

ASSESSMENT OF THE PARTICIPATION OF WOMEN IN FAMILY FARMING AMONGS RICE – PRODUCING COMMUNITIES IN RURAL AREAS OF ANAMBRA STATE, NIGERIA.

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**Abstract** – The study was on extent of participation of women farmers in rice production at family farming level in Anambra State, Nigeria determined the rice production activities, women socio-economic characteristics influence on participation in rice production at family farming level, and challenges facing the women. Data were collected with a well-structured questionnaire from 108 women rice farmers at family farming level using a multi-stage, purposive, simple random and a snowball technique. Data were analyzed using a combination of analytical tools such as descriptive statistics, participatory index, logistic regression, and inferential statistics such as z-test from logit regression result and one way analysis of variance (ANOVA). The result presented shows the mean age was found to be 41 years while the greater proportion (49.1%) of them were married. The mean years of formal education was 11 years, this implies that on the average, the majority (51.9%) of the farmers attended secondary school. The mean farming experience was 14 years, while the mean household size, farm size and monthly income were 6 persons, 5 plots and N29,680.48 respectively. The majority (63.0%) of the farmers were not members of farmers' cooperative with a mean extension contact of 1 contact. The women actively participate in decision making (site selection, choice of variety, organization of labour, among others), implementation (seedling, fertilizer application, among others), controlling (labour engagement, monitoring), and evaluation (operation, policy and programs). It was equally revealed that years of study (1.91)\*, farm experience (1.82)\*, monthly income (1.91)\*, farm size (1.99)\*\* and cooperative (2.28)\* were the socioeconomic variables that influenced women participatory index. The challenges facing women rice producers in family farming were rotated into five component factors, and the 5 factors explained 72.92% of the total factors challenging family farming among women rice farmers in the study area.

**Keywords:** family farming, women rice farmers, participation, Anambra

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Family farming has been the bedrock of the major agriculture revolutions in developed countries and it forms the social basic in most developing countries, helping to supply their domestic markets, but also the international markets. Nevertheless, it paradoxically constitutes the great mass of poor rural household's worldwide facing food insecurity (Bélières, Bonnal, Bosc, Losch, Marzin&Sourisseau, 2014). At least 500 Million of the world's (estimated) 570 million farms are managed by families, making family farm predominant in global agriculture (FAO, 2014; Lowder, Scoet& Singh 2014).

Both in developing and developed countries, family farming is the predominant form of agriculture in the food production sector. The 2014 International year of family farming (IYFF) aimed to raise the profile of family farming and smallholder farming by focusing world attention on its significant role in eradicating hunger and poverty, providing food security and nutrition, improving livelihoods, managing natural resources, protecting the environment, and achieving sustainable development, in particular in rural area. The goal of the 2014 IYFF is to

reposition farming at the Centre of agricultural, environmental and social policies in the national agenda identifying gaps and opportunities to promote a shift towards a more equal and balanced development (FAO 2014) .

The ease in preparation and its wide usage in festivities have made rice a popular meal in most households in Nigeria, with almost similar recipes for preparation across the cultures. It is estimated that the per capita consumption of rice is about 24.8 kg (Adeyeye , Navesero , Ariyo&Adeyeye, 2010). Hence, rice production is critical to global food security. Rice is grown on more than 144 million rice farms, mostly smaller than 1 hectare (Ricepedia. 2013).

Nigeria is the continent's leading consumer of rice, one of the largest producers of rice in Africa and simultaneously one of the largest rice importers in the world. As well as an important food security crop, it is an essential cash crop for it is mainly small-scale producers who commonly sell 80 per cent of total production and consume only 20 per cent. Rice generates more income for Nigerian farmers than any other cash crop in the country. In 2008, Nigeria produced approximately 2 million MT of milled rice and imported roughly 3 million metric tons, including the estimated 800,000 metric tons that is suspected to enter the country illegally on an annual basis (FAO 2019)

The crop constitutes one of the major crops produced in Nigeria. According to Babafada (2003), rice is the fourth major cereal crop in Nigeria after sorghum, millet and maize, in terms of output and cultivated land area. The National and International Research Institute (NIRI) in Nigeria have developed over 52 varieties of rice with potential yield of 2 - 8 tonnes paddy per hectare and maturity period ranging from 95 - 140 days (Ogundari, 2006). Nevertheless, domestic production of rice in Nigeria is not meeting the Nigerians' demand and may be partly due to the huge import bill on rice in the nation (Ayoola,, Kudi,, Dangbegnon,, Daudu, Mando, Amapu, Adeosun, and Ezui, 2012). Under the agricultural transformation agenda, rice transformation plan aimed at achieving massive local production and milling of rice which will be aimed at substituting parboiled (imported) rice. The expectation is that with the advent of high quality lower cost milled rice, a significant portion of demand in the domestic rice market will shift from parboiled rice to milled rice (Federal Ministry of Agriculture and Rural Development, FMARD 2011).

Most rice-growing areas in Anambra state such as Ayamelum, Anambra West, Anambra East, Awka North, and Orumba North, are characterized by independent smallholder farms, and Government incentives to the farmers, as well as other specialized services were rare (Chukwukelu, 2017). Throughout the world, rural women historically have contributed and played important role in rice farming system. Their roles and those of men are contributed by several interrelated socioeconomic (including class, ethnicity, age, religion), political and environmental factors and are known as "gender roles". However, these are dynamic and can change over time depending on changes in other factors (Hovio, 2007). He further pointed that in West Africa, women's involvement in rice farming varies from region to region, and even with regions.

Nigerian women have made considerable contribution to agricultural production and have been found in the production of crops such as yam, maize, cassava, rice and other food crops and also now constituting the majority of smallholder farmers in many parts of the nation such as in the South West, South East, SouthSouth among others, providing most of the labour and managing many farms on a daily basis (Ojo, 2012). Many women in developing economies such as Nigeria have become involved in rice production irrespective of their economic and social backgrounds. Apart from the need to earn wages and become financially independent, women see rice production as a means of employment because majority of them are not adequately educated for white-collar jobs, which in any case are not readily available. Rice cultivation is also a means to fight hunger (Fonjong, and Athanasia 2007).

The growth recorded in rice production has been facilitated by government policies towards achieving self-sufficiency in rice production. Government intervention in rice production has leaned towards providing inputs such as improved seedlings and fertilizer to small holder farmers. Also, some state governments have granted land concessions as an investment incentive to large commercial farmers. Towards improving irrigation, government is investing in various irrigation projects In addition, through the Central Bank of Nigeria, funding has been made available to rice farmers at affordable rates through the Anchor Borrower's Programme ( PWC, PricewaterhouseCoopers Limited 2018)

In the past 5 years however, rice imports have declined by 33.3% in 2017. This decline has been attributed to reduced demand as a result of Government's policies on import substitution – import tariffs and inclusion of rice in the list of 41 items ineligible for forex in the official market. Despite these, Nigeria remains the single largest rice importer in Africa and the world's third largest, with Thailand and India as its largest import sources ( PWC, PricewaterhouseCoopers Limited 2018)

### 1.2 Statement of the Problem

Self-sufficiency in rice production has eluded Nigeria for a long time despite the effort made by the Government of Nigeria for over 36 years towards realizing self-sufficiency (Umeh and Ataborh 2006).The federal government of Nigeria had announced her plans to ban the importation of rice by 2015. According to the government, the country must be self-sufficient in rice in a manner that grows agricultural sectors to create jobs. Therefore, it was going ahead to ensure the ban on rice importation as from 2015, at which time the nation would have attained self-sufficiency in rice production in line with the rice implementation plan (Osagie, 2014). This explains why rice import accounts for approximately one third of Nigeria's rice supply (FAS, 2010). Rice import represents more than 25% of agricultural imports and over 40% of domestic consumption (FMARD, 2004; Ohaka, Adiaha and Amanze 2013). Despite the place of rice in contributing to the food supply in Nigeria, Its production is still put at 3.2 million tonnes (Babafada, 2003; Ohaka *et al.*, 2013).

Nigeria's rice yield is one of the lowest globally at 2 tonne per hectare, relative to 4 – 7 tonne per hectare in Asia. More than 80% of Nigeria's rice is produced by small scale farmers, while the remaining 20% is produced by commercial farmers. In addition, most of the processors are small scale with low capacity (less than 300kg/hr) and obsolete mills (Ricepedia, 2013). National Cereals Research Institute, NCRI (2004) identified the constraints that limit rice production efforts by farmers to include problems associated with research, poor pests and disease management, low soil fertility, use of simple and inadequate farm implements, low institutional and infrastructural support, lack of credit facilities, inadequate improved input delivery, lack of appropriate marketing channels, inadequate irrigation facilities and poor extension services. IFAD (2014), noted that to bridge this huge gap inherent in the rice production sector, several agricultural programs such as Anchor Borrowers Programme, FADAMA I, II and III, IFAD assisted Value Chain Development Programme, Presidential Rice Farm Association of Nigeria, among others have evolved.

Charles and Willem (2008) opined that the importance of the role played by women in agricultural production is such that the widespread failure so far to reach women farmers through formal extension services has major repercussions for national output and food security as well as social justice.

The participation of women farmers in rice production in Nigeria have been widely described in the literature but, very little has been done in the crucial area of the assessment of their participation in rice production at family farming level. In line with the importance of women in agricultural production and food security, it becomes pertinent to inquire about the situation in Anambra State particularly as it identifies the rice production activities and the extent of participation of women; determines the effect of socio-economic characteristics of the women on their participation in rice production; and Examine the challenges facing them at family farming level in Anambra State

### 1.3 Research questions

- (i) what are the various rice production activities and the extent of participation of women at family farming level?
- (ii) what are the socio-economic characteristics influence on their participation in rice production at family farming level ?
- (iii) what are the challenges facing the women at family farming level?

### 1.4 Objective of the study

The main objective of this study is to examine the extent of participation of women farmers in rice production at family farming level in Anambra State.

Specifically the study is designed to:

- (i) Identify the rice production activities and the extent of participation index of women at family farming level ;
- (ii) Determine the women socio-economic characteristics influence on their participation in rice production at family farming level;
- (iii) Examine the challenges facing them at family farming level.

## 1.5 Hypotheses of the study

The following hypotheses will be tested.

- H<sub>01</sub>: Socio economic characteristics of the women have no significant influence in their participation in rice production under family farming in Anambra State.
- H<sub>03</sub>: Challenges faced by the women rice farmers has no significant influence on their extent of participation at family farming level in Anambra State.

## 1.6 Significance of the Study

The study helps the government and other policymakers to make realistic managerial decisions that will favor rice production exercise through the information that will be generated from the study, with regard to the role of women in rice production at family farming level, other activities and work load, and hence formulate gender sensitive development projects. It will create awareness among the society and outsiders on the role played by women in rice production and gives due respect to their contribution and need, The study provides information that guides financial institutions willing to grant loans to interesting women rice farmers on repayment programs.

It serves as an information guide to the academic researchers, general public and unemployed women desiring to invest in rice farming as a business to reduce the incidence of unemployment and to bridge the rice deficiency in production. The study exposes the enterprising nature of rice production that will empower women, and play an important role in supporting the social and economic safety net of household and communities.

## 1.7 Scope of the study

This study on assessment of the participation of women in family farming among rice producing communities in Anambra State, Nigeria identified the rice production activities, the socio-economic characteristics of the women, and their challenges on participation in rice production at family farming level in Anambra State. The study used a well-structured questionnaire to provide adequate information to the above-mentioned investigations in Ayamelum, Awka North, and Orumba North Local Government Area. The information provided were equally used to test the significance of the stated hypotheses to the study.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Conceptual Review

##### 2.1.1 Family farming

Family farming refers to one of the forms in which agricultural production is organized, comprising farms characterized by organic bonds between the family and the production unit, the use of family labour and the

exclusion of full-time hired labour. These bonds translate into the inclusion of productive capital in family assets and into a combination of market and non-market operational and domestic logic in the way family labour is allocated and rewarded, and in the choices of product sharing between final consumption, intermediate consumption, investments and accumulation.

Family farming is the main form of agricultural organization worldwide. In reality, it involves a multiplicity of concrete types that can be seen at farm level. These types of family farms actually arise from different ways of organizing kinship, from the ways in which natural resources are used (accessibility and quality) from the specificity of social organizations (social norms, family configuration, nature of social interactions), and from the characteristics of the economic context (Bélières *et. al*, 2014). Definitions adopted by the FAO (2013) Substantively defined Family farming as “a means of organizing agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family capital and labour, including both women’s and men’s. The family and the farm are linked, co-evolve and combine economic, environmental, social and cultural functions”. It also Statistical defined it as “a family farm is an agricultural holding which is managed and operated by a household and where farm labour is largely supplied by that household”.

Toulmin and Guèye (2003) stated that the priority of family farm production is subsistence in West Africa; the principal objective of the family farm is first to provide its members with food and shelter, second, to sell whatever is needed to gain cash for satisfying the range of other needs of the household, such as clothing, medicines, school fees, investment in new equipment, and tax payments. Diaz Osorio (2007) who argued that among Latin American countries there is a significant number of family farmers who are not subsistence farmers but that either asset endowment or the context is constraining their transition into commercial farming.

Radel, Claudia, Schmook, Mcevoy, Mendez and Petrzelka (2012), argued that a family may still be operating the farm with hired labour to fill the gaps left during times of outmigration, particularly by *de jure* female headed households when male family members migrate. Riley (2009) defines family farms as those with more than one generation of the same family involved in the farm enterprise. In his opinion, this is one of the most important aspects in distinguishing family farms from other farming practices and suggests that there are longer-term impacts of the farming operations and production. This means that the success of the family farm at a given time may not only impact the current operators’ (manager or head of household, the family members) income and food security, but also the sustainability of family farming as a livelihood for the future generation.

Bélières, Jean-François, Bosc, Faure, Fournier, and Losch (2002). also make a distinction between the managerial role of the family farmer and that of the head of a company “who may be absent himself from the scene of production and who is concerned mainly (possibly having delegated management responsibility) with the return on his assets and invested capital”. This aspect further differentiates the operations of a family farm and a non-family managed business in agricultural market systems. In Japan, Iwamoto (2006) views the family as an investor, owner and manager of a farm. Sanches Peraci, (2011) identify the manager as the “head of household” or “landowner.” Family relationships in the farm have important implications on production decisions, such as the choice of crops, the organization of family labour and its allocation to different tasks, management of farm land and other assets, and questions of inheritance (Toulmin and Guèye, 2003). Some literature points to family farming as a mechanism to preserve the cultural values of historical importance (Sanches, 2011). Experts and non-experts in local communities maintain traditional knowledge. Written, oral and non-verbal means transfer knowledge among and within cultures, generations, population groups, communities, households and individuals (FAO, 2009). Thus, the role of family farming for preserving this knowledge could be fundamental. Koohafkan and Altieri (2011) stated that traditional systems of agriculture are under threat by modern agriculture and should be preserved, because of their ecological and cultural significance and their wealth and breadth of accumulated knowledge and experience in the management and use of resources that these [traditional] systems represent, it is imperative that they be considered globally significant resources to be protected and conserved, as well as allowed to evolve.

Some family farms, particularly those that use traditional practices, have greater familiarity with the historical management of natural resources. This gives these family farms the potential to assume a major role in protecting the environment, as long as there is an enabling environment for the continuation of these practices. Some countries have begun to adopt public policies that support styles of agriculture practiced by “family farmers who are guardians of nature”, “family farmers who protect freshwater”, “rural producers of indigenous seeds”, and so on (Sanches, 2011). Such practices could also be applied in innovative ways to help tackle today’s problems (FAO,

2009). Toulmin and Guèye (2003), based on their work in West Africa, concluded that, the principal objective of the family farm is first to provide its members with food and shelter. Family farming is also seen as providing food security for the community and potentially beyond. According to Sanches (2011), there is now also recognition that family agriculture has the potential to produce basic foods... thus, many countries have reformulated programmes and institutions for family agriculture in order to improve the frequency and regularity, and increase the volume of the national food output, as a means of seeking both greater food and nutritional security and a more stable economy.

Elizabeth and Ana2014 stated that definition of family farming should therefore be one that not only recognizes the role of the family in production and management of the farm, but that also:

- Includes forestry, fisheries, pastoral, and aquaculture activities besides crop production;
- Recognizes that all the above-mentioned agricultural activities make important contributions to household income and food consumption;

Recognizes family farms' diversity in terms of land size, amount of production, share of family labour utilized, degree of market integration, and policy needs, varying across countries, agro-ecological zones, and social contexts;

- Considers that family farmers may or may not own land;
- Recognizes that family farmers often operate on farms or plots that are units of inheritance or succession within the family or household;
- Recognizes that family farming goes beyond agricultural production and combines ecological, social, cultural and environmental objectives and therefore has a close tie to the local culture and the rural community;
- Recognizes that family farms' sustainability depends not only upon economic factors and environmental management, but also on the intergenerational transfer of local knowledge and traditional practices, resources, and social identity;
- Considers that roles and responsibilities in family farming may not be evenly distributed within family members or the household and that interests and constraints vary across them.

### 2.1.2 Concept of Participation

The terms participation and participatory development are used interchangeably (Long, 2001). We define participation after Reed (2008) as a process where public or stakeholder individuals, groups and/or organisations are involved in making decisions that affect them, whether passively via consultation or actively via two-way engagement. In the last decade theories on participation distinguished between participation as a means and as an end. According to Karl (2000) participation as a means, is a process through which people cooperate and collaborate in development projects and programmes; as an end participation is a process that empowers people, as they gain skills, knowledge and experience, which create self-reliance and self-management. There is no blueprint prescription for ensuring participation and empowerment, but participation does not occur in a vacuum. It is determined by socio-economic, environmental, political and cultural context within which individuals and communities live (UNDP, 2004).

Participation in extension is the process of communication among men, women farmers and extension workers during which the farmers take the leading role to analyze their situation, to plan, implement and evaluate development activities. It is a way helping the disadvantaged people and women to gain access to and control over resources or services such as training, farmers' tour, inputs, information etc. needed to sustain and improve their livelihood (Subedi, 2008). Cornwall, (2006) defined participation as the voluntary and democratic involvement of the people in contributing to the development effort, sharing equitably in the benefits derived therefrom and decision-making in respect of setting goals, formulating policies and planning and implementing economic and social development programs" (as cited in Cornwall, 2006). Further participation is needed to "understand stakeholder perceptions, perspectives, values, attitudes, and practices so that they can be incorporated into...development initiatives" (World Bank, CI, and FAO 2007). Participation involves power where the most powerful struggle to

maintain control of their privileges; and, they continue to argue, even development agencies hesitate to give up control or power (Mohan, G 2008), as cited in Desai and Potter, (2008). A United Nations report (1979) defined participation as sharing by people in the benefits of development, active contribution by people to development and involvement of people in decision-making at all levels of society (Desai and Potter, 2008). These definitions of participation demonstrate the complexity of participation and the innate challenges they pose and highlights the challenge of power dynamics within participation and the need to fully understand the power structure and balance in the participation and development context.

Participatory processes were formally introduced in the development arena in the early 1980s by Robert Chambers' 'Rapid Rural Appraisal' methodology, the literature about participation has built up as of the 1990s and become packed with theories, frameworks and guidelines advocating the need for and modes of 'participation'. The number of acronyms representing approaches claiming 'best practice' is staggering. However, an increasing number of critiques have commented on how participatory approaches, and the investments they require, have not resulted in better development impacts (Cooke & Kothari, 2001). While indicators for impact of development are not always clearly articulated, neither by advocates nor critics, the discrepancy between promise and reality is often ascribed to issues relating to implementation. In other words, the principles are good but the practice can be bad. Indeed, not uncommonly is participation in development limited to proposal jargon or at most 'quick and dirty' stakeholder consultation set within the frameworks for change of the proposal designers and funders who have a stake in things being done their way. Those with power still tend to determine who has the right to participate, how participation is done and how decisions are made and followed up on. Participation has become part of the institutional, political and economic agendas, but not necessarily of the required worldviews and skill sets of the individuals formulating the policies and agendas, and even not always of those doing the work on the ground. According to Waishbord (2001) participatory theories criticized the modernization paradigm on the ground that it promoted a top-down ethnocentric and paternalistic view of development. They argued that the strategic model proposed a conception of development associated with a western vision of progress. Mikkelsen (2005) contends that it is a widely held belief among development professionals that a higher level of participation among community members will lead to more sustained projects and better long-term results (Mikkelsen, 2005). While theories follow a set of logical propositions about how the world is structured, participatory development theory falls under the normative approach (Potter, Robert cited in Desai and Potter, 2008). The normative stance says that one can generalize about "what should happen or be the case in an ideal world" (ibid). Thus my thesis follows the normative view when addressing what should be happening in an ideal world.

Women's participation also includes working with the community, especially men, to open the space for women to participate and support their participation. This was an important step forward in the organization's strategy to protect women and girls. Failure to include women and girls in decision-making processes often means that their concerns and protection risks are not addressed in the community's overall response and in their negotiations with external stakeholders, such as UN Commission on Human Rights (UNHCR) and its partners. As a result, resources may be inaccurately targeted and the protection problems women and girls face regarding their security and their access to services may be exacerbated. In June 2005, many field offices reported that women's participation in camp committees was limited by cultural practices related to gender roles. Participation and empowerment of women and girls are essential to ensuring gender equality and to enhancing their protection. This means we must undertake targeted actions to: ensure the meaningful participation of women in the design, implementation, monitoring, and evaluation of all our operations, policies, and programme (UNHCR 2005). One of the most common criteria used to define project success in the *Women in Agriculture Sourcebook* published by the World Bank in 2009 was women's participation.

Mamun-ur-Rashid, Kamruzzaman and Mustafa (2017) pointed out that the participation of women in agricultural sector is pervasive and women have remarkable participation in crop processing, home gardening, and managing small scale livestock and fisheries. Women participation in agricultural extension service can reduce poverty; improve food security; develop family health and nutrition status, create new job opportunities and enhance efficiency of extension services. According to Tesfaye (2015) women are responsible for most of the food production and work on both family farms and as wage laborers, most of them do not have legal control over the land resource. Most of women's work lies in the margin of major development efforts and programs. Hitherto without the complementarities of women's attempt, such efforts and programs would barely work even though men own such assets and inputs as land, credit, seeds, livestock technology and infrastructure.

### 2.1.3 Women in rice production activities

According to Okeke and Aluka 2017, the planting period of rice in the south east Nigeria was mostly between May and August and the harvesting mostly took place from October – December; and about 69% of the farmers harvest their rice manually while 31% use mechanical means. The cultivation of rice begins by preparing seed bed/ land preparation which includes land clearing, tillage, and ploughing etc depending on size of farm. After land preparations, planting begins by planting either water-soaked rice or dry rice seeds. Seeds can be sown using a machine that places the seed in the soil in large farms but in developed countries low flying planes broadcast rice seeds onto already prepared fields. After one month or less of growth, the seedlings are transplanted in bunches from nursery beds to main field if it is not planted directly to the field. First weeding commences 1 month after transplanting or 21 days after germination for those planted directly to the field. Second weeding may be done 36 days after first weeding. Prior to transplanting fertilizer may be broadcasted and puddle into the soil according to the farmers schedule. Some farmers may schedule for first top dressing or broadcasting 2-3 weeks after transplanting. Application of fertilizer depends on the farmers' schedule.

At maturity stage (approximately four months after planting) the grains begin to ripen, the tips begins to droop and the stem yellows – the water in the field is drained if it is a flooded field (Jahn., Almazan, and, Pacia 2005). As the field dries up, the grains ripe further and harvesting is commenced. As the field dries up, the grains ripe further and harvesting is commenced. Depending on the size of the farm and the level of mechanization, rice is either harvested by mechanized means or manual labour. According to (FAOSTAT 2014), 60% of farmers in African uses manual labour. Threshing of rice follows the harvesting operation, but in a full mechanized system where rice is being harvested with rice combine, harvesting and threshing are done simultaneously with combine harvester. After harvesting and threshing, the paddy rice is parboiled and milled using manual or mechanical method. Before milling, rice grain is dried in order to reduce the moisture content to about 19% to avoid breakage of the seeds during milling. The drying can be done through naturally occurring sunshine. In developed countries drying can be done with artificially heated air. Rice is processed at mill using automated processes. The paddy rice undergoes many processes like hulling, polishing, grading, destonning etc. before marketing or storage.

After Hulling which is removal of the outer husk to get the bran rice, polishing of the bran rice begins which is removal of the outer bran layer to get the white rice. Grading follows after polishing. Grading is separating long rice from broken rice. Destonning follows immediately after grading. Foreign rice at stage of polishing do undergo further processes which is also called coating i.e. coating with either protein material or any other substance (National Research Council. 1996). This is generally known as converted rice.

Rahman, Gabriel, and Marcus (2004) state that, women play vital role in food production processing and marketing in Nigeria such as rice production; producing about 60 - 80 percent of total output. Although, Umeh&Ataborh2006 observed that, rice producers are dominated by males which accounts for 85.8% while women accounts for only 14.2%.

The rice cropping system and the post-harvest services in Nigeria encompass a wide range of agricultural activities ranging from landclearing, seed bed preparation, broadcasting fertilizer application, weeding and bird scanning. Others include harvesting, threshing, parboiling, drying, winnowing, bagging, marketing and distribution. These activities are largely executed manually and women and children from the very vulnerable segments of the society who are largely involved. Ecosystems of rice production in Nigeria are determined by interplay of such variables as geology, climate, soil types and hydrological vegetation and a range of socio-economic factors (Barker and Herdt, 2009). Women participation in most of the activities is usually undertaken in post-harvesting processing of the crop (Ogbe, 2009). In almost all rice growing areas in Nigeria, men traditionally undertake such activities as land preparation, ploughing, irrigation and field-leveling. Women on the otherhand are responsible for sowing, transplanting, weeding and crop processing (FAO, 2005).

Results revealed that 75% of the farmers in the South-Eastern Nigeria use manual labour in the seed bed preparation while 25% use tractors. It was observable from the results that 15-15-15 NPK and urea fertilizers were predominantly used by the farmers in the area for rice production and the application method was mostly by manual broad casting over the planted area. Results also recorded that rice harvesting mostly took place from October – December; and about 69% of the farmers harvest their rice manually while 31% use mechanical means.



More so, average of 49.6% of the farmers thresh their harvested rice manually while 50.4% of them use mechanized means (Okeke and Aluka2017) .

#### 2.1.4 Socio – Economic characteristics and Influence in Development Participation

Gender of household head is expected to capture the difference in farmers' willingness to Participate in Rice development project (RDP) between males and females with males expected to have a higher willingness to participate than females. Females are normally occupied with domestic activities such that they do not have enough time to participate. Age is expected to influence participation negatively. Younger household heads are more dynamic with regards to adoption of innovations than older household head (Enete and Igbokwe, 2009). It is expected that household head that are married will have a higher probability of participation. Married household heads are normally assisted by their spouses in production, processing and marketing decision making. Household size is expected to positively influence farmers' participation. Household size serves as a form of family labour and complements the effort of the household heads on the farm. The availability of family labour provides the household head the opportunity to share responsibility and save time for other development activities. Also, larger households spend more on food and other household needs. The higher expenditure associated with larger households sizes tend to make them more resource constrained and hence the need for external support. Most researchers have found a positive relationship between farm size and participation or adoption (Adimado, 2001; Kheralla, Minet , Kachule, Souce and Berry, 2001; Langyintuo and Mekuria, 2005). Household head with more land will require improve seed varieties that are more yielding. Most of these pieces of information are shared through development projects. Other studies such as Mussei, Mwanga, and Mwangi, Verkuijl, Mungiand Elang (2001), and Gockowski and Ndoumbe (2004) found a negative relationship between farm size and participation and adoption. The labour demand for working on a large area of farm makes farmers unwilling to participate in development activities. Experience farmers are less likely to participate in rice development project. Most of these farmers depend on their farming experience acquired over their productive years. Education is posited to have a positive effect on participation since it enables an individual to make independent choices and to act on the basis of the decision, as well as increase the tendency to co-operate with other people and participate in group activities (Enete and Igbokwe, 2009). Market price of rice is posited to influence participation in RDP positively. Higher price serves as an incentive for farmers to increase their production and also seek innovative methods of meeting the demands of buyers. Rice development project provides farmers the opportunity to learn new and innovative farming methods. Farmers with knowledge of rice varieties that can be cultivated in any ecology have a higher probability of participation in rice development projects. Knowledgeable farmers are normally engaged in development projects to serve as linkage between farmers and agricultural development organizations (Sindi, 2008). The negative effect of education on probability of participation suggests the strong competing effect of diverting skills of household head to other off-farm employment opportunities (Martey, Al-Hassan and Kuwornu. (2012). this could reduce household head dependency on agricultural development projects.

#### 2.1.5 Women Family Farming and Challenges

Bélières *et al.* (2014) stated that, there is abundant literature on gender issue in agriculture, particularly emanating from international institutions, strongly recommending women's access to the means of production and to market, with the same working conditions and remuneration as for men. Inequalities in access to resources that arise from social functional are commonly acknowledged closing the gaps would surely improve the incentive to produce, incomes and living standards of the families involved.

The resulting comparisons between men and women are understood as 'gender analysis' but provide a static view, one that privileges women and highlights the nature of their disadvantage, by focusing on time inputs, assets especially land but also credit conditional on land access, and women's caring roles. These comments are not made to suggest that women are not disadvantaged (in households or in other institutional settings). Rather I am supporting an alternative approach that begins by examining the character of households in specific settings, how they operate in terms of income earning and meeting responsibilities, and the implications for individual decision-making and household livelihoods of what are often interlocking projects of individual household members (and even other kinsmen) that extend over time and over a wider range of activities. (Leach., Scoones and Stirling, 2010). Women's inability to have access to resources equal to that of men is based upon certain prevalent social structures (Sarris, 2002). For example, traditionally, a woman's debt was held to be the collective responsibility of the family or

the husband and therefore a family or husband could prevent a woman from acquiring a loan from the bank or the moneylender (Arhin, 2000).

Despite the brilliant feats of women, some individuals and groups including women's groups, governments, development partners, and civil society organizations, have put up arguments that the biology of sex determines that women are limited to the home and children and must play a subordinate role in the economy, public affairs and even in the home (Amu, 2005, p. 8). The notion behind this statement is that a woman's place belongs to the kitchen, from where she has to cater for the stomachs of her family by preparing food and also carrying pregnancy to term and bringing forth children, socializing them and making sure they fit into society. In view of this ideology, women are forced to occupy a limited if not subordinate position in society (Fayorsey, 2006). Since these dynamics point to clear problems in terms of production, household wellbeing, and women's empowerment, they have served as guides to action: they highlight entry points for problem solving, for example through legislation supporting women's resource rights, or through targeted asset/ resource provision (including micro-credit). While these might be regarded as innovative development activities, at the same time, they are not straightforward strategies, especially where resources are valuable and resource access is contested (WB/FAO/IFAD. 2009).

Although it can be shown that there are apparent conflicts of interest between household members, and members of other linked institutions, perhaps what is less evident or less reported is that there are also substantial levels of cooperation and shared interests between husbands and wives, and between household members and wider kinship groups. As Jackson argues that it is not a good idea to... imagine that preferences and risk behaviour of male household heads can be taken to reflect that of all members within the household, [it is also not a good idea] to separate out women from the context of household relations and suggest they are reliably risk averse and oriented to subsistence and food security in a narrow sense of food production. A husband may be food security personified'.(Jackson, 2007). Equally, there is evidence that in some circumstances men support women in their call for more resources. Rao (2008), writing of Santal women and men in Dumka District, Jharkhand, India, observes that while in general *Good Women do not Inherit Land* (the title of her book), in some instances, men may support women's land rights. While these men are likely to be secured in their own authority, Rao also notes that customary institutions, at least in this location, even though entirely male dominated, have generally supported women's land claims (Rao 2008). Hence we cannot simply assume that the outcome of any perceived conflict of interest is women losing out in all circumstances. Outcomes such as women taking on additional workloads 'for men'; giving up any existing rights they may have to men such that they appear to lose their ability to fulfil their responsibilities; and husbands and other men not acting to protect or support the needs and interests of their wives and other women, need to be investigated rather than to be taken for granted. In each case this might involve asking a range of questions of different household/ family/ community members. What evidence there is from sub-Saharan Africa (but also from elsewhere) indicates that the demands that husbands can make of wives are not open-ended, that marriage is not simply an institution for the exploitation of women, and 'back grounding shared interests can underestimate the extent to which women have rational commitments to household arrangements, even though they appear to be gender inequitable' (Jackson, 2007)

But fully aware of the qualities that they possess, women have made frantic efforts to end the marginalization they have been suffering at the hands of men. Apusigah, 2004; points out that African women, holding to their own in different sectors of the body politic, continue to initiate and/or participate in various resistances, overt and covert, that threaten ruling governments. Through friendship connections, cliques, and kinship relations women get together to support one another in various fields of endeavor (ABANTU for Development, 2004; Dolphyne, 1991 as cited in Apusigah, 2004) In spite of these protests and resistances from women, their status has not changed. Gender inequalities continue to constrain women's ability to participate in and contribute meaningfully to the economy. Women's low participation in national and regional policy-making, their invisibility in national statistics and their low participation in extension services have meant that those issues of most concern to women have been neglected in the design and implementation of many development policies and programme.

In the nine countries examined by Franklin, 2007 in a recent study, as throughout Africa in general, he found that while women are present in greater degrees in agricultural/rural organizations, they tend to comprise a low proportion of the membership and are often not represented in the higher levels of leadership. While women's membership is most often limited by their lack of formal land ownership, many rural organizations do not sufficiently concern themselves with the needs of rural women. Women's participation as office holders in these organizations tends to be even more limited. The gender division of labour and social responsibilities in the

household constitutes the deciding factor in women's commitment to subsistence production to fulfill their responsibility to feed the family and ensure food security for the household. As a result, most women in low-income food-deficit countries (LIFDCs), especially in rural areas, are over-burdened with a wide range of activities and tasks in agriculture, animal husbandry and in the household (Gueye, 2003). It has been noted that systemic gender biases may exist in the form of customs, beliefs and attitudes that confine women mostly to the domestic sphere; women's economic and domestic workloads that impose severe time burdens on them; and laws and customs that impede women's access to credit, production inputs, employment, education, or medical care (Ogunlela and Mukhtar 2009).

## 2.2. Review of Related empirical Studies

According to Rahman, Shammi, Parvin, Akter, Khan, and Haque (2016) on the Contribution of rural women to rice production activities in two different areas of Bangladesh. The study utilized the data collected by the field survey from Nilphamari and Mymensingh districts of Bangladesh. A total number of 60 women respondents were selected using random sampling methods who were actively working in the rice fields during the production period in 2015. Data were analyzed using simple statistical techniques as well as OLS regression analysis. An analysis of the socioeconomic status of the women showed that in terms of contribution, nearly 43% and 42% of the total works were done by rural women in rice farming activities in Nilphamari and Mymensingh district, respectively. It was found that male workers spent 228.2 hours and female workers 174.5 hours per season in Nilphamari region compared to 270 hours and 197.3 hours per season in Mymensingh region, respectively. The average wage rate in Nilphamari district was BDT 241/day for male and BDT 175/day for female. Similarly, in Mymensingh district the average wage rate for male and female workers was BDT 281/day and BDT 162/day, respectively. The result of the OLS method suggests that the distance of the rice field from the home, the number of available technologies used and the number of adult male labour significantly affect the women's participation in farming activities. Despite the positive role of women in the production activities, their contribution was often neglected in terms of wage rate. Therefore, this study recommends the avoidance of wage discrimination between male and female workers which may strengthen their position within the family and increase their self-esteem and status in the society.

Asha Roy, Dilshad Zahan Ethen, Riffat Ara Zannat Tama and Ismat Ara Begum (2015) carried out a study, women labor participation in rice production in some selected areas of Thakurgaon district. The present study was undertaken to analyze the participation of women labor in rice production activities covering randomly selected 50 rural households of two villages under Ranisonkail Upazila of Thakurgaon district. Data were collected from the selected households using face to face semi-structured interviews during December 2013 to February 2014. The study revealed that in rice production activities the percentage of hiring out days for women were 94.18 and 92.90 in aman and boro seasons, respectively. To determine the effects of the explanatory variables on women labor participation in rice production, Ordinary Least Square method was used. The analysis showed that age of the respondents and total household expenditure were positively related with women participation but negatively related with education, number of male earning members and farm size of the households. The study concludes that education, credit facilities, extension and motivation, need-based training should have the potential to increase women's participation in farm activities reasonably contributed to household income. Therefore, effective initiatives undertaken by the concerned agencies in improving women's education, skill acquisition training and access to information could enhance women's empowerment in order to achieve gender equality and development at all levels in the rural society of Bangladesh.

Yulian Junaidi (2014) carried out a study on participation of women farmers in rice farming and food security of farmer's household in swampland-indonesia. *The purpose of this study was to (1) identify the level of participation of women farmers in rice farming in swamp land, (2) assess the condition of the level of household food security of women farmers in the rice swamp land seen from Share of Food Expenditure (PPP) and (3) analyze relationship with the level of participation with the household level food security of women farmers in the rice swamp land.* The primary and secondary data were used in this study. The samples of this study were 120 respondents. The study conducted in Lebung Jangkar and Sembadak village which located in Pemulutan Sub-district also Ulak Segelung and Sakatiga Village which located in Indralaya Sub-district, Ogan Ilir District, South Sumatera Province, Indonesia, these locations were decided using purposive method. The basic method used in this research was descriptive analytical method. *The results showed that the level of participation of women farmers in rice farming in the high category. The level of household food security of women farmers in the rice swamp land, which is 69 percent food secure and 31 percent food vulnerable. From the results of the research can be seen also that there is a positive relationship between the participation of women farmers in rice farming with the level of their household food security.*

Anshu, and Varma SK (2017) on Involvement of Man and Women in Paddy Cultivation Operation, conducted in Kurukshetra district of Haryana state with the objective of analysing the involvement of man and women in paddy cultivation. Two blocks from Kurukshetra district were randomly selected i.e. Thanesar and Ladwa block. Two villages from each block were selected randomly. From Kurukshetra district 30 households from each village were selected randomly thus making a total sample of 120 households from different socio-economic categories. Frequency, percentage, mean, 't' test and correlation were computed for analysing data. The study revealed that the average workload of men and women of low socio-economic strata were higher than those of medium and high socio-economic strata, in operation like Land preparation, Nursery raising, Manure and fertilizers application and Intercultural operation. It may therefore, be inferred that landless women and men performed more work in paddy cultivation than the women and men of medium and high socio-economic strata.

Thabiti Hassanhabiti (2014) conducted gender analysis in rice production in Kyela district, Mbeya region- Tanzania. The study covered four randomly selected villages of Katumba, Mpunguti, and Kasala and Tenende. The sample size constituted 100 respondents including males and females from the four villages. Data were analysed to obtain the descriptive statistics, Harvard analytical framework of activity profile were employed to assess gender roles in rice production, independent t-test was employed to compare rice production between male and female headed households and one way ANOVA used to test mean differences of rice production between MHH's and FHH's while multiple linear regression used to identify gender related socio-cultural factors that influence rice production. The study found that among MHH's and FHH's, who were literate, had higher rice production than illiterate ones. However, gender roles and time spent in rice production are almost equal. Furthermore, on the overall access and control over resources of MHH's and FHH's revealed that, (57%) male had higher access. In accessing to credit (49%), therefore, in order to improve gender on rice production education should be encouraged in the households' members to uplift gender sensitivity and awareness in the households and access and control over resources should consider gender. It is recommended that in order to improve gender participation in rice production, awareness raising on equality and equity in access and control over resources, including access and control over land, and access to education among household members should be improved.

Esther L. Achandi, Gaudiose Mujawamariya, Afiavi R. Agboh-Noameshied, Shewaye Gebremariam, Njaka Rahalivavololona, and Jonne Rodenburg (2018) on Women's Access to Agricultural Technologies in Rice Production and Processing Hubs: A Comparative Analysis of Ethiopia, Madagascar and Tanzania, this study presents results from a farmer survey conducted with 560 rice farmers from 27 villages spread over five hubs (concentration areas of rice production and processing) in three different countries in Eastern Africa (Ethiopia, Tanzania and Madagascar). To analyze the quantitative data, descriptive statistical techniques like frequency counts were used and means and percentages were calculated. A simple Women Empowerment Index suggested by Paris et al. (2008) was adopted to analyze the level of participation of women in decision-making within the household. The main research objective was to assess women's access to rice technologies and constraints to adoption of technologies. Constraints were analyzed over five different categories: (1) institutional (2) access to agricultural inputs, (3) technology-contextual, (4) household and socio-cultural and (5) extension. Key providers of extension were public (government), Non-Governmental Organizations (NGOs) and international organizations. Our study identifies that the 2 overarching constraints to technology adoption are institutional and cultural impediments and related to the mode of delivery of extension services. Furthermore, the Focus Group Discussions (FGD) with the women, revealed that empowerment of women in decision making at the household level can enhance women's access and engagement in better farming practices suggested under extension advisory services. This is specifically true where women are able to overcome the hurdles of acquisition of extension training and access to the improved technologies.

Ayanwale Adeolu B. and Amusan Christianah A. (2014) examined gender analysis of rice production efficiency in Osun state: implication for the transformation agenda. Primary data were elicited from 100 rice farmers with the aid of structured pre-tested questionnaire and analyzed using frequency counts, budgetary analysis and stochastic frontier production function. Findings showed that the majority (62%) of the farmer were males, below 50 years of age (52%) with only 6 years of formal education (58%) having farming as their primary occupation (65%) and cultivating up to 5 hectares of land (66%), while, only 42% of the female farmers were below 50 years of age. Most (71%) respondents had up to 6 years of formal education, cultivated up to 5 hectares (61%) of land, few (18%) chose farming as primary occupation. The budgetary analysis revealed that N2.18 profit accrued to every N1 invested in rice production. Hiring an additional female labour during planting improved total output by 7.1kg,

while an extra male labour hired during land clearing, fertilizer application and harvest reduced output by 46.4kg, 35.5kg and 11.2kg respectively. A naira increase in the cost of fertilizer increases total output by 2.7kg. The study concluded that male farmers' were more efficient than the female farmers. Farmers' efficiency can be enhanced through mechanisation and fertilizer input supply; while provision of postharvest equipment will help women diversify into value addition.

Omiunu1 Ojunga Gideon (2014) on investigating the challenges faced by women rice farmers in Nigeria investigated the major constraints faced by women rice farmers in Nigeria. The study employed a survey research design. One hundred women rice farmers were randomly selected and information were obtained with the aid of well-structured questionnaire. The frequency, percentage, t-test and regression analysis were used to analyze data obtained. The study revealed that, only 26% had negative productivity, 53% had positive productivity, few (31%) had a positive profit of above 100,000 Naira and others have a profit of between 1 - 100,000 Naira. Personal saving was the best source of finance or capital for women rice farmers. Lack of finance is one of the major challenges faced by women rice farmers. Other challenges include credit availability and accessibility, lack of mechanized/technological equipment's, level of degradation, among others. Also, result showed that only government support as a source of finance was negatively significant and affected women rice farmers' productivity negatively. The study recommended that, women rice farmers should endeavour to undergo various developmental programmes to develop themselves so as to increase their competitive advantage in their locality and also in the local and global agricultural sector. In addition, governments and other policy makers should strategize plans and programme that would contribute to women rice farmers, agriculture, community and national development.

Oluwafemi Ajewole, Opeyemi Ayinde Eytayo, Vivian Ojehomon, Rita Agboh-Noameshie, Aliou Diagne (2015) carried out a study, Gender Analysis of Agricultural Innovation and Decision Making among Rice Farming Household in Nigeria. This research analyzed agricultural innovation, constraints faced by male and female rice farming households and decision making among rice farming household in Nigeria rice hub. A 3-stage stratified random sampling procedure were used, descriptive statistics, Ordinal Ranking, Least Significant Difference and Women empowerment index were the tool of analysis. The study showed that 23.81% of the respondents are female-headed and 76.19% are male-headed; more than half of the women (54.29%) are without formal education as compared to men (25.89%). Only 13.39% and 8.57% of the male and female headed household use rice innovation; access to credit, high cost of input and poor soil fertility are the major constraints; women empowerment results showed 76.60% of decision is made by solely by male head, 7.80% is made by female and 7.09% of decisions are jointly made. The study recommends that; innovation usage should be advocated, subsidy should be intensified and gender consideration in decision making be made a priority.

Abuh, Paul Ojochenemi, Romanus Gabriel, and Joshua Ogwuche (2017) focused on Analysis of Women Farmers in Rice Production in Donga Local Government Area of Taraba State. A total of 120 Questionnaire were collected and subjected to descriptive statistical analysis. The study used purposeful sampling technique to choose two (2) wards out of the ten (10) political wards in Donga Local Government Area of Taraba State. The two (2) wards were Akate and Asibiti wards. Also, random sampling was used to distribute the questionnaires among the respondents in the two (2) wards selected. In each of the wards, twelve (12) households were randomly selected and five (5) questionnaires were distributed to each of the household. The Chi-Square(X<sup>2</sup>) test was used to ascertain the relationship between the factors affecting rice production by women rice farmers in Donga L.G.A of Taraba State. The study reveals that 41.7 percent of respondents purchase farmland for the cultivation of rice. And 40 percent obtain credit facilities from cooperative societies. Also, 42.5 percent of the respondents consider inadequate finance as the major factor affecting rice production by women farmers in Donga L.G.A of Taraba State. All stakeholders must give all necessary assistance to women farmers involve in rice production

Ayodeji Alexander Ajibola Coker, Emmanuel Oladipo Akogun, Cornelius Owoniyi Adebayo, Shaba Mohammed, Mercy Nwojo, Halimat Sanusi and Hamdalat Opeyemi Jimoh\_ (2017) carried out a study on Gender differentials among subsistence rice farmers and willingness to undertake agribusiness in africa: evidence and issues from Nigeria. This article determined rice farmers' productivities and competitiveness, their willingness to undertake and factors influencing their participation in agribusiness across gender, using descriptive and inferential statistics. Data collected were analysed using descriptive statistics, productivity index, net farm income and probit regression analysis. The study employed a case study of rice farmers in Ibaji Local Government Area of Kogi State, Nigeria. The study employed a multi-stage sampling design, to select a sample of 160, with 80 each of male and female respondents selected. From a population of 280 at 95 per cent confidence interval and 5 per cent precision level.

The study concluded that in spite of the willingness to invest in agribusiness, gender imbalance in socioeconomic status, resource use and incomes were still recurring issues limiting productivity, competitiveness in rice production and by extension, food security. To feed Africa, there is the need to close the gender gap in socio-economic status, resource access, productivity and competitiveness, align national with regional agenda and the global sustainable development goals on hunger and equity, with the view to pooling resources towards tackling the food insecurity on an equitable and sustainable basis. It has also become imperative to support effective policy deployment, implement proven innovative and sustainable agri-business models and embark on targeted gender support within country and regional settings.

According to Ayoola, J. B.; Dangbegnon .c, Dauduc.k,Mando .A, Kudi .T,M, Amapu .I.Y, Adeosun J.O. , and Ezuik.s (2011) on Socio-economic factors influencing rice production among male and female farmers in Northern Guinea Savanna Nigeria: lessons for promoting gender equity in action research,Examined the performance of male and female farmers in rice farming in the Northern Guinea Savannah of Nigeria, with a view to determining the parameters for promoting gender equity in farmers' access to opportunities for improved livelihoods from rice production. Data were obtained from 624 farmers selected by stratified random technique from twelve villages in Katsina and Kaduna States of Nigeria; using structured interview and focus group discussion. The data were analyzed using descriptive statistics and regression model of double log form. Results indicated that land, variable inputs, and experience were significant at 1 percent and 5 percent levels; implying that these variables would greatly influence productivity of rice for both male and female farmers in the area; while age would influence rice production negatively, implying that the older the rice farmers the less the vigor for farming. Also, the coefficient for marital status of women was negative; implying that married women within reproductive age were more likely to be constrained in their production by their multiple roles and cultural practices that prevented women from direct field production activities. It was concluded that policies that would enhance farmers access to land, fertilizers, improved seeds, herbicides and labour; coupled with strategies for substituting women's time on production activities for non-entrepreneurial activities would likely enhance rice production and gender equity among rice farmers in the Northern Guinea Savanna, Nigeria.

Okam, Yusuf, Abdulrahman and Suleiman (2016) carried out a study, Comparative analysis of profitability of rice production among men and women farmers in Ebonyi state, Nigeria. Primary data was used for this study. These were collected with the aid of structured questionnaire. Information on both irrigated and upland rice production was collected. Multistage purposive and random sampling techniques were employed for data collection. The information collected was subjected to various analyses using the production function analysis model and the gross margin equations. The coefficient of determination ( $R^2$ ) of the regression was 53% and 47% for men and women rice farmers respectively. The results indicate that out of seven variables included in the model, three (farming experience, cost of labour and cost of seed) were found to significantly influence rice profitability among male farmers while four (farming experience, cost of labour, cost of agrochemical and cost of seed) of the variables were significant at influencing rice profitability among female farmers. The Total Variable Cost (TVC) incurred by the male and female respondents averaged N73, 435.00/ha and N60, 906.80/ha, with a Gross Margin (GM) of N86, 328.00/ha and N62, 035.20/ha respectively. Gross Margin/Naira invested was 1.18 and 1.02 for the male and female farmers respectively. Rice production was a profitable enterprise in the study area as significant profit was recorded per hectare of land cultivated. The study established that if male and female educated farmers are engaged in the production of rice and with proper access to credit, more profit will be realized, hence, the enterprise can serve as a means of employment for the populace as well as improving level of living of both male and female farmers.

Ayoola, Kudi, Dangbegnon, Daudu, Mando .A, Amapu, Adeosun, and Ezui (2012) on Gender perspectives of action research for improved rice value chain in northern guinea savanna, Nigeria. This paper aimed at determining the gender disparity along the rice value chain in Northern Guinea Savanna of Nigeria. 250 farmers were selected by stratified random technique from five villages in Katsina State of Nigeria. Data obtained by structured interview and focus group discussion methods were analyzed by descriptive statistics and gross margin techniques. Gross margin profit was significant for male farmers (t-statistics = 10.628) but not for female farmers (t-statistics = 1.262) at 5 percent level. The rates of return on capital were 0.847, 0.148 and 0.601 for processing, wholesale market and retail market levels respectively. Socio-cultural factors confining women to indoor activities constrained their access to production inputs, processing facilities and market. Improved access of farmers to inputs, and women in particular to processing facilities and skills would promote production of good quality rice in the study area.

According to Kagbu, Omokore, and Akpoko, (2016) on Adoption of recommended rice production practices among women rice farmers in Nasarawa state, Nigeria, *assessed the factors influencing adoption of recommended rice production practices by women farmers in Nasarawa State. A total of 203 women rice farmers were selected for the study using multi-stage sampling procedure. Data were collected using structured interview schedule. Descriptive statistics and multiple regressions were used for data analysis. Results reveal that the majority (70.9%) of the respondents was less than 45 years old, married (82.5%), had below secondary education (80.0%), had farming experience of 10 years and above (80%), and inherited their farmlands (81.4%). Farm size (2.6353,  $P < 0.05$ ) was the only socio-economic factor which significantly influenced adoption of recommended rice production practices by women rice farmers in the study area. Constraints hindering adoption of RRPPs were unavailability of credit facilities, poor marketing system and unstable price, and inadequate extension contacts. It was recommended that government should ensure that credit facilities are made available and accessible to women farmers. Also, buy-back arrangement should be introduced in order to ensure good pricing for rice producers.*

According to Effiong, Ijioma and Okolo, (2015) on the examination of the level of participation of women farmers in rice production in Bende L.G.A, Abia State, Nigeria. Data for the study were obtained from 90 respondents and summarized using frequency distribution, percentages and logistic regression. The respondents were young, energetic and enterprising with large household sizes and majority were married small-scaled farmers, with much experience in rice production. The farmers had access to credit and each farmer made a profit of N30, 508.03. This indicates that rice production was profitable in the study area. The clustered mean (cx) of 3.687 indicates that majority of the respondents participate in rice production. 71.43 of the respondents were women involved in rice production while 28.57 percent were women not involved in rice production. Involvement of women in rice production could be due to choice made by the women (Lancon, 2002). Household size, access to credit, output, total cost and membership of cooperatives were significant variables influencing the participation of women farmers in rice production. Inadequate land, inadequate finance, shortage of farm inputs, low level of infrastructure and climate change were the major problems facing women in rice production.

Ayoola (2011) examined the performance of male and female farmers in rice farming in the Northern Guinea Savannah of Nigeria, with a view to determining the parameters for promoting gender equity in farmers' access to opportunities for improved livelihoods from rice production. Data were obtained from 624 farmers selected by stratified random technique from twelve villages in Katsina and Kaduna States of Nigeria; using structured interview and focus group discussion. The data were analyzed using descriptive statistics and regression model of double log form. Results indicated that variables of interest would greatly influence productivity of rice for both male and female farmers in the area; while age would influence rice production negatively, implying that the older the rice farmers the less the vigour for farming. It was concluded that policies that would enhance farmers access to land, fertilizers, improved seeds, herbicides and labour; coupled with strategies for substituting women's time on production activities for non entrepreneurial activities would likely enhance rice in the Northern Guinea Savanna, Nigeria.

Edeogbon, Iyilade, and Nwachukwu, (2019) investigated on the study, Assessment of Gender Participation in Rice Production in Abakaliki, Nigeria. A total of hundred and sixty (160) male and female respondents were randomly selected from registered rice producers. Primary and secondary sources of instruments were employed and data were analyzed using descriptive statistics as frequency counts, percentages mean and standard deviation. T-Test and Product Moment Correlation was used to test the hypotheses. The result of the study showed that a high proportion of female respondents (59.5%) was within the ages 41-50 years and male respondents (48.3%) were within the ages of 31-40 years with a mean age of 38.9. This is an indication that most of the respondents are in their productive age. Also females tend to stay longer in rice production while the male involvement declines as they advance in age. This agrees with the findings of Ayoola *et al* (2011) which says that the categories of rice farmers in the Northern Guinea are in their productive age and tends to disagree with the findings of Kebbeh *et al* (2003) who reported an average age of 47 years for rice farmers in their research on challenges and opportunities for improving irrigated rice productivity in Kaduna and Niger States of Nigeria.

Activities like weeding, threshing, winnowing, cleaning, parboiling, dehusking etc. were dominated by the female farmers. Educational qualification ( $r = -0.323^{**}$ ,  $p < 0.139$ ) had a negative correlation which implies that the less educated participated more in rice production activities. It is therefore recommended that whenever there is the need to build the capacity of rice farmers, female farmers should be trained in simple/local languages that they can easily comprehend in the study area since they are not as educated as their male counterpart.

Kagbu, Omokore, and Akpoko, (2016) *assessed the factors influencing adoption of recommended rice production practices, PRPPs by women farmers in Nasarawa State. A total of 203 women rice farmers were selected for the study using multi-stage sampling procedure. Data were collected using structured interview schedule. Descriptive statistics and multiple regressions were used for data analysis. Results revealed that the majority (70.9%) of the respondents was less than 45 years old; the majority (82.5%) of the women rice farmers were married. This result agrees with the findings of Onumadu and Osahon (2014) where the majority of rice farmers were married. This implied that married people were more in rice farming and this could be as a result of more responsibilities they were saddled with as married people who had the role for providing household needs of their families; had below secondary education (80.0%), had farming experience of 10 years and above (80%), and inherited their farmlands (81.4%). Farm size (2.6353,  $P < 0.05$ ) was the only socio-economic factor which significantly influenced adoption of recommended rice production practices by women rice farmers in the study area. Constraints hindering adoption of RRPPs were unavailability of credit facilities, poor marketing system and unstable price, and inadequate extension contacts. It was recommended that government should ensure that credit facilities are made available and accessible to women farmers. Also, buy-back arrangement should be introduced in order to ensure good pricing for rice producers.*

## 2.3 Theoretical Framework

### Theory of participation

Supporting theoretical discourse on determinants of participation was given by Rwelamira (2015) who noted that peoples' motivation to participate in collective action is a result of their expectations such as access to services and maximization of self-interest and benefits through interaction with others. By the 1960s it was known that lack of ownership, lack of coordination, too much planning, and a "rhetoric of participation" were harming development (Dijkstra, 2011), things which popular participation was theorized to ameliorate. It was becoming evident that the attempt at foreign industrialization was not working. This act described an "emphasis...on assuring maximum participation in the task of economic development on the part of the people of the developing countries" (Cornwall, 2006).

Mansuri and Rao (2012) identify the focus on participation in development (from the mid-1980s) as a reaction against large-scale "top-down" investment projects, and the social costs of structural adjustment. They suggested that *Economists such as Sen and Ostrom made a vigorous case for a more bottom-up and deliberative vision of development that allows for "common sense" and "social capital" of communities to play a central part in decisions that affect them. Their scholarship led to a renewed interest in community-based development, decentralization, and participation by donors and government.* They also argue, however, that *this renewed policy interest in participatory initiatives, along with the expansion in funding, has proceeded, in large part, with little systematic effort to understand the particular challenges entailed in inducing participation or to learn from past programs. As a result, the process is, arguably, still driven more by ideology and optimism than by systematic analysis, either theoretical or empirical.* Mansuri and Rao noted the distinction between "organic" participation, which reflects collective action organised by communities or through local political action, often to counter the state, and participation that is "induced" by donor or government programmes, notably through decentralisation and community driven development. The analytical value of the concept of "organic" participation may be questioned because the space and potential for individual or collective action to emerge may depend significantly on the attitude that the state takes towards it, and because the relationship between the state and other social forces may be complex, rather than simply oppositional. This broader concept of participation is central to the idea of the citizen, understood as someone with rights, aspiration and responsibilities in relation to other community members and the state (DFID 2010). The rationale for externally driven measures to foster participatory approaches is based (implicitly or explicitly) on an inability of community members to organise themselves effectively. Mansuri and Rao (2012) characterise this as a "civil society failure" in which: *Civic action is either absent or operates in a way that results in a net reduction in efficiency.*

The principal objective of this Marxist-oriented school of Participatory Action Research [PAR] was not development, but rather "transformation of the cultural, political, and economic structures which reproduce poverty and marginalization" (Leal, 2007). Leal, and other recent participation critics have developed these narrow political views, stating that participatory approaches are "most likely to succeed where they are pursued as part of a wider (radical) political project and where they are aimed specifically at securing citizenship rights and participation for marginal and subordinate groups" (Leal, 2007; Hickey and Mohan, 2005). In this approach, participation, power, and politics were intricately combined. The political right to participation is a fundamental ingredient for transformative change process to occur (Hickey and Mohan, 2005). The recent World Congress on Communication reported "limited participation" of the poorest in the development process (World Bank, CI, and FAO 2007, p. 2).



Other experts have also recently reported a "historic and systemic failure of the development industry to 'fix' chronic underdevelopment" (Leal, 2007). Some experts stated that participation was as "ubiquitous as ever" (Hickey and Mohan, 2005, p. 3), but there was not notable improvement in the effectiveness of international development. Even the Poverty Reduction Strategy Papers [PRSPs] by the World Bank were critiqued for being top-down during this time. The World Bank has been consistently promoting participation for 45 years, but one of the major problems is the lack of clarity as to what is meant by local participation. The main tenet of participatory community development approaches is that all stakeholders collaborate in any development activities from the very beginning of project identification, prioritization, planning, implementing, evaluation and monitoring. It is also geared towards achieving a sense of ownership and sustainability of the projects (GTZ-OSHP, 2002).

Margaret Kohn (2000) proposes that spaces are deliberately construed so that only certain voices are heard (Hickey and Mohan, 2004). Thus participation can be a challenge in conveying to the community why their involvement and input is important and worthwhile, as well as creating an equal space where participants can freely and equally express their opinions.

In discourses around sustainable development, the term participatory approach has become a widely advocated methodological principle for intervention practice, and a range of participatory methodologies, methods and techniques have been proposed in order to operationalize it. Despite the fact that important differences exist among the various methodologies, they have in common that they primarily perceive the process in which actors supposedly participate as a process of planning, decision-making and/or social learning (Cees, 2000). A number of participatory methodological approaches have been adopted to bring about sustainable development at the community level. However, each participatory approach is deemed suitable for a specific type of problem situation, in relation to which it aims to generate certain contributions. In part, this explains why so many methodologies and approaches exist, each with its own acronym, abbreviation or (marketing) label.

When researching participation, it is important to evaluate it within a particular context and culture (Morgan, 2001).

Farmers' participation is an important factor for sustainable agriculture in rural area. Farmers' participation issues are the areas of concern at national and local level (Subedi, 2008). Without participation, there are obviously no partnerships, no developments, and no program (Aref, Marof and Sarjit 2010). Therefore, a lack of participation in the decision to implement an agricultural policy can lead to failure in the agricultural development. Farmers' participation is considered necessary to get community support for agricultural development projects (Cole, 2007). Farmers' participation refers to peoples' engagement in activities within the rural. It plays an essential and long-standing role in promoting quality of life (Putnam, 2000). Without community participation, there is obviously no partnership, no development and no program. Meanwhile, some scholars provided a typology of participation (Leksakundilok, 2006), In Arnstein's model, programmatic intent could range from low "manipulation" of participants, to "high", full control of decision-making mechanisms by community residents and service consumers (Hardina, 2004).

There are a number of barriers that make fuller participation difficult for the villagers. Farmers' participation in agricultural development is faced with some barriers. There are a number of reasons why active participation is hard to achieve in practice. In rural area in the west, participation is constrained by a number of factors, including residents' lack of knowledge, confidence, time and interest (Cole, 2006). Frequently a lack of ownership, capital, skills, knowledge and resources all constrain the ability of communities to fully control their participation in agricultural development (Scheyvens, 2003). Knowledge of the decision-making processes is essential if farmers are to take an active part in agriculture planning (Cole, 2006). Aref et al., (2010) also indicated some of barriers of participation in communities. These barriers include lack of knowledge, lack of ability of individuals to participate, lack of effective and strong government institutions, inadequate focus on human resource development and dependency on government and lack of authority in communities.

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1. Research Design

A sample survey design was used. A survey research studies both large and small population by selecting and studying samples chosen from the population to discover the relative incidence, distribution and interrelations of sociological and psychological variables. It is an investigation in which only part or a sample of the population is used and the choice of the sample is done such that representativeness is ensured. For this reason, the researcher will make use of a questionnaire to gather data that will help to operationalize the assessment of women in family farming amongst rice producing communities in rural areas of Anambra State,

#### 3.2 Area of the Study

Anambra state is one of the 36 states in Nigeria, it is located in the south-Eastern part of the country, and comprises 21 Local Government Areas which includes (Aguata, Awka North, Awka South, Anambra East, Anambra West, Anaocha, Ayamelum, Dunukofia, Ekwusigo, Idemili North, Idemili South, Ihiala, Njikoka, Nnewi North, Nnewi South, Ogbaru, Onitsha North, Onitsha South, Orumba North, Orumba South and Oyi), which is sub-divided into four agricultural zones to aid planning and rural development. Its name is an anglicized version of the original OmaMbala, the Igbo name of the Anambra River. The capital and seat of government is Awka. The state's theme is "Light of the nation". Boundaries are formed by Delta State to the west, Imo State and Rivers State to the south, Enugu State to the east, and Kogi State to the north. The name was derived from the Anambra River (Omambala) which flows through the area and is a tributary of the River Niger. The indigenous ethnic groups in Anambra state are the Igbo (98% of the population) and a small population of Igala (2% of the population), who live mainly in the north-western part of the state.

It has an estimated population of 4,182,032, with the male population of 50.9% and female 49.1% (National Population Commission (N.P.C) 2006)) The area has a mean temperature of 30° C during the hottest period of February to April and 21° C during the coldest period of December to January. The State has two distant seasons of dry and rainy seasons. The annual average rainfall is between 2000mm to 2300mm and distributed through March to November. The mean annual relative sunshine intensity is 5. 2 hours. The state occupies an area of 4,416 square kilometers. About 70% of the total mass is arable land, which is under cultivation while the remaining 30% is residential areas.

Agriculture is the predominant in the rural areas engaging more than 70% of the rural population. The number of farm families is 338,721 with an average size of 8 persons per farm family or household (Anambra State Economic Empowerment Development Strategy (S.E.E.D.S) 2006). Anambra State is situated between Latitudes 5° 32' and 6°45' N and Longitude 6°43' and 7° 22 'E respectively.

#### 3.3 Population of the Study

The study has an infinite population, comprising all the women in family farming amongst rice producing communities in rural areas of Anambra State,

#### 3.4 Sampling Technique and Sample Size.

The study made use of a combination of sampling technique, multi- stage, simple random ,purposive and snow ball sampling technique was used to select 108 respondents for the study.

In the first stage, three agricultural zones, Aguata, Awka, and Anambra were purposively selected (out of the four agricultural zones) from where one local government area was purposively selected out of each zones ( a total of three local government areas was obtained for the study), Orumba North, Awka North, and Ayamelu, based on the local government areas that are well known for rice production.

In the second stage, two communities were randomly selected from each of the local government areas that made it a total of six communities. .Equally, two villages were randomly selected from each community that made it a total

of twelve villages for the study.

Furthermore, a snow- ball sampling technique (chain referral ssampling) was used to select nine women rice farmers under family farming from each of the twelve villages this therefore, made the sample size one hundred and eight respondents.

**Table 3.1**

| Agriculture Zones | Local Government Area | Communities        |
|-------------------|-----------------------|--------------------|
| Aguata            | Orumba North          | Ufuma, Ndikelionwu |
| Awka              | Awka North            | Achalla, Ugbenu    |
| Anambra           | Ayamelum              | Omor, Anaku        |

**3.5 Sources of Data**

The researcher sourced data only from primary source. The primary data was achieved basically from the use of a well-structured questionnaire and interview with the women rice farmers under family farming.

**3.6 Description of Data Collection Instrument**

A well-structured questionnaire was designed and used to elicit information from the women rice farmers under family farming. The question was designed in parts. Section A contained background information of the respondents. Section B contained information on rice production activities, and Section C contained information on the challenges faced by the women rice farmers.

**3.7 Data Administration and collection of Questionnaire**

The researcher engaged three enumerators (research assistants); each enumerator covered one Local Government Area. The enumerators spent at least two weeks in the field to collect the needed data for the study.

**Table 3.2 presented the information on data distribution and return rate.**

| Agriculture Zones | Local Government Area | Stratum | Return Rate |
|-------------------|-----------------------|---------|-------------|
| Aguata            | Orumba North          | 36      | 100%        |
| Awka              | Awka North            | 36      | 100%        |
| Anambra           | Ayamelum              | 36      | 100%        |
| Total             |                       | 108     |             |

**3.8 Validity and Reliability of the Questionnaire**

**3.8.1 Validity**

The validity of research ensures that the research instrument will be able to measure what it was designed to measure. Every research instrument which may be a questionnaire, psychological test, observation or interview etc., is expected to gather dependable information on certain characteristics, ability or traits of the respondent or group of people. The dependability of this instrument on the data to be gathered is what is called validity. Therefore, the

questionnaire was validated by three experts (two lecturers from crop science department, and the project supervisor) they judged the appropriateness and clarity of the items in the questionnaire.

### 3.8.2 Reliability

Reliability refers to where data is collected, quantified or evaluated. It is the ability of the data gathering process to provide results that are consistent and within expected ranges. Reliability has to do with consistency and stability of the instrument or test. The reliability of the instrument was established using a test re-test method. Copies of the questionnaire for the study was administered to ten (10) women rice farmers under family farming, after two weeks, the questionnaire was readministered and their responses was subjected to a Cronbach's Alpha test of reliability where their internal consistency was determined with 5% Alpha level of significance. Thus, a Cronbach Alpha of 0.838 (Table 3.3) obtained attested to the reliability of the instrument.

Table 3.3: Reliability test result

| Cronbach's Alpha | Cronbach's Alpha Based on N of Items | Standardized Items |
|------------------|--------------------------------------|--------------------|
| 0.838            | 0.853                                | 20                 |

Source: Field Survey Data, 2019.

### 3.9 Measurement of Variables

Deciding how variables will be measured is the first step in organizing the observation of a study. The type of scale that was used in determining the nature of the subject of the study. In this study, the researcher measured the assessment of women rice farmers' participation in rice production at family farming level as thus;

**Independent variable:** an independent variable is a variable whose variation does not depend on that of another, it is a value that is manipulated to determine the value of a dependent variable. The independent variables for the study include;

**Socioeconomic Characteristics:** Age (years), Farming experience (years), Years of school attendant (years), Educational qualification (ordinal: No formal education = 0, primary = 1, secondary = 2, and tertiary = 3), Household size (No), and Marital status (nominal: single = 1, married = 2, widow(er) = 3, separated/divorced = 4), farm size (ha), number of extension visit last cycle (No), monthly income (₦), and membership of a cooperative (dummy; yes = 1, and no = 0)

**Challenges encountered by women in rice production under family farming:** The challenge was captured on 5-point Likert scale.

**Dependent variable:** A dependent variable is a variable whose variation depends on that of another; it is gotten as a result of the manipulation of another variable. For the purpose of this study, the dependent variable is:

**Participation:** the level of women participation was scaled from 1 – 5 as strongly participated, participated, somewhat participated, not participating, and strongly not participating respectively.

### 3.10 Data Analysis

A statistical tool was employed to analyze the data that was collected in order to achieve the stated objectives of the study. The study utilized a combination of analytical tools of descriptive, participatory index, Logit regression models, and inferential statistics of ANOVA analysis. Objective 1 was achieved using descriptive statistics which include; frequency, percentage and mean, and was later subjected to participatory index. Objective 2 was achieved with a logit regression model and objective 3 was achieved with Principal Factor Analysis (PFA). The null hypothesis one was tested with t-ratios from the logit regression analysis in objective 2, and the null hypothesis two was tested with one-way ANOVA.

3.11 Model Specification

A). descriptive statistics for objective 1 is mathematically stated thus;

$$\bar{X} = \sum \frac{FX}{n} \dots \dots Eqn. 3.3$$

Where;

$\bar{X}$  = mean

X = variable outcome

n = sample size

F = frequency

B). the participatory index to further ascertain objective one is stated thus;

$$PI = \frac{f_{sa}x1 + f_a x0.8 + f_{sw}x0.6 + f_a x0.4 + f_{sd}x0.2}{N} \dots Eqn. 3.4$$

Where:

PI = participatory index

N = observation

$f_{sa}x1$  = *outcome of strogly participated*

$f_a x0.8$  = *outcome of participated*

$f_{sw}x0.6$  = *outcome of somewhat participated*

$f_a x0.4$  = *outcome of not participated*

$f_{sd}x0.2$  = *outcome of strongly not participated*

C). Logistic regression model for objective 2 is implicitly stated thus;

$$P = f(X1, X2, X3, X4, X5, X6, X7, X8, X9, X10, e) \dots \dots Eqn. 3.5$$

Where:

P = mean threshold of participation (continuous variable)

$\beta \dots \beta 8$  = Parameter of estimate

X<sub>1</sub> = Sex (dummy; Male = 1, Female = 0).

X<sub>2</sub> = Age (years).

$X_3$  = Farming experience (years)

$X_4$  = Years of school attendant (years)

$X_5$  = Marital status (dummy: single = 1, married = 2, widow(er) = 3, separated/divorced = 4)

$X_6$  = Farm size (Ha)

$X_7$  = monthly income (₦)

$X_8$  = Household size (No)

$e$  = error term.

**D).** Principal Factor Analysis (PFA) for objective 3 is stated thus:

$$X_{ij} = \delta_{i1}F_{i1} + \delta_{i2}F_{i2} + \dots + \delta_{jm}F_{iK} + e_{ij} \dots \text{Eqn. 3.7}$$

Where:

$X_{ij}$  = observation on variable  $X_j$  for the  $i$ th sample number.

$F_{iK}$  = score on factor  $F_K$  ( $K = 1, 2, 3 \dots m$ )

$F_1$ - $F_m$  = common factors

$e_{ij}$  = the value on the residual variable  $E_j$  for the  $i$ th sample number.

$\delta_{j1} \dots \delta_{jm}$  = factor loading (regression weight)

The associated assumption was applied accordingly while the suitable number of factors was subjectively selected based on varimax rotated factor matrix obtained using SPSS version 23.0 software. The explanatory techniques using PFA model with interactions and varimax rotation was adopted. The factor loading under constraint (beta weight) represented a correlation of the variables (constraints areas) factors that has the same interpretation as any correlation coefficient Kaiser's criterion using factor loading of 0.30 and above in naming and interpretation. At the end; the varimax was rotated into 2 factors which included; socioeconomic, and constraint factors.

**Test of Hypothesis**

The null hypothesis one was tested from Z score of objective 2.

The null hypothesis two was tested with one-way ANOVA.

**E).** the formula for one-way ANOVA is as follow:

$$F = \frac{MST}{MSE}$$

$$MST = \frac{SST}{P - 1}$$

$$SST = \sum n(x - \bar{x})^2$$

$$MSE = \frac{SSE}{N - P}$$

$$SSE = \sum (N - 1)^2$$

Where:

F = ANOVA coefficient

MST = Mean sum square due to treatment

MSE = Means sum square due to error

SST = Sum square due to treatment

SSE = Sum square due to error

P = Total population

S = Standard deviation

N = Total number of the observation

n = total number of sample in the population

## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSIONS

#### 4.1.1 Socioeconomic characteristics of women (n = 108)

The women socioeconomic characteristics is presented in Table 4.1

**Table 4.1: Socio-economic characteristic of women**

| Sn. | Variable                          | Frequency | Percentage | Mean  |
|-----|-----------------------------------|-----------|------------|-------|
| 1   | <b>Age</b>                        |           |            |       |
|     | 18 - 25 years                     | 13        | 12.0       |       |
|     | 26 - 33 years                     | 26        | 24.1       |       |
|     | 34 - 41 years                     | 12        | 11.1       | 41.20 |
|     | 42 - 49 years                     | 28        | 25.9       |       |
|     | 50 - 57 years                     | 1         | .9         |       |
|     | 58 years - above                  | 28        | 25.9       |       |
| 2   | <b>Marital status</b>             |           |            |       |
|     | Married                           | 53        | 49.1       |       |
|     | Single                            | 14        | 13.0       |       |
|     | divorce/separated or widow        | 41        | 38.0       |       |
| 3   | <b>Level of education</b>         |           |            |       |
|     | Primary                           | 37        | 34.3       |       |
|     | Secondary                         | 56        | 51.9       | 10.80 |
|     | Tertiary                          | 16        | 14.8       |       |
| 4   | <b>Farming Experience (years)</b> |           |            |       |
|     | 1 – 5                             | 14        | 13.0       |       |
|     | 6 - 10                            | 26        | 24.1       |       |
|     | 11 - 15                           | 14        | 13         | 13.72 |
|     | 16 - 20                           | 28        | 25.9       |       |
|     | 21 years and above                | 26        | 24.1       |       |
| 5   | <b>Farm size (plot)</b>           |           |            |       |
|     | 1 – 3                             | 41        | 38.0       |       |
|     | 4 – 6                             | 26        | 24.1       | 5.28  |

|   |                                |    |      |           |
|---|--------------------------------|----|------|-----------|
|   | 7 – 9                          | 26 | 24.1 |           |
|   | 10 and above                   | 15 | 13.9 |           |
| 6 | <b>Household size (Person)</b> |    |      |           |
|   | 1 – 5                          | 41 | 38.0 |           |
|   | 6 – 10                         | 67 | 62/0 | 6.10      |
|   | 11 and above                   | -  | 0    |           |
| 7 | <b>Monthly income (₦)</b>      |    |      |           |
|   | 1 – 20,000                     | 13 | 12.0 |           |
|   | 20,001 – 30,000                | 56 | 51.9 |           |
|   | 30,001 – 40,000                | 14 | 13.0 | 29,680.48 |
|   | 40,001 – 50,000                | 13 | 12.0 |           |
|   | 50,001 and above               | 12 | 11.1 |           |
| 8 | <b>Extension contact (No)</b>  |    |      |           |
|   | 0                              | 54 | 50.0 |           |
|   | 1 – 3                          | 41 | 38.0 | 1.36      |
|   | 4 – 6                          | 13 | 12.0 |           |
|   | 7 and above                    | -  | 0    |           |
| 9 | <b>Cooperative membership</b>  |    |      |           |
|   | No                             | 68 | 63.0 |           |
|   | Yes                            | 40 | 37.0 |           |

Source: Field Survey Data, February 2020.

**Age:** the Table 4.1 shows that greater proportion (25.9% and 25.9%) of the women rice producers are within the age of 42 – 49 years and 58 years and above respectively, while the remaining 24.1%, 12.0%, 11.1% and 0.9% are within the age of 26 – 33 years, 18 – 25 years, 34 – 41 years, and 50 – 57 years respectively. The mean age of the women was found to be 41.20 years; the implication is that the women are still in their active farm age in the area. This findings is in agreement with Ayanwaland Amusan (2014) on gender analysis of rice production efficiency in Osun State, the study also aligns with Kagbu, Omokore, and Akpoko (2016) on adoption of recommended rice production practice among women farmers in Nassarawa State, Nigeria.

**Marital status:** findings also shows that greater proportion (49.1%) of the women are married, while the remaining 38.0% and 13.0% are either divorce/separated or widow and single respectively.

**Level of education:** interestingly, the study also shows that the majority (51.9%) of the women attended secondary school, while the remaining 34.3% and 14.8% attended primary and tertiary education respectively. The mean age of formal learning was 11 years. Therefore confirming that the women are fairly educated.

**Farming Experience (years):** the study shows that the greater proportion (25.9%) have spent 16 – 20 years in rice farming, while the remaining 24.1%, 24.1%, 13.0% and 13.0% have spent 6 - 10 years, 21 years and above, 1 – 5 years, and 11 – 15 years respectively. The mean age of farming experience was found to be 14 years. This is in line with Edeoghon, Iyilade, and Nwachukwu (2019) on assessment of gender participation in Abakaliki, Nigeria.

**Farm size (plot):** gathering from the results of the field work, the researcher found out that a greater proportion (38.0%) of the women have 1 – 3 plots of land, while the remaining 24.1%, 24.1%, and 13.9% have 4- 6 plots, 7- 9 plots, and 10 plots and above respectively. The mean farm size was 5.28 plots. This is an indication that family farming is at subsistent level in the area.

**Household size (Person):** the study shows that the majority (62.0%) of the women have a household size of 6 – 10 persons, while the remaining 38.0% and 0% have a household size of 1 – 5 persons and 0 person respectively. Their average household size was found to be 6 persons.

**Monthly income (N):** the majority (51.9%) of the women have a monthly income between ₦20,001 – ₦30,000, while the remaining 13.0%, 12.0%, 12.0% and 11.1% have a monthly income between ₦30,001 – ₦40,000, ₦1 – ₦20,000, ₦40,001 – ₦50,000 and ₦50,001 and above respectively. The mean monthly income of women in the study was found to be ₦29, 680.48.



**Extension contact:** the Table 4.1 shows that the majority (50.0%) of the women had no contact with extension agent in the last farm season, while the remaining 38.0% and 12.0% contacted with the agents 1 – 3 times and 4 – 6 times in the last farm season respectively. The mean contact was 1 time.

**Cooperative membership:** furthermore, the findings shows that the majority (63.0%) of the women are not members of farmerscooperative, while the rest 37.0% are members of farmers’ cooperative. This result therefore justifies the low number of extension contact in the last farming season by the women.

4.1.2 Extent of women’s participation

The extent of participation of the women rice farmers is presented in Table 4.2

Table 4.2: Extent of women’s participation

| S n.     | Activities                           | SNP | NP | SWP | P  | SP | Mean threshold | Index |
|----------|--------------------------------------|-----|----|-----|----|----|----------------|-------|
| <b>A</b> | <b>Decision making on production</b> |     |    |     |    |    |                |       |
| 1        | Site selection                       | 14  | 0  | 27  | 13 | 54 | 3.86           | 0.77  |
| 2        | choice of variety                    | 0   | 13 | 14  | 41 | 40 | 4.00           | 0.80  |
| 3        | organization of labour               | 0   | 14 | 41  | 13 | 40 | 3.73           | 0.75  |
| 4        | allocation of different task         | 0   | 0  | 81  | 27 | 0  | 3.25           | 0.65  |
| 5        | management of farm land/assets       | 0   | 13 | 54  | 27 | 14 | 3.39           | 0.68  |
| 6        | questions of inheritance             | 95  | 13 | 0   | 0  | 0  | 1.12           | 0.23  |
| <b>B</b> | <b>Implementation:</b>               |     |    |     |    |    |                |       |
| 1        | seedling                             | 13  | 14 | 41  | 27 | 13 | 3.12           | 0.62  |
| 2        | spray of agrochemical                | 67  | 41 | 0   | 0  | 0  | 1.29           | 0.28  |
| 3        | fertilizer application               | 13  | 41 | 27  | 27 | 0  | 2.63           | 0.53  |
| 4        | seed bed/land preparation            | 0   | 41 | 54  | 13 | 0  | 2.74           | 0.55  |
| 5        | nursery                              | 0   | 0  | 27  | 13 | 68 | 4.38           | 0.88  |
| 6        | planting                             | 0   | 14 | 27  | 13 | 54 | 4.00           | 0.80  |
| 7        | milling                              | 27  | 54 | 13  | 14 | 0  | 2.13           | 0.43  |
| 8        | bird scarring                        | 13  | 14 | 41  | 41 | 0  | 3.04           | 0.61  |
| 9        | Harvesting                           | 0   | 0  | 68  | 26 | 14 | 3.50           | 0.70  |
| 10       | Weeding                              | 0   | 27 | 54  | 27 | 0  | 3.00           | 0.60  |
| 11       | rice sorting                         | 13  | 81 | 14  | 0  | 0  | 2.00           | 0.40  |
| 12       | seed preservation                    | 13  | 0  | 54  | 14 | 27 | 3.39           | 0.68  |
| 13       | winning                              | 27  | 13 | 14  | 27 | 27 | 3.13           | 0.63  |
| 14       | straw drying                         | 27  | 0  | 54  | 13 | 14 | 2.88           | 0.58  |
| 15       | thinning/transplanting               | 0   | 27 | 13  | 14 | 54 | 3.88           | 0.78  |
| 16       | cleaning                             | 13  | 14 | 27  | 27 | 27 | 3.38           | 0.68  |
| 17       | parboiling                           | 13  | 40 | 0   | 14 | 41 | 3.28           | 0.66  |
| 18       | threshing                            | 13  | 68 | 27  | 0  | 0  | 2.13           | 0.43  |
| 19       | drying                               | 27  | 27 | 40  | 14 | 0  | 2.38           | 0.48  |
| 20       | husking                              | 13  | 54 | 14  | 13 | 14 | 2.64           | 0.54  |
| 21       | sorting of grain                     | 13  | 27 | 27  | 41 | 0  | 2.89           | 0.58  |
| 22       | bagging                              | 27  | 40 | 0   | 27 | 14 | 2.64           | 0.53  |
| 23       | transportation and marketing         | 27  | 54 | 27  | 0  | 0  | 2.00           | 0.40  |
| 24       | hulling                              | 40  | 27 | 41  | 0  | 0  | 2.00           | 0.40  |
| 25       | polishing                            | 27  | 68 | 0   | 13 | 0  | 2.00           | 0.40  |
| 26       | grading                              | 0   | 40 | 68  | 0  | 0  | 2.63           | 0.53  |
| 27       | de-stoning                           | 0   | 68 | 27  | 0  | 13 | 2.61           | 0.52  |
| <b>C</b> | <b>Controlling:</b>                  |     |    |     |    |    |                |       |
| 1        | <b>Labour engagement</b>             | 0   | 27 | 41  | 40 | 0  | 3.12           | 0.62  |
| 2        | <b>Monitoring   supervision</b>      | 0   | 0  | 81  | 27 | 0  | 3.25           | 0.65  |
| <b>D</b> | <b>Evaluation in all your:</b>       |     |    |     |    |    |                |       |

|   |           |    |    |    |    |    |      |      |
|---|-----------|----|----|----|----|----|------|------|
| 1 | operation | 0  | 54 | 13 | 27 | 14 | 3.00 | 0.60 |
| 2 | Policies  | 27 | 13 | 54 | 0  | 14 | 2.64 | 0.53 |
| 3 | programs  | 0  | 40 | 54 | 0  | 14 | 2.89 | 0.58 |

Source: Field Survey Data, February 2020.

The researcher use participatory index method to ascertain the extent of women’s participation in rice production activities in the study area. The items under study were sub grouped into 4 classifications as decision making (site selection, choice of variety, organization of labour, allocation of different task, management of farm land/assets and questions of inheritance), implementation (seedling, spray of agrochemical, fertilizer application, seed bed/land preparation, nursery, planting, milling, bird scarring, harvesting, weeding, rice sorting, seed preservation, winnowing, straw drying, thinning/transplanting, cleaning, parboiling, threshing, drying, husking, sorting of grain, bagging, transportation and marketing, hulling, polishing, grading and de-stoning), controlling (labour engagement, monitoring| supervision ) and evaluation (operation, policy and programs). The participatory index was ranged from 0 to 1, based on the rule of thumb, index value less than 0.5 had a weak participatory index and was otherwise not accepted in decision making. Thus, the women actively participate in decision making in form of (site selection, choice of variety, organization of labour, allocation of different task and management of farm land/assets), Implementation (seedling, fertilizer application, seed bed/land preparation, nursery, planting, bird scarring, harvesting, weeding, seed preservation, winnowing, straw drying, thinning/transplanting, cleaning, parboiling, husking, sorting of grain, bagging, grading and de-stoning), controlling (labour engagement, monitoring) and evaluation (operation, policy and programs).

4.1.3 Women’s socioeconomic influence on participation in rice production

The socioeconomic characteristic influence on women’s participation index is presented in Table 4.3

Table 4.3: Women’s socioeconomic influence on participation in rice production

| Logistic regression         |             |                         | Number of obs. = 108            |                      |           |
|-----------------------------|-------------|-------------------------|---------------------------------|----------------------|-----------|
|                             |             |                         | LR Chi <sup>2</sup> (8) = 30.60 |                      |           |
| Log likelihood = -61.081151 |             |                         | Prob> Chi <sup>2</sup> = 0.0002 |                      |           |
|                             |             |                         | Pseudo R <sup>2</sup> = 0.2003  |                      |           |
| Participation               | Coefficient | Marginal effect (dy/dx) | Z-value                         | [95% Conf. Interval] |           |
| Age                         | -0.1972075  | -0.0331734              | -1.33                           | -0.4877397           | 0.0933246 |
| Marital status              | -0.3686017  | -0.0620047              | 0.54                            | -1.696523            | 0.9593191 |
| Years of study              | -2.112384   | -0.3553366              | (-1.91)*                        | -4.276835            | 0.0520671 |
| Farm experience             | 1.047248    | 0.1761638               | (1.82)*                         | -0.0811009           | 2.175597  |
| Household size              | -.2975661   | -0.0500553              | -0.60                           | -1.270375            | .6752429  |
| Monthly income              | .0007742    | 0.0001302               | (1.91)*                         | -.0000201            | .0015685  |
| Farm size                   | -5.274269   | -0.8872158              | (1.99)**                        | -10.46449            | -.0840459 |
| Cooperative                 | 11.07653    | 1.863248                | (2.28)**                        | 1.554175             | 20.59888  |
| Constant                    | 17.28324    |                         | 1.79                            | -1.671359            | 36.2378   |

Source: Field Survey Data, February 2020. (\*) Significant at 10%, (\*\*) Significant at 5% and (\*\*\*) Significant at 1%

The logistic regression of Table 4.3 to examine the influence of women’s socioeconomic characteristics on extent of participation had a log likelihood of -61.081 (the higher the log likelihood the better the model fit), a likelihood ratio (LR) of 30.60 was significant at 1% level of probability which is an indication that the model was a good fit. A Pseudo R<sup>2</sup> which means the same as coefficient of multiple determinant in a linear regression had a value of 0.2003 which means that the women’s socioeconomic characteristics explains 20.03% of the variation in their participatory index while the remaining 79.97% was as a result of error beyond the control of the women. The pseudo R<sup>2</sup> above accepted 0.20 level could be as a result of cultural restriction on women in some farming practice and asset ownership in an African system.

The coefficient of age, marital status and household size were not significant at either 10%, 5% or 1% level of probability.

The marginal effect of years of formal study was negative and significant at 10% level of probability; this implies that a unit increase in the number of farmers that spends less years in formal learning will reduce their participatory index by 35.5% in the area. This was in agreement with Thabitihassan (2014) on gender analysis in rice production in Kyala district Mbeya region Tanzania.

The marginal effect of farming experience was positive and significant at 10% level of probability; this implies that a unit increase in the women’s farming experience will increase the women’s participatory index by 17.6% in the area. This finding is in line with the *a priori* expectation that more experienced women tending to participate more in rice farming activities. This was in agreement with Thabitihassan (2014) on gender analysis in rice production in Kyala district Mbeya region Tanzania.

The marginal effect of monthly income was positive and significant at 10% level of probability; this implies that a unit increase in the monthly income of women will increase their participatory index by an infinitesimal value of 0.001% in the area. This was equally expected by the *a priori* expectation since it was suspected that women with increased income status may end up engaging hired labour.

The marginal effect of farm size was negative and significant at 5% level of probability; this implies that a unit increase in the number of women’s farm size will reduce the women. This outcome is in line with the *a priori* expectation as women with smaller farm size are supposed to have a higher participatory index.

The marginal effect of cooperative membership was positive and significant at 5% level of probability; this implies that a unit increase in the number of women that are members of a cooperative society will increase their participatory index by 186.3%. This outcome is most appropriate as membership of a formidable association is expected to increase women participation in unionism.

This findings on socioeconomic influence on participation is not in line with Asha, Dilshad, Riffatand Ismat (2015) on women labour participation in rice production in some selected areas of Thakangan district, Bangladesh.

**4.1.4 Challenges facing women’s participation**

The challenges facing women’s participation is presented in Table 4.4

**Table 4.4: Pattern Matrix<sup>a</sup> of the challenges facing women rice producers**

| Challenges facing women rice producers                        | Component |        |        |        |   |
|---|-----------|--------|--------|--------|---|
|   | 1         | 2      | 3      | 4      | 5 |
| Poor access to capital  | 0.916     |        |        |        |   |
| Inadequate finance  | 0.906     |        |        |        |   |
| High cost of labour   | 0.824     |        |        |        |   |
| Challenges of pest and disease                                | -0.775    |        |        |        |   |
| Low level of infrastructure                                   | 0.753     |        |        |        |   |
| Lack of knowledge on improved agric. Tech.                    | 0.548     |        |        |        |   |
| Lack of managerial skills                                     | -0.529    |        |        |        |   |
| Child bearing   |           | 0.886  |        |        |   |
| Distance to processing center                                 |           | 0.866  |        |        |   |
| poor access to improved variety                               |           | 0.831  |        |        |   |
| Low pricing of produce  |           | -0.708 |        |        |   |
| High cost and delay in supply of fertilizer and agro chemical |           | 0.673  |        |        |   |
| Use of rudimentary technology                                 |           |        | 0.872  |        |   |
| Low government participation                                  |           |        | -0.824 |        |   |
| poor access to extension service                              |           |        | 0.614  |        |   |
| Climate change  |           |        | -0.539 |        |   |
| Inadequate supply of fertilizer                               |           |        |        | 0.780  |   |
| Lack of processing facility                                   |           |        |        | 0.758  |   |
| Scarcity/shortage of improved rice variety                    |           |        |        | -0.732 |   |

|   |      |
|---|------|
| High cost of transportation               | 0.75 |
|   | 9    |
| Poor access to improved agric. Technology | 0.71 |
|   | 0    |
| Poor access to improved agric. Inputs     | 0.53 |
|   | 6    |

Source: Field Survey Data, February 2020.

The challenges of family farming among women rice producers in Anambra State were analyzed with principal factor analysis. The result had a Kaiser Meyer-Olkm (KMO) value of 0.776 (Appendix 1 Table c) which shows data adequacy. Variables with communalities value less than 0.5 (Appendix 1 Table d) was removed since the rule of thumb assumes that such variable was not strong for factor loading. The challenge was rotated into 5 component factors with a positive eigenvalue. A pattern matrix (Appendix 1 Table f) was used as a discriminant analysis to ensure no variable loaded in more than one factor loading. Factor one explained 24.21% variance of factors challenging family farming among women rice farmers, factor two explained 19.70% variance of factors challenging family farming among women rice farmers, factor three explained 13.22% variance of factors challenging family farming among women rice farmers, Factor four explained 9.22% variance of factors challenging family farming among women rice farmers and factor five explained 6.52% variance of factors challenging family farming among women rice farmers. The 5 factors explained 72.92% (Appendix 1 Table e) of the total factors challenging family farming among women rice farmers in the study area. Thus, the variable that loaded in factor one were; poor access to capital, inadequate finance, high cost of labour, challenges of pest and disease, low level of infrastructure, lack of knowledge on improved agric. Tech. and lack of managerial skills.

Factor two include; child bearing, distance to processing center, poor access to improved variety, low pricing of produce and high cost and delay in supply of fertilizer and agro chemical.

Factor three include; use of rudimentary technology, low government participation, poor access to extension service and climate change.

Factors four include; inadequate supply of fertilizer, lack of processing facility and scarcity/shortage of improved rice variety.

Furthermore, factor five include; high cost of transportation, poor access to improved agric. Technology and poor access to improved agric. Inputs. These challenges were all in agreement with those identified by Kagbuet *et al.* (2016) on adoption recommended rice production practice among women rice farmers in Nassarawa State, Nigeria.

## 4.2 Test of Hypotheses

### 4.2.1 Socioeconomic characteristics influence of women’s participation

The socioeconomic characteristics influence of women’s participation is presented in Table 4.5

Table 4.5: Women’s socioeconomic influence on participation in rice production

| Participation   | Coefficient | Z-value  | Decision |
|-----------------|-------------|----------|----------|
| Age             | -0.1972075  | -1.33    | Accept   |
| Marital status  | -0.3686017  | 0.54     | Accept   |
| Years of study  | -2.112384   | (-1.91)* | Reject   |
| Farm experience | 1.047248    | (1.82)*  | Reject   |
| Household size  | -.2975661   | -0.60    | Accept   |
| Monthly income  | .0007742    | (1.91)*  | Reject   |
| Farm size       | -5.274269   | (1.99)** | Reject   |
| Cooperative     | 11.07653    | (2.28)** | Reject   |

Source: Field Survey Data, February 2020.

The test of hypothesis one on influence of women’s socioeconomic characteristics on participatory index presented in Table 4.6 was drawn from significant variables in objective two (Table 4.3). The result presented shows that hypothesis one was rejected based on those variables that are significant which include; years of study (1.91)\*, farm experience (1.82)\*, monthly income (1.91)\*, farm size (1.99)\*\* and cooperative (2.28)\*

4.2.2 Influence of challenges on women’s participation

The influence of challenges on women’s participation is presented in Table 4.6

Table 4.6: Influence of challenges on women’s participation

| Source        | Sum square | Degree of freedom | Mean square | F-stat.   | Prob> F |
|---------------|------------|-------------------|-------------|-----------|---------|
| Between group | 6.933      | 7                 | 0.990       | (5.62)*** | 0.0000  |
| Within group  | 19.733     | 112               | 0.176       |           |         |
| Total         | 26.067     | 119               | 0.2241      |           |         |

Source: Field Survey Data, February 2020.

The influence of challenges on participatory index of women rice farmers in family farming was confirmed with a one way analysis of variance (ANOVA) and had F-statistic value 5.62 significant at 1% level of probability, this implies that challenges statistically influenced participatory index. Thus, hypothesis three is therefore rejected.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Summary of the Findings

The study was on extent of participation of women farmers in rice production at family farming level in Anambra State, Nigeria determined the rice production activities, women socio-economic characteristics influence on participation in rice production at family farming level, and challenges facing the women. Data were collected with a well-structured questionnaire from 108 women rice farmers at family farming level using a snowball technique. Data were analyzed using a combination of analytical tools such as descriptive statistics, logistic regression, and inferential statistics such as z-test from logit regression result and one way analysis of variance (ANOVA).

The result presented shows that a greater proportion (25.9% and 25.9%) of the women are between age 42 – 49 years, and 58 years and above respectively, their mean age was found to be 41 years while the greater proportion (49.1%) of them were married. The mean years of formal education was 11 years, this implies that on the average, the majority (51.9%) of the farmers attended secondary school. The farming experience was 14 years, while the mean household size, farm size and monthly income were 6 persons, 5 plots and ₦29, 680.48 respectively. The majority (63.0%) of the farmers were not members of farmers’ cooperative with a mean extension contact of 1 contact.

The results showed that the women actively participate in decision making (site selection, choice of variety, organization of labour, allocation of different task and management of farm land/assets) implementation (seedling, , fertilizer application, seed bed/land preparation, nursery, planting, bird scarring, harvesting, weeding, seed preservation, winnowing, straw drying, thinning/transplanting, cleaning, parboiling, husking, sorting of grain, bagging, grading and de-stoning) controlling (labour engagement, monitoring) and evaluation (operation, policy and programs).

It was equally revealed that years of study (-1.91)\*, farm experience (1.82)\*, monthly income (1.91)\*, farm size (1.99)\*\* and cooperative (2.28)\*\* were the socioeconomic variables that influenced women participatory index.

The challenges facing women rice producers in family farming were rotated into five component factors, the study therefore shows that factor one explained 24.21% variance of factors challenging family farming among women rice farmers, factor two explained 19.70% variance of factors challenging family farming among women rice farmers, factor three explained 13.22% variance of factors challenging family farming among women rice farmers, Factor four explained 9.22% variance of factors challenging family farming among women rice farmers and factor five explained 6.52% variance of factors challenging family farming among women rice farmers. But the 5 factors explained 72.92% of the total factors challenging family farming among women rice farmers in the study area.

Furthermore, challenges (5.62)\*\* were seen to have a significant influence on participatory index at 1% level of probability.

## 5.2 Conclusion

It was interesting to study the extent of participation of women farmers in rice production at family farming level in Anambra State, Nigeria and its importance cannot be overemphasized as the results are evident enough to draw a logical conclusion. The study have been able to establish that years of study, farm experience, monthly income, farm size and cooperative membership are more or less the determinant of women participation in the study area. This knowledge will help to explain the possible challenges that will limit women from participating in a family farming in Anambra State, Nigeria.

## 5.3 Recommendations

From the findings, these recommendations were made:

- I. Modern farming technologies should be made available to the women to reduce the cost incurred on labour.
- II. Low pricing of produce have been reported as a challenge to the women, thus. Women should be advised to join or form a cooperative society in order to enjoy the principles of bulk purchase at a reduced price and structural market for their products.
- III. Government should endeavor to subsidize improved farming inputs for the women.
- IV. Women should be encouraged to be making use of climate smart agriculture.

## 5.4 Contribution to Knowledge

- i. The study have established that years of formal study, farming experience, farm size, monthly income and cooperative membership were the determinants of women participation in family farming in Anambra State, Nigeria.
- ii. The study also established that challenges facing women rice producers at family farming level influenced their participatory index.
- iii. The study further established that women had access to decision making (site selection, choice of variety, organization of labour, allocation of different task and management of farm land/assets) implementation (seedling, , fertilizer application, seed bed/land preparation, nursery, planting, bird scarring, harvesting, weeding, seed preservation, winnowing, straw drying, thinning/transplanting, cleaning, parboiling, husking, sorting of grain, bagging, grading and de-stoning),controlling (labour engagement, monitoring ) and evaluation (operation, policy and programs).

Appendix 1

Table a: Socioeconomic influence on participatory index

|                             |               |   |        |
|-----------------------------|---------------|---|--------|
| Logistic regression         | Number of obs | = | 120    |
|                             | LR chi2(8)    | = | 30.60  |
|                             | Prob > chi2   | = | 0.0002 |
| Log likelihood = -61.081151 | Pseudo R2     | = | 0.2003 |

| Participation  | Coef.     | Std. Err. | z     | P> z  | [95% Conf. Interval] |           |
|----------------|-----------|-----------|-------|-------|----------------------|-----------|
| age            | -.1972075 | .1482334  | -1.33 | 0.183 | -.4877397            | .0933246  |
| Marital_status | -.3686017 | .6775231  | -0.54 | 0.586 | -1.696523            | .9593191  |
| Education      | -2.112384 | 1.104332  | -1.91 | 0.056 | -4.276835            | .0520671  |
| Experience     | 1.047248  | .5756988  | 1.82  | 0.069 | -.0811009            | 2.175597  |
| Household_size | -.2975661 | .4963402  | -0.60 | 0.549 | -1.270375            | .6752429  |
| Income         | .0007742  | .0004053  | 1.91  | 0.056 | -.0000201            | .0015685  |
| Farm_size      | -5.274269 | 2.648122  | -1.99 | 0.046 | -10.46449            | -.0840459 |
| Cooperative    | 11.07653  | 4.858432  | 2.28  | 0.023 | 1.554175             | 20.59888  |
| _cons          | 17.28324  | 9.67089   | 1.79  | 0.074 | -1.671359            | 36.23783  |

Table b: Marginal effect of socioeconomic influence on participatory index

|                | dy/dx     | Delta-method<br>Std. Err. | z     | P> z  | [95% Conf. Interval] |           |
|----------------|-----------|---------------------------|-------|-------|----------------------|-----------|
| age            | -.0331734 | .0244136                  | -1.36 | 0.174 | -.0810232            | .0146763  |
| Marital_status | -.0620047 | .1135049                  | -0.55 | 0.585 | -.2844701            | .1604608  |
| Education      | -.3553366 | .1789177                  | -1.99 | 0.047 | -.7060087            | -.0046644 |
| Experience     | .1761638  | .0934525                  | 1.89  | 0.059 | -.0069998            | .3593273  |
| Household_size | -.0500553 | .0832603                  | -0.60 | 0.548 | -.2132425            | .1131318  |
| Income         | .0001302  | .0000656                  | 1.99  | 0.047 | 1.70e-06             | .0002588  |
| Farm_size      | -.8872158 | .4274442                  | -2.08 | 0.038 | -1.724991            | -.0494405 |
| Cooperative    | 1.863248  | .7693711                  | 2.42  | 0.015 | .3553082             | 3.371187  |

Table c: KMO and Bartlett's Test

|  |          |
|--|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | .776     |
| Bartlett's Test of Sphericity Approx. Chi-Square | 2244.412 |
| Df   | 253      |
| Sig.   | .000     |

Table d: Communalities

|          | Initial | Extraction |
|----------|---------|------------|
| VAR00031 | 1.000   | .595       |
| VAR00032 | 1.000   | .685       |
| VAR00033 | 1.000   | .710       |
| VAR00034 | 1.000   | .942       |
| VAR00035 | 1.000   | .930       |
| VAR00036 | 1.000   | .863       |

|          |       |      |
|----------|-------|------|
| VAR00037 | 1.000 | .701 |
| VAR00039 | 1.000 | .780 |
| VAR00040 | 1.000 | .595 |
| VAR00041 | 1.000 | .779 |
| VAR00042 | 1.000 | .818 |
| VAR00044 | 1.000 | .665 |
| VAR00045 | 1.000 | .360 |
| VAR00046 | 1.000 | .842 |
| VAR00050 | 1.000 | .646 |
| VAR00054 | 1.000 | .739 |
| VAR00055 | 1.000 | .746 |
| VAR00056 | 1.000 | .781 |
| VAR00057 | 1.000 | .601 |
| VAR00059 | 1.000 | .685 |
| VAR00043 | 1.000 | .813 |
| VAR00058 | 1.000 | .770 |
| VAR00052 | 1.000 | .726 |

Table e: Total Variance Explained

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              | Rotation Sums of Squared Loadings <sup>a</sup> |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|--|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |  |
| 1         | 5.569               | 24.211        | 24.211       | 5.569                               | 24.211        | 24.211       | 4.963  |
| 2         | 4.532               | 19.703        | 43.915       | 4.532                               | 19.703        | 43.915       | 4.478  |
| 3         | 3.041               | 13.223        | 57.138       | 3.041                               | 13.223        | 57.138       | 3.468  |
| 4         | 2.121               | 9.224         | 66.361       | 2.121                               | 9.224         | 66.361       | 2.622  |
| 5         | 1.509               | 6.562         | 72.924       | 1.509                               | 6.562         | 72.924       | 2.686  |
| 6         | 1.051               | 4.570         | 77.494       |                                     |               |              |  |
| 7         | .807                | 3.510         | 81.003       |                                     |               |              |  |
| 8         | .768                | 3.340         | 84.344       |                                     |               |              |  |
| 9         | .605                | 2.632         | 86.976       |                                     |               |              |  |
| 10        | .431                | 1.875         | 88.852       |                                     |               |              |  |
| 11        | .352                | 1.528         | 90.380       |                                     |               |              |  |
| 12        | .339                | 1.474         | 91.854       |                                     |               |              |  |
| 13        | .328                | 1.428         | 93.282       |                                     |               |              |  |
| 14        | .281                | 1.221         | 94.503       |                                     |               |              |  |
| 15        | .257                | 1.116         | 95.619       |                                     |               |              |  |
| 16        | .218                | .947          | 96.566       |                                     |               |              |  |
| 17        | .190                | .826          | 97.392       |                                     |               |              |  |
| 18        | .173                | .750          | 98.142       |                                     |               |              |  |
| 19        | .146                | .636          | 98.778       |                                     |               |              |  |
| 20        | .116                | .502          | 99.281       |                                     |               |              |  |
| 21        | .088                | .382          | 99.662       |                                     |               |              |  |
| 22        | .056                | .244          | 99.907       |                                     |               |              |  |
| 23        | .021                | .093          | 100.000      |                                     |               |              |  |

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.



Table f: Pattern Matrix<sup>a</sup>

|          | Component |       |       |       |      |
|----------|-----------|-------|-------|-------|------|
|          | 1         | 2     | 3     | 4     | 5    |
| VAR00034 | .916      |       |       |       |      |
| VAR00035 | .906      |       |       |       |      |
| VAR00036 | .824      |       |       |       |      |
| VAR00037 | -.775     |       |       |       |      |
| VAR00054 | .753      |       |       |       |      |
| VAR00052 | .548      |       |       |       |      |
| VAR00050 | -.529     |       |       |       |      |
| VAR00058 |           | .886  |       |       |      |
| VAR00043 |           | .866  |       |       |      |
| VAR00032 |           | .831  |       |       |      |
| VAR00040 |           | -.708 |       |       |      |
| VAR00031 |           | .673  |       |       |      |
| VAR00046 |           |       | .872  |       |      |
| VAR00056 |           |       | -.824 |       |      |
| VAR00057 |           |       | .614  |       |      |
| VAR00059 |           |       | -.539 |       |      |
| VAR00044 |           |       |       | .780  |      |
| VAR00042 |           |       |       | .758  |      |
| VAR00055 |           |       |       | -.732 |      |
| VAR00039 |           |       |       |       | .759 |
| VAR00033 |           |       |       |       | .710 |
| VAR00045 |           |       |       |       | .536 |
| VAR00041 |           |       |       |       |      |

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

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