NIGERIA

SITUATION ANALYSIS AND NEEDS ASSESSMENT

OF SWEET POTATO AND OFSP

The authors accept sole responsibility for this report drawn up on behalf of HKI Nigeria.
The report does not reflect the views of HKI Nigeria.

CONTENTS

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ACRONYMS AND ABBREVIATIONS

ADP	Agricultural Development Projects
AIBDF	Agricultural Inputs Business Development Fund
AIIF	Agricultural Inputs Import Fund
BASAC	Bauchi State Agricultural Company
BNARDA	Benue Agricultural and Rural Development Authority
ECOWAS	Economic Community of West African States
FAO	Food and Agricultural Organisation
FAO	Food and Agriculture Organization of the United Nations
FASCOM	Farmer Supply Company
FASCKT	Farmer Supply Company, Katsina
FFD	Federal Fertilizer Department
FGN	Federal Government of Nigeria
FMARD	Federal Ministry of Agriculture and Rural Development
FOS	Federal Office of Statistics
FPDD	Fertilizer Procurement and Distribution Division
FSCs	Farm Service Centers
FSFC	Federal Superphosphate Fertilizer Company Limited
GDP	Gross Domestic Product
HKI	Helen Keller International
IARCs	international agricultural research centers
ICI	Chemical and Allied Products
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IFDC	International Fertilizer Development Center
IITA	International Institute for Tropical Agriculture
IPC	International Potato Centre
KASCO	Kano Agricultural Supply Company
KADP	Kwara State Agricultural Development Programme
KNARDA	Kano State Agricultural and Rural Development Authority

LC	letter of credit
LGA	local Government Area
MIS	Market Information Systems
NAFCON	National Fertilizer Company of Nigeria
NARIs	National agricultural research institutes
NGOs	Nongovernmental organizations
NSS	National Seed Service of the FMARD
NADP	Nasarawa State Agricultural Development Programme
NAFDAC	National Food and Drugs Administration and Control
NCFN	National Committee on Food and Nutrition
NRCRI	National Root Crops research Institute
NGO	Non-Governmental Organisation
NPC	National Population Commission
OFSP	Orange Flesh Sweet Potato
PCU	Project Coordinating Unit of the FMARD
PTF	Petroleum Trust Fund
RAC	Reaching Agent of Change
SPMMV	Sweet Potato Mild Mottle Virus
SON	Standard Organisation of Nigeria
SFI	Soil fertility initiative
SG 2000	Sasakawa-Global 2000
SO	Strategic Objective
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Program
USAID	United States Agency for International Development
VAD	Vitamin A deficiency
WHO	World Health Organisation
VAT	Value-added tax
WARDA	West Africa Rice Development Association

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EXECUTIVE SUMMARY

The situation Analysis examined the literature and both secondary and primary data on Sweet Potato and Orange Fleshed Sweet Potato in Northern Nigeria, namely Benue, Kwara and Nasarawa States. The broad objective of this situation analysis provides clear understanding of the agricultural policy, and programme issues involved in up scaling sweet potato and OFSP in Nigeria. Data were collected from exiting survey literature and the data bases of the States Ministries of Agriculture and Natural Resources, Ministry of Economic Planning and Budget National Population Commission, Ministries of Health, States Health Management Board, Ministries of Education, Farmers and Sweet Potato Producers, etc. A focus Group Discussions were also organized for groups in the various Agricultural Zones to foster better understanding and interpretation of data. Most data from the reviewed literature were already analysed, while the primary data were manually collated and tabulated for each state and used to either confirm or update and fill the gaps in the secondary data.

The study reviewed the demographic, health and nutrition information in Nigeria as the basis for unravelling the situation of sweet potato and OFSP in Nigeria. It examined the population dynamics, land area and arable land, education and literacy, administration, the economy and natural resource distribution in Nigeria. The health indicators especially those related to maternal mortality, infant and child mortality and life expectancy are also reviewed. It addresses women's health and its effects on agricultural productivity. Furthermore, the study examined food consumption patterns, food availability, and affordability within the framework of the national nutrition policy. The study reviews the status of food based interventions in Nigeria and outlines the local and international partnerships and institutional structure and systems that have been established to facilitate improvements in nutrition in Nigeria.

The study reviews the national policy environment within the framework of the national agricultural policy. These include the national fertilizer policy, seed policy, and the crop protection products policy. The poor implementation of agricultural and nutritional policies is a major obstacle to sweet potato and OFSP production in Nigeria. Most of the policies targeted root and tuber crops in general and there are no specific policies targeted at sweet potato or OFSP in particular. It was also found that the demand for sweet potato, availability of improved

technology and efficient dissemination of information by ADPS are critical to increase demand generation and supply improvements in sweet potato and OFSP production and marketing.

It was further observed that literacy, health and nutrition status and location of intervening projects favour urban areas more than rural areas. More so, females are worse off in most of the parameters when compared to their males counter parts in the distribution of farming resources and crop production. Major policy initiatives of the Federal Government had led to significant increase in the demand for roots and tuber crops, which has created opportunities for the states in the production of sweet potato and OFSP. The situation analysis shows that most of the data available are not specific to sweet potatoes and OFSP but groups all root-crops (Cassava, yams, and sweet potatoes) together as roots and in other instances just as potatoes. The study observed that increase investment in Sweet Potato and OFSP will be enhanced the strengthening of formal and informal education for the youths and mass literacy campaigns for adults. OFSP campaign should target the rural poor especially the women. The high rate of illiteracy prevailing among the women in rural areas poses a major constraint to advocacy. The situation suggests that the introduction of OFSP programme must be coupled with mass literacy to facilitate understanding of the need to invest in OFSP. High illiteracy in all the states suggests that simples' methods should be pushed in rural areas especially among women.

The study reviewed the situation in three states of Nigeria, Nasarawa, Kwara and Benue States. The study shows marked similarities in the three states in terms of overall policy and institutional structures for the expansion of sweet potato and OFSP. The challenges include the lack of access to finance and modern technology. The recommendations focus on pro-poor interventions targeted at women. It recommends improved access to finance and equipment for expanded farming of sweet potatoes and OFSP in the three states and other parts of Nigeria.

CHAPTER 1

INTRODUCTION

The Reaching Agent of Change (RAC) is a three (3) year project funded by Bill and Melinda Gates Foundation in collaboration with the International Potato Centre (CIP). The overall vision of the project is to see substantially increased investments and commitment to the dissemination and use of Orange Flesh Sweet Potatoes (OFSP) as a means to combat Vitamin A deficiency (VAD) and food insecurity in Nigeria. The objectives of RAC are:

1. To increase investment in orange-fleshed sweet potato (OFSP) through advocacy and capacity building;
2. To put in place policy and institutional arrangements to upscale OFSP; and
3. Develop best practices for OFSP advocacy. This advocacy effort will be spearheaded by a cadre of dynamic African advocates who are committed to achieving better nutrition impact through agricultural innovation.

1.1. Objectives and Scope of the Study

Broadly, this situation analysis provides understanding of the policy, gender and agricultural issues involved in the up scaling of sweet potato and OFSP in Nigeria.

Specifically, objectives of the situation analysis are as follows:

1. Identify the environment, policies, gender issues, and stakeholders, farming system, organizations, and VAD and funding opportunities for sweet potato and OFSP.
2. Determine federal and State level policies affecting sweet potato cultivation and consumption in the areas.
3. Identify gaps in knowledge/information regarding sweet potato and Orange Fleshed Sweet Potato.
4. Identify potential stakeholders to Orange Fleshed Sweet Potato advocacy strategy in Nigeria.

1.2. Methodology/Strategy

The situation analysis covered three States of Northern Nigeria namely Benue, Kwara and Nasarawa States, which were purposely chosen by Helen Keller International. The three states have large number of sweet potato producers and potentials of increased productivity of sweet potato and OFSP.

1.3. Literature Search and Desk Review

The study relied extensively on available evidence on sweet potatoes and OFSP in Nigeria in general and specifically on the three selected states. There is a gamut of literature on the subject based on extensive surveys conducted by researchers and agricultural institutions in the state and the federal government departments and agencies on agriculture. International organisations such as UNICEF, FAO, WHO and the World Bank have published a number of data bases that provide useful and extensive information on the subject. These materials were consulted and referenced in this report.

1.4. Data Collection

Both Primary and Secondary data were collected from the three States of Benue, Kwara and Nasarawa. The secondary data were collected from literature and data sets from the States Ministries of Agriculture and Natural Resources, Ministry of Economic Planning and Budget, National Population Commission, Ministries of Health, States Health Management Board, Ministries of Education, Central Bank of Nigeria and Federal Office of Statistics.

The primary data were collected from the states using field assistants. Each State was divided into three Agricultural zones with the aid of Agricultural Development Programme (ADP). A multi-Stage sampling procedure was used. In each agricultural zone, three Local Government Areas were purposely selected due to importance in Sweet Potato Production. In the second stage, twenty households were randomly selected from each Local Government Area, which gave a total of 60 households in each agricultural zone. In each State therefore, a total of 180 farmers were used in eliciting information on the situation and policy issues regarding Sweet Potato and other farming activities of each State. A total of 540 Farmers were interviewed, comprising 180 from Benue, Kwara and Nasarawa respectively.

1.5. Data Analysis

Most data from the reviewed literature were already analysed and described while the primary data were manually collated and tabulated for each state and used to either confirm or update and fill the gaps in the secondary data.

1.6. Output/Deliverables

The deliverables are; to conduct the situation analysis for use during an upcoming advocacy policy analysis workshop, and deliver a completed situation analysis report.

CAHPTER 2
BACKGROUND AND CONTEXT

2.1 DEMOGRAPHIC INFORMATION

2.1.1. Location and Land Area

Nigeria is the most populous country in Africa. It is situated on the Gulf of Guinea in West Africa. Its neighbors are Benin, Niger, Cameroon, and Chad. The lower course of the Niger River flows south through the western part of the country into the Gulf of Guinea. Swamps and mangrove forests border the southern coast; inland are hardwood forests. Nigeria's land area covers a total of 92.4 million hectares including 91.1 million hectares of land mass and 1.3 million hectares of water bodies. The agricultural land area of 83.6 million hectares is classified as 28.2 million hectares arable, 2 million hectares of irrigable land, 2.5 million hectares permanent crops, 10.9 hectares forest/wood, and 40 million hectares pasture. The agricultural gross domestic product is contributed by crops 85%, livestock 10%, fisheries 4%, and forestry 1%. More than 90% of the agricultural output is accounted for by small-scale farmers with less than 2 hectares under cropping. It is estimated that about 75%t (68 million hectares) of the total land area has potential for agricultural activities with about 33 million hectares under cultivation. However, of the estimated 3.14 million hectares of irrigable land area, only about 220,000 hectares 7% is utilized (NPC, 2009).

2.1.2. Population Dynamics

The population of the country, based on the 2010 estimate is 152,217,341 with an urban population of 50% of total population. It has a population growth rate of 1.9%; birth rate of 36.0/1000; infant mortality rate of 92.9/1000; life expectancy of 47.2; and a population density of 151 per km^2. The age of the population is as follows: 0-14 years: 42.3% (male 27,466,766/female 27,045,092), 15-64 years: 54.6% (male 35,770,593/female 34,559,414), and 65years and over: 3.1% (male 1,874,157/female 2,055,966). The median age in Nigeria is an average of 18.63 years for the total population, while it is 18.71 years for the male population, and 18.55 years for the female population. The country has a total population sex ratio of 1.02 male(s)/female. Sex ratio at birth is 1.03 male(s)/female; under 15 years: 1.02 male(s)/female;

15-64 years: 1.04 male(s)/female; 65 years and over: 0.91 male(s)/female; and. Nigeria has a net migration rate of 0.27 migrant(s)/1,000 population (NPC, 2009)

2.1.3. Peoples and Governance

Nigeria is composed of more than 250 ethnic groups; the following are the most populous and politically influential: Hausa and Fulani 29%, Yoruba 21%, Igbo (Ibo) 18%, Ijaw 10%, Kanuri 4%, Ibibio 3.5%, Tiv 2.5%. English language is the official administrative language, while local vernacular are predominantly Hausa, Yoruba, Igbo (Ibo), and Fulani, Ibibio, Efik, Ijaw, and more than 200 others. Administratively, the country consists of 36 states, a federal capital territory, and 774 local government areas (LGAs). The country is governed under a three-tier government structure of the federal, state, and local governments. This administrative structure is meant to promote development at the community level. The states include, Abia, Adamawa, Akwa Ibom, Anambra, Bauchi, Bayelsa, Benue, Borno, Cross River, Delta, Ebonyi, Edo, Ekiti, Enugu, Gombe, Imo, Jigawa, Kaduna, Kano, Katsina, Kebbi, Kogi, Kwara, Lagos, Nassarawa, Niger, Ogun, Ondo, Osun, Oyo, Plateau, Rivers, Sokoto, Taraba, Yobe, Zamfara (NPC, 2009).

2.1.4. Economy and Natural Resources

The economy of Nigeria has an estimated Gross Domestic Product GDP (purchasing power parity) of $357.2 billion. The real GDP growth rate is 6.2%, GDP - per capita and purchasing power parity is $2,400, inflation is 11.5%, unemployment rate is 4.9% and rate of urbanization is 3.5%. The disaggregated GDP by sector is as follows: agriculture: 36.3%, industry: 30.5%, services: 33.3%. The labour force is an estimated 55.67 million. The occupational distribution of the Labor force is; agriculture 70%, industry 10%, services 20%. 60% of the population lives below poverty line. The major natural resources are natural gas, petroleum, tin, columbite, iron ore, coal, limestone, lead, zinc, and arable land. The main agricultural products include, cocoa, peanuts, palm oil, corn, rice, sorghum, millet, cassava, potato, yams, rubber; cattle, sheep, goats, pigs; timber; and fish. Similarly, the main industrial products are , crude oil, coal, tin, columbite, palm oil, peanuts, cotton, rubber, wood, hides and skins, textiles, cement and other construction materials, food products, footwear, chemicals, fertilizer, printing, ceramics, steel, small commercial ship construction and repair (FOS, 2009) .

2.1.5. Formal Education

Primary school participation, net enrolment ratio in the period 2007-2010 is 66% for males and 60% for females. Net enrolment ratio for secondary school participation in the same period is 29% for male and 22% for female Seex table 1 Annex 1.

2.1.6. Literacy (Disaggregated By Sex; Rural/Urban)

Nigeria's literacy rate for the *total population is* 68%, *male:* 75.7%, *female:* 60.6%. Literacy rate among young people age 15-24 is 78% for male and 65% for female. Adult literacy rate is 61%. Primary school net enrolment ration 2007-2009 is 63% (See table 2 Annex 1) (NPC, 2009).

2.2. HEALTH INFORAMATION

2.2.1 Basic Health Indicators

Under 5 Mortality Rate in 2010 Is 143/1000 Live Birth. Infant Mortality Rate (Under 1) In Same period is 88/1000 live births. Neonatal mortality rate, 2010 is 40. Life expectancy at birth (years), 2010 is 51. Maternal mortality ratio, 2006-2010 is 550/10000. Antenatal care coverage (%), at least once, 2006-2010 is 58%. Life expectancy for females as a % of males, 2010 is 103 (See Table 3, Annex 1) (NPC, 2009).

2.3. NUTRITION

Food insecurity and malnutrition in rural areas of Nigeria result from non-implementation and inadequate implementation of the National Food and Nutrition Policy and National Plan of Action for Food and Nutrition.75% of children (2006-2010) are introduced to solid, semi-solid or soft foods, (6-8 months), Vitamin-A supplementation coverage rate (6-59 months) 2010, full coverage is 91%. Early initiation of breastfeeding (%), (2006-2010) is 38. Percentage of children (2006-2010) who are exclusively breastfed, (<6 months) is 13%. Percentage of children (2006-2010) who are: introduced to solid, semi-solid or soft foods, (6-8 months). Percentage of under-fives (2006-2010) suffering from: stunting moderate & severe is 41%. Vitamin A supplementation coverage rate (6-59 months) 2010, full coverage (%) is 100% (See table 6 Annex) (NPC, 2009).

2.3.1. Food Consumption Patterns

A majority of the households residing in the rural areas consumed fruit, leafy vegetables, meat products, and dairy products between once and twice a week. 2.2% of households in the rural areas do not consume meat products. The trend in frequency of consumption of non-staple foods by households in the rural is similar to the observed pattern in the rural sector. A majority of the households consume more non-staple foods once or twice a week. For almost all the non-staple foods with the exception of fats and oils, their percentage frequency of consumption are known to decreased after the once or twice a week. In all the sectors, a relatively significant percentage of the households did not consume meat products (2%) or fruit (1%). Non-leafy vegetables followed by fats and oils, fruit, and fish products are consumed over four times a week in the urban areas (FOS, 2010).

2.3.2. Food Availability and Affordability

According to the Federal Office of Statistics (2009), the most available staple foods that are major sources of energy (calories) were rice (14.8%), cassava (12.9%), maize (10.6%), and yam (10.1%). Cowpea, groundnut, and soybean are major sources of plant proteins. Cowpea was the most available, followed by groundnut, and soybean. The most available non-staple foods were meat products (14%), non-leafy vegetables (13%), leafy vegetables (9.5%), and fats and oils (8.9%). The least available and affordable were banana, bakery products, fruit, and beverages. Within the 9–12 month period, rice was more available (16.4%) and affordable (13%) in the dry savanna zone, followed by maize at 12.7% (availability) and 10.5% (affordability), and sorghum at 11.6% (availability) and 10.3% (affordability). Cassava and yam were the least available and affordable. In the dry savanna, the most available non-staple foods were meat products (12.4%), non-leafy vegetables (15.4%), dairy products (8.2%), and fats and oils (10.6%). The least available and affordable were bakery products, fruit, and beverages. In the moist savanna rice was more available (12%) and affordable (9%), followed by cassava and maize (11%) and yam (10.5%). Soybean, plantain, and sorghum are the least available and affordable. Among legumes, cowpea was the most available and affordable followed by groundnut and soybean. The most available staple foods that are major sources of energy (calories) were rice (15.7%), cassava (18.0%), maize (9.3%), potatoes and yam (12%) in the humid forest. Cowpea, soybean, and groundnut are major sources of plant proteins. Cowpea is the most available, followed by

groundnut. Soybean is the least available. Cassava is the most affordable, followed by rice, yam, and maize. For legumes, cowpea is the most affordable followed by groundnut. In the humid forest zone, the most available non-staple foods are meat products (15.2%), non-leafy vegetables (11.8%), leafy vegetables (10.8%), fats and oils (8.0%), and fish (8.5%). The same trend is observed for affordability. The least available and affordable are banana, bakery products, fruit, and dairy products (FOS, 2009).

2.3.3. National Policy on Food and Nutrition

Nigeria launched its National Policy on Food and Nutrition in 2002, with the overall goal of improving the nutritional status of all Nigerians. This policy sets specific targets, which include reduction of severe and moderate malnutrition among children under five by 30% by 2010, and reduction of micronutrient deficiencies (principally of vitamin A, iodine and iron) by 50% by 2010. To tackle malnutrition, Nigeria has identified the following strategies:

- Improving Food Security through programmes and projects in the agricultural and nonagricultural sectors to increase household income especially in the poorer segment of the population.
- Enhancing care-givers' capacity by promoting optimal infant feeding practices and reducing the workload of women to create more time for childcare, through the development of labour saving technologies
- Improving Health services to provide essential maternal and child health care
- Controlling micronutrient deficiency and anemia through a strategy comprising vitamin and mineral supplementation, food fortification and dietary diversification.
- Eliminating Iodine Deficiency Disorder through salt iodization programme
- Institutionalizing general consumer protection measures to safeguard food quality and consumer health.

4.2.1. Food based nutrition interventions

4.2.1.1.International Organisations and Partner Agencies

Major interventions and projects aimed at improving nutrition including food based nutrition interventions are implemented by the government of Nigeria and international partners. These include, UNICEF, FAO, WHO, UN, NGOS, international organizations, federal, state and local governments. It is important to note that most of these agencies operate through federal, states and Local Governments ministries. Take for instance, the National Programme for food security is jointly assisted by World Bank, FAO, USAID and it is coordinated by UN. National Agricultural Marketing Information System is jointly assisting the States in Agricultural Marketing and Information. UNICEF and WHO are involved in Nutrition and health related projects in all the States and it administered through the States Ministry of Health. None of the Agencies is directly funding sweet potato in any of the States. Supported by UNICEF and the Micronutrient Initiative of the Canadian Government, this programme works through the establishment of an effective partnership with the private sector food industries, media houses, the consumer association and development partners.

2.3.4.2 National Institutions and Government Agencies

The National Planning Commission through the National Committee on Food and Nutrition (NCFN) serves as the focal point for the co-ordination and harmonization of all food and nutrition related policies and programmes in the country. The Federal Ministry of Health, the Federal Ministry of Industry, the National Agency for Food and Drugs Administration and Control (NAFDAC), the Standards Organization of Nigeria (SON), the National Primary Health Care Development Agency are also involved in the Government nutrition programmes. The initiative to control and reduce micronutrient deficiency disorders in Nigeria goes back to 1990. In 2002, the Government adopted a new strategy: the fortification of staple food with Vitamin A, so that children will naturally consume Vitamin A in their food. The Ministry of Industry and Standards Organization of Nigeria published mandatory standards for vitamin A fortification in flour, sugar, and vegetable oil in 2002. By 2004, 70% of the sugar, 100% of wheat flour and 55% of vegetable oil sold on the market, were fortified with Vitamin A. Nigeria is also fortifying wheat flour with iron, thereby helping to protect children and mother's physical and mental health (UNICEF, 2006).

2.3.4.3 Federal Government School Feeding and Health programme

A combination of social marketing techniques and enforcement of quality standards by NAFDAC and SON ensure both the demand for fortified food and the compliance of producers and importers. To improve the nutritional status of school children, the Federal Government launched the Home-Grown School Feeding and Health programme in September 2005 under the coordination of the Federal Ministry of Education. The programme aims to provide a nutritionally-adequate meal during the school day. The pilot phase (Sept 2005-July 2006) involved 12 States and the Federal Capital Territory in the six geopolitical zones (UNICEF, 2006).

2.4. OVERVIEW OF THE NATIONAL AGRICULTRAL POLICY ENVIRONMENT

According to (IITA//IFDC/WARDA, 2000), assessment of the Agricultural Input Markets in Nigeria, shows that the Federal Government of Nigeria formulated its first comprehensive agricultural policy in 1985. The policy instruments, which remained valid for the next 15 years, composed of macro-economic policies, agricultural-sector policies, and policies for the support services. The macro-economic policies included pricing, trade, exchange rate, and agricultural land policies. The sector-specific policies included food production, input supply and subsidy policies while the support services policies included agricultural technology generation and extension, agricultural credit, insurance, produce marketing, and research policies. The primary objective of these policies was to reinforce agriculture's contribution to food security, employment, and provision of raw materials and foreign exchange in the Nigerian economy.

2.4.1. Fertilizer Policy

Prior to 1976, the state governments were responsible for the procurement and distribution of fertilizer until the Federal government established the Fertilizer Procurement and Distribution Division (FPDD) within the Federal Ministry of Agriculture as the central procurement and distribution unit. Two granulation plants, Federal Superphosphate Fertilizer Company Limited (FSFC) and National Fertilizer Company of Nigeria (NAFCON), were established in 1976 and 1988, respectively. These were set up as a strategy to develop domestic production capacity to meet a significant proportion of fertilizer demand. A later development in the fertilizer production scene was the installation of many bulk blending plants in various parts of the country through public and private sector initiatives. Between 1976 and 1995, several variants of the procurement and distribution arrangements between the FGN and the States were experimented. They included the involvement of the states and state organs in the transportation and distribution of imported and domestically produced fertilizers, the establishment of fertilizer depots as distribution points to the States, and the involvement of NAFCON in the distribution of locally produced fertilizers. As consumption of fertilizer increased, the inadequacies of public sector controlled procurement and distribution arrangements began to manifest in leakage and transit losses, late and non-deliveries of fertilizers to designated depots, artificial scarcity, and unsustainable subsidy burden. Realizing that an efficient and sustainable agricultural input supply system could be achieved through the participation of the private sector, the Government

started reforming the fertilizer sector in 1994 and adopted a fertilizer liberalization policy in 1996. That policy aimed at improving production, procurement and marketing efficiency and encouraging transparency and competition. The Federal government completely withdrew from procurement and distribution activities and discontinued the subsidization of fertilizer. To give relief to farmers, it reduced the import tariff on fertilizers from 10% in 1996 to 5% in 1997 and zero percent in 2000; it also abolished the value-added tax (VAT) and excise duty. However, because the reform process was not supported by developments in institutional capacity and human capital formation, fertilizer use decreased from over 500,000 nutrient tons in 1994 to approximately 100,000 nutrient tons in 1999 (IITA//IFDC/WARDA, 2000). The private sector and some states have now assumed greater responsibilities for production, procurement and marketing activities. Most of the states have established blending plants to increase the local supply of blended products while others such as Oyo State procure fertilizers from the main private sector producers and importers at market prices and distribute them to farmers at subsidized prices.

2.4.2. Seed Policy

According to the (Federal Ministry of Agriculture and Rural Development 2001), the national seed policy, formulated in 1992, provides guidelines for the development of the seed sector. The national agency responsible for coordinating development, monitoring policy, and implementing quality control in the national seed system is National Seed Service (NSS) of the Federal Ministry of Agriculture and Rural Development (FMARD). To give a legal backing to the seed policy, a National Agricultural Seed Decree No. 72 (1992) was enacted for regulating the various aspects of seed production, marketing, and quality control activities in Nigeria. The national seed policy is in line with regional/international standards and makes provisions for the withdrawal of public sector agencies in favor of the private sector in key areas of the seed industry. However, in practice, public- and private-sector roles are not clearly delineated. Today, the NSS roles are limited to seed technology training, quality control, and the coordination of breeder seed production. The production of breeder seed is the responsibility of agricultural research institutes, while that of foundation seed is handled by both the NSS and the private sector. Certified seed production is now in the domain of the private sector, using contract farmers.

2.4.3. Crop Protection Products CPP Policy

According to (IITA//IFDC/WARDA, 2000), Government strategy on agro-chemicals supply is to encourage the establishment of plants to manufacture or process agro-chemicals in Nigeria. For imported agro-chemicals the government's strategy is to ensure the timely supply in adequate quantities by providing the necessary assistance for their importation. The marketing of CPPs in Nigeria is much unorganized and lacks proper legislative control. The deregulation policy has attracted many unprofessional dealers in CPPs subsector with serious implications for quality, human health, and the environment. Agricultural Development Projects (ADPs) are directly involved in the pricing or marketing of CPPs.

2.4.5. ANALYSIS OF NIGERIAN AGRICULTURAL POLICY

According to the (Federal Ministry of Agriculture and Rural Development 2001), the assessment of the national agricultural policy and investment in Nigeria covers an assessment of the performance of Nigeria's agriculture sector, a review of past policies affecting agriculture, an assessment of investment processes in Nigerian agriculture, an analysis of constraints to private sector investment in Nigerian agriculture, and an evaluation of investment options. Nigeria's agricultural policy is the synthesis of the framework and action plans of Government designed to achieve overall agricultural growth and development. The policy aims at the attainment of self-sustaining growth in all the sub-sectors of agriculture and the structural transformation necessary for the overall socioeconomic development of the country as well as the improvement in the quality of life of Nigerians.

2.4.5.1. Main Features of the National Agricultural Policy

The main features of the national agricultural policy include the evolution of strategies that ensure self-sufficiency and the improvement of the level of technical and economic efficiency in food production, the introduction and adoption of improved seeds and seed stock, husbandry and appropriate machinery and equipment. Others are the efficient utilization of resources, encouragement of ecological specialization and recognition of the roles and potentials of small scale farmers as the major production of food in the country. The policy proposed a reduction in risks and uncertainties through the introduction of the agricultural insurance scheme to reduce natural hazards factor militating against agricultural production and security of credit outlay through indemnity of sustained losses. A nationwide, unified and all-inclusive extension delivery

system under the Agricultural Development Programme (ADP) was put in place in a joint Federal and State Government collaborative effort. Agro -allied industries were actively promoted. Other incentives such as rural infrastructure, rural banking, primary health care, and cottage industries were provided, to encourage agricultural and rural development and attract youth, including school leavers, to engage in farming. The agricultural policy is supported by sub-policies that facilitate the growth of the sector.

2.4.5.2. Policy Objectives

According to the (Federal Ministry of Agriculture and Rural Development 2001), the broad policy objectives are:

i. The achievement of self-sufficiency in basic food supply and the attainment of food security;
ii. Increased production of agricultural raw materials for industries;
iii. Increased production and processing of export crops, using improved production and processing technologies;
iv. Generating gainful employment;
v. Rational utilization of agricultural resources, improved protection of agricultural land resources from drought, desert encroachment, soil erosion and flood, and the general preservation of the environment for the sustainability of agricultural production;
vi. Promotion of the increased application of modern technology to agricultural production;
vii. Improvement in the quality of life of rural dwellers.
viii. Creation of more agricultural and rural employment Opportunities to increase the income of farmers and rural dwellers and to productively absorb an increasing labour force in the nation;
ix. Protection and improvement of agricultural land resources and preservation of the environment for sustainable agricultural production;
x. Establishment of appropriate institutions and creation of administrative organs to facilitate the integrated development and realization of the country's agricultural potentials.

2.4.5.2. Policy Strategies

i) Creating a more conducive macro-environment to stimulate greater private sector investment in agriculture;

ii) Rationalizing the roles of the tiers of government and the private sector in their promotional and supportive efforts to stimulate agricultural growth;

iii) Reorganizing the institutional framework for government intervention in the agricultural sector to facilitate the smooth and integrated development of the sector;

iv) Articulating and implementing integrated rural development programs to raise the quality of life of the rural people;

v) Increasing budgetary allocation and other fiscal incentives to agriculture and promoting the necessary developmental, supportive and service-oriented activities to enhance agricultural productivity, production and market opportunities; and

vi) Rectifying import tariff anomalies in respect of agricultural products and promoting the increased use of agricultural machinery and inputs through favourable tariff policy.

2.4.5.3. Institutional Framework and Policy Stakeholders

The successful implementation of the agricultural policy is contingent upon the existence of appropriate institutional structures that guarantee the effectiveness of agricultural enterprises and the welfare of farmers through the provision of access to credit and investment funds, subsidies, and budgetary allocation. The national agricultural policy is based on the administrative structure of the government. It outlines the stakeholders as the federal, state and local governments as well as the private sector. These institutional stakeholders are the main actors that drive the implementation of the national agricultural policy. Within the framework of the national policy, the federal government is responsible for research and development of appropriate technology for agriculture, including biotechnology; seed industry development, seed law enforcement and seed quality control; support for input supply and distribution, including seeds, seedlings, brood stock and fingerlings; continued support for agricultural extension services; promotion of micro- and rural credit institutions; promotion of agricultural commodity development and marketing.

The state governments are responsible for the promotion of the primary production of all agricultural commodities through the provision of a and efficient and effective extension service; the production of inputs for crops, livestock, fish and forestry; access to land for all those wishing to engage in farming; development and management of irrigation facilities and dams; training and manpower development; promotion of appropriate institutions for administering credit to smallholder farmers; maintenance of buffer stocks of agricultural commodities; investment in rural infrastructure, including rural roads and water supply in collaboration with federal and local governments; and, ownership, management and control of forest estates held in trust for local communities. The local governments are responsible for the provision of effective extension service; rural infrastructure to complement federal and state governments' efforts; management of irrigation areas of dams; mobilization of farmers for accelerated agricultural and rural development through cooperative organizations, local institutions and communities; provision of land for new entrants into farming in accordance with the provision of the Land Use Act; and, coordination of data collection at primary levels. According to the policy document, private sector is responsible for agricultural production; processing, storage and marketing are essentially private sector activities Federal Ministry of Agriculture and Rural Development 2001).

2.4.5.4. Review of Agricultural Development, Supportive and Service Delivery Programs

The agricultural development programmes include research and development, biotechnology development, animal vaccine production, veterinary drug manufacture, agro-chemicals manufacture, water management, adaptive technology promotion, and the creation and operation of an Agricultural Development Fund. The supportive activities include input incentive support and commodity marketing and export activities. The Service Delivery Activities include input supply and distribution, agricultural extension, micro-credit delivery, cooperatives and farmer/commodity associations, commodity processing and storage, agro-allied industry and rural enterprise development, and export promotion of agricultural and agro-industrial products.

2.4.5.5. Effectiveness of Policies, Regulations and Institutions on Nigerian's Agriculture

According to (Manyong et. al. 2005), constraints to agricultural policy effectiveness are identified to include those of policy instability, policy inconsistencies, and narrow base of policy

formulation, poor policy implementation, and weak institutional framework for policy coordination. The policies aimed at stimulating on-farm production, which includes those policies aimed at stimulating agricultural production for domestic market, agricultural input demand by farmers, domestic agricultural commodity trade, agricultural input supply to farmers and domestic investment in agriculture. According to the (Federal Ministry of Agriculture and Rural Development 2001), the national agricultural policy notes that the most effective agricultural policies and regulations are those targeted to upstream agricultural production activities and geared towards the domestic market. Policies geared towards enhanced post-production activities such as commodity storage, commodity processing, transportation and distribution services as well as commercialization of agriculture are generally ranked low in terms of effectiveness. Other policies and regulations associated with improved human welfare ranked very low, while policies on foreign investment ranked lowest in terms of effectiveness of policies, regulations. The facilitating factors for the effectiveness of policies and regulations on agriculture include high demand for agricultural produce, availability of improved technology, efficient dissemination of information by the ADPs, and value added leading to improved income. On the other hand, the common factors responsible for ineffectiveness of policies and regulations, especially on the downstream segment of agriculture, include instability of the political climate, insecurity of investment, non-standardized product quality, non-competitive nature of agricultural products from the country in the export market due to high cost of production and lack of adequate processing facilities.

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2.4.5.6. Agricultural Input Markets in Nigeria

According to IITA (2000), agricultural input markets are fragmented and underdeveloped in Nigeria. During the 1990s, Nigeria introduced input market reforms without adequate supporting developments in institutional capacity and human capital formation. As a result, fertilizer use decreased from over 500,000 nutrient tons in 1993/94 to approximately 100,000 nutrient tons in 1999/2000. The use of improved seed and pesticides also decreased. Because the input markets are not functioning properly, the transaction cost of acquiring inputs is high and even then inputs are not readily available on time and in good quality. Quality control regulations are not enforced properly. In the seed sector, funding arrangements for the National Seed Service (NSS) remain inadequate and uncertain for performing training and quality control functions. Dealer networks

in rural areas are not well developed, and farmers must travel long distances to acquire inputs. Access to finance for developing medium and small-scale enterprises is prohibitive. Market information is nearly absent. The Federal Fertilizer Department (FFD, formerly Fertilizer and Procurement Division (FPD) responsible for collecting and disseminating agronomic data (fertilizer response rates) and market information (input and crop output prices), is severely constrained to perform its functions. The lack of reliable data makes it difficult to calculate value-cost ratios and other relevant parameters for proper business planning. Although the production of certified seed is managed by the private sector, arrangements for the production of foundation seed are not clearly defined. The lack of clarity about intellectual property rights discourages breeder seed production in the private sector. Lack of proper monitoring and regulation has led to the widespread sales of outdated pesticides by untrained and unscrupulous traders endangering human health and the environment.

CHAPTER 3: CASE STUDY OF NASARAWA, KWARA AND BENUE STATES

3.1 Geographical Location and land Area

Nasarawa, Kwara and Benue States are located in the north central zone of Nigeria within the sub-humid region which lies south of the semi-arid and arid zones. The region occupies about 43 million hectares with rainfall ranging from 1000 to 2000 mm. 71% of the arable area is not cultivated due to low population density. The vegetation consists of open forest in the south and savannah grassland in the northernmost parts of the zone. Rainfall ranges from 1000 to 2000 mm. This region produces the largest quantities of sweet potato as well as yam, cassava, sorghum, maize, rice and onions (FOS, 2009)

3.2. NASARAWA STATE

Nasarawa state is located in the north central zone of Nigeria. It is located on latitude of 70 and 90N and longitude of 7^0 and 10^0E. Nasarawa state was carved out of Plateau state in 1st October, 1996. It has a land area of about 27118 km^2. Major crops produced in the state include Yam, Cassava, Maize Sweet Potatoes, Rice, Sorghum, Groundnut, Benniseed, Sugarcane, Cowpea and Millet. The State is divided into three administrative regions. Nasarawa Central comprises Nasarawa Eggon, Akwanga; and Wamba; Nasarawa East comprises, Keffi, Kokona, Nasarawa, Toto, and Karo. Nasarawa South comprises Lafia, Doma, Awe, Keona, and Obi. The formal enrolment and completion of primary education in Nasarawa state is 70% for male and 56% for female. Primary education completion rate is 80% among males and 60% among females. Similarly, the formal enrolment and completion of secondary education in Nasarawa state is 75% for males and 60% for females. The tertiary education completion rate is 55% for males and 63% for females (See table 4 Annex) (NPC, 2009).

3.2.1. Literacy

The literacy level among the males in all the Local Government Area ranges from24% - 37% while that of the female's ranges from 19% to 27%. Keffi Local Government Area is the most literate in both sexes with 37% for male and 27% for females. This implies that about 63% and 73% of both males and females in the area are illiterates See table 7 Annex (NPC, 2009).

Life expectancy in Nasarawa is 55 for males and 53 for females in rural areas, while in urban areas it is 56 for males and 54 for females. In rural areas, infant and child mortality is 18/1000

and 20/1000 respectively for male and female children respectively. In urban areas, infant and child mortality is 10/1000 and 20/1000 for male and female children Seee table 8 Annex (NPC, 2009).

3.2.2. Existing Interventions/Projects Addressing VAD, Nutrition, and Poverty

There are a number of intervention projects on nutrition in Nasarawa State. There is the Special Programme on Food Security aimed at increased agricultural and food production and poverty reduction and the Root and Tuber expansion Programme are being implemented in Nasarawa State. The focus of these programmes is on increase productivity in all root crops, processing and marketing. The New Rice for Africa Initiative with focus on increase productivity of rice is functional in Nasarawa. The Rural Institutional Building Programme with the mandate of linking farmers to Microfinance Institutions. The Badakoshi Agricultural Scheme Programme focuses on loans to farmers in form of cash and kind; similarly the Fadama component with focus Poverty reduction and the Child Education and Community Development Initiatives are also key interventions in the state. A part from Badakoshi Agric Scheme, Federal Government initiated the rest and Nasarawa State Government adapted. All the programmes were implemented through ADP in the State. ADP is strategically positioned for dissemination of innovations, advocacy and implementation. This has policy implication for increase investment in OFSP (NADP, 2009).

3.2.3. Average Major Crop Production Figure for 2010 -2011 in Nasarawa State

Sweet Potato ranks 7th among major crop production by land area planted and 4th by mean field (tons per hectare) in Nasarawa State See table 9 Annex.

3.2.4 Extension System

There were two types of agricultural extension systems in the State - public and the private System in Nasarawa State. The ADP in the State administers the public system. It uses training and visits. The Young Men Christian Association, (YMCA), and the Project Agape are two private extension systems operate in the state. These organizations use a person-to-person

approach in addition to training and visit. The ratio of extension agents to farmers in the State is 1:1388. 20% of the extension agents are females.

3.2.5. Gender Differences in Decision Making.in Percentages

Yam production enterprise is predominantly dominated by men, especially in decisions regarding farm size, inputs to be used, technology to be applied, control of income and access to credit. About 90% of the decisions in arable crop production in the state are determined by men. It implies that men are a critical group in the promotion of OFSP in the state.

3.2.6. Sweet Potato for Livelihoods and Food Security

Sweet potato is one of the crops processed by the rural women for income generation. It has tremendous potentials for providing food for human beings. It is consumed as part of the main meal or as a snack. They are fried into chips or roasted as whole roots. Though processed products are very attractive to customers, fresh use is the major form of utilization in Nigeria Sweet potato is high in calorific value and can be processed into flour, fortified with wheat flour, and fried into puff-puff, chin-chin, cake and buns, industrial alcohol, vinegar, yeast and acetone. It therefore has a potential of playing an important role as a food security crop and provides a variety of human food, animal feed and industrial products for empowering the low-income women producers in the state.

3.2.7. Sweet Potato Production for Food Security Production at Household

Nasarawa land area for Sweet Potato and OFSP farming is about 1429 hectares, and the annual production is 160680 metric tons. Productivity is 11.24 metric tons per hectare, while annual per capita consumption is 8.26 kg. Sweet Potato is planted twice in a year at household levels. It is planted between June/July and October/November each year. It could be planted solely or intercropped with cereals such as maize, millet, and sorghum. Two institutions have been particularly active in improving the production and utilization of sweet potato in Nigeria, namely, the National Root crop Research Institute (NRCRI) in Umudike and the International Institute of Tropical Agriculture (IITA) in Ibadan. The OFSP variety produces higher yield than other varieties of the white fleshed potatoes See table 11 Annex.

The distribution of sweet potato processors or producers in Nasarawa State is skewed toward age specific groups in the range of 30-39 years and people with non-formal education. The extension training activities of the Women-In-Agriculture unit of the Agricultural Development Programme conducts training on sweet potato processing, several uses of sweet potato nutritional value of sweet potato and identification of sweet potato products. The Women-In-Agriculture (WIA) unit of the Agriculture Development Project (ADP) is to improve the standard of living standard of rural women farmers in the areas of increased crop production, introduction of improved technology for food crops processing and marketing of farm produce.

3.2.8. Marketing and Processing

Local markets are in place for sweet potato and other products. Most villages hold the market every five days. Surplus sweet potato is sold in the farms directly to buyers or in the market places or along major roads. Sweet Potato is marketed in both local and urban markets as tubers and processed products. The urban markets contained more than 2000 persons while rural markets contained not more than 1000 persons ,Agyaragu, Assakio and obi Markets for urban while Agarago, Alamis, sabungida Markets are for rural. The major trade routes are: Lafia – Doma; Lafia – Nasarawa Eggon; and Agarago Routes. Some dominant markets include Bida market in Niger State, Bukuru, Kuara rata, Gargann, Bokkos and Terminal market in Plateau State and the Offa market in Kwara State. Traders transport sweet potato from this region to other states including Lagos, Oyo in the southwestern region, Enugu in the southeast region and Sokoto, Kano and Bauchi in the northern regions.

3.2.9. Opportunities for Increased Utilization

Most of the sweet potato produced in the region is consumed boiled, roasted or fried and may also be boiled with beans or rice. Sweet potato is also used to make *kunu* drinks. It is a very popular traditional staple in Nasarawa and Abuja. Sweet potato flour, which is prepared from sundried chips, is mixed with cassava and then pounded into *foofoo*. There are great opportunities for increased utilization especially as it is becoming widely accepted in the area especially chips, kunu sweetening, and snacks for school children. In urban areas of the state, the roots are boiled, sliced and sun dried for about one week. This product is called *usinsin dankali*,

which may be preserved and later boiled with rice or beans, or eaten as snacks. One major use of sweet potato in the state is for the production of sweet potato flour called *tsiro*. It is prepared by peeling the roots, slicing, sun drying and pounding using a mortar to obtain flour. The flour is then used as sweetener for *kunu* or *pap*. Sweet potato is used for making meat pies. The leaves and vines of sweet potato are also used in the fresh or sun-dried forms to feed sheep and goats.

3.2.10. Sweet Potato Agronomy and Breeding, Pests and Diseases

Sweet Potato is planted in plots with ridges. Weeding and fertilization is used in the husbandry. Some farmers use pre-emergence herbicides. It was either planted solely or intercropped with cereals such as maize and millet. The major pest was Sweet Potato weevil known as cylas puncticolis and branneus. Sweet Potato Virus known as Mild Mottle Virus (SPMMV). Two plantings are practised in this region. In the first planting between May and July, the crop is rainfed. The second planting is done under irrigated or *arable land* conditions and in the flood plains between August and December. Only a few farmers are able to have a second planting because of limited arable *land* areas. Planting under well-organised irrigation systems takes place in Talata Mafara in Sokoto in the northwest. Sweet potato is planted usually as a sole crop. However, it is sometimes inter-planted with crops such as maize, soybean, sorghum and millet. Planting materials (vines) are usually obtained from nurseries maintained by some local governments or from previously harvested farms. Varieties are distinguished by skin or flesh colour, leaf shape and sweetness of roots when boiled.

3.2.11. Sweet Potato Research and Multiplication System

Currently National Root Crop Research Institute (NRCRI), Umudike has on-going research in Nasarawa State on OFSP. There are on-farm trials in Nasarawa Eggon, Keffi, Lafia, and Obi. NRCRI has contact farmers who are working with them in OFSP. The institute is working on the following varieties of OFSP: 4401, 99-2 which is a light -deep colour, 440199-4 (light deep colour) and 4402393 (deep coloured OFSP). Sweet Potato is currently multiplied in the area through vines and seed. In Nasarawa State, it is the ADP and the National Root Crops Research Institute that were involved in the OFSP multiplication efforts. It is jointly promoted by the Ministry of Agriculture and Natural Resources, Ministry of Health, and State Health Management Board.

3.2.12. Potentials for OFSP

Observing the enthusiasm among farmers and other stakeholders in the state, there is great potential for OFSP especially among the rural poor who cannot afford to consume the highly bioavailable animal foods on a regular basis. Also being used as staple food will provide an advantage over most vegetables in the supply of significant amounts of Vitamin A and energy concurrently among the most vulnerable groups, especially mainly infant and mothers. OFSP has great potential for improving nutrition, which enhances its adoption, and increase investment in the area. It was observed that sweet potato is not gender discriminating and could be adopted by both sexes. The value addition OFSP brings is already making waves in the Ministry of Agriculture and Natural Resources, and even among the farmers in the state.

3.2.13. Policy Environment

The major thrust of the government on OFSP is the provision of right policy environment and the incentives for private investment, strengthening the capacity of Women and Youths in OFSP production, empowering women and reducing violence against women, and increased integration of women social and economic activities.

3.2.14. Stakeholders/Funding Agencies/Donors

The major stakeholders in Nasarawa State are the federal, state and local governments, international organisations, the producers and famers, the marketers, processors and non-governmental organisations. Among the international organisations are UNICEF, FAO, NGOs, and WHO. UNICEF and WHO are assisting the state government in mass literacy programme, HIV/AIDS, Poverty alleviation programme while FAO is involved in agriculture. These stakeholders are important in mobilization and advocacy for increased investment in OFSP.

3.2.15. Mobilization/Advocacy

The following groups have been identified as helpful in mobilization and advocacy for sweet potato and OFSP. They include; Ministry of Agriculture & Natural Resources; Farmers Associations; Influential Opinion Leaders; and Christian/Moslem Leaders; and Political Leaders

3.3. KWARA STATE

3.3.1 Demographic Information

Kwara State is located in the north central zone of Nigeria. The total population of the state was about 2.36 million in 2006 out of which farmers account for about 80% (KWADP, 1996). The state shares boundaries with Oyo, Osun, Ondo, Kogi, Ekiti, and Niger states. It shares an international boundary with the Republic of Benin. The state presently comprises of sixteen Local Government Areas. A humid tropical climate prevails over the state and it has two distinct seasons; the rainy and dry seasons. The rainy season lasts between April and October and the dry season between November and March. The rainfall ranges between 50.8mm during the driest months to 2413.3mm in the wettest period. The mean annual rainfall is about 1500mm. The minimum average temperature throughout the state ranges between 21.1oc and 25.0oc while, maximum averages temperature ranges from 30^{oc} to 35^{oc}.

3.3.2. Arable Land Area

The state is primarily agrarian with great expanse of arable land and rich fertile soils. The state has a total land area of about 66,900km2, which is 7.24% of the total land area of the country, which is put at 923,770km2 (FAO, 1995). 75.9% (50,782 km2) of the land is arable, 14.1% (9,425 km2) is forest and 10% (6,693 km2) is not available for use. Agricultural production is largely peasant and small-scale relying heavily on the use of manual labour equipped with crude implements, while fertilizers, mechanical implement, improved seeds and agrochemicals are also used to some extent.

3.3.3. Type of Cropping Systems

The typical cropping systems in the state are maize-based system, yam-based system, cassava-based system, sweet potato-based system, and rice system in areas located along river Niger, the major river in the state. Mixed cropping, shifting cultivation and crop rotation are the predominant methods of cropping in the state. The major crops cultivated in the state include yam, maize, rice, cassava, groundnut, cowpeas, sorghum, melon, okra, pepper and some leafy vegetables (KWADP, 1996). Most of the food crops cultivated are consumed by the household and small proportion is sold to earn some cash income.

3.3.4. Sweet Potato Farming and Production in Kwara State

Offa Local Government Area is one of the major sweet-potato growing areas of Nigeria. Sweet potato is grown mainly on smallholder farms and concentrated particularly in communities in Offa Local Government Area (Fawole, 2000). Offa LGA has an annual rainfall of 1000mm and a relative humidity that ranges between 65% and 80% in the dry and rainy seasons respectively. From a list of 890 sweet potato farmers, 90 who are producers, processors and marketers were purposively selected for data collection. Farmers' engagement in sweet potato production is between 1-10 years (72.2%) and above 20 years (4.4%). Pattern of land acquisition indicates that majority (67.8%) of the farmers inherited farmland, while a few (4.4%) purchased theirs (Fawole, 2007). This tenure system usually does not encourage increased production, as those interested in purely commercial production may not have access to land. The high proportion of farmers (63.3%) who grow sweet potato is encouraging. This suggests enormous capacity for adoption of improved technologies and increased production. Typically, most of the farmers (19.1%) adopt mixed cropping pattern. Only a few (8.9%) are into sole sweet potato production. Sweet potato is cultivated either in intercrops with cassava, maize, sorghum, as vegetables or as mono-crops in small farm lots and peri-urban holdings. Procurement of planting materials is mainly vines from harvested crops (54.4%). Friends (31%) and extension agents (14.4%) are the other sources. This procurement pattern may not be the best as it may encourage the spread of pests and diseases thus causing depression in yield and income levels. Among the sources of labour, family labour is predominant, (52.2%) followed by hired labour (43.3%) (Tayo, 2000).

3.3.5. Processing of Sweet Potato in Kwara State

The traditional processing technique is the preferred (83.3%) processing method. Potato flour (72.2%) is the main processed form of sweet potato of sweet potato and is supported by the confectionary factories and the preparation of local foods See table 12, 13, 14 and 15 Annex.

3.3.6. Marketing of sweet potato in Offa LGA, Kwara State

The main package materials for sweet potatoes are baskets (55.5%) and sacks (44.4%) are sweet potato. About 82% and 17.8% of sweet potato produced are sold in the markets and farm gates respectively. The annual profit margin is low, considering that the profit accruable to majority (89.00%) of the farmers is less than 10, 000 naira after every planting season. Very few (19.9%)

of the farmers make profit between 11, 000 – 20,000 Naira. The unit price of sweet potato ranges between 50 – 300 Naira per basket and 5, 000- 1000 Naira per sack See table 17 and 18 Annex.

3.3.7. Challenges

Some of the challenges faced by sweet potato farmers include inadequate government aid, high labour cost, limited access to credit and poor storage, poor market outlets, lack of access to improved technologies, and high incidence of pest and diseases (Fawole, 2007).

3.4. BENUE STATE

3.4.1. Demographic Information

Benue State is one of the states in North Central Nigeria. The state has a land area of 300,955 square kilometers. The State is located approximately between latitudes 61/2°N to 81/2°N and longitude 71/2°E to 10°E. It is bounded by the following states: Nassarawa to the north, Taraba to the east, Cross-River to the south east, Enugu to the south west and Kogi to the west (Figure 1). The South eastern part of the state also shares border with the Republic of Cameroon. Most of the state is in the southern guinea savannah. The 2006 population census puts the population of Benue State at 4,219,244. Between 70 to 80% of the population live in rural areas. Agriculture accounts for over 75% of economic activities. The state has a total of twenty three Local Government Areas (LGA) out of which seven are in the Northern zone. The zone lies between latitudes 6°50` North and longitude 7°50` to 10° East. The zone covers an estimated land area of about 10,318.2 km2 and has an estimated population of about 959,512 persons (Federal Office of Statistics, 1996). The zone comprises seven LGAs namely: Gboko, Buruku, Tarka, Guma, Makurdi, Gwr East and Gwer West. The zone has tropical climate with two distinct seasons (rainy and dry seasons). The rainy season commence from April to October, while the dry season is from November to March. Two rainfall peaks are observed with an annual average rainfall of about 1500 mm (BNARDA, 1997). The lower peak occurs in May – June, while the higher peak occurs in August – September. The higher peak is followed by 3 – 4 months of dry season (December – March), which is noted by harmattan winds. According to BNARDA (1997), the daily mean temperature during the rainy season is 28°C while in dry season the average temperature is 35°C.

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3.4.2. Production and Cropping System

In Benue State, approximately 212,840 ha was subjected to sweet potato production with a mean yield of 9.80 t/ ha in 2008 (BNARDA, 2008). Recently, several improved varieties of sweet potato have been introduced into the cropping systems of smallholder farmers in Benue State, particularly from International Institute of Tropical Agriculture (IITA), Ibadan and the National Root Crops Research Institute (NRCRI), Umudike. Farmers in Benue State who intercrop or mix sweet potato with pigeon pea do so in highly variable planting patterns with resultant low productivity.

3.4.3. Marketing Sweet Potatoes

Local markets are in place for sweet potato and other products. Most villages hold the market every five days. Surplus sweet potato is sold in the farms directly to buyers or in the market places or along major roads. Some dominant markets include Makurdi, Gboko, Buruku, Tarka, Guma, Otukpo, Nsukka and Enugu, Aba and Port Harcourt in South Eastern Nigeria.

CHAPTER 4

RECOMMENDADTION AND CONCLUSION

4.1. Recommendations

1. Formal education for the youths and Mass literacy campaigns for adults are required as necessary conditions for demand generation and supply improvements in Sweet Potato and OFSP production and intervention.

2. OFSP campaign should target the rural poor especially the women and young people. The high rate of illiteracy prevailing among the women in rural areas poses a major constraint to advocacy.

3. The situation analysis suggests that there is substantial scope for increasing sweet potato productivity, and the introduction of OFSP programme must be coupled with advocacy increase understanding of the nutritional and economic advantages of OFSP.

4. High illiteracy in all the states suggests that simple methods should be advocated for rural areas, especially among women.

5. There is need for improved access to farming and potato processing technology for improved production, processing and supply of Sweet Potato and OFSP in rural and urban areas.

6. Improved access to finance targeted at sweet potato framers and OFSP is needed to increase arable land use and cultivation of OFSP for increased yield and marketing.

7. Government policy on tubers should include specific aspects that mobilize all partners to support sweet potato and OFSP farming in Nigeria.

4.2. Conclusion

The sub-humid region of Nigeria, which lie south of the semi-arid and arid zones, occupies about 43 million hectares, with rainfall ranging from 1000 to 2000 mm. This region produces the largest quantities of sweet potato. Cultivation of sweet potato in this region is largely undertaken by farm families whose farms range from one to three hectares in size. The farms are cleared and ridges 20-40 meters long are made mainly with the use of family labour.

In Nigeria, sweet potato (*Ipomoea batatas)* production, marketing and utilization have expanded beyond the traditional areas of the central and riverine zones to the humid, sub-humid and semi-arid regions in the last two-and-a-half decades. The national production figures reported by FAO showed a rapid increase in production and area harvested in the 1990s, surpassing two million tons harvested from more than 300,000 hectares annually by the end of the decade. However, estimates of sweet potato in Nigeria vary widely among different sources, and as such these statistics should be interpreted with caution.

FAO estimates of average sweet potato yield of 5 to 8 t/ha are similar with estimates from farm surveys conducted by state agricultural development projects which reported yields of popular local varieties from 7 t/ha in the southeastern zone, 3.5 t/ha in the northern zone, and 7 to 8 t/ha north central area. Farm yields remain far below that obtained from research plots with improved varieties, however. Estimated yields in the research stations vary from 40 to 70 t/ha for improved varieties while multi locational trials for improved varieties registered 23.5 t/ha yield across seasons and locations. Production cost of N32, 000/ha yields an average of 5.16 tons, or N6.2/kg. With market prices varying from N5/kg to N15/kg throughout the year, farmers may sell at a loss when prices are at their lowest. Market prices of sweet potato compare with maize and yam and are much higher than cassava. Transportation accounts for the largest share of distribution cost of sweet potato. These suggest there is substantial scope for increasing sweet potato productivity in Nigeria. Sweet potato is traditionally consumed in boiled form with varying accompaniments including cowpea, rice, and millet and Benniseed. In the semi-arid zone, sweet potato flour is popularly used for sweetening local foods while in the urban markets of the humid south, sweet potato fried chips are produced and marketed. Return on investments in sweet potato production is currently marginal, but promises huge returns as access to technology and finance improves.

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ANNEXES

Table 1. Formal Education (Disaggregated By Sex, Enrolment And Completion Rates

Primary school participation, Net enrolment ratio (%), 2007-2010*, male	66
Primary school participation, Net enrolment ratio (%), 2007-2010*, female	60
Primary school participation, Net attendance ratio (%), 2005-2010*, male	65
Primary school participation, Net attendance ratio (%), 2005-2010*, female	60
Primary school participation, Survival rate to last primary grade (%) , 2006-2009*, admin. data	–
Primary school participation, Survival rate to last primary grade (%) , 2005-2010*, survey data	98
Secondary school participation, Net enrolment ratio (%), 2007-2010*, male	29
Secondary school participation, Net enrolment ratio (%), 2007-2010*, female	22
Secondary school participation, Net attendance ratio (%), 2005-2010*, male	45
Secondary school participation, Net attendance ratio (%), 2005-2010*, female	43

Source (FOS, 2009)

Table 2. Literacy (Disaggregated By Sex; Rural/Urban)

Youth (15-24 years) literacy rate (%), 2005-2010*, male	78
Youth (15-24 years) literacy rate (%), 2005-2010*, female	65
Adult literacy rate: females as a % of males, 2005-2010*	69
Enrolment ratios: females as a % of males, Primary GER, 2007-2010*	88
Enrolment ratios: females as a % of males, Secondary GER, 2007-2010*	77
Survival rate to last grade of primary: females as a % of males, 2006-2009*	100
Total adult literacy rate (%), 2005-2010*	61
Primary school net enrolment ratio (%), 2007-2009*	63

Source (FOS, 2009)

Table 3. Basic Health Indicators

Under-5 mortality rank	12
Under-5 mortality rate, 1990	213
Under-5 mortality rate, 2010	143
Infant mortality rate (under 1), 1990	126
Infant mortality rate (under 1), 2010	88
Neonatal mortality rate, 2010	40
Total population (thousands), 2010	158423
Annual no. of births (thousands), 2010	6332
Annual no. of under-5 deaths (thousands), 2010	861
GNI per capita (US$), 2010	1180
Life expectancy at birth (years), 2010	51
% share of household income 2000-2010, lowest 40%	15
% share of household income 2000-2010, highest 20%	49
Life expectancy: females as a % of males, 2010	103
Adult literacy rate: females as a % of males, 2005-2010	69
Enrolment ratios: females as a % of males, Primary GER, 2007-2010	88
Enrolment ratios: females as a % of males, Secondary GER, 2007-2010	77
Survival rate to last grade of primary: females as a % of males, 2006 -2009	100
Contraceptive prevalence (%), 2006-2010	15
Antenatal care coverage (%), At least once, 2006-2010	58
Antenatal care coverage (%), At least four times, 2006-2010	45
Delivery care coverage (%), Skilled attendant at birth, 2006-2010	39
Delivery care coverage (%), Institutional delivery, 2006-2010	35
Delivery care coverage (%), C-section, 2006-2010	2
Maternal mortality ratio† , 2006-2010, reported	550
Maternal mortality ratio† , 2008, adjusted	840
Maternal mortality ratio† , 2008, Lifetime risk of maternal death: 1 in:	23

Source: NPC 2009)

Table 5. School Enrolment for Male and Female

School Category	**Enrolment**		**Completion**	
	Male	Female	Male	Female
Primary	High (70%)	Moderate (56%)	High (80%)	Moderate (60%)
Secondary	High (75%)	Moderate (60%)	Moderate (60%)	Moderate (64%)
Tertiary	Moderate (55%)	Moderate (63%)	Moderate (60%)	Low (31%)

FOS (2009)

Table 6. Nutrition Information

% of infants with low birth weight, (2006-2010)	12
Early initiation of breastfeeding (%), (2006-2010)	38
% of children (2006-2010) who are: exclusively breastfed, (<6 months)	13
% of children (2006-2010) who are: introduced to solid, semi-solid or soft foods, (6-8 months)	75
% of children (2006-2010) who are: breastfed at age 2, (20-23 months)	32
% of under-fives (2006-2010) suffering from: underweight (WHO), moderate & severe	23
% of under-fives (2006-2010) suffering from: underweight (WHO), severe	9
% of under-fives (2006-2010) suffering from: wasting (WHO), moderate & severe	14
% of under-fives (2006-2010) suffering from: stunting (WHO), moderate & severe	41
Vitamin A supplementation coverage rate (6-59 months) 2010, full coverage (%)	91
% of households consuming iodized salt, (2006-2010)	97

Source: NPC 2009)

Table 7 Literacy Rate in Nasarawa State

State	**Literacy**	**Males Population %**	**Females Population %**
	1,446,165	441,859 30%	340,875 24%
Akwanga LGA	89,448	9840 33%	24204 28%
Awe LGA	85,514	20,588 24%	14,442 16%
Doma LGA	105,936	30,721 29%	21,775 21%
Karu LGA	168,946	59,205 35%	48,780 29%
Keana LGA	63,032	16,454 26%	13,343 21%
Keffi LGA	73,533	27,114 37%	19,602 27%
Kakana LGA	83,344	21,149 25%	15,838 19%
Lafia LGA	255,908	75,503 30%	54,220 21%
Nasarawa LGA	144,926	41,886 32%	31,585 22%
Eggon	114,222	36,328 32%	29,645 26%
Obi LGA	114,586	35,282 31%	28,172 25%
Toto LGA	90,720	28,406 31%	23,024 25%
Wamba LGA	56,050	19,383 35%	16,245 29%

Source: (NPC, 2009)

Table 8. Average Health and Nutrition Status of Nasarawa State

S/N	**INDICATORS**	**VALUE**	
		Rural	**Urban**
1.	Life Expectancy	Male 55 Female 53	Male 56 Female 54
2.	Infant and Child Mortality	18-20/1000	10-20/1000
4.	Breast Feeding Rate	45% - 70%	80 – 90%
5.	Mean age at Weaning	$1^{1/2}$ - 2 years	1-2 years
6.	VAD Prevalence	8 – 10/1000	5-8/1000
7.	Maternal Mortality	10 – 20/1000	5-10/1000

Source: (NPC, 2009)

Table 9. Average Major Crop Production Figure for 2010 -2011

Rank	Crops	Area Planted '000ha	Mean Field (tons/ha)
1	Yam	118.46	21.69
2	Melon	110.18	0.81
3	Sorghum	105.50	1.61
4	Rice	105.22	2.74
5	Cassava	98.91	14.97
6	Maize	81.20	2.15
7	**Sweet Potato**	**14.29**	**11.24**
8	Cocoyam	8.90	5.86
9	Soybeans	5.80	1.10
10	Tomatoes	2.50	12.63

Source: Nasarawa State ADP

Table 10. OFSP

Variety Status	Yield	Maturity	DM	BC
440199 -2	10-12 tons/ha	2-3 Months	NA	NA
440199-4	8-10 tons/ha	2-3 Months	NA	NA
440293	10-12 tons/ha	2-3 Months	NA	NA

Source: Nasarawa State ADP

Table 11. Varieties of Sweet Potato Grown

Varieties	Yield	Characteristic
(1) 0087/87	6 tons/ha	Orange Fleshed
(2) Ex-Igbariam	4 tons/ha	White Fleshed
(3) Maiganje	2 tons/ha	White Fleshed

Table 12. Profile of Sweet Potato Farmers in Kwara State

Variable	Categories	Frequency
Age	21-49	97.8
	50 years and above	2.2
Gender	Male	90.0
	Female	10.0
Marital Status	Married	78.7
	Single	16.7
	Separated	1.1
	Widowed	3.3
Household type	Male headed	90.0
	Female headed	10.0
Educational Status	Formal	52.2
	Non-Formal	47.8
Farm Size	1-3Acres	52.2
	4-6 Acres	34.4
	7-10 Acres	13.30

Source: (Fawole, 2007)

Table 13. Summary of Descriptive Statistics of Sweet Potato Farmers in Kwara State

Characteristics	**Frequency**	**Percentage**
Gender		
Male	91	92.8
female	7	7.2
Age (Years)		
1.20	0	0
21-30	6	61
31-40	31	31.6
41-50	35	35.7
51-60	12	12.3
Above 60	14	14.3
Educational Level		
Literacy	28	28.6
Adult Education	22	22.4
Primary Education	26	26.5
Secondary Education	18	18.4
Tertiary Education	4	4.1
Farm Size (ha)		
0.01-1.00	59	60.2
1.10-2.00	32	32.7
2.10-3.00	5	5.1
Above 3.00	2	2.0
Household Size		
1-5	1	1.0
6-10	62	63.3
11-15	35	35.7

Source: (Fawole, 2000)

Table 14. Sweet Potato Production in Offa LGA, Kwara State

Variable	**Categories**	**Percentage**
Farming experience	1-10 years	72.2
	11-20 years	21.1
	above 20years	4.4
Land tenure system	Inherited land	67.8
	Lease	27.8
Sweet potato variety grown	Improved	63.3
	Local	36.7
	Mixed	91.1
	Improved	63.3
Adopted cropping	Local	36.7
	Mixed	91.1
	Pattern Sole	8.9
	Local	36.7
Planting materials	Post-harvest	54.4
	Source Friends	31.1
	Extension service	14.4
Labour source	Family labour	52.2
	Hired labour	43.3
	Others (Age group,	4.4

Source: (Fawole, 2007)

Table 15. Processing of Sweet Potato Offa LGA, Kwara State

Variable	Categories	Frequency
Processing techniques	Traditional	83.3
	Improved	6.7
Product form	Flour	72.2
	Boiled	17.8
Marital Status	Chip	10.0

Source: (Fawole, 2007)

Table 16. Sweet Potato Production in Offa LGA, Kwara State

Variable	Categories	Percentage
Farming experience	1-10 years	72.2
	11-20 years	21.1
	above 20years	4.4
Land tenure system	Inherited land	67.8
	Lease	27.8
Sweet potato variety grown	Improved	63.3
	Local	36.7
	Mixed	91.1
	Improved	63.3
Adopted cropping	Local	36.7
	Mixed	91.1
	Pattern Sole	8.9
	Local	36.7
Planting materials	Post-harvest	54.4
	Source Friends	31.1
	Extension service	14.4
Labour source	Family labour	52.2
	Hired labour	43.3
	Others (Age group,	4.4

Source: (Fawole, 2007)

Table 17. Processing of Sweet Potato Offa LGA, Kwara State

Variable	Categories	Frequency
Processing techniques	Traditional	83.3
	Improved	6.7
Product form	Flour	72.2
	Boiled	17.8
Marital Status	Chip	10.0

Source: (Fawole, 2007)

Table 18. Marketing of sweet potato in Offa LGA

Variable	Categories	Frequency
Packaging	Baskets	55.5
	Sacks	44.8
Market	Market	82.2
	Farm gate	17.8
Annual profit margin	N1000 – N10,000	88.8
	N11,000	15.5
	N20,000	11.1

	Above N20,000	4.4
Union membership	No	63.3
	Yes	Yes 36.7
Unit price	Basket 25-35kg	N150-300
	Sack 70-90 kg	N500-1,000

Source: Fawole (2007)