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CENTRE FOR SUSTAINABLE  
DEVELOPMENT (CESDEV) MASTERS IN DEVELOPMENT  
PRACTICE (MDP)

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VALUE CHAIN DEVELOPEMNT PROGRAMME  
NIGER STATE

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## **ACRONYMS**

ADPs - Agricultural development programmes

CESDEV- Centre for Sustainable Development

FAO- Food and Agricultural Organization

FCT – Federal Capital Territory

FGD- Focus Group Discussion

FGN- Federal Government of Nigeria

FMARD - Federal Ministry of Agriculture and Rural Development

FMARD- Federal Ministry of Agriculture and Rural Development

GDP – Gross Domestic Product

GPS – Global Positioning System

IFAD- International Fund for Agricultural Development

KI- Key Informant Interview

LGAs- Local Government Areas

MDGs- Millennium Development Goals

NCRI – National Cereals Research Institute

ODK – Open Data Kit

PPS – Probability Proportional to Size

SDGs – Sustainable Development Goals

SSA - Sub Saharan Africa

UNs- United Nations

USAID – United States Agency for International Development

USDA FAS- United States Department of Agricultural and Foreign Agricultural Services

VCDP- Value Chain Development Programme

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## **EXECUTIVE SMMARY**

This study assessed the impact of the adoption of innovative rice processing techniques of International Fund for Agricultural Development (IFAD) Value Chain Development Programme on profitability and empowerment. The main objective of this study is to assess how poor rural people overcome poverty and achieve food security through remunerative modern and improved rice processing technique, ensure sustainable and resilient livelihoods and women empowerment.

The study analyzed the socio-economic characteristics of the adopters of the modern rice processing technique, determine their net returns, empowerment, and the identified the constraints faced by these rural poor households. A random sampling method was used to select 427 respondents from five participating local government areas in Niger State, Nigeria. Descriptive statistics, Poisson regression, ordinal ranking and women empowerment index were the tools of analysis. The study showed that education, access to credit and link to market access had the highest relative contribution to the disempowerment index, 70% of the respondents do not have autonomy in decision and income. The study showed that the average age of the processors is 37 years and about 54% of the respondents have informal education hence affects market access. About 70% of the respondents do not take decisions on production activities. The study reveals that education, autonomy of production, access to credit, and market linkage enhanced women empowerment in Niger State. Therefore, efforts should be made to prioritize these indicators and link the processors to the market for profitability.

# **1 CHAPTER ONE**

## **1.1 INTRODUCTION**

### **1.2 BACKGROUND OF THE STUDY**

With the continuous growth in population dynamics of Nigeria, Agriculture plays a key role in rural transformation and improvement in their wellbeing because is a focal source of employment and a catalyst in the GDP and wealth creation process in many African countries including (Ayevbuomwan et al 2016). In the Nigerian Agricultural environment, rice (*Oryza sativa*) has become an increasingly important commodity for majority of Nigerians and it constitutes about 20% of total food expenditure (Braun 2006). Because it is a rich and cheap source of carbohydrate to both human and animals, the demand for rice has increased over the last 4 decades and 80 percent of Nigerians consume it and has become not only a diet but a major source of calories for the urban poor (Alufohai and Ojogho 2009). Rice serves as a major staple crop that cushions the effect of under-nutrition and severe hunger in Nigeria and many other developing countries of the world (Nwalieji, et. al., 2014; National Cereal Research Institute (NCRI) 2004). Domestic rice which is normally poorly-milled and non-polished have great color variation and might contain different varieties in the same bag (USAID 2010).

Rice processing introduces new cuisine with rich taste and enables farmers with new sources of income as a means of empowerment and poverty eradication inline with the 17 goals of the Sustainable Development Goals (SDGs). With the increased availability of rice, it has become part of the everyday diet in many Nigerian homes. The World Bank projected that from 2010, the poorest income class of urban households in Nigeria may obtain not less than 33 percent of their cereal-based calories from rice annually (United States Department of Agriculture and Foreign Agricultural Service (USDA FAS 2003). If Nigeria is to become self-sufficient in rice processing, productivity and efficiency must be enhanced. This implies that resources allocated to rice processing must be efficiently utilized.

The demand for local rice is increasing by day as people are becoming more enlightened and informed about the nourishment. As a result of the growing population as well as the federal Government policy ban on rice importation, the Nigerian rice sector has witnessed a remarkable improvement both in terms of production, processing and consumption. Nigeria not only being one of the largest producer is also the leading consumer of rice in Africa and simultaneously one



of the largest rice importers in the world mostly from Thailand (Emodi 2010). As well as an important food security crop, rice is an essential cash crop for it is mainly small-scale producers who commonly sell 80 per cent of total production and consume only 20 per cent (FAO 2017). Rice generates more income for Nigerian farmers than any other cash crop in the country. A report by the Federal Ministry of Agriculture and Rural Development indicated that domestic rice consumption is below per capita need. Estimated national demand for rice in Nigeria is put 5.2 million ton per annum, where production is estimated at only 3.3 million tons and a deficit of 1.9 million for importation with the attendant drain on the Nation's foreign reserve (Onyeneke 2017).

The Nigerian rice processing sector reflects the combined effect of both the traditional and non-traditional rice processing technique which is primarily consumed in its parboiled form. It is in view of this that the International Fund for Agricultural Development (IFAD) adopted the innovative rice processing technique in Nigeria to enhance the quality and purity of the locally processed rice in six states (Abia, Anambra, Benue, Ebonyi, Niger, Ogun and Taraba) under the Rice and Cassava Value Chain Development Programme (VCDP) in order to complement the growing rice demand particularly at the rural poor and also to serve as a means of women empowerment because gender plays a key role in the agricultural sector. Although both men and women are involved in the agricultural value chain, but in Nigeria, women account for 75% of the farming population (FMARD 2013). These women are largely involved in the production, processing and marketing the agricultural produce and participate actively in harvesting, off farm activities like processing. A study by the National Bureau of Statistics in 2014 (NBS) revealed that women involvement in Agricultural activities has increased compared to men and these women mostly carry out the task of off-farm activities such as processing using traditional and rudimentary technologies (Ademilua et.al 2017).

Accordingly, in Nigeria today, despite women constituting the majority of the population are mostly used for domestic activities and are less involved in activities that would empower them. While men take most of the decision despite the fact that these women particularly in the rural areas constitute about 60 to 80 percent of the total agricultural labour force (World Bank 2016), they are ignored and are sometimes faced by challenges and constraints such as lack of access to credit, lack of autonomy in decision making as well as being forced to adopt traditional method of agricultural for processing food to eat due to lack of access.

Therefore, the adoption of innovative rice processing technique initiated by IFAD to support these women is primarily key and would go a long way; to reduce global hunger rate and poverty, to enhance the quality of locally consumed milled rice, empower women in terms of (access to finance and autonomy of production) and promote the businesses of these rural rice processors.

### **1.3 THE INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT**

The international Fund for Agricultural Development (IFAD) is which a specialized agency of the United Nations which was established as an international financial institution in 1977 as one of the major outcomes of the 1974 World Food Conference. It resolved that "an International Fund for Agricultural Development should be established immediately to finance agricultural development projects primarily for food production in developing countries." IFAD's goal is to empower poor rural women and men in developing countries to achieve higher incomes, improved food security and reduce famine were not so much failures in food production but structural problems relating to poverty and to the fact that the majority of the developing world's poor populations were concentrated in rural areas.

### **1.4 OBJECTIVES OF IFAD**

IFAD will ensure that poor rural people have better access to, and the skills and organization they need to take advantage of:

- Natural resources especially secure access to land and water; improved natural resource management and conservation practices;
- Improved agricultural technologies and effective production services
- Providing access to a broad range of financial services
- Transparent and competitive markets for agricultural inputs and produce
- Providing opportunities for rural off farm employment and enterprise development
- Enhancing local and national policy programming processes.

### **1.5 IFAD STRATEGIC FRAME WORK 2016 – 2025.**

The overall activities of IFAD are guided by its Strategic Framework on enabling inclusive and sustainable rural transformation of poor rural people to improve their food security and nutrition, raise their incomes and strengthen their resilience which articulates its

contribution on the 2030 agenda for Sustainable Development. Agenda 2030 offers clear evidence that IFAD's mandate of investing in rural people and enabling inclusive and sustainable transformation of rural areas, notably through smallholder agriculture-led growth is of absolute global relevance.

After several years of growth and reform, IFAD is now recognized for its experience, knowledge and performance in this domain; it stands ready to achieve greater impact and it is well positioned to play a larger role in helping countries fulfil their priorities relative to Agenda 2030. For it to do so, it needs to work in a way that is bigger, better and smarter.

During the period covered by this framework, IFAD's overarching development goal will be to invest in rural people to enable them to overcome poverty and achieve food security through remunerative, sustainable and resilient livelihoods. IFAD will pursue three closely interlinked and mutually reinforcing strategic objectives (SOs) to achieve its goal;

- **SO1:** Increase poor rural people's productive capacities;
- **SO2:** Increase poor rural people's benefits from market participation;
- **SO3:** Strengthen the environmental sustainability and climate resilience of poor rural people's economic activities.

:

## **1.6 IFAD IN NIGERIA**

Since 1985, IFAD has financed nine programmes and projects in Nigeria. In line with IFAD's Strategic Framework 2016-2025, IFAD's approach encourages involvement in reducing rural poverty at all levels of government; sets up and strengthens farmers' organizations; and supports empowerment of poor rural people, especially women and young people.

IFAD's current strategy, in agreement with the Nigerian government covers the period 2016-2021. The goal is a rural economy in which those IFAD help can benefit from economic growth, in line with two strategic objectives:

- developing the sustainable, climate-resilient economic and financial inclusion of young people in profitable agribusiness; and
- Strengthening institutions at state and community levels to work with private companies in key value chains.

IFAD continues to partner with the Nigerian Government in building rural institutions, establishing community-driven development initiatives, developing profitable smallholder

agri-businesses, and pursuing financial inclusion for rural poor households. It has financed programmes and projects with a total loan commitment of over US\$250 million particularly for reducing rural poverty. The country currently attracts over 40 per cent of the financial resources that IFAD allocates to Western and Central Africa and has contributed \$37.2 million dollars (about N13.4 billion) to Nigeria's Gross Domestic Product (GDP). The programmes have addressed the livelihood needs of poor rural people.

IFAD support to the Nigerian Government's poverty reduction programme in rural areas targets large numbers of smallholder farmers and is essentially people-oriented and evidence based. IFAD supports programmes and projects that work with communities, with smallholder farmers as the key players and promotes commodity-based interventions that provide technical and financial support along the value chains – such as livestock products, rice and other cereals, roots and tubers, vegetables and agroforestry products.

### **1.7 IFAD Value Chain Development Programme in Nigeria**

The IFAD Value Chain Development Programme (VCDP) is a six-year development initiative of the Federal Government of Nigeria (FGN) and International Fund for Agricultural Development (IFAD) programme which is aimed improving cassava and rice value chains in six states viz: Anambra, Benue, Ebonyi, Niger, Ogun and Taraba to address the constraints within the agricultural value chain. Enhancing productivity and providing access to market for rice and cassava smallholder farmers via Value Chain Development Programme is embedded in Nigeria Governments plan.

“The value chain approach adopted by the Federal Government of Nigeria is therefore aimed at concentrating commodity production activities around existing rice mills by organizing farmers in groups (Farmers Organizations/cooperatives) to readily access inputs such as improved seeds, agrochemicals, fertilizers and innovative methods of production from extension services. Intense efforts are being made to achieve self -sufficiency in rice production in Nigeria in which several bilateral, multilateral agencies as well as local entrepreneurs are currently supporting rice production and processing in Nigeria”.

The VCDP was initiated to reduce the gap in rice production and improve on the quality of the yield by increasing production capacity through modern and best agronomic practices in the target areas, making it competitively sustainable and to serve as a means of income increase.

For the case of Niger state, the IFAD VCDP focuses on three key aspects viz;

- Agricultural Market Development: Through Commodity Alliance Forum where all stakeholders meet on a quarterly basis to discuss issues concerned with the value chain development
- Programme Management and Coordination: through sensitizations and advocacy visits across the LGAs.
- Smallholders enhancement and Productivity:

## **1.8 Problem statement**

Increasing rice productivity and producing good yield for rice as a staple crop for increased market access, reduction in poverty and value addition is essential. Rice is an agricultural product which contains 75.5% carbohydrate and low fat (0.8%), 6.8% protein and a significant amount of vitamin E and growing demand is on the increase. In the last decade, rice has moved from being a ceremonial crop to a staple commodity in many Nigerian homes and hence the need for improved rice processing and production in Nigeria.

Nigeria has become a major consumer and importer of rice in Africa and indeed is classified among the top four Agricultural imports in the country (Omoare 2017).

Rice importation is seen as a waste of foreign exchange based on the comparative advantage of the country in rice production and which represents a significant amount of lost in earnings for the country (Oyediran 2016). As a result, it has led to the loss of revenue, unemployment, loss of manpower and food insecurity.

Therefore, in view of the above, this research necessitates the need to assess the impact of innovate rice processing technique adoption and how this innovation is used to empower women, provide link and promote access to market which serve as the basis for rolling out sustainable activities to reduce poverty and accelerate economic growth by engaging the local rice processors in Niger State for food security (FAO 2017).

## **1.9 Justification of the Study**

In Nigeria, rice processing seems yet to receive the required attention to meet the demand the country need. This seems to have led to a significant increase in rice importation. Innovative rice processing adoption can help policy actors, investors, donors and entrepreneurs to identify new ways of modern rice processing method locally. It does so by proffering a greater insight into the nexus between policy actors, market and non-market

institutions, poverty reduction, food security, women empowerment and socio-economic development.

Therefore, it is envisaged and hoped that the findings of this research will be useful to the researcher, rice processors, farmers, academia, and policy makers to identify the needs and address the gaps on improved rice processing in Nigeria. The findings in this research will also accentuate the links between the researcher, government agencies and international organizations, consumers and the farmers to bolster cooperation, integration and coordination for effective improved rice processing and production in Nigeria. The research will also be used to complement other studies conducted to instrument other appropriate policy options for improved rice processing technology in the Nigeria.

### **1.10 Objective of the Study**

The main objective of this study is to assess how poor rural people overcome poverty and achieve food security through remunerative modern and improved rice processing technique, ensure sustainable and resilient livelihoods and women empowerment.

#### **1.10.1 Specific Objectives**

- i. To describe the socio-economic characteristics of the adopters of innovative rice processing technique.
- ii. To identify the determinants of innovative rice processing techniques adoption.
- iii. To determine the level of empowerment of the adopters of the innovative rice processing technique.
- iv. To identify the factors affecting empowerment of the adopters of innovative rice processing technique within the study area.

### **1.11 Research Hypothesis**

- i. The level of women empowerment has no effect on the adopters of innovative rice processing technique in the study area
- ii. The level of women empowerment has significant relationship on decision and autonomy of production

### 1.12 Plan of the Study

The activities and timeline of the activities involves among many other activities the following:

ACTIVITIES	MARCH				APRIL				MAY			
	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4
Familiarization visit (host organization/communities)	■											
Review of baseline study, formulation of research questions & interview guide		■	■									
Engage enumerators			■									
Conduct a research tools validity (pre-test)			■	■								
Collecting data from various project locations					■	■	■					
Data entry and processing							■	■	■			
Data analysis									■	■		
Evaluating research findings											■	
Reporting result												■

## **2 CHAPTER TWO**

### **2.1 LITERATURE REVIEW**

The adoption of the new technologies such as yielding varieties led to the increase in agricultural productivity in Africa to a high economic venture (World Bank 2008). Thus, before the invention of modern agricultural equipment, several other traditional means of processing have been used for rice. These include: pounding in mortar with pestle; rubbing on the floor; beating with clubs on the floor; pounding gently with clubs in jute bags and threading under the feet of man or hooves of animals (Adejoh et al 2017). These traditional methods are deficient because lots of damages on the rice itself which leads to low productivity and labour wastes. Besides that, the traditional method is unhygienic (Mutalibi 2007).

In view of the above, it is evident that the adoption of high yield rice varieties has had a positive impact on household and improvement on their well-being and livelihood (Mendola 2007). Furthermore, studies show that the benefits obtained from adoption of innovative processing techniques will not only enhance livelihood but also empower the processors for commodity value chain services by raising their income, improve farm production of paddy, increase productivity and reduces time wastage for leisure and workload (Onyeneke 2017).

Studies carried out by other scholars on technology adoption in developing countries on factors that influenced technology adoption can be grouped into the following three broad categories (Feder et al., 1985): viz;

- factors related to the characteristics of producers
- factors related to the characteristics and relative performance of the technology
- Institutional factors.

However, Nasiru (2014) stated that the factors related to the characteristics of producers include level of educational attained, years in agricultural activity, age, gender, labour, economic status, farm size, etc. He affirmed that the factors related to the characteristics and performance of the technology include food and profitable purposes, perception of the individuals, complexity and performance of the innovation, the turn over period from the investment, the relative profitability/breakeven of its adoption compared to substitute technologies, its availability and



that of corresponding inputs, the susceptibility of the technology to environmental hazards etc. He further opined that other factors include access to credit, access to reliable information on the technologies, market access and inputs factors, the land tenure system and the availability of adequate infrastructure etc. Similarly, Matata et al. (2001) listed factors such as personnel, institution, environmental and socio- economic factors are the overarching influence on technology adoption. Adesina and Baidu-Forson (1995) opined that age was negatively related to probability of involvement in rice processing projects, whereas Asante et al. (2011) recorded a positive relationship.

Onyeneke (2017) studied the determinants of adoption of innovative technologies in rice processing in Imo State of Nigeria using two-stage random sampling techniques to select a total of 135 rice farmers from the three agricultural zones of the state. Primary data were collected with the aid of a well-structured questionnaire and interview schedule; and analyzed using both descriptive and logit regression analysis. Their regression result shows that variables that determine the adoption of rice processing technologies included gender, age, marital status, and household size. Onumadu and Osahon (2014) studied the socioeconomic determinants of adoption of improved rice technologies by farmers in Ayamelum Local Government Area in Anambra State, Nigeria using multiple regression analysis. Their result showed that age, gender, level of education, size of farm land, years of farming experience and membership of farmers' association are significant in the adoption of improved rice farming technologies.

### **3 CHAPTER THREE**

#### **3.1 METHODOLOGY**

#### **3.2 Overview of Country of Research**

Nigeria is a West Africa country which borders with the Republic du Benin to the west, Chad and Cameroon to the east, and Niger Republic to the north. Its coast lies on the Gulf of Guinea in the south and it borders Lake Chad to the northeast. Noted geographical features in Nigeria include the Adamawa highlands, Mambilla Plateau, Jos Plateau, Obudu Plateau, the Niger River, River Benue and Niger Delta.

With a population of about 180 million people, Nigeria is the largest in Africa and accounts for 47 percent of West Africa's total population (World Bank 2012). Nigeria is also the biggest oil exporter in Africa, with the continent's largest natural gas reserves. Nigeria's oil wealth has helped it maintain relatively steady economic growth despite recent global financial downturns. The country's GDP grew from 6 percent in 2008 to 8.4 percent in 2010 (World Bank 2012). Unemployment remains a significant problem, however, with an estimated 50 million youth unemployed. An estimated 70 percent of Nigerians live on less than US\$1.25 per day. Nigeria was ranked 40th out of 79 on the 2012 Global Hunger Index and 156th out of 187 on the 2011 UNDP Human Development Index. Poverty is especially widespread in rural areas, where 80 percent of the population lives below the poverty line (IFAD 2012).

#### **3.3 Study Area**

Niger State is a state in the North Central Nigeria and the largest state in the country with its capital in Minna. Other major cities are Bida, Kontagora, and Suleja. It was formed in 1976 with a total population of 5,556,200 (2016 census projected) and lies between latitude  $8^{\circ}$  to  $11^{\circ} 30'$  North and longitude  $03^{\circ}$  to  $07^{\circ} 40'$  East. The State is bordered to the North by Zamfara State, West by Kebbi State, South by Kogi State, South West by Kwara State, North-East by Kaduna State and South East by FCT. The State also has an International Boundary with the Republic of Benin along Agwara and Borgu LGAs to the North West. The state is named after the River Niger. Two of Nigeria's major hydroelectric power stations, the Kainji Dam and the Shiroro Dam, are in Niger State. There are three major ethnic groups (Nupe, Gbagyi, and Hausa) in the State, other tribal groups include Kadara, Koro, Baraba, Kakanda, Gana-Gana, Dibo, Kambari,

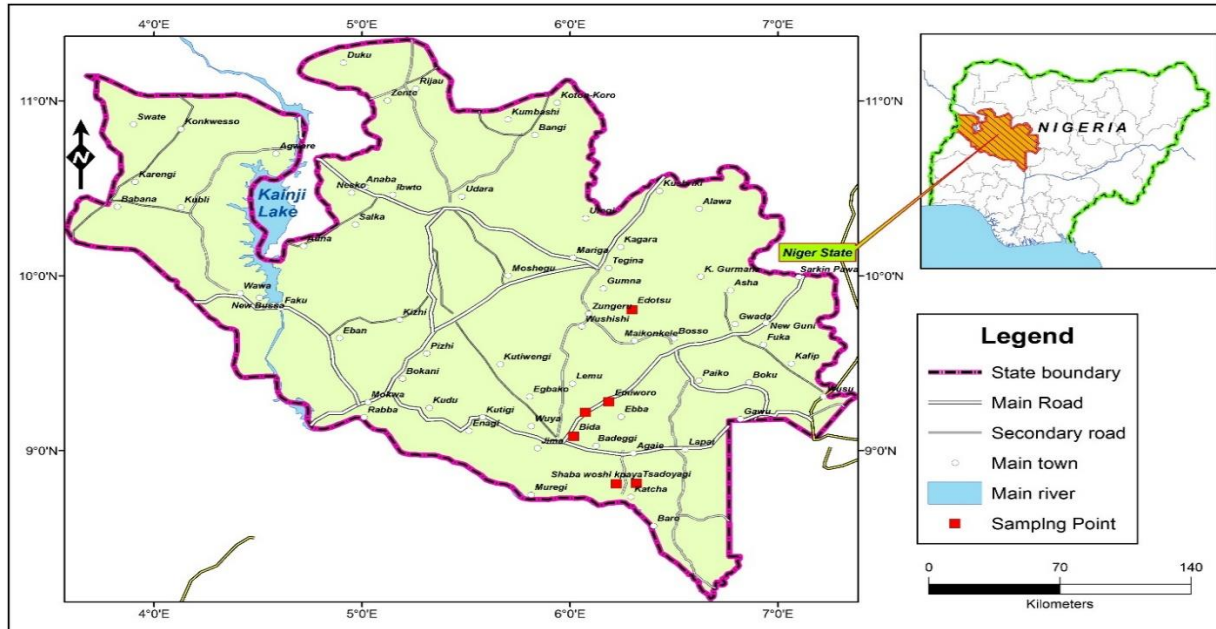
Kamuku, Pangu, Dukkawa, Gwada and Ingwai. The State also has numerous settlers from other parts of the Country.

Niger State is one of the states participating in the Value Chain Development Programme (VCDP) initiative of the FGN and IFAD programme on the improvement of Rice and cassava value chains for small holder farmers and has 2 soil types Ku soil and Ya soil. The Ku soil has little erosion hazards, while the Ya soil has better water holding capacity which is most suitable for farming activity.

Agriculture is the primary economic activity of a majority of its indigenes and its economy is based largely on subsistence crops, livestock, internal markets and export of raw commodities. Over 85 percent of the arable land in Niger State is used for agriculture as it possesses one of the largest and most fertile agricultural lands in the country, thus accounts for the nearly 90 percent of the population engaged in agriculture in the State. Due to its Agricultural potential, Niger State has the capacity to produce most of Nigeria's staple crops such as Yam, rice, cassava. It also has ample opportunities for grazing, fishing and forestry.

The timeframe for the research is three months as it is the period of internship program and it is to be conducted in 5 LGAs which are:

- i. Bida LGA
- ii. Katcha
- iii. Kontagora
- iv. Shiroro
- v. Wushishi



**Figure 1. Map of Niger State Indicating the study area.**

### 3.4 Sampling Method

A purposive sampling technique was adopted in the participating Local Government Areas from the Value Chain Development Program using the Yamane sampling method calculator by taking a precision level of 4.12% which also represents 30% of the study population. The population size of the processors was 1570 and 427 respondents were selected as indicated in figure 1 below. The respondents were randomly selected from each of the 5 LGAs based on their sampling size using probability proportional to size (PPS) sampling technique to administer the questionnaires.

Yamane method

$$n = \frac{N}{1 + Ne^2}$$

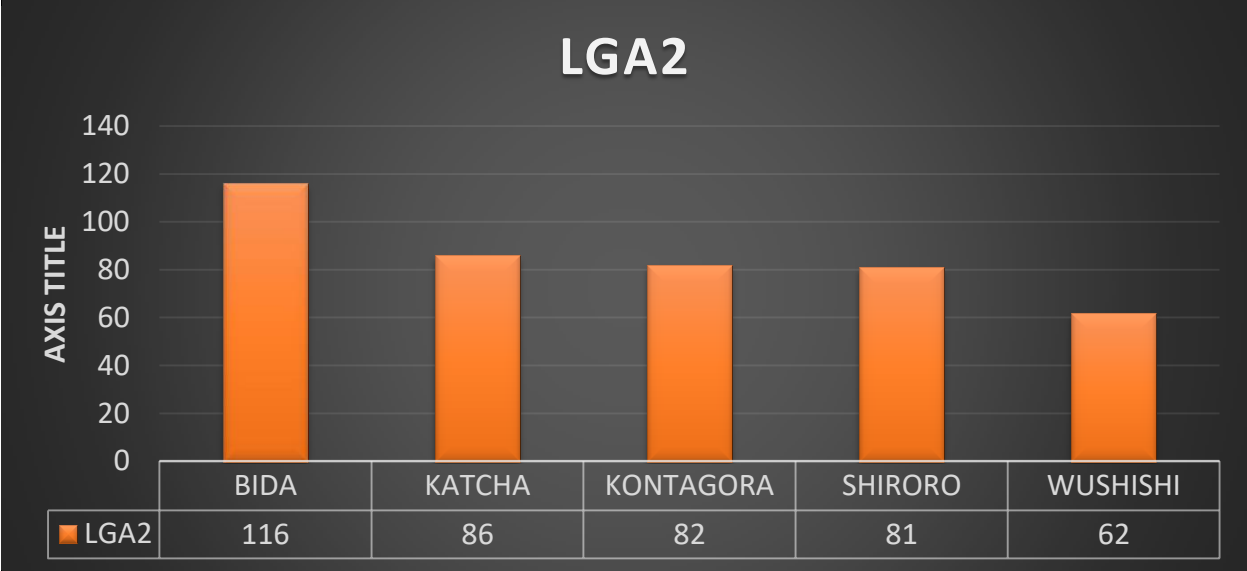
Where

$n$  = sample size

$N$  = Total population of rice processors

$e$  = error term

**Figure 2. Summary of the distribution**

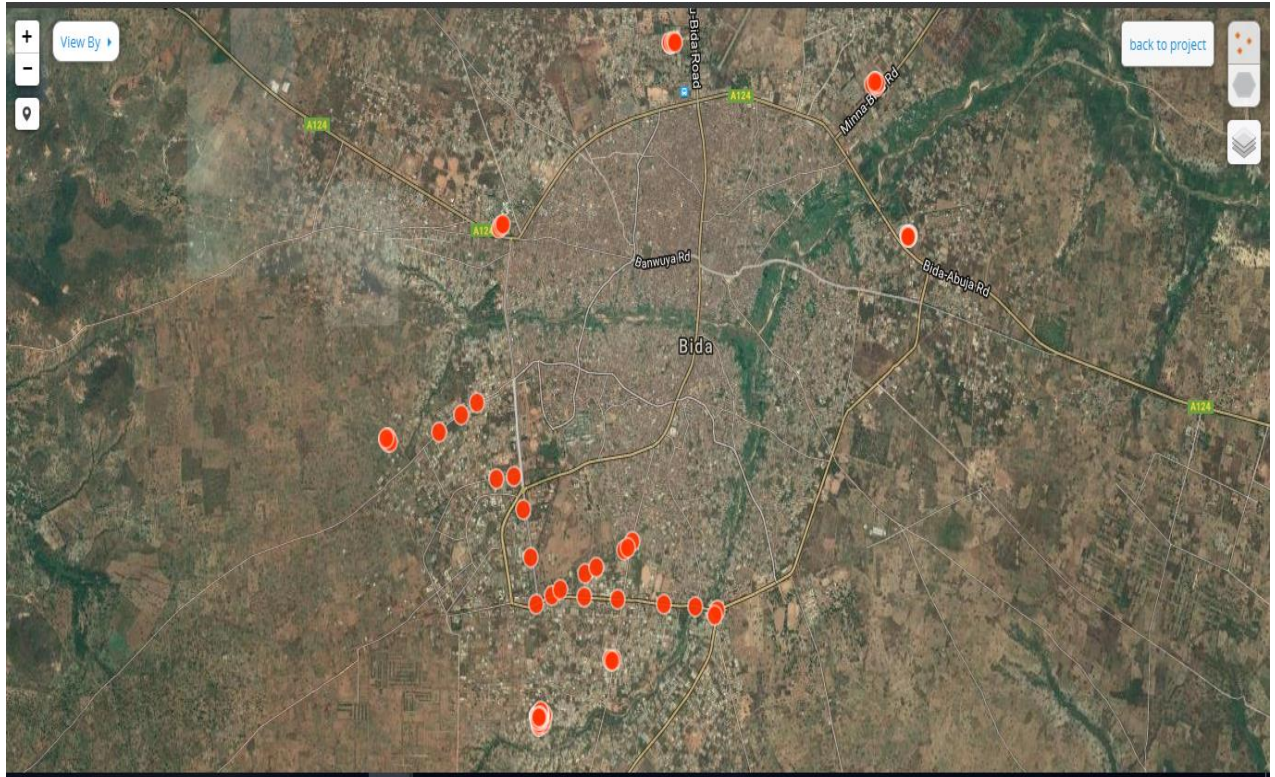


Source: Author 2018

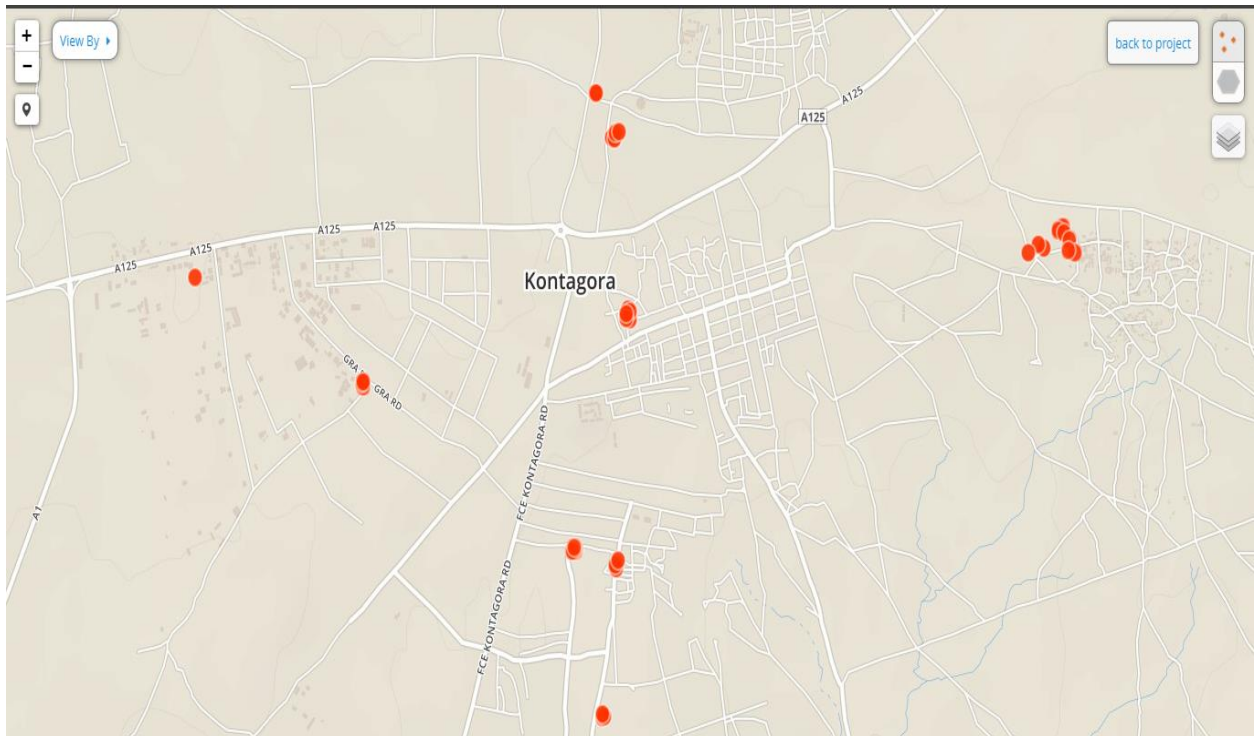
**3.5 Method of Data Collection**

The study used both primary and secondary data. Primary data was collected through android based questionnaire administered using the Open Data Kit (ODK) collect, key informant (KI) interview, focus group discussion (FGDs) as well as observations within the study area were also administered.

Secondary data was collected through the review of baseline study, journals, reports, publications on research works, newsletters, internet and books.



**Figure 3: Satellite Image showing the positions of the respondents from the GPS in Bida LGA**



**Figure 4 Locations of the respondents in Kontagora LGA**

### 3.6 Data Analysis

The analysis of both quantitative and qualitative data involved the use of Descriptive statistics (frequencies, percentages, chart and cross tabulation) for objectives 1 and 4 and Poisson regression method of analysis was used for objectives 2 and 3. The Data was also presented in illustrative tables and graphs (bar charts and pie chart) to analyze the productivity of the respondents.

### 3.7 Analytical Methods/Technique

#### Analytical Technique

Data analysis was done with descriptive statistics and inferential statistics. Descriptive statistics involved the use of means, frequency distributions and percentages while the inferential statistics involved the use of Poisson regression and t-test models. The models are specified below.

#### Poisson regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_{11} X_{11} + \mu$$

Where;

Y = Number of rice processing technologies adopted

$X_1$  = Age of respondent (years)

$X_2$  = Gender (male = 1, female = 0)

$X_3$  = Marital status (married = 1, otherwise = 0)

$X_4$  = Education (formal = 1, otherwise = 0)

$X_5$  = Household size (number)

$X_6$  = Experience in agricultural activity (years)

$X_7$  = Extension visit (number)

$X_8$  = Level of engagement in agriculture (full-time = 1, otherwise = 0)

$X_9$  = Source of training (government = 1, otherwise = 0)

$X_{10}$  = Average sale (₦)

$X_{11}$  = Installed capacity (kg)

$\alpha$  = Constant

$\beta_1 - \beta_{11}$  = Regression coefficients

$\mu$  = Error term



**T-test model:**

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where;

$\bar{X}_1$  = Mean of installed capacity

$\bar{X}_2$  = Mean of actual capacity utilised

$\sigma_1^2$  = Variance of installed capacity

$\sigma_2^2$  = Variance of actual capacity utilised

$n_1$  = Number of observation of installed capacity

$n_2$  = Number of observation of actual capacity utilised

**3.8 Expected Result**

The study would assess the involvement of poor rural women on innovative rice value chains as a means of sustainable livelihood and its implication on the prospects of future agriculture and rural development. The result would also indicate the potentials of empowerment and sustainable development in rice value chain development in the study area.



## **4 CHAPTER FOUR**

### **4.1 RESEULTS AND DISCUSSIONS**

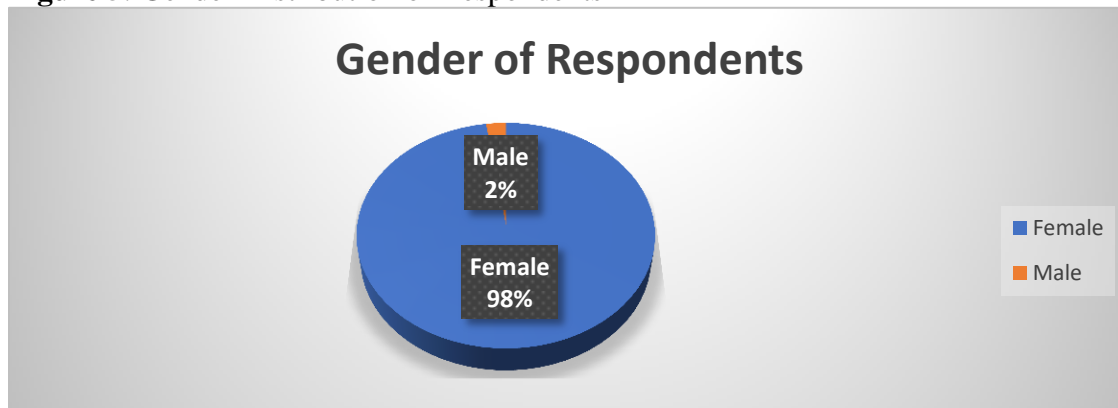
This chapter discusses the data analysis and findings from 427 respondents on the adoption of the innovative rice processing technique in 5 LGAs in Niger state based on the four outlined objectives stated above. The questionnaire was administered by 10 enumerators using an android based platform between April 22, 2018 and May 12, 2018. The data were statistically analyzed using Stata application. The findings are discussed according to the sections designed on the questionnaire. The sections are:

- socio- economic characteristics of rice processors
- Factors influencing the adopters of innovative rice processing technique within the study area
- Socio-Economic characteristics of the adopters of innovative rice processing technique
- Constraints for the adopters of innovative rice processing technique in agribusiness
- What are the determinants of innovative rice processing techniques adoption
- Constraints to the Adoption of the Processing Techniques
- Empowerment Index

### **4.2 Results based on the Socio-economic information of rice processors**

The result of the socio-economic distribution is presented in Table 1 below which indicates the information about age, marital status, level of educational, household information, years of experience and access to basic infrastructure, while the gender distribution is presented in figure 2. The information provided here is analyzed using frequency count and percentage.

**Figure 5: Gender Distribution of Respondents**



#### **4.2.1 Age**

Table 1 revealed that 31.2% of the respondents were between 36-40 years of age, while (25.3%) of respondents were between 41-50 years of age. It also showed that 17.8% of the respondents were between the ages of 21-30, while 5.4% of the respondents had above 51 years of age. The mean age of the respondents was 38.0 years this shows that they are young, active, energetic and middle-aged individuals who are known to be economically active, innovative and could easily key-in to new innovation.

#### **4.2.2 Marital Status**

Table1 also indicated that (90.9%) of respondents were married, while (4.9%) of respondents were single. Also, 3.75% were widowed while 0.47% were divorced. This result shows that majority of the respondent were married which is expected to arouse their interest in adoption of new innovation.

#### **4.2.3 Household size**

The finding in Table 1 revealed that 54.8% of the respondents had between 6-10 household sizes, while 21.8% of the respondents had household size of between 1-5 persons. Also, 17.0% of the respondents had between 11-15 persons as their household size, while 6.3% of respondents had between 15-20 members as their household size. Household size is a major determinant that fast track processors in adopting innovative technologies.

#### **4.2.4 Education**

Education is the process of acquiring knowledge, experience, skills and sound attitude through teaching and learning process. Finding in Table 1 showed that 52.7% of the respondents had non-formal education, similarly 16.4% of the respondents had secondary education. Moreover, 14.5% of the respondents had primary education while 7.03% and 1.41% of the respondents had post-secondary and adult education respectively. This shows that most of the respondents had non-formal education. The fact that most of them were not literate is disadvantageous to the adoption of any innovation meant to improve their output in the study area.

#### **4.2.5 Experience in agricultural activities**

Table 1 revealed that 39.1% of respondents had experience range of 6-10 years while 22.5% of respondents had experience range of 11-15 years. Also, 13.6% of respondents had experience range of 16-40 years, while 9.1%, 6.5%, 5.2% and 3.9% had experience ranges from 21-25 years, 26-30 years, 1-5 years and above 30 years respectively. The number of years spent in agricultural activities might serve as indication of practical knowledge acquired by the processor in agricultural production.

**Table 1: Distribution of respondents according to socio-economic characteristics**

<b>Variable</b>	<b>Frequency (n =427)</b>	<b>Percentage</b>	<b>Mean</b>
<b>Age</b>			
21 – 25	28	6.56	38.00
26 – 30	48	11.24	
31 – 35	87	20.37	
36 – 40	133	31.15	
41 – 45	63	14.75	
46 – 50	45	10.54	
51 – 55	10	2.34	
56 – 60	8	1.87	
Above 60	5	1.17	
<b>Marital status</b>			
Single	21	4.92	
Married	388	90.87	
Divorced	2	0.47	
Widowed	16	3.75	
<b>Household size</b>			
1 – 5	93	21.78	8.00
6 – 10	234	54.80	
11 – 15	73	17.10	
15 – 20	27	6.32	
<b>Educational level</b>			
Non-formal education	225	52.69	
Primary	62	14.52	
Adult	6	1.41	
Secondary	70	16.39	
Post-secondary	30	7.03	
Others	34	7.96	
<b>Experience in agricultural activity</b>			
1 – 5	22	5.15	14.00
6 – 10	167	39.11	
11 – 15	96	22.48	
16 – 20	58	13.58	
21 – 25	39	9.13	
26 – 30	28	6.56	
Above 30	17	3.98	

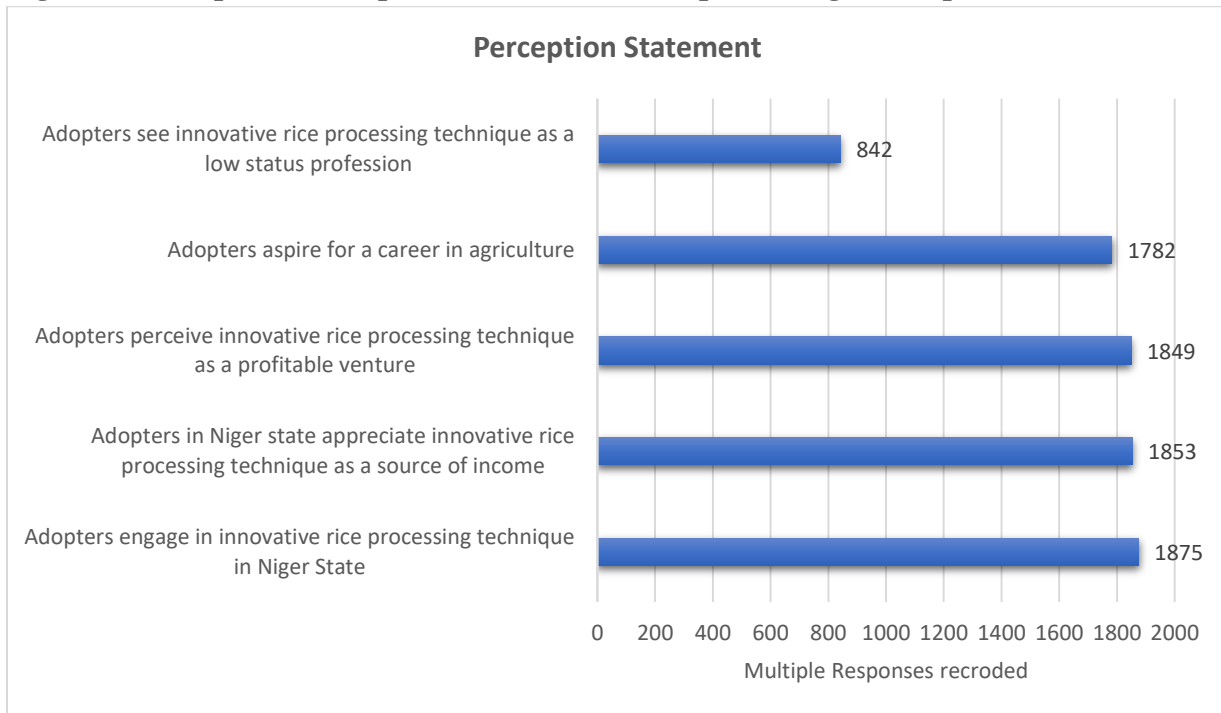
### 4.3 Results based on the determinants of innovative rice processing techniques adoption

Figure 6 represents the perception of the adopters of the innovative rice processing technique.

#### 4.3.1 Perception of adopters of innovative rice processing technique

Figure 6 revealed the perception of adopters of innovative rice processing technique in the study area. This was based on 5 point likert scale of Strongly agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly disagree (1), these will be added together that is  $5+4+3+2+1$  and be divided by 5 to get a weighted mean value of 3.0. However, any weighted mean value less than 3.0 will be regarded as disagree while  $\geq 3.0$  will be termed agree. The result from the Table revealed that 45.7% agree that Adopters engage in innovative rice processing technique in Niger State with weighted mean of ( $\bar{X} = 4.39$ ) while 47.1% agree that Adopters in Niger state appreciate innovative rice processing technique as a source of income with weighted mean of ( $\bar{X} = 4.34$ ). Also, 49.6% agree that Adopters perceive innovative rice processing technique as a profitable venture with mean value of ( $\bar{X} = 4.33$ ) while 62.1% of the respondents agree that Adopters aspire for a career in agriculture ( $\bar{X} = 4.17$ ). Lastly, 36.1% disagree that Adopters see innovative rice processing technique as a low status profession with mean value of ( $\bar{X} = 1.97$ ).

**Figure 6. Perception of adopters of innovative rice processing technique**



The Poisson regression estimates of the determinants of the adoption of rice processing technologies using Chi-squared value of 92.14\*\*\* and a constant of 1.19 t-value *the variables, the coefficient and t-value on a probability level of  $p < 0.01$ ,  $< 0.05$  and  $< 0.10$ .*

**Table 2: Poisson regression estimates of determinants of adoption of rice processing technologies**

<b>Variable</b>	<b>Coefficient</b>	<b>t-value</b>
Age of respondent	0.0023	0.86
Gender	-0.0133	-0.72
Marital status	-0.0491	-0.55
Education	0.4634	2.47**
Household size	0.0115	0.73
Experience in agricultural activity	0.0438	2.65***
Extension visit	0.0345	2.97***
Level of engagement in agriculture	0.8031	3.11***
Source of training	0.3054	1.72*
Average sale	1.19E-07	0.32
Installed capacity	6.13E-06	2.62***
Constant	0.3211	1.19
LR Chi-squared value	92.14***	
Log likelihood	-667.6596	

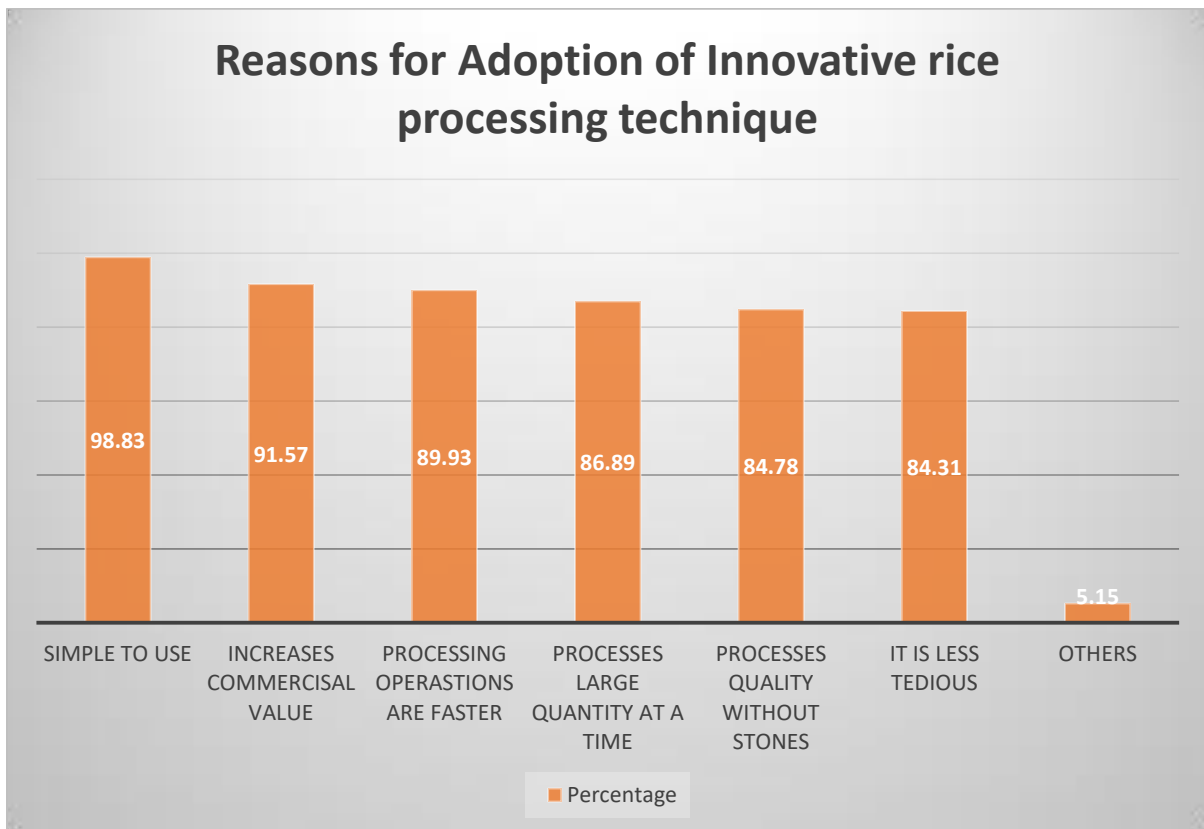
NOTE: \*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$  and \* =  $P < 0.10$  level of probability

#### **4.3.2 Reason for adoption of innovative rice processing technique**

Figure 7 indicated the reason for adoption of innovative rice processing technique in the study area. The result of the findings showed that 98.8% of the respondents revealed that simplicity was the reason for adoption of innovative rice processing technique while 91.6% showed that increment the commercial value of product was behind their adoption of rice processing technique, that is the nature of the technology is not complex to adopt. More so, 89.9% showed that faster in the processing operations was the reason for adoption of innovative rice processing technique while 84.9% agree that the ability to process large quantity at a time was the reason for adoptin of innovative processing

technique. Also, 84.8% revealed that processes quality products without stones was reason for adoption of innovative rice processing technique while 84.3% revealed that less tedious was the reason for adoption of innovative rice processing technique. Lastly, 5.2% revealed that there are other reasons for adoption of innovative rice processing technique.

**Figure 7: Reason for adoption of innovative rice processing technique**



NOTE: \* = Multiple responses recorded

#### **4.3.3 Percieved impact attained in adopting innovative rice processing technique**

The result in Table 3 showed the percieved impact in adopting innovative rice processing in the study area. This was based on 5 point likert scale of Very high (5), High (4), Average (3), Low (2), and Very low (1), these was summed together that is 5+4+3+2+1 and was divided by 5 to get a weighted mean value of 3.0. However, any weighted mean value less that 3.0 will be termed as low impact while  $\geq 3.0$  will be regarded as high impact The result in the Table showed that 62.8% of the respondents have high perception that adopting innovative rice processing technique will increase

the quality of rice with weighted mean of ( $\bar{X} = 4.30$ ), while 63.5% of the respondents have high perception that adopting innovative rice processing technique will increase capacity building in the study area with mean value of ( $\bar{X} = 4.14$ ). Also, 82.7% of the respondents have high perception that adopting innovative rice processing technique will increase the quantity of rice in the study area with weighted mean of ( $\bar{X} = 4.05$ ). While 58.9% of the respondents have high perception that adopting innovative rice processing technique will standardized production (quality control) with weighted mean of ( $\bar{X} = 3.88$ ).

More so, 76.1% of the respondents in the study area have high perception that adopting innovative rice processing technique will provide access to innovative platforms with weighted mean of ( $\bar{X} = 3.84$ ) while 53.4% of the respondents have high perception that adopting innovative rice processing technique will increase their access to market information with weighted mean of ( $\bar{X} = 3.84$ ). Moreover, 61.1% of the respondents have high perception that adopting innovative rice processing technique will increase their asset ownership with weighted mean of ( $\bar{X} = 3.82$ ). Also, 70.9% of the respondents have high perception that adopting innovative rice processing technique will increase their household income with weighted mean of ( $\bar{X} = 3.81$ ) while 61.4% have high perception that adopting innovative rice processing technique will increase trade promotions with weighted mean of ( $\bar{X} = 3.68$ ). Lastly 47.5% of the respondents have high perception that adopting innovative rice processing technique will increase the quality of rice with weighted mean of ( $\bar{X} = 3.62$ ). It can be concluded from the result that all the respondents have high impact on adoption of rice processing technique in the study area, this was due to the fact that their weighted mean was equal or greater the weighted mean value.

Table 3 represents the respondents' perceived impact attained in adopting the innovative rice processing technique using the weighted mean (WM) and the weighted sum (WS) which showed high perception on the adoption



**Table 3: Respondents perceived impact attained in adopting innovative rice processing technique**

Areas of impact	WS	WM	Remark
Quality	1835	4.30	High Perception
Capacity building	1766	4.14	High Perception
Quantity (Yield)	1730	4.05	High Perception
Standardized production (Quality control)	1658	3.88	High Perception
Access to innovative platforms	1638	3.84	High Perception
Access to market information	1638	3.84	High Perception
Asset ownership	1630	3.82	High Perception
Household Income	1625	3.81	High Perception
Trade promotions	1571	3.68	High Perception
Infrastructure management	1546	3.62	High Perception

NOTE: WS = Weighted Sum and WM = Weighted Mean

#### 4.3.4 Constraints to the Adoption of the Processing Techniques

Table 4 revealed the constraints to the adoption of the processing techniques in the study area. This was based on four point likert scale of Very severe (4), Severe (3), Indifference (2), Not severe (1), these will be added together that is 4+3+2+1 and be divided by 4 to get a weighted mean value of 2.5. However, any weighted mean value less than 2.5 will be regarded as not severe while  $\geq 2.5$  will be termed severe. The result in the Table indicated that insufficient funds was severe with mean value of ( $\bar{X} = 3.07$ ), this was followed by insufficient equipment with the mean value of ( $\bar{X} = 2.53$ ). Also inadequate rural infrastructure was severe with mean value of ( $\bar{X} = 2.41$ ) while lack of storage facilities was severe with mean value of ( $\bar{X} = 2.15$ ). It can be concluded from this findings that insufficient funds and insufficient equipments were the major constraints faced by the respondents in the study area, unavailability of capital serve as obstacle for the respondents from adoption and also hinder them from having access to equipments.

Furthermore, the following constraints were not severe according to their mean values no difference in selling price when conventional method is used with mean value of ( $\bar{X} = 1.95$ ), addition of extra cost in production with mean value of ( $\bar{X} = 1.90$ ), lack of good

market with mean value of ( $\bar{X} = 1.86$ ), high cost of labour with mean value of ( $\bar{X} = 1.78$ ), processing hazards with mean value of ( $\bar{X} = 1.64$ ), poor leadership in the group with mean value of ( $\bar{X} = 1.61$ ), poor extension services with mean value of ( $\bar{X} = 1.49$ ), and time is wasted when reading and adjusting measurement on the weighing scale with mean value of ( $\bar{X} = 1.37$ ). These constraints do not strongly affect the adoption of innovative rice processing technique in agribusiness.

**Table 4: Constraints to the Adoption of Rice Processing Techniques**

Constraints	Weighted Sum	Weighted Mean	Remark
Insufficient funds	1312	3.07	High Perception
Insufficient equipment	1080	2.53	High Perception
Inadequate rural infrastructure	1028	2.41	High Perception
Lack of storage facilities	916	2.15	High Perception
No difference in selling price when conventional method is used	831	1.95	Low Perception
Addition of extra cost in production	812	1.90	Low Perception
Lack of good market	793	1.86	Low Perception
High cost of labour	758	1.78	Low Perception
Processing hazards	700	1.64	Low Perception
Poor leadership in the group	686	1.61	Low Perception
Poor extension services	635	1.49	Low Perception
Time is wasted when reading and adjusting measurement on the weighing scale	586	1.37	Low Perception

#### **4.3.5 Constraints for the adopter of innovative rice processing technique in agribusiness**

The result in Table 5 showed constraints for the adoption of innovative rice processing technique in agribusiness . This was based on 5 point likert scale of Strongly agree (5), Agree (4), Neutral (3), Agree (2), and Strongly disagree (1), these will be added together that is 5+4+3+2+1 and be divided by 5 to get a weighted mean value of 3.0. However, any weighted mean value less than 3.0 will be regarded as disagree while  $\geq 3.0$  will be termed agree. The result in Table above revealed that 54.1% of the respondents agree that inadequate capital was the major constraints for the adoption of innovative rice processing technique in agribusiness with the mean value of ( $\bar{X} =$

4.22), while 57.4% agree that inadequate resources were the major constraints the adoption of innovative rice processing technique in agribusiness with the mean value of ( $\bar{X} = 3.67$ ). Also, 54.8% agree that poor and inaccessible roads was the major constraints in the adoption of innovative rice processing technique in agribusiness with the mean value of ( $\bar{X} = 3.55$ ). Also, 34.2% that lack of technical know-how was one of the minor constraints the adopters of innovative rice processing technique in agribusiness with the mean value of ( $\bar{X} = 2.96$ ) while 52.7% that lack of market was the least constraints the adopters of innovative rice processing technique in agribusiness with the mean value of ( $\bar{X} = 2.95$ ). These constraints were minor because of their weighted mean value is low compare to average mean value.

**Table 5: Constraints for the adopters of innovative rice processing technique in agribusiness**

Constraints	WS	WM	Remark
Inadequate capital	1803	4.22	Major Constraint
Inadequate resources	1569	3.67	Major Constraint
Poor and inaccessible roads	1515	3.55	Major Constraint
Lack of technical know-how	1265	2.96	Minor Constraint
Lack of market	1261	2.95	Minor Constraint

NOTE: WS = Weighted Sum and WM = Weighted Mean

### 4.3.6 Access to Social Capital

#### 4.3.6.1 Level of land access

The level of land access on Table 6 revealed that 68.2% of the respondents in the study area had access to > 1 acre of land while 19.4% of the respondent had access to 3-5 acres of land. However, 6.3% of the respondents had access to more than 5 acres of land while 6.1% of the respondents had access to 1-3 of land in acres. It can be concluded that most of the respondents in the study area did not have access to adequate land and this is expected to affect their production

#### 4.3.6.2 Distance to market

The result in Table 6 further revealed that 37.9% of the respondents had between 1-2 km distance to market while 32.1% less than 1km distance to market. Also, 16.9% had between 2-3km to market while 13.1% of the respondents had more than 3km

distance to market. This shown that the respondents in the study area did not have to embark on long distance before having access to market.

#### 4.3.6.3 Credit

The result in Table 6 further revealed that 44.0% access to credit will to a very extent influence participation in VCDP, 20.6% revealed that access to will greatly influence participation in VCDP. More over, 17.8% of the respondents revealed that access to credit will moderately influence their participation in VCDP while 8.7% and 8.9% revealed that access to credit will small extent and not at all influence of participation in VCDP. It can be concluded that majority of the respondents in the study to some extent had access to credit and this is expected to boost their production output.

#### 4.3.6.4 Extension access

Table 6 showed that 99.3% of respondents had access to extension services while 0.7% of the respondents had no access to extension. Access to extension service in the context of agricultural technology is expected to influence adoption. Extension contact has been proven to have positive effect on the adoption of improved technology.

**Table 6: Access to Social Capital**

Category of capital asset	Level of access	Frequency (n = 427)	Percentage
<b>Land</b>	<b>Level of land access</b>		
	Less than 1 acre	291	68.15
	1-3 acres	26	6.09
	3-5 acres	83	19.44
	More than 5 acres	27	6.32
<b>Market</b>	<b>Distance to market</b>		
	Less than 1km	137	32.08
	1-2 km	162	37.94
	2-3 km	72	16.86
	More than 3km	56	13.11
<b>Credit</b>	<b>Access to credit</b>		
	Yes	227	53.16
	No	200	46.84
	<b>Influence on participation in VCDP</b>		
	Very great extent	88	20.61
	Great extent	188	44.03
	Moderate extent	76	17.80
Small extent	37	8.67	
Not at all	38	8.90	

<b>Extension services</b>	<b>Access to extension services</b>		
	Yes	424	99.30
	No	3	0.70

### **4.3.7 Distribution of respondents according to source of amenities**

#### **4.3.7.1 Water**

The result in Table 7 showed that 92.5% of the respondents used borehole while 4.9% and 2.6% used protected well and stream respectively. This findings revealed that most of the rice processors in Niger State used borehole, this might due to the fact that borehole is predominant mostly found in every rural area of the State.

#### **4.3.7.2 Raw Material**

Entries in Table 7 revealed that 59.7% of rice processors accessed raw materials through producers while 29.5% accessed raw materials in the open market. Also, 9.2%, 1.2% and 0.5% of the respondents accessed raw materials from cooperative, retailers and wholesaler respectively. This findings indicated that producers were the major source of raw materials to rice processor in the State. This is an indication that there is likely probability of them getting access to cheap materials from producers.

#### **4.3.7.3 Training**

Table 7 showed that 75.7% of the respondent recieved training from government organization while 13.8% recieved training from private firms. Also, 10.1% recieved training from non-governmental organization while 0.5% of rice processor did not have access to training. This findings showed that most of the rice processors recieved training from government.

**Table 7: Distribution of respondents according to source of amenities**

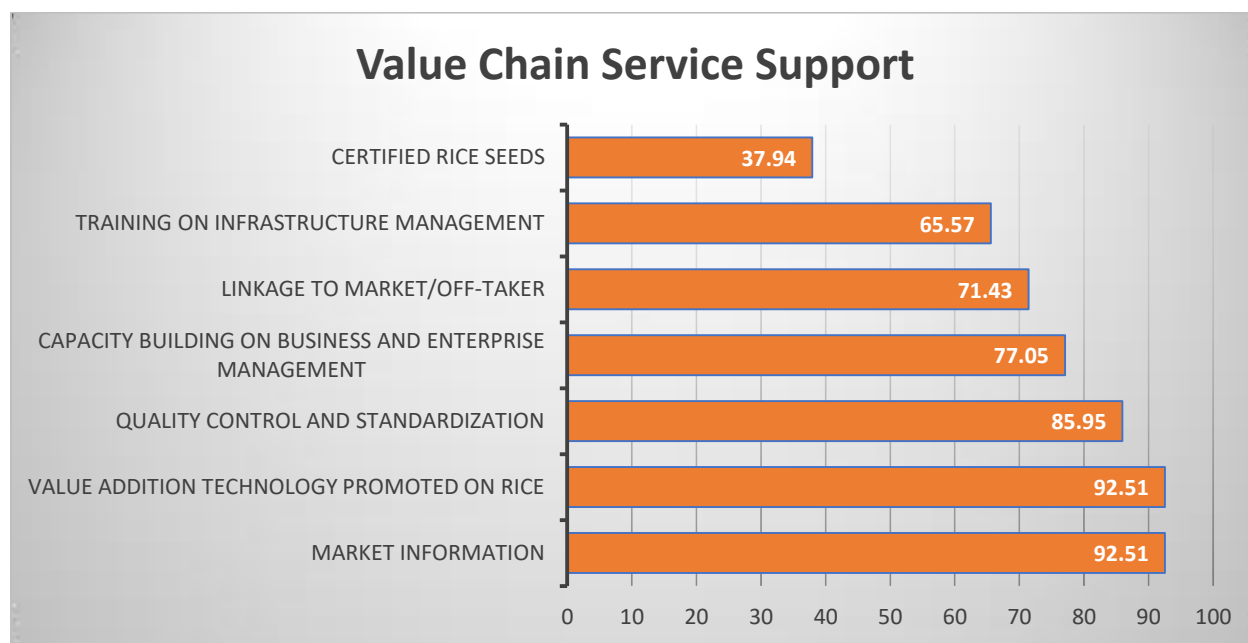
<b>Amenities</b>	<b>Frequency (n = 427)</b>	<b>Percentage</b>
<b>Water</b>		
Borehole	395	92.51
Protected well	21	4.92
Stream	11	2.58
<b>Raw materials</b>		
Cooperative	39	9.13
Open market	126	29.51
Producers	255	59.72
Retailers	5	1.17

Wholesalers	2	0.47
<b>Training</b>		
Government	323	75.65
Private	59	13.82
Non-government	43	10.07
None	2	0.46

#### 4.3.8 Value chain services accessed

Figure 8 showed the distribution of respondents according to value chain services accessed in the study area. The findings according to this Table indicated that market information was ranked 1<sup>st</sup> with 92.5%, this was followed by access to value addition technology promoted on rice with 92.5%. Also, quality control and standardization was rank 3<sup>rd</sup> with 85.9%, this was followed by capacity building on business and enterprise management that was rank 4<sup>th</sup> with 77.1% in the study area. Other value chain services accessed by the respondents were linkage on market off-taker rank 5<sup>th</sup> with 71.4%, training on infrastructure management rank 6<sup>th</sup> with 65.6% and certified rice seed rank 7<sup>th</sup> with 37.9%.

**Figure 8: Description of Value Chain Services of the respondents**



#### 4.3.9 Comparison between installed and actual rice processing capacity

Table 8 showed the comparison between the installed capacity of the processing machine and that of the actual capacity after processing. The result showed that based on the mean average, there is a difference of 9384kg of rice between the actual was recorded at 22,146kg at a significance level of 1%. This shows that the difference could be as a result of waste, low quality paddy and hence leads to loss revenue due to the significant difference.

**Table 8: Comparison between installed and actual rice processing capacity**

Variable	Mean	t-value
Installed capacity (kg)	31531.09	3.8541***
Actual capacity (kg)	22146.85	
Difference (kg)	9384.24	

NOTE:\*\*\* = 1% level of significance

#### 4.4 Results based on determinant of the empowerment index of the processors.

This section explains the empowerment index of the processors using the 5 domains of empowerment and the 10 indicators for the analysis. *The domains are (Production, Resources, Income, Leisure and Leadership).*

##### 4.4.1 Production

###### 4.4.1.1 Involvement in crop production activities

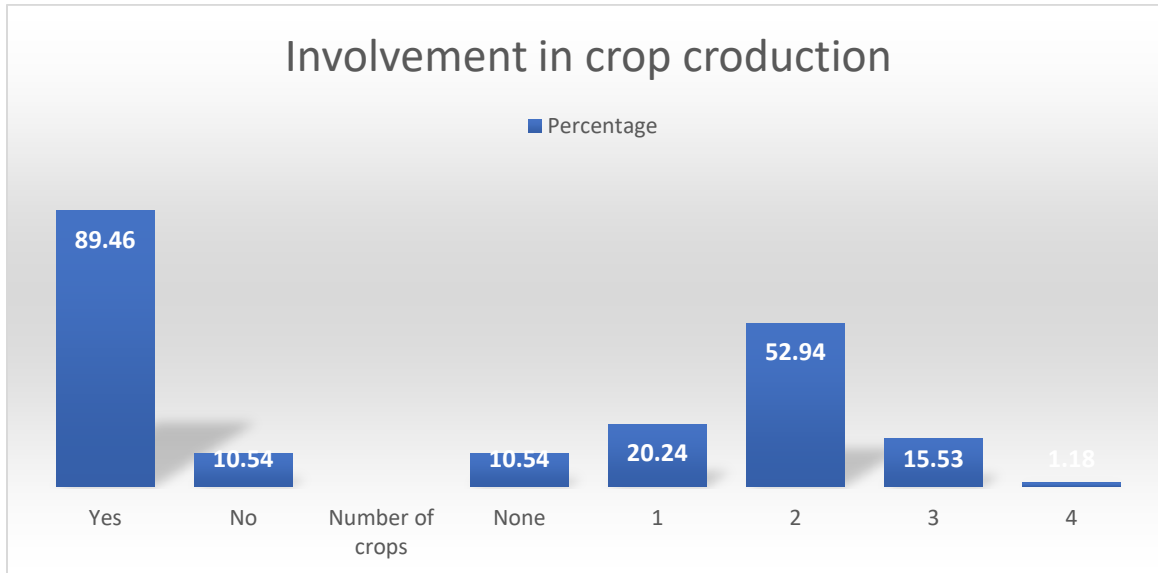
The findings according to figure 9 revealed that 89.5% of the respondents involved in crop production while 10.5% did not involved in crop production. This findings indicated that most of the rice processors in the study area also engage in crop production. This table further revealed that 52.9% of the respondents engaged in production of two crops, 20.0% involved in production of one crops while 15.5% and 1.2% of rice processors produced three and four crops respectively.

##### 4.4.2 Resources

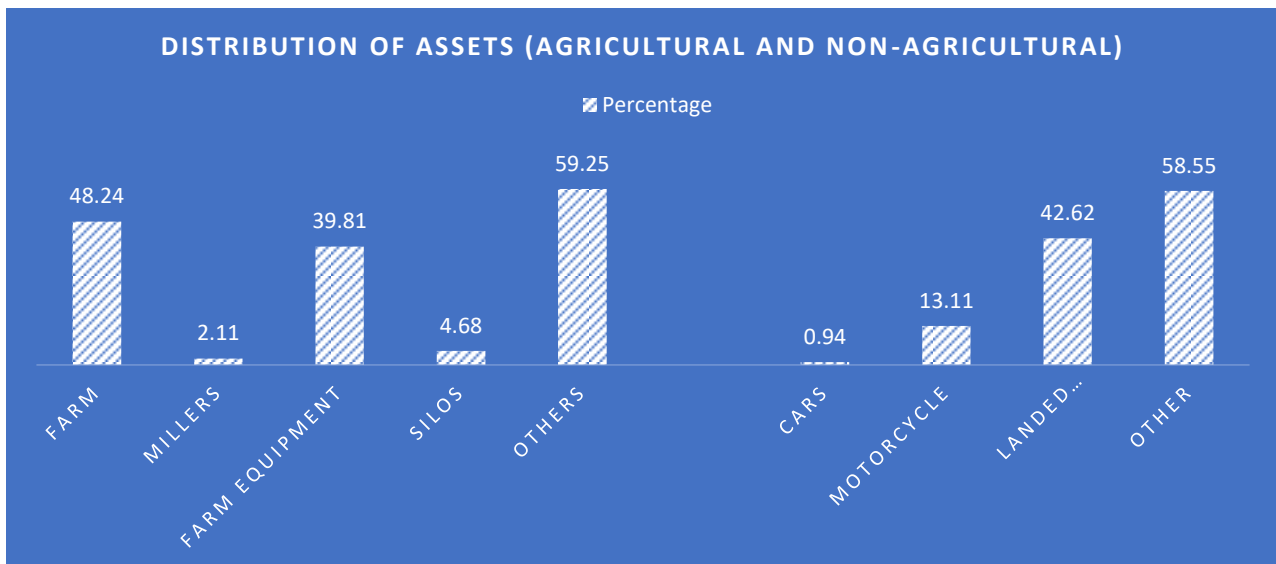
Figure 10 recorded that the distribution of respondents according to agricultural asset showed that 48.2% had farm, 39.8% had farm equipments, 4.7% had silos, and 2.1% had millers while 59.3% had others. Moreover, distribution of respondents

according non-agricultural assets revealed that 42.6% had landed property, 13.1% had motorcycle while 0.9% had cars.

**Figure 9: Involvement in crop production activities**



**Figure 10: Distribution of respondents on the type of Assets owned**



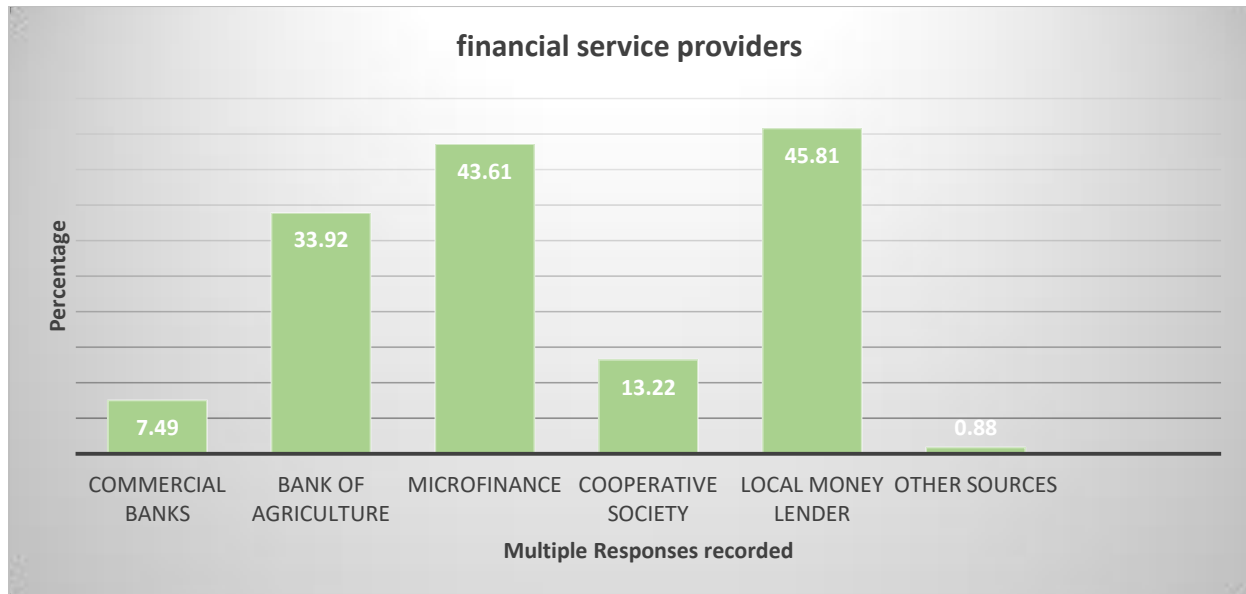
#### 4.4.2.1 Financial services providers

The distribution of respondents according to Figure 11 showed that local money lender had 45.8% this was followed by micro finance bank with 43.6%. Others financial service providers



include bank of agriculture 33.9%, cooperative society 13.25, commercial bank 7.5% and others 0.8%. This findings revealed that local money lender and microfinance bank were the major financial service providers for rice processors in the study area.

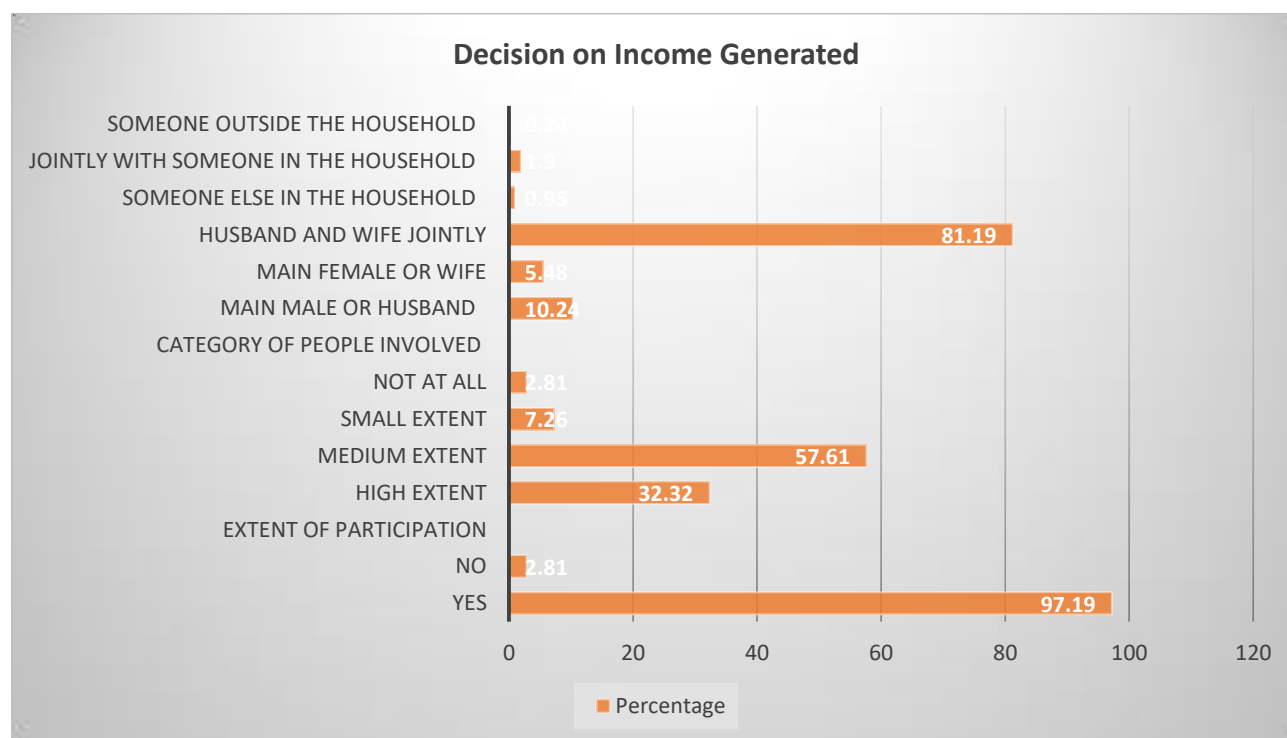
**Figure 11: Distribution of respondents' access to financial services**



#### 4.4.3 Income

The result according to Figure 12 revealed that 97.2% of rice processors participated in household decision making on income generated while 2.8% did not participated. This findings showed that majority of the respondents participated in household decision making and this is expected to influence their income positively. 81.19% is jointly decided between the husband and the wife. The extent of participation showed that 57.6% had medium extent, 32.3% had high extent of participation and 7.3% had small extent of participation. Furthermore, caterogry of people involved revealed that 81.2% of husband and wife were involved in decision making, 10.2% main male and husband were jointly involved, 5.5% main female or wife were involved.

**Figure 12: Participation in Household decision making on income generated**



#### 4.4.4 Time

##### 4.4.4.1 Workload and Leisure

The distribution of respondent according to table 9 on wake up time indicated that 61.8% of the respondents wake up between 4:01am-5:00am on weekdays while 63.2% wake up between 5:01am-6.00am on weekend. While 58.8% of the respondents wake up between 5:01am-6:00am during off-farm days. This findings revealed that rice processors always wake up on time.

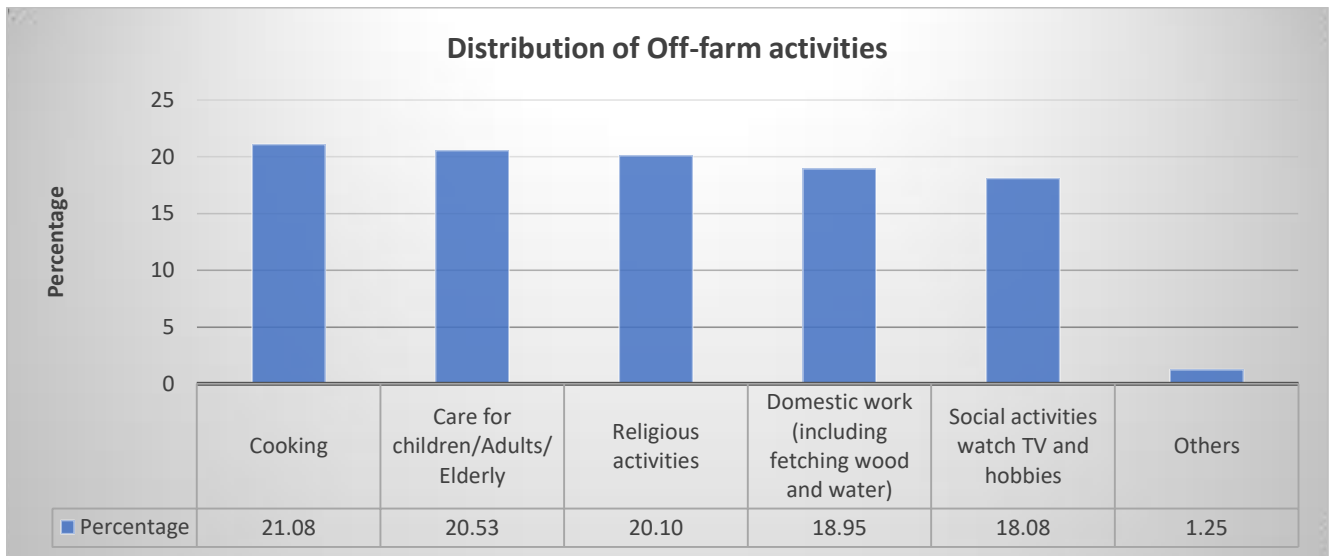
**Table 9: Time: Distribution of respondents according to daily wake up time**

Time	Weekdays		Weekends		Off-farm days	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
3:01am – 4:00am	15	3.51	41	9.60	20	4.68
4:01am – 5:00am	264	61.83	98	22.95	14	3.28
5:01am – 6:00am	128	29.98	270	63.24	251	58.78
6:01am – 7:00am	20	4.68	17	3.98	138	32.32
7:01am – 8:00am	-	-	1	0.23	4	0.94

#### 4.4.4.2 Off-farm activities of rice processors

The distribution of respondents according to Figure 13 indicated that 90.6% of the respondents engaged in cooking, 88.3% care for children and adults/elderly, 86.4% engaged in religious activities, 81.55 involved in domestic work (including fetching wood and water) while 77.8% engaged in social activities. The findings indicated that all the rice processors were fully involved in off-farm activities in the study area.

**Figure 13: Time: Distribution of respondents according to off – farm activities.**



### 4.5 Leadership

#### 4.5.1 Group leadership

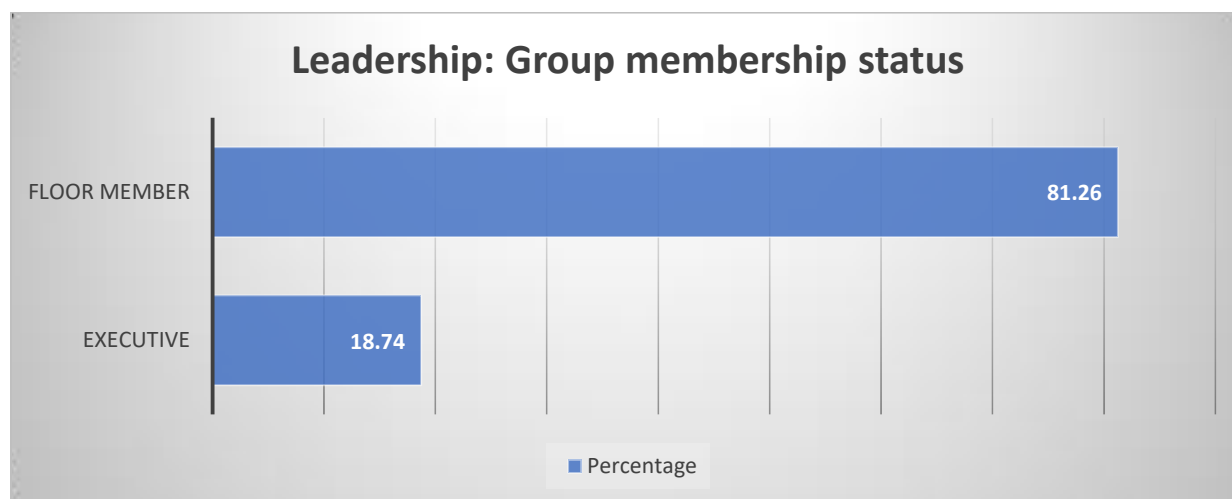
Figure 14 showed that the distribution of respondents according to group membership status was 81.3% of rice processors were floor members while 18.7% were executive members. This shows that majority of the rice processors were floor members in the group they belong.

#### 4.5.2 Public speaking

This result in table 10 was based on five point scales of very comfortable (5), fairly comfortable (4), little difficulty (3), great deal of difficulty (2), and not comfortable (1). This were summed together that is 5+4+3+2+1 and divided by 5 to get a weighted mean of 3.0, any points  $\geq 3.0$  is termed comfortable while  $< 3$  is not comfortable. However according to the result of this findings, do you feel comfortable speaking up in public to protest the misbehaviour of authorities or

elected offices was comfortable with mean value of ( $\bar{X} = 3.83$ ), do you feel comfortable speaking up in public to help decide on infrastructure (like small wells, roads, water supplies) to be built in your community was comfortable with mean value ( $\bar{X} = 3.59$ ), do you feel comfortable speaking up in public in public to ensure proper payment of wages for public works or other similar programs with mean value of ( $\bar{X} = 3.83$ ). This showed that all the respondents are comfortable with public speaking, this might be due to their level of exposures.

**Figure 14: Leadership: Group membership.**



**Table 10: Public speaking variables**

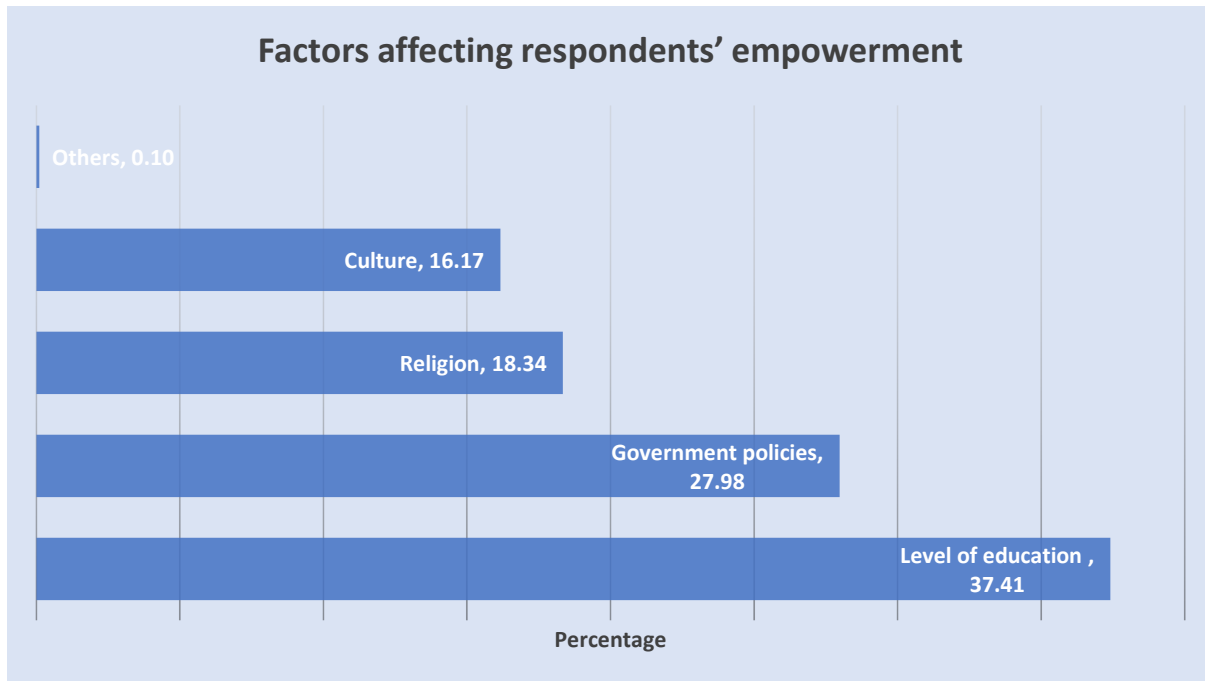
Variables	Weighted sum	Weighted mean	Remark
Do you feel comfortable speaking up in public to help decide on infrastructure (like small wells, roads, water supplies) to be built in your community?	1533	3.59	Comfortable
Do you feel comfortable speaking up in public in public to ensure proper payment of wages for public works or other similar programs?	1519	3.56	Comfortable
Do you feel comfortable speaking up in public to protest the misbehaviour of authorities or elected offices?	1634	3.83	Comfortable

#### 4.6 Factors affecting respondents' empowerment

The result in figure 15 showed that 37% of the respondents indicated that level of education affect their empowerment while 28% believed is government policies that affect their

empowerment. Also, 18%, 16% and 1% stressed that religion, culture and others affect their empowerment. This finding showed that majority of rice processors revealed that level of education affect their empowerment, this might be due to their low level of literacy.

**Figure 15: Factors that affect women empowerment.**



\*Multiple responses recorded

## **5 CHAPTER FIVE (SUMMARY, RECOMMENDATIONS AND CONCLUSION)**

### **5.1 SUMMARY OF FINDINGS**

This study assessed the impact of the adoption of innovative rice processing techniques under the International Fund for Agricultural Development (IFAD) Value Chain Development Programme on profitability and empowerment. The study analyzed the socio-economic characteristics of the adopters of the modern rice processing technique, determine their net returns, how empowered the processors are and identified the constraints faced by these rural poor women.

Consequently, the face of changing the socio-economic realities of these actors and players within the rice value chain development through an innovative agricultural system constitutes a cornerstone. Reason being that the actors are not fully accessible to the innovative processing technique and hence disempowers them.

The results proved that the innovative system is hindered due to insufficiency in integrating the required relationship for the adoption and work life balance of the rural women. The study also revealed that 52.7% of the processors have non-formal education and about 39% have basically 6 – 10years experience in farming activities. The perception of the innovative method as indicate din the results showed that 45.7% of the respondents agreed the method on a weighted sum of  $x = 4.39$  and 98.8% believed in its simplicity improvement in commercial value. Also, 76.1% agreed it will provide access to innovative platforms and boost trade.

Consequently, Paucity of funds, lack of adequate equipment, in sufficient infrastructure, women involvement in decision making and lack of balance on workload from leisure termed to disempower these women and hence affect processing output.

### **5.2 CONCLUSION**

Based on the major findings following the study, the following conclusions were reached:

- i. The key actors involved in rice processing technique are dominated by married female from a majorly household size of 6-10 with different levels of education and different years of farming experiences.
- ii. The result showed also that the processors have different perceptions of innovative techniques, however majority believed that its simplicity and value addition is paramount.

- iii. Several constraints were recorded but lack of funding was identified as the major constraint while inadequate resources such as storage facilities also influence processing capacity.
- iv. Lack of access to land for farming affect and influence purchase of the paddy from the producers as well as distance to market which also constitute social challenge and hence influence participation in VCDP in Niger state.
- v. The respondents identified that local money lender are the major source of finance due to high interest rate and repayment period.
- vi. Result also identified that 37% of the respondents believed that level of education and affects women empowerment, 28% believed it is government policies within the study area. While 18%, 16% and 1% believed that religion, culture and other factors respectively are the factors that affect women empowerment.

### **5.3 RECOMMENDATIONS**

- Based on the findings, the study recommended that efforts must be directed at these individual indicators to improve on the empowerment, market access, funding etc and especially in planning intervention strategies that would sustain their processing activity. This should be backed up with enforcement of policies that will ensure rural women enjoy the same potentials, rights and privileges as men in society in order to ensure and achieve sustainable rural development.
- Promote and create a strong link for the processors to a larger market for profitability.
- Ensure steady supply of the material from the producers at a cost effective and efficient way.
- The need for policy actors and players within the VCDP to design policies and programs to strengthen innovative capabilities among stakeholders in innovative rice processing technique.
- Capacity building and training of a larger group of traditional method on the adoption technique through dissemination of the skills by technology transfer agencies.
- Sensitization and awareness campaigns on the quality of rice locally produced to marketers and consumers to be followed by harmonization and enforcement in order to encourage and sustain the local rice processors.

- Rice innovation system does not only include stakeholders and interactions, but also mandates that guide such interaction. To achieve the desired increase in rice production and strong linkage mechanisms, appropriate framework should be established among the actors in rice innovation system. It is important that periodic evaluation of the programme be undertaken so as to know at what point to make amends and adjustments.



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## **APPENDIX I PHOTOS**



Innovative  
Equipment.

Picture Showing the  
Different Stages  
involved.



Women Sorting  
and removing  
waste from the  
finely processed  
rice in Bida LGA

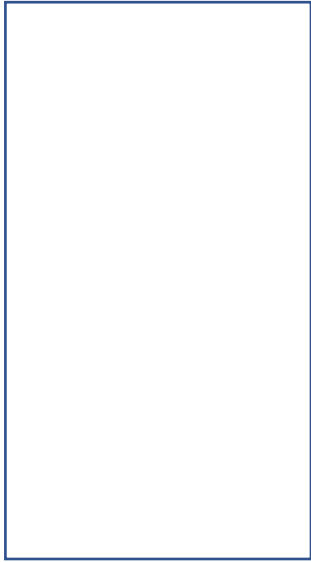


Researcher  
Administering  
Questionnaire  
during Pretest at  
Shiroro LGA



Field Survey and  
Key Informant  
Interview.





Soaking and  
Winnowing  
Equipment

## **APPENDIX II QUESTIONNAIRE**



# IFAD MDP QUESTIONNAIRE

## ASSESSMENT OF THE IFAD VALUE CHAIN DEVELOPMENT PROGRAMME ON SMALL HOLDER FARMERS IN NIGER STATE, NIGERIA

This questionnaire is designed for assessing the IFAD Value Chain Development programme on small holder farmers by women in Niger State, Nigeria. You are highly encouraged and persuaded to respond to the statements in this questionnaire in the most truthful and objective way. Your participation in facilitating this study is highly appreciated and all information obtained will be highly confidential.

Kindly tick the correct answer in the space provided or supply the required information, where necessary, please specify and/ or elaborate.

### SECTION A: BACKGROUND INFORMATION

1. Name of Respondent .....
2. Name of L.G.A .....
3. Name of Community .....
4. Name of Farmer's organization .....
5. Name of Cluster .....
6. Phone Number .....
7. GPS Position: Latitude ..... Longitude ..... Altitude ..... (Meters)

### SECTION B: SOCIO- ECONOMIC CHARACTERISTICS THE ADOPTERS OF INNOVATIVE RICE PROCESSING TECHNIQUE.

1. Gender: Male \_\_\_\_\_ Female \_\_\_\_\_
2. Age (in Years): \_\_\_\_\_
3. Marital Status: Married ( ) Single ( ) Widow ( ) Divorce ( )
4. Educational Status: Primary ( ) Secondary ( ) Adult Education ( ) Post-Secondary ( ) Non Formal Education ( )
5. Household size: .....
6. How long have you been involved in agricultural activities? ..... Years

### SECTION B: Perception of adopters of Innovative Rice Processing Technique

1. Please indicate your level of agreement with the following statements that relate to the influence of **perception of the adoption of the innovative rice processing Technique** in Niger state, Nigeria.

SN	Perception	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
a	Adopters engage in innovative rice processing technique in Niger State					
b	Adopters aspire for a career in agriculture					
c	Adopters see agriculture as a low status profession					
d	Adopters perceive agriculture to be a profitable venture					
e	Adopters in Niger state appreciate agriculture as a source of income					

**SECTION C: Reasons for adoption of innovative rice processing technique.**

**(Tick multiple points in Section F)**

1. What type innovative processing techniques have you adopted?

Please specify \_\_\_\_\_

2. List the equipment you are using for the processing.

.....

3. What are the reasons for adopting the innovations listed above?

- a. Simple to use ( )
- b. Processes large quantity at a time ( )
- c. Processing operations are faster ( )
- d. Processes quality products without stones ( )
- e. It is less tedious ( )
- f. It increases the commercial value of product ( )

**SECTION D: Perceived impacts of adopting innovative rice processing technique.**

1. What is the level of impact attained in adopting rice processing technique?

Please **tick** as appropriate.

SN	IMPACT	VERY HIGH	HIGH	AVERAGE	VERY LOW
a	Quality				
b	Quantity (Yield)				
c	Standardized production (Quality control)				
d	Household Income				
e	Asset ownership				
f	Infrastructure management				
g	Trade promotions				
h	Capacity building				
i	Access to innovative platforms				
j	Access to market information				

**SECTION E: Constraints to the Adoption of the Processing Techniques.**

1. What are the constraints to the adoption of the processing technique in your area?

SN	CONSTRAINTS	VERY SEVERE	SEVERE	NOT SEVERE	INDIFFERENT
a.	Insufficient funds				
b.	Insufficient equipment				
c.	Addition of extra cost in production				

d.	High cost of labour				
e.	Time is wasted when reading and adjusting measurement on the weighing scale				
f.	Processing hazards				
g.	Lack of good market				
h.	Poor extension services				
i.	Poor leadership in the group				
j.	No difference in selling price when conventional method is used				
k.	Lack of storage facilities				
l.	Inadequate rural infrastructure				

**SECTION F: Constraints of the Adopters of the Innovative Rice Processing Technique.**

1. What are the constraints to the adoption of the processing technique in your area?

SN	CONSTRAINTS	VERY SEVERE	SEVERE	NOT SEVERE	INDIFFERENT
a.	Insufficient funds				
b.	Insufficient equipment				
c.	Addition of extra cost in production				
d.	High cost of labour				
e.	Time is wasted when reading and adjusting measurement on the weighing scale				
f.	Processing hazards				
g.	Lack of good market				
h.	Poor extension services				
i.	Poor leadership in the group				
j.	No difference in selling price when conventional method is used				
k.	Lack of storage facilities				
l.	Inadequate rural infrastructure				

**SECTION G: ACCESS TO Capital and Social Services**

8. Please tick in the column as appropriate.

SN	Statement	Categories	Tick
a	What is the size of land available for you to carry out agricultural processing activities?	Less than 1 acre	
		1-3 acres	
		3-5 acres	
		More than 5 acres	
b	What is the distance to the nearest market for your agricultural produce?	Less than 60 minutes	
		1-2 hours	
		2-3 hours	
		More than 3 hours	
c	What is the status of the road network from your production site to the market?	Deteriorated greatly	
		Deteriorated a little	
		It has not changed	
		Improved a little	
		Greatly improved	
d	To what extent does access to credit influence your	Very great extent	

	participation in agricultural value chain in Niger State, Nigeria?	Great extent	
		Moderate extent	
		Small extent	
		Not at all	

**Access to Social Amenities**

SN	Questions	Categories	Tick
1	What is your source of Water	Protected Well	
		Borehole	
		Stream or River	
		Rain	
		Pump	
2	Where do you source for raw materials	Producers	
		Retailers	
		Wholesalers	
		Open Market	
		Cooperative	
3	Who offers trainings on agricultural projects in this region?	Non- Governmental Organization	
		Government of Nigeria	
		Private Sector	
		None	
4	How many trainings organized by any of the actors stated in question 1 above have you attended?	1-5	
		5-10	
		More than 10	

**SECTION H: ACCESS TO VALUE CHAIN SERVICES**

1. Do you have access to or benefited from the following value chain services or support in the last 12 months? (Tick as appropriate)
  - a. Market Information Yes ( ) No ( )
  - b. Quality Control and Standardization Yes ( ) No ( )
  - c. Linkage to Market/Off-taker Yes ( ) No ( )
  - d. Value Addition Technology promoted on rice and cassava Yes ( ) No ( )
  - e. Capacity building on Business and Enterprise Management Yes ( ) No ( )
  - f. Training on Infrastructure Management Yes ( ) No ( )
  - g. Processing waste management Yes ( ) No ( )
  - h. Certified rice and cassava seeds Yes ( ) No ( )

2. What is your enterprise monthly processing capacity?

<b>Installed Capacity (kg)</b>	<b>Actual Capacity (kg)</b>

**SECTION H: Determinants of empowerment index on sustainable rural off-farm employment and market access.**

**Production Empowerment:**

1. Are you allowed to grow any type of crop for consumption and sale to the market?

Yes ( ) No ( )

2. If yes in 1 above how many types of crops? (Please specify) \_\_\_\_\_

3. If No in 1 above, why? \_\_\_\_\_

**4. Ask questions on input in productive decisions**

**Resources Empowerment**

5. Do you own any asset? Yes ( ) No ( )

6. If yes in Question 4 above, what type of asset do you own? Please specify \_\_\_\_\_

7. Do you have access to credit? Yes ( ) No ( )

8. If yes where is the source?

Where do you source for financial services?

SN	Financial Provider	Service	Savings	Credit facilities	Amount ₦	Interest Rate	Period
A	Commercial banks						
B	Bank of Agriculture						
c	Microfinance						
d	Cooperative Society						
e	Local Money Lender						
f	Others (Specify)						

9. Do you take decisions for credit? Yes ( ) No ( )

**Income Empowerment**

10. Did you participate in the last 12 months on decision on use of income from rice production?

Yes ( ) No ( )

11. If yes how much input did you have?

Very well ( ) fairly well ( ) Not at all ( )

12. When decisions are made regarding use of income generated for the Household, who normally takes decision?

Main male or husband	1	
Main female or wife	2	
Husband and wife jointly	3	
Someone else in the household	4	
Jointly with someone in the household	5	
Someone outside the household	6	
Household does not engage in activity	7	

13. To what extent do you feel you can own your decision regarding control over use of income?

High extent ( ) medium extent ( ) small extent ( ) Not at all ( )

**Time (Workload and Leisure)**

- 14. Ask questions on the workload of the woman
- 15. Ask questions on leisure time spent

**Leadership: Group Member and Speaking in Public**

- 16. Ask questions on the role of the women in the household whether being a group member
- 17. Ask questions on whether the woman has access to public speaking

**What are the factors that Affect women Empowerment:**

- i. Education ( )
- ii. Government Policy ( )
- iii. Religion ( )
- iv. Culture ( )
- v. Other Factors ( )