ORANGE-FLESHED SWEETPOTATO IN NIGERIA

A Situation Analysis and Needs Assessment Report

Nigeria, April 2012

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ACKNOWLEDGEMENTS

This report benefited immensely from the support of HKI Nigeria. The promotion expert and the office were very supportive in responding to the required information and also taking part during field activities to collect data. The report also benefited from other literature sources from partners and counterparts, which aided the primary and secondary data collection processes and the preparation of this detailed review. This report acknowledges the efforts of the field officers who visited the various states to collect the information used to put together this report.

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	Non-Governmental 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 Sweetpotato
PCU	Project Coordinating Unit of the FMARD
PTF	Petroleum Trust Fund
RAC	Reaching Agent of Change
SPMMV	Sweetpotato Mild Mottle Virus
SON	Standards 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 information from both primary and secondary sources on sweetpotato (*Ipomoea batatas)* and orange-fleshed sweetpotato (OFSP) in three north central geopolitical zones of Nigeria, namely Benue, Kwara and Nasarawa States . The broad objective of this situation analysis was to provide clear understanding of the agricultural policy and programme issues involved in up scaling sweetpotato and OFSP in Nigeria. Data were collected from existing survey literature and from the database of the following ministries in each state: Agriculture and Natural Resources, Ministries of Economic Planning and Budget, National Population Commission, Ministries of Health, States Health Management Boards, Ministries of Education, Crop Farmers and Sweetpotato Producers. The process also involved conducting focus group discussions with communities in the various agricultural zones to foster better understanding and interpretation of data. Most data from the reviewed literature were already analysed. 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 sweetpotato 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 study also reviewed health indicators, especially those related to maternal mortality, infant and child mortality and life expectancy. 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 established to facilitate improvements in nutrition in Nigeria.

The study reviewed the national policy environment within the framework of the national agricultural policy. The policies include the national fertilizer policy, seed policy, and the crop protection products policy. The study observed that the poor implementation of agricultural and nutritional policies poses a major obstacle to sweetpotato and OFSP production in Nigeria. Most of the policies reviewed targeted root and tuber crops in general and none specifically targeted sweetpotato or OFSP in particular. The study found that the demand for sweetpotato, availability of improved technology and efficient dissemination of information by Agricultural Development Programmes (ADPs) are critical to increase demand generation and supply improvements in sweetpotato and OFSP production and marketing.

The study further observed that literacy, health and nutritional status as well as location of intervening projects favour urban areas more than rural areas. More so, females are worse off in most of the parameters than their male counterparts 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, creating opportunities for the states in the production of sweetpotato and OFSP. The situation analysis also showed that most of the data available were not specific to sweetpotatoes or OFSP but broadly targeted all root crops (cassava, yams, and sweetpotatoes). The study observed that increased investment in sweetpotato and OFSP will be enhanced by strengthening formal and informal education for the youth and mass literacy campaigns for adults. The OFSP campaign should therefore target the rural poor, especially women. A key finding of the study was that the high rate of illiteracy prevailing among women in rural areas poses a major constraint to advocacy. Findings from this situation analysis suggest that the introduction of the OFSP programme must be coupled with mass literacy interventions to facilitate understanding of the need to invest in the crop. The high illiteracy in all the states suggests that simples' methods should be used in rural areas, especially among women.

The study further reviewed the situation in Nasarawa, Kwara and Benue states. The findings show marked similarities in the three states in terms of overall policy and institutional structures for expanding sweetpotato and OFSP. Of the three states, there was a paucity of published literature and secondary data available for Benue compared to Nasarawa and Kwara; thus, the limited information regarding some aspects of the study in Benue state. The challenges include lack of access to finance and modern technology to drive agriculture in the study areas. The recommendations focused on pro-poor interventions targeted at women. The study recommends improved access to finance, equipment and improved inputs for expanded farming of sweetpotatoes and OFSP in the three states studied and in other parts of Nigeria.

CHAPTER 1

INTRODUCTION

The Reaching Agent of Change (RAC) is a three year project funded by the Bill and Melinda Gates Foundation and implemented by the International Potato Centre (CIP) and Helen Keller International (HKI). The overall vision of the project is to see substantially increased investments and commitment to the dissemination and use of orange fleshed sweetpotatoes (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 sweetpotato (OFSP) through advocacy and capacity building.
2. To put in place policy and institutional arrangements to upscale OFSP.

1.1. Objectives and Scope of the Study

Broadly, this situation analysis was undertaken to provide an understanding of the policy, gender and agricultural issues involved in up scaling sweetpotato and OFSP in Nigeria.

Specifically, the objectives of the situation analysis were:

1. Identify the environment, policies, gender issues, and stakeholders, farming system, organizations, and vitamin A deficiency (VAD) and funding opportunities for sweetpotato and orange fleshed sweetpotato.
2. Determine federal and state level policies affecting sweetpotato cultivation and consumption in the areas.
3. Identify gaps in knowledge/information regarding sweetpotato and orange fleshed sweetpotato.
4. Identify potential stakeholders to implement a strategy for OFSP advocacy in Nigeria

1.2. Methodology/Strategy

The situation analysis covered three states in northern Nigeria, namely Benue, Kwara and Nasarawa which were purposely chosen by Helen Keller International (HKI). The three states have large number of sweetpotato producers and the potential to increase productivity of sweetpotato and OFSP.

1.3. Literature Search and Desk Review

The study relied extensively on available evidence on sweetpotatoes and OFSP in Nigeria in general and specifically in the three selected states. A range of literature exists on the subject based on extensive surveys conducted by researchers and agricultural institutions in the states and Federal Government departments and agencies with mandates in agriculture. International organisations such as the United Nations Children's Fund (UNICEF), the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the World Bank have published databases that provide useful and extensive information on the subject. These materials were consulted and referenced in this report.

1.4. Data Collection and Data Analysis

Both primary and secondary data were collected from Benue, Kwara and Nasarawa states. The secondary data were collected from literature and data sets from the state ministries of Agriculture and Natural Resources, Economic Planning and Budget, Health, Education; the State Health Management Boards; National Population Commission; Central Bank of Nigeria and the Federal Office of Statistics (FOS).

The primary data were collected from the states using field assistants. Each state was divided into three agricultural zones with the aid of the Agricultural Development Programme (ADP). A multi-stage sampling procedure was used. In each agricultural zone, three local government areas were purposely selected based on their importance in sweetpotato production. In the second stage, 20 households were randomly selected from each Local Government Area, which gave a total of 60 households in each agricultural zone. In each state therefore, 180 farmers were sampled to elicit information on the situation and policy issues regarding sweetpotato and other farming activities in the state. A total of 540 farmers were interviewed, comprising 180 each from Benue, Kwara and Nasarawa states.

Most data from the reviewed literature were already analysed and described. 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.

1.5. Output/Deliverables

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

CHAPTER 2
BACKGROUND AND CONTEXT

2.1 DEMOGRAPHIC INFORMATION

2.1.1. Location and Land Area

Nigeria is situated on the Gulf of Guinea in West Africa and is the most populous country in Africa. Her neighbours 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; hardwood forests are found inland. Nigeria's land area covers 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 of permanent crops, 10.9 hectares of forest/wood, and 40 million hectares of pasture. The agricultural gross domestic product (GDP) 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 who have less than 2 hectares of land under cropping. An estimated 75% (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 used (NPC, 2009).

2.1.2. Population Dynamics

The population of the country, based on the 2010 population projections, is 152,217,341 with an urban population constituting 50% of total population. Nigeria has a population growth rate of 1.9 per cent, a birth rate of 36 per 1000, an infant mortality rate of 92.9 per 1000 live births and life expectancy is estimated at 47.2 years.

On average, population density is 151 per km^2 and the type of age distribution shows an expansive population pyramid signifying a higher proportion of young people: 42.3% are aged 0-14 years (male 27,466,766/female 27,045,092); 54.6% are aged 15-64 years (male 35,770,593/female 34,559,414); and 3.1% are aged 65years and over (male 1,874,157/female 2,055,966). The median age in Nigeria is an average of 18.63 years for the total population; 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 males to females, meaning that there are slightly more males than females. The sex ratio at birth is 1.03 males to female and the ratio for those under 15 years is 1.02 males to females. Ratios for other categories are as follows: for 15-64 years it is 1.04 males to females; and 65 years and over it is 0.91 male to female. Nigeria has a net migration rate of 0.27 migrants per 1000 population (NPC, 2009).

2.1.3. Peoples and Governance

Nigeria comprises more than 250 ethnic groups. The most populous and politically influential are: Hausa and Fulani 29%, Yoruba 21%, Igbo (Ibo) 18%, Ijaw 10%, Kanuri 4%, Ibibio 3.5%, and Tiv 2.5%. English is the official administrative language. 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.

2.1.4. Economy and Natural Resources

The economy of Nigeria has an estimated GDP (purchasing power parity) of $357.2 billion. The real GDP growth rate is 6.2%, with GDP per capita and purchasing power parity at $2,400. Inflation is 11.5%, the unemployment rate is 4.9% and the rate of urbanization is 3.5%. The disaggregated GDP by sector is: agriculture 36.3%, industry: 30.5%, and services: 33.3%. The labour force is an estimated 56 million people. The occupational distribution of the labour force is agriculture 70%, industry 10%, and services 20%. Sixty per cent 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 are, cocoa, peanuts, palm oil, corn, rice, sorghum, millet, cassava, potato, yams, rubber; cattle, sheep, goats, pigs; timber; and fish. The country's 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, and 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 was 29% for male and 22% for female (see Table 1, Annex 1).

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

Nigeria's literacy rate for the total population is 68% (75.7% male, and 60.6% female). The literacy rate among young people aged 15-24 is 78% for males and 65% for females. Adult literacy rate is 61%. (NPC 2009)

2.2. HEALTH INFORMATION

2.2.1 Basic Health Indicators

Under 5 mortality rate in 2010 was 143/1000 live births. The infant mortality rate (under 1 year old) during the same period was 88/1000 live births. Neonatal mortality rate in 2010 was 40/1000 live births and life expectancy at birth (years) in the same year was 51. Maternal mortality ratio in 2006-2010 was 550/10,000. Antenatal care coverage (%), at least once, 2006-2010 was 58%. Life expectancy for females as a percentage of males in 2010 was 103 (see Table 3, Annex 1) (NPC, 2009).

2.3. NUTRITION

Food insecurity and malnutrition in rural areas of Nigeria result from non-implementation or inadequate implementation of the National Food and Nutrition Policy and National Plan of Action for Food and Nutrition. The National Demographic Health Survey indicates that a total of 75% of children (2006-2010) are introduced to solid, semi-solid or soft foods at 6-8 months. Only 38% of mothers initiate breastfeeding early (2006-2010) and the percentage of children (2006-2010) who are exclusively breastfed, (<6 months) is 13%. The percentage of under-fives (2006-2010) who suffer from moderate to severe stunting is 41%. While the prevalence of vitamin A deficiency is at 29.5%, (Maziya-Dixon et al., 2005), the rate of Vitamin A supplementation coverage remains low at 26% (NDHS 2008).

2.3.1. Food Consumption Patterns

Most of the households residing in the rural areas consumed fruit, leafy vegetables, meat products, and dairy products between once and twice a week. In rural areas, 2.2% of households did not consume meat products. Most households consume non-staple foods once or twice a week. In all the sectors, only 2% of households consumed meat products and only 1% consumed fruits. 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

In the three states, staple foods are the major sources of energy (calories). According to FOS (2009), the most available of these were rice (14.8%), cassava (12.9%), maize (10.6%), and yam (10.1%). Cowpea, groundnut, and soybean were reported to be the major sources of plant proteins. Of these, 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 savannah 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 the least affordable. In the dry savannah, 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 savannah rice was more available (12%) and affordable (9%), followed by cassava and maize (11%) and yam (10.5%). Soybean, plantain, and sorghum were the least available and least affordable. 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 was the most available, followed by groundnut. Soybean was the least available. Cassava was the most affordable, followed by rice, yam, and maize. For legumes, cowpea was the most affordable followed by groundnut. In the humid forest zone, the most available non-staple foods were 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 was observed for affordability. The least available and affordable were 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 5 years 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 non-agricultural 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 anaemia 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.

2.3.4. Food based nutrition interventions

2.3.4.1. 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, and non-governmental organizations (NGOs), other international organizations, federal, state and local governments. Most of these agencies operate through federal, states and local governments ministries. Take, for instance, the National Programme for Food Security. This is jointly assisted by World Bank, FAO, the United States Agency for International Development (USAID) and is coordinated by the UN National Agricultural Marketing Information System. The programme 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 these projects are administered through the state ministries of health. None of the agencies is directly involved in funding sweetpotato 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 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 coordination 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), and 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 dates 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 the vitamin in their food. The Ministry of Industry and SON 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 ensures 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 (September 2005 to July 2006) involved 12 states in the 6 geopolitical zones and the Federal Capital Territory (UNICEF, 2006).

2.4. OVERVIEW OF THE NATIONAL AGRICULTURAL POLICY ENVIRONMENT

According to the International Institute of Tropical Agriculture (IITA)/the Internatinal Fertilizer Development Center(IFDC)/the Africa Rice Center (WARDA) (2000) assessment of the agricultural input markets in Nigeria, the Federal Government formulated its first comprehensive agricultural policy in 1985. The policy instruments, which remained valid for the next 15 years, comprised macro-economic policies, agriculture-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 this policy was to reinforce the contribution of agriculture to food security, employment, and provision of raw materials and foreign exchange in the Nigerian economy.

2.4.1. Fertilizer Policy

Before 1976, the state governments were responsible for buying and distributing 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 plants 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 Federal Government and the states were tested. 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 leakages 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 subsidy on fertilizer. To give relief to farmers, the government reduced the import tariff on fertilizers from 10% in 1996 to 5% in 1997 and 0% in 2000; it also abolished 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 Seed Service (NSS) of the Federal Ministry of Agriculture and Rural Development (FMARD) is the national agency responsible for coordinating development, monitoring policy, and implementing quality control in the national seed system. To give legal backing to the seed policy, a National Agricultural Seed Decree No. 72 (1992) was enacted to regulate 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 provides for the withdrawal of public sector agencies in favour of the private sector in key areas of the seed industry. However, in practise, 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 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 of adequate quantities by providing the necessary assistance for their importation. The marketing of crop protection products (CPPs) in Nigeria is disorganized and lacks proper legislative control. The deregulation policy has attracted many unprofessional dealers in this sub-sector 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 to attain self-sustaining growth in all the sub-sectors of agriculture and the structural transformation necessary for the overall socio-economic 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 potential of small-scale farmers as the major producers 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 hazard factors militating against agricultural production and security of credit outlay through indemnity of sustained losses. A nationwide, unified and all-inclusive extension delivery system under 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:

- The achievement of self-sufficiency in basic food supply and the attainment of food security;
- Increased production of agricultural raw materials for industries;
- Increased production and processing of export crops, using improved production and processing technologies;
- Generating gainful employment;
- 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;
- Promotion of the increased application of modern technology to agricultural production;
- Improvement in the quality of life of rural dwellers;
- 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;
- Protection and improvement of agricultural land resources and preservation of the environment for sustainable agricultural production;
- 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 programmes to raise the quality of life of the rural people;

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

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 promoting the primary production of all agricultural commodities by providing an efficient and effective extension service; producing inputs for crops, livestock, fish and forestry; facilitating access to land for all those wishing to engage in farming; developing and managing irrigation facilities and dams; training and manpower development; promoting appropriate institutions for administering credit to smallholder farmers; maintaining buffer stocks of agricultural commodities; investing 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 providing effective extension services; rural infrastructure to complement federal and state government efforts; managing irrigation areas of dams; mobilizing farmers for accelerated agricultural and rural development through cooperative organizations, local institutions and communities; providing land for new entrants into farming in accordance with the provision of the Land Use Act; and coordinating data collection at primary levels. According to the policy document, 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 Programmes

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, as well as export promotion of agricultural and agro-industrial products.

2.4.5.5. Effectiveness of Policies, Regulations and Institutions on Nigeria'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. Others are poor policy implementation and a weak institutional framework for policy coordination. The policies are aimed at stimulating on-farm production, for the domestic market, demand for agricultural input by farmers, domestic agricultural commodity trade, supply of agricultural input 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 at 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 services leading to improved income. 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 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 and market information is nearly absent. The Federal Fertilizer Department (FFD), formerly the 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 annual rainfall ranging from 1000 to 2000 mm. Due to the low population density, 71% of the arable area is not cultivated. The vegetation consists of open forest in the south and savannah grassland in the northern-most parts of the zone. This region produces the largest quantities of sweetpotato, 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 7° and 9°N and longitude of 7° and 10°E. Nasarawa State was carved out of Plateau State on 1 October 1996. It has a land area of about 27,118 km^2. The major crops produced in the state include yam, cassava, maize, sweetpotatoes, rice, sorghum, groundnut, benniseed, sugarcane, cowpea mille, and tree cops such as oranges, mango, cashew etc. The state is divided into three administrative regions (senatorial districts): Nasarawa Central comprising Nasarawa Eggon, Akwanga and Wamba; Nasarawa West comprising Keffi, Keana, Nasarawa, Toto, and Karu; and Nasarawa South comprising Lafia, Doma, Awe, Keana, and Obi.

3.2.1. Literacy

The formal enrolment and completion of primary education in Nasarawa State is 70% for males and 56% for females. 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 (NPC, 2009).

The literacy level among males in all the LGAs ranges from 24% to 37%, while that of the females ranges from 19% to 27%. Keffi LGA is the most literate in both sexes with 37% for male and 27% for females.

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

Life expectancy in Nasarawa is 55 years for males and 53 years for females in rural areas, and in urban areas it is 56 years for males and 54 years for females. In rural areas, infant and child mortality is 18/1000 and 20/1000 live births respectively for male and female children. In urban areas, infant and child

mortality is 10/1000 and 20/1000 live births for male and female children respectively (Table 8- See Annex), (NPC, 2009).

Several intervention projects on nutrition are ongoing in Nasarawa State. The Special Programme on Food Security is aimed at increasing agricultural and food production and poverty reduction. The aim of the Root and Tuber Expansion Programme is to increase productivity, processing and marketing of all root crops. The New Rice for Africa Initiative is another programme being implemented in the State with a focus on increased productivity of rice.
The Rural Institution Building Programme, which started in 2004, and is ongoing with the mandate of linking farmers to microfinance institutions to access credit for its various agricultural activities.

The Badakoshi Agricultural Scheme Programme is also ongoing in Nasarawa State. It focuses on loans to farmers in form of cash and kind for its various agricultural activities. The Fadama 111 project focuses on poverty reduction and the child education and community development initiatives in the state.

Apart from the Badakoshi Agricultural Scheme, all the other programmes in the state are initiated by the Federal Government and adopted by the Nasarawa State Government through counterpart funding. All the programmes in the state were implemented through ADP except Badakoshi and the child education and community development initiatives. The Nasarawa State ADP is strategically positioned to disseminate innovations, advocacy and implementation. This has policy implications for increased investment in OFSP (NADP, 2009).

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

Sweetpotato ranks 7th amongst major crop production by land area planted and 4th by mean field (tons per hectare) in Nasarawa State, the 1st crop in terms of land area planted being yam (118.46 ha), melon (110.18 ha), sorghum (105.50 ha), rice (105.22 ha), cassava (98.91 ha) and maize (81.20 ha) in that order. In terms of mean field tons per hectare production, yam ranks first with 21.69 ton/ha, followed by cassava (14.95 ton/ha) and tomatoes (12.63 ton/ha) (see Table 9,).

3.2.4 Extension System

Two types of agricultural extension systems operate in the state, public and private. ADP in the state administers the public system. It uses training and visit system of extension services delivery. This system consists of fortnightly visits to farmers/farmer groups by frontline extension agents to deliver improved

packages of technologies and working with them. It also involves monthly technology reviews and fortnightly training/reviews for effective feedback mechanisms. For the process to be effective there is a programme of continuous training and re-training of staff and farmers. The extension agents also have to be mobile as do the supervisors. Finally, there should be a strong linkage between research-extension, farmers and inputs dealers.

The Young Men's Christian Association (YMCA) and the Project Agape are two private extension systems operating 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; of all the extension agents, 20% are females.

3.2.5. Gender Differences in Decision Making.

Crop production activities in the state are 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, Land ownership remains a major constraint to women in terms of crop production. However, crop harvesting, processing and marketing are dominated by women. This implies that men are a critical group in the promotion of OFSP in the state.

3.2.6. Sweetpotato for Livelihoods and Food Security

Sweetpotato is one of the crops processed by rural women for income generation. The crop has tremendous potential to provide food for the population. It is consumed as part of the main meal or as a snack. Sweetpotato can be fried into chips, pellets and crisps or roasted as whole roots. Though processed products are very attractive to customers, fresh use is the major form of utilization in Nigeria. Sweetpotato 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 can be play an important role as a food security crop and provide a variety of human food, animal feed and industrial products to empower low income women producers in the state.

3.2.7. Sweetpotato Production for Food Security Production at Household

Nasarawa has about 1,429 hectares available for farming sweetpotatoes; the annual production is 160,680 metric tons. Productivity is 11.24 metric tons per hectare, while annual per capita consumption is 8.26 kg. Sweetpotato is planted twice in a year at household level, between May/June and between

August/September. The crop can 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 sweetpotato in Nigeria, namely the National Root crop Research Institute (NRCRI) in Umudike and IITA in Ibadan. The OFSP variety produces higher yields than other varieties of white fleshed potatoes (see Table 11, Annex).

The distribution of sweetpotato producers and processors in Nasarawa State is tilted toward age specific groups in the range of 30-39 years. The extension training activities of the Women-In-Agriculture unit of ADP conducts training in sweetpotato processing, several uses of sweetpotato, nutritional value of sweetpotato and identification of sweetpotato products. The Women-In-Agriculture aims to improve the living standard of rural women farmers through increased crop production, introduction of improved technology for food crops processing, utilization and marketing of farm produce.

3.2.8. Marketing and Processing

Local markets are in place for sweetpotato and other products. Major market days occur every five days. Surplus sweetpotato is sold in the farms directly to buyers or in the market places. Sweetpotato is marketed in both local and urban markets as tubers and processed products. The major trade routes in the State are: Lafia–Doma; Lafia–Nasarawa Eggon; and Ayaragu routes.

3.2.9. Opportunities for Increased Utilization

Most of the sweetpotato produced in the region is consumed boiled, roasted or fried; it may also be boiled with beans or rice. Sweetpotato is also used to make *kunu* drinks. It is a very popular traditional staple in Nasarawa and Abuja. Sweetpotato flour, which is prepared from sundried chips, is mixed with cassava and then pounded into *fufu*. Great opportunities exist for increased utilization, especially as the crop is becoming widely accepted in the area particularly as chips, *kunu* sweetening, and snacks for school children. Sweetpotato is also used to make meat pies. The leaves and vines of sweetpotato are used in the fresh or sun-dried forms to feed sheep and goats.

3.2.10. Sweetpotato Agronomy and Breeding, Pests and Diseases

Sweetpotato is planted on ridges. It is either planted solely or intercropped with cereals such as maize and millet. The major pest of the crop is the sweetpotato weevil. . The crop is rainfed in the first and second planting. A third planting is possible where irrigation facilities are available.

3.2.11. Sweetpotato Research and Vine Multiplication System

Currently NRCRI, Umudike, has ongoing research in Nasarawa State on OFSP. The institute has on-farm trials in Nasarawa Eggon, Keffi, Lafia, and Obi. NRCRI has contact farmers who are working with them in OFSP on-farm trials 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). Sweetpotato is currently multiplied in the area through vines and seed. In Nasarawa State, ADP and NRCRI were involved in the OFSP multiplication efforts.

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 bio-available 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 infants and mothers. OFSP has great potential for improving nutrition and its potential to generate income, particularly for women farmers enhances its adoption.

3.2.13. Policy Environment

The major drive of the government on OFSP promotion is to provide the right policy environment and the incentives for private investment, strengthening the capacity of women and youths in OFSP production and utilisation, and empowering women through increased integration of women in 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, producers and farmers, the marketers, processors and NGOs. Among the international organizations are UNICEF, FAO, NGOs, and WHO. UNICEF and WHO are assisting the state government in a mass literacy programme, HIV/AIDS, poverty alleviation programme while FAO is involved in agriculture. These stakeholders are important in mobilizing and advocating for increased investment in OFSP.

3.2.15. Mobilization/Advocacy

The following groups have been identified as helpful in mobilization and advocacy for sweetpotato and OFSP. They include; Ministry of Agriculture and Natural Resources; farmers' associations; influential

opinion leaders; religious leaders; political leaders, media houses, and the ministries of Health, Women Affairs, Education, and Information.

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 accounted 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 currently comprises 16 LGAs. A humid tropical climate prevails over the state and it has two distinct seasons: rainy and dry. The rainy season lasts between April and October and the dry season between November and March. The rainfall ranges between 50.8 mm during the driest months to 2413.3 mm in the wettest period. The mean annual rainfall is about 1500 mm. The minimum average temperature throughout the state ranges between 21.1°C and 25.0°C while, maximum averages temperature ranges from 30°C to 35°C.

3.3.2. Arable Land Area

The state is primarily agrarian with great expanses of arable land and rich fertile soils. The state has a total land area of about 66,900 km^2, which is 7.24% of the total land area of the country (FAO, 1995). An estimated 75.9% (50,782 km^2) of the land is arable, 14.1% (9,425 km^2) is forest and 10% (6,693 km^2) is unavailable for use. Agricultural production is largely peasant and small-scale relying heavily on the use of manual labour equipped with crude implements; fertilizers, mechanical implements, 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, yam-based, cassava-based, sweetpotato-based, and rice (in areas located along River Niger). 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 a small proportion is sold to earn some cash income.

In Kwara State, sweetpotatoes are mostly planted twice and used as a food security crop when crops such as yam and maize are scarce. This crop is planted by both male and female farmers. During its season, (July/August and November/December) the crop is in abundant supply, thus the cost is low.

The total production as at 2010 is estimated to be 95,000 tons (KWADP Annual Report, 2010). It is also estimated that this value is less than 10% of the estimated production capacity of the state.

3.3.4. Literacy:

According to the National Literacy Survey of 2010 conducted by the National Bureau of Statistics, Kwara State has the lowest adult literacy rate (42.6%) in the country**.**

3.3.5. Health/Existing Interventions/Projects addressing VAD, Nutrition & Poverty

Kwara State has several intervention projects on poverty reduction. There is a Programme for Food Security aimed at increased agricultural and food production and also to help alleviate poverty in the state. However, the non-payment of counterpart funds for this programme has given it a less functional focus. Another is the Root and Tuber Expansion Programme (R-TEP), designed to improve on the existing root and the tuber crops (including sweetpotato) for quality and productivity. The rice initiative that boosted rice production in the state from its former position of 7th to 2nd within the states in north central is another example of R-TEP. This programme is ongoing currently. All these programmes are being implemented under Kwara State ADP. For the health and nutrition components, staff of the Women in Agriculture Department of ADP teaches women farmers essential nutrition practices integrating them into local diets. ADP is strategically located for prompt dissemination of technologies that will alleviate poverty, improving the health and wellbeing of the rural farmers in the State for better productivity.

3.3.6. Average major crop production data

The table below shows the average major crop production data in Kwara State.

KWARA STATE AGRICULTURAL DEVELOPMENT PROJECT, ILORIN
AGRICULTURAL PRODUCTION SURVEY RESULTS (APS) 2002 – 2011
CROP (TONS), AREA CULTIVATED (Ha) AND YIELD (TONS/Ha).('000)

S/NO	CROPS	2002	2003	2004	2005	2006	2007	2008	2009	201
1.	**MAIZE**									
	TON	70.91	100.40	86.74	113.40	150.38	149.89	164.53	189.78	196
	HA	57.66	57.66	64.05	82.9	110.42	109.20	114.66	126.22	133
	YIELD (Tons/Ha)	1.30	1.47	1.25	1.35	1.58	1.37	1.43	1.50	1.4
2.	**SORGHUIM**									
	TON	73.27	42.65	47.47	60.30	75.33	102.97	112.70	131.05	137
	HA	40.32	33.47	30.67	47.6	57.12	67.30	80.50	84.93	87.
	YIELD(Tons/Ha)	1.70	1.27	1.42	1.27	1.32	1.53	1.4	1.54	1.5
3.	**RICE**									
	TON	22.72	18.71	47.47	71.90	118.31	234.21	345.69	440.43	480
	HA	8.19	8.20	20.85	31.3	50.01	97.18	135.04	142.81	147
	YIELD(Tons/Ha)	2.77	2.28	2.30	2.36	2.37	2.41	2.56	3.08	3.2

4.	**MILLET** TON HA YIELD(Tons/Ha)	12.20 11.87 1.03	13.00 12.00 1.04	8.74 5.02 2.30	11.30 6.5 .75	14.66 8.06 1.82	25.39 13.43 1.89	28.44 15.05 1.89	19.54 16.64 1.17	20. 17. 1.2
5.	**COWPEA** TON HA YIELD(Tons/Ha)	4.95 7.04 0.69	5.56 7.74 0.72	0.67 1.47 0.46	0.721 1.5 0.47	0.70 1.39 0.50	0.968 4.34 0.22	1.08 5.12 0.21	3.12 5.42 0.57	3.2 5.5 0.5
6.	**MELON** TON HA YIELD(Tons/Ha)	1.87 13.51 0.14	2.50 14.73 0.17	3.88 15.75 0.13	4.00 16.1 0.25	3.721 14.13 0.26	6.70 15.22 0.44	6.85 17.12 0.4	8.472 18.74 0.45	8.0 18. 0.4
7.	**SOYA BEAN** TON HA YIELD(Tons/Ha)	- - -	- - -	- - -	- - -	- - -	28.70 18.28 1.57	28.13 19.40 1.45	30.43 20.67 1.47	32.5 21.2 1.53
8.	**YAM** TON HA YIELD(Tons/Ha)	624.11 51.26 12.33	563.48 48.85 10.86	327.74 28.03 11.70	385.9 33.2 11.63	412.89 34.83 11.85	810.70 69.53 11.66	948.58 76.13 12.46	1,006.07 80.72 12.46	1,05 84.1 12.5
9.	**CASSAVA** TON HA YIELD(Tons/Ha)	542.08 41.36 12.94	510.00 40.61 12.56	480.72 38.59 12.21	740.30 59.4 12.46	1184.48 77.50 15.28	1111.27 65.41 16.99	1195.24 69.73 17.14	1,219.27 76.36 15.97	1,310 79.52 16.48
10.	**GROUND-NUT** TON HA YIELD/HA	13.66 7.89 1.73	15.43 8.00 1.93	26.3 10.1 2.26	29.4 11.1 2.65	31.80 11.80 2.70	33.45 20.65 1.62	32.82 21.04 1.56	34.00 22.94 1.48	34.97 23.31 1.50
11.	**S/ POTATO** TON HA YIELD(Tons/Ha)	71.97 8.85 8.01	40.50 5.53 7.32	63.6 9.3 7.37	59.8 7.0 8.50	60.38 7.12 8.49	67.59 7.82 8.64	67.70 8.05 8.41	71.26 8.19 8.7	81.27 8.78 9.26
12	**OKRO** TON HA YIELD(Tons/Ha)	51.65 14.80 3.49	55.75 16.27 3.42	99.08 19.75 5.01	82.5 21.0 3.9	85.45 21.54 3.9	63.93 15.86 4.0	94.23 24.86 3.75	111.61 27.03 4.14	124.2 27.77 4.53
13	**TOMATO** TON HA YIELD(Tons/Ha)	2.40 0.63 3.8	0.83 0.26 3.21	0.84 0.73 1.16	0.896 0.295 3.04	2.4 1.4 1.7	2.12 0.639 3.3	1.99 0.476 4.2	11.07 2.14 5.59	12.25 2.17 6.12
14	**PEPPER** TON HA YIELD(Tons/Ha)	0.331 0.120 2.75	0.303 0.104 2.91	4.27 2.25 1.89	1.17 0.81 1.4	2.1 0.9 2.3	11.76 5.821 2.0	21.44 9.11 2.35	19.81 4.60 4.31	43.19 8.87 3.39
15	**GARDEN EGG** TON HA YIELD(Tons/Ha)	- - -	0.630 0.173 3.64	0.342 0.100 3.42	0.672 0.14 4.8	- - -	0.804 0.268 3.0	1.2 0.354 3.4	- - -	4.67 1.43 3.25
16	**AMARANTHUS** TON HA YIELD(Tons/Ha)	4.51 0.845 5.33	2.75 0.65 4.25	3.73 0.75 4.95	38.3 8.5 4.5	39.4 8.9 4.4	41.13 10.28 4.0	6.50 1.48 4.4	6.98 1.52 4.6	80.73 16.75 4.72

Source: KWADP, PME, APS 2002 – 2011.

3.3.7. Gender differences in decision making

Gender inequality manifests in terms of resources available to male and female-headed households in Kwara State. Male-headed households possess more resources than female-headed household. Crop output, off-farm income, total household income and available labour hours were significantly higher in male than female-headed households. Men made about 70% of the decisions on crop production in the state. Female-headed households are more vulnerable to food insecurity and the frequency and severity of using coping strategies were higher in female than in male-headed households (Babatunde et al., 2008).

3.3.8. Sweetpotato for livelihoods and Food Security

Sweetpotatoes could be planted conveniently twice in a year as a rainfed crop. It is planted in the southern part (major producing areas) between April/May and September/October each year. The crop is consumed as a staple food in some areas and in other parts of the state it is consumed as a snack or as a food supplements both fresh and in locally processed forms. It could be processed into products such as bread, using its flour fortified with wheat flour, juice, jam, and even sweetpotatoes chunks like yam chunks to make a local delicacy called *amala* (a local flour like semovita, taken with soup).

3.3.9. Sweetpotato Farming for food production at household levels in Kwara State

Offa LGA is one of the major sweetpotato growing areas of Nigeria. However, sweetpotato is grown in all the 16 LGAs of Kwara State. It is grown in considerably large quantities in Irepodun, Ifelodun, Edu, Patigi, Kaiama and Offa LGAs of Kwara State (KWADP, 2009). The yearly average rainfall in Kwara State ranges from 900 mm and 1100 mm, occurring within a period of 40 to 75 rainy days. This favours the growth of sweetpotato. From a list of 890 sweetpotato farmers, 90 who are producers, processors and marketers were purposively selected for data collection. Farmers had been engaged in sweetpotato production for between 1 and 10 years (72.2%) and above 20 years (4.4%). The pattern of land acquisition indicates that most (67.8%) 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 sweetpotato is encouraging. This suggests enormous capacity for adoption of improved technologies and increased production. 19.1% of farmers practise mixed cropping; only a few (8.9%) are into sole sweetpotato production. Sweetpotato 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%). Other sources of planting materials are friends (31%) and extension agents (14.4%). This procurement pattern may not be the best as it may

encourage the spread of pests and diseases, reducing yield and income levels. Among the sources of labour, family labour is predominant (52.2%), followed by hired labour (43.3%) (Tayo, 2000). In Kwara State, sweetpotato is produced by individual and cooperative farmers.

3.3.10. Processing and Utilization of Sweetpotato in Kwara State

Both traditional and improved processing techniques are used to process sweetpotatoes in the state. The crop is processed into various food products such as sweetpotato chunks used in making a local delicacy called *amala*, it is added to yam and produced to make pounded yam and its starch is removed and used to make *fufu*. Sweetpotato is also boiled, roasted and eaten alone or mixed with other foods and vegetables to produce porridge, and many other delicacies. Its modern processing technique has been successful, especially at Offa with the advent of the Federal Polytechnic which has used this product to produce flour for confectionaries such as chin chin, bread, cookies, meat pies etc. Furthermore, the KWADP Women in Agriculture (WIA) department has integrated training in modern processing techniques into its programmes. In some localities such as Agbamu and Ekiti, the importance of sweetpotato cannot be overemphasized because it is even used as one of the requirements in marriage dowry payments.

3.3.11. Marketing and Distribution of Sweetpotato in Kwara State

Sweetpotatoes are produced mainly in rural areas and are sold mostly in the local markets on market days. The crop is mainly packaged in baskets (55.5%) and sacks (44.4%). About 82% and 17.8% of sweetpotato produced are sold in the markets and farm gates respectively. The annual profit margin is low, considering that the profit accruable to most (89.0%) farmers is less than 10,000 naira after every planting season. Very few (19.9%) of the farmers make profits of between 11,000 and 20,000 Naira. The unit price of sweetpotato ranges between 500 and 3,000 naira per basket and 5,000 and 10,000 naira per sack (see Table 17 and 18, Annex).

3.3.12. Opportunity for Increased Utilization

Most of the sweetpotatoes produced in the state are consumed boiled, roasted or fried and may also be boiled with beans or rice. At times the sweetpotatoes are boiled and oil is added to them to make pottage. Sweetpotatoes are also used to make *kunu* in some parts of the state, although this is not too popular. The crop is a very popular traditional staple food in some LGAs such as Offa, Oyun and Irepodun. It could be prepared as yam chunks, which is later ground into flour to prepare a local delicacy called *amala*. There are great opportunities for increased utilization and production, as sweetpotato is becoming widely

acceptable in the state. In urban areas, the roots are boiled, sliced, sun dried for about a week and stored for use during times of scarcity. People rarely eat the leaves, which are used predominantly to feed animals.

3.3.13 Sweetpotato Agronomy and Breeding, Pests and Diseases

Currently, sweetpotato is generally planted on ridges which are either made by hand or using a tractor. In the sweetpotato belt, handmade ridges called mounds are preferred to using a tractor. Tractors are used only when the crop is planted for commercial purposes. Farmers do not usually use fertilizers, especially in the sweetpotato belt possibly because the land in the zone is fertile. Fertilizers normally cause the sweetpotato tubers to crack. Elite farmers use hand weeding and pre-emergence herbicides as husbandry methods.

The major pests of the crop are: weevils known as *Cylas puncticolis and Cylas branneus* millipede, etc. while the diseases includes sweetpotato virus (mild Mottle virus) and potato blast is occasionally observed. Varieties are usually distinguished by the colour of the flesh and skin, the shape and size of the leaves and the taste of the roots.

3.3.14. Sweetpotato Research and Vine Multiplication System

Currently, NRCRI, Umudike, is just concluding its on-farm trials in collaboration with Kwara ADP using OFSP as one of the major varieties at six sites in Kwara State: Ogbondoko (two sites), Ijagbo, Agbamu (two sites) and Onila. Kwara ADP will finally be used in the rapid multiplication of its vines after the success of on-farm adaption in Kwara State. The project hopes KWADP in collaboration with the Ministry of Health, the media such as NTA, Kwara TV and Radio Kwara will jointly promote OFSP in Kwara State.

3.3.15. Potentials for OFSP

The enthusiasm observed among our farmers and all other stakeholders towards the adoption of the OFSP gives a comfortable assurance for the potential of OFSP. The farmers find it difficult to purchase the vitamin A supplement commodities from towns and cities; but they freely eat OFSP. This will ensure food security and provide the vitamin A requirement for these rural farmers and the vulnerable groups. As a result, OFSP has great potential to improve nutrition which will in turn enhance its adoption and also increase investment among rural farmers. In Kwara State, sweetpotato is not gender discriminating; this becomes an added advantage to the popularization of the crop. The value addition introduced

alongside OFSP will definitely promote its sale and consumption and will increase the income level of the farmers.

3.3.16. Policy environment

The correct environmental policy can help promote OFSP among private investors. Increased investment from private sector can also help create opportunities for employment among youth and women.

3.3.17 Stakeholders/Funding/Donors

The major stakeholders in Kwara State are the Federal, State and Local governments, international aid agencies and NGOs. Others are the producers (farmers), marketers and processors of sweetpotatoes. The use of sweetpotatoes among the HIV/AIDS patients will definitely draw the attention of other international organizations such as UNICEF, FAO and WHO to the importance of OFSP. Sweetpotatoes could also be used as poverty alleviation crop.

3.3.18 Mobilization/Advocacy:

The following groups have been identified as helpful in mobilizing and advocating for OFSP. These include KWADP and the ministries of Agriculture and Natural Resources, Health and Education, and farmers' associations, influential opinion leaders and village heads.

3.3.19. Challenges

Some of the challenges faced by sweetpotato farmers in Kwara State include inadequate government aid, high labour cost, limited access to credit and poor storage. Others are poor market outlets and high incidence of pests 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 km^2. 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. The south-eastern part of the state also shares a 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 people. Between 70% and 80% of the population live in rural areas. Agriculture accounts for over 75% of economic activities. The state has 23 LGAs of which 7 are in the Northern Zone. The zone lies between latitudes 6°50`N and longitude 7°50` to 10°E. It covers an estimated land area of about 10,318.2 km^2 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, Gwer East and Gwer West. The zone has a tropical climate with two distinct seasons (rainy and dry seasons). The rainy season lasts 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 characterized 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.

3.4.2. Literacy level

The literacy rate in the state is 57.2 %NPC, 2006). The male literacy level stands at 32.6% while the female literacy level stands at 24.6% in the state (NPC, 2006).

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

There are a number of interventions in Benue state to address poverty, food and nutrition insecurity and to assist farmers. The development objective of Third National Fadama Development Project for Nigeria (Fadama III) is to sustainably increase the incomes of fadama users (World Bank website 2013). "Fadama" is a Hausa name for irrigable land which is usually low-lying plains underlain by shallow aquifers found along major river systems. (Lagos FADAMA 2010). Benue state also benefits from the National Special Programme on Food Security, similar to what obtains in Kwara state.

National Poverty Eradication Programme (NAPEP) was established in 2001 by the Nigerian government with the aim of poverty reduction, in particular, reduction of absolute poverty. It was designed to replace the Poverty Alleviation Program. NAPEP goals include training youths in vocational trades, to support internship, to support micro-credit, create employment in the automobile industry, and help VVF patients (NAPEP 2012).

Lower Benue River Basin Development Authority (LBRBDA) is a subsidiary of the Federal Ministry of Water Resources which oversees Benue, Plateau, Nasarawa and part of Kogi states. Among many

responsibilities, it supplies access to irrigation for farmlands and tractors to farmers, as well as potable water to rural communities.

Benue State Ministry of Agriculture is the government agencies that provide policy. However the agency's capacity to assist farmers has been greatly diminished due to staff shortages and lack of funding (Ayado 2012).

The University of Agriculture, Makurdi was set up to pioneer new institutional approaches to the generation and dissemination of new agricultural technologies. It plays a key role in supporting agricultural development of Nigeria and through its research, advances the course of agriculture in general (University Of Agriculture, Makurdi. 2011).

The Makurdi Cooperative Extension Centres Initiative is one of the outreach arms of the University of Agriculture Makurdi (UAM) and it was set up to perform the following functions (among others) of interpreting, publishing and disseminating to extension staff, farmers and other agricultural workers research results in agriculture, Animal Husbandry, Home economics, Agricultural Economics and Rural Sociology. In addition the organisation identify field problems needing research and communicate these back to researchers for immediate solution, serving as an information Centre on agriculture for industries, banks and other organizations. It also serves as a training centre of extension staff in the catchment area of the University on a systematic basis by offering regular in-service training sessions and specialized short courses and organizing workshops, providing advisory and consultancy services in agricultural systems, assisting States in the Catchment area in organizing and conducting agricultural shows during which the activities and contributions of UAM would also be publicized. (University of Agriculture, Makurdi Strategic Plan 2008 – 2018).

Another intervention is the Improved Farmer Participation in Research and Extension in Benue State (IFPREB) whose main goal is to improve the capacity of poor farmers, especially women, to manage and sustain their agricultural resources and increase productivity in Benue State (CEC/IFPREB, 2000)

Farm and Infrastructure Foundation is an organization for Participative Policy Advocacy, Research and Brokerage in Agriculture and Rural Development working in Makurdi with a focus on farmers and other rural poor that is empowered with a voice and a vote in the policy process wherein promoted. (FIF 2013)

The Roots and Tuber Expansion Programme another government intervention was designed to address the problem of food production and rural poverty. The long-term objective of the programme is to commercialize root and tuber production to improve the living conditions, income, food security and

nutritional health of the poorest smallholder households in the programme area. It particularly targets small-scale farmers with less than 2 hectares of land per household. The programme uses the existing extension service system to introduce improved varieties of roots and tubers and better cultivation techniques.

3.4.4. Average Major Crop Production in Benue State

Arable land in the state is 231,000 km^2; approximately 212,840 hectares is used for sweetpotato production with a mean yield of 9.80 t/ha in 2008 (BNARDA, 2008). Recently, several improved varieties of sweetpotato have been introduced into the cropping systems of smallholder farmers in Benue State, particularly from IITA, Ibadan, and NRCRI, Umudike. Farmers in state who practise intercropping or mix sweetpotato with pigeon pea do so in highly variable planting patterns, resulting in low productivity.

There are three agro-ecological zones in Benue State, namely North-East, North-West and South agro ecological zones namely Zones A, B, and C.. The first two zones have 7 LGAs each and third has 9 LGAs (BNARDA, 2012).

Under Zone A, Vandeikya and Konshisha are dominant areas where sweetpotato is cultivated. Under Zone B, Gboko and Buruku are dominant in sweetpotato production while under Zone C, Ado, Obi and Oju are dominant. The land area cultivated with sweetpotato in Vandeikya and Konshisha is 2000 ha and 9551 ha respectively with yield of 5 metric tonnes per hectare. The major crops grown in the three agricultural zones include yam, cassava, cocoyam, sweetpotato, maize, sorghum, rice, millet, groundnuts cowpea, soya bean, bambara nut, beniseed etc. These crops are intercropped.

Table 5.1: Major agricultural production data: Roots and Tubers

Root/Tuber	Mean yield (metric tons)	Mt/Ha	Hectares
Cassava	7365	13.16	559.65
Yam	292861	12.83	228.26
Cocoyam	21.71	10.39	2.08

Sweetpotato	228.64	9.92	23.04

Source: Benue State ADP (2011)

Table 5.2: Major agricultural production data: Cereals

Cereal	Mean yield (metric tons)	Metric tons per hectare (Mt/Ha)
Maize	162.28	1.41
Sorghum	198.01	1.73
Rice	308.47	2.11
Millet	65.78	1.54

Source: Benue State ADP (2011)

Table 5.3: Major agricultural production data: Legumes

Legume	Mean yield (metric tons)	Metric tons per hectare (Mt/Ha)
Groundnut	393.21	1.93
Cowpea	27.43	0.86
Soya bean	189.14	2.10
Bambara	13.42	1.10
Beniseed	51.89	1.13

Source: Benue State ADP (2011)

Table 5.4: Major agricultural production data: Others

Other crop	Mean yield (metric tons)	Metric tons per hectare (Mt/Ha)
Melon	42.99	1.13
Onion	60.53	6.15
Okro	130.16	3.95
Tomato	59.33	4.34
Pepper	27.72	2.57
Sugar cane	249.00	11.34
Ginger	4.41	4.44
Garden egg	82.88	5.89
Amaranthus	245.2	8.72

Source: Benue State ADP (2011)

Table 5.4 shows that sweetpotato production is lowest among the root and tuber crops. However, when compared with the cassava and yam, it produces higher yields. This implies high potential for OFSP in the state due to the yield per hectare.

3.4.5. EXTENSION SYSTEM

The Benue State ADP uses the training and visit system. Approaches used in reaching the farmers in the state include the electronic media (radio, television) and print media as well as demonstration farms and campaigns, management training plots and on farm adaptive research.

ADP is the only public institution used to reach out to farmers in Benue State. However, the project has a working understanding with the Benue State Ministry of Agriculture.

3.4.6. EXTENSION RATIOS

Extension Ratios in Benue state

Total farm families 413,159

Ration of extension workers to farmers : The ratio of extension workers to farmers is 1 to 1000. This is grossly inadequate for the agricultural sector needs in the state. The low ration of extension workers to farmers is because of staff shortages arising from retirement and embargo on new recruitment by the state government.

Percentage of Extension workers

The percentage of male extension workers in the state is 65% compared to females which are 35%. This may be attributed to the rigours demands of extension work thus attracting more males than females.

Source: Benue State Agriculture Development Project

3.4.7. Gender Differences in Decision Making in Farming Households by Percentages

Table 5.5: Gender Division of labour for main crops

Items	Males % (no.)	Female % (no.)
Involvement in all farming activities	43.3 (26)	56.7 (34)
Decision on income/	65 (39)	35 (21)
use of inputs	61.7 (37)	38.3 (23)
Access to land	66.7 (40)	33.3 (20)
Technology	61.7 (37)	38.3 (23)
Access to credit	20 (12)	8.3 (5)
Total	(191)	(126)

Source: Field data, 2012

Table 5.5 shows that 57.7% of the females were involved in all farming activities. This implies that the females provide more labour than the males. The results further reveal that more males than females make decisions on income (65%), use of agricultural, inputs (61.7%) access to land (66.7%) and technology (61.7%). Males also had more access to credit (20%) than females (8.3%); this could be due to

male involvement in savings and thrift activities. This result is in agreement with that of the Federal of Statistics Report (2001) on Gender dimensions of some social indicators in Benue State (**Table 5.6**).

Table 5:6 Gender Dimensions of some social indicators COLUMN

	Female %	Male %
Endangered in crop farming	61	58
Ownership of land	14	51
Access to farmland	31	58
Control over proceeds of farm sales	32	53
Access to credit	7	10
Use of agricultural inputs	26	33
Responsible for fetching water	88	54
Responsible for fetching firewood	77	41

Field Data 2012

Table 5.6 indicates how women are socially and economically disadvantaged. More women are engaged in crop production than men, but women rarely own or control farmland. Women are also largely responsible for fetching water and firewood. This reflects the women's contribution to the welfare of children.

3.4.8. Sweetpotato for livelihood and food security

Sweetpotatoes is planted conveniently twice in a year in the rainy season and dry season. It is planted between July and August each year. The people in Benue also process sweetpotato similar to what obtains in Nasarawa and Kwara states. It provides income for farmers as well as food security for

households who grow the crop. It often boiled or cooked as a porridge; fried or pounded into a thick dough mixed with yam. It appears that more people prefer to eat the fresh roots than process into flour like what obtains in Kwara.

Table 5.7 Varieties of Sweetpotato and their characteristics

Varieties	**Characteristics**
Local varieties	Less disease attack
TIS 8164	High Yield and attack less disease
Shagari	Early growth

Source: FGD

Majority of those interviewed at the FGD indicated that they do not have any knowledge of OFSP. Sweetpotato is consumed boiled, fried, roasted or as flour. The crop was also used to produce Chips, pellets, local drinks and flour. Respondents indicated that they cultivated sweetpotato mainly between July and August. Majority of those interviewed at the FGD preferred the TIS 8164 variety for its high yield.

Table 5:8 Major constraints to sweetpotato production

Items	Frequency	Per cent
Lack of adequate fund for procuring inputs	60	100
High cost of movement of produce due to		
Bad feeder roads	49	81.7
Lack of storage facilities	51	85
Low market /Low sales	53	88
Low price	40	66.7

Rest and Diseases	25	41.7

Source: Field data, 2012

Table 5.8 shows that lack of adequate funds to purchase inputs (100%), high cost of movement of produce due to bad feeder roads (81.7%), lack of storage facilities (85%) and low market (88%) were the major constraints to the production of sweetpotato. However, lack of adequate funds to purchase inputs was the main constraint farmers faced in sweetpotato production.

3.4.9. MARKETING AND PROCESSING

Table 5:9 Sweetpotato marketing and processing

Method of marketing	Frequency	Per cent
Bulk	60	100
Retail	-	-
Total	60	100

Source: FGD.

Table 5.9 Shows that all the respondents at the FGD indicated that sweetpotato is sold in bulk to their customers.

3.4.10. SIZE OF MARKET

The size of the sweetpotato market is moderate in the rural areas and high in the urban areas. Major markets for sweetpotato include Ihiokwu, Otukpo, and Utonkon; Otukpo road is a major transport route for the crop.

3.4.11. OPPORTUNITIES FOR INCREASED UTILIZATION OF SP

Respondents revealed that sweetpotato leaves could also be consumed as a vegetable. Some indicated that the leaves were medicinal. Exploring this potential for medical reasons is therefore an opportunity that should be seized.

3.4.12. SWEETPOTATO AGRONOMY AND BREEDING, PESTS AND DISEASES

Common pests of sweetpotato identified by the farmers' respondents include fire flies (*mue mue*) and nematodes. There was no information on sweetpotato multiplication systems, research and the potential of OFSP in the state.

OFSP is a value added product for correcting the imbalance in the original sweetpotato and thereby providing adequate food for consumers. Nutritionally, its intake will correct prevalence of vitamin A deficiency in Benue State. In this state, the crop mainly belongs to women, and it is referred to as a woman's crop. With current emphasis on women empowerment, investment in OFSP will be an investment to empower many women.

3.4.13. NEEDS ASSESSMENT

At the FGD, most respondents involved in growing sweetpotato produce it for subsistence. Most respondents indicated lack of adequate funds as their major constraint. The awareness of OFSP was also found to be very low among the respondents.

3.4.14. Methodology

Two LGAs where sweetpotato is grown were purposely selected in each of the zones: Zone A (Konshisha and Vandeikya LGAs), Zone B (Gboko and Buruku LGAs), and Zone C (Obi and Oju LGAs).

Production and Cropping System

3.4.15. Marketing Sweetpotatoes

Local markets are in place for sweetpotato and other products. Most villages hold their markets every five days. Surplus sweetpotato 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

RECOMMENDATIONS AND CONCLUSIONS

4.1. Recommendations

1. Formal education for the youth and mass literacy campaigns for adults are required as necessary conditions to generate demand and improve supply in sweetpotato and OFSP production and intervention.

2. OFSP campaign should target the rural poor, especially 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 sweetpotato productivity, and the introduction of an OFSP programme must be coupled with advocacy and increased understanding of the nutritional and economic advantages of OFSP.

4. High illiteracy in all the states suggests that simple methods should be used to create awareness on OFSP in rural areas, especially among women.

5. Farmers need improved access to farming and potato processing technology for improved production, processing and supply of sweetpotato and OFSP in rural and urban areas.

6. Improved access to finance targeted at sweetpotato farmers 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 sweetpotato and OFSP farming in Nigeria.

4.2. Conclusion

The sub-humid region of Nigeria, which lies south of the semi-arid and arid zones, occupies about 43 million hectares; rainfall ranges from 1000 to 2000 mm per year. This region produces the largest quantities of sweetpotato. Cultivation of sweetpotato in this region is largely undertaken by farm families whose farms range from 1 to 3 hectares. The farms are cleared and ridges 20-40 metres long are made, mainly using family labour.

In Nigeria, sweetpotato 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 2 million tons harvested from more than 300,000 hectares annually by the end of the decade. However, estimates of sweetpotato production in Nigeria vary widely among different sources, and as such these statistics should be interpreted with caution.

FAO estimates of average sweetpotato yield of 5 to 8 t/ha are similar to estimates from farm surveys conducted by state agricultural development projects which reported yields of popular local varieties from 7 t/ha in the south-eastern zone, 3.5 t/ha in the northern zone, and 7 to 8 t/ha north central area. However, farm yields remain far below those obtained from research plots with improved varieties. 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 32,000 naira per hectare yields an average of 5.16 tons, or 6.2 naira per kg. With market prices varying from 5 naira per kg to 15 naira per kg throughout the year, farmers may sell at a loss when prices are at their lowest. Market prices of sweetpotato compare with those of maize and yam and are much higher than those of cassava. Transportation accounts for the largest share of distribution cost of sweetpotato. These suggest there is substantial scope for increasing sweetpotato productivity in Nigeria.

Sweetpotato is traditionally consumed boiled with varying accompaniments including cowpea, rice, millet and beniseed. In the semi-arid zone, sweetpotato flour is popularly used to sweeten local foods while in the urban markets of the humid south, sweetpotato fried chips are produced and marketed. Return on investments in sweetpotato 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*, administrative 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 figures 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	**Sweetpotato**	**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 varieties

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 sweetpotato grown

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

Table 12. Profile of sweetpotato 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 sweetpotato 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. Sweetpotato 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
Sweetpotato 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 sweetpotato 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. Sweetpotato 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
Sweetpotato 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 sweetpotato 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 sweetpotato 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)