

**ANALYSIS OF WOMEN EMPOWERMENT IN CASSAVA PRODUCTION AND
PROCESSING AS A MEANS OF HOUSEHOLD POVERTY STATUS IN
KWARA STATE, NIGERIA**

BY

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JUNE, 2015

DECLARATION

I hereby declare that this thesis titled “**Analysis of Women Empowerment in Cassava Production and Processing as a Means of Household Poverty Status in Kwara State, Nigeria**” was written by me and it is the record of my research work. No part of this work has been presented in any previous application for another degree or diploma at any institution. All references made to published literatures have been duly acknowledged.

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CERTIFICATION

This thesis titled “**Analysis of Women Empowerment in Cassava Production and Processing as a Means of Household Poverty Status in Kwara State, Nigeria** ”by **Morolake BOLAJI** meets the regulations governing the award of the degree of Master of Science (Agricultural Economics) of the Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to the Almighty God who gives wisdom and knowledge.

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My utmost appreciation goes to God Almighty, who by His son Jesus Christ has made life meaningful to me. To God be the glory.

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Love you all.

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ABSTRACT

This study is focused on the analysis of women empowerment in cassava production and processing as a means of household poverty status in Kwara State, Nigeria. Women in Kwara State were empowered by RTEP in order to improve their living standard and there was therefore the need to evaluate the impact of the programme on the women's income, productivity and poverty status. Primary data were collected from the farmers and processors who were participants or non-participants in Root and Tuber Expansion Programme (RTEP) through the use of structured questionnaires. Purposive sampling was used to select the LGAs and villages, while random sampling was used to select the respondents and 12% (199) of the sample frame was used for this study. Tools for analyses were descriptive statistics such as frequency, tables, percentages, FGT, double difference estimators and multiple regressions. The results of the analysis showed that mean age for participants and non-participants farmers were 40 and 37 years and the mean age for participant and non-participant processors were 40 and 39 years respectively. Results of intensity of cassava production revealed that factors such as age ($p < 0.001$), occupation ($p < 0.01$) and agro-chemicals ($p < 0.01$) significantly influenced the intensity of cassava production and the results of intensity of cassava processing showed that years of participation ($p < 0.0001$) and extension visits ($p < 0.01$) were statistically significant and influenced the intensity of cassava processing. The results from FGT revealed that poverty depth for participants (farmers) were 0.19 and 0.17 while for non-participants, 0.17 and 0.14 also the poverty severity for participants (farmers) were 0.07 and 0.02 and about 0.07 and 0.05 for non-participants (farmers) before and after the empowerment programme. Results for double difference estimators revealed that the values were positive with mean increase percentage values of 57.64% and 27.87% for participants and non-participants (farmers) and about 32.65% and 23.88% participants and non-participant (processors). This indicates that the empowerment programme impacted positively on the participants' income, productivity and poverty status for farmers and processors. The multiple regression estimates revealed that when time and participation acted together, the variables of income, productivity and poverty status were significant at both 1% and 5% levels of probability indicating that time and participation in an empowerment programme significantly influences the income, productivity and poverty status of the participant farmers and processors. The major problems encountered by the farmers and processors were inadequate capital which was the major constraint to women empowerment followed by inadequate training by extension agents and poor market price for produce. In conclusion, it can be noted that women who participated in the RTEP had increases in their income, productivity and poverty status. Thus, it was therefore recommended that due to the improvement in the poverty status of participants in the RTEP, more empowerment programmes should be established by government in areas where there are high levels of poverty incidences so that poverty in those areas can be alleviated.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Women can be described as an indispensable group in the development of any nation (Safiya, 2011). Women play significant and potentially transformative roles in agricultural growth in developing countries, but they face unrelenting obstacles and economic constraints limiting further contribution in agriculture. Women are responsible, in addition to seeking livelihoods, for keeping their homes and providing for their children (Lawanson, 2003). Women have great potentials necessary to evolve a new economic order, to accelerate social and political development and consequently transform the society into a better one (Safiya, 2011). Kayode *et al.*, (2013) described Nigerian women as a crucial factor for production. According to him, they assume this status because they are largely responsible for the bulk of crops production, agro-based food processing, preservation of crops and distribution of outputs or products from farm centers to urban areas. The importance of women in the agricultural development as stated above cannot be overemphasized and this has led to the empowerment of more women in production and processing of various crops such as Cassava, maize and yam. The Government in collaboration with other private bodies has helped to empower women in order to improve their standard of living. Empowering women can mean the provision of sufficient opportunities to women to develop their potentials and contribute to the overall development of the nation. Empowering women particularly in the area of agriculture has been done using cassava which is a low risk crop with high yielding potential and a developed market for its sales. Cassava has been identified as a very powerful poverty fighter by driving down the price of food to millions of consumers (Iheke, 2008). Cassava

is the third-largest source of food carbohydrates in the tropics. Uche *et al.*, (2008) stated that Cassava is a staple food crop in Kwara State consumed majorly as *gari* by households with a population of about 2,371,089 million people. Nigeria is the world's largest producer of cassava; its production is put at about 37.5 million metric tonnes per year (Food Agricultural Organization, 2013). This production performance has rated Nigeria as the largest cultivator of cassava in the world. In 2002, cassava suddenly gained prominence in Nigeria following the pronouncement of a presidential initiative on the crop. The initiative was aimed at using cassava production as the engine of growth in Nigeria. In recent times, government has encouraged the use of the crop to produce a wide range of industrial products such as syrup and bread (Fakayode *et al.*, 2008).

Cassava can be cultivated with family labour, land, hoe and machete, making it an alternative and low-risk crop for poor women farmers. Also, cassava is available to low-income rural households in the farming of simple food products which are significantly cheaper than grains such as rice, maize and wheat (FAO, 2006). Cassava is mainly produced by small scale farmers in rural communities and is primarily consumed in the form of garri or fufu (Iheke, 2008). However, cassava can be processed into several other product like chips, flour, pellets, adhesives, alcohol and starch which are raw materials for livestock feed, alcohol/ethanol, textiles, confectionery, wood and food industries (Iheke, 2008). The crop has continually played vital roles as source of income to farmers, low cost food source for both the rural and urban dwellers as well as household food security (Nweke, 1996). These features have endowed it with a special capacity to bridge the gap in food security and poverty alleviation (Clair *et al.*, 2000). The idea of food security was presented for the first time at the World Food Conference in 1974 viewed solely from the

perspective of having adequate availability of food on a national scale. Today, it is a condition in which all people have access at all times to enough food of an adequate nutritional quality for a healthy and active life (Tollens, 2000). There are four dimensions to this: (i) availability of sufficient amount of food which is a function of food production (ii) stability of supply over time which depends on the ability to preserve/store produced food and supplement available food through imports if necessary (iii) access to the available food which depends on income levels and its distribution and (iv) food utilization which encompasses procurement, ingestion and digestion all of which are dependent on nutritional quality, education and health (Tollens, 2000). Food security exists at both the macro and micro levels. National Food Security (NFS), the macro dimension, is possession by a nation of the capacity to procure enough food through production or imports to feed its population and one of the ways in achieving food security is by empowering the people. Empowerment is both a process and an outcome. Depending on how it is used, the two are indistinguishable. Empowerment has for the most part remained rooted in the local communities, in the needs of the 'poorest of the poor' especially women (Desai and Potter, 2008). Women's empowerment is therefore more than simply a 'motherhood' term for development agencies (Desai and Potter, 2008). According to the Ghanaian Times (2006), Women empowerment concerns itself with giving women the ability or opportunity to better their own lives and society in general. It has nothing to do with competition with men but rather partnering and complementing to ensure growth and prosperity for a nation. Buvinic (2006), posited that women empowerment is not only a holistic concept but also multi-dimensional in its approach and covers social, political, economic and social aspects. Empowering Nigerian women is important because they labour and live under stress and are

overwhelmed by the responsibilities in their lives; those created by the society and themselves and they are expected to perform their traditional roles such as running their homes efficiently and be good wives and step-mothers. They are also expected to contribute to their family income so that the household income will increase when combined with that of the male household head. Nweke *et al.*,(2002) stated that women in cassava production can be empowered through the provision of improved cassava varieties, use of fertilizer, use of agrochemicals, and use of improved harvesting equipment. Women are and have always been users of technology as well as men. The issue is the kind of technologies women use for different kinds of activities and the position of women in production process, such that they can acquire and utilize new technologies. Hence, the introduction of the Root and Tuber Expansion Programme (RTEP) which was designed with the overall objective of achieving a sustained increase in the production of cassava, yam, cocoyam and potatoes as well as their end products. RTEP was planned by the Food and Agricultural Organization (FAO) in conjunction with the Federal Government of Nigeria following the completion of cassava multiplication project (CMP) (Ugwu, *et al.*, 1996). In December 1999, the International Fund for Agricultural Development (IFAD) approved a credit of 23.05 million U.S. Dollars to the Federal Government of Nigeria (FGN) for RTEP. The main thrust of the programme was to consolidate gains made under the cassava multiplication programme (CMP) in order to enhance national food security and income for poor farmers(Ugwu, *et al.*, 1996). According to the RTEP implementation manual, (Kwara State Agricultural Development Programme, 2006), the program focused on available low-cost technologies that could be easily adopted by poor farmers, a combination of improved cassava, yam, sweet potatoes and cocoyam varieties, and also

improved cultural practices, given the high cost of inputs and the restricted access to credit by small scale farmers. The project aimed at exposing farmers to improved root and tuber crops production and processing technique designed to fit into the existing root and tuber based farming systems in Nigeria. The goal of RTEP was to improve the living conditions, incomes and food security of small holder households in the project area through increases in the production of the RTEP crops as well as processing and marketing of their end product (KWADP, 2006). The overall target group is about 5.2 million small holders with less than 2 to 3 hectares of land holding per household in Nigeria. This translates to about 200,000 small holders per participating state (KWADP, 2006).

The Kwara State Government through the RTEP engaged and empowered women in the State in cassava production and processing. This was done through the provision of improved cassava cuttings, subsidized cost of input such as fertilizer, insecticide, supply of modern peelers and graters. The Root and Tuber Expansion Programme (RTEP) particularly encouraged rural women farmers to engage in the production and processing of root and tuber crops and also in the marketing of these crops in order to improve their standard of living and in turn alleviate poverty in Kwara State and the nation as a whole (KWADP, 2006).

1.2 Statement of the Problem

Poverty is simply the state of being poor. It is a life situation of having little or no means of survival (Fakoya *et al.*, 2010). For instance, having no food, shelter, clothes, basic health care, education and other means of improving one's life. Poverty alleviation therefore involves improving the living conditions of people who are already poor. (Fakoya *et al.*, 2010). Poverty is one of the developmental problems facing Nigeria particularly Kwara

State being prevalent in rural areas where the main occupation is farming (Adekemi *et al.*, 2012). This implies that if farming operations can be improved in the rural areas, poverty will be alleviated to a reasonable extent.

In some states in Nigeria, rural women are gradually taking over the production and processing of root and tuber crops (Afolabi, 2008). However, factors militating against women in their participation in agricultural production are many, some of which are socio-cultural and economic in nature. Also, the population of women in educational, economic, social and political programme is low, and has led to a serious set-back in the economy, thus the need for women empowerment (Safiya,2011). The existing women-focused development programmes such as Root and Tuber Expansion Programmes aimed at the rural household ought to be assessed and strengthened to achieve greater impact. Hence, the need to evaluate the impact of RTEP on the women's income, productivity and poverty status. This study was therefore conducted with the primary aim of analysing the impact of empowering the women in production and processing on household poverty status. In addressing these problems, this study tried to answer the following questions;

- i. what are the socio economic characteristics of women cassava farmers and processors in the study area?
- ii. What are the factors that influence the intensity of production of women cassava farmers and processors in the study area?
- iii. What is the impact of empowering women cassava farmers and processors on their income, productivity and poverty status?
- iv. What are the constraints to women empowerment in the study area?

1.3 Objectives of the study

The main objective of the study was to analyse women empowerment in cassava production and processing as a means of household poverty status in Kwara State. The specific objectives were as follow;

- i. describe the socio economic characteristics of cassava women farmers and processors in the study area;
- ii. determine the factors that influence the intensity of cassava production among farmers and processors in the study area;
- iii. assess the impact of empowering cassava women farmers and processors on their income, productivity and poverty status; and
- iv. identify the constraints to women empowerment in the study area.

1.4 Research Hypotheses

- i. There is no significant difference in the income of participants and non-participants in cassava production and processing.
- ii. There is no significant difference in the productivity of participants and non-participants in cassava production and processing.
- iii. There is no significant difference in the poverty status of participants and non-participants in cassava production and processing.

1.5 Justification for the study

In different parts of the world, rural women as smallholder farmers and landless workers, play a major role in supporting their households and communities in achieving food and nutrition security, generating income, and improving rural livelihoods and overall well-being (IWD, 2012). Women contribute to agriculture and rural enterprises, thereby

improving local economies directly and global economies by expansion. They perform most of the unpaid labor in rural areas (IWD, 2012). They are however faced with unrelenting obstacles that limits their contribution to agricultural growth and development. Therefore, empowering women would represent a prudent investment in a nation's development through a fairer system of distribution of wealth and power among people and greater access of women to agricultural inputs. Education and skills acquisition are empowerment tools for poverty alleviation. If properly acquired, these are capable of increasing agricultural yields, rural income and improved quality of life for rural women and their families. Nevertheless, little work has been done in the study area to assess the impact of women empowerment programmes to household poverty alleviation. There was therefore the need to evaluate the impact of RTEP on poverty status of women cassava producers and processors and this study is expected to bridge knowledge gap in the area of empowerment by revealing the current status of poverty which will in turn be useful in formulating relevant policies on women empowerment in the study area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Cassava Empowerment

Cassava can be said to be an important crop in terms of it being a tool for empowerment. It possesses certain features such as being easy to cultivate with little or no assistance. It is rich in starch and consequently has a variety of end uses. According to Adeniji *et al.*, (2000), Cassava is important, not only as a food crop but even more so as a major source of income for rural households. As a cash crop, cassava generates cash income for the largest number of households in comparison with other staples. The Government has encouraged the production and processing of cassava and Nigeria is currently the highest producer of cassava in the world (Adeniji *et al.*,2000). Due to the great attributes of cassava, International Fund for Agricultural Development recognized that cassava could be used as a commodity based approach to poverty alleviation hence, the introduction of cassava empowerment to women in rural areas in Nigeria (Adeniji *et al.*,2000).

2.2 Women Empowerment in Cassava Production and Processing

Women empowerment is a recurrent issue in poverty alleviation Schemes (Lawanson, 2003).

Women empowerment can be described as the provision of adequate opportunities to women to develop their potential and contribute to the development of the nation in particular and to the world in general (Safiya, 2011). Adewole (1997) described women empowerment as the provision of conducive environment or opportunities to women to contribute their quota to the social, political and economic development of a nation thereby improving their standard of living.

Women who are empowered in cassava production and processing play major roles such as planting of cassava cuttings, weeding, harvesting etc. Traditionally, the bulk of cassava products are processed by women at village level, working independently or organized into informal groups or cooperatives. These women have developed an empirical knowledge of the physical and chemical characteristics and the functional properties of the cassava starch. The traditional processing techniques are laborious; washing, peeling, fermenting and heat treatments are typical of the processes used in the production of gari and fufu flour. Cassava processing is a rural enterprise which adds value to the product and increases the marketing opportunities for small and semi-subsistence farmers (FAO/IC, 1995). Women are however faced with various challenges and there conditions under which women operate which are not favourable to them. Women are left on their own most of the time to cater for themselves and their children. Ezeigbo (1990) noted that Nigerian Women labour and live under stress because they are overwhelmed by the responsibilities in their lives; those created by the society and themselves. According to Ezeigbo, Nigerian women are expected to perform their traditional roles efficiently, run their homes, and be good wives and step-mothers. They are also expected to contribute to their family income, cater for the extended family members and perform efficiently in their jobs or businesses. Also, the population of women in educational, economic, social and political programmes is low, and has led to a serious set-back in the economy, thus the need for women empowerment (Safiya, 2011). When women are empowered as well as men, it brings about balance to division of labour, also when women are empowered; they contribute to the household food basket. There is also an increase in household income when combined with their male counterpart.

2.3 RTEP as a Source of Women Empowerment in Nigeria.

Poverty has been a serious challenge to governments in Nigeria. Its effect, which includes lack and deprivation in the basic necessities of life, is worrisome. Poverty humiliates and dehumanizes its victim (Raheem *et al.*, 2014). Asamuet *al.*, (2014) noted that poverty has earned recognition in the extent of ravaging society and the affairs of humanity at the international, national and local level. Therefore the need for urgent actions towards poverty alleviation is paramount.

Among several agricultural programmes targeted towards poverty alleviation in Nigeria, is the Root and Tuber Expansion Programme (RTEP) which was designed to consolidate the gains made under the Cassava Multiplication Programme (CMP) (KWADP, 2006). The implementation of the project commenced in July, 2001 with the goal of increasing income, alleviating poverty and improving food security status of the farmers with less than 2 hectares of land, growing and processing cassava, yam, cocoyam, irish and sweet potatoes in the project area (Adekemi *et al.*, 2012). The programme encouraged farmers to engage in improved cultural practices, given the high cost of inputs and the restricted access to credit by small scale farmers. The project aimed at exposing farmers to improved root and tuber crops production and processing technique designed to fit into the existing root and tuber based farming systems in Nigeria (Ibrahim *et al.*, 2010). This programme particularly encouraged women farmers to engage in cassava production and processing. The women were being empowered in cassava production and processing by forming a number of groups in which they participated actively (KWADP, 2009).

2.4 Empowering Rural Women for Sustainable Food Security

The right to food is a fundamental human right. Yet, millions of people suffer the “ravages of hunger and malnutrition or the consequences of food insecurity” It is no longer just a “moral imperative”, but “survivability imperative” and food and agriculture are central to the poverty issue. The goal of eradicating hunger will only be achieved if the voice of the silent majority of human kind is heard. That voice belongs to women. In the face of poverty, natural disaster and war, it is the resilience and ingenuity of women that enable families and communities to survive. Empowering women, who play the most important role as producers of food, is key to achieving food security. The legal system is an important tool for this empowerment, for it is the legal system that is capable of establishing an equitable and transparent framework for the functioning of a civilized society and for protecting the rights of vulnerable groups including women. It is through law that mechanisms are structured for both the short-term approach to respond to hunger in a crisis and the long- term approach to respond to hunger with agriculture and development policies aimed at food self-sufficiency. Food security exists when all people, at all time, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food security is fundamental to individual human dignity, growth, and survival. We all pay for widespread hunger and malnutrition through sacrificed human potential, lost economic opportunity, social tension, violence, and war. Creating feedback channels between all parties in the development equation would bring about the necessary equalization to the full participation of rural women in the economic benefits of Nigerian agriculture.

Empowering rural women for participation in agricultural decision-making and leadership in Nigeria represents the most appropriate and effective way forward.

2.5 Introduction, Spread and Importance of Cassava

Cassava (*Manihot esculenta*) was introduced into central Africa from South America in the sixteenth century by the early Portuguese explorers (Jones, 1959). It was probably the emancipated slaves who introduced the cassava crop into southern Nigeria, as they returned to the country from South America via the islands of Sao Tome and Fernando Po. At that time there were Portuguese colonies off Nigeria's shores (Ekandem, 1962). Cassava, however, did not become important in the country until the end of the nineteenth century when processing techniques were introduced, as many more slaves returned home. Cassava is important, not only as a food crop but even more so as a major source of income for rural households (Adeniji *et al.*, 2000). Nigeria is currently the largest producer of cassava in the world with an annual production of 37.5 million tonnes of tuberous roots. Cassava is largely consumed in many processed forms in Nigeria. Its use in the industry and livestock feed, is well known, but is gradually increasing, especially as import substitution becomes prominent in the industrial sector of the economy. As a cash crop, cassava generates cash income for the largest number of households in comparison with other staples. It is produced with relevant purchased inputs as frequently as and in some cases more frequently than other staple crops. A large proportion of total production, probably larger than that of most staples, is planted annually for sale.

As a food crop, cassava has some inherent characteristics which make it attractive to consumers, especially to the rural dwellers in Nigeria. First, it is rich in carbohydrates especially starch and consequently has a multiplicity of end uses. Secondly, compared to

grains, cassava is more tolerant of low soil fertility and more resistant to drought, pests and diseases and it is also very cheap and affordable to the rural people (Adeniji *et al.*, 2000). These attributes are therefore what IFAD has recognized in the crop as lending itself to a commodity-based approach to poverty alleviation (FAO/IC, 1995).

2.6 Women and Cassava Processing

Fresh cassava roots cannot be stored for long because they rot within 3-4 days of harvest. They are bulky with about 70% moisture content, and therefore transportation of the tubers to urban markets is difficult and expensive. The roots and leaves contain varying amounts of cyanide which is toxic to humans and animals, while the raw cassava roots and uncooked leaves are not palatable (Okezie *et al.*, 1988). Therefore, cassava must be processed into various forms in order to increase the shelf life of the products, facilitate transportation and marketing, reduce cyanide content and improve palatability. The nutritional status of cassava can also be improved through fortification with other protein-rich crops. Processing reduces food losses and stabilizes seasonal fluctuations in the supply of the crop.

2.7 Traditional methods of processing cassava

Traditional cassava processing methods in use in Africa probably originated from tropical America, particularly north-eastern Brazil and may have been adapted from indigenous techniques for processing yams (Jones, 1959). The processing methods include peeling, boiling, steaming, slicing, grating, soaking or seeping, fermenting, pounding, roasting, pressing, drying, and milling. These traditional methods give low product yields which are also of low quality.

Rapid urbanization in tropical Africa increased mobility in both rural and urban areas and the changing roles and status of women have resulted in an unprecedented demand for convenience foods. Added to these factors is the high cost of fuel for cooking in urban areas at a time when fuel wood is not only inconvenient to use but is becoming increasingly scarce. Therefore, cassava processing and utilization technologies for the future should improve traditional methods and develop low cost equipment with low energy demands. Improved processing and utilization technologies should address issues related to farmers' (producers') and consumers' needs (particularly future urban needs), and also to economic factors and nutritional values. Knowledge of the current traditional processing and utilization methods and of present urban patterns of consumption and changing urban needs will guide future strategies for cassava processing and utilization.

Improvement of nutritional values of processed products also requires special attention from policymakers and researchers. Cassava is frequently denigrated because its roots are low in protein. However, protein may be supplemented from other sources, particularly legumes; for example, fortification of cassava flour or garri with protein-rich soyflour can be achieved. Such fortified products will be nutritionally advantageous, and thus economical and acceptable to consumers.

Although cassava is regarded as subsistence crop of low-income families or as a "famine-reserve crop", about 60 percent of the cassava output of households in the Oyo area of Nigeria is sold for processing (mostly into garri) while the remaining 40 percent is consumed at home (Ikpi *et al.*, 1986). A high proportion (50 percent) of cassava was also sold to food processors in the western region of Cameroon (Okezie *et al.*, 1988), suggesting a changing status for cassava.

2.8 Constraints in the traditional processing of cassava

Traditional methods of processing cassava have been affected by various factors. These factors have been discussed as follows:

2.8.1 Environmental factors

During the rainy season, sunshine and ambient temperatures are relatively low for processing cassava, particularly in lowland humid areas where cassava is mainly grown and utilized. In other localities, particularly in savanna zones, water which is essential for processing cassava is not easily available. During the early rainy season, the dry matter content of roots is usually lower than in the dry season, which can result in a lower yield of products. In the dry season when the soil is hard, harvesting and peeling tubers for processing are difficult and result in more losses.

2.8.2 Varietal factors

Cassava shape varies among cultivars. Roots with irregular shapes are difficult to harvest and peel by hand, resulting in great losses of usable root materials. Root size also varies with cultivars although it depends more on environmental factors such as soil. Smaller roots require more labour for peeling. Varietal differences in dry matter content and starch content and quality influence the output and quality of the processed products. Cyanide content varies with varieties, but is also affected by the crop growth environment.

2.8.3 Agronomic factors

The time for planting and harvesting, and age of plant, from planting to harvesting, all affect starch content, yield and quality of products. Other agronomic practices such as intercropping, fertilizer application and spacing can also affect yield and crop quality.

2.8.4 Socioeconomic factors

Harvesting and transporting of roots from farm to homestead and subsequent processing are mainly done by women. Most of the steps in processing are carried out manually using simple and inexpensive tools and equipment that are available to small farmers. Cassava processing is labor intensive and productivity is usually very low. Transport of products to markets is made difficult by the poor condition of rural roads. The drudgery associated with traditional processing is enormous and the products from traditional processing methods are often contaminated with undesirable extraneous matter. Some of the products are therefore not hygienic and so are of poor market value. Better processing methods can improve the life-styles and health of rural people through higher processing efficiency, labor saving and reduced drudgery, all of which improve the quality of products.

Subsistence farmers harvest cassava when needed. Thus they leave the cassava in the ground for long periods, believing that the cassava is safer and would undergo less damage than when harvested. Although this system has certain merits, a delay in harvest can result in root losses due to root rots, damage by animals, and a decrease in the starch content in roots. Furthermore, keeping cassava in the ground prevents the use of that land for other purposes.

2.9 Women's response to selected cassava production technology in Nigeria

Technology has brought improvements in crop quality. Early in the century, fertilizers provided nutrients the soil lacked. Studies have determined which nutrients the soil lacked. Studies have determined which nutrients plants need, and today the soil and crop are carefully monitored to ensure that the proper amounts and types of fertilizers are applied. Cassava production has for the most part kept pace with the rapid growing population. This

has largely been the result of some selected technologies including: Adoption with timeliness of planting, improved cassava varieties, use of fertilizer, use of agrochemicals, and use of earth moving equipment (Nweke *et al.*, 2002). Schumacher *et al.*, (1980) point out that issue of technology is not a question of women with or without technology. Women are and have always been users of technology. The issue is rather the kinds of technologies women use for different kinds of activities and the position of women in production process, such that they can acquire and utilize new technologies (Adesiji, *et al.*, 2011).

In African society women grow from 60 to 90 percent of the food (Rockefeller foundation, 1989). The role of men and women in farming differ in Africa. Men clear the land and women weeding and processing. Since the colonial period, men have been most active in cash crop production, while women have been mainly concerned with foods, horticulture crops and crop processing (Adesiji *et al.*, 2011).

On the other hand, the women's work was seen to continue throughout the agricultural year. Women are known to grow food crops for family consumption, while the men cultivate fruit trees and cash crops such as cocoa, plantain and kola nut. It is also observed that women participate in planting, collecting, harvesting and transportation of crops (Adesiji *et al.*, 2011). Carr, (1981) reported that rural oriented development projects stand a greater chance of success if more consideration is given to the important role that women have to play in enabling potential benefits to be realized. Technology regarding food production, food processing and household tasks is necessary as well as the impact of technology on income generating activities for women. It is stated that technology can reduce drudgery, but also reduce opportunities for employment, depending on the

circumstances. Dey, (1984) reported that the lack of adequate attention to appropriate technologies for women compared with men has at times disrupted the balance in the division of labour. Insufficient attention has been given to studying women's time constraints, energy demand and expressed need for appropriate technologies. She noted that in many countries the introduction of tractor equipment to men has in many countries reduced male workload and permitted expansion of the area under cultivation. This has increased the labour input of women in transplanting and weeding without providing alternative appropriate labour saving equipment.

Women play an important role in cassava production, processing and marketing. The extent of their involvement in cassava production and their contribution to household food basket vary from one ethnic group to another. Until recently, the role of women was underestimated. This misconception together with cultural prejudices limits the access of women to extension services and other resources (Adeniji *et al.*,2000).With growing recognition of the role of women in agricultural production, a number of programmes have been initiated recently, namely, Women in Agriculture (WIA), Better Life Programme (BLP), Family Economic Advancement Programme (FEAP) and Family Support Programme (FSP).These serve as mechanisms for giving women better, cheaper or more reliable access to land, credit, agricultural inputs, extension information and other resources. Concerted effort must, therefore, be made to ensure that women have better, cheaper and reliable access to land, credit, agricultural inputs, extension information and other resources. The existing women-focused development programmes and other programmes aimed at the rural households in general, should be streamlined and

strengthened to achieve this objective. Women also need to be properly organized to gain better access to these services and resources (Obadan, 1996).

To increase processing efficiency, save labour and improve the margin of profit for women who are the primary processors of cassava, there is a need for improved access to processing facilities and improved processing technology to remove drudgery and produce higher value cassava products, such as flour and starch. This underscores the need to design machines that are gender specific for women who play a major role in cassava production and processing. There is also a need to strengthen the capacity of the ADPs, to involve women in cassava-based on-farm adaptive research trails and processing demonstrations(Obadan, 1996).

There are factors and constraints affecting rural women in food crop production, processing and marketing and according to Abott (2007), various food crops have production, processing and marketing problems. Some of the problems include:

i. Production methods: According to Abott (2007),this is one of the persistent obstacles. In many areas, the bulk of agriculture output comes from large numbers of very small farmers each operated independently. The lack of organizing an efficient assembly, processing and distribution is immensely more complicated than when farms are few, large, and specialized. Efficient marketing demands a fairly high degree of uniformity in most farm products. The marketing of tropical crops is usually hampered by lack of uniformity of the varieties and the small scale of production.

ii.Storage equipment and appropriate technology: female farmers generally own fewer tools than men do since farm capital contributes positively to yields. Female farmers are

likely to have lower yields than male farmers. Moreover, new technology has often been inappropriate to women's need. Inadequate storage facilities are the causes of heavy losses of agricultural produce in many parts of the country. This results in serious wastage of foodstuffs and increase cost to consumers. In order to avoid losses and quality deterioration of their produce, and to obtain money to meet immediate debts, many farmers are obliged to sell their produce as soon as it is harvested or produced. This results in very low prices because the marketing system is overburdened and farmers lack bargaining power (Abott, 2007).

iii. Agricultural development policies and research: although policy makers and planners are becoming increasingly aware of the crucial contributions of women in agriculture and food security, agricultural policies as a whole still do not address the needs of women farmers adequately. Whereas as the needs and roles women farmers play are recognized in policy, this tends not to be adequately translated into practices in agricultural development programme and planning (Abott, 2007).

2.10 Poverty and poverty alleviation

A precise definition of poverty has become a controversial issue both in theory and policy because poverty is relative to people, countries, geographical location, contexts, developmental approaches and national wealth (Fakoya, *et al.*, 2010). Poverty has been described as a social problem whereby the household income is insufficient to ensure suitable livelihoods, consequently leading to hunger, malnutrition, ill health and mortality from illness. It is however generally agreed that poverty is a condition in which one cannot generate sufficient income required to secure a minimum standard of living in a sustainable pattern (Fakoya *et al.*, 2010).

The current rate of poverty reduction is too slow to meet the target set for poverty reduction by the year 2015 Fakoya *et al.*, (2010). According to Fakoya *et al.*, If this trend continues, poverty incidence would only reduce to 43% as opposed to 21.4% by 2020. To achieve this target therefore, the current environmental and political will of the national poverty eradication programme must be sustained and well monitored for its impact to be felt by people in Nigeria.

Cassava is a food security crop and can be used to alleviate poverty in terms of its production and processing (Nweke, 2003) because of its ability to grow under a wide range of conditions, some of which are quite unsuitable for other crops. Therefore, cassava being an important arable crop commonly cultivated by majority of farmers can be fully exploited in addressing the issue of poverty among farmers in Nigeria. Cassava is simply the most important staple food grown and consumed in the Western Region of Nigeria and it can play a major role in the effort to alleviate the country's food crisis. Cassava roots are processed by a variety of methods into different products and used in diverse ways according to local customs and preferences of the people to provide a carbohydrate based diet. According to International Institute for Tropical Agriculture (2003), the raw cassava roots and leaves are not palatable, thus there is need to process its roots into various products such as gari, fufu, lafun (cassava flour) and starch. Thus cassava requires more processing, but not requiring sophisticated tools and equipment and much capital. According to Fakoya *et al.*, Cassava is one of the most important food crops in Africa. It derives its importance from the fact that it is starchy, thickened and its tuberous roots are a valuable source of cheap calories especially in developing countries where calories deficiency and malnutrition are wide spread. Fakoya *et al.*, 2010 stated that the level of

income realized by the farmers from cassava production is quite high. Majority of the farmers (65.71%) realized between N10, 000 - N20, 000 or (\$67-134) per month from their cassava farms. This indicates that most of the cassava farmers earn more than the one dollar per day poverty line adopted by the United Nations. Akorede (2004) opined that before cassava production can attain its potential of increasing farmer's income and improving their standard of living, researches into improved production methods, handling and marketing of its products need to be undertaken. Therefore, research and adoption of technological improvement are crucial to increasing agricultural productivity and alleviating poverty.

There are various problems militating against the attainment of women empowerment in the country. The disparities between Nigerian women and men in terms of political, social, educational and economic achievements cannot be separated from some problems which hinder parity between the two groups. These problems are as stated by Yahaya (1999):

a. Illiteracy

Cultures and sub-cultures in Nigeria give preference to male children as they are usually regarded as the heirs or the pillars of the family. Female children are usually less privileged and consequently not given adequate opportunity to acquire education and formal training. Umar (1996) noted that in any traditional Nigerian community, it is believed that the place of the girl-child and the subsequently the women is in the kitchen or at home. He stressed further that women in Nigeria are socialized into accepting the traditional roles of bearing and rearing children and of maintaining the welfare of the family. Thus, in most parts of Nigeria, particularly the rural setting, the education of the girl-child does not go beyond what she needs to bear children and keep the home (Yahaya, 1999).

b. Rivalry among women

Yahaya (1999) stated that Nigerian society seems to encourage women to compete with one another in a subtle way. On many occasions, unhealthy rivalries among women usually lead to envy and jealousy. This prevents women from being team players and from supporting another during period of need. Consequently, most perceive men's domination as acceptable and preferable to female domination.

c. Low Participation of Women in Politics

The level of women's participation in politics is still low in Nigeria. Awe (1990) asserted that most women in Nigeria do not contest elective post but limit their activities to voting during elections. Although, this attitude may be related to their level of education and poor economic base, it has adverse effect on women's struggle to emancipation.

d. Poor Economic Base

Most Nigerian women are poor. This situation is related to their low level of educational attainment. Poverty is reflected in almost all aspects of an average Nigerian woman's life. Mbofung and Atinmo (1985) observed in their study that the mean daily intake of 2,250 kcals, which is common among pregnant women in Nigeria, is lower than that reported for pregnant women in developed nations. According to the researchers, the energy intake among pregnant women in Nigeria was inadequate as most of them expended about the same level of energy as they did before their pregnancy. This finding is a glaring indication of poverty among Nigerian women.

e. Insufficient need for power

Nigerian women are generally not aggressive enough to seize leadership mantle from their male counterparts. Steiner and Miner (1977) observed that individuals who seek power

will have to strive hard to reach positions where they can exercise authority over others. Similarly, Okojie (1990) stressed that people who lack power drive will find it difficult to assume leadership position. This impediment may be attribute to low self- concept on the part of Nigerian Women most of whom believe that the males are better (than them) in human endeavors.

The following limitations were also exacted from Sandra *et al.*, (2001)

i. Limited access to resources (Land):

Access to assets is the single most urgent need for the upliftment of women in general and farm women in particular. Though the Indian legislation permits equal right of man & women in property yet the condition in actual sense is not so. Rural women still do not have ownership on land and the patters are allotted in the name of their husband. Due to this they cannot take independent decision on various agricultural aspects. Therefore, concerted efforts are needed to promote women access to resources. For this, the following measures are suggested: the distribution of land to the landless women should be included in the existing Government policies on distribution of joint patter to husband & wife. Short term operational ownership of land female farmers while giving land on leasing may be arranged.

ii. Limited access to input and credit:

Though women make substantial contributors to agriculture development, their access to the most crucial input credit is limited. Since they are not land owners, the credit flow generally goes in the name of male member (i.e. owners). For promoting women's access to farm input & credit, following measures may be taken: credit flow to rural women could be channelled through credit & thrift societies, voluntary agencies in each district may be

identified which could help in developing women organizations, credit organizations should simplify the procedures & modalities to suit the educational level of rural women & also organize credit camps in village exclusively for women, Farm women should also be recipient of credit for which possession of assets may not be insisted upon (Sandra *et al.*, 2001).

iii. Inadequate technical competency:

Though women are involved in almost all agricultural operations, yet, they have inadequate technical competency due to their limited exposure to outside world. This has compelled them to follow the age old practices which in turn result in poor work efficiency and drudgery. Training is an important component which enhances knowledge, skill and attitude. For building technical competency among farm women, specialized need base and skill oriented training should be organized preferably at village level. Some of the priority areas in which women need training includes; conservation and management of natural resources, Renewable energy source, Seed production technology, Use of fertilizer, Post-harvest management. Looking into the importance of conservation and management of natural resources for sustainable development, due emphasis should be given on this aspect and it should be included as an essential feature in all the training programmes organized for farm women.

iv. Poor participation in decision making:

Generally, decision regarding the activities requiring technical competency and money related matters are taken by male members. Since knowledge and economic independence are the parameters of women empowerment enhancing the technical knowledge, skills and building greater involvement in various farm activities is needful.

v. Poor existing Research and Extension System or Poor gender consideration:

Though several technological breakthroughs have been observed in the recent past, the technologies by the researchers are not tailored to the specific needs of the farm women. With this result, most of the agricultural operations are performed manually and in an unskilled manner which results into greater drudgery on the part of farm women. In order to cater to the technological needs of the farm women, scientific information in agriculture should be tested and refined, special attention should be given by farm scientist for evolving relevant technologies or modifying existing ones, there should be active participation of rural women in developing new technology (Sandra *et al.*, 2001).

vi. Untapped women potential:

Though women have many inherent capacities like high determination, sense of responsibility, better managerial ability, yet their potential has not been identified by the extension personnel. For example, women are considered as reservoirs of rich traditional wisdom with respect to various agricultural practices.

Looking to the present status of women in agriculture and their limited access to research and extension services, it is utmost needed to revamp the entire approach towards women farmers to cater to their existing needs emphasizing the future challenges which the country has to face in the coming years. For this, there is no way but to develop the human resources. Hence, empowerment of women is the need of the day, as it is only the surest way of making women as partner's in development and bringing them in the mainstream of development, not only as mere, Beneficiaries but also contributors. If women are empowered, the day is not far away when

Feminization of agriculture will be in the offing and the theme ‘Women Feed the World’ will be true in its actual sense (Sandra *et al.*, 2001).

2.14 Measurement of Poverty

The purpose of poverty measurement is to find out who is poor, how many people are poor, and where the poor are located. There are two approaches to the construction of poverty line, the absolute poverty approach and the relative poverty approach. The former is based on cost of basic needs (CBN) approach in which some minimum nutritional requirement is defined and converted into minimum food expenses. A household is then defined as poor if its income or consumption level is below this minimum. The relative approach which this study adopted takes a proportion of mean annual income as the poverty line. For example, one-third and two-thirds of mean annual income is popular, the former defines core poverty line and the latter defines moderate poverty line (Durojaiye, 1995; World Bank, 1996; Ayinde, 1999; Omonona, 2001). The most frequently used measurements are:

1. The head count poverty index given by the percentage of the population that live in the household with annual income per capita less than the poverty line.
2. The poverty gap index which reflects the depth of poverty by taking into account, how far the average poor person’s annual income is from the poverty line.
3. The distributionally sensitive measure of squared poverty gap which reflects the severity of poverty.

Though some studies have used income as indicator for poverty line (Aromolaran *et al.*, 2002; Ayinde, 2003), this study however adopted annual farm income to construct the poverty line.

2.11.1 Double difference method

According to Nkonya *et al.*, (2008), double difference methods compares change in outcomes pre and post program for participant and non-participant. It is mostly used especially if selection bias is additive and time invariant. Using this techniques/outcome is not affected by expectations of participation because it's usually nets out the selection bias (Nkonya *et al.*, 2008). This method is said to be sensitive to data quality as measurement error is likely more serious in comparing change in variables than comparing levels.

2.12 Impact of Women Empowerment and Poverty Alleviation

There has been a noticeable impact of women empowerment as regards to poverty alleviation. Cloud *et al.*, (1985) stated that the projects where women's access to productive resources was high were also the projects with the highest efficiency. It is therefore stressed that both equity and efficiency are best served by projects that take explicit account of men's and women's roles in agricultural systems. As a result, the income of women when combined with the men will increase household income which will in turn alleviate household poverty.

According to Lawanson (2003), Poverty alleviation for women means not only an increase in their income, but also an increase in opportunities and access to productive resources such as land and capital, promotion of gender equity and encouragement of women participation in decision-making. So when women are empowered, they have more

opportunities to utilize resources at their disposal which would increase their productivity and income thereby improving their standard of living.

Date-Bah *et al.*, (1981) reported that introducing appropriate technology for women should not only be viewed in terms of methods which could lead to an increase in income and a reduction in drudgery, but also as an important means of social change in the life of the rural family. Therefore with this social change the rural family can adopt more technologies in the future which would in turn improve their lives.

Fakoya *et al.*, (2010) reported from their study that majority of the respondents realized between N10,000 –N20,000 monthly (\$67-134). The study also revealed that income from cassava production had an effect on the purchase of clothing material, payment of school fees and payment of health care services. This study apparently shows that cassava production has the capacity to alleviate poverty.

Fakayode *et al.*,(2008) in the study of productivity analysis of cassava-based production systems in the guinea savannah: case study of Kwara state, Nigeria revealed that land, labour, educational status of the household head and the fertilizer input significantly influenced the productivity levels in cassava-based farms. This shows that if women are empowered to have easy access to land, cheap labour and easy access to fertilizer, their production level will increase thereby leading to higher output and alleviating poverty.

2.13 RTEP Women Empowerment Activities

The implementation of RTEP commenced in July, 2001 with the goal of increasing income, alleviating poverty and improving food security status of the farmers with less than 2.0 hectares of land, growing and processing cassava, yam, cocoyam, Irish and sweet potatoes in the project area (Adekemi *et al.*, 2012).

The programme encouraged farmers to engage in improved cultural practices, given the high cost of inputs and the restricted access to credit by small scale farmers. This programme particularly encouraged women farmers to engage in cassava production and processing. Here, the women were been empowered in cassava production and processing by forming a number of groups in which they participated actively (KWADP, 2009). The activities that took place under this programme are farming activities and processing activities.

1. Farming activities: Here, the farmers were given improved varieties to plant on their farms so that the quantity of produce harvested would increase.

2. Processing activities: The farmers were assisted in purchasing equipment by subsidizing the price. This helped them process the cassava on time in various acceptable forms for consumption.

3. Extension activities: The extension agents introduced the farmers to various improved varieties and other cultural practices to improve their productivity.

CHAPTER THREE

METHODOLOGY

3.1 The Study Area

The study was conducted in Kwara state. The State lies between latitudes 6°50" N and 11°50" N and longitudes 2°80" E and 7°50" E and covers a total land area of about 332,500 square kilometers. The average temperature varies between 27⁰ c and 35⁰c. Throughout the year the mean annual rainfall is from 1000mm to 1500mm. The state shares boundary with Ekiti to the south, Oyo to the south, Osun to the south , Niger and Kogi States in Nigeria and an international border with the Republic of Benin along its north-western part (KWADP, 2006). The vegetation which is mainly wooded Guinea savannah is well suited for the cultivation of a wide variety of staples like cassava, maize, cowpea, fruits and vegetables. Rice and sugarcane are significant cash crops (Fakayode *et al.*, 2008).

The National Population Commission (NPC) census of 2006 puts the population of Kwara State at 2,371,089, with the Male populations at 1,220,581 and female population at 1,150,508.

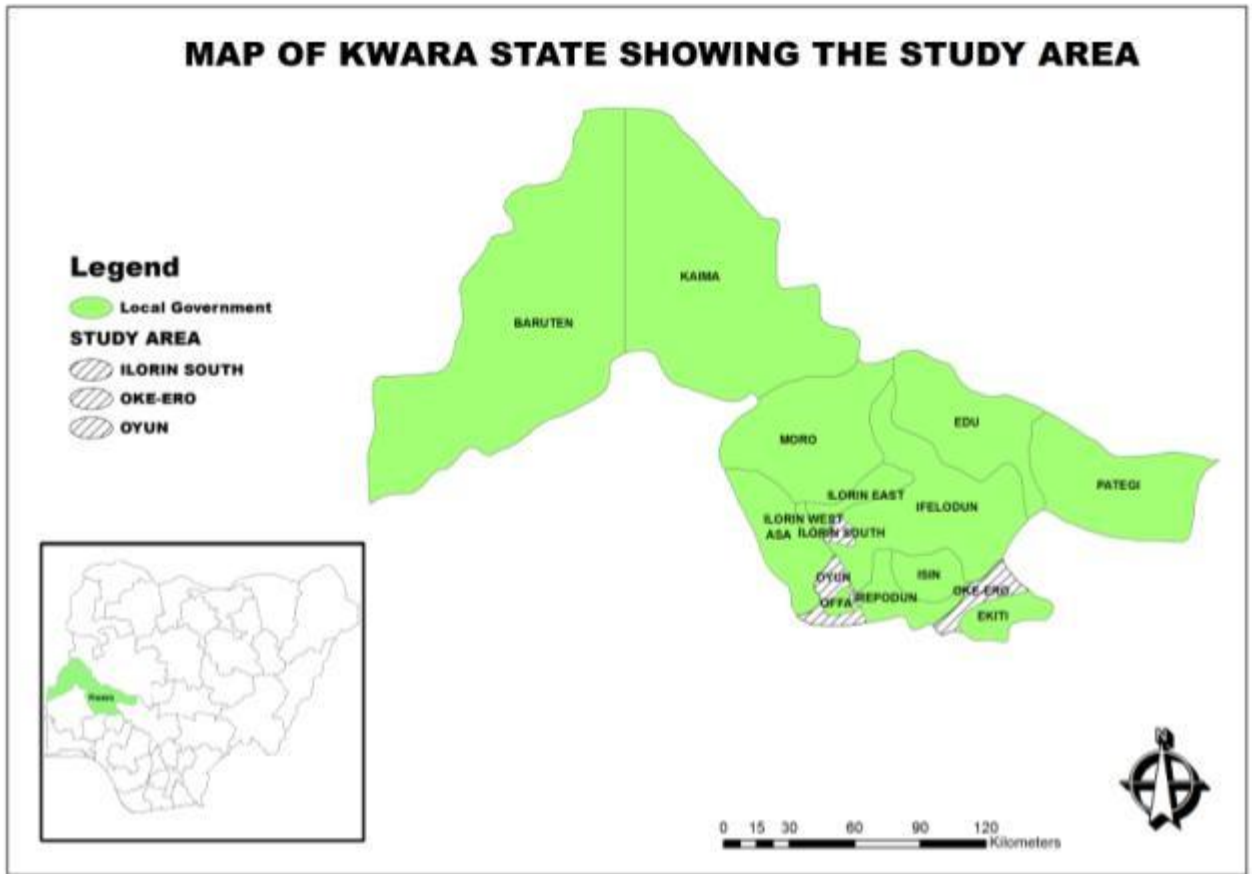


Fig. 1: Map of Kwara State Showing the Study Area

3.2 Sampling Procedure

A multistage sampling technique was used for the study in the selection of respondents. The first stage involved the purposive selection of three LGAs where RTEP activities have been implemented. (The reason for their selection was due to their high level of participation in the programme). The second stage was the purposive selection of the villages from the LGAs. The selection was as a result of their high level of involvement in the programme and the third stage involved the random selection of respondents by the use of cards. Two sets of respondents were involved, these include farmers and processors. Twelve percent of the population was used for the study as shown in Table 1

Table 1: Distribution of Respondents in the Study Area

LGA	Village	Population	Sample Size (12%)
Oyun	Erin-Ile	300	37
	Ijagbo	230	28
Ilorin South	Ilorin	500	62
	Tanke	310	38
Oke- Ero	Idofin Odo- Ashe	150	19
	Illofa	130	15
		1625	199

KWADP 2009

3.3 Data Collection

Primary data were used for the study. The data were collected from respondents using structured questionnaire. The primary data collected include age, educational level, extension contact, costs of fertilizer, agro-chemicals and labour.

3.4 Analytical Techniques

The analytical tools used in this study include; descriptive, FGT, DDE, multiple regression and two sample t-test.

3.4.1 Descriptive statistics

Descriptive statistics was used to achieve objectives i and iv. Here, means, percentages and frequencies were used.

3.4.2 Foster-Greer-Thorbecke (FGT) poverty measures

Foster-Greer-Thorbecke (1984) was used to achieve objective (ii). This was used to determine the Poverty Status of participants and non-participants of RTEP before and after obtaining credit. The model is specified as:

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^{Hi} \left(\frac{Z - Y_i}{Z} \right)^{\alpha}$$

$$P_0 = \frac{H_0}{N} \dots\dots\dots \text{(i)}$$

$$P_1 = \frac{1}{N} \sum_{i=1}^{H_i} \left(\frac{Z - Y_i}{Z} \right) \dots\dots\dots \text{(ii)}$$

$$P_2 = \frac{1}{N} \sum_{i=1}^{H_i} \left(\frac{Z - Y_i}{Z} \right)^2 \dots\dots\dots \text{(iii)}$$

Where,

P is the poverty index, α is a non-negative parameter, which takes the values 0, 1 and 2.

As the exponent increases the ‘‘aversion’’ to poverty as measured by FGT index increases.

When $\alpha = 0$, this index gives the head count ratio or the incidence of poverty which will be the percentage of participants and non-participants of RTEP that are classified poor in the area. When $\alpha = 1$, this index measures the poverty depth that is the proportion of the poverty line that the average poor will require to attain to the poverty line while severity of poverty is measured when $\alpha = 2$, Which is the mean of square proportion of the poverty gap.

When multiplied by 100, it gives the percentage by which a poor household’s per capita annual farm income should increase to push them out of poverty.

N= No of Respondents.

H_i = Head count of the poor (Number of poor farm household).

Y_i = Per capita annual farm income in Naira.

Z = Poverty line using 2/3 of mean per capita annual farm income of beneficiaries and non-beneficiaries of savings and credit cooperative societies in the study areas.

Construction of the Poverty Line

According to (FOS, 1999) and (Canagarajah and Thomas, 2002), there is no official poverty line in Nigeria and as such many earlier studies have used poverty lines which are proportions of the average per capita income or expenditure. However, in this study per capita annual farm income was used. Therefore, the poverty line was defined as

the two-thirds (2/3) and one-third (1/3) of the mean value of per capita annual farm income for beneficiaries and non-beneficiaries before and after obtaining credit in the study area.

$$\text{PCFI} = \text{TFI}/\text{HHS} \dots\dots\dots (\text{iv})$$

$$\text{MPCFI} = \text{TFI} / \text{TNR} \dots\dots\dots (\text{v})$$

$$\text{PL} = 2/3 \text{ or } 1/3 * \text{MPCFI} \dots\dots\dots (\text{vi})$$

Where:

PCFI = Per Capita Annual Farm Income

TFI = Total Farm Income

HHS = Household Size

MPCFI = Mean Per Capita Annual Farm Income

TNR = Total Number of Respondent

PL = Poverty Line

The Poverty line was placed at two-third and one-third mean per capita annual farm income of respondents as adopted by FOS (1999) and the World Bank/FOS/NPC (1998).

Based on this, the respondents were classified into three groups:

- Non-Poor: those with annual farm income above two-third mean per capita annual farm income, i.e. (above ₦192,885.30 and ₦193,409.70 per annum before and after obtaining credit).
- Moderate Poor: those with annual farm income between one-third and two-third mean per capita annual farm income, i.e.(between ₦96,442.66 and ₦192,885.30 per annum before while between ₦96,704.86 and ₦193,409.70 per annum after obtaining credit).

- Core poor: those with annual farm income below one-third mean per capita annual farm income, i.e. (below ₦96,442.66 and below ₦96,704.86 per annum before and after obtaining credit respectively).

3.4.3. Tobit model

A Tobit model is based on a censored dependent variable. A sample in which information on the regressand (dependent variable) is only available only for some observations is known as censored regression model (Eboh, 2009). Tobit model can be used in cases where the dependent variable is either zero or positive. It is useful in situations where the dependent variable has the property of jumping discretely to zero or any other threshold. Tobit model is a modification of probit model as it is developed based on the cumulative normal distribution function (Rahaman, 2011). The tobit model was used to determine the relationship between the extent of production of cassava and its products and the various factors that affects the production cassavaand processing of the participants only.

The equation is as follows as specified by (Rahaman, 2014):

$$Y_i = Y_i^* \quad \text{if } Y_i > 0 \quad \text{While,}$$

$$Y_i = 0 \quad \text{if } Y_i^* \leq 0, \quad Y_i = f(\beta x_i, \mu_i)$$

Where; Y_i = dependent variable (yield) (kg/unit area)

X_i is the vector of explanatory variables specified as determinants of intensity of cassava production which includes:

X_1 = Age of the respondent (years)

X_2 = Occupation

X_3 = Extension contact (number of contact with extension agent)

X_4 = Farming Experience (years)

X₅= Fertilizer cost (Naira/kg)

X₆= Agro- Chemical cost (Naira/Liter)

X₇= Labour (Man days equivalent)

β is the unknown co-efficient while μ is an independently distributed error term.

The tobit regression variables for processors are as follows:

Y_i = dependent variable (Output of processed cassava) (kg/bag)

While the independent variables are as follows:

X₁= Education (years)

X₂= Extension contact (number of contact with extension agent)

X₃= Major Occupation (Farmer=1, others=0)

X₄= Years of participation

β is the unknown co-efficient while μ is an independently distributed error term.

3.4.4 Double Difference Estimator

Double difference method is a standard programme evaluation tool used to measure potential programme impact (Verner and Verner, 2005). Information on both beneficiaries and non-beneficiaries were provided for before and after the empowerment programme, it is literally a “difference of difference” (Albouy, 2010). Double Difference Estimator was used to evaluate objective iii. The formula is given as follows:

$$DD^S = \left[\frac{1}{p} \sum_{i=1}^{i=p} (Y1ia - Y1ib) \right] - \left[\frac{1}{c} \sum_{j=1}^{j=p} (Yoja - Yojb) \right]$$

Where:

i= ith No. of participants

j= jth No. of non-participants (control)

Y_{oja} = Non-participants jth at time “a” (income, productivity and poverty alleviation) after the programme

Y_{ojb} = Non-participants jth at time “b” (income, productivity and poverty alleviation) before the programme

Y_{1ia} = Participants total (income, productivity and poverty alleviation) ith at time “a” (after) the programme

Y_{1ib} = Participants total (income, productivity and poverty alleviation) ith at time “b” (before) the programme

C = number of individuals in the control group (non-participants)

P = number of participants

DD^S = Double difference (N)

3.4.4.1 Multiple Regression

Athey and Imbens (2006) worked on non-parametric approaches to difference-in-differences and it was adopted by Khandker *et al.*, (2012). The regression model serve as a supporting technique to that which has been obtained by the double difference estimate (Khandker *et al.*, 2012). However, in order to take observable heterogeneity of individuals into account, Verner calculated the double difference estimator from a regression model including other personal characteristics. It is specified as:

$$Y_{it} = \alpha + \beta T_i + \gamma P_t + \delta (T_i * P_t) + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_6 X_{6i} + \varepsilon_{it} \dots \dots \dots (ix)$$

Where Y is the outcome of interest, T is the treatment and control groups which is indicated by dummy with equal one for those observations in treatment group and zero for control groups; P is the time period (first period is for before and second period is for after

project) which is indicated by dummy with equal one for those observations in the treatment and control group in the second period (after) and zero for first period (before).

The coefficient of interest, is the interaction term which is $(T_i * P_t)$.

Y_{it} = Income, Productivity and Poverty Status in period t of the project.

T_i = Dummy (1 if respondent i is beneficiaries and 0 otherwise)

P_t = Dummy (1 indicating after participating and 0 before participating).

$(T_i * P_t)$ = An interaction term between the treatment and time period.

β_i = Coefficient for the respective variables.

3.4.5 Two Sample t-test

The two sample t-test was used to test significant difference in the income, productivity and poverty status of cassava producers and processors (participants and non-participants) in the study area.

The formula is given as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2 - \Delta}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Where,

\bar{x}_1 = Mean of income, productivity and poverty status of producers and processors (participants) in the study area

\bar{x}_2 = Mean of income, productivity and poverty status of producers and processors (non-participants) in the study area

Δ = Hypothesized difference between the population means (given)

s_1 = Standard deviation of the producers and processors (participants) in the study area

s_2 = Standard deviation of the producers and processors (non-participants) in the study area

n_1 = Sample size of the producers and processors (participants) in the study area

n_2 = Sample size of the producers and processors (non-participants) in the study area

3.5 Variable Definition and Measurement

Age: Age is the length of time that somebody has existed, usually expressed in years. Age affects the decision making process of a farmer as it relates to adoption of improved agricultural technologies, risk aversion and marketing of produce. According to Mohammed (2011), the older the farmer is, the better is his understanding of the social, climatic and economic factors that affect farming.

Educational Level: Education is the act or process of acquiring knowledge, especially systematically during childhood and adolescence. Education affects the rate of adoption of innovations and technologies. It is measured in years. According to Ojuekaiye (2001), education is an essential socio-economic factor that influences farmer's decision because of its effect on the awareness and adoption of innovation that can enhance output.

Occupation: This is the kind of job a person does to earn a living. An individual may have both a major and secondary occupation just to make ends meet. A farmer can have a secondary occupation of a processor. Proxy was used to measure occupation (farmer=1, artisan=2, trading=3 processing=4).

Extension Contact: This is the number of times the extension agents have visited the farmers in order to train them on various farming and processing techniques and also to evaluate their progress.

Years of farming experience: This variable tells us how long a farmer has been into farming and this is measured in years

Years of participation: This is the period of time in which an individual has been an active member of an empowerment programme. This variable is measured in years.

Farm size: Land is one of the main factors of production. It is an *area* of ground used for some particular purpose (such as for farming). The farm size refers to the extent or area of land which is owned and used for farming of cassava by the farmers. This is measured in hectares.

Labour: Labour is an essential component in all agricultural activities. This is the effort put into an activity to produce a given result. Both family and hired labour are used on the farm. Labour is measured in man-hour /man- day

Fertilizer: This is an organic or synthetic substance usually added to or spread onto soil to increase its fertility to support plant growth. Synthetic fertilizer is mostly used by cassava farmers. It is measured in kilograms.

CHAPTER FOUR

RESULT AND DISCUSSION

This chapter presents and explains the findings of this study in line with the objectives of this study. The first section of this chapter deals with the analysis of data using descriptive statistics which includes frequencies and percentages. The second section involves using Tobit model to determine the influence of some factors on the intensity of production and processing of cassava. Also, the third section involves using DDE to determine the impact of women empowerment on income and productivity. Lastly, the constraints to women empowerment were also be discussed.

4.1 Socio-Economic Characteristics of Respondents

The socio-economic characteristics of cassava farmers and processors were considered in this study because of their importance to agricultural production, These include; age, educational level, household size, occupation, cassava enterprise, extension visits, years of farming experience, years of participation and farm size.

4.1.1 Age

Age is an important factor which affects production. The result in Table 2 showed that the mean age of participants was 40 while that of the non-participants was 37 years, indicating that most of the farmers were within the economically active age range. According to Fakoya and Daramola (2005), respondents within this age range are more innovative, motivated and adaptable persons who can withstand challenges arising from production.

Table 2: Distribution of Cassava Farmers based on Age

Age	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage

26-30	0	0	16	17
31-40	46	48.4	51	54
40-50	49	51.6	28	29
Mean	40		37	

4.1.2 Level of Education

The findings of this study revealed that majority (71%) of the participants and non-participants had educational attainment while 29% had no formal education. From the result in Table 3, majority of the respondents were educated. The high level of literacy among the women farmers may increase their farm productivity and production efficiency. Literacy rate in Nigeria according to National Literacy Survey 2010 among adults is 71.6% and from the result in Table 3, it can be said that most of the participants and non-participants are literate.

Table 3: Distribution of Cassava Farmers based on Educational Level

Level of Education	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
No Formal Education	19	20	19	20
Primary Education	26	27	39	41
Secondary School Education	36	38	30	32
Tertiary Education	14	15	7	7

4.1.3 Major Occupation

The result from Table 4 showed that, 99% of the participants engaged in farming of cassava as their major occupation while 1% engaged in processing as their major occupation. Also, for the non-participants, 93% engaged in farming of cassava as their major occupation while 5% engaged in processing. A few (1%) were artisans and likewise traders. This implies that majority of the respondents had farming as their major occupation.

Table 4: Distribution of Cassava Farmers based on Major Occupation

Major Occupation	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
Farming	94	99	88	93
Artisan	0	0	1	1
Trading	0	0	1	1
Processing	1	1	5	5

4.1.4 Secondary Occupation

The secondary occupation of the farmers was also examined. The result from Table 5 showed that 38% of the participants engaged in processing as their secondary occupation and 25% engaged in farming. For the non-participants, 32% engaged in processing as their secondary occupation and 30% engaged in trading. This implies that in addition to their major occupation, they all engaged in other forms of occupation which was expected to increase their income and their standard of livelihood at large.

Table 5: Distribution of Cassava Farmers based on Secondary Occupation

Secondary Occupation	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
Farming	24	25	18	19
Artisan	12	13	18	19
Trading	23	24	28	30
Processing	36	38	31	32

4.1.5 Cassava Enterprise

The result presented in Table 6 showed that 61.1% of the participants engaged in production enterprise while 38.9% engaged in both production and processing enterprise.

For the non-participants, 63% engaged in production enterprise and 37% engaged in both production and processing enterprise. This implies that most of the farmers engaged in more than one cassava enterprise to boost their level of income.

Table 6: Distribution of Cassava Farmers based on Cassava Enterprise

Cassava Enterprise	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
Production	58	61.1	60	63
Processing	0	0	0	0
Production/processing	37	38.9	35	37

4.1.6 Extension Contact

Extension agent contact is very vital in agricultural development. The result in Table 7 showed that the mean number of extension visits was 3 times for the participants (43%). The non-participants had no visits from extension agents. It can be noted that all the participants had extension visits. They have been trained on improved production techniques which may have increased their output and led to an improvement in their standard of living and eventually reduce poverty and this was in line with the expectation of RTEP.

Table 7: Distribution of Cassava Farmers based on Extension Visits

Extension Visits/Year	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
2 times	41	43	0	0
3 times	41	43	0	0
4 times	41	43	0	0
Mean	3		0	

4.1.7 Farming Experience

The result in Table 8 showed that the average number of years for farming experience was 21 for participants and 16years for the non-participants. Experience plays a significant role

in agricultural production. It is expected that the higher the farmers' experience, the better will be the productive capacity of the farmer. The negative effect may be derived from aging or reluctance to change from old and familiar farm practices and techniques to those that are modern and improved (Amaza *et al.*, 2006).

Table 8: Distribution of Cassava Farmers based on Farming Experience

Farming Experience	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
0-13	30	30	35	40
14-26	45	50	48	51
27-39	20	20	12	9
Mean	21		16	

4.1.8 Years of Participation

The years of participation in cooperative society's activities or an empowerment programme are important in agriculture because members can easily get access to various resources. The result in Table 9 showed that the average years of participation for both participants and non-participants were 14 years. This implies that they all had considerable years of participation in various cooperative societies. And due to their access, they likely had access to funds and trainings which in turn would improve their production and alleviate poverty.

Table 9: Distribution of Cassava Farmers based on Years of Participation

Years of Participation	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
0-10	40	42	27	30
11-20	54	57	36	40
20-30	1	1	32	30

Mean

14

14

4.1.9 Farm Size

The result in Table 10 showed that 37% of the participants had their farm size between 0.2-0.5 hectare while 33% had their farm size between 0.6-1 hectare. The average land size was 1.8 hectares. For the non-participants, 45% have between 0.2-0.5 hectare while 44% have between 0.6-1 hectare. The average farm size for non-participants was 0.7. This implies that most of the participants and non-participants were predominantly small scale operators because of their small farm holdings. One of the objectives of RTEP was to empower women with less than 2 hectares of land.

Table 10: Distribution of Cassava Farmers based on Farm Size

Farm Size	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
0.2-0.5	36	37	43	45
0.6-1	32	33	41	44
1.1-1.5	6	6	1	1
1.6-2	21	24	9	9
2.0-2.5	0	0	1	1
Mean	1.8		0.7	

4.2 Socio- Economic Characteristics of Cassava Processors

4.2.1 Age

The result on Table 11 showed the mean age for participants as 40 and for the non-participants as 39. Some 52% of the participants were between the ages of 31 and 40 years while for the non-participants, 57% were between the ages of 31 and 40. This result implies that most of the processors are in their active age.

Table 11: Distribution of Cassava Processors Based on Age

Age	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
0-30	0	0	23	22

31-40	54	52	59	57
40-50	50	48	22	21
Mean	40		39	

4.2.2 Level of Education

Majority of the participants and non-participants had one form of education or another. The result in Table 12 showed that 71% of the participants had one form of education or another while 61% of the non-participants had one formal education. Education is important in processing because knowledge and skill is needed. From the result, the participants were more educated than the non-participants.

Table 12: Distribution of Cassava Processors Based on Educational Level

Educational Level	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
No Formal Education	30	29	30	29
Primary Education	29	28	34	33
Secondary Education	36	34	30	28
Tertiary Education	9	9	10	10

4.2.3 Major and Secondary Occupation

The result in Table 13 showed that 64% of the participants engaged in processing as their major occupation. For the non-participants, 65% engaged in processing as their major occupation. For the secondary occupation in Table 13, it was observed that 54% of the participants engaged in processing as their secondary occupation while the non-participants had 46% engaged in processing. This implies that the respondents engage in other forms of business to help increase the amount of income they earned.

Table 13: Distribution of Cassava Processors Based on Major and Secondary Occupation

Participants	Non-Participants	Participants	Non-Participants
--------------	------------------	--------------	------------------

Major Occupation	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Farming	36	35	30	29	1	1	5	5
Artisan	0	0	2	2	16	15	11	11
Trading	1	1	4	4	31	30	40	38
Processing	67	64	68	65	56	54	48	46

4.2.5 Cassava Enterprise

The result in Table 14 showed that 64% of the respondents (participants) were involved in cassava processing enterprise and 36% were involved in both production and processing enterprises. For the non-participants, 67% were into cassava processing and 33% were into both production and processing enterprises. This means that majority of the respondents (participants and non-participants) engaged in processing of cassava only.

Table 14: Distribution of Cassava Processors Based on Cassava Enterprise

Cassava Enterprise	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
Production	0	0	0	0
Processing	67	64	70	67
Production/Processing	37	36	34	33

4.2.6 Extension Visits

The average number of extension visits by extension agents was three times in a year. It can be noted from Table 15 that 52% of the participants had three visits from extension agents per year while 40% had two visits from the extension agents while 8% had four visits. Extension visits are very important because the extension agents train processors on various methods of processing which helps to improve their output. According to Obwona

(2000), extension service is very essential to the improvement of farm productivity and efficiency among farmers.

Table 15: Distribution of Cassava Processors Based on Extension Visits

Extension Visits	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
2 times	42	40	0	0
3 times	55	52	0	0
4 times	7	8	0	0
Mean	3		0	0

4.2.7 Years of Participation

As shown in Table 16, the average years of participation in the empowerment programme for participants and non-participants was 15 years. This means that 98% of the participants had 13-15 years of participation in the programme. The data showed that most of the respondents were participants and this would help in the interaction of members and easy diffusion of information and assistance from government.

Table 16: Distribution of Cassava Processors Based on Years of Participation

Years of Participation	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
13-15	93	89	100	96
16-19	11	11	4	4
Mean	15		15	

4.3 Factors Influencing the Intensity of Cassava Production

The result of the Tobit model for factors influencing the intensity of cassava production among participants showed that age, occupation and agro-chemical cost were significant, while factors such as extension visits, farming experience, labour and fertilizer costs were not significant. Intensity was measured using the yield which is given as kg/unit area.

The age variable had a regression coefficient of -589.12 and statistically significant at ($p < 0.001$). This implies that a unit increase in age would decrease the intensity of cassava production by -589.12 units. This might be as a result of the farmer aging. Also, the regression coefficient for occupation was 190.89 and statistically significant at ($p < 0.01$). This implies that a unit increase in occupation would increase the intensity of cassava production by 190.89 units. Agro-Chemical cost was found to be negative and statistically significant at ($p < 0.01$). This implied that a unit increase in agro-chemical cost would decrease the intensity of cassava production by -0.137 unit. The other variables were not statistically significant because they did not influence the extent of cassava production. The result of the tobit regression is shown on Table 17.

Table 17: Estimates of Factors Influencing Intensity of Cassava Production

Variable	Coefficient	Std Error	t ratio
Age	-589.12**	283.445	-2.078
Occupation	190.89***	113.24	1.686
Extension Visit	338.582	212.257	1.595
Farm Experience	53.273	66.063	0.806
Fertilizer Cost	149.913	106.694	1.405
Agro-Chemical cost	-0.137***	0.078	-1.745
Labour Cost	-0.0268	0.0277	0.967
Log Likelihood	-813.71		

***Significant at 10%, ** Significant at 5% and * Significant at 1%

4.3.1 Factors Influencing the Intensity of Cassava Processing

The result of the Tobit model for factors influencing the intensity of cassava processing among participants showed that factors such as extension visits and years of participation were statistically significant while occupation was found to be negative. The intensity of cassava processing was measured by using kg/bag of processed cassava.

Extension visit is an important factor to consider in determining factors that influence the intensity of cassava processing. The regression coefficient for extension visit was 38.62 and statistically significant at ($p < 0.0001$). This implies that a unit increase in extension visit would increase the intensity of cassava processing by 38.62 units. Also the years of participation variable had a regression coefficient of 5.79 and statistically significant at ($p < 0.01$). This implies that a unit increase in years of participation would increase the intensity of cassava processing by 5.79 units. The occupation variable had a negative regression coefficient and was not statistically significant. This might be as a result of the processor investing in other things other than cassava processing enterprise. The result is shown in Table 18.

Table 18: Estimate of Factor Influencing Intensity of Cassava Processing

Variable	Coefficient	Std Error	t ratio
Education	1.197	9.145	0.131
Extension Visit	38.62*	14.874	2.596
Occupation	-1.271	8.719	-0.146
Years of Participant	5.786***	3.461	1.672
Log Likelihood	-621.57		

***Significant at 10%, ** Significant at 5% and * Significant at 1%

4.4: Poverty Status for (Cassava Farmers) Participants and Non-Participants of RTEP

The study established poverty thresholds based on the 2/3 and 1/3 mean per capita annual farm income (MPCFI) for cassava farmers who were participants and non-participants of RTEP. The year considered for before is 2000 and after is 2013. The study revealed that 23.16% and 0% of participants and about 18.95% and 23.16% of the non-participants lived below the poverty line before and after the empowerment programme. Also 40% and 33.68% of participants and about 72.63% and 71.58% of the non-participants were

moderately poor before and after the empowerment programme. It was found that 36.84% and 66.32% of participants and 8.42% and about 5.26% of the non-participants were under the non-poor category before and after the programme. The implication of the result reveals that, there was more improvement in the poverty status of especially participants after the empowerment programme.

The poverty depth for participants were 0.19 and 0.17 while for non-participants 0.17 and 0.14 also the poverty severity for participants were 0.07 and 0.02 and about 0.07 and 0.05 for non-participants before and after the empowerment programme. The implication of this is the fact that, the severity of poverty of participants after the programme was less than the non-participants by 20% even though they both had initially 70% poverty severity. The results are shown in Table 19.

Table 19: Poverty Status of (Cassava Farmers) Participants and Non-Participants of RTEP

Poverty Category	Participants		Non-Participants	
	Before	After	Before	After
Non-Poor	35 (36.84)	63 (66.32)	8 (8.42)	5 (5.26)
Moderate Poor	38 (40)	32 (33.68)	69 (72.63)	68 (71.58)
Core Poor	22 (23.16)	0 (0)	18 (18.95)	22 (23.16)
FGT Poverty Indices				
Poverty Incidence (Po)	0.57	0.49	0.58	0.65
Poverty Depth (P1)	0.19	0.17	0.17	0.14
Poverty Severity (P2)	0.07	0.02	0.07	0.05
POVERTY LINES:				
	BEFORE		AFTER	
MPCFI	= ₦ 148, 791.70 Per annum		= ₦ 553,826.10 Per annum	
2/3*(MPCFI)	= ₦ 99,194.44 Per annum		= ₦ 369,217.40 Per annum	
1/3*(MPCFI)	= ₦ 49,597.22 Per annum		= ₦ 184,608.70 Per annum	

Figures in parenthesis are the percentages

4.4.1: Poverty Status for (Cassava Processors) Participants and Non-Participants of RTEP

The study established poverty thresholds based on the 2/3 and 1/3 mean per capita annual farm income (MPCFI) for cassava processors who were participants and non-participants of RTEP. The year considered for before is 2000 and after is 2013. It was found that 23.08% and 2.85% of participants and about 43.26% and 36.53% of the non-participants above the poverty line before and after the empowerment programme. Also 70.19% and 69.23% of participants and about 39.42% and 55.77% of the non-participants were moderately poor before and after the empowerment programme. It was found that 6.75% and 1.92% of participants and 17.30% and about 7.69% of the non-participants were under the core poor category before and after the programme. The implication of the result

reveals that, there was more improvement in the poverty status of especially participants after the empowerment programme.

The poverty depth for participants were 0.14 and 0.10 while for non-participants 0.17 and 0.09 also the poverty severity for participants were 0.06 and 0.02 and about 0.08 and 0.03 for non-participants before and after the empowerment programme. The implication of this is the fact that, the severity of poverty of participants after the programme was less than the non-participants by 20%. The results can be seen on Table 20.

Table 20: Poverty Status of (Cassava Processors) Participants and Non-Participants of RTEP

Poverty Category	Participants		Non-Participants	
	Before	After	Before	After
Non-Poor	24 (23.08)	30 (28.85)	45 (43.26)	38 (36.53)
Moderate Poor	73 (70.19)	72 (69.23)	41 (39.42)	58 (55.77)
Core Poor	7 (6.73)	2 (1.92)	18 (17.30)	8 (7.69)
FGT Poverty Indices				
Poverty Incidence (Po)	0.56	0.51	0.52	0.45
Poverty Depth (P1)	0.14	0.1	0.17	0.09
Poverty Severity (P2)	0.06	0.02	0.08	0.03
POVERTY LINES:				
	BEFORE		AFTER	
MPCFI = ₦	153,500.00 Per annum		= ₦ 302,373.00 Per annum	
2/3*(MPCFI) = ₦	102,333.30 Per annum		= ₦ 201,583.30 Per annum	
1/3*(MPCFI) = ₦	51,166.67 Per annum		= ₦ 100,791.70 Per annum	

Figures in parenthesis are the percentages

4.4.2: Impact of Empowering Cassava Women Farmers on their Income, Productivity and Poverty Status

The double difference estimates of impact of empowering cassava women farmers on Table 21 revealed that the mean income for participants was ₦ 1,566.33 (21.1%) and ₦ 5,892.74 (78.82%) and about ₦ 1,472 (36.06%) and ₦ 2,610.97 (63.93%) for non-

participants before and after the empowerment programme. Also, the percentage mean income for participants and non-participants after the programme were 57.64% and 27.87%. The DDE value (₦ 3, 124.75) of income was positive. This implies that income increased as a result of the empowerment programme. This result is in agreement with the findings of Abdullahi (2005) who found a significant difference in income between participants and non-participants in his study of some poverty eradication programmes. The result on Table 21 showed that the participants had slightly higher productivity than the non-participants and their productivity was higher after the programme. Productivity was measured by dividing the output by an input (land). The DDE value (1117.89kg/ha) of productivity was positive. This implies that the productivity increased slightly. The DDE value (₦197,901) of poverty status was positive. This implies that the empowerment programme improved the poverty status of the participants.

Table 21: Double Difference Estimate of Impact of Empowerment on Women's Income, Productivity and Poverty Status of Farmers

	Before	After	Difference
Income(NGN/Farmer/Month)			
Participants	1566.23	5829.75	4263.52
Non-Participants	1472.19	2610.96	1138.77
Difference	94.0351	3218.78	3124.75
Productivity (kg/ha/Farmer)			
Participants	11287.4	13230.5	1943.16
Non-Participants	8070.53	8895.79	825.263
Difference	3216.84	4334.74	1117.89
Poverty Status (Per Capital Income)			
Participants	99194.4	369217	270023
Non-Participants	93238.9	165361	72122.2
Difference	5955.55	203856	197901

4.4.3: Impact of Empowering Cassava Women Processors on Income, Productivity

and Poverty Status

The double difference estimate on Table 22 revealed that the income of the (processors) participants was greater than the income of the non-participants. The income of participants nobefore and after the empowerment programme was ₦1,490.29 (33.67%) and ₦ 2933.68 (66.33%). While for non-participants, it was ₦ 1,467.64 (38.06%) and ₦ 2,388.35 (61.94%). The percentage mean increase for the participants andnon-participants were (32.65%) and (23.88%). The DDE value (₦524.68) for the income was positive. This implies that the income increased as a result of the empowerment programme. The result on Table 22 showed that the participants had more productivity than the non-participantsafter the programme. The DDE value (48.37kg) of productivity was positive. This implies that the productivity of the processors increased as a result of the empowerment programme. The value for poverty status for participants was higher than that of the non-participants and the DDE value (₦36,027.8) for poverty statuswas positive. This implies that the empowerment programme reduce the incidence of poverty among the participants in the empowerment scheme.

Table 22: Double Difference Estimate of Impact of Empowerment on Women's Income, Productivity and Poverty Status of Processors

	Before	After	Difference
Income (NGN/Processor/Month)			
Participants	1490.29	2935.68	1445.39
Non-Participants	1467.64	2388.35	920.71
Difference	22.65	547.33	524.68
Productivity (kg/bag/Processor)			
Participants	250.75	468.29	218.84
Non-Participants	185.67	356.16	170.47
Difference	65.08	112.13	48.37
Poverty Status (Per capital Income)			
Participants	102333	201583	99250
Non-Participants	100778	164000	63222.2
Difference	1555.56	37583.3	36027.8

4.4.4: Effect of Participation in Empowerment Programme on Farmers' Income, Productivity and Poverty Status

The regression result was used to support the double difference estimates. The coefficient of time for income and participation were positive and statistically significant at 1% levels of probability. This implies that as long as farmers participate in the empowerment programme, over a period of time, their income increases. Furthermore, the result in Table 23 showed that the coefficient for income when time and participation interacted (T*P) was positive and significant at 1% levels of probability. This means that income would increase among farmers who were participating in the empowerment programme as they spent more time in effective participation in the empowerment programme. The result in Table 23 revealed that the coefficient of time for productivity and poverty alleviation was positive and statistically significant at 1% and 5% levels of probability. This implies that as the farmers' level of participation increase, productivity would increase and poverty status would improve. The result in Table 23 revealed that the coefficient of time and participation (T*P) for poverty status was positive and significant at 1% level of

probability, implying that more time spent in participating in an empowerment programme improves the poverty status of the participant. This result is consistent with the findings of Ezeh (2004) and Nkonya *et al.*, (2008) who reported that Fadama project beneficiaries were better off than their non-beneficiary counter-part in terms of income and productivity.

Table 23: Regression Result of Effect of Participation in Empowerment Programme on Farmers' Income , Productivity and Poverty Status

Variable	Income	Productivity	Poverty Status
Intercept	1721.8 (8.53*)	672.544 (15.29*)	1147.86 (8.53*)
T	3976.85 (13.94*)	268.07 (4.30*)	2651.24 (13.94*)
P	762.274 (2.37*)	116.14 (1.86***)	508.183 (2.37*)
T*P	3124.75 (2.62*)	1117.89 (2.50*)	197901 (20.62*)

Figures in parentheses are the t-values. * Significant at 1%,*** Significant at 10%

4.4.5:Effect of Participation in Empowerment Programme on Processors' Income, Productivity and Poverty Status

The regression estimates in Table 24 revealed that the coefficients of time and participation for income and productivity and significant at 1% and 10% levels of probability. However, the coefficient of time for income was negative. This implies that as the processors levels of time increases their income decreases and this could be as a result of ineffective participation in the empowerment programme. The coefficients of participation of income, productivity and poverty status were positive and statistically significant at 1% levels of probability. This implies that processors participating in the programme earn more income, have higher productivity and experience improvement in their poverty status than those who do not participate in the empowerment programme. The result also showed that the coefficients of time and participation(T*P) for income, productivity and poverty status were positive and significant at 1% level of probability which means that income would

increase, productivity would be higher and poverty status would be improved among participants in the empowerment programme.

Table 24: Regression Result of Effect of Participation in Empowerment Programme on Processors' Income , Productivity and Poverty Status

Variable	Income	Productivity	Poverty Status
Intercept	1680.7 (21.47*)	228.55 (17.71*)	1120.47 (21.47*)
T	-197.37 (-1.78***)	22.5434 (1.23*)	131.58 (1.78***)
P	489.246 (4.72*)	88.0907 (5.16*)	326.164 (4.72*)
T*P	524.68 (6.21*)	48.37 (2.96*)	36027.8 (26.21*)

Figures in parentheses are the t-values. * Significant at 1%,*** Significant at 10%

4.4.6: Test of Hypotheses

The results from the paired t -tests in Table 25 revealed that the difference in the means of income, productivity and poverty alleviation of both farmers and processors were significant at 1% levels of probability. Thus the null hypothesis was rejected Therefore it can be concluded that;

- i. There is significant difference in the income of empowered women (cassava producers and processors) and those that were not.
- ii. There is significant difference in the productivity of empowered women (cassava producers and processors) and those that were not.
- iii. There is significant difference in the poverty alleviation of empowered women (cassava producers and processors) and those that were not.

Table 25 : Results of Two-Sample t –tests

	Participants	Non-	Difference	t-Statistic
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	participants			
Farmers				
Mean of income	69956	31331.6	38625.4	11.21(1.98)
Mean of productivity	13230.53	9464.211	3766.32	4.89(1.98)
Mean of poverty Status	1.634	1.4266	0.21	2.42(1.98)
Observations	95	95		
Processors				
Mean of income	35620.19	32730.77	2889.42	2.27(1.98)
Mean of productivity	468.9103	250.6657	218.244	15.9(1.98)
Mean of poverty status	1.5594	1.37496	0.1844	2.83(1.98)
Observations	104	104		

Note: Value in Parentheses = Critical Value

4.5 Constraints associated with women empowerment in the study area.

The constraints faced by the participants and non-participants of the root and tuber expansion programme as shown in Table 26 revealed that women complained of inadequate capital (45%) which was the major constraint followed by inadequate training (20%) by extension agents and poor market price (16%) of produce.

i. Inadequate Capital: 45% of the respondents identified that inadequate capital was a major constraint that faced them. This implies that investment in purchase of inputs and processing equipment was hampered and this has affected their productivity.

ii. Inadequate Training: This constraint affected 20% of the respondents. They complained of poor contact between them and the extension agents and thus, leading to low awareness. The extent of extension contact and training goes a long way in improving the respondents' knowledge and skills.

iii. Poor Market: This constraint is another challenge that faced the respondents. Having access to good market and good market information on price and demand for the commodity is vital to producers and processors. About 16% of the respondents were said this as a constraint.

iv. Poor Transport System: 8% of respondents identified that poor transport system affected the delivery of their produce to the markets. This has affected the price at which they sell their produce.

v. High cost of modern processing machines: Among the constraints, 7% of the respondents stated that the costs of modern processing machines were too high for them to afford and this has in turn reduced their level of production. The modern processing machines include grinders and rotary driers.

Table 26: Constraints to women Empowerment

Constraint	Frequency	Percentage	Ranking
Inadequate Capital	149	45	1 st
Inadequate Training	67	20	2 nd
Poor Market	54	16	3 rd
Poor Transport System	27	8	4 th
High cost of modern processing machines	24	7	5 th
Total	334		100

Multiple responses were allowed

CHAPTER FIVE

SUMMARY, CONCLUSION, CONTRIBUTION TO KNOWLEDGE AND RECOMMENDATIONS

5.1 Summary

The study evaluated women empowerment in cassava production and processing as a means of household poverty status in Kwara State. Data for the study were obtained by administering questionnaires to 398 respondents from Three Local Government Areas in Kwara State. The data collected were analyzed using descriptive statistics and inferential statistics in order to achieve the objectives of the study.

The findings of the study on the socio- economic characteristics of farmers (participants) indicated that majority of the participants (51.6%) were above 40 years of age. While for the non-participants, 54% were within the age group of 31-40. For education, 80% of the participants and non-participants had one formal education. The result for major occupation showed that 99% of the participants had farming as their major occupation and for the non-participants, 93% had farming as their major occupation. The result for the secondary education showed that 38% of the participants engaged in processing as their secondary occupation while 32% of non-participants engaged in processing. The result showed that 61.1% of the participants engaged in production enterprise while 63% of the non-participants engaged in production enterprise. The result for extension visit showed that 45% of the participants were visited four times in a year by the extension agents while non-participants had no visit from the extension agents. The means number of years for farming experience was 21 and 16 for participants and non-participants. While the mean number of years of participation was 14 years for both participants and non-participants. The result for farm size showed that 37% of the participants had between 0.2-0.5 hectares while 45% of the non-participants had between 0.2-0.5 hectares.

The summary for the processors (participants and non-participants) showed that for age, 52% of the participants were within the age bracket of 31 and 40 years while for the non-participants 57% were within the age bracket of 31 and 40 years. The study showed that 71% of the participants had one form of education or another while for the non-participants 71% had one form of education or another. The result revealed that 64% of the participants engaged in processing as their major occupation while 65% of the non-participants engaged in processing as their major occupation. For the secondary occupation, 54% of the participants engaged in processing while 46% engaged in processing as their secondary occupation. The result for cassava enterprise showed that 64% of the participants engaged in cassava processing enterprise while 67% of the non-participants engaged in cassava processing enterprise. The result showed that 52% of the participants had three visits from extension agents while the non-participants had no visit from the extension agents. The study revealed that, the means years of the participation for participants and non-participants was 15 years.

The poverty depth for (farmers) participants were 0.19 and 0.17 while for non-participants 0.17 and 0.14 also the poverty severity for participants were 0.07 and 0.02 and about 0.07 and 0.05 for non-participants before and after the empowerment programme, while the poverty depth for (processors) participants were 0.14 and 0.10 while for non-participants 0.17 and 0.09 also the poverty severity for participants were 0.06 and 0.02 and about 0.08 and 0.03 for non-participants before and after the empowerment programme. The DDE results for producers and processors revealed that the differences in the income, productivity and poverty status between participants and non-participants before and after the programme were positive. The regression results revealed that the variables of time,

participation and time interacted with participation, it was positively significant at 1% and 5% levels of probability indicating that the programme had a positive impact on the participants.

The Tobit regression analysis revealed that three variables namely; age, occupation and agro-chemical cost significantly influenced the intensity of cassava production. Also the tobit regression analysis showed that two variables namely; extension visits and years of participation significantly influenced the intensity of cassava processing. The calculated two sample t – values for income, productivity and poverty status of farmers and processors were significantly significant.

The constraints identified by the respondents include inadequate capital which was the major constraints to women empowerment in Kwara State followed by inadequate training by extension agents and poor market prices.

5.2 Conclusion

The Root and Tuber Expansion Programme has significantly helped to improve the poverty status of women who participated in the empowerment programme. The incidence of poverty especially among the women could be reduced through effective participation in empowerment programmes which are associated with increased income, and productivity. However, those who did not participate in the empowerment programme witnessed a decrease in their poverty status. Thus, there is room for the establishment of more empowerment programmes who would encourage women in areas experiencing high incidence of poverty.

5.3 Contributions of the study to knowledge

- i. It was established that 0% of the participant farmers are living below the poverty line while 23.16% of the non-participant farmers are living below the poverty line after the empowerment programme. Similarly, 1.92% of the participating and 7.69% of the non-participant processors are below the poverty line.
- ii. It was discovered that the percentage mean income for participants and non-participants farmers after the programme were 57.64% and 27.87% and about 32.65% and 23.88% for participant and non-participant processors.

5.4 Recommendations

The findings from this study have led to the following suggestions:

- i. Due to the improvement in the poverty status of participants in the RTEP, more empowerment programmes should be established by government in areas where there are high levels of poverty so that poverty in those areas can be alleviated.
- ii. The extension agents in collaboration with Non-Governmental Organizations should train more farmers and processors on improved methods of production and processing in order to increase their output.
- iii. Farmers and processors should form cooperative societies so as to easily have access to loans from financial institutions at reduced interest rate. This would help the farmers and processors to have more capital base and in turn improve their standard of living and alleviate poverty.

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APPENDICES

Appendix 1: M.Sc Research Questionnaire

A. SOCIO –ECONOMICS CHARATERISTICS OF CASSAVA FARMER AND OR PROCESSOR

- 1. Name of farmer / processor.....
- 2. Sex: Male () Female (X)
- 3. Age:

4. Marital status: Married () Single ()
5. Highest level of Education: (a) No Formal Education () (b) Primary school Education () (c) Secondary School Education () (d) Tertiary Education ()
6. Family Size:
7. Major occupation: a. Farming () b. Artisan () c. Trading () d. Processing ()
8. Secondary occupation: a. Farming () b. Artisan () c. Trading () d. Processing ()
9. Which cassava enterprise are you into? a. Production () b. Processing () c. Both ()
10. Have you been visited by an extension agent?
a. Yes () b. No ()
11. If yes, how many times in last one year?.....
12. What activities did the agent teach you?
13. Of what benefit were the techniques learnt to you to the success of your farm?
.....
14. Have you been trained on cassava farming / processing?
a. Yes () b. No ()
15. If yes which organization conducted the training?
.....
16. Was the training beneficial to you?
a. Not beneficial () b. somewhat beneficial () c. beneficial () d. very beneficial ()

17. What are the types of empowerment by RTEP?

types of empowerment	Yes	No
Improved cassava cuttings		
Credit availability		
Capacity building		

Others		
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B. FARMING CHARACTERISTICS

18. How long have you been in cassava farming? (Years of experience).....

19. Do you belong to any co-operative/Association? Yes () No ()

20. If yes, (Years of participation)

21. What is your land size:

22. Have you adopted any of the following farming methods?

farming methods	Yes	No
Improved cuttings		
Recommended spacing		
Application of fertilizer		
Application of herbicides		
Others		

23. Variable inputs (production Cycle 2000)

a. Seed (Kg)

Plot No	Quantity of cuttings(Kg)	Cost (₦)
1		
2		
3		

b. Fertilizer.

Plot No	Fertilizer type	Quantity(Kg)	Cost(₦)
1			
2			
3			

c. Agro Chemical

Plot No	Agro Chemical type	Quantity(litre)	Cost(₦)
1			
2			
3			

d. Labour input

(i). Land preparation

Plot No	Hire Labour			Family Labour		
	No of people	No of Hours	Cost (₦)	No of people	No of Hours	Cost (₦)
1						
2						
3						

24. Variable inputs (production Cycle 2013)

a. Seed (Kg)

Plot No	Quantity of cuttings(Kg)	Cost (₦)
1		
2		
3		

b. Fertilizer.

Plot No	Fertilizer type	Quantity(Kg)	Cost(₦)
1			
2			
3			

c. Agro Chemical

Plot No	Agro Chemical type	Quantity(litre)	Cost(₦)
1			
2			
3			

d. Labour input

(i). Land preparation/ Harvesting

Plot No	Hire Labour			Family Labour		
	No of people	No of Hours	Cost (₦)	No of people	No of Hours	Cost (₦)
1						
2						
3						

25. What was/ is your level of income?

Plot No	year 2000 (N)	year 2013 (N)
1		
2		
3		

26. What was/ is your level Output?

Plot No	year 2000 (Kg)	year 2013 (Kg)

C. PROCESSING CHARACTERISTICS

27. Do you engage in processing? a. Yes () b. No ()

28. Have you adopted any of the following processing equipments?

processing equipments	Yes	No
Grater		
Frier		
Rotary driers		
Press		
Others		

29. What are your products: a. Gari () b. Fufu () c. Chipa and Pellets () d. Starch () e. Others ()

30. What was/ is your level of income from processed products?

Products	year 2000 (N)	year 2013 (N)
Gari		
Fufu		
Chipa and Pellets		
Starch		
Others		

31. What was/ is your level of output from processed products?

Products	year 2000 (N)	year 2013 (N)
Gari		
Fufu		
Chipa and Pellets		
Starch		
Others		

D. CONSUMPTION STATUS FOR PRODUCERS AND PROCESSORS

32. Kindly Provide Information on Your Household Food and Non-Food Consumption Expenditure.

Item	Amount spent(₦/) (2000)	Amount spent(₦/) (2013)
Food		
House rent		
Electricity/water bills		
School expenses(school fees, textbooks, writing materials e.t.c)		
Medical expenses		
Clothing expenses		
Communication expenses(G.S.M calls, recharge cards e.t.c)		
Transportation expenses		
Social expenses(wedding, naming ceremony e.t.c)		
Religion(offerings, contributions e.t.c)		
Remittances(monthly allowance to parents, relations or friends e.t.c)		
Monthly subscriptions(internet, D.S.T.V e.t.c)		
Others.....		

E. CONSTRAINTS TO WOMEN EMPOWERMENT

S/n	Constraints	Ranking according to severity. 1-least	Copying strategy

		severe, 2- moderately severe , 3- most severe	
1			S
2			
3			
4			
5			
6			

33. Suggest possible solution to the constraints encountered above by the women

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Thanks for your co-operation