# GENDER DIFFERENTIALS IN PRODUCTIVITY AND POVERTY OF RICE FARMING HOUSEHOLDS IN NIGER STATE, NIGERIA

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**A THESIS SUBMITED TO THE POSTGRADUATE SCHOOL OF FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF TECHNOLOGY IN AGRICULTURAL ECONOMICS AND FARM MANAGEMENT**

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# ABSTRACT

The study on the gender differentials in productivity and poverty was conducted in Niger State, Nigeria. Multi stage sampling technique was used to select 130 male and 106 female household heads involved in rice farming. A well-structured questionnaire and interview schedule was used to obtain information on socio economic characteristics and other quantitative variables of interest for the study. Data collected were analysed using descriptive statistics, productivity index, ordinary least square Foster Greer and Thorbecke (FGT) model, Logit regression and Oaxaca-Blinder decomposition technique. The result of productivity analysis revealed that male and female household heads had a mean productivity of 3.62 and 3.05 respectively, with male being more productive at higher level. Findings from the ordinary least square regression estimates reveals farm size, labour, education, household size, use of improved seed, credit and capital depreciation were significant determinants of productivity for the households. Oaxaca-Blinder decomposition of the differential in productivity was most accounted for by the Coefficient effect (120.52%) and in favour of male headed households, poverty was higher among female headed households. Poverty incidence, poverty depth, and poverty severity of 0.27, 0.5, and 0.25 respectively, were higher than that of male headed households with 0.14, 0.1262 and 0.0159 respectively. Education, household size, extension, credit, occupation, access to credit and income were significant determinants of poverty. Similarly, Oaxaca-Blinder decomposition of poverty revealed endowment effect (64.06%) accounted for a major cause of poverty differential revealed which was in favour of the male headed households. Problem of storage, insecurity, and inadequate access to improved varieties were the most severe constraints faced by the male household heads while problem of storage, poor road network, and insecurity were found to be most severe among female household heads. Based on these, the study concluded that male are more productive than the female rice farmers, poverty is higher among female headed households, productivity differentials is mainly due to coefficient effect (structural effect). Poverty differential is majorly due to differences in endowment effect. Lack of storage and insecurity are major constraints faced by the farmers. It was recommended that government and traditional institutions should promote equality through the removal of all forms of barriers and limitations which reduces the productivity of the females. Women should diversify into other sources of income generating ventures to boost their income and reduce the poverty among the female headed households. Government should provide the necessary infrastructure such as storage facilities, good roads, and irrigation facilities as this would improve the productivity of the farmers.

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## Acronyms

| | |
|---|---|
| ATA | Agricultural Transformation Agenda |
| CPM | Capability Poverty Measure |
| DEA | Data Envelopment Analysis |
| ECOWAS | Economic Community of West African States |
| FAO | Food and Agriculture Organization |
| FDAE | Federal Department of Agricultural Extension |
| GDP | Gross Domestic Product |
| HDI | Human Development Index |
| IPM | Integrated Pest Management |
| NAERLS | National Agricultural Extension and Research Liaison Services |
| NBS | National Bureau of Statistics |
| NPC | National Population Commission |
| OLS | Ordinary Least-square |
| OECD | Organisation for Economic Co-operation and Development |
| PC | Productivity Commission |
| PPP | Purchasing Power Parity |
| SIGI | Social institution and Gender Index |
| TENS | Transforming Education in Niger State |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| WDR | World Development Report |

# CHAPTER ONE

# 1.0 INTRODUCTION

## 1.1 Background of the Study

Rice is among crops widely produced with high consumption globally, Rice alongside maize and wheat provide at least 42% of the world caloric intake, it can also be said that rice serves as a highly consumed food, with demand estimated at 3.5 billion people which account for world food consumption (Lanessa, 2017). In Africa, there is over 130 million hectares of land suitable for cultivation of rice, despite this vast expanse of land only about 10 million is utilized, Africa can considerably support its food production particularly for smallholder farmers, if agri-food systems are useful versatile and giving sustenance particularly to women and children (Rodenburg *et al.,* 2014). The world's demand for processed rice is predicted to increase to 555 million tonnes by year 2035 (Udemezue, 2018). Although rice is an important crop for household food consumption and combating poverty, production has not equal the demand, this is associated with gender insensitivity in policy making which is prevalent in Nigeria **(**Ajewole *et al.,* 2016**).**

In recent years, rice consumption has substantially increased (10% per annum) with Nigeria's rice consumption more than other African countries, with an estimated annual consumption of 24.8 kg. (Ajala and Gana, 2015; Apata *et al*., 2018). This increase in rice demand can be caused by a growing population with diverse personal tastes and quick urbanization (Dauda and Dzivama, 2004; Sowunmi *et al*., 2014). Only about 57% of the 6.7 million metric tonnes of rice household demand in Nigeria is produced by indigenous rice producers, of which 73.5% of the total national output is produced in northern Nigeria (National Agricultural Extension and Research Liaison Services and Federal Department of

Agricultural Extension, 2014). The supply deficit can be balanced by increasing output of rice farmers through the adoption of technologies for rice production, irrigation farming system and use of fertilizer.

Decline in progress towards food security has been credited to low productivity of agrarian assets among other reasons such as growing population and political unrest (Food and Agricultural Organization [FAO], 2015a). Despite significant advancement during the most recent twenty years, Africa is still lingering behind production and output levels, input conversion rate, innovation adoption, and access to credit (Dillon and Barrett, 2014; and FAO, 2015a).

In African countries and in other developing countries, gender influences the distribution of assets, riches, job roles, political influence as well as possession of rights and obligations in private and public life (Ilesanmi, 2018). Nigeria's poverty rate is high and increasing, in spite of its middle-income status, four out of 10 Nigerians lived below the poverty line in 2016. Estimated at global poverty line of US$ 1.90 each day, in 2018, Nigeria surpassed India as the country with the greatest concentration of living in extreme poverty. The increase in poverty rate observed in Nigeria is higher when compared with neighboring countries. The poverty rate surged from 35.0 to 38.8 percent of Nigeria’s population from 2011 to 2016 (World Bank, 2019).

It is well recognised that discrimination based on gender or unfair resource distribution is one of the societal issues that affect many different aspects of daily life. (Edeoghon *et al.*, 2019). It therefore becomes a priority to have strategy which takes into cognizance gender differences when initiating a poverty alleviation project (Ayinde *et al.*, 2013). If issues associated with gender bias that cause imbalance, such as in output levels are not

addressed, Nigeria's intended goal of poverty eradication may seem like a mirage. In this context, the research seeks to compare the productivity and poverty status of households with male and female heads of rice farming being a major food crop and a significant source of income for farmers.

### 1.2 Statement of the Research Problem

Significant percentage of African populace, particularly Nigeria, has challenges with declining productivity and increasingly slipping into poverty. Several comparative studies revealed an existing differential in farm yield when female farm owners are compared to the male farm owners (World Development Report [WDR], 2012). This inequality was not because they are less skilled but because they operate using lower inputs such farmland, fertilizer, seeds and other agricultural inputs, this phenomenon has led to a wide gender gap in resource allocation and use (Odozi, 2012). It has been observed that men are more at advantage in having access to agricultural extension and use of productive resources such as land, determined by factors of political, social and cultural classification (Oladosu *et al.,* 2018). This suggests constraints in gender inequality in rice production resulting in productivity differentials. Women have higher probability of access to lesser land to cultivate than men, with land ownership or tenure providing weaker basis for land ownership among female farmers. Secondly, far to reach improved technology and agricultural information creating more limitation in females. In growing crops, women face higher constraints in access to inputs, resulting in lower input use, hence producing below optimal. Poverty has largely been attributed to the women folks, considering the fact that women make up at least 50% of the global population, but due to unequal access to

resources, more than 70% of people live in poverty (Kemi and Jenyo, 2016; Oluwatayo, 2014).

Nigeria is positioned poorly in poverty including outcomes relating to human outcomes, this is has seen the country plunge further into poverty This has partly been attributed to low productivity and resource distribution inequality. There is need for government to ensure its policies and programs protect the poor and provide enabling ground for a more, productive, and equitable society (World Bank, 2019).

Unless Africa increases effort in ensuring gender balance, it will not meet up in expectations of growth and development (African Development Bank, 2014). Gender disparities in production greatly affect Africa's output level. This means in attaining this goal, policies and decisions should be tailored towards solving issues bordering on gender bias, to ensure equality in right and access to resources in an attempt to redress the gender differentials in productivity and poverty status. Though there have been studies on gender differentials in productivity and poverty (Ajewole *et al.,* 2016 and Ojo, 2015), There is a knowledge vacuum on how much socio-economic and institutional factors contribute to gender differences in poverty and productivity.

In view of the problems and knowledge gap stated, the following research questions were raised for this study in an attempt to fill this knowledge gap.

i. What are the socio-economic characteristics of rice farmers in the study area?
ii. What are productivity differentials in rice production along the gender differential?
iii. What are the determinants of gender productivity in the study area?
iv. What are the differences in poverty along gender line in the study area?

v. What are the determinants of poverty in the study area?

vi. What are the challenges faced by the respondents in the study area?

## 1.3 Aims and Objectives of the Study

The purpose of this study is to examine how rice farmers in Niger State, Nigeria, differ in terms of productivity and their level of poverty.

The specific objectives were to:

i. describe the socio-economic characteristics of the respondents along the gender differential in the study area;

ii. analyse the productivity differentials in rice production along the gender line;

iii. examine the determinants of respondents rice productivity;

iv. analyse the respondents' level of poverty and gender differences;

v. examine the factors that determine respondents' poverty status along the gender differential;

vi. Identify the constraints faced by the respondents in the study area.

## 1.4 Hypotheses of the Study

The following hypotheses were tested:

$H_{01}$: there is no significant difference between the productivity of male and female rice farmers in the study area.

$H_{02}$: there is no significant difference between the poverty status of male and female rice farmers in the study area.

## 1.5 Justification for the Study

In view of existing problems and knowledge gap, result of this study with consideration of selected local government areas of Niger state addresses gender issues as a medium to upgrading production conditions and reducing poverty. In addition, findings of the study address knowledge gap in productivity and poverty of rice farming households, by providing relevant empirical support needed to ensure equal agro-input support and poverty eradication to both genders. This ensure provision of statistical facts required by policy makers for correcting gender lop-sidedness in productivity and poverty status in the study area. The empirical study serves as insight to government on best approach to combating challenges of gender equity, this enable policy makers to formulate policies and create programmes that will tackle the issue of poverty alleviation and gender equality.

Also, findings of this studies serves as a basis for further research into this less researched area of poverty alleviation in the study area and nationwide, findings of this study is helpful in guiding agricultural cooperative societies in formulating policies aimed at balancing the gender differential of poverty and productivity by ensuring an all-gender inclusive and equality approach in distribution of resources, ultimately contributing to country's building through improved rice productivity and poverty reduction. Futhermore, findings of the study guides the farmers in making wise decisions on the farm so as to achieve high productivity in addition to making guided decisions of households on consumption choices in relation to income generated by the households, by so doing ensure proper management of resources on the farm and in the farming households.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

### 2.1 Productivity, Poverty, and Gender Concepts

#### 2.1.1 Productivity

The rate at which inputs are transformed into outputs is referred to as productivity. It measures how resources are used up in production, and usually stated in terms of the ratio of output generated to input used in production (Goshu *et al.*, 2017). In other words, productivity is a measure of resources utilization which can be stated in quantitative and qualitative terms (Productivity Commission [PC], 2016). Productivity can also be referred to as an index measuring output relative to the input.

Productivity is distinct from production, while production refers to conversion of input to output, productivity measures input-output transformation rate. Previous attempts at explaining productivity in terms of this ratio were less explicit, Agricultural productivity can be defined in relationship of input to output through terms such as tonnes/hectare (FAO, 2018).

#### 2.1.2 Forms of productivity

Productivity in quantitative measures is expressed as partial productivity or total productivity.

##### 2.1.2.1 Partial productivity

A more common expression of productivity is referred to as partial productivity, being that it only single input is put perspective in relation to output (Pooja and Sachin, 2015). The

proportion of one input to all outputs in a production is a mathematical measure of partial productivity. Producers largely consider measuring partial productivity because of ease of production data tracking for certain inputs in comparison to another. Also, since the total or multifactor provides measures that gives insight of a full picture of the production process, partial factor productivity is easier to relate when the producer has a particular input of interest. In agriculture, partial productivity measures can be represented with terms such as tonnes/hectare, indicating an output/input relationship.

#### 2.1.2.3 Total factor productivity

This productivity measure factors in the effect of all input on the output in a production process. Mathematically measured through a summation of all input resources used in production such as human labour, capital, raw material, fertilizer, as a link to the output. it provides clearer view of productivity (Fugile, 2015). When determining total productivity, the total output and total input must both be presented in a single measure unit. In regard to output, total factor productivity does not concentrate on any particular input. As such, it is too broad to be used when the producer is concerned with improving input use efficiency.

### 2.1.3 Poverty

Poverty can be defined in a generalized term as deprivation of material necessities, insecurity, and unpredictability, incapacity to plan because the poor is low in ability to act in anticipation of unforeseen either as an aversive measure or in achieving a goal, low self-esteem (Saleem *et al.*, 2019). Onyenmerem *et al.* (2018) defined poverty in a form not restricted to financial incapacitation to buy necessities but as the inability to live a noble life with a niche in the society. This defines poverty in a view, through ability to possess life needs such as food, education, security and social inclusion. Furthermore, poverty can

be expressed as living condition assessed through sustainability or chronic deprivation of needed resources (United Nations [UN], 2012). As observed (David, 2019) poverty is measured as either absolute, relative or combination. Absolute poverty is measured through level of monetary earnings or income necessary for subsistence. On the other hand, relative poverty is comparative of existing living level of the poor to level in another community. The measurements of poverty are linked to the definition of poverty in an effort to count and locate the poor. According to Foster *et al.* (1984), Mailumo (2013) and Oladimeji (2015).

Studies by United Nations Development Programme (UNDP) encourage using Human Development Index (HDI) and Capability Poverty Measure (CPM). HDI is a three-dimensional assessment of poverty that takes into account factors such as a new-born's life expectancy, achievement in education, and a rise in real Gross Domestic Product (GDP) per capita income (PPP$).

Poverty is phenomenon that can be traced way back to the beginning of human existence in Nigeria, found in virtually all societies it cannot be easily eradicated except through provision of adequate needs and resources accompanied by even distribution among members of the society. Alleviating Poverty requires collaborative efforts of government and individuals to move the status of the populace in a more favourable direction (Obiadi *et al.*, 2019). Common man measures poverty through ability to organize elaborate family occasions, festival spending, wedding, manage large families and ownership of domestic animals like Goats, Cattles, and Poultry (Staudt, 2014).

### 2.1.4 Causes of poverty

World Bank (2012) pointed out factors causing poverty. These include high unemployment, infrastructural deficiency, non-provision of accessible markets, depletion of natural resources, non-participation in design of development programmes and non-reachable assistance for those living below the poverty margin. The Concern Worldwide US (2020) summarized the causes of poverty outlined as;

- Marginalization and Inequality: Caste structures, gender disparities, and marginalisation based on race or tribal identity all result in limited or no access to the resources necessary to lead full, productive lives. A community that is disenfranchised can be more susceptible to poverty.
- Conflict: Violence or social disturbance acts as a catalyst for poverty by encouraging widespread conflict. As a result, infrastructure is destroyed, the society comes to a standstill, and people are displaced from their communities. Nigeria has experienced widespread violence, and the south-west region in particular has been devastated by poverty. Female-headed households are increasingly widespread as a result of violence, and their families are particularly vulnerable due to the unequal access to resources and exclusion from decision-making.
- Climate change: Hunger is brought on by climatic changes like drought or flooding. Its effects also disproportionately harm women, cause refugees, and even influence conflict, all of which add to the cycle of poverty.
- Lack of Education: Most people who are severely poor lack formal schooling. Lack of funding, the cost of uniforms and books, and discrimination towards girl students are all

obstacles to education. Education provides access to employment, resources, and other abilities that a family needs to live

- The stage of economic and social development: Even if a country has high export profits, economic underdevelopment may place managerial restrictions on absorption capacity or the use of funds for poorly targeted or unavailable development initiatives.
- Low productivity: The consuming unit (individual households) in this scenario is unable to generate a sufficient amount of revenue to support decent living standards. This would come about as a result of low education levels, poor health or physical incapacity, and insufficient access to economic assets, which causes unemployment.
- Market imperfections**:** These are the kinds of variables that, by introducing prejudice, would prohibit people from moving forward in society and limit equitable access to productive assets. These elements may be the result of ignorance, culture, sex, youth, race, and other variables. Imperfections in the market also result from unbalanced income distribution patterns that benefit some groups in society while making the less fortunate class poorer and inefficient in the labour market.
- Political instability: when political transition programmes are not successfully implemented it can cause social and economic instability both locally and abroad. With limited outputs and markets for sales, productive ventures are unable to thrive, investments are withheld, and jobs become unstable. In general, the populace experience economic instability.

## 2.2 Theoretical Framework

### 2.2.1 Rice sector development in Nigeria

Nigeria like other African countries have been making significant efforts in improving rice production, Harold and Tabo (2015) further account that other African countries also

integrated production enhancement programs into their production systems. These align with ECOWAS agricultural policy. In Nigeria, These efforts have yielded results leading to a boost in local production of rice with production increasing (Osabuohien *et al.*, 2018). The Nigerian government through implementation of agricultural policies at various government levels has achieved a rise in the level of rice output over the years. There have been different opinions on whether producing rice in large quantities should be considered as means to food security or not (Herrmann *et al.*, 2017). Osabuohien *et al.* (2017) is of a contradictory view, emphasizing the need to strengthen small-holder farmers.

One more significant part of rice system that requires attention is the issue of production advancement in rice processing since it requires consideration is the issue of mechanical headway in rice handling by the rural rice farmers which are traditional, work-concentrated and tedious. With more significant innovation level, farmers aspire to accomplish a higher output with global repute that will increase demand for indigenously produced rice. Mechanical progressions in the production-harvest cycle lead to advancement evident commercialization and productivity of rice system. Use of current innovation in the production and processing will additionally ensure a superior rice to make it more attractive to buyers and will draw in additional purchases of the product. Kareem (2016) reported that limited progression in science and mechanical technology is a significant impediment confronting the accomplishment of production advantages in farming.

Osabuohien *et al*. (2018) found that rice farming and processing are lucrative businesses in Nigeria and that encouraging investment in these activities is necessary. In addition to the

nutritious value of rice and the high propensity of people to consume it, the by-product of rice could be used as a source of generating energy for home needs. This could be used as a source of biofuel for cooking, particularly in rural areas where the majority of rural residents struggle to pay the high prices for kerosene or gas for cooking and warmth. Yan *et al.* (2016) in their study emphasised that a lot of the by-products produced by rice might be used to generate energy and cut down on the amount of firewood needed for everyday cooking. In Nigeria, where rural residents frequently cook with firewood and charcoal, this is essential. The implication of the aforementioned is that contemporary rice processing at milling centres could aid in the preservation of rice hub, which serves as firewood to the neighbourhood, hence lowering the expense of purchasing kerosene for cooking.

Amb and Ahluwalia (2016) reported that rice systems and processing are beneficial endeavours in Nigeria and what is required is to strengthen interest in rice processing activities. Aside the healthy benefit of rice high tendency of individuals towards its utilization, the result of rice could act as a wellspring of energy age for home grown purposes. This could act as a wellspring of biofuel for cooking particularly in rural settings where the vast majority of the dwellers can't promptly manage the cost of the expense of lamp oil or gas for cooking and warming purposes. Ecological consideration must be taken into account throughout the production process, notably in the selection of land and the typological elements of the location, in order to produce rice at its maximum potential. In this regard, the technique used to prepare the ground has a big impact on how much rice is produced.

### 2.2.2 Review of socio-economic attributes of gender farmers

The exclusion of women's labour from the production of food crops is one of the factors contributing to Nigeria's declining agricultural productivity (Oluwatosin, 2016). Women farm managers have been reported to be in need of time saving technologies for both farm activities and domestic works to reduce length of hours spent in farm, increase efficiency leading to increased yield and poverty alleviation among the farmers (Mgbada, 2018).

According to Erie *et al.* (2011) role of women farmers in agricultural production has been under-valued in agriculture, economic analysis and policies. Women are pivotal part of the agricultural sector, accounting for large share of farm labour and contribute to 80% of food production (Mgbada, 2018). However, there is need to close the existing gap between the actual and potential productivity levels of women in the farm. Bridging the gap serves as means of promoting efficient agricultural productivity, and aiding economic development.

Studies have shown that food crop farmers carry out their production under conditions using inefficient tools, traditional seed varieties, and so on, hence all effort in achieving maximum technical efficiency have been futile, especially among women farmers (Oyebamiji *et al.*, 2021). Therefore, an increasing efficiency in food crop production could lead to an improved welfare of farmers leading to a reduction in poverty status and food insecurity level (Faborede and Koledoye 2014).

### 2.2.3 Gender measure of disparity in agricultural productivity

As obtainable in other African countries, women in Nigeria have involved further into agricultural production within the last ten years (Chekene and Kashim, 2018). The gender-based differences in access to and utilization of agrarian resources have widened the

productivity gap. Women are becoming more involved in the agriculture and food industries, but they still have difficulty accessing resources including land, water, inputs, and delivery of extension services (Ojo, 2015).

In a study by Oseni *et al*. (2013) studying differences between the gender in agricultural productivity throughout Nigerian regions. The O-B method, which measures the differences in productivity between men and women, revealed a substantial gender disparity in statistics in the Northern area. The gender gap in farmer production in the southern region was shown to be statistically significant. Although Agriculture in Nigeria is male dominant, women are seen participating in large numbers across the agriculture and food value chain; their involvement cuts across stages. In rural areas, about 70% of households with female household heads are headed by women who work in agriculture, a sector that employs 48% of women nationwide.

While there has been much discussion on the relationship between gender and agricultural productivity and how diverse input usage contributes to productivity differences, it is undeniable that women tend to employ different productive assets at lower rates than men (Croppenstedt *et al.,* 2013). This is prevalent in Nigeria, where women use fewer extension services and have less access to inputs than males despite making a significant contribution to agricultural production (Phillip *et al.,* 2009). Although this varies by location, with lower ownership and greater gender disparities in land tenure and proprietorship in the North of Nigeria when compared to Southern Nigeria, In Nigeria, men own land at a rate that is five times higher than that of women (British Council Nigeria, 2012). In addition, the relationships among women and the degree to which they have decision-making authority may have a detrimental impact on their capacity to advance. Findings from studies on

gender differentials reveal existing gap (Croppenstedt *et al.,* 2013; Oseni *et al.,* 2013). Some claim that farmers who are women are less productive than their male gender counterparts while others find little variations between the two gender groups, in some cases women are technologically more efficient in comparison to men.

### 2.2.4 Women contribution to household's welfare

Income and expenditure are two different ways that welfare can be assessed. However, it is typically believed that estimating welfare in less developed countries is best done using expenditure data (Ahmed and Mefsin, 2017). This is due to the difficulty in measuring household income in countriess where a large portion of it originates from self-employment. Additionally, whereas consumption is significantly less irregular than income throughout the course of a person's lifetime and is therefore easier to estimate (Haughton and Khandker, 2009). Women are prohibited from earning for sociocultural concerns in several countries.

There are 104 economies, according to the World Bank, that have labour regulations that limit the kinds of employment that women can engage in addition to when and locations they are eligible to work (World Economic Forum, 2018). Likewise, information from International Labour Organization (ILO) show that women make up 14% of domestic workers in Africa and are thought to make up 83% of domestic workers globally. Women's involvement in the labour force in 2018 was 48%, while men's participation that same year was 75% (ILO, 2019). In rural areas of Nigeria, in which more than 50% of women live, this situation is increasingly frequent (Abdullahi *et al.,* 2015). Rural women are now working in a variety of rural jobs, which is reversing the trend.

### 2.2.5 Narrowing the gender gap

Numerous studies have found that plots run by women produce lower yields than plots handled by men. This doesn't mean that women are less effective farmers than males. Infact, several research demonstrates that women are just as productive as males. The inputs are just not available to them. If they did, overall yields would be more like those of males, they would produce more, and the amount of food produced would rise overall. The Social Institution and Gender Index (SIGI) can be used to examine the relationship between gender equality and agricultural productivity (Organisation for Economic Co-operation and Development, [OECD] 2010). The SIGI index takes into account social and legal patterns that have an impact on women's economic advancement, such as property rights, marriage customs, and civil liberties. Low SIGI values indicate less gender-based discrimination. The average rice yields in countries tend to be greater than those in countries with more disparity than those with lower levels of gender bias. However, this link merely demonstrates correlation, not causation, and the direction of causality may run either way. Hence, while more productive agriculture tends to be associated with more equal societies, it can also contribute to a reduction in gender inequality (FAO, 2011).

### 2.2.6 Gender roles in agriculture

Gender is a reason for division of work among genders in many social orders: this division can be grouped into useful, conceptive, and common activities (Monica *et al.*, 2016). In non-industrialized countries, the division of labour by gender determines which jobs are considered appropriate for men and women. Certain jobs are only performed by men or women, and there is a division of orientation about who can be appointed to certain positions (Monica *et al.*, 2016). Gender division of labour vary by country, market

orientation (subsistence and commercialized), and male labour availability (Peterman *et al.*, 2010).

In Africa, female labour makes up 40% of the labour used to produce crops, this percentage is slightly higher in Malawi, Tanzania, and Uganda, and significantly lower in Nigeria (37%) (Palacios-Lopez *et al.*, 2015). Males dominate cash crop production, leaving food production and household related activities to females. Upsurge in prices of cash crop has males at the beneficiary end relative to females within the household (Monica *et al*., 2016). According to reports, in Ghana, young rural men (aged 15 to 24) spend about two-thirds less time on housework than their female counterparts, who put in at least 50 hours each week (FAO, 2012). Also reported in Ethiopia work time each week is higher in females when contrasted with males (Suárez, 2013). According to Suárez (2013), females work for longer hours than the men in families, while the converse is noticed for men in farming activities. Notwithstanding, regardless of the progressions that have been seen in female support in the work market, females actually shoulder the greater part of the obligations that connect with home administration (Singh and Pattanik, 2020). In Ghana, females are paid little for their labour contribution in food production (Monica *et al*., 2016).

In Sierra Leone, there is proof that females apportion significant time to home tasks which limit their financial options. Quentin and Yvonne (2010) report showed that the time spent on household activities lower yield which might restrict their income and dynamic power inside the family. The need to join child care, house work and different activities suggests that females' financial endeavours will stay limited scope (Konings, 2012).

### 2.2.7 Nigeria's agricultural productivity and production

In Africa, Nigeria is the country with the highest population. even so, one of the largest in terms of land area (910,770 km2 ). With a Gross Domestic Product (GDP) of $523 billion and a per capita GDP of $3,010 in 2013, Nigeria has the 27th-largest economy in the world (World Bank, 2014). The agricultural sector fills in as work to 60 % of Nigeria's general population and adds to more than 40 % of its Gross domestic product, though high poverty is seen among families, greater part rely on farming as source of revenue (World Bank, 2014). The development in the rural area is essentially ascribed to populace development and the cultivating of bigger land spread, conceivably by commercialization (Oseni *et al*., 2013). Agriculture in Nigeria is majorly seasonal due dependence on rain, it is characterized by low productivity, high use of crude farm technology, and labour intensive.

### 2.2.8 Agricultural cooperative and productivity

Agricultural co-operatives are farmer-owned organisations whose main goal is to boost member producers' output and earnings by improving their connections to the financial, agricultural input, information, and output markets. The 2011 ATA Agricultural Cooperatives Sector Development Strategy was published. Agricultural output per capital decreased once agricultural cooperatives were widely implemented and required to have members in the 1970s and 1980s. When farmers in Ethiopia were given the flexibility in joining or leaving cooperatives at any time starting in 1991, cooperative membership plummeted, output increased. There have undoubtedly been successful cooperatives in the area, such as those in the cotton and dairy industries in Mali, coffee in Ethiopia, and dairy in Kenya. Cooperatives can play a crucial role in sector development, as demonstrated by the examples of Taiwan, India, and Vietnam. Unfortunately, no African country has so far

increased staple crop yields on a sustained, large-scale basis joint action, and several cooperative development programmes have failed to achieve their objectives or have opposite effect. Utilizing combined effort, to foster unified service supply and economic emancipation, agricultural cooperatives aim to assist farmers in increasing their yields and revenue. In the growth and transformation plan, agricultural cooperatives are viewed as crucial to accomplishing the government's development goals. because of their primary mandate to support smallholder farmer production, and concentrating on different cooperatives calls for a different framework for analysis.

The primary types of agricultural cooperatives lie under the traditional agricultural enterprise activities, such as the provision of agricultural inputs, joint production, and agricultural marketing. Seeds and fertiliser are two examples of inputs that are supplied to farmers. Cooperatives engaged in joint agricultural production are presumed to be run by their members on communally owned farmland. The third category is collaborative agricultural marketing of producer crops, in which farmers pool their resources to change a specific agricultural commodity before packaging, distributing, and marketing it. The most common form of agricultural co-operation in Africa, however, the commercialization of agricultural goods has historically been the case. when small farmers have achieved their respective farm output tasks. However, in other instances, agricultural cooperatives have integrated crop marketing with input distribution (Kumar *et al.,* 2015).

### 2.2.9 Increase in agricultural productivity and poverty reduction

Agricultural efficiency affects poverty status because of reliance on farming as kind of revenue by greater part of needy individuals in sub-Saharan Africa (De Janvry and Sadoulet, 2010). A downslide in prices of agricultural produce can further plunge poor

farmers below the poverty line. In rural Africa, extreme poverty is more prevalent. Numerous factors, including an increase in farm and non-farm income, better health, and improved nutrition, contribute to the reduction of poverty in the agricultural sector (Mwabu, 2016). Majority of families in Nigeria attribute their financial hardship to the demands of agriculture, of which absence of agrarian data sources and inability to bear the cost of inputs (like composts and seeds) represents 44 % (Adeoye *et al.,* 2019).

### 2.2.10 Contributions of agricultural productivity to food security

Food security is an issue of worldwide worry that can be fixed through farming, this issue is fixed through increase in food production to provide for the growing global population. In order to feed the estimated 9.1 billion people on the planet, it will be essential to increase global food production by 70% between 2005 and 2050 (Phiri, 2018). Production in developing countries would need to increase. This suggests increase in yields yearly, grain yield for example, would have to increase by almost a billion tons (FAO, 2015b).

Boosting local and regional food supplies in every country is one strategy to feed the world's ever-growing population. This can be done through increasing agricultural production to achieve food security, or the availability of food in establishing sustainable food security. Additionally, boosting small and marginal farmers' production might be a crucial tool for long-term food security in low-income developing countries (Pawlak and Kolodziejczak, 2020). Additionally, it can encourage the growth of rural non-farm businesses, enhancing access to the food supply.

## 2.3 Analytical Frame Work

This section discusses the empirical strategy that was used in the study and a review of statistical tools used in previous researches.

### 2.3.1 Estimating the influence of determinants of production on productivity

In estimating the influence of factors of production on productivity, the estimation employs the use of parametric and non-parametric approach. In parametric estimation of productivity, The ordinary least square (OLS) regression technique is employed. Similarly, in parametric approach Data Envelopment Analysis (DEA) is used. This various approach to measuring productivity has been used in the researches. In a previous study by Osawe *et al.* (2017) Cobb-Douglas has widely been adopted in estimating the factors of production in a gender differential of productivity study. Cobb-Douglas is widely used in representing the output-input relationship.

The following function was used to model production:

$$P(L,K) = bL^{\alpha} K^{\beta} \qquad (2.1)$$

P = total production

L = labor input

K = capital input

b = total factor productivity

α and β are, respectively, labour's and capital's output responsiveness

Yield elasticity estimates the responsiveness resulting in an adjustment of levels of labor or capital utilized

The exponential functional form is changed into direct equation by taking the logarithm of the equation.

$LnY=\beta 0 + \beta 1 LnX_1 \ldots + \beta_n LnX_n + U$ (2.2)

Where: Ln=Natural logarithm

Y=Output

β = coefficient of Parameter

$X_{1 \ldots} X_n$= Independent variable/variables of estimation

### 2.3.2 Measurement of poverty

In the income approach to analyse poverty status, Foster, Greer and Thorbecke (FGT) poverty measure was used. This analytical tool has been used by Ajewole *et al.* (2016) in the study of poverty at the household level

$$P_{ai} = \frac{1}{n} \sum_{i-1}^{q} \left[ {(z - y)}/{z} \right]^{\alpha} \quad (2.3)$$

Where; Z=Poverty line

q = number of households living in poverty

n = Total sampled population

$y_i$= the household's average income for adults

α = Poverty aversion Parameter

z- $y_i$ =Poverty gap of the with household

Though FGT technique is a technique widely used in the measurement of poverty, it has some weakness. The use of poverty line relative the mean per capital income or expenditure of the population does not accurately reflect the difference in different countries.

### 2.3.3 Factors affecting household poverty

In assessing the factors that contribute to household poverty, logistic regression was utilized, as it had been in earlier research by Ajewole *et al.* (2016). The response variable is expressed with values one and zero. It is measured on a binary outcome by calculating the likelihood that the event will occur. Rather than using the dependent variable itself, the dependent variable's log chances are calculated instead, it does this to ascertain the link between one or more independent factors and the log odds of the dichotomous result. The ratio of two odds is known as the log odds ratio, and it serves as a summary indicator of the association between two variables (Adepoju and Obayelu, 2013).

$$Z_i = ln\left(\frac{P_i}{1-P}\right) = \beta + \beta_1 x_1 + \beta_2 x_2 \ \ldots + \beta_i x_i + u_i \qquad (2.4)$$

where Pi = likelihood that a farmer will remain above the poverty level. (1= Non-poor; 0 = poor)

β = coefficient of Parameter

$U_i$ = Error term or Disturbance term

The primary flaw in logistic regression is the assumption that the relationship between the dependent variable and the independent variables is linear. It only indicates how effective a prediction is. It only works for forecasting discrete functions. The dependant is hence confined to the set of discrete numbers. However, logistic regression is appropriate for the investigation because the majority of the independent factors in connection to the independent variable are non-quantitative.

### 2.3.4 Oaxaca-Blinder (O-B) mean decomposition technique

Previous studies on areas such as inequality of income, productivity, and poverty show no explanation on the reason of their decomposition, how each element of a group made to belong in that group or what made that made that element belong to these groups. This knowledge gap in previous studies can be explained through the Oaxaca-Blinder linear regression model (Oaxaca, 1973). This method originated from the need to investigate the salary gaps between white men and white women and between white men and black men. The O-B decomposition approach determines the contribution of each variable to the differences between the variables of interest and estimates the gap between the means of outcome variables for two groups. The gap or outcome of the mean differences between the two groups is divided using this decomposition technique into the component that can be explained (the endowment effect) and the component that cannot be explained (structural effect). Differences in explanatory factors account for the explained portion of the disparity, whereas discriminatory or omitted predictors account for the unexplained portion (Oaxaca, 1973). According to Lubrano (2016), Oaxaca uses this wage equation

$\log(\overline{W_I}) = X_i\beta + ui$ i= male (m) or female (f) (2.5)

To derive the decomposition model

$$\log(\overline{W_m}) - \log(\overline{W_f}) = (\overline{X_m} - \overline{X_f})\hat{\beta}_m + \bar{X}_f(\hat{\beta}_m - \hat{\beta}_f) \quad (2.6)$$

In this breakdown, the difference in average characteristics—which are initially used to explain the difference in percentage between the average male and female wage—is followed by the difference in the yield of female average characteristics, which is denoted by the notation m- f. When the difference in means is written as, this dual decomposition can be incorporated into a single statement:

$$\text{Log}(\overline{W_m}) - \log(\overline{W_f}) = (\overline{X_m} - \overline{X_f})\beta^* + [\overline{X}_m(\hat{\beta}_m - \beta^*) + \bar{X}_f(\hat{\beta}_m - \beta^*)]. \quad (2.7)$$

$$= \hat{Q} + \text{U} \quad (2.8)$$

The first part of the statement is the explained part, whereas the term in the square bracket is the unexplained part, according to Lubrano (2016). Obtaining the Blinder decomposition for β^*=βˆ m while recovering the previous decomposition for β^*=βˆ f.. The average of the two regression coefficients is chosen by another technique for decomposition that has been documented in the literature (Oaxaca and Ransom (1994), for instance, provide a description of how the generalised linear decomposition used below is used:

$$\overline{Y_A} - \overline{Y_B} = (\bar{X}_A - \bar{X}_B)\beta^* + \bar{X}_A(\beta_A - \beta^*) + \bar{X}_B(\beta^* - \beta_B) \quad (2.9)$$

Where: $\overline{Y_A} - \overline{Y_B}$ is mean wage difference between male and female headed household

$\bar{X}_A - \bar{X}_B$ is a vector of male and female individual characteristics (regressors)

$\beta_A \; and \; \beta_B$ is a vector of male and female is the corresponding coefficient for male and female to be estimated.

$\beta^*$ is the coefficient vectors' weighted average, $\beta_A \; and \; \beta_B$

(Daymont and Adrisani, 1984) suggested the blinder decomposition be extended as follows:

$$\overline{Y_A} - \overline{Y_B} = (\bar{X}_A - \bar{X}_B)\beta_B + \bar{X}_B(\beta_A - \beta_B) + (\bar{X}_A - \bar{X}_B)(\beta_A - \beta_B) = E + C + CE. \quad (2.10)$$

Where E is equivalent to the first part i.e the part of the differential due to differences in observable characteristics of endowments, C is equivalent to the second part which determine whether the differences are statistically significant, demonstrates the portion due

to different coefficients, and CE represents the portion that the interaction can account for of C and E. Jann (2008) proposed that the computation of standard error for this decomposition is based on knowing if the regressors are stochastic or not. However is computed as follow;

If regressors are fixed, then the result becomes Var($\bar{X}\,\hat{\beta}$) = $\bar{X}\,Var\,(\hat{\beta})\bar{X}$ (2.11)

If the regressors are stochastic but not uncorrelated, Jann (2008), showed that this variance becomes Var ($\bar{X}\hat{\beta}$) = $\bar{X}'Var\,(\hat{\beta})\bar{X} + \hat{\beta}'\,Var\,(\bar{X})\hat{\beta} + tr\,Var\,(\bar{X})Var\,(\hat{\beta})$. (2.12)

Despite the extensive use of Oaxaca-Blinder decomposition in previous studies, The gender gap literature has argued that the observed disparity is a highly complex phenomena that can only be further complicated by a mean comparison analysis and may fluctuate over the productivity distribution. The potential for productivity in either the higher or lower part of the distribution can be very different. Therefore, assuming a constant productivity difference over the productivity distribution would be false.

## 2.4 Review of Empirical Studies

### 2.4.1 Review of related research

Ajewole *et al.* (2016) In a study, cgender differences in poverty among rice-farming households in Nasarawa and Benue rice hub of Nigeria were examined. According to the report, 54.29% of respondents have not had a formal education, contrasted to men's 25.89%, and 23.81% are headed by women and 76.19% by males. Households with male heads have lower incomes (47.32% and 37.14%). Poverty is influenced by a number of factors, including upland area, age, household size, credit utilisation, and education level.

However, it was suggested that gender sensitivity should be given top priority in initiatives for reducing poverty for households that harvest rice. Also, it is important to promote innovation utilisation while giving education first priority.

In another research by Osawe *et al.* (2017) productivity differentials of rice production system in Nigeria agro ecological zones was examined. The results of the analysis revealed that irrigation system and a combination of rain fed upland, lowland and The rice production method with the highest net returns was irrigation. In Nigeria, female rice farmers, pesticide use, and fertilizer use all had a beneficial impact on rice yield, while years of schooling, seed use, and labour use had a negative impact. It was advised that policy initiatives to increase rice yield should focus on lowering associated labour costs and lowering cost of fertilizer acquisition by boosting mechanization of rice production in Nigeria.

Also, a study by Oseni *et al*. (2013) aimed at analyzing the disparities in agricultural output between male and female plot managers in Nigeria helped explain gender variations in agricultural production. The analytical technique employed was the Oaxaca-Blinder decomposition approach. After accounting for the production parameters that were observed, the study's findings indicate that women in the North produce 28% less than men do. but in the South there aren't any noticeable gender inequalities. The North's structural implications is more than the endowment at the mean, according to the results of the decomposition. The findings show that despite the reality that women in the North have less access to resources than males, major inequities persist even when input levels are equal. The endowment impact is more significant than the structural effect for the South, based on the decomposition outcomes. The majority of the gender difference in the South

is explained by access to resources, and the gap will be negligible if women receive the same level of input as males. The disparity between the North and South's outcomes indicates that policies should change depending on the study to close the differential gap.

Although earlier research has sought to analyse production and poverty disparities between the genders, the contributions of the various genders have not been explained. This made it necessary to break down the differential in order to apply the Oaxaca-blinder model to explain the causes and origins of the inequality. Additionally, the observed production restrictions provide additional information on factors influencing the production process and poverty that are not incorporated in the different models of poverty and production.

# CHAPTER THREE

## 3.0 RESEARCH METHODOLGY

### 3.1 Study Area

The study was conducted in Niger State, Nigeria, the State was created in 1976. It is located in Guinea Savannah Region and lies between latitude $80^0$ to $11^0$ 30'North and longitude $03^0$ 30' to $07^0$ 40' East of the equator. The state is bordered to the north by the Federal Capital Territory (FCT) and Kaduna State, to the west by Kebbi State, to the south by the Kogi State, and to the south-west by the Kwara State. Niger state and Benin Republic share border. The State's land area is 74,244 square kilometers (7,424 million hectares), or 8% of the total land area of the nation (Ojo, 2015; National Bureau of Statistics (NBS), 2017). According to the National Population Commission (NPC), 2006, the state has a population of around 3,950,249 individuals, 2,032,725 of whom are men and 1,917,524 of them are women. By 2021, the population of the state is expected to reach 5,971,706 at a 3.4% annual growth rate (Transforming Education in Niger State [TENS], 2021). With a mean temperature of 27.7ºC and an average annual rainfall ranging from 782-1250 mm, the state's climate and biological conditions are favourable (Tsado, 2013).

The State comprises of 25 LGAs that are split into three agricultural zones. The main crops grown in these zones include millet, rice, maize, guinea corn, cowpea, cassava, groundnuts, and sweet potatoes. Most farmers raise animals including hen, goats, and lambs, but some also work in other crafts like carving, weaving, and blacksmithing (Tsado, 2013). 15% of the State's population works in other occupations such white collar employment, businesses, crafts, and the arts, compared to 85% of farmers (Tsado, 2013). The availability

of significant water bodies, including dams and reservoirs, as well as the state's southern boundary's huge flood plain, provide excellent opportunities for the dry-season cultivation of fadama crops (TENS, 2021).


**Figure 3.1: Map of Niger state showing study location**
Source: Rice Farmers Association of Nigeria (RIFAN, 2020) Niger State Chapter

### 3.2 Sampling Procedures and Sample Size

There are three agricultural zones in the state and they are: Zone I, Zone II and Zone III. For this study, a 3-stage sampling technique was used to generate data. Lavun, Paikoro, and Wushishi were the three Local Government Areas from the zone that were purposefully chosen for the first stage. In the second stage, two communities from each Local Government Area were selected at random. The third step entailed the stratified random selection of homes with male and female heads. The sample size was calculated from the sampling frame using the Yamane (1973) formula. 236 farmers in total were chosen for this study.

As stated in Yamane formula: $n = \frac{N}{1+N(e)^2}$ (3.1)

Where; n=sample size, N=finite population, e= limit of tolerable error (0.05), 1= unity

**Table 3.1: Distribution of respondents base on their sample frame and sample size**

| LGAs | Selected communities | Sample frame | Sample size | Males | Females |
|---|---|---|---|---|---|
| Lavun | Gaba | 115 | 47 | 25 | 22 |
| | Batati | 92 | 38 | 21 | 17 |
| Paikoro | Kwakuti | 96 | 39 | 19 | 17 |
| | Paiko | 84 | 34 | 23 | 19 |
| Wushishi | Zungeru | 103 | 42 | 22 | 17 |
| | Lokogoma | 88 | 36 | 20 | 14 |
| **Total** | | **578** | **236** | **130** | **106** |

Source: Rice Farmers Association of Nigeria, Niger State Chapter (RIFAN) 2020

### 3.3 Method of Data Collection

For the study, both primary and secondary data were used. Under the direction of the researcher, primary data were gathered from respondents via interviews using a well-structured questionnaire with the assistance of skilled enumerators. A questionnaire was utilized to collect data on the respondents' socioeconomic characteristics, including their age, gender, marital status, household size, level of education, and years of farming experience. Other information includes household expenses; total income achieved monthly, input-output data from farm activities, and constraints to rice farming.

### 3.4 Method of Data Analysis

Descriptive statistics such as mean, median, frequency distribution table and percentages was used to describe the socio-economic characteristics of respondents (male and female household members) in the study area (objective i). Productivity index was used in estimating the total factor productivity of the respondents (objective ii). Ordinary least square was used to estimate determinants of productivity (objective iii). Foster Greer and Thorbecke (FGT) index model was used to analyse poverty status of respondents (objective iv). To ascertain how respondents' socioeconomic standing related to poverty levels. Logit regression was utilized. (objective v). Oaxaca-Blinder decomposition was used analyzing the degree to which socioeconomic factors influencing poverty and productivity (objective iii and v). Descriptive/Likert scale was used to identify the constraints faced by the respondents (objective vi).

### 3.4.1 Descriptive Statistics

Descriptive statistics such as mean, tables, frequency distribution and percentage was used to describe the socio-economic characteristics of the respondents (i) and constraints faced by the respondents (vi).

### 3.4.2 Total Factor Productivity

Productivity index was used to estimate the total factor productivity of the respondents as stated :

$$P = \frac{Y}{X} \qquad (3.2)$$

Where:

P = Productivity (Index)

Y= Value of input (₦)

X= Value of Output (₦)

### 3.4.3 Ordinary Least Square

Ordinary least square (OLS) was used to estimate the determinants influencing the productivity of the rice farming household members. The equation showing the relationship between the determinants and output is stated in its explicit form as.

$Y= \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_4 X_6 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + U$ (3.3)

Where:

Y= Total Factor Productivity (Index)

$X_1$= Farm size (Hectares)

$X_2$= Labour (Man days)

$X_3$= Seed (Kg)

$X_4$= Fertilizer (kg)

$X_5$= Agrochemical (kg)

$X_6$= Educational level (man-days)

$X_7$= Household Income (₦)

$X_8$=Access to improved seed (Yes=1 no=0)

$X_9$=Credit (₦)

$X_{10}$=Fixed capital depreciation (₦)

### 3.4.4 Foster-Greer-Thorbecke (FGT)

Rural household poverty levels were assessed using the Poverty Index, which divided households into classifications of the poor and not-poor. The P measures are now frequently used to study poverty. The measurements relate to several aspects of the prevalence of poverty. For the head count (incidence), depth, and severity of poverty denotred by $P_0$, $P_1$, and $P_2$ respectively. The following is an estimate of the mathematical formulation of poverty measurements as determined from Foster, Greer, and Thorbecke (1984):

$$P_{ai} = \frac{1}{n}\sum_{i-1}^{q}\left[{(z-y)}/{z}\right]^{\alpha} \quad (3.4)$$

Where:

$\alpha = 0$, $P_o = \frac{1}{n}\sum_{i-1}^{q}\left[{(z-y)}/{z}\right]^{0} = \frac{q}{n}$ →Poverty incidence or head count

$\alpha = 1$, $P_1 = \frac{1}{n}\sum_{i-1}^{q}\left[{(z-y)}/{z}\right]^{1}$ → Poverty depth

$\alpha = 2$, $P_2 = \frac{1}{n}\sum_{i-1}^{q}\left[{(z-y)}/{z}\right]^2$ →Poverty severity

Where:

α = degree of poverty

n = number of households in a group

q = the number of poor households

y= the per capita income (PCI) of the $i^{th}$ household.

z = poverty line

The core poverty level is defined as the 2/3 mean per capita income, whereas the moderate poverty line is defined as the 1/3 mean per capita income. The moderate poverty level, however, was the only focus of this study.

α = degree of poverty aversion

Per capita income= $\frac{Total\ income}{household\ size}$

Mean per capita household income (MPCHI) = $\frac{Total\ household\ PCI}{Total\ number\ of\ Households}$

The categorization of respondents based on the poverty line is given as:

Extreme poor: income < 1/3 of MPCHI

Moderately poor: income <2/3 of MPCHI

Non-poor: income > 2/3 of MPCHI

### 3.4.5 Logit regression model

By calculating the likelihood that the event would occur, the logit regression model was used to examine the varied effects of household and socioeconomic factors on the poverty status of the rice farming household on a dichotomous outcome.

Logit model is expressed as : $Y_i = ln\left(\frac{P_i}{1-P}\right) = \beta_o + \beta_1 x_1 + \beta_2 x_2 \ ... + \beta_i x_i + u_i$ ( 3.5)

Where; Pi = probability that a farmer will fall below the poverty line or not; (1= Non-poor; 0= poor)

$Y = \beta 0 + \beta 1 X1 + ..... + \beta_{14} X_{14}$ (3.6)

Where;

X1…$X_{14}$ are the explanatory variables. Y= Poverty status of household (Non-Poor = 1, poor=0 ).

$X_1$ = Age of the respondents (in years);

$X_2$ = marital Status (married = 1, 0 if otherwise);

$X_3$=Farm size (hectare)

$X_4$= Farming experience (years)

$X_5$ = Educational level (years)

$X_6$ = Household size (Number)

$X_7$ =Cooperative Membership (Member=1 non- member=0)

$X_8$ = Extension contact(contact = 1, 0 if otherwise)

$X_9$ = Access to credit ( monetary value in Naira)

$X_{10}$ = Primary occupation(Farming Occupation=1 Non Farming occupation=0)

$X_{11}$ = Land Ownership (land owner = 1, 0 if otherwise)

$X_{12}$=Household expenditure(₦)

$X_{13}$ = Total household income (₦)

$X_{14}$ = Remittance (₦)

U= error term

### 3.4.6 Oaxaca- Blinder Mean Decomposition

Following previous studies (Daymont and Adrisani 1984; Jann 2008) the Oaxaca-Blinder approach was employed to demonstrate how much the mean difference in production (G) between male and female farmers is caused by variations in their observable covariates (E) and co-efficients of variables (C)

$$G=\bar{Y}_m - \bar{Y}_f = [\bar{X}_m - \bar{X}_f]\beta_f + \bar{X}_f(\beta_m - \beta_f) + [(\bar{X}_m - \bar{X}_f)(\beta_m - \beta_f)] \quad (3.7)$$

Where; $\bar{Y}_m - \bar{Y}_f$= mean Productivity difference

$\bar{X}_m. - \bar{X}_f$= difference in observable covariates of male and female farmers

$\beta_m$ *and* $\beta_f$ =difference in co efficient of variables for male and female farmers estimated

Similar to this, the Oaxaca-Blinder decomposition approach for non-linear regression by Bauer and Sinning (2008) was used to breakdown the poverty disparity as follows:

$$E(P_m) - E(P_f) = [E(X_m) - E(X_f)]\beta_f + E(X_f)(\beta_m - \beta_f) + [E(X_m) - E(X_f)](\beta_m - \beta_f) \quad (3.8)$$

$E(P_m) - E(P_f)$ = mean difference in poverty between male headed and female headed household

$E(X_m) - E(X_f)$ = expected variable factors of male and female that contribute to differences in poverty.

$\beta_{m.}$ and $\beta_f$ estimated parameters for men and women.

### 3.5 Test of Hypothesis

The Z-test was used to evaluate the claim that there is no gender-related difference in productivity and poverty. As seen in the following calculation, the z-test statistics.

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \qquad (3.9)$$

Where:

$\bar{X}_1$ = mean of male gender

$\bar{X}_2$ = mean of female gender

$\sigma_1^2$ = variance of the male gender

$\sigma_2^2$ = variance of the female gender

$n_1$ = number of male gender

$n_2 =$ number of female gender

### 3.6.0 Measurement of variables, definitions, for productivity and poverty

**Level of education**: Education level of household head measured by number of years spent in school.

**Marital Status** : Status of household head in marriage measured as married=1, not married=0.

**Household size**: Number of people in a household who depend on a common resources such for sustenance.

**Farming experience**: Number of years spent in farming

**Membership of cooperative society**: Membership of cooperative society groups, association and was measured as 1= member, 0 = non-member.

**Access to credit**: The real amount of money the responder had received as credit in naira was used to gauge this.

**Farm size**: The size of the farm land used for rice cultivation. Farm size was measured in hectares.

**Extension contact**: Contact with Extension agent was measured as = 1 and no contact = 0

**Capital inputs**: This refers to fixed farm inputs available to respondents they can also be called farm assets, measured in monetary value.

**Fixed capital depreciation**: Fixed capital deprecation was measured in naira

**Labour**: Human effort used on the farm, labour input in the form family, communal and hired labour was measured in man day.

**Seed**: Quantity used for cultivation was measured in kilograme

**Access to improved seed**: Improved seed use or access was measured as 1=access 0= no access

**Fertilizer**: Quantity of fertilizer used on farmland was measured in kilogramme.

**Household income**: Monetary gains from farming and non-farming sources

**Household expenditure**: Money spent on consumer-oriented goods and services.

**Land ownership**: Household head Ownership of land, (owner =1 not owner= 0)

**Remittance**: Money sent to the household from urban areas or abroad

## CHAPTER FOUR

## 4.0 RESULT AND DISCUSSION

### 4.1 Socioeconomic Characteristics of the Farmers

This section discusses the socioeconomic characteristics of the respondents, including sex, marital status, educational attainment, years of experience in rice cultivation, and household size as shown in Table 4.1

**Table 4.1: Distribution of respondents according to socio-economic characteristics**

| Variable | Male Frequency (n=130) | Percentage | Mean | Female Frequency (n=106) | Percentage | Mean |
|---|---|---|---|---|---|---|
| **Age** | | | | | | |
| <31 | 24 | 18.5 | 38 (9.48) | 15 | 14.2 | 40 (10.11) |
| 31-40 | 66 | 50.8 | | 45 | 42.5 | |
| 41-50 | 24 | 18.5 | | 21 | 19.8 | |
| 51-60 | 16 | 12.3 | | 25 | 23.6 | |
| **Marital Status** | | | | | | |
| Single | 2 | 1.5 | | 3 | 2.8 | |
| Married | 108 | 83.1 | | 79 | 74.5 | |
| Divorced | 5 | 3.8 | | 4 | 3.8 | |
| Widowed | 15 | 11.5 | | 20 | 18.9 | |
| **Educational Status** | | | | | | |
| Primary | 36 | 27.7 | | 29 | 27.4 | |
| Secondary | 48 | 36.9 | | 48 | 45.3 | |
| Tertiary | 18 | 13.8 | | 8 | 7.5 | |
| Non formal | 28 | 21.5 | | 21 | 19.8 | |
| **Household Size** | | | | | | |
| <6 | 36 | 27.7 | 8 (3.13) | 28 | 26.4 | 7(2.44) |
| 6-10 | 70 | 53.8 | | 65 | 61.3 | |
| >10 | 24 | 18.5 | | 13 | 12.3 | |
| **Primary occupation** | | | | | | |
| Farming | 117 | 90.0 | | 99 | 93.4 | |
| Artisan | 9 | 6.9 | | 1 | 0.9 | |
| Trading | 4 | 3.1 | | 6 | 5.7 | |

Source: Field survey, 2021 Note: figures in ( )= Standard deviation

**Table 4.1: Distribution of respondents according to socio-economic characteristics (cont'd)**

| Variable | Male Frequency (n=130) | % | Mean | Female Frequency (n= 106) | % | Mean |
|---|---|---|---|---|---|---|
| **Farming experience** | | | | | | |
| <11 | 16 | 12.3 | 17(8.04 ) | 14 | 13.2 | 17(8.67) |
| 11-20 | 89 | 68.5 | | 70 | 66.0 | |
| 21-30 | 16 | 12.3 | | 14 | 13.2 | |
| >30 | 9 | 6.9 | | 7.5 | 7.5 | |
| **Farm Size** | | | | | | |
| < 1.1 | 51 | 39.2 | 1.26 (0.61) | 57 | 53.8 | 1.01(0.45) |
| 1.1 - 2.0 | 64 | 49.2 | | 48 | 45.3 | |
| 2.1 - 3.0 | 12 | 9.2 | | 0 | 0 | |
| > 3.0 | 3 | 2.3 | | 1 | 0.9 | |
| **Sources of credit** | | | | | | |
| Cooperative | 20 | 15.4 | | 22 | 20.8 | |
| Commercial Bank | 9 | 6.9 | | 10 | 9.4 | |
| Family and friends | 6 | 4.6 | | 1 | 0.9 | |
| Government Programmes | 3 | 2.3 | | 8 | 7.5 | |
| None | 92 | 70.8 | | 65 | 61.3 | |
| **Farmland ownership** | | | | | | |
| Inheritance | 68 | 52.3 | | 37 | 34.9 | |
| Rent/lease | 11 | 8.5 | | 18 | 17.0 | |
| Gift | 30 | 23.1 | | 42 | 39.6 | |
| Purchase | 21 | 16.2 | | 9 | 8.5 | |
| **Extension contact** | | | | | | |
| Weekly | 0 | 0 | | 2 | 1.9 | |
| Fortnightly | 14 | 10.8 | | 15 | 14.2 | |
| Monthly | 23 | 17.7 | | 16 | 15.1 | |
| Quarterly | 11 | 8.5 | | 6 | 5.7 | |
| None | 82 | 63.1 | | 67 | 63.2 | |
| **Farm Labour*** | | | | | | |
| Family | 123 | 94.6 | | 102 | 96.2 | |
| Communal | 43 | 33.1 | | 14 | 13.2 | |
| Hired | 97 | 74.6 | | 82 | 77.4 | |

Source: Field survey, 2021 figures in ( )= Standard deviation * = multiple response, % = percentage

### 4.1.1 Age

Age refers to the length existence of a person or individual, it is a socio-economic factor affecting productivity and poverty of farmers. Results on Table 4.1 shows majority (69.3%) of the Male respondents ranged in age from 31 to 50. While for the female respondents, majority (62.3%) were within the age range of 31 and 50. This implies that majority of the respondents are young and energetic adults, with a younger population among female respondents. This result is consistent with that of Bamiro and Alaro (2013), who reported that farmers below the age of 50 made up the largest percentage of those who were actively farming.

### 4.1.2 Marital status

Marriage is a revered institution in Africa, and marital status refers to the state of being married or not. Majority of the respondents on the gender side of male (83.1%) and female (74.5%) were married, this imply a possible dependent on family labour by the respondents. This result is in line with the findings of Adeoye *et al*. (2019), who claimed that most rural households in Nigeria are headed by married people. The farmers' marital status can be a sign that they have access to labour from their families, which lowers production costs. Additionally, a woman's marital status affects whether or not she is granted specific rights that vary and depend on the traditions of the society; this may limit her access to factors of production besides labour.

### 4.1.3 Education

Education refers to the process of transferring skills and knowledge from one person to another, educational attainment affects the decision making and performance of an individual based on the knowledge and skills possessed. Findings of the study shows

majority (78.8%) of the male and also majority The highest level of formal education reached by both male and female respondents was secondary education, which was held by 80.2% of the female respondents. Females had lower rates of postsecondary education, which may be due to a high rate of secondary school dropouts. This result is consistent with United Nations Women (2014) research on the decreased enrolment of girls in higher education in Africa. NBS (2020) also noted that female household heads had lower levels of education than male household heads.

### 4.1.4 Household size

The term "household size" describes the total number of individuals who share a roof and a cooking vessel, apart from habiting in same accommodation and dining, they depend on the household head's income for support in fulfilling other needs and necessity of life. Result from Table 4.1 revealed more than half (53.8%) of the male respondents had household size ranging between 6 and 10 and also a majority (61.3%) for the female respondents, with an average household size for men is eight, and for women it is seven. This implies most of the respondents had access to family labour, a larger household means a higher income requirement is needed for family upkeep. This outcome is consistent with those of Abosede and Adeyemo (2019) who found that the respondents' mean household size was less than 10 persons.

### 4.1.5 Primary occupation

Individuals rely on a particular source of income as their major source of income used in catering for themselves and their family. In rural areas, agriculture-related jobs like farming and raising animals are the main sources of income. Table 4.1 reveals majority (90.0%) of the male respondents were farmers, while the majority (93.4%) of the female respondents

were farmers as well, with some additionally working as artisans and traders. This suggests that the majority of responses are farmers. This implies that a major source of income in the study area is farming, An increase in production would increase household income. This outcome is similar to the findings by Yusuf *et al*. (2016).

### 4.1.6 Farming experience

Farmers acquire knowledge and skills as a result of performing farming activities, these sums up to form the farmers farming experience which helps them in dealing with complexities that arises in farming. Findings of the study in Table 4.2 revealed that majority (68.5%) respondents have farming experience between 11- 20 years. and also majority (66.0%) for the female respondents, with a mean farming experience of 17 years for the male household heads and 16 years for the female household heads. This implies the respondents in the study area are experienced and are likely to have more knowledge needed to handle the technicalities that comes with rice farming. This result conforms to the findings of Adeoye and Ugalahi (2017) where most farmers had at least 10 years farming experience.

### 4.1.7 Sources of farm credit

Farmers in a bid to increase output and productivity seek for loans to supplement in areas of low input, this they acquire from various formal and informal sources. Table 4.2 reveals a low access to farm credit by majority of the respondents, 70.8% of male and 61.3% of female respondents had no source to farm credit, while for those who had credit, cooperative society was a major source of farm credit. Having access to credit enables the farmers to expand the scale of production which would lead to higher output. This result is

in agreement with findings of Silong and Gadanakis (2019) which noted a low access to credit by farmers.

### 4.1.8 Farm size

Farm size refers to the land size used for cultivation, Land being an important input in agriculture especially in crop production cannot not be overemphasized even with the discovery of modern farming methods such as hydroponics (growing plants without soil, by using mineral nutrients solutions in an aqeous solvent). Findings of the study in Table 4.2 revealed the farm size of the respondents, majority (88.4%) of the male household heads had a farm size of less than 2.0 hectares, a larger proportion of the respondents had a farm size below 2.0 hectares. Majority (99.1%) of the female household had farm size below two hectares. This implies majority the farmers were smallholder farmers. The findings could be as a result of fragmented use of land and mixed cropping pattern of farming among famers. An expansion in the land available for the cultivation would lead to higher output. The result is in agreement with findings of Idumah *et al.* (2015) who noted that majority of farmers are small scale farmers cultivating on land size below 3.0 hectares.

### 4.1.9 Farm land ownership

Farm land ownership involves having right to use of land and making decisions on the land, this decision could be use of land for collateral when obtaining farm credit, building farm structures and decision on when and type of crop to plant. Table 4.2 reveals the land ownership of the respondents, majority (52.3%) of the male respondents indicated inheritance as the means of land ownership, while most (39.6%) of the female respondents owned farmland through gifting. This observed means of land ownership could be as a result of lower status given to women in comparison to their male counterparts. In some

communities, women have no rights to land ownership among other deprivations. This result is in agreement with findings of Ahmed and Deji (2020).

### 4.1.10 Extension contact

Agricultural Extension, which is the dissemination of knowledge and information on modern farming techniques and good agronomic practices is achieved majorly through the use of agricultural extension workers among other means of information dissemination and knowledge sharing. As shown in table 4.2 the frequency of extension visit observed by the respondents, majority (63.1%) of the male and also majority (63.2%) of female the respondents indicated not having access to extension agents, this could lead to low knowledge of modern farming techniques and low adoption of modern agricultural technologies. This result is in agreement with the findings of Makama *et al.* (2018) and Obianefo *et al.* (2021) who reported that majority of farmers lacked access to extension services.

### 4.1.11 Source of farm labour

The human effort used in accomplishing task on the farm land is generated from different sources, the source of farm labour has implication on the cost of production, output and productivity. The findings in Table 4.2 reveals the source of farm labour used by the respondents, majority (94.6%) of the male respondents, and also a majority (96.2%) of the female respondents indicated family as source of farm labour. Also, Hired labour was observed to be a major source of labour. This implies a use of family labour with hired labour complementing the use of family labour on the farm of the household as a source of labour. This could be as a result of high reliance on manual labour and fragmented use of

farm land which could hinder the use of machines on the farmland. This result is in agreement with the findings of Oladosu *et al.* (2018) where family labour was the major source of labour among farmer.

### 4.2 Productivity Differentials in Rice Production along Gender Lines

To obtain a broad understanding of the relationship between outputs and all inputs used by farmers to produce rice, total factor productivity was examined. The total factor productivity index was used to estimate the gender differences.

**Table 4.2: Total factor productivity of respondents**

| | Male | | Female | |
|---|---|---|---|---|
| **Range** | **Frequency** | **Percentage** | **Frequency** | **Percentage** |
| < 2.1 | 18 | 13.85 | 18 | 16.98 |
| 2.1 – 4.0 | 72 | 55.38 | 77 | 72.64 |
| 4.1 – 6.0 | 29 | 22.31 | 7 | 6.61 |
| 6.1 – 8.0 | 9 | 6.92 | 3 | 2.83 |
| 8.1 – 10.0 | 1 | 0.77 | 1 | 0.94 |
| > 10.0 | 1 | 0.77 | | |
| Mean | 3.6182 | | 3.0515 | |
| Minimum value | 0.2532 | | 0.2727 | |
| Maximum value | 10.1299 | | 9.0606 | |

Source: Field survey, 2021

Result on Table 4.2 reveals a total factor productivity index for respondents who were both male and female. The majority of male respondents (55.38%) had a productivity index between 2.1 and 4.0, and the majority of female respondents (72.64%) had a similar index. In general, the results indicate that more male respondents than female respondents had productivity indices that were higher. This is clear from the mean productivity index calculated for both gender groups, which was 3.62 for the male respondents and 3.05 for the female respondents respectively. Although there was not much of a difference in the mean productivity index between the male and female respondents, more male respondents

were more productive than their female counterparts. This result is consistent with research by Oseni *et al.* (2013) and Croppenstedt *et al.* (2013), which found that women were less productive than men.

### 4.3 Determinants of Productivity

All factors of production have effect on the productivity, these factors could be significant or not significant, and this could have a positive or negative relationship depending on the nature of the relationship. Table 4.3 shows the determinant of total factor productivity for the male and female household heads. It shows the relationship between the determinants and productivity. Results from Table 4.3 reveals the male regression had an estimated pseudo R-squared value of 0.580 and 0.645 for the female, this implies about 58% and 64% of the productivity of the female and male household heads was explained by the predictor variables specified in the model.

The overall goodness of fit for the model was indicated by the F-statistics values of 16.42 for households headed by men and 17.24 for households headed by women, both of which were statistically significant at 1%. For the households headed by men, eight out of the ten explanatory variables (farm size, labour, seed, fertilizer, household size, access to improved seed, and access to credit) were significant at the 1% and 10% level. While six factors (farm size, education, household size, better seed, access to credit, and capital depreciation) were discovered to have statistical significance on productivity of families led by women.

**Table 4.3: Estimates for the determinants of total factor productivity**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| **Variables** | **Coefficient** | **S. E** | **T-Value** | **Coefficient** | **S. E** | **T-Value** |
| Farm Size | 1.0474 | 0.2804 | 3.74*** | 0.9398 | 0.1240 | 7.58*** |
| Labour | -0.0073 | 0.0020 | -3.73*** | 0.0023 | 0.0020 | 1.15 |
| Seed | -0.0635 | 0.0134 | -4.75*** | -0.0050 | 0.0129 | -0.39 |
| Fertilizer | -0.0087 | 0.0031 | -2.81*** | -0.0015 | 0.0025 | -0.56 |
| Agrochemical | 0.0928 | 0.0748 | 1.24 | 0.0253 | 0.0607 | 0.42 |
| Education | -0.0282 | 0.0279 | -1.01 | 0.0473 | 0.0236 | 2.01** |
| Household size | 0.1205 | 0.0400 | 3.02*** | 0.1115 | 0.0368 | 3.03*** |
| Access to improved seed | 1.1474 | 0.2305 | 4.98*** | 0.7162 | 0.1843 | 3.89*** |
| Access to credit | 8.10e-06 | 2.78e-06 | 2.91*** | 8.16e-06 | 2.51e-06 | 3.25*** |
| Capital depreciation | 7.941e-04 | 4.28e-04 | 1.86* | -9.71e-04 | 3.66e-04 | -2.65*** |
| F-value | 16.42*** | | | 17.24*** | | |
| $R^2$ | 0.5798 | | | 0.6447 | | |
| $R^2$ Adjusted | 0.5445 | | | 0.6073 | | |

Source: Field survey, 2021

Statistically significant at 1%, the farm size of the male-headed household had a favourable link with productivity. While the farm size showed a favourable association and was statistically significant at 1% for households with female heads of home. This suggests that an increase in farm size would result in higher output for households led by men and women. This further suggests that the farmers' farms need to be expanded.

Finding of the study revealed labour of the male headed was negative and statistically significant at 1%. This implies inverse relationship between labour and productivity. This could be as a result of uneven distribution of labour in case where the households are into

multiple cropping. In a situation where labour on farm land is not effective, increase in labour would lead to an inverse relationship with productivity as revealed in findings of this study.

Seed for the male headed households had a negative relationship with productivity which was significant at 1%. This implies an inverse relationship between seed and productivity. This relationship observed could be due to use of local seeds by the farmers as the farmers use seed gotten from previous harvest. In some cases, the farmers do not adhere to proper seed rate and spacing during sowing. These could lead to a decrease in productivity even in cases of higher seed rate.

Findings of the study revealed fertilizer had a negative relationship with productivity of the male headed households and was statistically significant at 1%, this implies for the male use of fertilizer had an inverse relationship with productivity. This may be due to improper use of fertilizer by the farmers, when fertilizer is used wrongly or applied at wrong times, it may lead to a decrease in productivity due to the adverse effect on the crop.

Education of the female household heads had a positive relationship with productivity and statistically significant at 5%, this implies a positive relationship between education and productivity of the female household heads. The further implies positive influence of enrolment in formal education and attainment of higher education would positively affect productivity of the female house heads.

Household size of the male household heads had positive relationship with and was significant at 1% for female household heads, household size also had a positive relationship with productivity and had significant on productivity at 1%. Household size

having a positive relationship with productivity could be due to the high reliance of household members as a source of labour in addition to hired labour.

Access to improved seed had a positive relationship with the productivity of the male household heads and statistically significant at 1% also for the female headed households, improved seed was positive and was statistically significant at 1%, this implies a positive relationship between the use of improved seed and productivity. Since the use of seed from previous harvest and family and friends is major source of seed for farmers, use of improved seed would improve the productivity of the respondents.

Access to credit for male was positive and statistically significant at 1% while for the female, access to credit was positive and statistically significant at 1%, this implies, a direct relationship with productivity, credit used by farmers are usually channelled to the purchase of inputs needed for production, more credit facilities would imply more inputs for the farmers which would lead to higher productivity.

Finding of the study showed capital depreciation had a positive coefficient for the male and was statistically significant at 10%, while for the female capital depreciation had a negative coefficient and was statistically significant at 1%, this implies capital has a direct relationship with productivity of the male headed households while for the female headed households capital depreciation has inverse relationship with productivity. This contradictory or opposing relationship observed in capital depreciation and productivity of the male and female household heads could be due to more use of capital input by the male household heads. While in situations where female household heads are faced with low capital input and competing crop enterprises, capital depreciation may not be accounted in

the productivity of the crops. This result is in agreement with the findings of Donald *et al.* (2020) and Gebre *et al.* (2021).

### 4.3.1 Oaxaca-Blinder (OB) threefold decomposition of the gender differences in productivity

From the preceding section, the determinants of productivity for the male and female gender group were estimated to evaluate how the variables affect the productivity of the different gender groupings. However, what is more crucial is that decision-makers comprehend the root causes of these gaps in order to suggest relevant actions and interventions that are likely to close the gap. On this note, OB was used to decompose and summarize their differences in estimated average characteristics of productivity generating factors (endowment or composition effect), gender differences in returns of factors generating productivity and interactive relationship between the endowment effect and coefficient effect(structural effect) which is the interaction effect as shown in Table 4.5.

The difference in mean productivity is 0.6316 (63.16%), which is statistically significant at 1%, according to the result in panel 1 of Table 4.4 The aggregate decomposition revealed that the endowment effect accounted for 20.86% of the gender gap in productivity between the gender groups, though this gap was not statistically significant. The endowment coefficient showing a positive sign meant that male farmers possessed more resources, variables, or endowments than female farmers did. The coefficient effect, however, was significant at 1% and accounted for 120.52% of the gender gap. Additionally, positive was the variable for the coefficient effect. This indicates that male rice farmers may have had a structural advantage over female farmers and a structural advantage proportional to the magnitude. Although negative, the effect of interaction as not statistically significant,

Because interaction between endowment effect and coefficient effect differences, the interaction effect had a negative sign. This finding agree with findings of Tibesigwa and Visser (2016).

In Table 4.4, Panel 3 provides a detailed breakdown of the endowment effect, structural effect, and interaction effect, Farm size and seed are the main determinant of endowment effect which were significant at 5%. The positive coefficient for farm size indicates that men had a greater advantage in landholdings and utilisation. The coefficient for seed was negative, signifying that females were more likely to use seed. Other variables with a potential to be significant include capital depreciation, education, access to better seeds, and loan availability this positive indicators meant males had greater endowment than females. Labour and capital depreciation were the main determinants for the coefficient effect (return on observable characteristics or variables), and they were statistically significant at 1%. The fact that labour had a negative sign indicates that labour use for women was more efficient than men. Having a positive coefficient, depreciation of capital was of advantage to male farmers more indicating they used capital resources more frequently by men. A positive value for the constant indicates that men have a productivity advantage over women in the start with the exception of seed and education, none of the factors in the interaction effect were statistically significant, and the majority had negative coefficients. This outcome is inline with Mukasa and Salami's findings (2015).

**Table 4.4: Oaxaca-Blinder three fold decomposition of gender differentials in productivity among rice farming households**

| 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Gender differentials** | | | | | | | | |
| **Category** | **Coefficient** | **Std. error** | **T-value** | | | | | | |
| Female | 3.6473 | 0.1537 | 23.72*** | | | | | | |
| Male | 3.0158 | 0.1333 | 22.62*** | | | | | | |
| Difference | 0.6316 | 0.2035 | 3.10*** | | | | | | |
| 2 | **Aggregate decomposition** | | | | | | | | |
| | **Endowment effect(E)** | | | **Coefficient effect(C)** | | | **Interaction effect(EC)** | | |
| | Coefficient | Std. error | T-value | Coefficient | Std.error | T-value | Coefficient | Std.error | T-value |
| | 0.1317 | 0.1654 | -0.80 | 0.7612 | 0.1980 | 3.84*** | -0.2614 | 0.1724 | 1.52 |
| % share of the differentials gap | 20.86% | | | 120.52% | | | -41.38% | | |
| 3 | **Detailed decomposition** | | | | | | | | |
| Variables | Coefficient | Std. error | Z-value | Coefficient | Std. error | Z-value | Coefficient | Std. error | Z-value |
| Farm Size | 0.1898 | 0.0949 | 2.00** | 0.8467 | 0.5656 | 1.50 | -0.1253 | 0.0971 | -1.29 |
| Labour | 0.0426 | 0.0570 | 0.75 | -1.3405 | 0.4320 | -3.10*** | -0.0547 | 0.0736 | -0.74 |
| Seed | -0.2093 | 0.0986 | -2.12** | -1.3596 | 0.5952 | 2.28 | 0.1678 | 0.1001 | 1.68 |
| Fertilizer | -0.0707 | 0.0507 | 1.39 | 0.4370 | 0.4300 | 1.02 | -0.0492 | 0.0542 | -0.91 |
| Agrochemical | -0.0133 | 0.0244 | 0.54 | -0.4189 | 0.4291 | 0.98 | -0.0173 | 0.0324 | -0.53 |
| Capital depreciation | 0.0528 | 0.0392 | 1.35 | 0.8559 | 0.1855 | 4.61*** | -0.1667 | 0.1067 | -1.56 |
| Education | 0.0104 | 0.0209 | 0.50 | 0.0981 | 0.3518 | 0.28 | 0.0030 | 0.0121 | 0.25 |
| Household size | -0.0176 | 0.0414 | 0.42 | -0.1298 | 0.4327 | 0.30 | - 0.0027 | 0.0112 | -0.25 |
| Access to improved seed | 0.0898 | 0.0771 | 1.16 | 0.1063 | 0.1839 | 0.58 | -0.0147 | 0.0282 | -0.52 |
| Access to credit | 0.0572 | 0.0423 | 1.35 | 0.0062 | 0.1259 | 0.05 | -0.0015 | 0.0311 | -0.05 |
| Constant | | | | 1.6598 | 0.8416 | 1.97* | | | |

Source: Field survey, 2021

### 4.4 Poverty status of the Households

The poverty status of the households was analysed using Foster-Greer-Thorbecke (FGT) is presented in Table 4.5. Poverty status was analysed based on the three indicators of poverty, the indicators are incidence of poverty, poverty gap, and the severity of poverty. The poverty line was calculated as 2/3 of the mean per capital income of household heads. Findings in Table 4.5 revealed the head count incidence of poverty for male and female household heads was 0.14 and 0.27 respectively. This means that 14% of the male household heads and 27% of the female household heads were poor or had income below the poverty line. The result shows that female household heads were poorer than male household heads. This result is in agreement with the findings of Oluwatayo (2014), Edet and Etim (2014).

**Table 4.5: Distribution of respondents based on poverty status and indices**

| | **Male** | | **Female** | |
|---|---|---|---|---|
| **Indices** | **Freq.** | **%** | **Freq.** | **%** |
| I. Poor | 18 | 13.85 | 29 | 27.36 |
| II. Non poor | 112 | 86.15 | 77 | 72.64 |
| Poverty line | 30,570.42 | | 27,229.59 | |
| Poverty Incidence | 0.1385 | | 0.2736 | |
| Poverty gap index | 0.1262 | | 0.5 | |
| Poverty Severity index | 0.0159 | | 0.25 | |

Source: Field survey, 2021

Note: Freq implies frequency, % implies percentage.

The higher poverty observed in women could be attributed to social norms and limitations of women from equally accessing productive resources like men, other reasons may be

large household size, restrictions in use of farm land for farming activities, scale of production and the seasonal nature of farming in Nigeria. However, the result disagrees with the findings of Eduomiekumo *et al.* (2014) and Ajewole *et al.* (2016) who reported that male headed households are likely to be poorer than female headed households.

More so, the poverty gap for male headed households and female household heads was 0.1262 and 0.5 respectively, this finding implies that 12.62% and 50% of the of per capita income are required to raise poor male and female household heads from below the poverty line to the poverty line.

### 4.5 Determinants of Poverty

The determinants of poverty were estimated using logit regression, the independent variable was a dichotomous variable of 1= non poor and 0= poor. The result of the regression is presented in Table 4.6, the pseudo R-squared of 0.7447 for the male household heads and 0.6826 for the female household heads implies that about 74% and 68% of effect on poverty status was explained by the explanatory variables specified in the model. The chi-squared value of 129.01 for the male household heads and 99.37 for the female household heads was statistically significant at 1% indicating the model's overall goodness of fit. Out of the 14 explanatory variables specified in the model, four variables (Household size, access to credit, occupation, household income) significantly influenced the poverty status of the male household heads, while 6 variables (education, household size, extension, access to credit, household income, household expenditure) significantly influenced the poverty status of the female household heads.

**Table 4.6: Logit regression of the determinants of poverty status**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| **Variables** | **Coefficient** | **S.E** | **Z-Value** | **Coefficient** | **S.E** | **Z-Value** |
| Age | -0.0369 | 0.0760 | -0.49 | 0.0462 | 0.1067 | 0.43 |
| Marital status | -1.0840 | 1.2271 | -0.88 | 0.8533 | 1.2197 | 0.70 |
| Farm size | -0.6602 | 1.0084 | -0.65 | -0.8723 | 1.2936 | -0.67 |
| Farming experience | 0.0206 | 0.0904 | 0.23 | -0.0298 | 0.1211 | -0.25 |
| Education | -0.0538 | 0.1363 | -0.39 | -0.2863 | 0.1332 | -2.15** |
| Household size | -1.2848 | 0.3938 | -3.26*** | -1.1560 | 0.3434 | -3.37*** |
| Cooperative | 1.0298 | 1.1095 | 0.93 | 0.7214 | 1.2868 | 0.56 |
| Extension | -0.1379 | 0.9897 | -0.14 | 3.0761 | 1.0999 | 2.80*** |
| Access to credit | 2.7622 | 1.1759 | 2.35** | 1.9571 | 1.0381 | 1.89* |
| Farming occupation | 2.4313 | 1.0740 | 2.26** | 0.4937 | 1.5444 | 0.32 |
| landownership | 0.3104 | 1.0421 | 0.30 | -0.0436 | 1.0420 | -0.04 |
| Household income | 3.44e-04 | 8.90e-06 | 3.86*** | 1.72 e-04 | 7.65e-06 | 2.25** |
| Household expenditure | 4.1e-04 | 2.78e-04 | 1.47 | -6.34e-04 | 2.7e-04 | -2.34** |
| Remittance | 5.4e-04 | 5.41e-04 | 1.00 | -1.03e-03 | 1.48e-03 | -0.70 |
| Chi Square value | 129.01*** | | | 99.37*** | | |
| Log likelihood Function | -22.1115 | | | -23.1076 | | |
| Pseudo R2 | 0.7447 | | | 0.6826 | | |

Source: Field survey, 2021

Education of females had negative relationship with poverty, it was statistically significant at 5%. This implies an inverse relationship between education and poverty of female household heads. This could be due to low enrolment of females in school in the study area, as shown in Table 4.1 school enrolment of females was low at higher levels.

Digitalization creates more jobs even in rural areas, ability to read and write in addition to digital literacy would give them opportunities to exploring other means of livelihood. Education of male had no significant influence on the poverty of male headed households.

Household size of the male household heads was significant and negative, indicating an inverse relationship with poverty. Also, household size had a negative relationship with the poverty of the female headed households. It was statistically significant for both male and female household heads at 1% probability level. This implies an inverse relationship with poverty. Higher household size means a higher dependency, this leads to higher household expenditure, an increasing household size with a static or even decreasing income may plunge the household into poverty.

Extension for the female household heads had a positive relationship with poverty. It is statistically significant at 1%, this implies a direct relationship between extension and poverty of female headed households. This could be due to effective extension services enjoyed by the females. Results on table 4.1 shows the females had more access to extension services. The busy nature of male household heads means lesser possibility for extension visits. Extension knowledge is beneficial to the farmers through educating the farmers on good agronomic practices and new innovation in agriculture such as improved varieties, these leads to increase in output and a possible increase in income.

Access to credit had positive relationship with the poverty of male and female headed households, it was significant at 5% and 10% respectively, credit which could be in the form money or input leads to increase production scale resulting in higher output. Increase in output for the farmers means a decline in the food expenditure of households and higher

income. Therefore increase in access to credit would increase the likelihood of not being poor in the study area.

Farming as primary occupation for the male headed household had a positive relationship with poverty and significant at 5% this implies a direct relationship in Agricultural occupation would increase the likelihood of not being poor. Farming occupation was not significant for the female household heads.

Household income had a positive relationship with the poverty of the male and female headed households and significant at 1% and 5% probability level respectively, This implies a direct relationship between the household income and poverty. An increase in income while expenditure remains static or decreases could result in a high likelihood of not being poor.

Household expenditure of female household heads was negative and is statistically significant at 5% probability level. This implies inverse relationship between household expenditure and poverty of female headed households, an increased household consumption with little or no increase in income lead to higher likelihood of falling below the poverty line. In rural areas, females have limited options of livelihood diversification as most of the economic activities available to them are low income generating when compared to the males. The responsibilities of house activities and providing for the household are another limitation to livelihood diversification for the female household heads. This result is in agreement with the findings of Robin *et al.* (2020) and Buba *et al.* (2018)**.**

### 4.5.1 Oaxaca-Blinder (OB) threefold decomposition of the gender differences in poverty

The male and female rice households in the research area were analysed using the Oaxaca-Blinder decomposition approach to determine the causes of the gender gap in poverty. Estimate of gender-based poverty drivers among rice farming households based on the logistic regression analysis were presented in the preceding section. However, in order to offer strategies and interventions that will probably or even close the gap, it is necessary to understand the reasons for this difference.

Table 4.7 provides the result of the threefold Oaxaca-Blinder decomposition of the gender differential in poverty among the rice farming households, it summarizes main findings by grouping covariates (see Table 4.7) the first panel of the decomposition presented in table 4.7 reveals the mean gender estimates for poverty levels by groupings and their variations. It reveals a poverty differential gap of 0.2548, the poverty prediction level by groups and differential gap was significant at 1% level of probability. This finding is in line with findings of Mukasa and Salami (2015) and Morgrado and Salvucci (2016).

**Table 4.7: Oaxaca-Blinder three fold decomposition of gender differentials in poverty among rice farming households**

| 1 | Gender differentials | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Category** | **Coefficient** | **Std. error** | **Z-value** | | | | | | |
| Male | 0.7076 | 0.0406 | 17.40*** | | | | | | |
| Female | 0.4258 | 0.0500 | 9.05*** | | | | | | |
| Difference | 0.2548 | 0.0645 | 3.95*** | | | | | | |
| **2** | | | | **Aggregate decomposition** | | | | | |
| | **Endowment effect(E)** | | | **Coefficient effect(C)** | | | **Interaction effect(EC)** | | |
| | **Coefficient** | **Std. error** | **Z-value** | **Coefficient** | **Std.error** | **Z-value** | **Coefficient** | **Std.error** | **Z-value** |
| | -0.1633 | 0.0553 | -2.95*** | -0.1402 | 0.0661 | -2.12** | 0.0486 | 0.0582 | 0.84 |
| % share of the differentials gap | 64.06% | | | 55.00% | | | -19.05% | | |
| **3** | | | | **Detailed decomposition** | | | | | |
| **Variables** | **Coefficient** | **Std. error** | **Z-value** | **Coefficient** | **Std. error** | **Z-value** | **Coefficient** | **Std. error** | **Z-value** |
| Age | -0.0062 | 0.0155 | 0.40 | -0.1365 | 0.3107 | -0.44 | -0.0141 | 0.0323 | -0.43 |
| Marital status | -0.0024 | 0.0060 | 0.40 | -0.1022 | 0.0955 | -1.07 | 0.0105 | 0.1184 | 0.89 |
| Farm Size | -0.0055 | 0.0102 | 0.54 | -0.0244 | 0.1316 | -0.19 | 0.0036 | 0.0195 | -0.19 |
| Farming experience | 0.0095 | 0.0106 | 0.90 | -0.0547 | 0.1503 | -0.36 | -0.0045 | 0.0130 | -0.35 |
| Education | 0.0027 | 0.0055 | 0.50 | 0.0404 | 0.10667 | 0.38 | 0.0012 | 0.0039 | 0.31 |
| Household Size | 0.0269 | 0.0217 | 1.24 | 0.1944 | 0.1425 | 1.36 | 0.0132 | 0.0141 | 0.93 |
| Cooperative Membership | 0.0021 | 0.0062 | 0.34 | 0.0228 | 0.0748 | 0.31 | 0.0007 | 0.0028 | 0.23 |
| Extension | 0.0020 | 0.0091 | 0.22 | 0.0359 | 0.0501 | -0.72 | -0.0009 | 0.0044 | 0.21 |
| Access to credit | 0.0158 | 0.0191 | 0.83 | 0.0515 | 0.0646 | 0.80 | -0.0043 | 0.0075 | -0.58 |
| Occupation | 0.0121 | 0.0080 | 1.51 | 0.2735 | 0.1805 | -1.52 | -0.0266 | 0.0206 | -1.29 |
| Land ownership | 0.0021 | 0.0084 | 0.25 | 0.0054 | 0.0645 | 0.08 | -0.0013 | 0.0156 | -0.08 |
| Household income | 0.0876 | 0.0305 | 2.87*** | 0.1103 | 0.1621 | 0.68 | -0.0175 | 0.0263 | -0.67 |
| Household expenditure | 0.0057 | 0.0065 | 0.89 | 0.0305 | 0.0485 | 0.63 | 0.0041 | 0.0076 | 0.54 |
| Remittance | 0.0150 | 0.0109 | 1.38 | 0.0231 | 0.0678 | 0.34 | -0.0144 | 0.0425 | -0.34 |
| Constant | | | | 0.2889 | 0.4145 | 0.70 | | | |

Source: Field survey, 2021

The decomposition result's second panel is divided into three parts. The endowment effect, which represents the first component indicates the rise in poverty of the rice farming households if the male and female household heads had the same endowment. The second part is the coefficient effect which quantifies changes in the female poverty when applying the male coefficients to current level of female characteristics. The third component is the interaction term, which calculates the joint impact of variations in endowments and household head coefficients. According to the decomposition analysis, there are gender disparities of -0.1632551(64.06%) due to endowment, -0.1401766(55.00%) due to coefficients and 0.0485697(-19.05%) due to interaction of endowment and coefficient effect. Accordingly, the part due to endowment effect was positive and significant at 1% probability level. Also, the part due to coefficient effect was positive and significant at 5% probability level. Consequently, the coefficient for interaction was positive but not significant. This implies that the major cause of differential in poverty is caused by endowment effect, it also implies the male farmers have more endowment benefit and have more structural advantage (coefficient effect) in comparison to the female farmers.

In the study as shown in Table 4.7, In panel 3, a detailed breakdown of the endowment effect, structural effect, and interaction effect is presented. The endowment effect is mostly explained by differences in household size which was positive and significant at 1%. This suggests that the size of the household tends to have a greater impact on households headed by men.

None of the variables had a coefficient effect (structural) that was significant. However, the majority of the variables' magnitudes had a positive sign. Household size, Education, cooperative membership, access to credit, land ownership, household income, household

expenditure and remittance were all positive but not significant. Also, the constant was positive but not significant. This suggests that, compared to their female counterparts, male farmers gain more from the return to observable characteristics.

Furthermore, none of the variables had any significance in the interaction impact. However, the majority of the variables' magnitudes had a negative sign. Hence, for poverty to be reduced, policy creation and interventions should be focused on integration, granting women access to resources and opportunities for engagement of women in policy formulation execution, as well as effective monitoring of programmes aimed for their welfare. This is consistent with findings of Aguilar *et al*. (2014 ) Mukasa and Salami (2015) and Lubrano (2016).

### 4.6 Constraints Faced by the Farmers in Rice Production

The result in Table 4.8 showed the constraint faced in rice production by the male household heads. Problem of storage was the most severe constraint followed by insecurity, and poor extension knowledge. This implies a high need for storage facilities by the rice farmers, high insecurity disrupts farming activities and affects productivity. When farmers are educated on new innovations and technology they are able to improve their productivity. The least constraints faced were inadequate access to processing facilities, low fertilizer use and inadequate access to improved varieties. This implies availability of availability of capital input and infrastructure needed for production.

**Table 4.8: Constraints Faced by the Farmers in Rice Production**

| Constraints | Male Weighted sum | Male Weighted mean | Remark | Rank | Female Weighted sum | Female Weighted mean | Remark | Rank |
|---|---|---|---|---|---|---|---|---|
| Poor knowledge of extension services | 287 | 2.21 | S | 3rd | 200 | 1.89 | NS | 7th |
| Low fertilizer usage | 243 | 1.87 | NS | 9th | 199 | 1.88 | NS | 8th |
| Inadequate access to agricultural credit | 284 | 2.18 | S | 4th | 211 | 1.99 | NS | 5th |
| Poor road network | 260 | 2.00 | S | 6th | 231 | 2.18 | S | 2nd |
| Problem of pests and diseases | 248 | 1.91 | NS | 7th | 209 | 1.97 | NS | 6th |
| Inadequate access to improved varieties | 247 | 1.90 | NS | 8th | 185 | 1.75 | NS | 9th |
| Inadequate irrigation facilities | 277 | 2.13 | S | 5th | 214 | 2.02 | S | 4th |
| Problem of insecurity | 290 | 2.23 | S | 2nd | 220 | 2.08 | S | 3rd |
| Inadequate access to processing facilities | 227 | 1.75 | NS | 10th | 161 | 1.52 | NS | 10th |
| Problem of storage facilities | 333 | 2.56 | S | 1st | 284 | 2.68 | S | 1st |

Source: Field survey 2021, NS= not severe, S=severe

The result in Table 4.8 showed the constraint faced in rice production by the male household heads. Problem of storage was the most severe constraint followed by insecurity, and poor extension knowledge. This implies a high need for storage facilities by the rice farmers, high insecurity disrupts farming activities and affects productivity. When farmers are educated on new innovations and technology they are able to improve their productivity. The least constraints faced were inadequate access to processing facilities, low fertilizer use and inadequate access to improved varieties. This implies availability of availability of capital input and infrastructure needed for production.

Similarly, the constraints faced by female household heads are shown in Table 4.8 problem of storage facility was the most severe constraint faced, next was poor road network and insecurity. The least constraints faced are low fertilizer use, Inadequate access to improved varieties and Inadequate access to processing facilities. This implies the female household heads are faced with constraint of infrastructure and insecurity and have the capital input needed for production. This result is in agreement with the findings of Quddus and Kropp (2020) stating that infrastructure and production facilities are the most severe constraints farmers face.

## 4.7 Test of Hypotheses

### 4.7.1 Hypothesis I

The null hypothesis I ($H_{01}$) stating that there is no significant difference between the productivity of male and female differential in the study area was tested using Z-test statistics. The result is presented in Table 4.9

**Table 4.9: Z-test estimate for null hypothesis I**

| | Mean | Standard deviation | t-value | Decision |
|---|---|---|---|---|
| Productivity of male | 3.537998 | 1.775167 | 2.2990** | Accept |
| Productivity of female | 3.051502 | 1.326968 | | |
| Mean difference | 0.486496 | 2.178708 | | |

Source: Field survey, 2021

The result of the Z-test shows a t-statistics value of 2.2990 significant at 5% level of probability. This implies that there was a significant difference in the mean productivity of the male and female gender in the study area. Thus the null hypothesis is therefore rejected and therefore the alternate hypothesis accepted

### 4.7.2 Hypothesis II

The null hypothesis II ($H_{02}$) stating there is no significant difference between the poverty of male and female differential in the study area was tested using Z-test. The result of the Z-test is presented in Table 4.10

**Table 4.10: Z-test estimate for null hypothesis II**

| | Mean | Standard deviation | t-value | Decision |
|---|---|---|---|---|
| Poverty of male | 0.6132075 | 0.4893291 | 0.8004 | Reject |
| Poverty of female | 0.5566038 | 0.4991457 | | |
| Mean difference | 0.0566038 | 0.7280789 | | |

Source: Field survey, 2021

The result shows a t-statistics value of 0.8004 not statistically significant. This implies that there was no significant difference in the mean poverty of the male and female gender in the study area. Thus the study fails to reject the null hypothesis.

# CHAPTER FIVE

# 5.0 CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusion

This study examined the gender differentials in Productivity and Poverty status of rice farming households in Niger State, Nigeria. Findings of the study results showed majority of the farmers are in their youthful age, marriage was high among household heads, male farmers had higher education attainment with secondary education being the highest education for the females. In addition, there was a difference in productivity, with male headed households being more productive. Furthermore, the study revealed a higher poverty incidence among female headed in gender differentials. farm size, labour, education, household size, use of improved seed, credit and capital depreciation were significant determinants of productivity for the households. The coefficient effect most accounted for the gender gap in production. and favoured male headed households, education, household size, extension, credit, occupation, access to credit and income were significant determinants of poverty. Similarly, gender poverty differential revealed endowment effect accounted for a major cause of poverty differential revealed which was in favoured male headed households.

The Oaxaca-Blinder mean decomposition revealed the productivity differentials was mostly explained by the coefficient effect. However, endowment effect was a major source of gender differential in poverty of the households. Insecurity, inadequate access to storage facilities inadequate irrigation facilities, and poor road network were severe constraints faced by both male and female household heads, while poor knowledge of extension was constraint faced by the male household heads only, There is no significant difference in

productivity of male and female farmers while for poverty status there was no significant difference in poverty of the male female headed households.

### 5.2 Recommendations

Based on the findings of this study, policy measure aimed at eliminating differentials in productivity and poverty along the gender line among rice farming households in study area were made as follows:

1. Government should enforce a gender sensitive approach in ensuring equal access to production inputs such as land, fertilizer, use of modern farm tools and machines as this would increase the productivity of the female household heads as most times women are marginalized in the use of farm inputs.
2. An increased labour force participation of women in rice farming would lead to higher productivity. This can be achieved through special programs such as Women in Agriculture (WIA) which would be targeted at improving the working condition of women farmers and increasing productivity.
3. Government and non-governmental institutions should make cooperative societies or farm associations target of economic empowerment in the form of credit facilities, sale of farm input at subsidized rate, thereby increasing their output, which would result in higher income and reduce poverty incidence among the rice farming households.

4. It is important to eliminate institutional and social rules that restrict women's rights, deny them the ability to own land, prevent them from receiving a formal education, or set a minimum standard for education. This can be achieved when government enforce policies

targeted at eliminating hidden bias and discriminatory gender roles, norms, laws and beliefs.

5. Government should intensify efforts at curtailing issues affecting security such as kidnapping, banditry, farmer-herders conflict and land grabbing as this would reduce the fear of the farmers from going to the farm, leading to enhanced productivity.

6. Government should step up efforts to address security-related problems like kidnapping, banditry, farmer-herder conflict, and land grabbing because doing so would make farmers less afraid to work on their farms and increase output.

7. The appropriate stakeholders should work to provide the farmers with infrastructure like storage facilities, good roads, processing facilities, power supply, and water since the productivity of farmers is impacted by infrastructure.

8. Since farmers with large family size are more likely to be in poverty due to significant financial obligations and duties, government and traditional institutions should make efforts aimed increasing family planning awareness in order to lower the size of the farming households.

### 5.3 Contribution to knowledge

Although there have been studies on gender differentials in productivity and poverty (Ojo, 2015; Ajewole *et al.*, 2016), there was a knowledge gap on how much socio-economic and institutional factors contribute to gender differences in poverty and productivity. This knowledge gap was bridged in ways listed as follows:

1. Decomposition of the differential into three groups namely endowment effect, coefficient effect and interaction effect. through the use of Oaxaca-Blinder decomposition technique.
2. Endowment effect accounts for the part of the differential due to differences in observable characteristics of endowments,
3. Coefficient effect determine whether the differences are statistically significant, it demonstrates the portion due to different coefficients,
4. The interaction effect which account for the interaction between observable endowments characteristics and coefficient effect.

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## APPENDIX

## FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

## SCHOOL OF AGRICULTURE AND AGRICULTURAL TECHNONOLOGY

## DEPARTMENT OF AGRICULTURAL ECONOMICS AND FARM MANAGEMENT

**QUESTIONNIARE ON GENDER DIFFERENTIALS OF PRODUCTIVITY AND POVERTY STATUS OF RICE FARMING HOUSEHOLDS IN NIGER STATE NIGERIA.**

**DATE OF INTERVIEW…… QUESTIONNIARE No ……**
**LGA…...…… COMMUNITY……. ENUMERATOR PHONE NO……**

Dear Respondent,

I am a post graduate student in the above department and Institution undertaking a research study on the Gender Differentials of productivity and poverty status of Rice Farming Households in Niger State Nigeria.

Kindly Assist in completing this questionnaire as the information as the information you provide will be used strictly for research purpose and shall be treated with confidentiality.

**LAWAL, Ahmed Tijani**

**M.TECH/SAAT/2018/8302**

**Section A: Socio-Economic Characteristics of the respondents**

1. Name of Respondents……..
2. Gender : Male ( ) Female( )
3. Age ……years
4. Religion: Christianity ( ) Islam ( ) Traditional ( )
5. Educational Qualification of Respondents
   Primary Education ( )
   Secondary Education ( )
   Tertiary Education ( )
   No Formal Education ( )

6. Marital Status: Single ( ) Married ( ) Divorced ( ) widow/widower ( )

7. Household Size 1-5( ) 6-10 ( ) 11 above ( )

8. For how long have you been farming rice?.....years

9. Primary occupation : farming ( ) civil servant ( ) Artisan ( ) Trading ( ) Others……..

10. Secondary Occupation : farming ( ) civil servant ( ) Artisan ( ) Trading ( ) Others……..

11. Income Generated from secondary occupation……NGN per month
12. Do you belong to cooperative society? Yes ( ) No( )
13. Do you have Access to credit Yes ( ) No( )
14. Source of credits.
    Cooperative ( ) Commercial Bank( ) Friends and family ( ) others……
15. If yes how much did you collect…….
16. What are your sources of farm Finance?
    Self ( ) Friends and Family ( ) cooperatives( ) Bank Loan( ) Government sponsored Loan( )
17. Do you have Access to extension agents? Yes ( ) No( )
18. If yes, how often?
    Weekly ( ) Forthnightly ( ) monthly ( ) quarterly ( ) bi annualy( ) yearly( )
19. Distance to market ……Km

**Input Used In Rice Production by the Respondent**

| | Qty (Kg/ litres) | Amount(NGN) |
|---|---|---|
| Fertilizer | | |
| Organic Fertilizer | | |
| Seed | | |
| Herbicide | | |

20. Do you have Access to improved Rice Variety seeds ? Yes ( ) No( )
21. Land Size used in cultivation……..(ha)
22. What is your ownership system ?
    Inheritance( ) rented( ) Communal Land( )
23. If rented how much do you pay for rent ?.....naira
24. What is your source of Farm labour?

Multiple response allowed

I. Hired labour ( )
II. Family labour ( )
III. Communal labour ( )

25. Amount paid for labour

Amount paid for daily labour…….. Naira

| Operation | No of child | No of men | No of Women | No of Days | TOTAL |
|---|---|---|---|---|---|
| Land Preparation | | | | | |
| Planting | | | | | |
| Weeding | | | | | |
| Harvesting | | | | | |
| Threshing | | | | | |
| Winnowing | | | | | |

26. Farm Assets

| S/N | ASSET | Quantity | Amount per unit | Total amount of acquisition |
|---|---|---|---|---|
| 1 | Cutlass | | | |
| 2 | Hoe | | | |
| 3 | Tractor | | | |
| 4 | Plough | | | |
| 5 | Sickle | | | |
| 6 | Harrow | | | |
| 7 | Tresher | | | |
| 8 | Sprayer | | | |
| 9 | Water pumping machine | | | |
| 10 | Others……. | | | |

**Farm output of the respondents**

27. Quantity of rice harvested…….(bags) Amount…….(NGN)
28. unit price per bag……..

**INFORMATION OF POVERTY LEVEL**

29. Number of Dependents……
30. Do you engage in any other occupation apart from farming? Yes ( ) No ( )
31. How much do you realize from the occupation Monthly
    ……NGN
32. What type of residence do you live in ?
    Rented= 1 permanent= 2
33. If rented, how much do pay per annum?.....
34. Are you a beneficiary of Government support program or NGO. Yes( ) No( )
35. Amount benefited from the support……..
36. Do you receive money relative in the city or abroad? If yes how much……
37. Amount spent on food

| **Food type** | **Amount spent daily** |
|---|---|
| Cereals | |
| Legumes | |
| Root and tuber | |
| vegetables | |
| Fruits | |
| Others | |
| **Total** | |

38. How much do you spend on the Following?

| **S/N** | **Good and Services** | **Amount (Weekly)** |
|---|---|---|
| 1 | Water | |
| 2 | Health care | |
| 3 | Electricity | |
| 4 | Transportation | |

| | | |
|---|---|---|
| 5 | Education | |
| 6 | Communication | |
| 7 | House Rent | |
| 8 | Clothing | |
| 9 | Kerosene/firewood | |
| 10 | Others | |
| | **TOTAL** | |

**39. Income from non-farm Activities**

| **S/N** | **Economic Activities** | **Amount realized daily** |
|---|---|---|
| 1 | Brick layer | |
| 2 | Carpentry | |
| 3 | Black smith | |
| 4 | Hair dressing | |
| 5 | Food Selling | |
| 6 | Milling | |
| 7 | Provision sales | |
| 8 | Pottery | |
| 9 | Transportation | |
| 10 | Others…….. | |
| 11 | **Total** | |

**40. Constraints faced in rice production**

| **S/N** | **CONSTRAINTS** | **NOT SEVERE** | **SEVERE** | **VERY SEVERE** |
|---|---|---|---|---|
| **1** | poor extension knowledge | | | |
| **2** | Low fertilizer use | | | |

| | | | | |
|---|---|---|---|---|
| **3** | Low Access to agricultural credit | | | |
| **4** | Poor Road Network | | | |
| **5** | Pest and Diseases | | | |
| **6** | Poor access to improved Varieties | | | |
| **7** | Inadequate Irrigation facilities | | | |
| **8** | Insecurity | | | |
| **9** | Lack of Access to processing machines | | | |
| **10** | Others……. | | | |