvement in cassava products as a result of new processing technologies introduced. The yam miniset technology was introduced jointly by National Root Crop Research Institute (NRCRI) and (IITA). Although highly rated, it is yet to enjoy a widespread adoption rate.

The technology delivery system is organised around the extension system. The extension system not only establishes direct linkages with research and technological findings, but also conveys the newly-introduced technologies direct to farmers in a manner and form which farmers can understand and apply in their production processes. Over the years, several approaches have been adopted to forge effective research extension linkage system as well as extension-farmer technology delivery gradient. The extension methods adopted have included the farm settlement scheme, the project approach, the integrated system of extension practice under the National Accelerated Food Production Programme (NAFPP) of the 1970s, Operation Feed the Nation approach, and the approaches adopted under the Green Revolution programme and the Agricultural Development Projects (ADPs). Except the ADP system, none of the extension approaches under past agricultural development programmes was sustained or found suitable in addressing the fundamental problem of technology transfer to largely illiterate small-holder operators who constitute over 80 per cent of Nigeria's agricultural producers.

Under the ADP system, several variants of extension approaches were tried. These have included the group farm approach, the progressive or target farmers' approach, and the Training and Visits (T&V) method under the Unified Agricultural Extension System (UAES). Under the UAES, one Village Extension Agent (VEA) constitutes the direct link with the farmers. The VEA directly exposes farmers to new technologies and relates in reverse manner, farmers' problems to the scientists. While noting the significance of direct contact with farmers, the VEA arrangements have some inadequacies. The principal limitation of the VEA approach to technology information dissemination is seen in the existence of several classes and groups of farmers, who not only plant different crops (arable, tree, fruits, and the like) but plant these in mixtures of farming systems of which the VEA may not have comprehensive knowledge as to be in a position to offer appropriate solutions to myriads of problems that daily confront farmers. This limitation becomes more significant given the low level of qualification of most of the VEAs.

The T&V extension system encompasses scheduled and regular visits to farmers' fields, feedback to research scientists, training of extension staff, and thorough supervision and definitive administrative procedure. Essentially therefore, T&V system brings together all principal actors in the system - the extension agent, the farmer and the scientist. The research-extension-farmer-input-linkage system (REFILS) is a modification of the T&V system. REFILS essentially integrates extension system into the farming system research (FSR). REFILS involves four phases which are problem identification, technology generation, technology adaptation and technology dissemination. The overall philosophy of the system is based on the belief that the two-way linkage within the farmer-extension-research tripod serves to bridge the gaps between generation, dissemination and use of agricultural technology. The processes to achieve the desired objectives of REFILS are via Monthly Technology Review Meetings

(MTRMs), Forthnight Meetings (FMs), Diagnostic Surveys (DSs), On-Farm Adaptive Research (OFAR), Small-Plot Adoption Technique (SPAT), OFAR workshops and cropping scheme meetings and extension workshops.

A host of social, economic and cultural factors influence the rate of adoption of agricultural technologies. Adoption of new practices involves a series of interacting steps including awareness, deliberate search for information on the new technology, decision making, trial, evaluation and adoption (Mabawonku and Osuji, 1978). In general and as discussed earlier, new innovations introduced in the agricultural sector in Nigeria have included mechanical inputs, fertilizer, agrochemicals (herbicides and pesticides), improved planting materials, planting pattern and general farm hygiene and husbandry. Over the years, research has made available a large variety of adoptable/adaptable technologies in several crops targeted at specific agroecological zones. However, despite increasing number of technological innovations being introduced, the adoption rate is small as smallholder farmers continue to rely more on unimproved local cultivars, manual operations, bush fallows and less than optimal use of fertilizer, pesticides and herbicides. Small farmers tend to prefer local crop varieties which perform better than the improved varieties under the prevailing cropping system characterised by minimal inputs and intercropping practices. Improved varieties require considerably high doses of inputs for optimal performance. However, results of performance have shown that where improved varieties have been combined with improved technologies generated by research, output levels realised are much higher than those realised under the traditional system. This is well demonstrated by the data in Appendix 4.1 which indicate the yield increases realised across Nigeria under ADPs. It has also been demonstrated that even under the usual intercropping system, adoption of improved technologies can result in significant increases in output provided the management practices are above average.

Production of Technology - Fertilizer and Seed

Fertilizer

The application of agricultural technology predisposes that adoptable technologies are available and at the reach of the farmers to use. The sources of modern technology could be from domestic or global sources or both. The state has a role to control the dependence on imports as a way to conserve very scarce foreign exchange. In Nigeria the major items of modern technology application on the farm are fertilizer and seed. Indeed, fertilizer stands out as the most sought after technology as revealed by several studies (Idachaba, 2000, Erinle, 1994 and Falusi, 1981) The Nigerian state has had to depend mainly on imports to meet its fertilizer needs (Appendix 4.2). Domestic production of fertilizer on a significant scale did not begin until 1987, long after a preliminary feasibility study on the possibility of local production of fertilizer commissioned by Nigeria and Indonesia in 1972. Although there are five fertilizer plants in Nigeria, the National Fertilizer Company (NAFCON) located at Onne, Rivers State is the major producer of fertilizer in Nigeria.

The state attempted to exercise control over the procurement, pricing and inter-regional and inter-state distribution of fertilizers. The policies were generally poorly coordinated. Procurement was centralised through the Fertilizer Procurement Unit in the Federal Ministry of

Agriculture. The intention was to relieve the state of the burden of the processes of importation and for quality control. The Unit coordinated the supplies to the State warehouses. At the state level, the Ministry of Agriculture through its extension officers was responsible for distribution. The main outlet to reach farmers was the state agro-service centres established in selected locations in the state. A nationally fixed uniform retail price was installed to operate throughout the country. This implies that the state absorbs the cost of transportation, storage and administration.

In the 1970s some State governments went further to appoint sales agents to complement public sector distribution arrangement. They were soon dispensed with towards the end of the decade following the discovery of untoward practices of these sales agents, who sold fertilizers at prices above those fixed by the government. However, it was found that the state had neither the financial resources nor the manpower to effect efficient distribution of fertilizer. Other problems included untimely delivery of fertilizers, shortages in supply, malpractices by government officials and a host of other constraints. In effect because of these problems fertilizer applications were below recommended dosages and this adversely affected the yield potential of high-yielding varieties (HYV) of arable crops being introduced to the farmer. Class differentiation also emerged as influential and commercial farmers with large farm holdings received priority attention in fertilizer distribution and allocation at the expense of millions of smallholder farmers. The subsidy on the product appears to be the source of the problem.

Fertilizer subsidy in Nigeria has been criticised. It has been argued that no matter how small the rate of subsidy is, it tends to shift attention away from needed developmental agricultural research and extension, rural water supplies, small scale irrigation schemes and land development. In addition, fertilizer subsidy tends to create a dependency syndrome by which vested interests come to expect every regime to continue with the fertilizer subsidy scheme. Furthermore, fertilizer subsidy tends to crowd out other more important items in the agriculture budget as the budget is often blotted, giving a wrong impression of the "large" size of the agriculture budget when in actual fact it is the fertilizer subsidy that accounts for the bulk of the budget. Also, fertilizer subsidy practice tends to crowd out the private sector and such that the development of private sector capacities in fertilizer procurement and distribution is advertently suppressed. However, the lesson of the last 25 years is that Nigerian farmers are more concerned with fertilizer availability at the time and place they need it most than they are about fertilizer subsidy.

National Seed Policy and Seed Development Plan

A policy that stresses the importance of ensuring adequate supply of good quality seeds at affordable prices was initiated; aimed at providing a framework for future development of the seed sub-sector through, establishment and governmental support of varietal improvement, registration, release and multiplication of released varieties; re-organisation of both the public and private sectors involved in the seed industry; and encouragement of the private sector participation and take-over by the seed industry. Suffice it to say here that a seed development plan to implement the policy was articulated several years later, in 1992 and that the National Seed Council was also established in the same year. The Council was charged with

responsibility for the overall policy guidelines and monitoring of the development of the national seed systems. The functions include:

- To analyze and propose programs, policies and actions regarding seed development and the seed industry in general, including legislation and research on issues relating to seed testing, registration, release, production, marketing, distribution, certification, quality, importation and exportation of seeds and quarantine regulations relating thereto;
- Propose improved management system and procedure relating to the administration of seed activity and advice the Government on the organisation, management and proper financing of seed programme;
- Analyse the market and prices of seeds;
- Control, supervise and approve the activities of the Crop Variety Registration and Release Committee; the Seeds Standard Committee, the Seed Industry and Skill Development Committee; and such other committees as may be established from time to time
- Advice the national research system on the changing pattern of seed demand and farmers needs;
- Monitor and evaluate the achievement of the national seed system and recommend improvements thereto;
- Encourage the formation or establishment in Nigeria of seed companies for the purpose of carrying out research, production, processing and marketing of seeds; and
- Perform other related functions as may be required of the council.

However, the policy has failed to adequately address the threat posed by the new seed varieties to the continued existence of local land races which are much more in use by the local farmers within the country and the sub-region than the improved, released varieties.

Land Policy

Land is critical to the outcome of green revolution since it is the primary factor and medium of plant growth. Prior to the promulgation of land use decree of 1978, different land law operated among the regions of the federation. In the Northern region, the land belonged to the state. The emirs and chief supervised the use of land and issued out certificates of occupancy. The people had the right to use the land but not to own it. But what operated in the Eastern region was slightly different. There were individually owned small pieces of land that were passed and shared by the sons of the father at death. Also, the communal lands were owned by the village, town or clan. The ownership of land in the Western region was a bit similar to that of the East. There were the communal (held on tribal, village, clan or family basis), collective (a group of people bought and shared lands) and individual ownership. On the agricultural scene, millions of independent peasant farmers controlled their land and cultivate crops of their choice. However, individual who were not the bonafide owners of land on which they farmed could not plant permanent crops, such as cocoa and oil palm.

But following the declining contributions of agriculture to GDP in the early 1970s experts observed that peasant agriculture was “the problem” to increased agricultural output. To remedy the situation, the land use decree was promulgated in 1978. This land decree did not alter the

Northern region traditional land tenure system but changed the system that operated in the East and Western regions. The ownership of land in each state was vested in the state governments in trust for the people of the state. Through the land use decree, highly placed and influential government officials were able to acquire lands from their rightful owners at little or no cost thereby dispossessing peasant farmers of their land.

Specific Agricultural Technology Programmes

The shift to modern technology in Nigerian agriculture actually occurred within the context of a relatively greater emphasis on the agricultural sector in the Third Plan compared with the previous plans. It reflected a shift in focus towards the food crops from export crops. The use of technologies became the central strategy in several programmes and projects. In the plan also, the government had sought to improve the institutional infrastructure in the rural areas. The systems of credit, food marketing, storage and fertilizer procurement and distribution were part of the efforts. Land reforms, foreign investments, research and extension activities as well as injection of foreign capital dominated the new approach to finding solution to the food problem engulfing the Nigerian state. In order to have a deeper understanding of the institutional setting within the framework of an emerging green revolution in Nigeria, considerable space and time are devoted to describing in some details specific programmes and projects embarked upon during this period. It was these institutional structures that served as vehicles for various technological innovations introduced to the farmers. That is, they capture the essence of the Nigerian version of the green revolution (Roy, 1990).

The National Accelerated Food Production Programme (NAFPP)

The NAFPP was anticipated to herald the green revolution by making all inputs available to farmers in a coordinated fashion. The programme was initiated in 1973 and the main objective was to accelerate the production of six major food crops, namely rice, maize, millet, sorghum, cassava and wheat. The increased production was to be obtained by using field tested packages of improved practices that could significantly outperform the traditional ones. The programme consisted of three phases, namely the Minikit, Production kit and Mass Production. The entire activity was structured on integrated adaptive research and extension programme. The National Rice/Maize Centre was established to guide and coordinate the activities of the NAFPP for rice and maize. This centre was based at the National Cereals Research Institute (NCRI) in Ibadan and another centre for millet, sorghum and wheat was established at Samaru near Zaria in Northern Nigeria. The National Root Crop Research Institute (NRCRI) at Umudike in Eastern Nigeria took charge of cassava while the International Institute of Tropical Agriculture (IITA), Ibadan was the national coordinator of the programme (IITA, 1976).

The various crop research institutes involved in the programme were expected to evolve, through research, high yielding varieties of the crops and pass these to be tried by the extension agents on farmers' farms in small plots of 50 square metre size, called the Minikit plots. In addition to the variety trials, fertilizers and herbicides trials were also carried out for each variety. After the harvest, the farmers were expected to select the best of the varieties and the technologies for trials on what were called production kit trials of about 1000 square metres each. Thereafter, the varieties entered into the last phase of the programme which was referred to as the Mass

adoption phase. Thus, in three stages the farmers were involved in testing and selecting new varieties and new improved practices, and in the designing of production packages. Neighbouring farmers were also expected to evaluate the results of the trials and consider adopting those technologies that were judged to be beneficial to them.

Zonal sub-stations were established for adaptive research, seed multiplication and training of the extension workers in applied research techniques, crop protection, grain storage, seed production, management, mechanization techniques and the gathering of economic data. The farmers were also expected to be assisted with credits and the marketing of their produce.

However, the impact of NAFPP on agricultural development was quite limited in spite of the elaborate nature of the programme and the efforts of its authors. Famoriyo (1980) identified the factors that militated against the success of the programme as including lack of effective supervision of farmers; late arrival of inputs; lack of record-keeping among the largely illiterate farmers; inadequate funding; poor infrastructural facilities, and grossly inadequate extension services.

Agricultural Development Projects (ADPs):

The Agricultural Development Project concept was launched in the early 1970s. The first generation ADPs were the enclave projects which started on a pilot scale in Funtua, Gusau and Gombe all located in the northern parts of the country. According to Olayide (1979), ADP was an integrated approach combining technology, effective extension services, access to physical inputs, adequate market and other infrastructural facilities directed at effecting knowledge-based agriculture which could promote improved farm productivity and raise the living standard of smallholder farmers of Nigeria. The main objective of ADPs had been to achieve self sufficiency in food production, while their functions were to provide farm inputs to farmers at the village level; ensure the utilisation of such inputs, through provision of adequate credit, extension and marketing services to farmers; provide and maintain agricultural lands through effective soil conservation measures; provide technical and management training to agricultural workers; and provide a base for the improvement of health and social services in the project areas.

In this regard, the operational features of the outfit may be summarised as follows:

- An input and credit delivery system through well-defined farm service centres established within the reach of farmers.
- A massive programme of rural feeder road construction intended to open up the project area, facilitate the delivery of farm inputs to farmers and promote efficient evacuation of farm produce from hinterland.
- An efficient extension and manpower training system supported by adaptive research with the view to making extension services easily available to farmers.
- A semi autonomous project management with built-in project monitoring and evaluation units as a means of obtaining quick feedback on the progress of the projects.

From this operation structure it is evident that the state was the chief force behind the project. The private sector was assigned no obvious role while the market system was also excluded from mediating in input supply function. The farmers, however, could sell their products in the open market. Because of total involvement of the state in the operations of the project, it is not surprising that over the years the ADPs derived their funds from the direct grants by the Federal Government; grants by the state government; and loan funds from the World Bank.

There is overwhelming evidence that ADPs have played a significant role in the evolution of GR in Nigeria. Measuring the impact of the enclave ADP on the project area, Olayide (1981) asserted that the pilot ADPs, especially in the Funtua case, had a significant impact on the crop yield and the farm income, as 80% of the participating farmers recorded increases in their crop yield and income Idachaba *et. al*. (1981) also acknowledged that the project significantly reduced the "extension agent farmer" ratio to 1:500, although it was still far from what obtained in countries like Philippines, 1:100 and Kenya 1:200. The CBN (1991) assessed the ADP system and indicated significant rates of achievement in several of the activities of the project. For instance, in the late 1980s the ADPs constructed annually over 1000km of new rural roads, maintained over 2000km of rural roads annually and rehabilitated over 1000km of roads. During the same period, the projects supplied over 500,000 tonnes of fertilizer annually to the farmers under the projects and ensured that this input reached the farmers at appropriate time and at official prices. Seed multiplication, land clearing, tractor hire and irrigation were the other services which ADP provided for its farmers. Sales of agrochemicals and farm equipment were established for project farmers while extension visits to participating farmers exceeded by nearly four folds over planned visits during the period under review. As a result of these supporting activities production levels planned for maize, millet, sorghum, yam and cassava were virtually achieved and, indeed, surpassed in the case of tubers (Table 4.6). However, the achievement levels in certain commodities (rice, cowpeas, wheat, soybean and others) were not as envisaged. As noted by Evbuomwan (1997), the achievements and performance of the ADPs have resulted in positive effects on the host communities, particularly in stemming the trend of poverty in these rural areas.

Table 4.6: Production of Crops in ADP Project Areas, 1986-1988

Commodities	1986		1987		1988		Output Performance	
	Area	Output	Area	Output	Area	Output	1986/87	1987/88
(a) Maize	2,661.8	2,345.2	29,619.4	23,469.2	n.a	32,176.3	0.88	0.79
(b) Rice	8,652.7	656.2	2,351.3	493.5	n.a	518.7	0.08	0.21
© Millet	4,015.8	2,251.6	3,681.0	2,121.3	n.a	2,333.4	0.56	0.58
(d) Sorghum	5,731.42	3,798.6	4,910.6	2,731.4	n.a	3,026.4	0.66	0.56
(e) Cowpea	1,596.9	751.98	1,503.4	312.65	n.a	258.6	0.47	0.21
(f) Cassava	722.55	6,168.4	753.3	8,364.5	n.a	3,772.4	8.54	11.10
(g) Yam	688.4	6,091.6	863.6	8,354.5	n.a	8,454.8	8.85	9.67
(h) Cotton	28.0	9.8	44.2	26.8	n.a	29.4	0.35	0.61
(i) Groundnuts	188.4	560.5	1,574.1	974.8	n.a	1,073.3	0.51	0.62
(j) Plantain	n.a	n.a	14.0	42.0	n.a	n.a	-	3.0
(k) Cocoyam	103.3	4,687.13	90	270	n.a	n.a	4.54	3.0
(l) Irisk Potato	84,233	622.7	n.a	591.5	n.a	n.a	7.39	-
(m) Melon	87.5	16.10	16.24	4.59	n.a	n.a	0.18	0.28
(n) Soyabean	53.43	53.43	16.89	16.01	n.a	n.a	1.00	0.95
(o) Wheat	-	118	-	250	n.a	40	-	-

n.a = not available
Source: CBN: Annual Report and Statement of Account, 1988.

The River Basin Development Authorities (RBDAs):

At another stage in the agricultural history of Nigeria, the Federal Government, recognised the unreliability of the intensity and duration of rainfall, upon which the country's peasant agriculture depends. In 1976, ten River Basin Development Authorities (RBDAs) were created by law and in 1977, one more RBDA was added bringing the total number to eleven. They were as follows: Anambra-Imo, Benin-Owena, Upper Benue, Lower Benue, Chad Basin, Cross River, Hadeija - Jama'are, Niger Delta, Niger River, Ogun-Osun and Sokoto-Rima. These were established on some of the perennial rivers with which Nigeria has been so generously endowed, as discussed earlier. The main objectives of the projects included:

1. To embark on vigorous development of the land and water resources of Nigeria for agricultural purposes and rural development;
2. To be involved in direct food production as a way of training people on irrigation farming;
3. To support the farmers with improved seeds, agro-chemicals, mechanised tillage, harvesting processing and marketing.

A substantial proportion of government capital allocation to agriculture in the Third and Fourth National Development plan periods was earmarked for the implementation of the RBDAs. In the Third Plan Period, actual expenditures on various irrigation projects by the Federal and state governments amounted to ×778.1 million and ×50.1 million respectively. In the Fourth Plan period, the estimated expenditure of the Federal Government alone on irrigation projects was about ×2.094 billion, which was roughly 65 percent of the total actual spending on all agricultural programmes. The State Governments spent about ×40m. on irrigation projects representing about 5 percent of their total spending on the agricultural sector.

The intervention of RBDAs in the GR process was perceived several areas including, the comprehensive development of water resources for multipurpose use, including irrigation and urban water supply; control of floods and erosion, and watershed management; construction and maintenance of dams, dykes, wells, bore-holes, irrigation and drainage system; resettlement of persons affected by the irrigation activities; mechanised bush clearing and cultivation of land for agricultural production; large-scale seed multiplication for distribution to farmers.

However, as comprehensive as the activities were the RBDAs made only a modest contribution to the green revolution effort. The involvement of the RBDAs in direct food production was the killer function that obstructed achievement of significant progress in agricultural development efforts. By 1985, the Chad Basin RBDA had brought about 23,000ha of land under irrigation. The Hadejia and Sokoto-Rima RBDAs had also irrigated 27,750ha. and 25,000ha. of land, respectively. All other RBDAs combined had irrigated only 6,555ha. of land as of the same date, although these last eight RBDAs took off much later than the first three mentioned above. Record also shows that out of 536,282 ha. of land expected to have been irrigated by 1985 only 82,305 ha. had been executed.

Operation Feed the Nation

Operation Feed the Nation (OFN) as a rural development and agricultural programme, was launched in 1976 with the following specific objectives: to mobilise all classes of people in Nigeria to embrace agricultural production; to eliminate the traditional disdain for agriculture by the educated; to enhance food production at the household level; to create jobs and additional income; and to utilize more of the available land resources in the country. The instrumental value of the OFN was simply the populist nature of the scheme and the general acceptance it attracted. The programme had no adequate planning and clear development objectives. There was no institutional structure for its implementation and, therefore, lacked specific roles for peasant farmers, cooperatives, companies, other businesses and non-farmers. Uwakah *et. al*. (1980) stated that the programme made the greatest impact only in mobilising the people and creating a general awareness of the need for increased food production. They found only marginal increases in total farm area cultivated and the use of fertilizers and other improved farming inputs.

The Green Revolution Programme:

Between 1966-1979, Nigeria was under the military rule. The civilian regime which replaced the military desired to have an agricultural programme of its own totally different from those introduced in the past. Consequently, a modified form of the OFN programme titled the Green Revolution Programme (GRP) was launched in 1980 shortly after the inception of the civilian government. As expected, the GRP aimed at an accelerated increase in agricultural production by removing all known constraints to increased production. The central elements of the programme were much wider in scope than the OFN. Its unique aspect was the adherence to the recommendation of a team of World Bank and Nigerian consultants, which was that the government ministries should divest themselves of input procurement and distribution responsibilities and allow the private firms to perform these functions. The consultants in their report called "The Green Revolution: A Food Production Plan for Nigeria", also recommended that Nigeria should concentrate production efforts on a selected number of crops, viz; maize, rice, sorghum, millet, wheat, and cassava, for which she has technological innovation for increasing production. Doing this was expected to allow the country to close existing protein and calorie gaps substantially. The consultants further pointed out that there were possibilities for obtaining increased yields of many of Nigerian crops far greater than were being obtained if she could produce her own 'miracle seeds' and evolve packages of complementary inputs needed for the production of each crop.

In line with the recommendations, a series of activities including pest and disease control involving the use of ground spraying equipment and spray planes as well as a nationwide erosion control programmes were initiated. Substantial quantities of improved seeds and fertilizers were also distributed to the farmers. For instance, to boost rice production, 7,000 farmers were trained in 1981 in modern methods of rice production. Out of an estimated 66,000 ha of land which was to be cleared about 38,845 ha were actually cleared and planted to rice, yielding 102,400 tons of paddy. Similarly, the RBDAs and ADPs planted 52,604 ha yielding about 146,616 tons of paddy. Altogether the direct investment of the Federal Government was estimated to have resulted in additional 53,140 tons of milled rice to the national food basket. According to

Aribisala (1983), in response to the programme, Nigerian farmers increased their production to an estimated 650,000 tons of milled rice bringing the production from all sources to about 805,140 tons. Increased production was also recorded for maize mainly from the ADPs and RBDAs. However, in spite of the elaborate plan to prosecute the programme achievement level was quite modest because of several problems, including poor funding, lack of executive capacity in skill and facilities and institutional constraints such as lack of access to large parcels of land as a result of restrictions imposed by the land tenure system. In any case, in 1983 the military took over power again and terminated the programme.

General Assessment of Nigeria's Green Revolution Strategies

The foregoing analysis has shown that the 1970-85 period was extremely significant in respect of state intervention in Nigerian agriculture, particularly in the introduction of green revolution production practices among the peasantry. In the SAP years, state intervention was significantly relaxed. It was totally withdrawn from direct production and other activities which the private sector could handle much more efficiently than the public sector. Since the end of SAP, government intervention has been relatively ambivalent but more into correcting the lapses noticed in state withdrawal from some activities under what is called 'guided deregulation'. However, most of the interventionist programmes failed to make the desired impact because their potency and implementational processes were flawed. What needs to be clearly stated is that the ADP system and RBDAs constitute the core of the Nigerian 'green revolution', which combine technology with infrastructure, storage and other functions. However, three basic issues may be raised in respect of Nigeria's green revolution proceeses.

The first issue with these two strategies is their limited coverage in terms of spatial spread of the activities and the number of farmers involved. As may be recalled the ADPs started as enclave projects, confined to limited geographical areas and surrounding communities. For instance, the pioneer ADPs, in Funtua, Lafia and Ayangba were executed as enclave projects. This same pattern was repeated throughout the other states of the Federation until the 1980s when the ADPs became statewide projects, that is, executed in all parts of a state. Indeed, the so called 'statewide' approach could not have been effective given the vast number of farmers, the geographical spread of a state and gross inadequacy of government finances and support services and personnel to undertake the projects the way they were conceived, planned and executed in the initial enclaves. Similarly, it is obvious RBDAs cannot be located in any other area except where perennial rivers or other sources of water are available. Consequently, the large irrigation schemes under the green revolution efforts were located in such areas, but mostly in the north of the country. Because of the technology involved and the cost implications, only a few RBDAs could be established in about eighteen communities. Again, the area and farmer coverage is very limited.

Thus, the implication of limited coverage of the projects is that the benefits and opportunities for green revolution through ADPs and RBDAs are limited to the areas and farmers who are participants. The rub-off effects on non-participating farmers who incidentally are in the majority and off project sites have been quite minimal. Consequently, the expectation of huge food output arising from widespread green revolution activities involving most Nigerian farmers could not be realised. Nonetheless, the growth increases noticed would still need to be attributed

to the various efforts that have been made to change the production configuration of Nigerian agriculture over the years.

A second issue is the range of crops involved in the Nigerian green revolution and how these have fared in terms of productivity or yield levels. The crops which have featured in the Nigerian green revolution are grains (rice, maize, sorghum, millet and wheat) and tubers (cassava and yam). Cotton, sugar and other minor crops with little or no significance to food supply also featured at some point. While the wisdom of paying special attention to the grains cannot be faulted, the choice of wheat as the main crop under the RBDA technology was inexcusable. Wheat is a temperate crop and the varieties cultivated in Nigeria are those that may fairly perform well during the dry harmattan season of December to February. In spite of obvious difficulties, Nigerian went headlong into wheat production programme under the RBDA system. The result, expectedly, was a disaster and a colossal waste of resources that could have been utilized for other commodities. Andrea and Beckman (1982) aptly described the misadventure of Nigeria into wheat cultivation as a 'Wheat Trap' - huge investments had already been committed on the programme and the government was hardpressed to continue with the effort or risk losing all the investments hitherto committed to the programme. Wheat has eventually failed and in practice the emphasis has eventually come to rest on maize and rice.

Rice is cultivated in virtually all the agro-ecological zones in Nigeria, from the mangrove and swamps environment of the Niger Delta in the coastal areas, to the dry zones of the Sahel in the North. In the 1960s, area cultivated was below 150,000 hectares and output was below 300,000 metric tons. In 1980, output rose to about 1 million metric tons while the area cultivated and yield rose to 550,000 hectares and about 1.9 tons per hectare respectively. In 2000, out of 25 million hectares of total land cultivated in Nigeria, about 6.4 per cent or 1.6 million hectares are under rice. Figures 4.1 provides the trend in area and output, while Figure 4.2 shows the yield levels between 1961 and 2000. In most of the 1990s, output increased while yield declined, which suggest extensive rice cultivation and little impact of green revolution initiatives. Given the prominence which rice has now assumed in the Nigerian food basket and to douse the intensity of imports which today stands at about 330,000 metric tons and nearly $700 million as import bill annually, the government has recently incepted a rice expansion programme to make Nigeria self-sufficient in rice in two years, that is, by 2005. Nigeria expects to be in a position to export rice by 2006! This is the sort of perception and policy orientation that have guided green revolution and food policy in Nigeria for many years.

Sorghum, maize, yam and millet present a different challenge in the Nigerian green revolution and technology adoption. These crops are usually planted in mixtures of two or three crops at a time in the farming systems. But under the recommendations on high yielding varieties introduced to farmers emphasis is on monocropping to achieve optimal yield levels. For example, the improved OPVs of maize were developed for monocropping and dense populations and failed to give good results when intercropped with cassava, yam sorghum or millet as farmers have practised over the years. In addition, it was difficult if not impossible to design an optimal package of inputs for crops planted in mixtures. Other problems confront the HYVs being recommend to the farmers. Fertilizer has remained the bane of increased productivity.

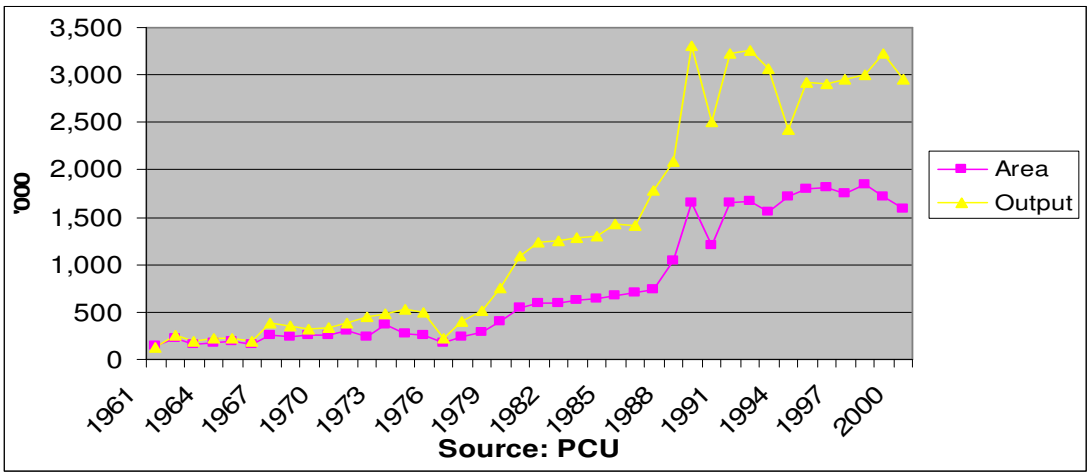

Figure 4.1: Area and Output of Rice in Nigeria

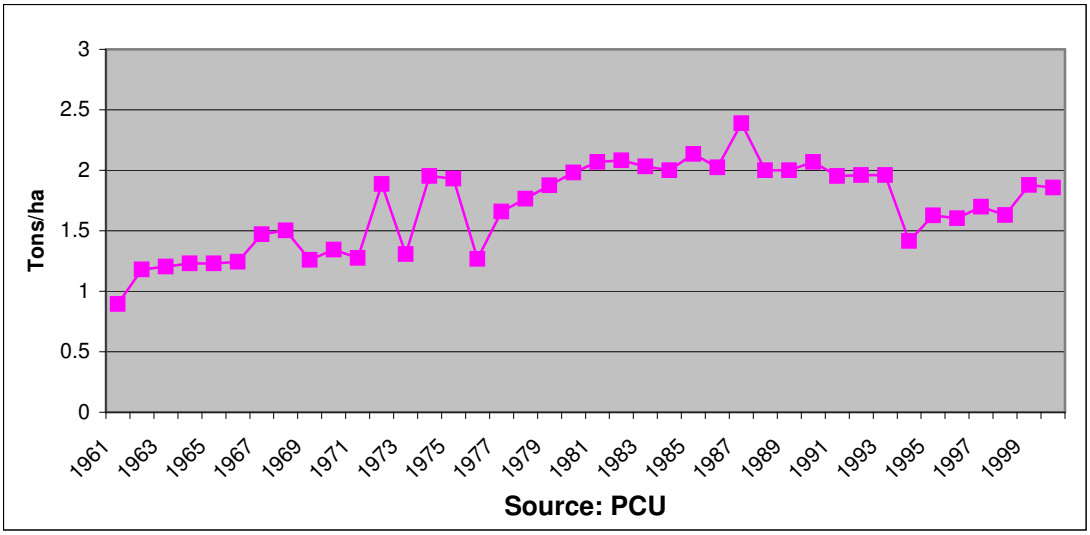

Figure 4.2: Rice Yield in Nigeria

The input has always been in short supply, making farmers not to use the optimal rates which may result into significant yield. Farmers have also raised the concern that HYVs are highly susceptible to pest and diseases and, therefore, of high risk to investment. Although maize and cassava suffer from a number of pests and diseases (e.g. maize from stems borers and downy mildew and cassava from cassava mosaic) the risk of investment in these crops does not appear to be a well-founded apprehension as most farmers could still realise significant output. Furthermore, the peasants seem to prefer the traditional varieties which they judge to be more palatable and of good keeping quality than the project varieties they are given to cultivate. Thus, resource constraints, notably fertilizer and labour and personal preferences on the part of the farmers tend to limit the adoption of green revolution package wholesale.

A third issue of concern relates to emerging differentiation among the peasantry. Big time farmers cultivating large hectareges of as much as 100 hectares or more even when farmers are town-based, seem to receive priority attention from green revolution project officials. The conceptual foundations of all the projects and programmes introduced in the farm scene since the 1970s have always been the smallholder farmer as the centrepiece of food and agricultural production. However, over the years some class differentiation has emerged even among the peasantry. Project officials have tended to provide support for the farmers on the basis of whether they are "progressive" or "traditional" farmers, classified as such if they are quite responsive to extension advice, or show little or no interest in extension advice, respectively. While the progressive farmers receive considerable quantities of physical inputs like fertilizer, the traditional and, therefore, non-progressive receive only the crumbs (D'Silva and Raza, 1980). The huge and growing level of public investment in the project areas has also attracted public officials to the project areas. Such officials have used ordinary farmers as fronts, while the public officials influence project managers to give preferential treatment to such farmers. Related to the issue of class differentiation is the effect of RBDAs on downstream farmers, whose farm land could not receive adequate inflow of water as a result of upstream dams. For such downstream farmers dry season cultivation of such crops as vegetables and onions has been rendered impracticable. This had led to protests in the past.

A final issue of concern is the sustainability of project-type intervention as a vehicle for prosecuting green revolution in Nigeria. It has become obvious in the past couple of years that the level of investment required to oil the wheel of ADPs and RBDAs could not be met by the Nigerian government. The scale of intervention (for instance, huge dams with sprinkler-type irrigation technology) has been questioned. Most analysts agree simpler and less capital-intensive systems should have sufficed, given the level of literacy of farmers expected to adopted the technologies being introduced. The implication of dependency on foreign countries for ordinary spare parts and management skill has also been highlighted. It is stated that what is saved in not importing food will invariably be used to import machinery to keep the project going and the country eventually fails to gain much in its strategy. Currently, the dependency is very ably demonstrated by reliance on imported fertilizer.

THE STRUCTURAL ADJUSTMENT PROGRAMME (SAP), 1986-1993

By the end of the 1970s the crevices which had started to show in the weak structure of the Nigerian economy eventually developed into gaping holes. Poor economic management and misapplication of earnings from petroleum exports had resulted in imbalances between aggregate supply, distortion of relative prices and erosion of international competitiveness. Consequently, the rising aggregate demand which was financed through external borrowing led to current accounts deficits, external payments problems and a debilitating external debt burden for Nigeria.

The situation was compounded by unfavourable developments in the international oil market. Since oil dominated the Nigerian economy in respect of foreign exchange earnings, it is easy to understand why the instability in the world oil market could affect and actually led to instability in the nation's economy. Nearly 95 per cent of Nigeria's foreign exchange earnings was being derived from petroleum exports in 1980 (see Table 5.1). This suffered reverses in two ways. First, there was a drop in OPEC's quota for Nigeria from about 2.1 million barrels per day (bpd.) in January 1981 to only about 640,000 bpd in August 1981. Second, the price per barrel of oil also dropped from over $20 per barrel to less than $20 per barrel. Both the declining volume of crude exports and falling prices combined to erode the revenue base of the economy, which experienced nearly 75 per cent drop in its foreign exchange earnings, from $26.3 billion in 1980 to only $6.8 billion in 1986. In the same period, the foreign exchange reserve s which stood at $10.2 billion in 1980 tumbled to $1.1 billion in 1986. Inevitably, the debt burden rose sharply from $8.9 billion in 1980 to $26.9 billion in 1986, that is, an increase of 124 per cent. It became burdensome for Nigeria to service its debt. Paradoxically, the country continued to accumulate some debt through imports to satisfy the acquired import taste of its citizens.

The unmitigated taste for imports had worked in the following manner. The economy was dependent on imports, both for consumer goods and capital goods required in the manufacturing sector. This was the case in respect of staple crops such as maize and rice which imports remained very high even though Nigeria produced the two crops. Between, 1970 and 1982 Nigeria's self-sufficiency ratio in maize and rice fell, while the imports of the two commodities rose quite significantly (Table 5.2). Similarly, the propensity for importation of other commodities such as frozen poultry, meat and beef as well as wheat was quite high. In the case of wheat, imports rose from 271,000 metric tons in 1970 to 1.5 million metric tons in 1982, with the import costs rising from $22 million to $330 million during the period.

Table 5.1: Nigerian foreign exchange, external reserves, and external debt

	Foreign exchange earnings			External reserves			External debt	
Year	Total	Total petroleum	Petroleum percent of total	Total 1/	Foreign exchange	Percent change in foreign exchange	Total	Percent change
	-Million dollars-		Percent	-Million dollars-		Percent	-Million in dollars-	Percent
1970	1248	718	58	202	174	N.a.	N.a.	N.a.
1980	26294	24841	94	10235	9593	54	8888	N.a.
1981	17241	16155	94	3895	3895	_68	12039	36
1986	6784	6385	94	1081	1081	_66	26931	124
1987	7559	7024	93	1165	1165	8	31857	18
1988	6875	6267	91	651	651	_44	32459	2
1989	7871	7470	95	1766	1765	171	41525	28

1/ Excluding gold.
N.A. = Not available
Source: (1) Central Bank of Nigeria (CBN): *Annual Report and Statesment of Accounts* (Several Issues)
(2) International Monetary Fund (IMF): *International Financial Statistics* Various Issues. Washington D.C

Table 5.2: Nigeria's Imports and self-sufficiency ratios (SSR's) in maize and rice

	Maize				Rice			
	Imports		Total domestic supply	Self-sufficiency ratio	Imports		Total domestic supply	Self-sufficiency Ratio
Year	Quantity	Value			Quantity	Value		
	1,000 tons	Million dollars	1,000 tons	Percent	1,000 tons	Million dollars	1,000 tons	Percent
1970	9.0	1.2	1452	99.4	2	0.2	230	99.3
1975	3.0	0.7	1365	98.8	7	3.9	349	98.1
1979	111	38.1	602	81.8	568	254	1067	46.8
1980	168	60	821	79.5	450	245	1175	61.7
1981	293	63.3	946	69	657	408	1482	55.7
1982	347	102.6	1000	65.3	539	290	1370	60.6
1983	50	17.6	1077	95.4	544	238	1395	61
1984	63	18.2	1259	95	365	165	1230	70..3
1985	77	23.6	1903	96	351	95	1302	73
1986	50	8.8	1786	97.2	320	80	1262	74.6
1987	0.3	0	1523	100	400	92	1077	62.9
1988	0.3	0.5	1766	100	200	55	871	77
1989	0	0	1613	100	200	58	895	77.7

Source: (1) CBN: *Annual Report and Statement of Accounts* (Several Issues)
(b) *FAO Production and Trade Yearbooks* (Several Issues), Rome

As a result of these developments, the economy had been virtually weaned to the external sector, with imports dictating the behaviour of several areas of the domestic economy. For instance, restrictions of imports easily manifested in shortages of consumer items like milk, cooking oil and butter. There was also under capacity utilization of manufacturing industries which depended on imported raw materials. Consequently, import restricting led to unemployment and retrenchment of workers. The public sector itself was not spared from the consequences of underperforming economy, as the civil service was down sized in order to control the wage bill. Another casualty was public works which were reduced to the minimum.

The concrete policy response to the declining economy was the promulgation of an Economic Stablization Act (ESA) in 1982. The main elements of this were imposition of import and exchange controls, and restrictive monetary and fiscal measures. The aim was to curtail importation on the one hand, and restrict capital expenditure on the other. However, the demand management measures failed to cause the desired impact to happen and a more stringent measure had to be resulted to. Very clever military government we had at this time. The government did not want to be seen as imposing the World Bank-induced structural adjustment measures on the Nigerian people. So, it introduced a public debate on the issue which eventually resulted in the so called "home grown". Structural Adjustment Programme (SAP), which commenced in July, 1986. In spirit and content, it was not home grown, but the typical, orthodox-type SAP which recognised the sovereignty of the market in economic matters.

SAP Objectives

SAP was conceived to change in a fundamental way the pattern of aggregate domestic expenditure and production, broaden the narrow economic base to embrace the non-oil sectors and promote self-sufficiency in domestic food production and supply. The instruments of SAP were targeted at the following objectives:

- diversification of the productive base of the economy to reduce reliance on crude petroleum while allowing the other sectors, particularly the primary sector to thrive and blossom into major economic contributors;
- decoupling the domestic manufacturing from imported raw materials while creating opportunities for industrial production relying on available domestic resources;
- promotion of sustainable growth through control of inflation and other economic vices; and
- reduction in public sector involvement in direct production activities and emphasising private sector participation.

With particular reference to agriculture, SAP was expected to lead to the achievement of the following objectives:

- expansion in domestic food production in order to reduce importation of food;
- domestic production of agricultural raw materials to feed the agro-based enterprises;
- increased value-added through domestic processing of agricultural commodities and expansion of employment in the manufacturing sector;

- re-enacting the glorious old days of the traditional Nigerian exports such as cocoa, palm produce, rubber and cotton;
- enhancement of the rural economy via viable rural-based and employment-creating activities, with the sole aim of raising rural income and stemming rural urban migration;
- disengagement of the public sector from direct agricultural production activities and encouraging private-sector control and ownership of agricultural enterprises.

SAP Policy Measures and their effects on Agriculture

A barrage of economic policy measures was introduced simultaneously to redress the downturn in the economy and chart a new path for growth and development. The measures were not directly focused on the agricultural sector but as a generalised attack on the concerns raised by the crippling decay of the fabric of the economy. The various policy measures undertaken under SAP were both macro and sectoral in nature.

Exchange Rate Policy

This is, perhaps, the most conspicuous and most encompassing policy measure adopted under SAP. It was conspicuous because much publicity and debate by the civil society was freely canvassed before it was introduced. It was encompassing because, it was a policy that fundamentally changed the price system and affected every Nigerian entrepreneur and consumer through its effect on the price level.

The exchange rate policy was premised upon establishing a "realistic" exchange rate for the local currency, the naira, which had hitherto been grossly overvalued as a result of rigid adherence to a fixed exchange rate in spite of general local inflation and inflation spiral in countries which are Nigeria's trading partners Overvaluation of the local currency affected agriculture negatively in two ways. First, it made imports of agricultural commodities, particularly raw materials much cheaper than the locally produced ones and thereby serving as a disincentives to local farmers, whose returns could not even cover the cost outlay let alone generating any remunerative margin. Second, local agricultural input suppliers found it cheaper and more rewarding engaging in imports rather than establish local plants to produce the various inputs required by the farmers. Consequently, the technological base of the Nigerian agriculture was inadvertently being laid on foreign technological effort and production.

The determination of the "realistic" exchange rate was by the operation of a foreign exchange market in which the exchange rate of the naira to foreign currencies, using the US dollar as the yardstick, was set by a bidding process involving Nigeria's apex bank, the Central Bank of Nigeria (CBN) and the commercial banks and the bureau de change operators. When the process commenced in 1986 naira exchange rate to the dollar was one to one. This rose to about 7.9 naira to $1 in 1990 and by the official end of SAP in 1993, the rate of exchange was about x17.50 to the US dollar.

The new exchange rate regime made it possible for farmers, notably cocoa growers to earn substantial income for their produce. Cocoa prices rose very sharply as all forms of export restrictions, taxes and administrative controls were dismantled including the erstwhile

commodity marketing boards. Food crop producers also benefitted marginally, initially and tremendously over the years of SAP. The benefits to food crop producers came about as a result of good prices, reduced competition with imports which were restricted by import bans, escalating import prices and the rising demand and involvement of corporate bodies in local sourcing for agricultural raw materials. High in the raw material demand, were the breweries which began to substitute locally produced sorghum for imported malt. Cassava was also finding increasing demand among industrial alcohol manufacturers and so, cassava farmers started to receive improved prices and income.

However, the naira costs of imported agricultural equipment and machinery such as harrows ploughs, and tractors; and physical inputs such as fertilizer and other agrochemicals escalated during SAP, making most of the equipment and inputs out of the reach of many farmers. The sharp rise in the costs of imported farm inputs did curtail new investments in commercial agriculture and the management and maintenance of existing equipment and machinery proved a difficult task because of the financial strain it imposed on modern farming. On the part of smallholder farmers, increased input prices discouraged adoption of productivity-enhancing technologies.

Trade Policy

During the 1970s and prior to the introduction of SAP reforms, trade policy encouraged protection of the domestic manufacturing industry, which was largely import dependent. Stimulation of export of both agriculture and domestic manufactures received only token attention, especially with petroleum exports dominating the external sector. Trade policy promoted infant industries which produced mainly for the internal markets, behind very high tariff barriers, which thus protected them from still competition from imported manufactures. Surprisingly, little was done to directly protect domestic agriculture, which was groaming under severe competition with large imports of food items, especially grains. This tended to erode the competitiveness of domestically produced grains and served as a disincentive to farmers.

The bias in protection of industry against nonchalant attitude towards agriculture was evident in the high differential in the aggregate unit price for the protected domestic manufactures vis-a-vis agriculture. The index of bias in protection estimated as the ratio of aggregate producer prices of agricultural sector to that of manufacture, varied between 0.55 and 0.86 during the pre SAP years (CBN-NISER, 1991). This suggests that on the aggregate, returns on investment in the protected industries were much higher than in agriculture. This was more so as the protected industries were also given access to cheap raw materials through liberal import and exchange rate policies, which enhanced reduction in cost of production. On the contrary, the farm production cost profile was rising, such that net returns on farming investments were significantly lower than the returns on investments in manufacturing enterprises.

The reformed external trade policy, therefore, aimed to encourage liberalized trade and export-led economy. Existing trade-restricting measures were repealed or modified. Import licencing and exchange controls on currency transactions were discontinued while import levy was also removed. Commodities that could not be imported were reduced in number from 74 to 16. However, rice, maize, wheat and wheat products and vegetable oils remained illegal imports. We

realise that these are commodities which Nigeria has the capacity and comparative advantage to produce herself. In addition to the above measures, the customs and excise duty schedules were overhauled, reducing the average nominal rate of protection to about 10 per cent.

On the export sector, a number of measures were introduced to boost exports. The long-standing export prohibition of certain commodities was relaxed, but was later reimposed on such commodities like grains and roots and tubers. Non-oil exporters were to enjoy the opportunity to operate a domiciliary account, which they could operate quite freely to meet their foreign exchange needs. There was also a duty drawback or suspension scheme which allowed exporters of manufactured goods to import, free of duty and indirect taxes, raw materials and intermediate inputs required for manufacture of such goods meant for exports.

Fiscal Policy

The thrust of SAP's fiscal policies was on reducing the size, scope and intensity of government involvement in economic activities. Thus, emphasis was focused on reducing government expenditure through rationalisation of government expenditure programmes, reduction of government subsidies to parastals as well as disubsidisation of certain products such as petroleum products and agricultural inputs. Furthermore, new projects were curtailed, maintenance of existing infrastructure rather than creating new ones was emphasised and increases in salaries and wages were put in obeyance. The whole essence of fiscal policy and measures undertaken in this respect was to achieve fiscal balance, which was not known during the period preceding the beginning of SAP. At that time, there was no coherent fiscal policy and the government allowed the level of economic activity to be determined by fluctuations in earnings from crude oil exports. Government anxiety to effect and demonstrate that development was occurring led to adoption of inappropriate measures. In the process, the agricultural sector was marginalised, while prices of public sector output, credit and foreign exchange were maintained at unrealistically low levels.

Monetary Policy

In consonance with the philosophy of minimalist state that informed SAP, monetary policy was intended to be restrictive, so that there could be financial savings, reduction in inflationary rates and reduced demand for foreign exchange. Unlike in the period before SAP, interest rates were liberalised in order to facilitate the market forces to influence the inflow of savings and allocation of credit. The conditions for licensing banks were also liberalised leading to the growth of nearly 300 per cent in the number of banks from forty one in 1986 to one hundred and twenty in 1992. But these were concentrated in urban areas and they shunned agricultural investments. During SAP, credit allocation guidelines were less detailed in order to allow interest rates play greater role. Therefore, instead of the previous practice of prescribing sectoral credit allocation for up to eighteen sectors, the economy was classified into only two sectors, namely priority sectors and the other sectors. The priority sectors were agriculture, manufacturing and constructions which were expected to receive a minimum of 50 per cent of the credit to the private sector. All the other sectors were to receive a maximum of 50 per cent of credit allocated to the private sector.

What followed these measures were unprecedented increases in interest rates (Table 5.3) Consequently, under liberalisation, it was impossible to prescribe interest rates for the agricultural sector. Invariably, agricultural sector projects and food crop producers had to compete for credit at the market-determined interest rates. The liberalised interest rates could not have favoured agricultural producers, the majority of who cultivate only very small farm sizes targeting household food requirement and only a small surplus for the market.

Table 5.3: Nominal Interest Rates in 1986 and 1992

Interest Rates	1986	1992	% Growth Rate (1986-92)
Prime Lending Rate	9.6	24.8	17.1
Maximum Lending Rate	11.5	26.5	14.9
Savings Deposit Rate	9.5	15.3	8.3
Minimum Rediscount Rate	10.0	17.5	9.8

Source: Computed from CBN Statistical Bulletin Vol. 4, No. 2, December, 1993

Public Expenditure and Investments Policy

Under SAP policy reforms, there were marginal improvements in the overall budgetary allocation to the farm sector and in the structure of expenditure items. For example, the Federal Government expenditures on agriculture rose from about 4.8 per cent of the annual expenditures of about x13.0 billion in 1981-85 to about 5.1 per cent of an average annual expenditures of about x19.4 billion in 1987-89. The extent of expenditure bias vis-a-vis manufacture was reduced as the total budgetary allocation to manufacture was cut back from 10.7 per cent in 1981-85, to about 5.9 per cent in 1987-89. Parastatal activities especially those involved in direct production were privatised, thus freeing government resources which were now channeled to extension services through the World Bank assisted ADP system.. Related to this, was the creation of extra-ministerial bodies such as DFRRI, designed specifically to reach rural people with basic infrastructure and extension services. The budgetary expenditures of these bodies have improved the overall financial outlays of the government in rural areas. Attention was also given to preventive health measures. Mass immunization campaigns and education of people on hygiene, sanitation, family planning and oral rehydration therapies were carried out. This became inevitable because drugs and health-care delivery through modern medicine in hospitals had become very expensive.

A new educational system designed to impart technical skills and knowledge to young people was introduced. Also, adult literacy programme and vocational training for rural dwellers attracted attention, especially of Government and Non-Governmental Organisations (NGOs). The location of social amenities in rural areas also improved. The DFRRI and most state governments attempted to decongest the cities through providing job opportunities and social amenities in rural areas.

Measures specifically directed at Agriculture

Agriculture received special treatment in a way that tended to recognise its cornerstone position in the economy, particularly being a sector in which most Nigerians operate. Some of the measures targeted at agriculture were as follows.

(a) Dismantling the commodity board system, which in the past accumulated substantial funds for the government, derived from charges and taxes
(b) Privatisation and /or commercialisation of public enterprises in the agricultural sector, particularly agricultural companies involved in production;
(c) Establishment of a directorate institution - the Directorate of Food, Roads and Rural Infrastructure (DFRRI) - to take charge of rural development and agriculture-related activities;
(d) Strengthening the existing Agricultural Development Projects (ADPs) such that the activities of the projects were made to expend throughout the state or region where they were first established;
(e) Intensified production and supply of farm inputs, particularly fertilizers, from domestic efforts via the commissioning of fertilizer blending and production companies;
(f) Creation of special programmes to boost the production of maize and rice, which profile in the food and feed domains had become very prominent; a target of 1.5 million metric tons was set for rice and 3.6 metric tons for maize within two years.

Structures for Implementing Agricultural Policies During SAP

Care was exercised in ensuring that agricultural policy thrust operated with an institutional setting during the SAP years. Three categories of institutions were identified by Nwosu (1991) as guiding the implementation of agricultural policies and programmes during SAP and these he categorised as financial, agricultural and "others." The financial institutions included the Central Bank of Nigeria (CBN), the commercial and merchant banks and the Nigerian Agricultural and Cooperative Bank (NACB). The agricultural institutions were the ADPs, the RBDAs and the DFRRI. In the group of 'others' were the National Directorate of Employment and the Technical Committee on Privatization and Commercialization.

(a) Financial Institutions

*The Central Bank of Nigeria (CBN)***:** The CBN was at the heart of SAP articulation and implementation. Its role in the implementation of the exchange rate and external trade policies had a telling effect on the agricultural sector. The operation of the foreign exchange market under SAP as administered by the CBN led to an unprecedented devaluation of the local currency, the naira. On the one hand, the devaluation helped in raising the farm income of export crop producers. On the other hand, it raised the prices of imported farm inputs for all categories of farmers and thus led to escalating farm, production costs. However, the CBN introduced measures to ensure that there was steady flow of credit to the farm sector. It prescribed the minimum proportion of the loan portfolios of commercial and merchant banks that must go to agriculture. It then provided a leeway for commercial banks to recover their loans in case of default by farmers. The bank ensured this through the operation of Agricultural Credit

Guarantee Scheme Fund (ACGSF), which allowed the CBN to underwrite some of the loans for agriculture.

The Commercial and Merchant Banks: The commercial and merchant banks are the main formal sources of credit and loans to the farming sector. During the SAP period agriculture and manufacturing were designated as high priority sectors. Consequently, the CBN prescribed targets which indicated the minimum proportion of loans and advances of commercial and merchant banks that must be made available to each of the preferred sectors. During SAP the banks did increase the relative allocations to farming.

*The Nigerian Agricultural and Cooperative Bank (NACB)***:** The NACB had always been concerned with meeting the credit need of agriculture because of the obvious discrimination the sector faced in the formal credit market. Its activities covered both small scale and large-scale production of crops, livestock and fish. The NACB was also able to increase its loans to agriculture in the SAP years. Much of these loans went to crops signifying the importance attached to crop production, although the livestock and fishery subsectors also benefitted considerably.

(b) *Agriculture Institutions*

Agricultural Development Projects (ADPs): The ADPs as discussed earlier, were created to enhance agricultural productivity by providing rural infrastructure, and farm input and introducing new technologies and farming practices. The ADPs focused almost exclusively on food crops. During the SAP period, the ADP system moved very quickly from a limited coverage programme to a state-wide programme, covering every area of the state where it was located. As a matter of fact, every state of the Federation established its own ADP and made the activities of the project to cover the entire state. For instance, all the six agricultural zones to which Osun State is carved has ADP presence. During SAP the financial allocation to the ADPs increased tremendously and the projects are known to have contributed significantly to the changing profile of crop production in the country and to the increasing technological innovation associated with food crop production in Nigeria in the last 25 years.

The River Basin Development Authorities (RBDAs): were reorganised with the number reduced from 18 to 11 and made to concentrate on providing irrigation, while rural development functions were dropped. They had several functions including land preparation and irrigation to farmers and marketing of farm inputs. Under SAP their production activities were stopped and they were refocused to providing surface and underground water resources for irrigation purposes and household consumption.

The Directorate of food, Roads and Rural Infrastructure (DFRRI): Its establishment coincided with the commencement of SAP and so the outfit became a major institution in agricultural development. Its focus was welfarist in nature as it attempted to provide food, road and infrastructure in rural areas, where the most poor people in Nigeria live. Thus, the major function of DFRRI included improvement of the quality of life and the standard of living of rural housing and health care; creating rural employment opportunities and incomes; and empowering the rural people to enhance their capacity to produce and consume qualitative goods and

services. DIFRRI was also to harness the potentially enormous resources of the rural areas for socio-economic development of the nation, as well as facilitate mass mobilisation of rural people for development. However, DFRRI major activities were in the construction and rehabilitaion of rural roads, rural water supply, rural electrification, rural industrial and technology development and agricultural production. Akande (1997) reported that DFRRI made significant contributions in the promotion of productive activities in agriculture and agriculture-based small and medium scale industries and in the provision of rural roads. DFRRI was at the same time criticised for not maintaining its roads and it also failed to promote food production in any significant way.

(c) *Other Institutions*

These included the National Directorate of Employment (NDE) and the NDE the Technical Committee on Privatisation and Commercialisation (TCPC) was created in 1986 to address the increasing trend of unemployment. Its activities focused in youth employment and vocational training, agricultural activities, small scale industries and graduate employment and special public works. The involvement of the directorate in agricultural production was seen as a vehicle to solve the unemployment problem.

The TCPC had the mandate to implement the privatisation and commercialisation policy of government. The committee was not only to examine and evaluate the capital base of the affected enterprise but was also to oversee all activities (public issue of shares, the share price, and supervision of sale) leading to the disposal for such enterprises from public sector.

Impact of SAP as Agriculture

The discussion here attempts to look at the outcome of SAP in the context of food supply and food availability. We need to recall that for the agricultural sector, SAP was expected to achieve the following:

1. increased agricultural output, both food and fibre;
2. increased value-added and a buoyant agro-allied and food processing sector; and
3. increased farm income and rural welfare.

The policy instruments under SAP and the way and manner these instruments were deployed affected the outcome of agriculture and its effectiveness in achieving increased food supply, increased value added and remunerative farm income by the farmers. It is important to realise that apart from economic and policy-induced changes in agricultural production profile, the weather factors and incidence of pests and diseases could have telling effects on agricultural performance. Thus, we need to exercise caution in attributing to SAP alone, the performance of the agricultural sector in the late 1980s and early 1990s.

Food Prices

With the devaluation of the naira, inflation rate soared, reaching about 41 per cent by 1989 and with rural inflation rates being much higher than the urban inflation rates. Expectedly, producer and urban retail food prices rose significantly, particularly for staple commodities like rice, yam,

cassava, maize, and cowpeas. (Appendix 5.1). Ojo (1989) shows that the food component of the composite consumer price index accounted for more than 60 per cent of the change in the index. Increases in food prices could be attributed to increases in production cost and to increases in petroleum prices, which increases led to high cost in transportation and tractor hire services. Effect of transportation cost was more glaringly felt in respect of commodities such as maize, yam and vegetable products hauled from the northern to the southern parts of the country. There was also the notion that the liberalization of trade prompted export of food commodities to the neighbouring countries and that this might have contributed to the high domestic food prices. While inter-border trade has been a thriving business across the Nigerian borders, the volume of food exports to these countries could, at best, be a very insignificant proportion of the volume which enters the domestic marketing system and thus consumed in the country. However, government responded to the trans-border trade by outlawing exports of certain commodities including cereals, roots and tubers.

Crop Output

Food crop production responded favourably to increasing output prices. The index of output of major food crops between 1970-1990 (Appendix 5.2) show some significant findings. Between 1970-1985, domestic production of yam, maize, millet, rice and cassava either stagnated or declined sharply. The output of yam in 1985 was only 38 per cent of the output in 1970. Except for millet (119 per cent), other food crops had lower outputs in 1985 compared to 1970, with 82 per cent for maize, 70 per cent for rice and 27 per cent for cassava. But during SAP years, 1986-1999, the food crop subsector recorded significant growth rates (Table 5.4). During the entire period the growth rate was about 5 per cent per annum. The crop subsector must have taken advantage of the ban imposed in staple grain imports and certain programmes introduced to boost crop production, including the activities of DFRRI. However, it must be noted that individual food crops performed differently. The average growth rates in output achieved for cereals and tubers in the short-run were, therefore, varied. Weather factors could have played contributory role to policy-induced increases in output. It must also be stated that the increased in output were the result of area expansion rather than the result of intensification (Appendix 5.3). The prices of improved seeds and other planting materials as well as prices of agrochemicals, particularly fertilizer, increased to dramatically for ordinary smallholder farmers to engage the use of such inputs. Increased labour supply for area expansion was made possible by the DFRRI and other school-to-land programmes and incentives provided for graduate and non-graduate farmers by the government. Besides, the substantial increases in agricultural labour wages attracted migrant labour to agriculture, even from the Republic of Benin.

Farm Inputs

The major concerns here are availability, prices and quantities of inputs actually used by farmers. The imported farm inputs, notably fertilizers, herbicides and other agro-chemical products came under the hammer of the unfavourable exchange rate regime which devalued the local currency significantly. That is, prices of imported inputs went up almost instantaneously with the implementation of the new exchange rate policy. Akande (1988) confirmed significant increases in the prices of agrochemical products and noted further that increasing prices restricted farmers' utilization of the products. However, there was expansion in domestically produced fertilizers

Table 5.4: Growth rates of output of food commodities, 1987-1994

Year	Maize	Millet	Sorghum	Rice	Yam	Cassava	All Staples
1987	_10	_5	_5	4.9	_6.6	_5	_8.1
1988	14	6.8	6.8	3.4	3.2	6.8	6.6
1989	17.5	10.1	8.1	5.2	5	8.1	9.3
1990	31.7	15.4	9	11.4	7.8	10	12
1991	5	4.9	5.1	4.4	7.5	12.5	8
1992	0.5	9.5	10.1	1.1	9.4	12.1	11.2
1993	7.7	2.2	2.4	_6	7	3.4	4.8
1994	9.7	3.4	2.9	_20.8	5.2	2.9	4

Source: CBN Annual Report and Statement of Accounts (Several Issues)

while imports were also encouraged. Even though subsidy on fertilizers was retained during SAP, the prices at which fertilizers were available to farmers were quite high, registering an increase of 200-500 per cent, depending on the type of fertilizer. The mean net supply of fertilizers per annum was about 19.4 per cent higher during SAP than in the previous non-SAP. Similarly, the number of tractors available to farmers for crop land preparation was about 7.5 per cent higher than before SAP. The prices at which these inputs were available to farmers are as shown in Table 5.5.

Thus, while supplies of fertilizers, land clearing services and herbicides increased considerably during SAP, input distribution problems remained and strongly influenced farmers' access to and use of the various inputs. Some favoured agricultural programmes (ADPs and RBDAs), which normally received their allocation direct from the Federal Ministry of Agriculture rather than buying from the open market, always had fertilizers for their farmers, while other ordinary farmers often had to patronise booming secondary markets. As noted by Nwosu (1992), ADPs and RBDAs covered only limited areas and selected farmers and so, quantities of fertilizers available to the farmer under these programmes should not be taken as representative of the quantities available to the ordinary Nigerian small farmer.

With respect to credit, farmers enjoyed increased access to agricultural credit during SAP, commercial banks loans and advances to agriculture rose by about 26 per cent during SAP as compared with pre-SAP volume. Loans and advances by Merchant Banks rose by 164 per cent while the volume of loans from the Nigerian Agricultural and Cooperative Bank also increased by 34 per cent (CBN, 1990). However, the financial institutions showed preferences towards large-scale agricultural projects in their lending operation as a way of securing loans given out to farming and reducing administrative and other expenses incurred on loans. But, the rapidly rising interest rates following deregulation soon imposed a heavy debt repayment burden on commercial farm operators, resulting in farm liquidation or downsizing.

Table 5.5: Average Prices of Major Farm Inputs in Nigeria, 1980, 1985 and 1990

Type of Input	1980	1985	1990	1980-85	1985-90	1980--90
Hoe (unit)	2	2	20	0	900	900
Matchet (unit)	5	8	35	60	338	600
Sprayer (unit)	75	150	850	100	467	1033
Tractor Hire (per ha)	25	55	250	150	355	900
Fertilizer 25 kg)	5	15	50	200	233	900
Agrochemicals (1 lite of herbicides)	-	65	280	-	331	-
Outboard Engine (5 hp Yamaha)	350	1100	9900	214	800	2729

Source: (1) Akanji, Bola (1992)
(2) Central Bank of Nigeria, Economic and Financial Review Vol. 33 (2) pp.108

Profitability of Crop Production

The conclusion of many analysts is that crop production was more profitable to farmers during SAP than the pre-SAP period as a result of output prices rising much higher than the increases in input prices (CBN/NISER, 1991). Since farm households engaged more labour on the farms, crop production must have been so rewarding. It is, therefore, not surprising that more people took for farming on part time or full- time basis. Nwosu (1992) reported domestic increases in profitability of crop production in the villages of Imo State, Nigeria. Although his data showed that the average farm size in the states declined during the SAP period, the gross returns per hectare had risen by 102 per cent. Improved profitability levels were also reported in other regions of Nigeria, Akande (1991) for Bauchi State in the Guinea Savannah belt of the North where gross returns to the farmers were estimated at about 119 per cent and Adeyeye (1991), for the forest agroecology of the southwest region, where farmers were able to gross about 87 per cent more than their cost of production.

Household Food Consumption

The basic argument here is that we should expect a rise in household food consumption following increased production as well as increased farm income which might be available for consumption expenditure decisions. Increased consumption of major staples would indicate the extent to which local efforts was able to bridge the gap between supply and demand and the additional supply stress introduced by the ban imposed on food inputs since the inception of SAP. Evidence suggests that per capita consumption of cereals, pulses and fruits increased during SAP, but declined for roots and tubers, vegetable oils and sugar. The increased consumption of pulses might not be unconnected with prohibitive costs of animal protein; pulses were found more relatively cheaper as a source of protein than beef or fish.

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POST-SAP PERIOD, 1994 - 2003

Termination of SAP

The original SAP document indicated that the programme would be implemented for only two years, that is, 1986 - 1988. However, the implementation period had to be extended because the economy was still in the doldrums with the real sector, particularly agriculture, still unable to provide sufficient goods required by the people. The extension was also informed by the inability to complete the implementation of every element of the policies and strategies planned. For example, the commercialisation and/or privatisation of public enterprises including those in the agricultural sector, was yet to be implemented.

In the early 1990s, it was clear SAP impact on the economy was far-reaching and bringing in its wake serious socio-economic problems that were not anticipated. The effect on prices was too severe, with runaway inflation rates pervading the entire economic system. Unemployment rates were also rising while the growth rates recorded in the agricultural sector were beginning to slow down. It became apparent that government would need to tinker with certain aspects of the SAP measures, if the gains from the programme were to be sustained and if the social dislocations already created were to be effectively addressed.

Meanwhile, by the early 1990s, the military government in power commenced a political transition programme aimed at holding general elections and transferring power to a civilian administration. Unfortunately, the transition programme developed a hiccup and reached a debacle in 1993. The situation was, however, saved following the formation of a Transition Government made up of civilian and military personnel, but headed by a civilian. The civilian Head of State was soon shoved aside and Nigeria returned to full military rule which turned out to be one of the most vicious military dictatorships that ever ruled Nigeria. The new government took charge of the economy and undertook series of measures which largely reversed some of the SAP measures. Most conspicuous and far-reaching measured undertaken were the shifts in policy away from complete liberalization and deregulation to what was described as "guided deregulation". One of these was a change in the restrictive import trade policies. Previously, the trade policies entailed the prohibition of imports of farm inputs and certain products, especially food. In the new dispensation liberal import policies, in consonance with the principles of the World Trade Organisation (WTO), were installed. However, there was a tendency towards balancing out certain policy measures as the government did not want the total liberalization of policy to power imports which could compete away local production. So, in cases where domestic production was adjudged adequate for the internal market at non-inflationary prices, imports were discouraged.

There was also a shift in monetary and credit policy. The concern this time was to ensure that the inflow of credit to the agricultural sector was not hampered in any way. Up to this point, the interest was not capped but allowed to float following the liberalisation of the financial market.

The consequence of this was that the interest rates hit the ceiling, with the prime lending rate reaching nearly 30 per cent. Since the returns on agricultural investments could hardly accommodate this high level of interest rates, most small farmers were precluded from seeking credit from formal sources. Under the policy of guided deregulation the financial market was prevailed upon to reduce the interest rates particularly for agricultural enterprises.

With respect to inputs, the subsidy issue continued to dominate discussions and policy changes. The agricultural input subsidy policy, especially the fertilizer subsidy policy, was reversed back and forth, in an effort to strike a balance between increased supply of the essential commodity and the desire to ensure that subsidy did not create a gaping hole in the treasury. The activities of NALDA were intensified as a way of helping the farmer to clear farm lands at subsidized costs and also ensure that school leavers, especially graduates were encouraged to go into farming through acquisition and mechanisation of land preparation.

The main policy thrust of this era was encapsulated in certain programmes which aimed at improving the socio-economic status of the poor. The programmes were collectively called "poverty alleviation programme". This is not to say that the previous programmes had no implication for poverty alleviation or eradication. What made the poverty alleviation programmes unique was the strategy of targeting which attempts to differentiate among groups of beneficiaries unlike in the past when measures were generalised in content, implementation and application. The renewed efforts in the present circumstances were targeted at the poor and handicapped groups in the society. Two similar poverty alleviation programmes were initiated, the Family Support Programme (FSP) and the Family Economic Advancement Programme (FEAP). The programmes attempted to dampen the socio-economic repercussions of SAP measures on the household living conditions and general welfare. Women were targeted in the two programmes. Participating women were assisted with micro-credit and other arrangements to enhance their economic activities and to promote acquisition of new skills.

Agricultural policies of the civilian administration

The new civilian administration installed in May, 1999 inherited a handful of socio-economic problems. The government initial response was to enunciate certain policy thrust which would serve as the pillar of its economic programmes. The economic guiding principles which include macroeconomic and sectoral issues have implications for agricultural and food production.

The specific agricultural policy measures undertaken are reviewed briefly as follows. For agriculture, the government indicated its preparedness to achieve a turn-around of the sector to adequately play its pivotal role in food supply, employment creation, poverty reduction, provision of raw materials to agro-industrial sector, and in achieving a diversified economy. Consequently, the new government set specific targets it intended to achieve in four years, 1999-2003. Some of these are as follows: development of at least 150,000 hectares of fadama land with adequate wash bores, tube wells and irrigation pumps; raising of seeds (e.g. 2 million tones of groundnut seed for 50,000ha); development of at least 7 cattle breeding centers and 37 settlement centers as well as re-stocking 5 small ruminant breeding and multiplications centers; and establishment of at least one hatchery in each state of the Federation for the production of fingerlings.

Subsidy- Subsidy on fertilizer was specifically identified for policy attention. First, the government reduced fertilizer subsidy from 50 per cent to 25 per cent and made a general policy pronouncement to the effect that the agricultural input market would be totally liberalised. This was short-lived as government restored subsidy on fertilizer to the tune of 50 per cent. This ambivalence has continued and fertilizer remain a contentious issue among policy makers, farmers and development analysts. Meanwhile, efforts have commenced for the outright sale of the National Fertilizer Company of Nigeria (NAFCON) which is the largest fertilizer plant in the country. This may be seen as a move to get the private sector to assume full responsibility for fertilizer production, procurement and distribution. Currently, government is still involved in these activities.

Measures have also been undertaken to support other inputs. For instance, tariff reduction was introduced to promote importation of agricultural machinery while value added tax (VAT) on agricultural input sales has been abolished. These efforts are meant to secure improved access of farmers to the required inputs.

Output Support Programme:

The guaranteed minimum pricing scheme for farm products was re-established and an inter-ministerial committee was constituted to monitor the buying up of "excess" grains from farmers. This means the government is back again acting as the buyer of last resort. Consequently, a number of the existing grain silos have been reactivated, the construction of new ones is underway while the sum of x1 billion has been released for the purchase of grains. Establishment of Commodity Marketing Companies is also being considered.

Farm Credit:

Institutional restructuring is underway leading to the establishment of a new farm credit outfit, the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB). It is a merger of several institutions, including the erstwhile NACB. The expectation is that the new institution will avoid the mistakes and constraints which faced NACB in the past and that farmers would have improved access to formal credit. The NACRDB is expected to perform the role of a development bank in the agricultural sector.

Other Measures:

A new programme, the Poverty Alleviation Programme (PAP) which has agriculture as a major activity has been established. The three tiers of government are involved but specifically, local governments are to provide land for participants who are expected to adopt modern farming practices. The states have the responsibility to provide farm inputs while the federal government provides needed finance.

What essentially could be said about agricultural policy measures since the end of structural adjustment programme is that there has been no radical departure from measures and strategies undertaken in the past. The ADP institutional arrangement remains the most conspicuous

strategy to promote agricultural intensification and technological innovation in the agricultural sector. Since the ADP concentrates mainly on arable crops activities of this project are crucial to the promotion of green revolution in Nigeria. However, the ADP system currently faces severe constraints in its funding profile following the total withdrawal of the World Bank from the project. As may be recalled the World Bank had been a major financier and overseer of the ADPs. The responsibility for running the project now rests more with the state government with only a token support from the federal government. And because the ADP has over the years acquired series of assets and personnel, the overhead and project costs have been quite huge such that the state government alone could not fund the project adequately.

Trend in agricultural Production in Post Adjustment Years

During SAP years, agricultural output was growing at about 5 per cent per annum. This growth rate has, however, not been sustained since 1994 which marked the end of SAP policy programme. For the food grains, the growth rates in production, area and yield between 1995-2000 have generally varied (Appendix 6.1). In respect of production, millet and sorghum recorded growth increases, throughout the period whereas maize and rice suffered growth reverses in 1996. Increasing output growth rates in maize could probably be due to increasing yield level as areas cultivated to the grain recorded continuous negative growth rates during the period.

The variability in output, area cultivated and yield observed in the cereals be explained by the developments in the input domain. NISER (2003), shows that the drop in the growth of the major cereals such as maize may be attributed to difficulties encountered by farmers in securing agricultural inputs such as fertilizer, improved seeds and farm credit. These cereals which are cultivated mainly in the northern part of the country depend extensively on the use of fertilizer, an input always in short supply in Nigeria. The inaccessibility of most farmers to sufficient fertilizer has constrained the use of improved varieties of some crops while farmers go for the local varieties which do not require fertilizer but produce yields that are relatively low (NAERLS, 1999). Farmers have become skeptical about extension advice on improved technologies that are fertilizer dependent.

The annual growth rates associated with the production, hectarages and yield of cassava and yam are also shown in Appendix 6.1. It is observed that the growth rates achieved varied from year to year. For instance, the growth in output of both commodities dropped in 1997, with cassava recording a higher decline. But in 1998, the growth in cassava output was 1.76 per cent, having marginally increased from 1.69 per cent in 1997. By 1999, output growth increased substantially for both yam and cassava. The upward swing in the output growth of roots and tubers may be due to the favourable weather experienced during the 1998/99 planting period. Moreover, unlike the cereals which rely heavily on fertilizer, large hectarages of roots and tubers exist in the middle belt which has relatively fertile soil and therefore, does not face the limitation posed by inaccessibility of farmers to fertilizer.

It is also pertinent to state that the increases observed in the output of roots and tubers appear to be driven by increasing hectarages and increasing yield, but much more by the former. The implication of increasing hectarages is the need for increased input requirement, particularly

labour. Increasing wage rates, labour scarcity and the competition for available land by other crops cannot make expansion of cultivated farmland for roots and tubers a sustainable approach to increasing production of the two crops.

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FAILED PUBLIC POLICY IN AGRICUTURE?

A quintessential feature of Nigeria's agricultural sector management since independence some forty three years ago, is the absence of a lacuna in public policy initiatives. The previous analysis has clearly demonstrated that the agricultural sector has almost been choked up with a series of policy initiatives. What is, however, quite intriguing and equally confounding is the crawling pace at which the sector has proceeded to fulfill its instrumental value in the development process of the nation. The expectations have been that the rapid agricultural sector would provide sufficient food and fibre for the nation; generate and provide gainful employment and remunerative income for the people; and that the sector would continually shore up the external sector accounts of the nation through agricultural export earnings. The experience so far is far less than the promise held out as the preceding discussions seem to suggest. What are the facts? At the risk of repetition, we look at the following specific areas.

Crop and staple food production

In the quest of putting the Nigerian economy on the path of balanced, self-reliant and non-inflationary growth, agriculture has the responsibility to provide sufficient food at prices that are affordable to all Nigerians. However, over the years food supplies from domestic sources have been grossly inadequate. Available statistics on crop output from the FAO and Nigeria's Federal Ministry of Agriculture show modest growth rates for crop production in general between 1961 and 2000 (Table 7.1) a period of forty years. Nigeria actually experienced production depression during 1971-75 and 1976-80 sub-periods. These coincided with the time when petroleum assumed the ascendancy of the national economy and generated structural shifts in the real sector, including agriculture. People moved away from agriculture to the emerging manufacturing sector, construction industry and distributive trade. The results were the agricultural decline witnessed during the 1971-80 period, which registered negative growth rates of between 1.1 – 2.9 per cent. Paradoxically, the 1971-80 period witnessed significant policy intervention in agriculture as demonstrated by the initiation of a series of programmes and projects including the NAFPP, RBDAs and ADPs among others. It is either these programmes proved ineffective or were badly implemented. As we shall see later, poor implementation appears to be the bane of agricultural and, indeed, economic policies in Nigeria. This was clearly demonstrated by the data for the 1986-90 period which show that the crop production index rose by an annual average of 7.9 per cent, reflecting the effectiveness of SAP policy measures undertaken at this time and which were vigorously implemented.

Table 7.1: Index of Crop Production in Nigeria, 1961 – 2000
(1989 – 1999 = 100)

Period	Average Crop Production Index	Growth Rate in Crop Index (%)
1961-65	49.74	3.70
1966-70	56.30	0.94
1971-75	57.48	-2.87
1976-80	55.92	-1.09
1981-85	62.94	3.83
1986-90	85.32	7.90
1991-95	121.76	4.69
1996 – 2000	148.82	2.88

Sources: Food and Agriculture Organisation (FAO) database (www.fao.org)
Federal Ministry of Agriculture and Rural Development, Nigeria.

Further insight into the efficacy of agricultural policies specifically in the food sector may be gained by examining the performance of individual food crops. The data in Table 7.2 for the 1990 – 2000 period provide this opportunity. The data indicate positive growth rates in area and production for all staple crops except maize during the period covered. The output growth rates tend to reflect the area growth rates; that is, area expansion seems to beget output expansion. The growth rates in yield level during the period were less than 1 per cent for maize, millet and sorghum and actually negative in the case of rice, cassava and yam. This raises a number of issues with respect to agricultural science research expected to result in improved seeds and high yielding crop varieties; adoption of innovation by the farmer; and crop production management practices generally. It has been noted earlier that Nigeria has at least five full-fledged and autonomous research institutes with mandate on food crops. Nigeria also established seed multiplication centers. However, in spite of the existence of more or less robust agricultural science research and production of HYVs of various food crops, experience over the years has shown that achievement level by various research institutes has been quite modest, a problem traceable to poor funding (Ishola, 1994). With respect to adoption of HYVs the farmers would adopt, the varieties only to the extent that production – enhancement inputs are available and profitable to use. Availability of required inputs and ability to raise adequate working capital have been intractable problems facing food crop farmers for many years.

Table 7.2: Annual Growth Rates of Food Production in Nigeria: 1990 – 2000
(Percentage)

Crop	Area	Production	Yield
Maize	-3.3	-2.8	0.5
Millet	2.6	2.9	0.3
Sorghum	3.6	4.3	0.7
Rice	4.5	0.9	-3.6
Cassava	4.1	3.2	-0.9
Yam	6.5	4.8	-1.7

Source: As in Table 7.1

In terms of nutrient supply from domestic food production efforts, Nigeria's performance in relation to the performance of a number of countries with which it shares some similarities in socio-economic characteristics may be considered. The data in table 7.3 provide this comparative analysis. It is observed that Nigeria's performance in food supply per capita per day in 2000 was quite impressive when compared with performance, say, in Ghana and Indonesia in the same year. However, Nigeria's performance was inferior to the achievement levels in South Africa, Brazil, Argentina and Malaysia, particularly in protein.

Table 7.3: Per of calorie, protein and fat per day in selected countries (gm), 2000

Countries	Vegetable Products			Animal Products			Total		
	Calories	Protein	Fat	Calories	Protein	Fat	Calories	Protein	Fat
Nigeria	2763	57.3	52.9	87	7.9	5.6	2850	65.2	58.5
Ghana	2578	40.1	32.1	120	15.4	5.6	2599	55.5	37.6
South Africa	2516	48.1	47.2	370	25.9	25.0	2885	74.0	73.2
Brazil	2370	39.3	46.1	515	40.6	42.4	2985	79.9	88.5
Argentina	2181	34.8	51.1	1000	66.8	71.2	3181	101.6	122.3
Indonesia	2785	52.8	48.0	117	11.4	7.1	2902	64.2	55.1
Malaysia	2353	31.8	51.9	566	43.3	35.3	2919	75.1	87.2

Source: FAOSTAT, 2002

Production of agricultural raw materials

The expectation of having agriculture supply the raw material needs of local agro-industrial processing and manufacturing sector has equally failed to materialize. This is particularly so for the food subsector of the manufacturing industry. Estimates of industrial sector demand and supply from domestic sources of a number of commodities clearly show that industries are hardpressed to obtain the required quantities of raw materials from local sources (Table 7.4). In most cases such industries continue to operate at levels that are far less than the installed capacity. Because of this, the expected gains in multiplier effects in creating employment opportunities for farm workers, haulage firms, factory processors and product distributors arising from the expansion of domestic production of agricultural raw materials in tandem with an expanding industrial sector, could not be realized. Consequently, the welfare value of agriculture – industry linkage is very minimal as the linkage itself is very weak.

Table 7.4: Food industry demand and local supply of raw materials (000 tonnes)

Commodity	Demand	Supply	Demand-Supply Shortfall	Shortfall (%)
Maize	3,000	1,500	1,500	50
Sorghum	2,000	1,000	1,000	50
Rice	15,000	500	14,500	96
Wheat	4,000	40	3,960	99
Cassava	500	200	300	60

Source: Ajakaiye and Akande (1999), p. 28

Agricultural Exports and Imports

In the past, the agricultural export portfolio which mostly consisted of cocoa, palm produce, groundnut, cotton as well as hides and skins accounted for about 65 per cent of Nigeria's foreign exchange earnings. Today, agriculture is struggling to exceed 5 per cent of foreign exchange earnings for the country. It is only cocoa that still commands some respect in terms of its contribution to non-oil component of foreign exchange of Nigeria. In contrast, food-related imports account for about 10 per cent of total imports. This development mortifies the agricultural development objectives of the nation and raises concern on the validity of Nigeria's agricultural programmes.

Factors that limit impact of public policy

With reference to the central and rhetorical question raised in this section of the report and against the background of the picture of the performance of agriculture described above, do we conclude that public policy in the Nigerian agricultural sector has failed? The issues are beyond a simple affirmative response. The scenario described above is certainly not cheery but does not amount to despondency and failure of public policy in the sector. There are indications that progress is being made in several areas of the agricultural industry. It may be pedestrian, but output has been rising; improved varieties of arable crops as well as livestock breeding activities are being encouraged; improved food varieties are being produced in food processing factories; and farmers are trying out HYVs. Thus, while the general picture is that of a rather lethargic and slow response to policy initiatives generally, agriculture remains the most potent growth pole in the Nigerian economy with tremendous opportunities for expansion and addressing the fundamental problems of poverty and stagnation.

The prescribed policies have not been able to fully express themselves because of a host of constraining factors. These may be broadly classified into five categories, namely:

- policy, socio-economic and organizational constraints;
- environmental and natural resource management;
- labour and production management constraints;
- technical constraints; and
- inadequate understanding of the farmer for whom plans are being made.

Policy, socio-economic and organizational constraints

The first factor to be singled out in relation to policy issue in general is the lost opportunity at independence to integrate food production into the general agricultural production policy. Even if there were no food supply problem at that time (and really there was none), the Nigerian leaders should have realized that sooner or later food could become a problem if treated with benign neglect. They knew the population was growing very rapidly. Although like the other African leaders, the Nigerian leaders elected to pursue import-substitution industrial development strategy to achieve economic development, they did not realize the significance of laying the foundation of this industrial development on the most available resources and

opportunities which were in the agricultural sector. At that time, most developing countries found themselves in a world belonging to two development camps, that is, capitalism and socialism. Nigerian leaders were able to steer a middle course, choosing to operate a mixed economy based on positive neutrality and non-allignment. But then, agricultural policies were directed mainly at ensuring generation of government revenue through exports of cash crops while the domestic need was a residual.

The rulers who took over from those who won independence were not democratically elected but took over the reign of power from quarrelling politicians by force of arms. Military dictatorship traversed the Nigerian political arena for all but eleven of the forty three years of Nigeria as an independent nation. The incursion of the military into political arena engendered gross incompetence in the management and administration of the economy. Agriculture was a casualty of pan-territorial administration in a Federation and a constitution which made agriculture a concurrent item of development. The military amplified the lack of defining the proper role of government in agriculture, as most policy initiatives undertaken intensified government involvement in direct production and distribution. Many agricultural parastatals were established that later proved a drain on government treasury and making little impact on agricultural production. Perhaps, the most negative effect of military rule on Nigerian economy and agriculture had been the culture of instability in governance following series of regime changes occasioned by military coups that became almost an enterprise. As one military regime replaced the other, it meant changes in policies and programmes in agriculture and in other economic sectors.

Agriculture in Nigeria has also been confronted by the challenge of how to organize the smallholder farmers so as to exploit the benefit of scale, reduce administrative cost and maximize policy impact. It has long been discovered that the atomistic nature of smallholder farming and the scattered distribution of the farmers in space constrain the effect of policy and, therefore, the farmers would need to be organized into formations that will render agricultural policy very effective. The forms of organization that have been tried are mainly farmers' groups and cooperatives. Cooperatives have taken the form of being a multi-purpose organization with multiple objectives such as production, marketing and credit management, while single-objective cooperatives undertake only one function which may be production, marketing, credit, supplies, processing, or services. However, in spite of their promise in organizing farmers for modernized rural production, cooperatives have not been universally successful not only in Nigeria but also in most parts of Africa and other developing regions of the world. Widstrand (1972), Quick (1978), Killick (1978) and a host of other authors identified the following reasons for the seeming ineffectiveness of cooperatives: (1) failure to appreciate the divergence between African collective values and requirements for a formal cooperative; (2) lack of adaptation of government-initiated cooperatives to local conditions and social structure; (3) the tendency for cooperatives to be dominated by wealthier and, therefore, more influential and vocal members in the local communities; (4) top-down nature of government control; (5) changing emphasis of government interests and public programmes; (6) poor management; and (7) corruption. King (1981) attributed the failure of cooperatives in Nigeria to excessive top-down approach to the control of the institution, a style which ignores the sensibilities of local people and how they manage and administer their society. He further argued that, in general, cooperatives are an

institution that lend themselves to being hijacked and used by wealthier members in countries that attempt to follow a market-oriented policy of agricultural development.

Farmers' groups and local organizations appear to work much better than cooperatives simply because they are not run the way cooperatives are run, that is, having paid officers and highly formalized procedures. In most cases, farmers' groups are organised and managed by Non-Governmental Organisations (NGOs). The NGOs have proved extremely efficient and effective in their operations, which include microcredit management, services provision and linking farmers with market outlets. Sasakawa Global 2000 and Farmers Agricultural Development Union (FADU) have combined several functions to enhance the productive capacities of Nigerian farmers in several parts of Nigeria. However, the NGO intervention has very limited effect in terms of coverage. Not even all the farmers in a particular community is accommodated under an NGO activity. At best, NGO intervention has only demonstration effects and may inadvertently lead to differentiation in social status in communities where the NGOs operate.

Environment and natural resource management constraints

Environment and natural resource management constraints to the Nigerian agriculture manifest in several ways. The interaction of agricultural activities with the environment establishes an agriculture-environment nexus which has generated considerable global attention in recent times. The problem with Nigeria's environment and natural resources begins with the quality of land or soils on which crops are cultivated. There is no grade A soils in Nigeria, a situation which necessitates that supplementary nutrients must be added to the soils to make them productive. But because land capability and suitability classification has just been conducted, it means that the use of various categories of fertilizers in the past was based on inadequate knowledge and, therefore, could have been misused. However, fertilizer application in Nigeria has been grossly inadequate and since soils are not so good, it is not surprising that yields are low. In these circumstances the full effects of policy cannot manifest in the absence of complementing inputs availability.

Nigerian agriculture is rain-dependent. The intensity and distribution of rainfall is critical to crop growth. The tropical areas in general and river banks are yearly subject to flooding whereas areas around the Sahel and Lake Chad region suffer from drought intermittently. The irrigation strategy adopted has limited impact because irrigated areas are location-specific. Besides, irrigation agriculture has led to a series of other problems, such as, water logging, erosion, reduced water for communities downstream, water-borne diseases including schistomiasis and malaria, and displaced population formerly occupying the lands where dams now stand.

Certain economic activities have also affected the environment negatively. Oil exploitation, for instance, has rendered large areas in the Niger delta unusable for agriculture. Apart from oil prospecting activities which occupy physical space, the pollution of water and soil in the areas as a result of oil spillage, seepage, blowouts and pipe leakages, renders land uncultivable and destroys acquatic life and wildlife.

Labour constraints

Labour constraints show in low labour productivity, labour shortages and, therefore, very high wage rates, rural-urban migration and lack of skill to improve on farming practices. Because of limited use of mechanical, chemical and biological innovation in smallholder agriculture, human labour becomes the sole substitute to other forms of inputs that are capable of enhancing productive agriculture. Thus, there is a huge supply-demand gap for agricultural labour. This is further aggravated by the fact that the demand is concentrated in a particular period of months.

Technical constraints

Technical constraints are demonstrated by prevalence of pests and diseases which prevail in agricultural areas. The introduction of various food production programmes over the years resulted in opening up of more land for agriculture, the use of elite seed varieties and increased use of inorganic fertilizers and pesticides. However, these were not accompanied by well articulated pest and disease management practices. Consequently, the improved agricultural production systems became a veritable environment for pest and disease development. Pests and diseases account for crop losses of 30 – 50 per cent in the field and 15 – 20 per cent in the store. In very bad years, losses could be 100 per cent in the field, like in the case of quella birds and locust invasion.

Inadequate infrastructural facilities constitute part of the technical problems facing the Nigerian agriculture. Poor rural roads and communication, lack of social amenities such as electricity, portable water, health facilities, few schools, poor marketing facilities, and absence of a technical backup for repair and maintenance of agricultural machines and equipment, all these limit agricultural response to other incentives.

Planners' inadequate perception of the small farmer

Another major factor which has constrained the effectiveness of public policy in the agricultural sector is the lack of sufficient understanding and perception of the socio-economic characteristics of the Nigerian smallholder farmer by policy makers and agricultural development planners. If they had a clear perception of the small farmer and had incorporated this knowledge in the various policies and programmes designed for the farmer, the pursued agricultural policy would have had more impact than had been the case over the years. Understanding the socio-economic characteristics of the small farmer is vitally germane to the design of agricultural programmes presently and in future that we need to appraise these characteristics to see how important they are to successful prosecution of agricultural development initiatives.

The typical Nigerian small farmer is not literate, although he might have had a few years of primary education or koranic learning. This makes it difficult for him to access certain services and programmes that require formal procedure and processes such as filling and signing of forms or agreements as often required in formal organizations and government programmes. Although, illiteracy does not necessarily preclude him from belonging to associations (cooperatives,

outgrowers groups, credit unions, etc.) or being a beneficiary of agricultural development projects, such as the ADPs or the RBDAs, greater benefits could accrue to him if he were literate and able to negotiate his needs directly with project officials. Often he is a recipient of what the project officials consider is good for him.

The small farmer cultivates less than two hectares of farm land, which is located in two or more areas away from the household. The nearest farm plot, on which staple crops are planted, may be about two kilometres away while the most distant farm plot, usually cultivated with perennial crops, may be more than four kilometres from the homestead. The small farmer does own the land on which he farms. It is a family land, acquired through inheritance and which he, on his part, holds in trust for the coming generation. He, therefore, cannot alienate, sell or pledge the land. He holds only user rights on the land. This does not imply that access to land is a factor constraining the farm size. Rather, available working capital and other resources, particularly labour, are the factors that tend to limit the amount of land the small farmer can cultivate. Even in parts of the country where he is not a native, the small farmer can still have sufficient land to farm, provided he does not plant permanent crop, which has the tendency of long gestation period. In effect, the Nigerian small farmer has no tangible asset which can serve as collateral for loans with the formal sector of the financial market. The assets of the small farmer include his hut, some tree crops, a few livestock, produce in storage and the farming tools he owns. None of these is significant enough to earn the farmer a loan for production purposes.

On the farm plots in which staple crops are planted, two or more crops in a mixed cropping system are usually cultivated, although there is a tendency towards sole cropping for crops such as maize and rice which are produced for commercial purposes. In general mixed cropping involves several combination of crops. In the southern and middle belt areas, which are essentially in the tropical forest and guinea savannah wood lands, maize-cassava; maize-yam and maize-rice combinations are common. Whereas, in the Sudan and Sahel Savannah regions further north, guinea corn-millet, maize-guinea corn and millet-maize combinations are very common. The crop combinations are influenced by the amount of rainfall, the length of fallow, available land and type of crops. Usually crops used in planting combinations are those that are not competitive but complementary, which according to Norman (1969), involves crops that have different growth cycles, symbiotic relationships or differential labour demands. The advantage of crop combination to the small farmer is that he is able to spread labour over two or more crops. Mixed cropping also serves as a safety valve against total crop failure; when one crop fails the other may do well. However, mixed cropping is not suitably amendable to the technologies which agricultural policy tends to promote. Different crops perform better if they are cultivated sole and managed with clockwork precision as recommended by scientists.

The working equipment of the Nigerian small farmer consists of simple tools and appliances fabricated by local blacksmith. These are the hoe, cutlass, matchet, sickles, axes and others. He also uses locally woven baskets, calabashes and gourds to evacuate or store produce after harvest. He may construct barns for storage purposes. The small farmer engages the use of tractor where one is available. When he has sufficient working capital derived from his savings or borrowing, he acquires and uses fertilizers, herbicides and other crop growth enhancing inputs. The use of these inputs is never at optimal rates, often because the inputs are never available in the market in sufficient quantities. Over the years, he has realised that productivity

of his effort is enhanced by the use of fertilizer in particular and this has been one input that has suffered from series of scandals and unimaginative policies for many years. If he belongs to government sponsored projects such as the ADP, he is more likely to obtain considerable quantities of required inputs including fertilizer. In this case his performance is much better than the ordinary farmers who are in the majority.

The small farmer has also had to face the difficulty of obtaining loanable funds from the capital market. The problem here is that he is not in a position to provide the collateral required by the banks, which perceive smallholder farming as highly risky and therefore deserving a strong regime of collateral requirement. Consequently, he has had to rely on informal sources of credit such as thrift and savings societies, credit societies, local cooperatives and money-lenders, usually at usurious interest rates (Olomola and Akande, 1999). He may also obtain loans from relatives and friends but such loans are usually too small to meet his requirements. The government credit programmes are also inadequate to meet the needs of most farmers and such programmes also have several processes the farmer will need to undergo before having assess to loans.

Manual labour is the main input used in farming by the small farmer. This labour is contributed by members of the farming household who number about 10 (NISER, 2003) and hired labour. Hired labour is provided mostly by migrant workers from other parts of Nigeria, particularly from the Middle belt. Such migrant farm workers have been able to settle in many farming communities across the country. It is recognised that women make a significant contribution to labour requirement on the farm and are involved mainly in such activities as weeding, harvesting, produce evacuation and transportation to the homestead, produce processing and marketing. Children also contribute to labour on the farm and in some communities the children may be prevented from going to school for several days if their labour is critical to some activities on the farm at that particular time. The small farmer also has access to group labour. In this practice a group of farmers may decide to assist a member in carrying out specific task on his farm and for which the group is provided food and drinks in lieu of cash payment. This may be rotated among the members of the group.

Thus, from the above description the Nigerian small farmer is a limited resource producer, possessing little or no education, cultivating small farms which are located in different places, adopting predominantly the hoe-cutlass technology, having little access to loanable funds, and relying more on the family labour as major input into farming. Paradoxically, it is this same small farmer who produces more than 80 per cent of the entire agricultural output of Nigeria. In the past forty years or so he has been the centre of post independence agricultural policies and food development initiatives. Unfortunately, however, all the series of interventionist strategies imposed (the policies were never evolved through participatory processes) on the small farmer failed to take into consideration the socio-economic environment in which he operates. Policy makers have been much concerned with efficiency factors - appropriate technology, use of purchased inputs, application of scientific knowledge made available through extension, the market as the enabler and allocator of resources, etc. The farmer's culture, production objectives, productive capacity and resource base, and a host of other factors which affect him are wrongly or insufficiently perceived by the initiators of agricultural development programmes in Nigeria.

Since the 1970s, the small farmer has faced a cacophony of these policy measures and development strategies, and none allowed to run its full course or mature before new ones were introduced. This must have inevitably caused policy-induced indigestion in the farmer. He was no longer able to adjust relatively quickly to the speed and tempo with which new programmes were being introduced. The NAFPP, for instance, was introduced to transfer new production practices and specific technologies to the smallholder farmer. This was in 1973. A year or so after, the ADP system was introduced. The RBDAs, ADAs and other programmes followed in quick succession. The farmer under this scenario was obviously confused and unable to make the best use of the new programmes, which in themselves require a production discipline in the form of timely operations and adequate use of inputs, etc., a discipline almost entirely alien to the socio-economic characteristics and ability of the farmer. The panacea to the age-long slow responsiveness to technological innovation on Nigerian farms may therefore lie in carefully planned and executed development policy programmes which incorporate elements of socio-economic strength of the small farmers, while not being oblivious of their weaknesses.

Π

CONCLUSION AND PATHWAY TO A NEW GREEN REVOLUTION IN NIGERIA

This report has attempted to narrate and interpret the evolution of the Nigerian version of green revolution, which may be seen as consisting of a series of policies, projects and programmes undertaken by the state to achieve self-sufficiency in food provision. The food policy as a whole is a continuing debate and it is increasingly clear that the Nigerian government cannot ignore the food question. Indeed, the fortune and tone of the debate has become enhanced with the installation of democratic governance not too long ago, after many years of unhelpful military rule. The Nigerian people now have unfettered freedom to demand for the dividends of democracy and food being an important item in the pack. The study has shown that Nigeria has had the benefit of food production strategies under state and market directed policies from which insights can be drawn in determining the appropriate combination of measures that is desirable to raise the national capacity to produce sufficient food, to cater for a burgeoning population of over 130 million people which is also rising at an estimated rate of 3.2 per cent per annum.

In this concluding section, a few issues are briefly discussed. The first is the relevance of the Asian green revolution model for Africa and specifically for Nigeria. Since this is not a wholesale comparative study, what is done here is to draw some parallels or similarities and also note the areas of divergence and invariably draw some lessons. A second issue discussed is the extent of desirability of foreign assistance and capital in evolving a sustainable green revolution in Nigeria against the background of the nation's experience with the World Bank and the debt overhang that has refused to go away. A third issue is the set of new challenges facing Nigeria and Africa as a whole. This concerns globalisation, the World Trade Organisation discipline, biotechnology and production of genetically modified crops as well as the local challenge posed by the New Partnership for African Development (NEPAD) and the inter-related Poverty Reduction Strategy Paper (PRSP) as well as HIV/AIDS pandemic ravaging most parts of Africa. The final issue raised relates to some factors proposed to guide a new food policy in Nigeria and the rest of Africa.

Relevance of the Asian green revolution model for Africa

The question of relevance or irrelevance is not deterministic in a categorical sense. We could draw more mileage by engaging in some comparative analysis of the background from where the countries in both continents have emerged, the circumstances that necessitated green revolution, the way each continent had pursued the goal of domestic food sufficiency, the results of the green revolution and what the continent with less impressive outcome could learn from the more successful continent in the prosecution of green revolution programme.

African and Asian countries share some common needs and concern arising from similar origin of statehood. Both continents had been colonised; both gained independence, albeit, at different

times, with Asian countries gaining their independence much earlier than their African counterparts; both had and still have huge populations, with the highest concentrations of the world's most poor peoples being in the two continents; most of the countries in both continents have operated economies with private and public sector participation, but a better developed private sector exists in Asia; and agriculture, where most people reside and work, is key to accomplishing the development goals in both continents, that is, the goals of self-reliance, growth and equity. Thus, countries in the two continents have been seriously challenged by the need for a radical transformation of the food sector, given the wide ranging macro and micro implications, including getting sufficient food to eat, raising the nutritional level and the quality of food consumed, reducing or eliminating food imports, conserving foreign exchange, reducing inequality, stimulating increased farm income and thereby enhancing the demand capacity for industrial goods and raising the prospects for private investment through private accumulation. Because of widespread poverty and lack of sufficient foreign exchange to import food to feed the rising population and because of the availability of abundant nature's resources in land, water, climate, animals, forests and people the option of domestic self-sufficiency in food attracted and engaged the attention of leaders in both continents. The countries in the two worlds have opted for green revolution, that is, an agricultural production system which is based on application of scientific knowledge and practice.

However, since becoming independent territorial states the experience of both continents in agricultural technology application has been different. Asia has moved rather faster than Africa and has been able to appropriate the benefits of modern technology that is based on biological and mechanical inputs. The state played the key role in promoting these technologies in Asia. In India, for instance, green revolution started in the mid-sixties. This has been sustained and spread throughout the country. It is stated that India became self-sufficient in food within a short time of its launching the green revolution. However, India has not been able to resolve consumption and equity problems associated with modern technology.

In Nigeria and the entire African continent the green revolution concept is largely episodic, more of a slogan than a seriously coordinated, planned and executed programme. Nigeria has attempted to execute the green revolution activities in localised areas across the country through a series of policy interventions since the 1970s, but has failed to make the required impact. Since the programme has not spread equally and evenly across all known agroecological zones of the country, and given the dichotomy existing between designated 'progressive farmers' and 'other farmers', technology has, perhaps, raised concern over equity in inter-regional and inter-class terms, just as in the Asian green revolution countries.

In specific terms, in some of the Asian countries (Japan, China, Taiwan and India) where green revolution made a tremendous impact and, therefore, adjudged successful, the take off point was based on indigenous effort. Foreign technology was never the first choice. The initial stages of green revolution in these countries relied on intensive application of abundant labour and improvement of land. Later the capacity for domestic production of needed inputs, such as fertilizer, pesticides, seeds and others was developed and expanded such that little recourse was made to imports. The endogenisation of the capacity to undertake green revolution contributed in no small measure to eliminating bottlenecks and conserving resources for the countries involved.

At the other side of the continent, in Africa, Nigeria started very big and relied almost exclusively on external technology. She had the money at the take off stage of the green revolution policies and so could afford high technology sprinkler irrigation facilities in its river basin development and irrigation programme. But not many year after, the money dried up. The ability to import spare parts or engage foreign skills to repair and maintain the equipment was greatly impaired. In addition, the technology introduced could not be adequately engaged by a farming clientele that is largely illiterate, traditional in outlook and behaviour and which is virtually exhausted due to advanced age of most of the farmers. Other complicating factors militate against the success and impact of green revolution measures in Africa. The Nigerian green revolution, for instance, has been implanted admist the mixed cropping practices of the local farmers whereas new technologies, improved varieties and the recommendation accompanying the new technologies indicate best performance only when the crops are cultivated sole. While rice and wheat could be targeted in the green revolution programme in Asia where these crops feature prominently in the local diet, the same cannot be claimed for African countries, where several crops constitute important items in the diet. While the Asian green revolution scientists could concentrate efforts on, say, rice and wheat their counterparts in Africa would have to contend with several crops, including maize, rice, sorghum, millet, cassava, yam and cowpeas. This basketful of commodities presents a challenge to scientists working in an environment of constrained scientific resources. Finally, while the Asian spectacular performance rested on HYVs of wheat and rice, the performance level of any HYV in Africa has been generally salutary. It is only in the case of maize (OPVs) that Africa can claim some degree of success.

The World Bank and Nigerian Green Revolution

The role of the World Bank in Nigeria's food policy over the years deserves at least a passing comment. It is to be noted that the Bank has been a major factor in influencing agricultural policy in Nigeria since the 1970s. The thinking of the World Bank in respect of African development in general was conceptualised in its report titled "Accelerated Development in Sub-Saharan Africa" released in 1981. The report recommended a smallholder-based strategy for agricultural development and also stated that projects should be concentrated on regions of high commercial potential. In the specific case of Nigeria, the Bank implemented this prescription in the Agricultural Development Projects (ADPs) which are smallholder based and technology-driven, first, in selected areas in Northern Nigeria and later in other regions of the country. Undoubtedly, throughout the 1970s, 1980s and, perhaps, up till now the World Bank has been the largest external source of funds for Nigerian agriculture. The Bank allocated at least 72 per cent of its loans in the 1980s to agriculture. From this, nearly 80 per cent was directed at the ADPs. The loans were given with stringent conditions, that is, the "hard" IBRD terms. Under such conditions it was impossible to deny the Bank limitless inroads into Nigerian agriculture and this the Bank did so professionally.

The Bank succeeded in locating the base of the technological practices in the Nigerian agriculture in foreign countries and foreign technology. The Bank was able to do this through the terms and conditions of its aid package, the major components of which were fertilizer and management to run the projects at the village level. These components of the package absorbed

significant foreign exchange. By the mid 1990s, the World Bank withdrew its support for the ADPs in Nigeria and since then the ADPs have lost the steam in extending technological innovation to the Nigerian agriculture. The lesson here is that Nigeria has to settle the issue of reliance on foreign direct investment in future food policies and plans.

New Challenges

Technology is already being redefined by leading countries of the world. It is no longer limited to biological and mechanical inputs but now extends to various types of biotechnology and genetic engineering. This development has far reaching consequences for developing countries of Africa, who have not yet mastered the biological and mechanical inputs let alone high-tech production of food and other crops. The challenge of globalization and the opportunities as well as obstructions posed by World Trade Organisation tenets, with their emphasis on trade liberalisation, reduced tariffs, removal or reduction of subsidies all of which imply competitiveness, would also have to be addressed by African countries. Meanwhile, poverty has reached a crescendo and so also has debt overhang weighted down the African continent. The alternative of food import cannot and has never been justified. The concept of regional development in Africa through the newly-established New Partnership for African Development (NEPAD) would need to confront the issues of regional conflicts in several parts of the continent, since such conflicts are injurious to sustainable agricultural production, apart from the human miseries attending such conflicts. Regional economic partnership may also be considered to take advantage of scale while reducing the impact of scarce investible funds for productive farming. Recognising and adapting to the changing global environment will be very crucial if African countries are to face the rest of the world on equal footing.

The challenge of HIV/AIDS can be ignored only at the peril of African nations. Uganda, Tanzania, Zambia, Botswana and South Africa are ravaged by the AIDS pandemic. Available evidence indicates that the scourge is very prevalent in the Middle Belt Zone of Nigeria, which is fondly called the "food basket of Nigeria" (Akande. 2003). That is, HIV/AIDS is at the heartland of Nigeria's most potent agricultural production region. If this disease is not controlled but allowed to spread among agricultural population, it may overturn farming through unprecedented structural dislocation and decimation of the population.

Pathway to a new food policy

Existing policy framework is not necessarily flawed in terms of vision and desires of the Nigerian state. What is defective are the strategies that are rooted in foreign technology and applied on a farming population that remains largely lethargic and non-responsive. This situation raises the need for a more radical approach to food production development. An option is for the Nigerian state to set up structures that are capable of expanding the capacity to produce green revolution inputs, that is, fertilizer, improved seeds and pesticides. Unless there is a fundamental change in the supply, distribution and marketing of inputs, the green revolution process may remain deadlocked. Production of fertilizer and pesticides will no doubt require foreign investments which the national industrial policy should address in terms favourable to foreign investors and skills but also encouraging indigenous capital and technology transfer. The

capacity of the research institutes to generate and disseminate new technologies should be strengthened with adequate budgetary incentives and provision of scientific infrastructure.

Perhaps, changing the orientation of the farming population would have been much easier if the prerequisites for improved farm performance are available. Since these are largely inaccessible to the generality of farmers, the farmers may not be blamed. However, given the demand of new technology practices and in the face of myriads of shortcomings of the present generation of African farmers, there is need to recruit a new generation of young, educated, able and dynamic population into farming. This should be a deliberate state policy focused at total restructuring of the rural economy to encourage young people to stay in rural areas where they could profitably engage in economic enterprises that include farming and para-agricultural activities. The population of such new recruits throughout the country is likely to be a fraction of the current 70 per cent of the population that lives in the rural areas today. The new farmers could be a catalyst to change the agrarian landscape.

Total institutional re-enactment is desired. State institutions and markets are important adjuncts to agrarian structure, which is critical to the flow of technology. The market system, credit system, transportation, storage requirements and postharvest management needs in general are important consideration if green revolution is to be successfully undertaken in Africa. Cooperative institutions are important to the extent that they assist the individual farmers to realise their production goals. Non-governmental organisations also will continue to be relevant in technology and service provision, particularly in the area of microfinance.

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Appendix

Appendix 1.1

(a): Indexes of Agricultural Production, 1967-78

(1969/71 = 100)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
NIGERIA								.				
Food Production	86	89	100	102	98	100	93	102	106	109	110	112
Total Agriculture	86	86	100	102	98	100	94	102	106	110	110	112
Per Capita Agriculture	92	93	102	102	96	95	87	92	93	93	91	90
AFRICA												
Food Production	92	93	98	100	103	104	100	109	109	112	111	115
Total Agriculture	91	93	98	100	103	104	101	108	108	110	109	113
Per Capita Agriculture	99	98	100	100	100	99	98	97	94	94	91	91
WORLD												
Food Production	94	97	97	100	103	103	108	110	113	116	119	123
Total Agriculture	94	97	97	100	103	103	108	110	113	115	118	122
Per Capita Agriculture	100	100	99	100	101	99	102	102	103	103	104	105

Source: *FAO, 1978 Production Year Book*

Appendix 1.1 (cont'd)

(b)*: Area Under Some Major Food Crops, 1960-2 and 1973-5*

	1960	*1961*	*1962*	*1973*	*1974*	*1975*
Sorghum	*4853*	*4671*	*4786*	*5516*	*4653*	*3977*
Millet	*n.a*	*4372*	*4455*	*5151*	*4787*	*4769*
Maize	*1321*	*1378*	*1123*	*1130*	*579*	*1470*
Rice	*135*	*150*	*219*	*373*	*269*	*705*
Cowpeas	*1217*	*1216*	*1473*	*3256*	*2937*	*2953*
Yam	*n.a*	*1416*	*1303*	*855*	*671*	*1055*
Cassava	*n.a*	*782*	*868*	*361*	*415*	*988*
Groundnuts	*1467*	*1488*	*1501*	*2076*	*1796*	*n.a.*

(c) *Yields of Major Crops, 1960-2 and 1973-5 (kg/ha.)*

Sorghum	*760*	*850*	*940*	*567*	*1017*	*836*
Millet	*n.a*	*590*	*570*	*736*	*1160*	*993*
Maize	*n.a*	*800*	*880*	*715*	*911*	*960*
Rice (paddy)	*1160*	*750*	*1180*	*1305*	*3107*	*2798*
Cowpeas	*310*	*350*	*340*	*162*	*374*	*290*
Yam	*n.a.*	*9520*	*10060*	*8112*	*10638*	*8172*
Cassava	*n.a.*	*9460*	*8760*	*8039*	*8631*	*4366*
Groundnut in shall	*1280*	*1340*	*1680*	*432*	*600*	*n.a.*

(d)Food Production, 1960-2 and 1973-5

	1960	*1961*	*1962*	*1973*	*1974*	*1975*	***Average Annual*** *Growth Rate (%)*
Sorghum	*3484*	*3995*	*4508*	*3125*	*4734*	*3325*	*_0.84*
Millet	*2565*	*2649*	*2530*	*3794*	*5554*	*4737*	*1.2*
Maize	*1109*	*993*	*1168*	*808*	*528*	*1332*	*0.13*
Rice (paddy)	*118*	*258*	*196*	*487*	*836*	*1973*	*4.56*
Cowpeas	*371*	*430*	*508*	*530*	*1090*	*858*	*1.07*
Yam	*12106*	*13471*	*13090*	*6936*	*7138*	*8621*	*0.04*
Cassava	*6681*	*7399*	*7598*	*2582*	*3582*	*4314*	*0.06*
Groundnuts	*453*	*629*	*679*	*879*	*1078*	*499*	*_0.04*

n.a. = not available

Source: *FAO IWP Production/Utilisation/Processing Account; Rural Economic Surveys: 1962-70, Federal Office of Statistics.*

Appendix 4.1: Evaluation of Improved Technologies Through SPAT in Selected ADPs

ADP	No. of SPATS	Technology promoted	Yield		% Increase
			SPAT[a]	FAP[b]	
		MAIZE			
Bendel	300	Imp. Variety/spacing	2.50	1.47	70.1
Ondo	284	Plant population	2.21	1.74	27.0
	350	Fertilizer	2.90	2.26	28.3
	232	Imp. Variety	2.75	2.21	24.4
Lagos	318	Imp. Variety	2.50	1.83	36.6
Borno	1668	Imp. Variety	1.75	1.35	29.6
Kwara	714	Imp. Variety/spacing fert.+ ZnSo	3.28	2.28	87.7
	704	Imp. Variety/spacing fert.	5.94	2.27	161.6
Oyo	743	Plant population	2.40	1.80	33.3
	735	Fertilizer	2.30	1.40	64.3
Akwa Ibom	65	Imp. Var/spacing/fert.	2.8	1.2	133.3
CASSAVA					
Lagos	37	Imp. Variety	21.66	16.76	29.2
Oyo	107	Imp. Variety	16.00	10.00	60.0
	170	Fertilizer	14.00	9.00	55.6
Rivers	1786	Var./spacing/fertilizer	27.5	16.1	70.8
Anambra	1200	Var./spacing/fert.(1987)	16.1	9.96	61.6
	692	Var./spacing/fert.(1987)	11.4	7.5	52.0

[a]*SPAT = Small adoption plot - in which improved technologies are practised*
[b]*FAP = Farmer adjacent plot - adjacent to SPAT for comparisons*
Source: H.R. Chheda (1990) FACU Valedictory Lecture.

Appendix 4.2: Fertilizer Supply in Nigeria (Tons)

Period	Import	Domestic Supply	Total Consumption	Domestic supply as % of total consumption
1961	1394		1394	0
1962	1685		1685	0
1963	2093		2093	0
1964	2801		2801	0
1965	3649		3649	0
1966	7330		7330	0
1967	7261		7261	0
1968	10100		10100	0
1969	10405		10405	0
1970	6894		6894	0
1971	9245		9245	0
1972	19558		19558	0
1973	17600		17600	0
1974	26900		26900	0
1975	53300	1000	54300	2
1976	109300	3000	112300	3
1977	71900	4100	76000	5
1978	60100	3900	64000	6
1979	102600	5700	108300	5
1980	176700	5200	181900	3
1981	203700	9500	213200	4
1982	194800	7000	201800	3
1983	259600	4200	263800	2
1984	272000	5000	277000	2
1985	375200	5000	380200	2
1986	221200	5000	226200	2
1987	262500	78000	340500	23
1988	179000	291400	470400	62
1989	219400	324400	543800	60
1990	249700	340000	589700	58
1991	207100	381600	525700	73
1992	240000	371200	611200	61
1993	281000	330000	611000	54
1994	290300	157700	448000	35
1995	23700	138900	162600	85
1996	77200	123800	201000	62
1997	91500	46200	137700	34
1998	152000	81500	233500	35
1999	117600	85500	203100	42

Source: FAOSTAT, 2001

Appendix 5.1: Producer price response to policy changes

Crop	*Pre-SAP Period*	*SAP period*				*Difference between SAP and pre-SAP means*
		1987	*1988*	*1989*	*Mean*	
Real producer prices of food crops:	.....*Naira/ton*.....					*Percent*
Rice (milled)	*218*	*414*	*540*	*576*	*510*	*133.9*
Beans	*301*	*428*	*566*	*495*	*496*	*64.8*
Maize (shelled)	*135*	*109*	*242*	*250*	*200*	*48.1*
Yam	*230*	*163*	*220*	*222*	*202*	*_12.2*
Millet	*141*	*107*	*188*	*191*	*162*	*14.9*
Sorghum	*137*	*149*	*209*	*184*	*181*	*32.1*
Cassava (tuber)	*143*	*73*	*101*	*109*	*94*	*_34.3*
Nominal producer prices of food crops						
Rice (milled)	*1004*	*2313*	*4219*	*6322*	*4285*	*326.8*
Beans	*1302*	*2394*	*4423*	*5420*	*4079*	*213.3*
Maize (shelled)	*653*	*611*	*1891*	*2735*	*1746*	*167.4*
Yam	*909*	*910*	*1721*	*2430*	*1687*	*85.6*
Millet	*607*	*597*	*1472*	*2096*	*1388*	*128.7*
Sorghum	*570*	*830*	*1630*	*2017*	*1492*	*161.8*
Cassava (tuber	*642*	*406*	*788*	*1196*	*797*	*24.1*

Source: Derived from CBN: Annual Report and Statement of Accounts (Various Issues)

Appendix 5.2: Index of Output of Major Food Crops, 1970-1990 (1986 = 100)

Year	*Yam*	*Maize*	*Millet*	*Rice*	*Cassava*
1970	*236*	*108*	*76*	*99*	*334*
1971	*187*	*95*	*69*	*99*	*289*
1972	*132*	*33*	*58*	*158*	*165*
1973	*133*	*60*	*92*	*172*	*186*
1974	*137*	*40*	*135*	*186*	*229*
1975	*165*	*99*	*62*	*178*	*149*
1976	*124*	*80*	*63*	*77*	*114*
1977	*122*	*49*	*57*	*115*	*106*
1978	*112*	*49*	*58*	*113*	*104*
1979	*100*	*37*	*57*	*57*	*92*
1980	*100*	*46*	*65*	*37*	*90*
1981	*100*	*54*	*65*	*56*	*40*
1982	*102*	*57*	*92*	*75*	*38*
1983	*78*	*44*	*90*	*51*	*32*
1984	*88*	*80*	*81*	*55*	*77*
1985	*91*	*89*	*90*	*69*	*88*
1986	*100*	*100*	*100*	*100*	*100*
1987	*94*	*90*	*95*	*105*	*95*
1988	*175*	*96*	*90*	*187*	*202*
1989	*176*	*100*	*92*	*243*	*238*
1990	*150*	*165*	*82*	*162*	*235*

Source: CBN (1991), Statistical Bulleting, Vol. 1, Nos. 1&2

Appendix 5.3: Changes in the area and yields of selected crops

Area/yield/crops	*Base year 1984-86*	*1987*	*1988*	*1989*	*Average 1987-89*
Area cultivated:	*1,000 hectares*				
Rice	*580*	*630*	*635*	*640*	*635*
Maize	*1992*	*2000*	*2200*	*2000*	*2067*
Sorghum	*4967*	*4300*	*4400*	*4400*	*4367*
Millet	*4600*	*3100*	*3500*	*3500*	*4367*
All cereals	*12148*	*10045*	*10775*	*10590*	*10470*
Cassava	*1267*	*1500*	*1600*	*1700*	*1600*
Yam	*1633*	*1750*	*1800*	*1885*	*1812*
All roots and tubers	*3110*	*3250*	*3400*	*3585*	*3412*
Yields:	*Ton/hectare*				
Rice	*1.04*	*1.07*	*1.06*	*1.09*	*1.07*
Maize	*0.79*	*0.76*	*0.8*	*0.81*	*0.79*
Sorghum	*0.91*	*0.95*	*0.89*	*0.88*	*0.91*
Millet	*0.75*	*1.02*	*0.98*	*0.99*	*1*
Cassava	*7.23*	*5.47*	*5.48*	*5.77*	*5.57*
Yam	*6.73*	*7.93*	*7.94*	*7.71*	*7.86*
Change in area cultivated	*Percent*				
Rice		*8.6*	*0.8*	*_0.8*	*2.9*
Maize		*0.4*	*10*	*_9.1*	*4.6*
Sorghum		*_13.4*	*2.3*	*0*	*_3.7*
Millet		*_32.6*	*12.9*	*0*	*_6.6*
All cereals		*_17.3*	*7.3*	*_1.7*	*_3.9*
Cassava		*18.4*	*6.7*	*6.3*	*10.5*
Yam		*7.2*	*2.9*	*4.7*	*4.9*
All roots and tubers		*4.5*	*4.6*	*5.4*	*4.8*
Change in yields:	*Percent*				
Rice		*2.9*	*_0.9*	*2.8*	*1.6*
Maize		*_3.8*	*5.3*	*1.3*	*0.9*
Sorghum		*4.4*	*_6.3*	*_1.1*	*_1*
Millet		*36*	*_3.9*	*1*	*11*
Cassava		*_24.3*	*0.2*	*5.3*	*_6.3*
Yam		*17.8*	*0.1*	*_2.9*	*5*

Sources: (1) CBN: Annual Report and Statement of Accounts (Several Issues)
1. FAO: Production and Trade Yearbook (Several Issues)

Appendix 6.1: Growth Rates of Production, Area Planted and Yield of Cereals, 1996-2000

Year	*Maize*		*Millet*		*Sorghum*		*Rice*		*Cassava*		*Yam*	
Output	*Actual ('000tons)*	*Growth (%)*	*Actual ('000tons)*	*Growth (%)*	*Actual ('000tons)*	*Growth (%)*	*Actual ('000tons)*	*Growth (%)*	*Actual (0'000tn)*	*Growth (%)*	*Actual ('000tn)*	*Growth (%)*
1995	*6931*		*5563*		*6997*		*3293*		*31404*		*22818*	
1996	*5667*	*_18.24*	*5681*	*2.12*	*7084*	*1.24*	*3122*	*_5.19*	*31418*	*0.04*	*23201*	*1.68*
1997	*5254*	*_7.28*	*5902*	*3.89*	*7297*	*3.01*	*3268*	*4.68*	*32050*	*2.01*	*23972*	*3.32*
1998	*5127*	*_2.41*	*5956*	*0.91*	*7516*	*3*	*3275*	*0.21*	*32695*	*2.01*	*24768*	*3.32*
1999	*5476*	*6.08*	*5960*	*0.07*	*7520*	*0.05*	*3277*	*0.06*	*32697*	*0.01*	*25873*	*4.46*
2000	*4107*	*_25*	*6105*	*2.43*	*7711*	*2.54*	*3298*	*0.64*	*32010*	*0.64*	*26201*	*1.27*
1996-2000 Ave	*5126*	*_9.37*	*5921*	*1.88*	*7425*	*1.96*	*3248*	*0.08*	*32174*	*0.94*	*24803*	*2.81*
Area Planted												
1995	*5497*		*5107*		*6095*		*1875*		*2944*		*2164*	
1996	*4273*	*_22.26*	*5356*	*4.87*	*6191*	*1.57*	*1784*	*_4.85*	*2946*	*0.07*	*2172*	*0.37*
1997	*4200*	*_1.72*	*5487*	*2.45*	*6589*	*6.42*	*2048*	*14.8*	*2697*	*_8.44*	*2169*	*_0.1*
1998	*3884*	*_7.52*	*5956*	*8.54*	*6635*	*0.70*	*2044*	*_0.19*	*3042*	*12.79*	*2625*	*20.97*
1999	*3965*	*2.08*	*5603*	*-5.9*	*6678*	*0.65*	*2191*	*7.19*	*3072*	*0.96*	*2708*	*3.16*
2000	*3999*	*0.86*	*5814*	*3.77*	*6885*	*3.1*	*2199*	*0.37*	*3030*	*_1.36*	*2742*	*1.25*
1996-2000 Ave	*4064*	*-5.71*	*5643*	*2.74*	*6596*	*2.48*	*2053*	*3.46*	*2957*	*0.8*	*2483*	*5.13*
Yield												
1995	*1260*		*1089*		*1147*		*1756*		*10667*		*10544*	
1996	*1326*	*5.17*	*1060*	*_2.62*	*1144*	*_0.32*	*1750*	*-0.35*	*10664*	*_0.02*	*10681*	*1.3*
1997	*1250*	*_5.67*	*1075*	*1.41*	*1107*	*_3.21*	*1595*	*-8.81*	*11881*	*11.41*	*11047*	*3.42*
1998	*1320*	*5.52*	*1000*	*-7.03*	*1132*	*2.29*	*1602*	*0.41*	*10746*	*_9.55*	*9435*	*_14.59*
1999	*1381*	*4.62*	*1063*	*6.37*	*1126*	*_0.59*	*1495*	*-6.65*	*10643*	*_0.95*	*6554*	*1.25*
2000	*1027*	*_25.64*	*1050*	*_1.28*	*1119*	*_0.54*	*1499*	*0.27*	*10564*	*_0.74*	*9555*	*0.01*
1996-2000 Ave	*1261*	*_3.2*	*1050*	*_0.63*	*1126*	*_0.47*	*1588*	*_3.06*	*10900*	*0.03*	*10054*	*_1.72*

Source: Federal Ministry of Agriculture and Rural Development