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PrOpCom

Making Nigerian Agricultural Markets Work for the Poor

Baseline Survey of the Kano Rice Value Chain Final Report

By

Optimum Agricultural Consultants

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Final Report on the Baseline survey of the Kano Rice Value Chain



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GLOSSARY OF TERMS USED IN DESCRIBING RICE VARIETIES ACROSS CLUSTERS

Local name of variety or grade	Scientific equivalent	Category of users	Cluster where the name is used.
SANTANA	<i>WITA4</i>	Farmers, processors and local traders	Kura, Garko, Tudun Wada
KILAKI	Refer to rice varieties such as SIPI and WITA4	Processors and traders	Dandume, Makarfi
JAMILA	<i>SIPI</i>	Processors and traders mainly	Garko
DUKUSA	<i>SIPI, WITA4</i> and other short varieties	Farmers, processors and traders	Tudun Wada
GALAWARE	African wild rice	Farmers and traders	Hadejia
YAR YAMIDI	Local rice variety	Farmers	Hadejia
YAR KERA	Local rice variety	Farmers	Garko
YAR -DAS	Upland variety that originate from Das in Bauchi state	Farmers	Kura, Garko, Tudun Wada
SIPI	SIPI	Farmers	Kura-Kano, Garko, Hadejia
WITA	WITA	Farmers and traders	Kura-Kano, Hadejia
TOX	TOX	Farmers	Kura-Kano, Hadejia
YARZABUWA, MAIBIRO or MAIZABUWA	NERICA	Farmers and traders	Makarfi, Dandume
ZAIRA	ITA123	Farmers	Dandume
JAR NAIRA	ITA257	Farmers	Dandume
JALLOF, KWANDALLA or CAROLINE	ITA150	Farmers and trades	Dandume Makarfi, Tudun Wada
YAR GARKO	Rice grades processed in Garko	Traders at urban markets	Kano Markets
YAR TUDUN WADA	Rice varieties processed in Tudun Wada	Traders in urban markets	Kano markets
Yar Kura	Rice processed in Kura	Traders in Urban markets	Kano markets
Yar-Niger	Rice processed in Niger state	Traders in Urban markets	Kano markets
Yar-Banki	Rice from Banki in Cameroon Republic	Traders in Urban markets	Kano markets

EXECUTIVE SUMMARY

PropCom is a project aimed at facilitating functionality and efficiency of Nigerian commodity and service markets in such a way that these markets work for the poor. The goal is to improve livelihood of the poor by promoting their access and growth in commodity and service markets in line with the goals of poverty alleviation as envisaged in NEEDS and the attainment of the Millennium Development goals. During the first implementation of its catalytic activities, PrOpCom will focus on will focus on rice as the primary commodity.

In order to establish an effective monitoring and evaluation system that would effectively measure progress towards achievement of the project objectives and targets, baseline information needs to be collected and documented. Based on this background this baseline survey of rice value chain in the Kano catchments area is carried out as part of the activities aimed at promoting pro-poor markets opportunities for enhancing income, productivity and livelihoods.

The objectives of the survey as specified in the task assigned on the TOR were:

- Provide baseline information against which progress towards programme objectives and targets identified in the project (PropCom) log-frame can be measured.
- Collect data related to all Objectively Verifiable Indicators(OVIs) in PropCom's log frame
- Provide basis of comparison between the different sites where the project catalytic activities are undertaken

The survey was conducted through implementation of different data collection activities on four categories of market chain actors (Farmers, traders, millers and parboilers). Such activities include Focus Group Discussions (FGDs) based on flexible and open ended checklists, enumerator conducted survey which uses well structured questionnaires to obtain various responses from the market chain actors on issues that are important to the functioning of the rice value chain in Kano and its market catchments areas. Key informant interviews involving various stakeholders and case studies to determine financial performance of the various productions and processing enterprises were also conducted.

Key findings obtained from the survey were:

Rice production

- Three main types of rice production ecologies were identified; Upland, Lowland and irrigated perimeter. In Kano cluster 26.8%, 33.2% and 40% of farmers are operating in the upland, low land and irrigated perimeter production systems respectively. In Jigawa cluster 84% and 16 % are operating in the irrigated perimeter and low land systems respectively. In Kaduna and Katsina cluster 82% and 92% of the farmers respectively are operating in the upland production system.
- In Kura-Kano corridor rice production is done mainly within the irrigated perimeter of Kano River Irrigation Project (KRIP) where lowland varieties of rice such *SIPI* and *WITA* are mainly grown. 32.8% and 28% of the farmers in Kano clusters grow *SIPI* and *WITA* respectively. In Garko and Tudun Wada both upland and low land ecologies are used in the production of rice. Varieties grown therefore include both upland such *Yar'Das*, *NERICA*, *KERA*, *ITA 150* and lowland varieties such as *WITA4*, *TOX 1011* and *SIPI*. In Hadejia cluster rice production is mainly concentrated within the irrigation perimeter of Hadejia Valley Irrigation Project where low land rice varieties such as *SIPI* grown by 30% of farmers, *WITA* grown by 16% of farmers, and *TOX* are the most important. In Dandume and Makarfi clusters upland rice production ecology is dominant and varieties grown include *JALLOF (ITA 150)* by 50% of farmers, *Yar-Das*, *Kilaki* and *Yar-zabuwa(NERICA)* by 20% of farmers. Generally, the choice of varieties by farmers is influenced by type of production ecology, yield, duration of production cycle, market quality attributes such as length,

thickness and colour of the grain. Factors limiting optimum output and quality include water availability and level of inputs utilization at the farm level. Farmers are generally resource poor and lack adequate financial outlay that can enable efficiency in input utilization.

- High costs of inputs particularly fertilizers and labour is a major constraint to increased output quantity and quality among farmers. For example in Kano cluster 93.2%, 33.2%, and 62% of farmers interviewed indicated that fertilizer, labour and land preparation inputs respectively constitute the highest cost areas of rice production. Fertilizer costs and water un-availability are critical factors that can affect the sustainability of rice production enterprises. Many farmers indicated that inability to secure adequate fertilizers and water for supplementary irrigation can cause reduction in output in terms of both quantity and quality. Farmers obtained inputs from open markets and the strategy of bulk purchase using the platform of producer's association is one means of minimizing the costs of inputs particularly among farmers in the Kura- Kano axis.
- Major changes observed by farmers along the trajectory of rice commodity chain were; introduction of new varieties that are high yielding and resistant to diseases and pests by extension agents and projects, establishment of public irrigation schemes in Kano and Hadejia, increase in demand for local rice which led to increase in production and processing activities within the rice production zones. Extension and technical support in areas of rice production and processing technologies especially in Kano clusters is becoming more and more available to farmers as a result of projects and programmes such as SG2000, IITA interventions, MARKETS and PropCom projects.
- The motive for producing rice crop in all the clusters studied was mainly profit and means of livelihood. Creation of employment opportunities for others and food security are some of the most important non-income benefits of rice production mentioned by the farmers in all the clusters.
- Production and market risks associated with rice production enterprise include; water shortages and or flood as a result of drought or poor water flow along river channel, high input costs, and poor prices at harvest period and theft of harvested paddy in the fields.

Parboiling

- Parboiling paddy as an enterprise is a cottage industry in the clusters. Most rice producing households also operate a parboiling unit.
- Household parboiling units are usually established with the aim of parboiling owned rice but due to increasing demand for parboiling services such units' also parboiled rice for other processors on commercial basis.
- Private parboilers who operate outside the household mainly for commercial services are not many in number. There are also male private millers with parboiling units or facilities who provide parboiling services for a fee.
- Parboiling is women dominated enterprise in all the clusters studied, except in Tudun Wada where private male parboilers are found in significant number. In market based areas such as Dawanau private male parboilers are also found. In Kano cluster, 71.2 % of the parboilers were women and 66.7 % in Jigawa and Katsina

clusters each and 100% in Kaduna cluster were women. Male parboilers constitute 28.8% in Kano , 33.3 % each in Jigawa and Katsina.

- A standard grade of parboiled rice is characterized by long unbroken grains which do not break during milling. 100% of parboiles in Kano and Katsina clusters and 60% and 33.3% in Jigawa and Kaduna clusters respectively believed that such a standard product exist.
- Parboiling practices in terms of equipment, skills and method are virtually the same across clusters. The main parboiling equipment includes full or half drum, aluminum pots, mats, tarpaulin, cemented floor for drying. The price charged for parboiling services varies from one location to another. For example, in Kura-Kano corridor the price charged per bag of 100kg paddy is about NGN150 and in Garko it is about NGN350 per bag of 100kg paddy.
- Market and operational risk in parboiling include exposure to heat since parboilers generally used firewood as source of energy for parboiling. This was mentioned as a challenge by 40% of parboilers enumerated in Jigawa cluster. Poor quality parboiling as a result of paddy contamination at field level and or improper drying of parboiled paddy can affects the quality of the end product.

Milling

- Millers in all the study locations were men. Women are not directly involved in milling, but around each milling unit you may found a number of old women and young girls who usually provide winnowing services to processors. The milled rice is winnowed in order to properly separate the rice husk from the grain. The cost of this additional processing is charged separately from that of milling. Milling units usually consists of two types of machines; diesel powered and electricity powered as a strategy to secure alternatives. Millers prefer to use the electric types because they are more efficient in terms of output quality and cost of operation. But generally millers use more of the diesel generators than electric type due to poor and inadequate supply of electricity which characterize the general business operating environment. This is particularly the case in the Kura processing cluster where for about a year the electricity supply infrastructures are faulty without repair.
- Operation and ownership of milling enterprise are in most cases different. The owner usually employed an operator who is a skill person to operate the milling machine and unit. The operator is responsible for recruiting casual workers who will assist him in maintaining and operating the milling unit. Millers provide milling services to their customers for a fee which is usually charged per bag of paddy milled. But millers also milled their own paddy for sale, thus most owners of milling units are also traders. Such integration is more common among relatively large millers who possess the capital outlay to buy their own paddy for processing but even among such categories milling owned rice is combined with provision of milling services to others for a few.
- Milling enterprise is usually not integrated with parboiling. Customers or processors bring in their rice ready for milling. Parboiling is usually a separate activity which is done usually by women who operate parboiling unit located in their own household as a cottage enterprise. This scenario is generic in all the clusters of rice studied, expert in Hadejia where some few integrated units where found. Such units are proving both parboiling and milling services together and are fitted with improved

milling and parboiling equipment. A processor can therefore pay for both parboiling and milling services per bag.

- Quality of milling is very much depends on quality of parboiling and drying. The type and quality of paddy is also another factor. Well parboiled rice is one that is dried evenly and with a good colour or texture. This type of processing gives a better output well milled.
- Millers are generally not using polishers in their workshops or plants. In Kaduna about 73.3% of the millers interviewed indicated using polisher in milling and only 9.4 % used polisher in Kano clusters. We can technically talk about hulling not milling. Because polishing is not done. Millers achieved polishing by milling the rice twice (double milling). In Garko cluster, where rural women are actively involved in rice processing and trading chain a different scenario is obtained. In this case the women processed their own rice using slightly different method from that obtained in other places. The rural women are parboilers themselves and they have special skills and method of parboiling that produced a quality of parboiled paddy which they take to millers for milling in Garko town. After the milling the women used a very fine sand material which is obtained locally for polishing the milled rice and this gives the rice additional brightness and texture which attract higher prices and consumer preference. In other cluster such as Makarfi traders uses vegetable oil in polishing milled rice for improving quality.

Trading

- Three types of traders were identified;
 1. Those involved in purchasing paddy rice from farmers and selling it to other traders and processors
 2. Those involved in purchasing paddy rice from farmers and other traders and then processed the paddy into milled rice and sell to both retailers and consumers.
 3. Those who purchase only processed rice and sell to other traders, consumers and other buyers directly.
- In the Kura-Kano axis the second category is the predominant, while in Dawanau Rimi and Sabon Gari market the third is the predominant. But in Dawanau Market the first and second category can also be found in significant number. In other areas that is Garko and Tudun Wada the second and first category are the predominant. In Hadejia, most traders are also farmers and processors and thus the second category is the predominant. In Makarfi and Dandume the first category is predominant and the second category can also be found.
- Traders are involved in marketing of various types of grades. In Kura-Kano axis there are various types of rice traded at the market level. The most important among these include; SIPI, WITA and Yar-Das. In Tudun Wada and Garko, Dukusa, Yar-Das, Jamila, Santana and Kilaki are the common grades traded. In the production clusters local traders are in most instances farmers and at the same time processors. Hence they used similar terminologies used by farmers in naming the various rice grades they traded. In Hadejia, Dadume and makarfi which are also production- processing clusters traders used almost the same terminologies which farmers used for the same reason. In Kano market based clusters the grades mostly traded include; Yar-Tudun Wada, Yar-Garko, Yar-Niger, Yar –Banki and Yar-Kura. Traders in these

clusters are not farmers and they operate in urban centres where rice production is virtually not practice and thus are using different terminologies which are related to the production and or processing origin of the rice to denote the type of rice grades they traded.

- Opinions of traders in all locations (Kano-84.0%, Jigawa-86.67%, Kaduna-53.337% and Katsina-40%) shows standard products exist in all the locations. The availability of training on quality improvement is not common in all the clusters studied. In fact only fifteen percent (15%) and 6.67% of traders operating in Kano and Jigawa areas indicated that training is available to them; while only 4.0% of traders in Kano received such training.
- The factors which influence people choice for the commodity are basically product's quality and price. Results from the survey revealed that traders operating in Kano area (87.0%), Jigawa (93.33%), Kaduna (93.33%) and Katsina (100) observed that their customers showed higher preference to quality compared to price. Marketing of higher quality product is also important to the traders (Kano-93.0%, Jigawa-93.33%, Kaduna-86.67% and Katsina-100%).
- Quality attributes which traders are using in rice trading system include; mainly long and well filled grain, whiteness and dryness which are the standard quality attributes among traders in all the clusters. At the urban level there is marked price differential among different grades with Yar- Garko and Yar-Tudun Wada rated as high grades with higher prices compared to other grades. At the retail level however, there is marked interplay between quality and price among consumers. For instance in RIMI market in Kano, Yar-Garko is the best grades selling at relatively higher price, compared to Yar-Kura which is the cheapest but the aggregate market demand is in favour of Yar-Kura despite its lower quality. Consumers therefore tend to sacrifice quality for economic reason.
- Market risk include unstable prices within seasons , insecurity and accidents during transit, credit purchase arrangement especially at the wholesale level is also another risk element that leads to bad debt and loss of capital among traders.
- Non income benefits of trading include creation of employment for other people, increased interaction and linkages with other areas and organizations as a result of proper networking and bonding of social capital in form of traders associations.

Cross cutting issues

- Based on the qualitative interviews, it was noted that market chain actor's perception and knowledge about HIV/AIDS is high especially in terms of awareness and responsiveness to the issues particularly among the youth. Youth are generally aware of precautionary measures that they can take to prevent the spread of the diseases. Most people have knowledge of the means through which the disease can be acquired or spread and of its pandemic tendencies. Those affected face the tendencies of being stigmatized by their communities. However, the results of the enumerator survey indicated that the issue of HIV/AIDS and its implication is not taken seriously by majority of farmers and other market chain actors despite their awareness on its severe consequences on human lives and livelihoods. This opinion was indicated by 93.6%, 86%, 100% and 76% of farmers in Kano, Jigawa, Kaduna and Katsina clusters respectively. For parboilers, millers and traders in Kano cluster this opinion was indicated by 91.3%, 52% and 89% respectively.

- Major resources that are used among farmers and other actors for productive and reproductive purposes in the rice producing and processing clusters include; land, water and forest resources. The results of the survey indicated that land conflict among farmers and other actors across the clusters is not a major issue as indicated by 62.8% and 76% of farmers in Kano and Jigawa clusters and 98% each in Kaduna and Katsina clusters. The nature of land conflict generally experienced include; the sporadic farmer- pastoralist conflict over grazing land encroachment, the issue of land fragmentation due to increase in farming population and land tenure system, double allocation of land by irrigation project authority as obtained in Jigawa cluster only, trespassing of farm land by transporters, pedestrian and animals and land encroachment as a result of expansion of residential areas.
- The issue of soil fertility status is dynamic and it is influenced by many factors which are both biophysical and socio-economic. Continuous cropping, low use or application of farm yard manure, soil erosion and improper use of chemical fertilizers were some of the factors causing changes in soil fertility status in the rice production clusters as mentioned by the farmers interviewed. 56%, 39.5%, 41.7% and 70 % of farmers in Kano, Jigawa, Kaduna and Katsina clusters respectively indicated that fertility of soil is getting worse.
- Fuel wood is the main source of energy used by rural women for cooking and also used by rural entrepreneurs such as rice parboilers, blacksmith and so on. The use of fuel wood over time has in most cases resulted to decline in forest resources with severe environmental and climatic consequences. In the rice producing clusters under consideration majority of the farmers and other market chain actors in most of the cluster indicated having difficulty in accessing fuel wood.
- Majority of farmers (Kano-80.8%, Jigawa-84%, Kaduna-66% and Katsina-70%) indicated that water as a resource is not easily accessible. Some of the measures that can be taken in improving access to water include; construction of water wells, dams and adequate release of irrigation water by irrigation projects.
- In addition to reproductive roles at the household level, women in rural areas particularly in production areas are usually engaged in value addition and transformation of agricultural product. Such activities include rice parboiling, trading of commodities and in some cases women are also involve in production enterprises. Majority of the market chain actors across the clusters indicated that women involvement in business does not cause any conflict. 90%, 93.3%, 86.7% and 73.3% of parboilers in Kano, Jigawa, Kaduna and Katsina clusters respectively, whom where mostly women indicated that women involvement in business do not cause any conflict with their spouses. The same opinion was expressed by 85.6%, 84%, 68% and 76% of farmers in Kano, Jigawa, Kaduna and Katsina cluster respectively.

1.0 INTRODUCTION

The production, processing and marketing of cash crops such as rice, maize and groundnut are major sources of income for maintaining livelihoods particularly among people living in the rural areas of Nigeria. However majority of those engaged in such enterprises are resource poor and constrained. They operate in a context which is characterized by poor access to commodity and service markets, poor access to information and technology and thus their livelihoods are not improving. PropCom is a project aimed at facilitating functionality and efficiency of Nigerian commodity and service markets in such a way that these markets work for the poor. The goal is to improve livelihood of the poor by promoting their access and growth in commodity and service markets in line with the goals of poverty alleviation as envisaged in NEEDS and the attainment of the Millennium Development goals. During the first implementation of its catalytic activities, PrOpCom will focus on will focus on rice as the primary commodity.

In order to establish an effective monitoring and evaluation system that would effectively measure progress towards achievement of the project objectives and targets, baseline information needs to be collected and documented. Based on this background this baseline survey of rice value chain in the Kano catchments area is carried out as part of the activities aimed at promoting pro-poor markets opportunities for enhancing income, productivity and livelihoods.

The main objectives of the survey were to:

- Provide baseline information against which progress towards programme objectives and targets identified in the project (PropCom) logframe can be measured.
- Collect data related to all Objectively Verifiable Indicators(OVIs) in PropCom's log frame
- Provide basis of comparison between the different sites where the project catalytic activities are undertaken

1.1 Trend in Rice Production in Nigeria

Indigenous rice species *Oryza glaberrima* Stued has been grown in Nigeria for hundreds of years (Hardcastle, 1959), but the higher yielding exotic type (*Oryza sativa* L.) was introduced into the country around 1890 and today accounts for most of the rice grown in Nigeria. Rice is presently one of the most important staple food crops in Nigeria and is grown mainly by smallholder farmers. Rice formerly occupied a relatively obscure but elitist position in the dietary habits of Nigerians, today it has become an important staple food for majority of the citizenry. In the past, the production of rice was mostly at the subsistence level to meet the food needs of the family. However, in recent years rice production is becoming increasingly geared for the market, becoming an important food and cash crop to the smallholder farmers in Nigeria.

The national average annual production of rice in Nigeria has increased from 207,200 tons in the early 1960s to about 3,001,028 tons in th late 1990s, while the total area under rice production has increased from about 179,200 ha in the early 1960s to about 1,742,582 ha in the late 1990s (fig.1). In 2000 around 6.7% of the 25 million ha cultivated with various crops was under rice.

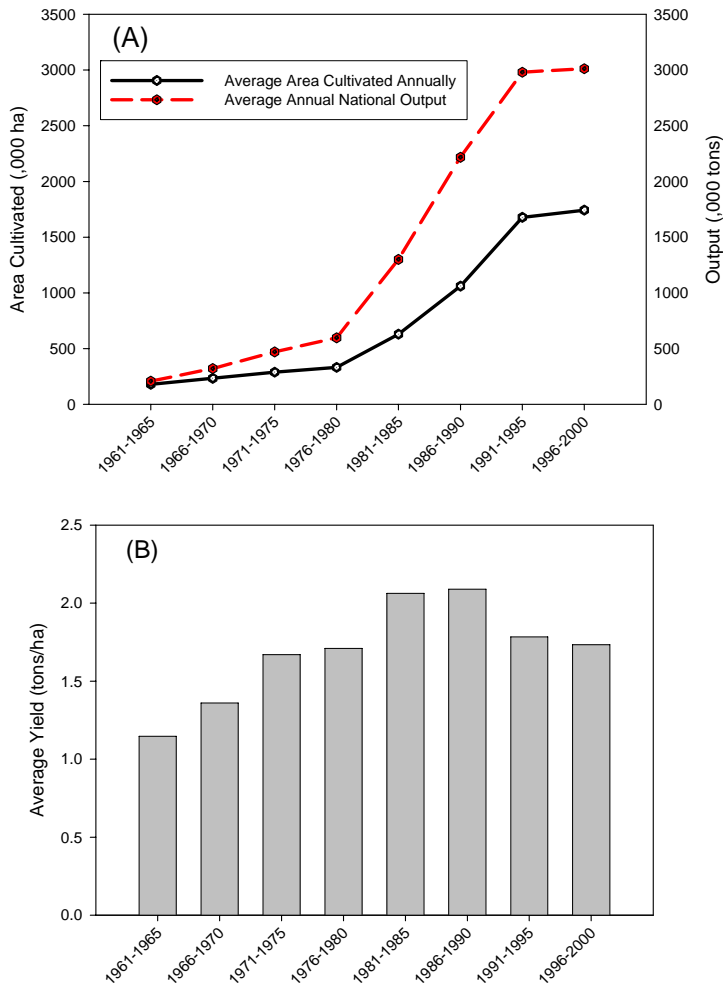


Figure 1: Rice production trends in Nigeria between 1961 to 2000 (A) average area cultivated per annum (B) average national annual output (data source: PCU, 2002)

Successive governments in Nigeria have continued to encourage rice producers to increase their output so as to meet both domestic and market demand. Such efforts include the establishment in 1953 of the Federal Rice Station (now the National Cereals Research Institute, NCRI), which between 1954 and 2002 has released 54 varieties to serve different ecologies in Nigeria (Ogundele and Okoruwa, 2006). Despite these efforts and the steady increase in the hectareage and annual total output from the 1960s to date rice yields have generally remained quite low (fig. 1). According to Ogundele and Okoruwa (2006), average national rice yields in 2000 was 1.85 tons/ha during the wet season and 3.05 tons/ha during the dry season. These values are very low compared to 3.0 and 7.0 tons/ha respectively in rain-fed and irrigated systems in places like Senegal and Cote d'Ivoire.

2.0 METHODOLOGY

2.1 Description of the study area

Kano State is one of the most important rice producing areas of the country. This is largely due to the more than 22,000 ha of irrigated schemes of the Hadejia Jama'are River Basin Development Authority located in the state, the vast Fadama areas that were further developed under the erstwhile National Fadama Development Project and the upland production areas of Tudun Wada and Rogo. Kano also has large processing clusters which are scattered in production centre areas like Kura, Karfi, Kwanar Dawaki, Tudun Wada, Bunkure, Garun Mallam, Chiromawa etc. These clusters, which have a combined number of about 400 mills, are the major means of rice processing in the State. The main types of mills used are the small Engleberg mills which typically process between 150 to 300kg per hour of paddy and are operated using electric motors or diesel engines. There are also a number of medium-sized mills which have the capacity to process between 700 to 1200 kg of paddy per hour and are scattered in a number of production centres including Kwanar Dawaki, Garun Mallam and Kura.

The main markets for commodity trading where rice is sold in large volumes include: Dawanau, Sabon Gari, Rimi, Yankaba and Kurmi markets. Local rice is also traded as a major commodity in most of the 44 Local Government Areas of the State where both local traders and those from elsewhere go to buy rice.

Rice is brought into Kano from other states like Kaduna, Katsina and Jigawa, Bauchi , Taraba, Yobe etc. This is processed and sold in the Kano markets which serve a population of about 5,000,000 people.

The study area for the baseline study covers the Kura-Kano rice corridor with a sub-sample in 3 other rice production/processing clusters that also are within the Kano market catchment basin. These clusters were Hadejia in Jigawa State, Makarfi in Kaduna State and Dandume in Katsina State.

2.2 General methodology

The entry points used for the identifying respondents for inclusion into the survey sample were the existing associations/groups, in the communities. Alternative means used include field facilitators of the Kano River Irrigation Project (KRIP) and the ADP field extension agents in the area as a lead to the respondents. The associations of the various professional categories (farmers, millers, traders, par boilers) were used for organizing the focus group discussions and conducting the enumerator survey. The methodology of the survey was explained to the contact persons so as to ensure representation of gender, age, size of operation and other socio-economic and location characteristics in the focus group composition and samples for the enumerator survey.

2.2.1 Focus Group Discussions

Six teams of two scientists each were used in conducting the Focus Group Discussion. One of the scientists in each team served as Facilitator and the as both Moderator and Note taker. The discussions were guided by a checklist which consists of open ended questionnaires. Three teams were allocated to Kano clusters in which a total of 21 FGDs were conducted across the various categories of the market actors in the Kura-Kano corridor and other sub-clusters. The other teams were each allocated to a state for the conduct of the FGDs.

In conducting the group members lead and to some extent dominate the discussion because as insiders they know better about their own affairs. The moderator was responsible for keeping the discussion on track so that the information required was obtained as accurately as possible. Two rounds of FGDs were conducted; the first round was exploratory while the second was conducted to provide missing information and further proves the information obtained from the first round of FGDs and from the enumerator survey. In the Kano area two FGDs per category of market actors were conducted in each round and in the other three outlying clusters only one FGD per category were conducted. Female scientist were used in conducting the FGDs for the par boilers who were predominantly women in most of the locations with the exemption of Tudun wada and Dawanau sub-clusters in Kano State and Hadejia in Jigawa State where men operates as par boilers.

Two rounds of FGDs were conducted in each of the locations. In the first round the teams makes preliminary contacts with the relevant stakeholders to introduce the study and obtained cooperation and reached agreement on the timing and dates for conducting the FGDs with the different categories of the market chain actors. Part of the preliminary exercise include discussion on planning the study with key stakeholders such as officials of the Kano River Irrigation Project in Kura, field extension staff of the various Agricultural Development Projects and Local Government Agric Departments in the study sites.

The second round of the FGDs was conducted in order to provide some missing information gaps that still exist after the conduct of the first FGDs and the enumerator survey and also to clarify some information that needs further proving. Issues covered during the second FGDs include mainly;

- Cross-cutting issues such as HIV/AIDS, soil fertility and resource control and use.
- Proof on ranking and names of varieties produced , processed and marketed

Key informant interviews with scientist and extension agents in the study sites were also held. Such interviews were conducted in order to obtained specific information such as scientific names of rice varieties mentioned in local terminologies by the various market actors studied. During the second FGDs a summary of the major findings from the first FGDs and enumerator survey were shared with the main stakeholders (associations, field staff and so on)

Case studies were also conducted .The case studies were conducted in order to establish enterprises budgets that were used in identifying and analyzing costs and benefits structure of the major enterprises (production, parboiling, milling and trading) along the rice commodity chain.

2.2.2 Enumerator survey

In conducting the enumerator survey the same six teams of scientists were used as supervisory units. In each of the location enumerators were recruited and training sessions were held for the enumerators by the teams of scientists. The training involves brainstorming on the contents of the questionnaires and also pre-testing exercises to enable the enumerators become acquitted with the content and strategy for conducting the questionnaires among the respondents. The size and distribution of samples across various categories of the market chain actors and locations as given in the TOR were found to be consisted with what was obtained during preliminary discussion with key informants among the rice value chain stakeholders and was therefore maintained and targeted. Table 2.2.1

gives the size and distribution of samples used for the enumerator survey in the various study sites.

Table 2.2.1: Sample size for enumerator conducted survey

Location	Target Group			
	Farmers	Parboilers	Millers	Traders
Kano				
Dawanau		10	5	20
Sabon Gari			5	10
Kasuwar Rimi				10
Chiromawa	40	10	10	10
Kwanar dawaki	20	10	10	10
Karfi	20	10	10	10
Kura	40	10	10	10
Tudun Wada	25	15	10	10
Garko	25	15	10	10
Garum Mallam	40			
Bunkure	40			
Other Clusters				
Katsina	50	15	15	15
Kaduna	50	15	15	15
Jigawa	50	15	15	15
Total	400	125	115	145

2.3 Limitations

The limitations of the study are described as the various constrained experienced which are technical, methodological and logistical. Some of the technical limitations were noticed in the content and structure of the survey instruments. For instance cross cutting issues involving HIV/AIDS and resource control and conflict which are more qualitative than quantitative where not included in the qualitative FGDs discussion guides. This was however corrected during the conduct of the second FGDs in which such issues were included in the checklists. The questionnaires used for the enumerator conducted surveys contained a lot of qualitative variables which were already covered in the FGDs and need not be repeated again. Questionnaires are better administered if they contained more of quantitative variables than qualitative. These mixes also create some difficulty in analyzing the data obtained from the enumerator conducted survey because most analysis toolkits like that of excel or SPSS are more easily used with quantitative variables.

The questionnaires and sample sizes were bulky; as a result the time and finance budgeted for the survey was found inadequate and extra days and staff had to be recruited. Enumerators observed that some questions were commonly asked and they may not be necessarily relevant to all categories.

3.0 RESULTS

3.1 Rice production

3.1.1 Socio-economic characteristics of farmers

The result indicates that farming is a male dominated enterprise in all the rice production clusters. Except in Kano clusters and Makarfi cluster in Kaduna state were 0.8% and 10 % respectively of the farmers interviewed were females. In terms of marital status majority of the farmers in all the clusters are married. The results indicated that over 90% of the farmers are married, except in Hadejia were only 62 % of those interviewed. Separated or widower was found in Makarfi only.

Many of the farmers are small or medium size holders. In Kano cluster 30.4% of the farmers have farm size in the range of 1.5 to 3 ha and 25.5% fall within the range of 3-6 ha of farm sizes. Only 8.8% are within the range of 10-100 ha of farm size. In Jigawa state majority (52%) of the farmers have farm sizes within the range of 0.5-1.5ha and 36% are within the range of 1.5 to 3ha of farm sizes. In Kaduna cluster 38% and 36 % of the farmers falls within the range of 1.5 to 3 ha and 3 to 6 ha of farm sizes respectively. In Katsina cluster 24% and 28% of the farmers fall within the ranges of 3 to 6 ha and 6 to 10 ha of farm sizes respectively and one farmer representing 2% of the total was within the range of 100 to 1000 ha of farm size.

The level of rice production activity and skill of producer could be assessed based on the number of years spent in farming which can be determined by years of experience in farming enterprises. Table shows a lot of variation in terms of years of experience of farmers from one cluster to another. In Kano clusters where rice production is a well established business venture, majority representing 30.8 % of the farmers interviewed have between 16-20 years of experience in farming and 17.6 % had more than 20 years of farming experience. In Katsina cluster majority of the farmers (64%) had more than 20 years experience in farming which is an indication of the predominance of farming as a means of livelihood in the area. In Kaduna cluster, majority of the farmers representing 46% of the total had 1 to 5 years experience in farming and 34 % had 6 to 10 years of experience. This is an indication of the likely dominance of young farmers or history of rice production as an economic activity. This, result is similar to what was obtained in Jigawa cluster in which the majority(38%) had experience of between 6 to 10 years in farming , while 28 % and 20 % had experience of between 1 to 5 years and 11 to 15 years respectively.

In terms of age, it can be seen that in Kano cluster those within the age range of 36 to 45 years are the majority. This is an indication of the dominance of able bodied middle-aged farmers in the cluster and the same was obtained in Kaduna where 40% of the farmers fall within this age category. In Katsina cluster, 42 % (majority) of the farmers are within the age category of 46 to 55 years, while 26 % for both the age brackets of 46 to 55 and more 55 years. This is an indication of the dominance of nearly old people in rice production enterprise which may have negative implication in terms of sustainability and dynamics of the business. In Jigawa cluster, majority (44%) of the farmers were below 26 years of age, which implies possible dominance of young people in farming business in the state. Generally, the age distribution across clusters seems to tally with that of years of experience in farming business.

The level of education of the farmers also varies from one cluster to another. In Kano cluster, majority (39.6%) of the farmers possess primary level education, 19.2 and 14 % possess secondary and tertiary level education respectively. In Jigawa cluster, 40% of the farmers possess secondary education and 36 % had tertiary level education. In Makarfi (Kaduna Cluster), 24 % and 20 % of the farmers had primary and secondary education and another 20 % had tertiary education. Farmers with no formal western education constituted

27%, 8 %, 36 % and 56 % in Kano, Jigawa, Kaduna and Katsina clusters respectively. Generally, the level of education across clusters among farmers seems to tally very well with their age distribution. More of old people were found in Katsina cluster and also more of uneducated. There is reason to believe that in rural areas the majority of the educated are young or middle-aged people. In this context, majority of the farmers are educated in all the clusters and such may have positive implication on innovation, receptivity to changes and dynamics of the rice value chain.

The household size of farmers across the clusters shows some significant variation. In Kano cluster majority of farmers (56.8%) have household size in the range of 10-15 members. In other clusters majority 40%, 38%, and 50% in Jigawa, Kaduna and Katsina clusters respectively, where also in the range of 10-15 members' household size. In Hadejia cluster, 46% of the farmers have household size with less than 10 members.

Farming is the primary occupation of majority of farmers in all the clusters. Other occupations such as salaried government work (civil servant) and trading are also important among the farmers in all the clusters. For instance, in Kano cluster 79.6 % of farmers have farming as their primary occupation followed by salaried government work which constitutes 11.2 % of the total. In Jigawa, trading was rated as the primary occupation by majority ((40%) of the farmers and salaried government work followed with 30 %. In Kaduna and Katsina clusters, 58% and 76 % of the farmers respectively rated farming as their primary occupation.

In terms of income distribution, majority of the farmers in all the clusters fall within the income category of N50, 000 to N200, 000 with percentage of 42 %, 74%, 42 %, and 26% in Kano, Jigawa and Katsina respectively.

Table 3.1.1: Socio-economic characteristics farmers

Characteristics	Kano Area (n=250)		Hadejia(n=50)		Makarfi(n=50)		Dandume(n=50)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Sex								
Male	248	99.2	50	100	45	90	50	100
Female	2	0.8	0	0	5	10	0	0
Marital Status								
Single	18	7.2	19	38	3	3.0	0	-
Married	232	92.8	31	62	46	92	50	100
Separated/Widowed	0	0	0	0	1	2	0	0
Divorced	0	0	0	0	0	0	0	0
Category of farm size in hectares								
Less 0.5	8	3.2	5	10	0	-	7	14
0.5 – 1.5	41	16.4	26	52	3	6	0	-
1.5 - 3	76	30.4	18	36	19	38	9	18
3 – 6	63	25.2	1	2	18	36	12	24
6- 10	39	15.6	0	-	8	16	14	28
10- 100	22	8.8	0	-	2	4	7	14
100 – 1000	0	-	0	-	0	0	1	2
Greater 1000	0	-	0	-	0	0	0	0
Years of Experience								
1-5	23	9.2	14	28	23	46	1	2
6-10	60	24	19	38	17	34	3	6
11-15	46	18.4	10	20	9	18	7	14
16-20	77	30.4	1	2	1	2	7	14
>20	44	17.6	6	12	0	0	32	64
Age Group								
Below 26	23	9.2	22	44	6	4	1	2
26-35	65	26	17	34	10	20	2	4
36-45	84	33.6	8	16	20	40	13	26
46-55	61	24.4	3	6	14	28	21	46
>55	17	6.8	0	0	0	0	13	26
Education								
Primary	99	39.6	8	16	12	24	14	28
Secondary	48	19.2	20	40	10	20	5	10
Tertiary	35	14	18	36	10	20	3	6
None	68	27.2	4	8	18	36	28	56
Household Size								
<10	31	12.4	23	46	21	42	3	6
10-15	142	56.8	20	40	19	38	25	50
16-20	30	12	2	4	5	10	8	16
21-25	19	7.6	2	4	2	4	4	8
26-30	81	7.2	1	2	0	-	6	12
>30	10	4.0	2	4	3	6	4	8
Primary Occupation								
Farming	199	79.6	12	24	29	58	38	76
Trading	16	6.4	20	40	7	14	3	6
Processing	6	2.4	0	-	0	-	0	-
Housewife	0	-	0	-	4	8	0	-
Service	1	0.4	1	0.4	0	-	0	-
Civil servant	28	11.2	15	30	9	18	9	18
Income (₦)Group								
50,000-200,000	105	42	37	74	21	42	13	26

0.2-0.5 million	71	28.4	11	22	16	32	12	24
0.5-1.0 million	27	10.8	0	-	6	12	7	14
1.0-3.5 million	15	6	0	-	2	4	3	6
>3.5 million	5	2	0	-	0	-	2	4
Don't Know	18	7.2	2	4	3	6	11	22
No Response	9	3.6	0	-	2	4	2	4

3.1.2 Production Systems, Farmers strategies and constraints

Majority of rice farmers in Kano and other outlying locations studied are operating under a context of increasing resource constraints. Their production and marketing strategies are dependent on factors that are both exogenous and endogenous to the production systems under which they operate such factors include access to inputs and credit, access to markets, technical support and extension, access to water for supplementary irrigation and so on.

Three production systems were identified as follows; Low land, Upland and developed irrigated perimeter (e.g. KRIP and HVIP) with varying constraints and opportunities in terms of water availability, cost of production, variety and quality of crop. In Kura-Kano Corridor rice production is done mainly in the irrigated perimeter of the Kano River Irrigation Project (KRIP) and the farmers are generally small scale producing rice mainly during the wet season but relying heavily on supplementary irrigation as a strategy to improve and sustain productivity, of rice farms due to erratic rainfall which characterize the farming system under which they operate. While in Garko and Tudun wada low land and upland system are mainly used for rice production. Hadejia production systems have various similarities with that of Kura-Kano axis because of the presence of Hadejia valley Irrigation Projects, but in addition the production of swamp rice is common in Hadejia areas which provide additional advantage for producers. In Makarfi and Dandume, upland rice production system is the predominant with few farmers operating in low land Fadama areas where opportunities for supplementary irrigation exists through the use of tube wells and motorized water pumps.

The results of the enumerator survey in Table 3.1.2 shows that in Kano cluster 26.8%, 33.2% and 40 % of the farmers are operating in the upland, lowland Fadama and irrigated perimeter production systems respectively. In Jigawa cluster 84% and 16% of the farmers interviewed are producing rice in the irrigated perimeter and lowland Fadama systems. In Kaduna and Katsina clusters 82% and 96% of the farmers respectively are operating in the upland production systems, while only 18% and 4% respectively are operating in the low land Fadama.

Various food and cash crops are grown in the different rice production clusters. In Kano cluster crops such as groundnut which is mainly produce as a cash crop and also its fodder used as supplementary feed for domestic animals. 67.2 % of the rice farmers mentioned ground as the other crop the produce. Maize which is as both cash and food crop is also another crop as indicated by 53.6% of the farmers in Kano cluster. In the dry season farmers used their rice fields to produce vegetables such as tomato and onion, 49.6% of the farmers mentioned tomato as one of the dry season crop they produced. In Jigawa cowpea is the other most important crop among rice farmers, 60% of the farmers indicated producing cowpea in addition to rice and millet was produced by 32% of the farmers.

The estimate of the average farm size cultivated in the production of crops in each of the cluster is given in Table 3.1.2. It can be noted that on the average 5.01ha, 1.68ha, 4.68ha and 6.28ha were cultivated in Kano, Jigawa, Kaduna and Katsina clusters respectively. The largest value was obtained in Katsina cluster which is an indication of the presence and influence of medium to large scale producers as can be seen from the socio-economic characteristics. In Kano and Kaduna, the average value is also relatively higher which is an

indication of presence and influence of medium scale producers. In Jigawa the least value was obtained and this is an indication of the presence and influence of small scale producers (Table 3.1.1 refers)

Table 3.1.2. Production systems and crops grown

Variable	Kano (n= 250)	Jigawa(n= 50)	Kaduna(n= 50)	Katsina(n= 50)
Main Crops grown				
Rice	250(100%)	50(100%)	50(100%)	50(100%)
Maize	134(53.6%)	9(18%)	30(60%)	32(64%)
Groundnut	168(67.2%)	-	1(2%)	2(4%)
Cowpea	88(35.2%)	30(60%)	13(26%)	7(14%)
Millet	27(10.8%)	16(32%)	-	2(4%)
Cotton	-	-	-	37(74%)
Onion	82(32.8%)	8(16%)	-	-
Tomato	124(49.6%)	12(24%)	-	-
Sugarcane	2(0.8%)	-	17(34%)	1(2%)
Sorghum	52(20.8%)	3(6%)	25(50%)	24(48%)
Water melon	8(3.2%)	-	-	-
Ranking of crops grown and importance.				
Rice (cash and food)	250(100%)	50(100%)	50(100%)	50(100%)
Maize (cash and food)	126(50.4%)	9(18%)	32(64%)	40(80%)
Groundnut (cash and fodder)	168(67.2%)	-	1(2%)	2(4%)
Cowpea(cash and Fodder)	88(35.2%)	30(60%)	13(26%)	7(14%)
Cotton (cash)	-	-	-	45(90%)
Sugarcane(cash)	2(0.8%)	-	17(34%)	4(8%)
Millet (Food)	27(10.8%)	16(32%)	-	2(4%)
Tomato	124(49.6%)	12(24%)	-	-
Mean area cultivated in hectares	5.01	1.68	4.68	6.28
Main rice ecology:				

upland	67(26.8%)	-	41(82%)	48(96%)
lowland	83(33.2%)	8(16%)	9(18%)	2(4%)
Irrigated perimeter	100(40%)	42(84%)	-	-
Varieties of rice produced				
SIFI	82(32.8%)	15(30%)		
WITA 4	70(28%)	8(16%)		
TOX 1011	12(4.8%)	7(14%)		
ITA 150	20(8%)		25(50%)	12(24%)
MAIZABUWA(NERICA(upland))	10(4%)		10(20%)	6(12%)
ITA 212	-	2(4%)		
SANTANA	21(8.4%)			
Yar –Das(upland variety)	15(6%)			
Yar-Yamidi(Local variety)	-	8(16%)		
Yar-Galaware(local variety)	-	8(16%)		
Yar kera(local variety)	10(4%)			
Yar-Digis(local variety)	10(4%)			
Jana	-	2(4%)		
Kilaki (upland varieties)	-			32(64%)

3.1.3 Quality standards and attributes of rice

Farmers attached various priorities to different quality attributes of rice, most of the attributes are market based such as length and brightness of grain and others are production based such as high yield and grain thickness or filled. The existence of a standard product which possesses all these characteristics was mentioned by most of the farmers in all the clusters studied. In Kano for instance 51.6% of the farmers said that a standard rice variety or product does not exist and 48.2 % were of the opinion that such product does exist. In Jigawa, Kaduna and Katsina clusters 90%, 96% and 98% respectively of the farmers interviewed indicated that a standard product does exist.(Table3.1.3c)

The results of the qualitative FGDs as summarized in Table 3.1.3a & b indicated that, in the studied rice clusters, farmers grow different types of rice varieties and the choice of the variety depend on quality issues such as yield, length of production cycle, market values like grain length, grain thickness(well filled) and brightness or colour of the rice grain. . In Kura-Kano corridor SIFI and WITA were ranked as the best quality rice varieties produced by farmers. In Garko cluster SANTANA and SIFI were the best quality and standard grades of rice produced and in Tudun Wada DUKUSA (SIFI, WITA4 and TOX1011) and YAR-DAS (Upland variety) were the best rice varieties in terms of quality and standard mostly grown by farmers.

In Hadejia rice cluster SIPI, WITA, GALAWARE and TOX were ranked as the best rice grades in terms of grain quality and market value. GALAWARE (African Wild rice variety) is the best among all these in terms of grain quality and market value, but its production is restricted to swampy Fadama area which is minor rice ecology in the area and thus its supply is not adequate. In Dandume and Markafi where upland production system is predominant rice varieties such as Maizabuwa (NERICA), YAR DAS, and JALLOF (ITA 150) were ranked in descending order as the best quality rice in terms of yield and market value. Production of NERICA is not widely adopted among farmers and thus Yar Das and JALLOF are the most important grades in terms of volume of production.

The results of the enumerator survey were to some extent consistent with the above background. In rice production farmers used different types of rice variety in the production processes. In Kano clusters, SIPI and WITA rice varieties are produced by majority of the farmers interviewed. 32.8% and 28% of the farmers produced SIPI and WITA respectively. In Jigawa cluster SIPI and WITA are the most important varieties grown by 30% and 16% of farmers respectively. In Kaduna cluster ITA 150 and NERICA are the most important varieties grown by 50% and 20 % of farmers respectively. In Katsina KILAKI which is an upland variety is mostly grown as mentioned by 64% of the farmers. In terms of ranking SIPI variety was ranked as the best grade by majority of farmers in Kano and Jigawa cluster as indicated by 50.8% and 46% of the farmers in the clusters respectively. In Kaduna and Katsina clusters ITA 150 was ranked as the best grade by 50% and 70% of the farmers interviewed respectively (Table3.1.3c)

From the surveyed results, it was found that generally in Kano clusters 36.8 % representing the majority of the farmers interviewed rated grain length as one of the most important quality attribute of a standard rice product and brightness of grain and high yield were each rated by 25.4% of the farmers. In Jigawa cluster, long grain, well filled grain and high yield were the most important qualities of rice mentioned by 68%, 44% and 30% of the sampled farmers. In Kaduna cluster, high yield and long grain were the most important quality attributes among 92% and 36% of farmers respectively. In Katsina cluster brightness of grain was the most important quality attribute among 92% of farmers' interviewed. It is important to note that long grain and high yield were important quality attributes among farmers in all the rice producing clusters, except in Katsina cluster where only 8% of the farmers rated high yield as an important quality attribute.

Farmers were generally of the opinion that quality of production is not yet at its best and thus can still be improved. Water availability for supplementary irrigation, poor seed quality and unavailability of low land rice production ecology were some of the factors limiting optimum quality of rice produced by farmers across the clusters.

It is important to note that, despite the variation in quality and preference of some varieties over others, prices for the various grades of paddy rice do not vary significantly in all the clusters. Demand for the best quality product is always higher but such is not leading to significant price variation, different varieties of paddy are sold at almost the same prices at the farmers' level. Significant price differentials are obtained at the processing levels, where the difference in quality due to processing influenced the price of the product. Quality of processed rice may be dependent on the inherent characteristics of paddy, processing technologies and skills used among others.

Information about quality and grades is fairly accessible among farmers in almost all the rice producing clusters. Such information is obtained from four important sources which include extension agents, traders, consumers and co-farmers. It is worth noting that, 44.4%, 62%, 2% and 60% of the farmers interviewed in Kano, Jigawa, Kaduna and Katsina do not have access to information on grades and quality. In Kano cluster, 23.6% of the farmers obtained information on grades and quality from consumers, 14%, 3.6% and 3.2 % from traders,

extension agents and co-farmers respectively. Thus, consumers turn out to be the most important source of information on grade and quality in Kano cluster and this may be related to the proximity of the rice producing areas of Kano to millions of urban consumers in Kano metropolis. In the other clusters of Jigawa and Katsina consumers do not at all serve as source of information on grades and quality. In Kaduna cluster only 2% of the farmers obtained information such information from consumers. In Kaduna cluster, 38%, 30% and 26% of the farmers obtained information on grades and quality from co-farmers, traders and extension agents respectively. In Katsina cluster, extension agents are the most important source of information (Table3.1.3c)

Buyers are expected to behave rationally and thus quality and price are two important and related factors generally considered by buyers in optimizing their purchase. For example, 66.4%, 64% and 50% of the farmers interviewed in Kano, Kaduna and Katsina indicated that price is the most important factor to buyers of rice commodity. Thus, in almost all the clusters, price turn out to be the most important factor buyers considered in making a purchase from farmers. For quality, 4.8% and 24% of farmers in Kano and Katsina respectively and 6% each in Jigawa and Kaduna clusters indicated that quality is another factor buyers considered while purchasing the commodity from farmers. Also, 16.8%, 30%, and 22% of farmers in Kano, Kaduna and Katsina clusters respectively reported that some buyers tend to consider both quality and price together and thus strategize to optimize purchase by achieving a fair compromise between quality and price. Majority of farmers (85.2%, and 100% in Kano and Kaduna clusters and 78 % each in Jigawa and Katsina clusters) in all the clusters generally agreed that a premium price for quality in the rice commodity chain exist. Thus, 78%, 86%, 100% and 26 % of farmers in Kano, Jigawa, Kaduna and Katsina clusters consider quality an important issue in their production enterprises (Table3.1.3c)

Training on quality improvement is not generally obtained by farmers and other people that form part of their production strategy within and outside their households. In Kano cluster only 19.6% of the farmers reported receiving such training themselves, while 14.4% and 6.8 % reported that one of their household members and hired workers respectively received such training. In Jigawa cluster none of the farmers or their household members received any form of training on quality improvement. In Kaduna clusters majority of farmers interviewed reported obtaining training on quality improvement and in Katsina only 2% received such kind of training. (Table3.1.3c)

Generally, training on quality improvement is not available to majority of farmers in Kano (80.4%), Jigawa (100%), and Katsina (98%) rice producing clusters.

Table 3.1.3a: Rice Quality Standards and Attributes: Farmers' Perspective in Kano Clusters

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Ranking of Varieties according to quality	<ul style="list-style-type: none"> • SIPI • WITA • DAS • SANTANA 	<ul style="list-style-type: none"> • SANTANA(WITA4) • Yar DAS • KERA(local variety) • KILAKI(local variety) 	<ul style="list-style-type: none"> • DUKUSA • DAS • SIPI • KWANDALA
Attainment of best quality product	WITA and SIPI	SANTANA and SIPI	
Factors limiting optimum quality of product	Water availability for supplementary irrigation especially for downstream farming communities	Best quality rice is one grown in lowland where irrigation facilities can be acquired for supplementary purpose	Water is a limiting input.
Prices for Various Grades	SIPI and WITA – NGN3000 per 100Kg bag of paddy	<ul style="list-style-type: none"> • Santana – NGN 350 per tiya. • Others = NGN 300 per tiya 	<ul style="list-style-type: none"> • DUKUSA – NGN 9000 per 100kg bag • Lower grades- NGN5000 to NGN7000 per 100kg bag
Existence of standard product	SIPI and WITA SIPI and WITA	SANTANA	DUKUSA
Qualities of a standard product	Palatability, Grain weight, Long, bright and unbroken grain when processed.	Long, bright and unbroken grain when processed.	Good grain filling, long, bright and unbroken grain when processed.

3.1.3b: Rice Quality Standards and Attributes: Farmers' Perspective in Other Clusters

Issues	Response		
	Hadejia	Katsina	Kaduna
Ranking of Varieties according to quality	<ul style="list-style-type: none"> • GALAWARE • SIPI • TOX • ITA 212 • WITA 	KILAKI	<ul style="list-style-type: none"> • Jallof • Das • Maibiro/Maizabuwa
Attainment of best quality product	GALAWARE is considered as the best but its quality can still be improved.	SANTANA and SIPI	Output quality not at its best now
Factors limiting optimum quality of product	<ul style="list-style-type: none"> • Water availability for supplementary irrigation especially for downstream farming communities • Quality seeds 	Best quality rice is one grown in lowland where irrigation facilities can be acquired for supplementary purpose	Mixing of different seeds varieties

Prices for Various Grades	GALAWARE, SIPI and WITA – NGN3000 per 100Kg bag of paddy	<ul style="list-style-type: none"> • Santana – NGN 350 per tiya. • Others = NGN 300 per tiya 	<ul style="list-style-type: none"> • Jallof –NGN 3,500 per 100kg bag of paddy • Yar-Das- NGN3000 per 100kg bag of Paddy • Yar-syria –NGN2800 per 100kg bag of paddy
Existence of standard product	GALAWARE , SIPI and WITA	SANTANA	Jallof is considered as standard product especially when processed.
Qualities of a standard product	Grain weight, Long and bright grain, high yield	Long, bright and unbroken grain when processed.	<ul style="list-style-type: none"> • Single variety types with no mix. • Well filled bags with no impurities • Bright grain when milled • Harvested matured and therefore well dried so that it does not turn moldy during storage.

Table 3.1.3c Quality and grades issues among sampled rice farmers

Variable	Kano(n=250)	Jigawa(n=50)	Kaduna(n=50)	Katsina(n=50)
Ranking of rice varieties				
SIPI(grain quality, high yield and disease tolerance	127(50.8%)	23(46%)	-	-
WITA4(Draught resistance, good tillering ability)	95(30%)	10(20%)	-	-
TOX(high yield, tolerant to pests and diseases)	28(4%)	7(14%)	-	-
NERICA(grain quality and suitable to upland)			20(40%)	5(10%)
Yar Galaware(low input requirement, high yield and quality)	-	10(20%)		
Kilaki, (draught resistance and grain quality)	-	-	5(10%)	10(20%)
ITA 150			25(50%)	35(70%)
Standard product				
Exist	121(51.6%)	45(90%)	48(96%)	49(98%)
Not exits	129(51.6%)	5(10%)	2(4%)	1(2%)
Qualities of standard product				
Long grain	92(36.8%)	34(68%)	18(36%)	-

Well filled grain	13(5.2%)	22(44%)	-	11(22%)
Well dried grain	22(8.8%)	7(2%)	-	1(2%)
Brightness of grain	64(25.6%)	8(16%)	1(2%)	46(92%)
High yield	64(25.6%)	15(30%)	46(92%)	4(8.0%)
Source of information on grades and qualities				
Extension agent	9(3.6%)	15(30%)	13(26%)	10(20%)
Traders	35(14%)	2(4%)	15(30%)	6(12%)
Consumes	59(23.6%)	-	2(4%)	-
Co-farmers	8(3.2%)	2(4%)	19(38%)	4(8%)
No access to information	111(44.4%)	31(62%)	1(2%)	30(60%)
Buyer preference				
Quality	12(4.8%)	3(6%)	3(6%)	22(44%)
Price	166(66.4%)	6(12%)	32(64%)	25(50%)
Both quality and price	42(16.8%)	-	15(30%)	22(44%)
Existence of premium price for higher quality	213(85.2%)	39(78%)	50(100%)	39(78%)
Importance of quality of production	195(78%)	43(86%)	50(100%)	13(26%)
Training on quality improvements:				
<i>Training available :</i>				
Received by self:	49(19.6%)	-	28(56%)	1(2%)
Household members:	36(14.4%)	-	1(2%)	2(4%)
Hired workers :	17(6.8%)	1(2%)	-	2(4%)
<i>Training not available</i>	201(80.4%)	50(100%)	22(44%)	49(98%)
Knowledge of Specific buyers and sellers :				
Know specific buyers:	176(70.4%)	22(44%)	48(96%)	1(2%)
Don't know specific buyers:	74(29.6%)	28(56%)	2(4%)	49(98%)
Advance payment incentives from buyers	33(13.2%)	22(44%)	16(32%)	1(2%)

3.1.4 Structural characteristics of rice value chain

The channel of marketing the crop in all the clusters is similar, with farmers selling their products to traders and processors in local markets and in most cases through the commission agents. Inputs for production are mostly obtained from private input sellers in the open market at commercial prices. Subsidized sources of inputs especially chemical fertilizers are not readily available and adequate except in Kura-Kano corridor where some farmers associations reported getting access to significant quantities of fertilizers from the state Agricultural Development Project (ADP) during the last cropping season. High costs of inputs particularly fertilizers and labour was the major constraints experienced by farmers across the clusters. Poor quality of seeds, poor market prices especially at harvest period and presence of commission agents in market places were some of the other constraints variously mentioned by farmers. This background seems to tally with the results of quantitative and wider enumerator survey conducted among sampled farmers across the clusters. From the survey results, 90.4 %, 96%, and 98% of farmers in Kano, Kaduna and Katsina clusters respectively sell their product directly to buyers and such buyers may include traders, processors and consumers. Selling through commission agents which is a minor channel in the other clusters, is the main channel of marketing the crop among all the farmers interviewed in Jigawa cluster.

In terms of cost of production the survey results in Table 3.1.4c, indicated that fertilizer, labour and land preparation inputs are the most important costs components in rice production. For example, in Kano cluster, 93.2%, 33.2% and 62 % of the farmers interviewed indicated that fertilizer, labour and land preparation inputs respectively constitute the high costs areas of rice production enterprise. From the table it can be noted that fertilizer was rated as the most important high costs input in rice production among farmers in all the clusters.

In relation to market functioning and efficiency, majority of farmers in all the clusters indicated that the market is functioning well. Some of the most common reasons given include; increase in demand for local rice, availability of land and water for rice cultivation due to presence of irrigation projects and availability of improved seeds. This opinion of market functioning well was stated by 80.8%, 96%, 78% and 90% of farmers in Kano, Jigawa, Kaduna and Katsina clusters respectively. The remaining farmers indicated that the market for the commodity is not functioning well and some of the constraints commonly mentioned include small profit margin due to high costs of production, poor prices of product due to glut and unethical conduct of traders and agents in the market.

From Appedix1a, it can be noted that in all the clusters farmers have access to various markets within proximity where they can sell the commodity produced. In Kano cluster about ten (10) market places are important selling points of rice commodity. 40% of the farmers sell mainly in Kura, Chiromawa, Kwanar Dawaki and Karfi markets which are all weekly rural markets where traders and other buyers come from various places to purchase both processed and paddy rice products. Kano main markets (Dawanua, Sabon-Gari, Rimi....) serve as another important selling point for 20% of the farmers interviewed in Kano cluster. In Jigawa cluster, two markets are very important selling point and these are Hadejia main market and Gujungu market where 60% and 20% of farmers respectively used in selling their rice products. In Kaduna and Katsina clusters all the farmers sell in Markarfi and Dandume rural weekly markets respectively.

From the FGDs results in Table 3.1.4a & b , it can be seen that, in Kura-Kano corridor, some of the major changes observed along the trajectory of the commodity chain include ; establishment of Kano River Irrigation Project(KRIP) which put river resources under control and thus making it more available throughout the seasons for irrigation and other uses. This development has positive impacts on farmers' production strategies especially in relation to water intensive crops such as rice. The introduction of new techniques of production such as

improved seeds, herbicides, tractor are other changes observed by farmers in Kura-Kano and the other production sub-clusters in Kano state. In Hadejia cluster a similar scenario was observed where the development of Hadejia Valley Irrigation Project (HVIP) had positive impact on rice production in the area in terms of making more land and water resources available to farmers. Improved technologies were introduced by extension agents. In Dandume some of the changes include, decrease in profitability of rice production due to increase in costs of production, use of poor quality seeds which leads to poor quality product is increasing among farmers. Maize is the most important crop in the area with rice taking the second position and becoming increasingly important due to higher demand for local rice. In Makarfi, similar changes were recorded, sugarcane is the main economic commodity produced among farmers but rice is becoming increasingly important over the years as a result of increasing market demand for local rice.

From the survey results in Table 3.1.4c, it can be noted that 89.2 %, and 27.2%, of farmers in Kano cluster indicated that increase in the costs of production and decrease in prices of the commodity over the years are some of the negative changes observed over the years, while 74.8%, 70.4%, 62.8 % and 50% mentioned increase in value or prices of the commodity, higher consumption level, increase in volume of production and introduction of high yielding varieties respectively as the most important positive changes in the rice commodity chain observed over the years. Improvement in grain quality was mentioned by 35.2% of farmers in Kano cluster and by 30%, 42 % and 54% of farmers in Jigawa, Kaduna and Katsina clusters respectively. Increase in the costs of production is one of the most important changes observed by a great majority of farmers in all the clusters.

High cost of production as a result of high costs of fertilizers and labour is a common constraint affecting the performance of farmers in all the production clusters. Fertilizers are obtained from private input sellers at commercial prices; subsidized sources are not adequate and reliable. In Kura-Kano corridor and Tudun-Wada farmers used their associations to procure fertilizers directly from manufacturers or regional distributors at better prices as a strategy of reducing the cost of production. Similar action or strategy is taken by farmers associations in Hadejia and Makarfi production clusters where farmers association organized bulk purchase of fertilizers for their members directly from manufacturers or distributors to take advantage of good prices. NPK and UREA fertilizers are the ones commonly used by farmers in rice production in both the low land and up land rice ecologies.

The retail prices of a bag of NPK and UREA fertilizers are virtually the same in all the production clusters. In Kura-Kano corridor the prices are NGN3200 and NGN2800 per bag of NPK and UREA respectively which are relatively lower compared with Hadejia and Tudun Wada where the prices were NGN3400 and NGN3200 for NPK and UREA respectively. Improved seeds are used and obtained from private input sellers and sometimes from extension staff of the State ADPs and SG2000 project. This scenario conforms very well with findings from the enumerator conducted survey as indicated in Table 3.1.4c. Where it can be noted that 64.8%, 84%, 100% and 94% of farmers in Kano, Jigawa, Kaduna and Katsina rice producing clusters indicated that fertilizers were available and almost the same proportion can afford to use fertilizers in their rice farms. The results also shows that NPK , UREA and to some extent SSP are the most commonly used fertilizers with an average prices of NGN2931, NGN2070, NGN2955 and NGN2993 for 25kg bag of NPK fertilizers in Kano, Jigawa, Kaduna and Katsina clusters respectively. For UREA fertilizers the average prices were NGN2751, NGN2320, NGN2824 and NGN2893 per bag in Kano, Jigawa, Kaduna and Katsina clusters respectively.

The use of SSP fertllizers in rice production was mentioned only in Kano and Kaduna clusters, while in Jigawa and Katsina clusters none of the farmers interviewed use SSP fertilizers. In terms of agrochemical 86.4%, 88%, 98%, and 94% representing majority of the farmers in Kano, Jigawa, Kaduna and Katsina clusters indicated that agrochemicals are

available from inputs sellers in the market. Some farmers' particularly large and medium scale used herbicides in weeds control.

Results of the FGDs as contain in Table 3.1.a & b shows that, extension and technical support in areas of rice production and processing technologies especially in Kano clusters is becoming more and more available to farmers as a result of projects and programmes such as SG2000, IITA interventions, MARKETS and PropCom projects.

In Kura-Kano corridor and Hadejia production clusters the presence of public irrigation projects has widen farmers' access to extension and technical advice in areas of production, input procurement and marketing. But such public projects have become less efficient at present in reaching the farmers. In Dandume and Makarfi, extension support especially in areas of production is obtained from the States ADP staff, but information about market condition is obtained usually from traders.

Table 3.1.4a: Structural Characteristics of the Rice Value Chain: Farmers' Perspective in Kano Clusters

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Farmers' dislikes in the rice market	<ul style="list-style-type: none"> Commission agents connive with traders to make price poor for farmers Poor market prices at harvest period 	High cost of inputs	High cost of fertilizer and labour
Trend in the rice value chain	<ul style="list-style-type: none"> Establishment of KRIP enhances rice production in the area. water become more available New techniques of production such as tractor, use of herbicides were introduce by extension agents 	<ul style="list-style-type: none"> Introduction of new varieties like NERICA by extension agents of SG2000 	<ul style="list-style-type: none"> Introduction of new seeds and technologies of production and processing. Market demand is increasing
Production constraints	High costs of fertilizers and unsteady water flow in KRIP	High cost of fertilizers	High costs of fertilizers and labour
Action taken to address production constraints	Farmers association buy fertilizers in bulk from company and also purchase some from subsidize source.	None	<ul style="list-style-type: none"> Farmer association trying to obtain fertilizers from subsidized sources Bulk purchase of fertilizers from source
Access to inputs	<ul style="list-style-type: none"> Mostly in open 	In open markets	<ul style="list-style-type: none"> Fertilizers are

and prices	market. NPK-NGN 3200, UREA-NGN2800 and SSP-NGN3400. <ul style="list-style-type: none"> Seeds used include SIPI, WITA, SANTANA 	inputs are available but the cost is the problem for resource poor farmers	available in open market. <ul style="list-style-type: none"> NPK-NGN3400 UREA NGN3200 SSP- NGN3500
Access to extension services and technologies	Extension advise from KRIP extension facilitators and NGOs	<ul style="list-style-type: none"> Extension staff of ADP and SG2000 gives advise and training on technologies Co-farmers and traders give information on market condition 	<ul style="list-style-type: none"> Extension agents Farmer associations Co-farmers Traders give information about market conditions

3.1.4b: Structural Characteristics of the Rice Value Chain: Farmers' Perspective in Other Clusters

Issues	Response		
	Jigawa	Katsina	Kaduna
Farmers' dislikes in the rice market	<ul style="list-style-type: none"> Poor market prices at harvest period 	Poor quality seeds and high cost of inputs especially fertilizers	High cost of fertilizer
Trend in the rice value chain	<ul style="list-style-type: none"> Poor quality paddy Decrease in extension activities Value of local has increase 	<ul style="list-style-type: none"> Poor quality produce is becoming common among farmers Profitability on the decrease as a result of higher costs in production Maize is the most important cash crop in the area with rice taking the second position and becoming increasingly important due to higher demand and processing activities of local rice across the country. 	<ul style="list-style-type: none"> Sugarcane is the main crop but, rice is becoming increasingly important over the years. Market demand is increasing
Production constraints	Fertilizer, labour and supplementary irrigation costs are the high costs components in rice production	High costs of production especially fertilizers and labour costs	High cost of production as a result of high fertilizers prices
Action taken to address	Farmers association buy	none	<ul style="list-style-type: none"> Farmer association trying

production constraints	fertilizers in bulk from company and also purchase some from subsidize source.		to obtain fertilizers from subsidized sources
Access to inputs and prices	<ul style="list-style-type: none"> Mostly in open market. NPK-NGN 3400, UREA-NGN3000 and SSP-NGN3400. 	Inputs are available in open markets inputs but at high cost	<ul style="list-style-type: none"> Fertilizers are available in open market. NPK-NGN3200 UREA NGN3000 SSP- NGN3300
Access to extension services and technologies	Extension advise from HVIP extension facilitators, Jigawa State ADP and SG2000 staff.	<ul style="list-style-type: none"> Extension staff of Katsina State ADP and SG2000 gives extension support to farmers 	<ul style="list-style-type: none"> Extension agents work with farmers but their visits and number not adequate. Information about market conditions is usually obtained from traders at the market.

Table 3.1.4c. Structural characteristics of rice value chain among sampled farmers

Variable	Kano(n=250)	Jigawa(n=50)	Kaduna(n= 50)	Katsina(n= 50)
Market functioning and reasons				
Functioning well: <ul style="list-style-type: none"> Increase in demand for local rice Availability of land and water for cultivation from project Availability of improved varieties 	202(80.8%)	48(96%)	39(78%)	45(90%)
Not functioning well: <ul style="list-style-type: none"> Increase in production level leading to glut Poor product prices in markets Unethical conduct of traders and other middlemen in markets Small profit margin due to high costs of production. Poor access road 	48(9.6%)	2(4%)	11(22%)	5(10%)

to markets				
Places of selling the commodity				
Kura market, Chiromawa, K/Dawaki and Karfi markets.	100(40%)	-	-	-
Kano main markets	50(20%)	-	-	-
Tudun wada	40(16%)	-	-	-
Kwanar Dangora market	10(4%)	-	-	-
Kibiya and Darki market	15(6%)	-	-	-
Garko market	35(14%)	-	-	-
Gujungu Market	-	20(40%)	-	-
Hadejia market	-	30(60%)	-	-
Makarfi market	-	-	50(100%)	
Dandume market	-	-		50(100%)
To whom the commodity is sold:				
Agents	24(9.6%)	50(100%)	2(4%)	12(24%)
Traders /processors	220(88%)	-	48(96%)	37(74%)
Consumers	6(2.4%)	-		1(2%)
Chain of selling:				
Directly to buyers(traders, consumers, processors)	226(90.4%)	-	48(96%)	38(98%)
Sell through agents	24(9.6%)	50(100%)	2(4%)	1(2%)
Market structure				
Favorable	147(58.8)	43(86%)	17(34%)	26(52%)
Not favorable	103(41.2)	7(14%)	33(66%)	24(%)
Credit availability and access				
Available				

	51(20.4)	30(60%)	19(38%)	12(24%)
Not available	199(79.6%)	20(40%)	31(62%)	38(76%)
Accessible	28(11.2%)	14(28%)	15(30%)	25(50%)
Not accessible	222(88.8%) 222(88.8%)	36(72) 36(72%)	35(70%) 35(70%)	25(50%) 25(50%)
Costs and conditions:				
Repayment after harvest (informal)	76(30.4%)	14(28%)	-	2(4%)
<ul style="list-style-type: none"> • Collateral and • Repayment after one year with 8% interest rate(formal) 	28(11.2%)	-	15(30%)	18(36%)
Average number of bags(100kg) of rice produced per season	98.5 bags	68.9bags	82.5 bags	103 bags
Average Selling Price per bag	N3000 per bag	N3000 per bag	N3000 per bag	N3000 per bag
Average quantity sold per season	77.9 bags	57.2bags	65.4 bags	90 bags
Average consumed	13.9 bags	5.6 bags	8.9 bags	7bags
Average quantity given out per season	6.7bags	6bags	8.2 bags	6.4bags
Average income or revenue obtained per season	N233,700	N171,600	N196,200	N270,000
Areas of high costs in production				
Fertilizers	233(93.2%)	50(100%)	43(86%)	49(98%)
Labour	83(33.2%)	31(62%)	17(34%)	47(94%)
Land preparation	155(62%)	43(86%)	36(72%)	44(88%)
Labour intensive operations				
Weeding	167(66.8%)	26(52%)	21(42%)	23(46%)
Harvesting	233(93.2%)	38(76%)	41(82%)	47(94%)
Land preparation	125(50%)	18(36%)	20(40%)	44(88%)
Contribution of household members to farm labour				
Adult male				
0	61(24.4%)	15(30%)	3(6%)	2(4%)
1-10	126(50.4%)	34(68%)	47(94%)	7(14%)

11-20	16(6.4%)	1(2%)	-	-
more than 20	2(0.8%)	-	-	1(2%)
Adult female				
0	186(74.7%)	36(72%)	49(98%)	1(2%)
1-10	12(4.8%)	13(26%)	1(2%)	-
11-20	-	-	-	-
more than 20	-	1(2%)	-	49(98%)
Engagement of household members in off -farm employments:				
Number of males engaged:				
0	118(47.4%)	24(48%)	15(30%)	19(38%)
1-10	111(44.4%)	25(50%)	35(70%)	31(62%)
11-20	17(6.8%)	-	-	-
more than 20	2(0.8%)	-	-	-
Number of females engaged:				
0	167(66.8%)	37(74%)	29(58%)	22(44%)
1-10	75(30%)	13(26%)	21(42%)	27(66%)
11-20	6(2.8%)	-	-	-
more than 20	-	-	-	-
Availability of hired labour and cost				
Adult male	222(88.8%)	44(88%)	49(98%)	19(38%)
Adult female	106(42.4%)	19(38%)	1(2%)	-
Male Children	156(62.4%)	28(56%)	29(53%)	-
Female children	89(35.6%)	17(34%)	-	48(96%)
Means and ways of storage				
Packaged in Bags and store.	202(80.8%)	48(96%)	50(100%)	8(16%)
Packaged in Bags using storage chemicals and store.	30(12%)	-	-	40(80%)
Sell instantly at farm	18(7.2%)	2(4%)	-	2(4%)
Production inputs availability and usage				
Fertilizers availability	162(64.8%)	42(84%)	50(100%)	47(94%)
Agrochemical availability	216(86.4%)	44(88%)	49(98%)	47(94%)
Fertilizers usage and affordability	223(89.2%)	44(88%)	50(100%)	36(72%)
Use of agrochemical and				

affordability				
Most commonly used fertilizers and prices				
NPK	N2931	N2070	N2955	N2993
UREA	N2751	N2320	N2824	N2893
SSP	2650	-	N2079	-

3.1.5 Prospects and constraints in rice production

Table 3.1.5a & b shows the result of the qualitative FGDs with farmers in all the clusters. The motive for producing rice crop in all the clusters studied was mainly profit and means of livelihood. In Kura-Kano and Hadejia clusters, the presence of KRIP and HVIP influenced many farmers into rice production as a result of more water, development of cultivable lands and extension. In Makarfi extension activities such as introduction of improved seeds makes rice production more profitable because such seeds are high yielding and resistant to diseases. In Garko the existence of abundant low lands which are suitable for rice cultivation in some part also influence farmers into production. In general, such influences are motivating and keeping farmers into rice production business despite all odds.

Creation of employment opportunities for others and food security are some of the most important non-income benefits of rice production mentioned by the farmers in all the clusters. The residues from rice farms are also used as feeds for livestock and this is particularly important in Kura-Kano and Hadejia clusters where due to presence of river resources pastoralists are found in large number and they used the residue from rice farms in feeding their cattle and small ruminants.

Despite the profitability and suitability of rice production enterprise to the ecologies, some constraints could be critical to the sustainability of the enterprise. For farmers in Kura-Kano and Hadejia clusters where supplementary is a strategic input, availability of water in the irrigation projects canals is an important factor. Sustaining and enhancing productivity levels and hence profitability is very much dependent on water availability for supplementary irrigation. Rice is mainly produced as wet season crop but the rainfall pattern of the areas makes supplementary irrigation a critical input and without it the prospect and sustainability of rice production would be significantly affected. In Garko and Tudun Wada where production is concentrated in Fadama and upland areas costs water is also a critical input but costs of inputs particularly fertilizers, pests and diseases problems are factors considered as critical to rice production profitability and sustainability. With persistent high costs of inputs and high incidence of pests and diseases, resource poor farmers may opt for a less input intensive crop as alternative.

High costs of fertilizers, inadequate and inefficient water flow in field canals for irrigated perimeters (KRIP and HVIP), inadequate rainfall and high incidence of pests and diseases especially for upland ecologies, poor market prices and outlet especially at harvest period are some of the challenges facing farmers in the various production clusters. Collective purchase from distributors of fertilizers using the platform of farmers associations is one of the actions taken by farmers particularly in Kura-Kano and Hadejia clusters in tackling the problem of high costs of fertilizers as a common challenge to rice production.

Poor market prices especially at harvest period are common challenges along the rice commodity chain in all the clusters. Market prices for rice commodity are influenced by level of competition. As more and more farmers opt for rice production in the various production zones across the country, the market supply would tend to increase and this would

ultimately affect the prices offered. Consumer preference is also another determinant of product price. In urban areas where the bulk of rice processed is taken consumers prefer well milled and polished rice which is more of a characteristics of foreign imported rice. Consumers therefore prefer to buy imported rice product and such competition with imported rice product is transferred down to local producers prices.

This background seems to conform well to the findings from enumerator conducted survey as indicated in Table 3.1.5c. From the results it can be noted that majority of farmers in all the clusters mentioned high costs of fertilizers and labour as important challenges in rice commodity chain. Insufficient rainfall and or draught was mentioned by only 8% and 16% of farmers operating in Kano and Jigawa clusters respectively where lowland rice varieties produced with the aid of supplementary irrigation predominates. In Kaduna and katsina clusters 26% and 36% of farmers indicated water shortage and or draught as a major challenge. In adequate capital was also mentioned as a challenge by majority of farmers across the clusters.

In terms of labour availability and organization farmers use both hired and family labour in operating the rice production enterprises. Appedix1a indicated that weeding, harvesting and land preparation are operations that are labour intensive and farmers irrespective of their scale of operation must employ labour particularly for these operations. Labour used is either source internally from household members in such cases the cost is imputed or hired from outside in such case the cost is based on prevailing farm labour wage rate or nature of operation. Contribution of household members to farm labour cut across gender in the sense that both male and female members participate in all the clusters. In Kano cluster for example, 50.4% and 6.4 % of the farmers had between 1-10 and 11 – 20 male members respectively of their household contributing to farm labour. In Jigawa and Kaduna clusters majority of the farmers (68% and 94% respectively) had 1-10 males' members of their household contributing to farm labour. In terms of female household members contribution to farm labour it was found that majority(74.7%, 72%, and 98% in Kano, Jigawa and Kaduna clusters respectively) of the do not have contribution from female members of their household. In Katsina cluster where males members contribution is not very important, the female members contribution is however very important with 98% of the farmers having more than 20 female members contributing to farm labour. Household may not necessarily be restricted to family size, but it may be used to describe chain of relatives, dependent, wives, sons and daughters that form part of the household strategy for subsistence and livelihoods.

Hired labour is also available and its utilization also cut across gender. Males, females and children all provide labour for different activities in rice production. For example in Table 3.1.5c, 88.8%, 88%, 98% and 38% of farmers in Kano, Jigawa, Kaduna and Katsina clusters indicated having access to hired labour from adult males, while 42.4%, 38% and only 2% in Kano, Jigawa and Kaduna clustes have access to hired labour from adult females. In Katsina farmers did not indicate access to hired labour from adult female, but 96% of the farmers in Katsina cluster indicated using female children as hired workers. The average wage rate per person per day across the gender categories were; NGN300, 260, 250 and 270 per day per person for adult male in Kano, Jigawa, Kaduna and Katsina clusters. Adult males are mostly used in weeding and land preparation activities. In harvesting adult females and children are mostly used and the payment is usually based on number of bags harvested. In Kano cluster NGN50b per 100kg bag harvested is generally paid and this is obtained in the other clusters with very little variation especially in Dandume where about NGN60 per bag. Male children are in addition to harvesting also used in supplementary irrigation activities where they are paid about NGN200 for irrigating an acre in Kano cluster and about NGN150 in Jigawa cluster.

Table 3.1.5a: Prospects and Constraints in Rice Value Chain: Farmers' Perspective in Kano Clusters

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Non Income benefits of rice production	<ul style="list-style-type: none"> • Employment for others e.g. labourers, traders, input sellers • Residues serve as feeds for animals and insects 	<ul style="list-style-type: none"> • Source of food for households • Employment opportunities 	<ul style="list-style-type: none"> • Food security • Employment • Husk use in animal feeds and as farmyard manure
What motivate and influence farmers into the production	<ul style="list-style-type: none"> • Existence of KRIP influence many farmers to produce rice • Before the project sorghum was the main crop 	<ul style="list-style-type: none"> • Profitability • Food security • Plentiful Fadama resources in the area. 	<ul style="list-style-type: none"> • Profitability of the crop • Its productivity is also high because the soils are suitable
Factors critical to sustainability of rice production	Water availability Capital	Water availability and fertilizer cost	<ul style="list-style-type: none"> • Cost of fertilizers and labour • Pests and diseases problem
What can keep farmers in the commodity business in spite of all odds	It is the most suitable crop in the area.	<ul style="list-style-type: none"> • Profitability of the crop • Suitability to soil condition (lowland areas) 	Its profitability and suitability to the soils
Factors influencing product price	<ul style="list-style-type: none"> • Market forces • Consumer preference 	<ul style="list-style-type: none"> • Competition with imported rice in urban areas 	<ul style="list-style-type: none"> • Quality of paddy • Supply and demand interactions i.e. market forces
Challenges facing the commodity chain	<ul style="list-style-type: none"> • High cost of fertilizers • Poor prices of commodity especially at harvest period 	High cost of inputs especially fertilizers	<ul style="list-style-type: none"> • Pests and diseases as a result of inadequate rainfall
Action taken to improve the situation	Collective Purchase of fertilizers from source by farmers associations		Application of insecticides

3.1.5b: Prospects and Constraints in Rice Value Chain: Farmers' Perspective in other clusters

Issues	Response		
	Jigawa	Katsina	Kaduna
Non Income benefits of rice production	<ul style="list-style-type: none"> • Employment for others • Residues serve as feeds for livestock and use as manure in farms 	<ul style="list-style-type: none"> • Employment opportunities 	<ul style="list-style-type: none"> • Food security • Employment • Husk use in animal feeds and as farmyard manure
What motivate and influence farmers into the production	<ul style="list-style-type: none"> • Availability of water in the channel of HVIP • Profitability of the crop production 	<ul style="list-style-type: none"> • Profitability of rice production is the main motivating factor. 	<ul style="list-style-type: none"> • Profitability of the crop • Improvements in rice productivity due to improved varieties.
Factors critical to sustainability of rice production	<ul style="list-style-type: none"> • Water availability • Cost of inputs 	Fertilizers and labour cost	<ul style="list-style-type: none"> • Cost of fertilizers. high cost of fertilizers can make a farmer abandon rice production
What can keep farmers in the commodity business in spite of all odds	It is the most suitable crop in the area and profitable	<ul style="list-style-type: none"> • Profitability of the crop 	As long as rice production remains profitable farmers can still manage to continue.
Factors influencing product price	<ul style="list-style-type: none"> • Market forces 	<ul style="list-style-type: none"> • Competition with other production areas 	<ul style="list-style-type: none"> • market forces • quality of the crop at harvest
Challenges facing the commodity chain	<ul style="list-style-type: none"> • High cost of inputs especially fertilizers • Poor prices of commodity especially at harvest period 	<ul style="list-style-type: none"> • High cost of inputs especially fertilizers and labour 	<ul style="list-style-type: none"> • Poor market outlet which normally leads to glut during harvest period
Action taken to improve the situation	Collective Purchase of fertilizers from source by farmers associations		Farmers associations is looking for alternative market outlet

Table 3.1.5c. Prospects and constraints in rice value chain among sampled farmers

Variable	Kano(n=250)	Jigawa(n=50)	Kaduna(n=50)	Katsina(n=50)
Major changes observed in the commodity chain:				
High yielding varieties	125(50%)	37(74%)	38(76%)	23(46%)
Increase in production leading to higher volume of paddy supply in markets.	157(62.8%)	12(24%)	22(44%)	21(42%)
Increase in number of buyers(positive)	87(34.8%)	10(20%)	20(40%)	30(60%)
Increase in value of local rice i.e. higher price(Positive)	187(74.8%)	12(24%)	14(26%)	16(32%)
Increase in demand at market level. (positive)	111(44.4%)	14(28%)	14(28%)	18(36%)
Decrease in price(Negative)	68(27.2%)	21(42%)	27(54%)	21(42%)
Increase in costs of production(negative)	223(89.2%)	47(94%)	50(100%)	46(92%)
Improvement in grain quality (positive)	88(35.2%)	15(30%)	21(42%)	27(54%)
Higher consumption of local rice(positive)	176(70.4%)	22(44%)	22(44%)	25(50%)
Major challenges in rice production				
Water shortages (draught or insufficient rainfall)	20(8%)	8(16%)	13(26%)	18(36%)
poor and untimely release or flow of irrigation water	98(39.2%)	32(64%)	-	-
High cost of fertilizer	222(88.8%)	47(94%)	48(96%)	47(94%)
Inadequate capital	125(50%)	29(58%)	26(52%)	30(60%)
Pests and diseases	43(17.2%)	10(20%)	33(66%)	28(56%)
Flooding	24(9.6%)	27(54%)	-	-
High cost of labour	168(67.8%)	23(46%)	25(50%)	34(68%)

3.1.6 Production and market risks in rice commodity chain

Table 3.1.6a and b shows the result of the qualitative FGDs with farmers on issues related to market and production risks. Production and market risks associated with rice production enterprise include; water shortages and or flood as a result of drought or poor water flow along river channel, high input costs, and poor prices at harvest period and theft of harvested paddy in the fields

Generally the risks of selling at poor prices particularly during harvest period are common to all production clusters. This is a seasonal phenomenon which occurs with varying degree of severity every season. Some farmers store their product at harvest with the hope of selling at later times when prices are better. Such action is not widespread since most farmers are socio-economically weak and does not have the capability in terms of facilities and finance to undertake storage.

In Kura- Kano corridor and Hadejia clusters where production is mainly dependent on using irrigation projects facilities for supplementary irrigation inadequate water flow or untimely release of water into field canals constitute a major risk. Without supplementary irrigation the lost or reduction in yield is very likely. A farmer can obtain very little or no output and or profit under such situation. Farmers use their associations to approach the project authorities on issue of water release and also mobilize their members to ensure prompt payment of fixed water charges to the projects. But flow or release of water is in some cases affected by the efficiency of the project water control structures which is sometimes beyond immediate control. Some especially in Hadejia area invest to acquire tube wells and water pumps so as to secure water for supplementary irrigation.

In upland production ecologies such as some part of Tudun Wada, Dandume and Makarfi the risks of crop failure due to pests and diseases and rainfall shortages are also very likely. Farmers tend to use short duration and disease resistant varieties of rice to avert or minimize such risks. Insecurity on high ways which prevent more traders from coming to markets for purchase was reported in Makarfi. In Dandume theft of paddy rice in the field after or before harvest is another commonly occurring phenomenon which is affecting farmers' prospects. Farmers collectively employ private security personnel to guard against theft at harvest period and such action has reduced the level of theft significantly over the years.

Table 3.1.6a: Risk and Uncertainties Associated with Rice Value Chain: Farmers' Perspective in Kano Clusters

Issues	Kura-Kano Corridor	Garko	Tudun Wada
Market risk in the commodity chain	<ul style="list-style-type: none"> • Water shortages • Glut during harvest period leading to poor prices and loss 	Poor prices of paddy rice during harvesting period.	<ul style="list-style-type: none"> • Water shortages • Pest and diseases
Action taken	<ul style="list-style-type: none"> • Complain to KRIP about the issue • Timely payment of water charges 	Some farmers store their paddy up till prices are good.	<ul style="list-style-type: none"> • Concentrate production to lowland where supplementary irrigation can be easily practice. • Apply

			insecticides
Improvements in market risks	<ul style="list-style-type: none"> Water flow is not improving. KRIP is not doing much about improving the situation. Many farmers refuse to pay water charges despite the effort 	Storing products at harvest for sale in later times usually bring higher benefits to farmers	The strategies leads to improvement
Persistence of market risk	Poor prices at harvest are still a problem. Alternative market outlets should considered		
Problem of irrigation water flow	Flow is in most locations not adequate leading to low productivity and quality of rice	Water for supplementary irrigation is obtained through the use of tube wells in Fadama areas. But, high cost of fuel makes supplementary irrigation expensive.	Irrigation water cannot be secured in the upland.

3.1.6b: Risk and Uncertainties Associated with Rice Value Chain: Farmers' Perspective in other clusters

Issues	Response		
	Jigawa	Katsina	Kaduna
Market risk in the commodity chain	<ul style="list-style-type: none"> Glut during harvest period leading to poor prices and loss Inadequate and inefficient water flow along Hadejia river leading to water shortages and sometimes to flood 	<ul style="list-style-type: none"> Theft of rice at the field after harvest Poor prices at harvest especially. 	<ul style="list-style-type: none"> Market glut Insecurity on highways preventing many buyers from coming for purchase.
Action taken	<ul style="list-style-type: none"> Complain to HVIP about water flow issue Those in Fadama areas secure irrigation facilities like tube wells and pumps. 	<ul style="list-style-type: none"> Maintain collective surveillance during harvest to minimize theft of rice 	<ul style="list-style-type: none"> Glut and insecurity problem are beyond farmers control
Improvements in market risks	<ul style="list-style-type: none"> Water flow is not improving. 	Theft has reduced now as a result of the collective action by farmers.	
Persistence of market risk	Water flow and Poor prices at harvest are still a problem.	Poor prices persist	Glut and insecurity persist
Problem of	Flow is in most locations	Rice is produce mainly in	Rice production in the

irrigation water flow	not adequate leading to low productivity and quality of rice.	the upland. It is very expensive to secure irrigation facilities in upland areas.	area is mainly upland Irrigation water cannot be secured in the upland areas. Water shortage can not be artificially remedied if it occurs.
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3.2 Rice Parboiling

3.2.1 Socio-economic background of parboilers

The socio-economic characteristics of parboilers in the study area are shown in Table 3.2.1. Rice parboiling as an enterprise is a cottage industry in the clusters, with most rice producing households also operating a parboiling unit. In all the clusters studied, parboiling is a women-dominated enterprise, however at Tudun Wada and Dawanau private male parboilers are found in significant numbers. More than 80% of the respondents interviewed were married and operated their parboiling business at the household to small business level. Parboilers who operate outside the household mainly for large scale commercial services are not many in number. There are however a few male private millers with parboiling units or facilities who provide parboiling services for a fee, especially at the Kano State (Kura-Kano, Garko and Tudun Wada).

More than half of the parboilers in all the clusters are in the age range of 26 – 45 years, with a modal range of 36-45 years (Table 3.2.1). The clusters also share similarities in terms of household size and level of educational attainment. The modal household size is 10 -15 people and more than 80% of the parboilers had no form of western education at all. Being a housewife is the primary occupation for 53.1 and 100% of the respondents in the Kano and Makarfi areas respectively. While in Hadejia and Dandume processing is the primary occupation of 60% of the respondents. Around 18.2, 60.0, 53.3 and 60.0% of the parboilers in Kano area, Hadejia, Makarfi and Dadume respectively have no idea what the levels of their annual household incomes are. In the Kano area 43.9% of the respondents had annual household income of between ₦50,000 to ₦200,000.

Table 3.2.1a: Socio-economic characteristics of parboilers

Characteristics	Kano Area		Hadejia		Makarfi		Dandume	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Sex								
Male	19	28.8	5	33.3	0	0.0	5	33.3
Female	47	71.2	10	66.7	15	100.0	10	66.7
Marital Status								
Single	2	3.0	2	13.3	0	0.0	2	13.3
Married	55	83.3	12	80.0	15	100.0	12	80.0
Separated/Widowed	5	7.6	0	0.0	0	0.0	0	0.0
Divorced	4	6.1	1	6.7	0	0.0	1	6.7
Category of Business								
Household	13	20.0	10	66.7	0	0.0	10	66.7
Small Business	32	49.2	3	20.0	15	100.0	3	20.0
Large Business	20	30.8	2	13.3	0	0.0	2	13.3
Years of Experience								
1-5	8	12.1	5	33.3	3	20.0	5	33.3
6-10	15	22.7	4	26.7	10	66.7	4	26.7
11-15	15	22.7	1	6.7	1	6.7	1	6.7
16-20	8	12.1	1	6.7	1	6.7	1	6.7

>20	20	30.3	4	26.7	0	0.0	4	26.7
Age Group								
18-25	7	10.6	4	26.7	3	20.0	4	26.7
26-35	20	30.3	3	20.0	4	26.7	3	20.0
36-45	22	33.3	5	33.3	6	40.0	5	33.3
46-55	10	15.2	3	20.0	1	6.7	3	20.0
>55	7	10.6	0	0.0	1	6.7	0	0
Education								
Primary	8	12.5	0	0	2	13.3	0	0.0
Secondary	0	0.0	2	13.3	1	6.7	2	13.3
Tertiary	2	3.1	0	0.0	0	0.0	0	0.0
None	54	84.4	13	86.7	12	80.0	13	86.7
Household Size								
<10	2	3.2	4	30.8	4	26.7	4	30.8
10-15	32	50.8	7	53.8	10	66.7	7	53.8
16-20	12	19.0	1	7.7	0	0.0	1	7.7
21-25	2	3.2	0	0.0	1	6.7	0	0.0
26-30	6	9.5	0	0.0	0	0.0	0	0.0
>30	9	14.3	1	7.7	0	0.0	1	7.7
Primary Occupation								
Farming	2	3.1	2	13.3	0	0.0	2	13.3
Trading	3	4.7	3	20.0	0	0.0	3	20.0
Processing	25	39.1	9	60.0	0	0.0	9	60.0
Housewife	34	53.1	0	0.0	15	100	0	0.0
Service	0	0.0	1	6.7	0	0.0	1	6.7
Income (N)Group								
50,000-200,000	29	43.9	3	20.0	2	13.3	3	20.0
0.2-0.5 million	9	13.6	2	13.3	0	0.0	2	13.3
0.5-1.0 million	4	6.1	1	6.7	0	0.0	1	6.7
1.0-3.5 million	0	0.0	0	0.0	1	6.7	0	0.0
>3.5 million	0	0.0	0	0.0	1	6.7	0	0.0
Don't Know	12	18.2	9	60.0	8	53.3	9	60.0
No Response	12	18.2	0	0.0	3	20.0	0	0.0

Table 3.2.1b: Resource base of rice parboilers (values in percentages unless indicated otherwise)

Variable	Kano(n= 80)	Jigawa(n= 15)	Kaduna(n= 15)	Katsina(n =15)
Type of parboiling equipment and average cost (₦)				
Aluminium Pots	1,551	2,262	1,143	-
Half Drum	-	60	1,200	700
Full Drum	-	1,700	-	1,400
Hanigha	-	120,000	-	
Others (shafa)	660	-	-	
Purpose of processing				
Household consumption				
Commercial		4		
Both	100	96	100	100
Type of customers				
Farmers	43.75	33.33	8	10
Millers	-	-	-	-
Traders	100	100	100	100
Self	100	96	100	100
Period of holding commodity before sale or pick up by customer				

1-3 days	49.9	100	92.8	100
4-7 days	29.5	0	7.2	0
More than a week	0	0	0	0
Average Fess charged per bag during peak season	160	250	200	250
Average Fess charged per bag during off- peak season	160	250	200	250
Availability of a standard product	100	60	33.3	100
Price and quality of service				
Same price for all quality of service	100	100	100	100
Unique practices				
Use unique practices in parboiling	26.4	26.67	6.7	-
Do not use any unique practices	73.6	73.33	93.3	100
Period of processing activity in year or season (in months)				
1-3 months	1.3	6.7	0	0
4-6 months	0	46.6	6.7	60
7-9 months	0	6.7	6.7	0
10-12 months	98.7	40.0	86.7	4
Usage of commodity				
Quantity sold in bags	192.0	54.8	67.6	232.7
Quantity given out in bags	2.4	4.2	2.3	-
Quantity consumed in bags	2.4	4.2	2.3	-
Source of information on grades and standard				
Source available	75.3	846	85.7	0
Sources not available	24.7	15.4	14.3	100
Criteria buyers used:				
Quality	76.9	100	100	100
Cost	23.1	0	0	0
Important aspects of quality:				
Grain lustre (brightness)	2.5	35.7	0	0
Grain Colour	2.5	14.3	0	0
Long unbroken grains	1.3	0	0	0
Dryness and colour of grains	93.8	50.0	100	100
Availability of improved technology				
Readily available	52.6	21.4	0	40
Not available	47.4	78.6	100	60
Willingness to invest in new technology.	94.7	100	38.5	40.0
Training available on improved technology from private sector	5.9	9.1	0	0
Credit availability and access				
Available	9.1	86.7	0	-
Not available	90.9	13.3	100	-
Accessible	0	66.7	0	-
Not accessible	100	33.3	100	-
Areas of high costs in parboiling				
Fuel wood	26.2	100	64.3	-
Transportation/handling	42.6	0	28.6	-
Labour	4.9	0	0	-

Water	0	0	0	-
Parboiling equipment	14.8	0	7.1	-
Which provide more income				
Process own product	40.7	26.7	46.7	6.7
Process for a fee	30.5	20.0	6.7	0
Both	28.8	53.3	46.7	93.3
Challenges encountered				
Exposure to heat	-	40	40	53.3
Chest pain	-	26.7	-	-
Inadequate drying spaces	18.75	-	-	-
Cost of fuel wood	31.25	98	100	100
Poor access to water	15	26.7	-	20
Major changes observed				
Increase in processing activity	18.8	26.7	-	-
Increase in revenue	10	33.3	-	20
More competition	3.8	-	-	20
Increase in cost of parboiling	10	26.7	66.7	-
Change in parboiling technology	5	6.7	33.3	6.7
Varieties processed most				
All type available	22.5	-	-	-
SIPI	12.5	80	-	-
Dukusa	18.75	-	-	-
Jallof	22.5	-	53.3	-
Galaware	-	100	-	-
Santana	43.75	-	-	-
Maibiro	-	-	100	-
Maizabuwa	-	-	-	100
Kilaki	-	-	100	100
Yar Zaria	-	-	100	100
Yar Das	50	-	-	-
Wita	56.25	53.3	-	-
Tox	-	80	-	-

3.2.2 Parboilers perspectives on rice quality

All the farmers enumerated in Kano and Katsina States; and 60 and 33.3% respectively in Jigawa and Kaduna States indicated the existence of product standards (Table 3.2.1b)). Parboilers across all the clusters rank the quality of rice based on its appearance, cleanliness, homogeneity, and level of recovery after parboiling and milling. Tables 3.2.2a & b further indicate the views of parboilers with regards to the varieties that have the best quality in their locality. Generally, good quality rice should have long, well-filled, bright grains that do not break during milling. According to the parboilers the determinants of rice quality after parboiling include:

- Homogeneity of variety. A good quality rice should be of a single type variety, mixing should be avoided right from seed sourcing for planting to post harvest operations
- Manner of harvesting and post harvest processing. Rice that is harvested fully mature and dry, and is threshed and winnowed on tarpaulin or mats will have good quality that will result in good output after parboiling.
- Experience and skills of the parboiler and types of parboiling equipments used

Therefore the major factors that limit the attainment of optimum quality of parboiled product include inadequate and inefficient parboiling equipment; improper drying of parboiled paddy;

and the experience and skills of the parboiler. Generally the parboilers across all the clusters rate the quality of their services very high but still feel it could be improved. Specific aspects of quality considered most important by 93.8, 50, 100 and 100% of respondents in Kano, Jigawa, Kaduna and Katsina States respectively was dryness and colour of grains after parboiling (appendix 2). According to the parboilers, quality rather than cost of product is the main criterion buyers use in selecting products.

Although the quality of parboiling and therefore quality of the end-product (milled rice) vary with the skills of parboiler and types of parboiling equipment used, there is no clear system of reward to quality. Products are mainly graded and priced based on the attributes of the variety rather than the grade or nature of parboiling process.

Table 3.2.2a Rice Quality Standards and Attributes from Parboilers' Perspective in Kano Area

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Ranking of Varieties according to quality	SIPI WITA 4 Yar Das NERICA Jollof	Jamila Santana Kilaki	Dukusa SIPI Yar Das
Attainment of best quality product	Quality not at its best	Quality could still be improved	Quality can still be improved.
Factors limiting optimum quality of product	Parboiling practices which depends on skill and experience	Inadequate and inefficient parboiling equipment	Improper Dying of parboiled paddy
Prices for Various Grades		Jamila, Santana , kilaki = NGN120 per tiya	DUKUSA milled is NGN8000- NGN 9000 per bag of 40 tiyas.
Existence of standard product	Standard parboiled rice should be dried, milky in colour and do not break during milling.	Jamila is a Standard product especially when polished with sand	DUKUSA
Qualities of a standard product	dried, milky in colour and do not break during milling.	Long grain, dried, bright and do not break in milling	Long grain, well filled grain.

Table 3.2.2b: Rice Quality Standards and Attributes from Parboilers' Perspective in Hajia, Makarfi and Dandume

Issues	Responses		
	Hadejia	Makarfi	Dandume
Ranking of Varieties according to quality	Yar yamidi Wita Galaware	Women rate their quality of parboiling as very high	Kilaki
Attainment of best quality product	Not attained. Parboiling can still be	Quality can be improved	Quality of parboiling can still be improved.

	improved.		
Factors limiting optimum quality of product	Quality of paddy and skill of the parboiler.	Parboiling method and drying practices	<ul style="list-style-type: none"> • Improper drying • Excessive sun drying • Use of poor quality water
Prices for Various Grades	NGN140 per bag is charged for parboiling	Jollop = NGN 3500 per bag Yar-Das = NGN 3000 per bag Maibiro = NGN 2800 per bag	NGN90-120 per bag is charged for parboiling
Existence of standard product	Exist. It is Galaware	Jollop is considered as standard	Standard exist
Qualities of a standard product	Long and well filled grain whiteness	Bright colour, long grain, minimum breakage when milled	Well dried Long and well filled grain

3.2.3 Parboilers perspectives on the structure of rice value chain

The perceptions of parboilers on the structural characteristics of rice value chain in the study areas are summarized in Tables 3.2.3a & b. The introduction and widespread use of milling machines as opposed to manual hand pounding is seen by parboilers in Kano-Kura corridor, Garko and Tudun Wada as one of the most significant changes in the rice value chain in recent years. Parboilers in Hadejia and Makarfi have noticed significant increases in rice production in their areas, which has led to significant increases in the demand for parboiling services. There is also the emergence of private integrated rice processing enterprises at Hadejia. However, in Kura-Kano corridor, Garko and Dandume the demand for parboiling services is well short of the capacity in these areas and the parboilers feel they can handle much more than they are currently processing. Generally parboiling activities are carried out almost all year round by most parboilers in Kano and Kaduna States, but in Jigawa and Katsina States 46.6 and 60% of the parboilers respective carry out there activities for 4 – 6 months in a year (Table 3.2.1b). Customers' products are usually processed and released to the customer within 3 days.

The aspects of the rice market strongly disliked by parboilers are short weight bags and poor quality paddy with stones and other impurities. Inadequate drying spaces and the absence of milling machines outside the major urban areas are also among the dislikes of parboilers at Tudun Wada and Makarfi respectively.

Generally the constraints to entry into the parboiling business are the skills of the potential entrepreneur and the availability of capital. Since most of the parboilers operate at the level of household to small business, the capital requirement is generally not high and skill and interest are the main factors that determine entry into the market. At Dandume traders give capital to parboilers on loan, thus facilitating their entry into the business. Availability and access of parboilers to loan is indicated in Appendix2. Access to credit sources is generally very low except at Hadejia where up to 66.7% of the parboilers said they had access to credit.

There are no access restrictions to markets for parboilers across the clusters; however most of the women especially at Kura-Kano and Makarfi do not go to market places. They usually conduct transactions that require going to market places through proxies, usually their

husbands and children. At Garko and Tudun Wada the women freely go the market and have no restrictions what so ever in carrying out their business transactions.

Table 3.2.3a: Structural Characteristics of the Rice Value Chain: Parboilers' Perspective in Kano Market Area

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Parboilers' dislikes in the rice market	Poor quality paddy and not measured correctly by traders.	Traders do not utilize women par boilers properly.	Lack of clean and proper drying spaces
Trend in the rice value chain	Reduction in volume of paddy parboiled Use of machines in milling as oppose to manual milling	Use of machines in milling as oppose to manual	New technologies for processing.
Constraints to entry into the commodity market	Capital and skills	Skills	Skills
Who determine entry into the market	No restrictions or regulation women are free to operate	Entry is influenced and facilitated by kinship and friendship.	Entry is influenced by increasing demand for the services from traders
Access restrictions to other markets	Women do not go to market places, but use children and husbands to buy and sell for them	None. Women are free to go to the market to buy and sell rice.	None.

Table 3.2.3b: Parboilers' Perspectives on Structural Characteristics of the Rice Value Chain in other clusters

Issues	Responses		
	Hadejia	Makarfi	Dandume
Parboilers' dislikes in the rice market	Poor quality of paddy. That is paddy brought with impurities.	Transporting parboiled rice to Makarfi for milling because no milling machines in other areas except in Makarfi.	Paddy is contaminated with stones and chaffs which affects quality of parboiling.
Trend in the rice value chain	<ul style="list-style-type: none"> Emergence of private integrated rice processing enterprises. Increase in the number of women 	Increasing number of farmers producing rice thus increase in paddy available for parboiling	<ul style="list-style-type: none"> Demand for parboiling services decline Parboilers are now receiving support from government in form of loans

	parboilers		
Constraints to entry into the commodity market	Capital and skills	Parboiling requires skills and experience and is capital intensive. Parboiling pots cost NGN 3000 to NGN 4000	<ul style="list-style-type: none"> • Skills are required. • Capital requirement is not much and it is usually obtained on credit from traders.
Who determine entry into the market	Parboilers are required to register with associations.	Entry is open but capital and skill are necessary and limiting factors for entry and expansion	Entry is open
Access restrictions to other markets	None	Women do not go to market places, but use children and husbands to buy and sell for them	None

3.2.4 Prospects and constraints in rice parboiling

Generally parboilers across the clusters view their parboiling as an important source of income and means of livelihood. Tables 3.2.4a & b summarize the views of parboilers with respect to prospects and constraints in the business. Generally the motivating factor that influences parboilers across the clusters is profit. The level of rice production and trade in the study areas means that there will be demand for parboiling, making it a feasible enterprise. About 53.3, 46.7 and 93.3% of the respondents in Jigawa, Kaduna and Katsina States find it more profitable to process both own product and for fee (Table 3.2.1b).

At Kura-Kano and Tudun Wada areas parboiling is an inter-generational enterprise and many of the actors are born into the business. The cost of inputs and demand for services are the main determinants of price of parboiling. In the view of parboilers, main challenges facing rice value chain in Kura-Kano, Garko and Tudun Wada areas are poor access roads linking operating areas and increased level of competition among parboilers. The use of motorcycles and bicycles in transportation is the main action taken to improve the situation. At Makarfi the cost of processing equipments is the main constraint, while at Dandume parboilers see lack of access to improved parboiling facilities and poor quality paddy from farmers as their major constraints. Although nearly all the parboilers in Kano and Jigawa States and 38.5 and 40% in Kaduna and Katsina States respectively are willing to invest in improved technology, most of the parboilers in Jigawa, Kaduna and Katsina States had no new parboiling technologies available in their localities (Table 3.2.1b). The areas of highest costs in parboiling are purchase of fuel wood in Jigawa and Kaduna states, and transportation and handling costs in Kano State. Across the clusters, parboilers do not face any major conflicts with their spouses as a result of their businesses.

Table 3.2.4a: Prospects and Constraints in Rice Value Chain: Parboilers' Perspective in Kano Market Area

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Non Income benefits of rice trading	Mean of livelihood	Enable women processors who are mostly nomadic to settle in one location	Employment for others within households.
What motivate and	Most of the	Parboiling is profitable.	<ul style="list-style-type: none"> • Inheritance

influence Parboilers into the Parboiling	parboilers inherited the occupation and it is a means of livelihood.	Availability of the commodity is also an influence	<ul style="list-style-type: none"> Size and volume of rice production and processing activities
Factors critical to sustainability of rice Parboiling	Low profit and there is no alternative occupation.	Poor access roads linking parboiling areas and markets.	Profit
What can keep Parboiling in the commodity business in spite of all odds	Increase in profit	Integration of parboiling with farming which is more profitable.	No other more feasible alternative occupation.
Factors influencing product price	Cost of inputs Demand and supply patterns	Transportation cost, cost of inputs like water, firewood	Cost of inputs like firewood and water
Challenges facing the commodity chain	Increase level of competition among parboilers Poor access road linking operating areas,.	Poor access road linking operating areas	Increase in number of parboilers making spaces for drying less available. Higher level of competition
Action taken to improve the situation	none	Use bicycles and motorcycles for transportation	None
Conflict between parboiler and spouse	Spouses accept parboiling business as means of livelihood.	No conflict. There is good understanding between parboilers and spouse.	No conflict. Husbands usually assist their wives with capital to improve the business.

Table: 3.2.4b: Prospects and Constraints in Rice Value Chain: Parboilers' Perspective in other outlying clusters

Issues	Responses		
	Hadejia	Makarfi	Dandume
Non Income benefits of rice trading	Employment	Means of livelihood	Employment
What motivate and influence Parboilers into the Parboiling	<ul style="list-style-type: none"> Profit Most feasible enterprise in the area because of the level of production and trading activities. 	Profit from rice processing is the motivating factor	Profit
Factors critical to	Profit	Inadequate milling	Low demand for

sustainability of rice Parboiling		machines close to women parboilers	parboiling services from traders.
What can keep Parboiling in the commodity business in spite of all odds	Most feasible activity for women.	As long as it is profitable and there is no alternative profitable business	As long as it is profitable.
Factors influencing product price	Supply and demand of paddy	Parboiling cost and market glut	<ul style="list-style-type: none"> • Cost of processing • Supply – demand interaction at market level
Challenges facing the commodity chain	Use of firewood which is affecting the health of women parboilers	High cost of processing equipment. A pot cost NGN3000 to NGN 4000	Lack of access to improved parboiling skills and facilities. Poor quality paddy which is not well graded at farmer level
Action taken to improve the situation	None	Hire parboiling pots at NGN 50 per day	Traders are advised to grade their paddy before for parboiling
Conflict between parboiler and spouse	None. Parboiling is part of the household livelihood strategies and spouse assist in making it better.	No conflict	None. Spouse assists parboilers with advice and linkage with customers.

3.2.5 Risks and uncertainties associated with rice parboiling

The major risks and uncertainties faced by parboilers are summarized in tables 3.2.5a & b. The market risks include:

- price fluctuations which affect profit margins
- cheating and unsatisfactory conduct by proxies in cases where wives do not go market themselves but use male relatives to carry out transactions on their behalf (Kura-Kano and Makarfi area)
- Theft of paddy while in parboiler's custody (Dandume area)

Generally these risks persist and nothing is done to improve or mitigate the situation.

Firewood is the main source of energy for parboiling and as such there is a lot of pressure on trees and shrubs around the clusters, posing risk to the environment. However, sometimes sorghum stalk is used as source of energy.

Parboilers across all the clusters do not perceive any major risk to their health as a result of their parboiling activities, except at Hadejia where they associated exposure to heat with high blood pressure.

Table 3.2.5a: Risk and Uncertainties Associated with Rice Value Chain: Parboilers Perspective in Kano Market Area

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Market risk in the commodity chain	Irregular price fluctuation of the commodity Women delegate other to purchase and sell on their behalf who in most cases cheat	Irregular price fluctuation of the commodity which affect profit margin	Poor quality output due to improper dying
Action taken	Encouraging delegates to be trustworthy	none	Parboiling smaller quantity at a time
Improvements in market risks	No significant improvements		
Persistence of market risk	Risk persist		
Use fire wood and depletion of trees and other natural resources	Firewood is sourced locally from the available trees resources and thus trees are cut without replacement	Firewood is sourced locally from the available trees resources and thus trees are cut without replacement	
Health problems related to use of fire woods.	Not felt	Not felt	Not felt

Table 3.2.5b: Risk and Uncertainties Associated with Rice Value Chain: Parboilers' Perspective in other outlying clusters

Issues	Response		
	Hadejia	Makarfi	Dandume
Market risk in the commodity chain	Health risks due to use of firewood. Some parboilers experienced high blood pressure which they associated with exposure to heat. Poor quality paddy (not graded) can result to poor quality of parboiling.	Purchase of paddy from market is done by husbands on behalf of their wives. Sometime grades bought by husbands do not conform to grades required by women. This leads to loss in quality and profit.	Theft of paddy while in parboiler custody. Over cooking or heating of paddy during parboiling leading to poor quality.
Action taken	Those affected health wise usually report to hospitals. Customers are	No action taken. This is to avoid conflict with husbands	In case of theft or poor quality parboilers are sometimes held liable

	always advise to obtained good grades of paddy.		by traders
Improvements in market risks	None	No improvement	-
Persistence of market risk	Poor quality (not graded and contaminated paddy) is still common.	Risk persist	Theft is still common.
Use fire wood and depletion of trees and other natural resources	Fire wood is used which is sourced locally.	Heat energy for Parboiling is generated by means of fire woods	Use of firewood as source of energy in parboiling is the common practice. The firewood is sourced locally.
Health problems related to use of fire woods.	High blood pressure	Parboilers do not have health related problems as a result of using fire wood	None

3.3 Rice milling

Millers in all the study locations were generally men. Women are not directly involved in milling, but around each milling unit you may found a number of old women and young girls who usually provide winnowing services to processors. The milled rice is winnowed in order to properly separate the rice husk from the grain. The cost of this additional processing is charged separately from that of milling. Milling units usually consists of two types of machines; diesel powered and electricity powered as a strategy to secure alternatives. Millers prefer to use the electric types because there are more efficient in terms of output quality and cost of operation. But generally millers use more of the diesel generators than electric type due to poor and inadequate supply of electricity which characterize the general business operating environment. This particularly the case in the Kura processing cluster where for about a year the electricity supply infrastructures are faulty without repair.

The type and capacity of milling machines used are similar across the clusters and are shown in Tables 3.3a and 3.3b

3.3a: Diesel Milling Machines (Main types: Top-land, Raja, Sonnet and Anil)

Capacity(horse power)	Output	Purchase price in NGN
6 hp	6bags per day(12hrs)	95,000
8hp	9 ,, ,, ,, ,,	110,000
10hp	13 ,, ,, ,,	120,000
12hp	16 ,, ,, ,, ,,	140,000

3.3b: Electric Milling Machines (Main types; Atlas and Anil)

Capacity(horse power)	Output	Purchase price in NGN
10hp	10bags per day(12hrs)	95,000
15hp	20 ,, ,, ,, ,,	110,000
20hp	25 ,, ,, ,,	120,000
30hp	35 ,, ,, ,, ,,	140,000

Operation and ownership of milling enterprise are in most cases different. The owner usually employed an operator who is a skill person to operate the milling machine and unit. The operator is responsible for recruiting casual workers who will assist him in maintaining and operating the milling unit. Millers provide milling services to their customers for fee which is usually charged per bag of paddy milled. But millers also milled their own paddy for sale,

thus most owners of milling units are also traders. Such integration is more common among relatively large millers who possess the capital outlay to buy their own paddy for processing but even among such categories milling owned rice is combined with provision of milling services to others for a few.

Milling enterprise is usually not integrated with parboiling. Customers or processors bring in their rice ready for milling. Parboiling is usually a separate activity which is done usually by women who operate parboiling unit located in their own household as a cottage enterprise. This scenario is generic in all the clusters of rice studied, except in Hadejia where some few integrated units were found. Such units are providing both parboiling and milling services together and are fitted with improved milling and parboiling equipment. A processor can therefore pay for both parboiling and milling services per bag.

3.3.1 Socio-economic characteristics of millers

The result indicates that milling is a male dominated or male operated activity in all the rice processing centres. No woman was reportedly involved directly in the milling.

Majority of the mill owners are married men ranging between about 67% at Makarfi to as high as 100% at Dandume. Single men also do own mills (from 7.14% in Kano area to 33.3% at Makarfi).

Many of the millers are small holder business men often constrained by lack of capital or awareness. The number of mills per person is usually 1. It is only in the Kano area that you find people owning the non Indian mills while at Dandume you may find as many as 13% millers with three or more mills. This shows the level of activity of rice processing in the area which is evident by the years of experience of millers in the community. Dandume has about 33% of its millers with the experience of rice milling of more than 20 years and Kura followed with a distant 1.43%. In Kano and Hadejia the majority of the millers have experience ranging between 11-15 years while Makarfi has about 50% of its millers with 6-10 years experience.

At Hadejia and Makarfi majority of the millers fall within 26-35 years of age but Kano and Dandume have about a third of their millers between the ages of 36-45 and 46-55, respectively. This can easily be associated with the longer years of experience in milling in these areas compared to Hadejia and Makarfi.

The level of education of the millers varies from location to location. While in Kano about 41% have primary education and about a third are not educated, at Hadejia 20% have tertiary education though as many as 60% are uneducated. At Makarfi the proportion of primary to tertiary education is about equal i.e. 50% of the millers each.

In most of the locations the family size is in the range of 10-15 (33.3% at Dandume to 73.3% at Makarfi). It is only in Kano that you may come across millers with more than 30 household members.

In two of the locations i.e. Hadejia and Makarfi, all the millers (100%) rely on milling as their primary occupation but at Dandume just 6.67% of the millers rely on rice processing as a major source of livelihood, they mainly depend on farming. In Kano about a third live on processing and 40% depend on farming.

The majority of the millers in Kano have an annual income of N500,000-N1,000,000 and about 8% may get as high as N3,500,000. Their income far exceeds any other location. This is indicative of the volume and nature of transaction which may be strongly influenced by the proximity of the processing centre to the city of Kano. All the millers at Hadejia either don't know their annual income or have refused to disclose the volume of their transactions (table 3.3.1).

Table 3.3.1: Socio-economic characteristics of millers

Characteristics	Kano Area (n=70)		Hadejia(n=15)		Makarfi(n=15)		Dandume(n=15)		
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Sex									
Male	70	100	15	100	15	100	15	100	
Female	-	-	-	-	-	-	-	-	
Marital Status									
Single	5	7.14	4	26.7	5	33.3	-	0	
Married	65	92.86	11	73.3	10	66.7	15	100	
Separated/Widowed	-	-	-	-	-	-	-	-	
Divorced	-	-	-	-	-	-	-	-	
Category of Business									
Medium 1	22	31.4	3	20	1	6.67	5	33.3	
Medium 2	0	-	0	0	0	0	2	13.3	
Small	40	57.1	12	80	14	93.3	4	53.3	
Medium 3	8	11.4	0	0	0	0	0	0	
Years of Experience									
1-5	12	17.1	4	26.7	4	26.7	0	0	
6-10	19	27.1	3	20	7	46.7	3	20	
11-15	22	31.4	6	40	3	20	4	26.7	
16-20	16	22.9	2	13.3	0	6.67	3	20	
>20	1	1.43	0	0	0	0	5	33.3	
Age Group									
18-25	6	8.57	4	26.7	3	20	2	13.3	
26-35	22	31.4	5	33.3	8	53.3	2	13.3	
36-45	24	34.3	2	13.3	2	13.3	2	13.3	
46-55	18	25.7	2	13.3	0	13.3	5	33.3	
>55	0	-	2	13.3	0	0	4	26.7	
Education									
Primary	29	41.4	2	13.3	7	46.7	7	46.7	
Secondary	21	30	1	6.67	0	0	0	0	
Tertiary	0	0	3	20	8	53.3	0	0	
None	20	28.6	9	60	0	0	8	53.3	
Household Size									
<10	2	2.86		13.3		26.7	1	6.67	
10-15	39	55.7	10	66.7	11	73.3	5	33.3	
16-20	12	17.1	3	20	0	0	3	20	
21-25	1	1.43	0	0	0	0	6	40	
26-30	10	14.3	0	0	0	0	0	0	
>30	2	2.86	0	0	0	0	0	0	
Primary Occupation									
Farming	28	40	0	0	0	0	9	60	
Trading	20	28.6	0	0	15	100	3	20	
Processing	22	31.4	15	100	0	0	1	6.67	
Housewife	0	0	0	0	0	0	0	0	
Service	0	0	0	0	0	0	2	13.3	
Income (₦) Group									
50,000-200,000	19	27.1	0	0	15	100	5	33.3	
0.2-0.5 million	11	15.7	0	0	0	0	5	33.3	
0.5-1.0 million	16	22.9	0	0	0	0	3	20	
1.0-3.5 million	6	8.57	0	0	0	0	1	6.67	
>3.5 million	0	0	0	0	0	0	1	6.67	
Don't Know	1	1.43	8	53.3	0	0	0	0	

No Response	0	24.3	7	46.7	0	0	0	0
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3.3.2 Millers' perspectives on rice quality

There are numerous rice varieties adapted to the different production systems and processing centres. However, it is apparent that many of the cultivars are genetically the same but are coded with different local names in the different locations. The names are a description of the quality of the grain i.e. in terms of its fineness, luster and grain to width ratio.

The millers rank the varieties based on their physical attributes after processing. The varieties that ranked top are different across the locations; however, they could be the same but bear different local names. For example, in Tudun Wada all short-statured, long duration, lowland rice varieties are collectively called 'Dukusa'. In the Kura-Kano cluster the output from top most varieties, namely, SIPI and WITA is comparable to imported rice according to the millers.

The general opinion of the millers is that although they are happy with the quality of their product, but they admit it can be made much better by improvement in the processing technology and techniques. This implies they are amenable to any change in their production system for as long as it results in better performance and efficiency while it takes into account their capabilities. In every location there is often a particular variety that when properly milled gives the best quality. Generally, quality is more important to customers than price. This is to say that customers are willing to pay for affordable price for good quality output from the processing units. To majority of millers (Kano-66.4%, Jigawa-100%, Kaduna-40% and Katsina-100%) higher profit margin is more important than the quality of output. Most traders (kano-45.3%, Jigawa-100%, Kaduna-80% and Katsina-72.7%) make higher profit margin when they serve as integrated actors (process their own product and also process for other customers) To some other millers dryness, brightness and grain length are important quality attribute. There is variation in the types of customers who enjoyed milling serves in the clusters. It is evident that farmers, parboilers and traders are very important recipients of the milling services. In Kano and Jigawa millers process their own commodity in addition to processing for others.

A number of factors have been identified as being responsible for limiting the optimum quality of rice. This include the quality of parboiling, experience and technique employed by the parboiler, type and age of milling machine, extent and nature of drying, rice variety and quality at harvest. However, the most emphasized is the need for parboilers to improve on their practices. Milling is usually the final stage of processing and ones it was poorly handled at the farmer's level and not much has changed at the point of parboiling, the end product is doomed. When farmers dry on bare ground the rice picks a lot of sand and soil particles which eventually dissolve when soaked in the hot water and changes the color of water which eventually changes the color of the rice even before milling. Many of the existing milling machines are without destoners and one stage milling is the norm and none of the millers goes through the second stage milling. Prices charged for milling a bag varies from lowest (NGN50) in Katsina, to intermediate in Kano (NGN100) and the highest rate in Kaduna (NGN225). There is however no variation in rate charged for different customers in the clusters with the exception of Katsina where traders are charged a little higher than others. Except for millers in Kaduna (60%) who charged lower price during off peak period, millers in other clusters maintained the same price for both peak and off peak periods. The price charged per bag for milling services is uniform irrespective of the type and quality of the parboiling. This could be because 73.3% of millers in Katsina use polisher while only 9.4% use polisher in processing rice in Kano cluster. Mostly the millers push the blame to parboilers or attribute it to lack of proper drying after the parboiling since often it is the responsibility of the rice owner to handle the drying before taken to the miller. After milling the prices vary depending on the grade of the product. There are standard products in all

the locations studied and these are usually the cultivars that ranked top according to quality. The qualities of a standard product are common to all locations i.e. the grain should be shiny, long, unbroken after milling, devoid of weed seeds, impurities and stones. Therefore Millers operating in Kano (68.3%), Kaduna (84.6%) and Katsina (75%) revealed the existence of standard outputs from processing in their clusters.

Table 3.3.2a: Rice Quality Standards and Attributes: Millers' Perspective in Kano Areas

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Ranking of Varieties according to quality	<ul style="list-style-type: none"> • SIPI • Wita • Yar-das • Jallop 	<ul style="list-style-type: none"> • Jamila • Santana • Kelake 	<ul style="list-style-type: none"> • Mai-adda • Dukusa
Attainment of best quality product	Quality is at its best considering technology and techniques available	Output is good but not at its best	Out put very good but could be improved
Factors limiting optimum quality of product	Poor par-boiling practices	Experience of Par-boiler and the parboiling techniques used.	Existing machines do not remove stones completely. Per-boiling practices also affect quality
Prices for Various Grades		Jamila = N GN350 per tiya Santana = NGN330 per tiya Kilaki = NGN320 per tiya	
Existence of standard product	SIPI and Wita are generally considered as standard product	Jamila is a Standard product	Mai-adda
Qualities of a standard product	Long grains, shinny dried with no impurities	Long grain, shinny, clean and dried.	Bright, long grain devoid of weeds and stones

Table 3.3.2b: Rice Quality Standards and Attributes from Millers' Perspective in Hadejia, Makarfi and Dandume

Issues	Response		
	Hadejia	Makarfi	Dandume
Ranking of Varieties according to quality	JANA, FARO, TOX, SIPI, CHINA 4	Jollof, Yar-Das, Maibiro	KILAKI
Attainment of best quality product	Quality not at its best and can be improved. FARO usually gives the best quality milled rice.	Quality not at its best and can be improved	Quality not at its best and can be improved. KILAKI usually gives the best quality milling.
Factors limiting optimum quality of product	Quality of Parboiling is the most important determinant. The type of paddy and its quality is also important determinants.	Parboiling practices and age of milling machines	Wear and tear of the milling machines. Poor parboiling especially when water use is not properly controlled in

			parboiling Poor dying in parboiling The type of paddy and its quality.
Prices for Various Grades(paddy)	Price charged per bag for milling services is uniform irrespective of the type and quality of the parboiling.	Jollof = NGN 3500 per bag; Yar-Das = NGN 3000 per bag; Maibiro = NGN 2800 per bag	Price charged per bag for milling services is uniform irrespective of the type and quality of the parboiling.
Existence of standard product	FARO or TOX milled as Kwandalla grade is a standard product.	Jollof is considered as standard product	KILAKI is the standard product.
Qualities of a standard product	Long and unbroken grain White and shiny grain.	Bright colour, long grain, minimum breakage when milled	Long grain and whiteness.

Table 3.3.2 c: Quality and other issues in rice milling among sampled millers

Variables	Kano(n= 70)	Jigawa(n= 15)	Kaduna(n= 15)	Katsina(n =15)
Type of milling machine commonly used				
Amuda	21 (30))	-	-	-
Colba	4 (5.71)	-	-	-
Colin	1 (1.43)	-	-	-
Eamex	4 (5.71)	-	-	-
Liberty	1 (1.43)	-	-	-
Lisen Emes	2 (2.86)	-	-	-
Madras	4 (5.71)	-	-	2 (13.33)
OPC	-	-	-	5 (33.33)
PMX	-	1 (6.67)	-	-
Selia	3 (4.29)	-	-	-
Source of milling machine				
Kano	69 (98.57)	15 (100)	9 (60)	15 (100)
Zaria	-	-	6 (40)	-
Millers categories				
Small(1 mill)	40 (57.1)	12 (80)	14 (93.3)	8 (53.3)
Medium1(2-3 mills)	22 (31.4)	3 (20)	1 (6.67)	5 (33.3)
Medium2(3or more mills)	-	-	-	2 (13.3)
Medium3(Non Indian mill)	8 (11.4)	-	-	-
Type of customers and fees charged 100kg bag for milling				
Farmers	NGN100 (77.4)	NGN100 (100)	NGN225 (53.3)	NGN50 (100)
Parboilers	NGN100 (55.9)	NGN100 (100)	NGN225 (53.3)	NGN50 (45.5)
Traders	NGN100 (68)	NGN100 (100)	NGN225 (53.3)	NGN60 (100)
Self	NGN100 (81.5)	NGN100 (100)	-	-
Use of Polisher by millers				
Use polisher	7 (9.4)	-	-	11 (73.3)

Do not use polisher	63 (90.6)	-	-	4 (26.7)
Fees charged per 100kg bag for milling				
Average at Peak Period	NGN100 (44.8)	NGN100 (100)	NGN225 (33.3)	NGN70 (40)
Average off Peak Period	NGN100 (50)	NGN100 (100)	NGN200 (60)	NGN70 (45.5)
Variation in Price for different quality of service				
Variation exist	12 (16.7)	-	3 (23.1)	15 (100)
No Variation	58 (83.3)	15 (100)	12 (76.9)	-
Storage of commodity before or after processing				
Provide storage	26 (37.5)	1 (9.1)	-	5 (33.3)
Do not provide storage	44(62.5)	14 (90.9)	-	10 (66.7)
Availability of a standard product				
Available	48 (68.2)	-	13 (84.6)	11(75)
Not Available	22 (31.8)	15 (100)	2 (15.4)	4 (25)
What is more important to buyers				
Quality	60 (85.1)	-	15 (100)	12 (78.6)
Price	10 (14.9)	15 (100)	-	3 (21.4)
Aspects important to miller in rice processing				
Quality of output	17 (24.6)	-	9 (60)	-
Higher income	46 (66.4)	15 (100)	6 (40)	15 (100)
Aspects of quality important to miller				
Dryness	35 (49.3)	-	-	-
Brightness	25 (36.2)	15 (100)	10 (66.7)	8 (53.3)
Grain length (long grains)	-	-	5 (33.3)	-
Availability of non-household labour				
Readily available	69 (98.3)	15 (100)	15 (100)	12 (78.6)
Not readily available	1 (1.7)	-	-	3 (21.4)
Number of months for processing in year				
6 months in a year	-	-	-	10 (66.7)
Year round	70 (100)	15 (100)	15 (100)	5 (33.6)
Number of household members engaged in processing employment				
Number of Male:				
1	-	-	7 (44.4)	-
2	25 (35.6)	-	-	-
3	-	-	-	3 (22.2)
4	-	9 (57.1)	-	-
Number of female				
1	28 (40)	-	-	4(28.6)
2				

Figures in parenthesis are the percentages

3.3.3 Millers' perspectives on the structure of rice value chain

The millers are irked by the incessant shortage of power supply, persistent hike in fuel prices, poor parboiling, adulteration of product, machine break down and theft. The investment and operational costs have been on the increase and in some places like Dandume the demand for milling is on the decline due partly to reduced local production of rice. In the same place millers provide services on credit and sometimes if the traders loose in their transaction it may affect the payment. In other places like Hadejia, millers complain of lack of good access roads to production areas which invariably affects product transportation to milling centres.

The increasing costs of transaction imply a reduction in the profitability of the business and this has further implication on its sustainability.

The activities of millers are generally on the rise in all the production and processing centres visited except Dandume. In this particular town large scale processing is still going on but lack of sufficient affordable inputs and declining rainfall is constraining the production of rice. Farmers are gradually shifting to maize which demands less amount of rain. Milling was manually done in the past using pestle and mortar and in some places grinding stones but are now replaced by machines. Because of the positive trend in rice production and marketing of local rice, there is an increase in the number of millers caused by the increase in demand for their services. There is also an emerging market for the rice husks by the livestock industry. Rising price of the commodity and fuel are some of the changes observed by reasonable proportion of the millers in recent times (appendix 3)

The main constraints to entry into the commodity market are the ability to raise enough capital and then be able to acquire the skills to survive the market competition. In all the rice processing centres, the millers organize themselves into association and demands that all potential millers register with them. Registration is open and affordable to all potential entrants. It is therefore not a structural barrier but a regulatory mechanism. There are no restrictions to other markets.

The millers operate all year round although there are peak periods of high activity which are soon after harvest and at the beginning of the following season (farmers and traders bring out their stored rice to sale to meet obligations for farming activities). However, in most places activities are almost even for most part of the year. They operate mornings and evenings to target market days.

Table 3.3.3a: Structural Characteristics of the Rice Value Chain: Millers' Perspective in Kano Area

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Millers' dislikes in the rice market	Poor parboiling practices, rising rented value of operation	Adulteration of product leading to reduced patronage	Increase in fuel price because it reduces the profit margin. High cost of electricity bill and poor supply.
Trend in the rice value chain	Increase in number of buyers, competition feed companies now purchase rice husk	Milling was manned in the past, now machines are used.	Increase in rice production and milling

Who determine entry into the market	Millers Association	Capital and Skill are essential. Millers association control entry	Capital and skill. Entry is regulated by millers association
Access restrictions to other markets	None	None	None
What is lacking in the present market structure	No permanent milling and market site.	Inadequate Government support in terms of provision of adequate operating capital and space.	No sufficient space for operation
Duration and frequency of operation per year	More milling in Sep. – Dec, but milling is all year round activity	There is no off season. Operate morning and evening target market days	No off season Market days are at intervals of only a day

Table 3.3.3b: Structural Characteristics of the Rice Value Chain: Millers' Perspective in other outlying clusters

Issues	Response		
	Hadejia	Makarfi	Dandume
Millers' dislikes in the rice market	Poor supply of electricity High cost of diesel Poor access road to production areas which affects products transportation to milling centres Customers do not stick to fixed prices for milling. Millers in most cases have to negotiate with customers to agree for price of service.	Breakage of machines and theft of customer produce in the milling room at night	Sometimes the demand for milling services is low. High cost of fuel and poor supply of electricity.
Trend in the rice value chain	Number of millers increase over time. Increase in demand for milling services due to increase in rice production and trading	Increase in demand for milling services due to increase in rice production	Production has decline over time and number of millers also reducing.
Constraints to entry into the commodity market	Capital and skills	Capital and skills	Capital and skills
Who determine entry	Potential entrants are	Registration with	Potential entrants are

into the market	expected to register with millers association. But capital and place to establish the business are sometimes constrained to entry.	millers' association	expected to register with millers association.
Access restrictions to other markets	None	Non	None
Duration and frequency of operation per year	Peak periods are immediately after harvest and at the beginning of rainy season when speculative middlemen including farmers are more willing to bring out paddy from stores for processing and sale	There is no completely off season. Peak periods are immediately after harvest and at the beginning of rainy season	Peak periods are immediately after harvest and at the beginning of rainy season when speculative middlemen including farmers are more willing to bring out paddy from stores for processing and sale

3.3.4 Prospects and Constraints in Rice Value Chain: Millers' Perspective

Apart from being a means of livelihood, millers perceive their activity as an opportunity to offer community members in particular their relations and neighbor a chance to be kept employed. Its keeps the youth occupied rather than idling who could turn up as nuisance or hoodlums against the community. Thus, millers associations are used as platforms for fostering good relationship among communities.

Millers are motivated to join the business because it is profitable and this is indicative from the experience of those who started much earlier. It has been a good means of living for many people for several years and many are encouraged by the large volume of rice produced in their locality. In many areas the availability of the raw material for (i.e. paddy) all year round means that there will be demand for milling services from processors.

Many factors are critical to the sustainability of the rice trade. These include electricity supply, cost of fuel, costs of machinery and maintenance, profitability and market outlet. There is evidence that electricity bill is an area of high cost in milling enterprises within all the clusters studied. Other areas of high cost include handling as mentioned by 34.5% of millers operating in Kano cluster. Poor market outlet could lead to low prices of good quality products and would consequently have adverse effect on the rice trade. The unavailability of credit to majority of millers (Kano-72.5%, Jigawa-100%, Kaduna-93.3% and Katsina-100%) made the smooth running and expansion of the enterprise less attainable.

Many millers have remained in the business despite all odd because it has been adapted as a means of living and there are few alternative job opportunities. It also serves to employ hundreds of people particularly the youth who otherwise may find it more difficult to make a living.

The product price is a function of many factors, namely, rising costs of inputs, quality of the milled rice, demand situation and type of rice (the white rice is always more expensive than the parboiled rice). The quality of the machine and the experience of the operator determine how well the rice is processed and this affects its market value.

There are a number of challenges facing the rice commodity chain. Mainly are the unreliable supply of electricity and the exorbitant cost of fuel. There is also the unsatisfactory commitment of the hired machine operators leading to long queues for milling services. The expansion of market outlets and adoption of improved processing techniques is a great challenge if they want to keep up with the consumer expectation of improving and up grading the Nigerian rice. The relationship between millers and traders has to be strengthened. For example, at Dandume, millers provide services on credit and sometimes processors (traders) refuse to pay when due. Similarly, some of their customers do bring poorly parboiled paddy which would result to poor milling and millers sometimes are held responsible

In many processing centres no effective measures are taken to overcome these challenges. However, in some location a few of the measures include, the use of alternative source of energy (i.e. diesel engines), and improved supervision of operators by investors.

In the past the dumping of rice husks constituted an environmental problem. At that time millers had to pay for its disposal, however, the situation has changed now in all rice processing centres. They have value now because of the demand from the livestock feed meals and cattle owners. In all areas studied except Tudun Wada, the miller takes ownership of the husks. In Tudun Wada, there is increasing competition between millers and their customers who insist in owning the husks (in fact, presently customers own the husks).

At present only a small proportion of millers in Kano (35.3%) obtained higher profit margin from use of improved technology. The situation is much better in Katsina were 75% of millers claimed to have higher profit margin from the use of improved technology. This is largely due to inaccessibility of millers to the improved technologies. Majority (Kano-96.8%, Jigawa-44.4%, Kaduna-100% and Katsina-66.7%) of the operators are willing to invest on improved technology if credit is made available to them. Training is important to understanding and use of improved technology. Except for 25% of the millers in Kano cluster, such training is not available. This is despite the fact that majority of the millers can afford the training. Since such trainings are available, it was difficult for the millers to assess its effectiveness. In Jigawa, Kaduna and Katsina experienced millers try to improve services offered to customers by training their labourers and household on attainment of quality standards. Skill and unskilled labour is very important in milling services. Generally, labour is readily available to operators in all the clusters studied. This facilitate the running of milling services year round among 70% in Kano cluster, 100% each in Jigawa and Kaduna. In Katsina 66.7% of the operators operates for only six months. Both male and female household members are engaged in processing employment. The number of male household members engaged in processing varied from 2 to 4. Fewer female (1 to 2) per household are usually found engaged in processing employment (appendix 3). Similar proportions of both male and female are engaged in other employment.

Table 3.3.4a: Prospects and Constraints in Rice Value Chain: Millers' Perspective in Kano Areas

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Non Income benefits of rice trading	Milling foster better social relationships among people in communities		Millers associations is used as platform for fostering good relationship among communities
What motivate and influence traders into the trade	Milling is a profitable means of livelihood	Availability of raw output (paddy)throughout the year and thus there is always demand for milling	Milling is a profitable activity in Tudun Wada. It is a means of livelihood for many

		services from processors	people.
Factors critical to sustainability of rice trade	High cost of milling machine and maintenance.	Rising cost of operation due to fuel prices and prices of machine parts.	Poor market outlet leading low prices of good quality products
What can keep traders in the commodity business in spite of all odds	Milling is a means of livelihood. No alternative job opportunities	Milling is a means of livelihood. No better and more feasible alternative job opportunities	Milling is a means of lively hood
Factors influencing product price	Rising price of inputs	Quality and demand	Cost of inputs: fuel, spare parts etc.
Challenges facing the commodity chain	Poor supply of electricity and high costs of diesel	Poor supply of electricity	Inadequate commitment of hired operators leading to long queue for milling services.
Action taken to improve the situation		Secure alternative by purchasing diesel engines.	Improved supervision by investors
Environmental problems of dumping rice husk	Rice Husk have value now because of its demand from feeds companies	Rice husk is valuable now. It is required by feed companies	Before millers pay for the removal of rice husk, now it has value because it is required by feed companies

Table: 3.3.4b: Prospects and Constraints in Rice Value Chain: Parboilers' Perspective in other outlying clusters

Issues	Response		
	Hadejia	Makarfi	Dandume
Non Income benefits of rice milling	Employ other people and provide good source of rice for consumers	It form basis for building socio-economic networks between people.	Employ other people
What motivate and influence Parboiling into the Parboiling	Milling is a profitable activity due to large output of rice coming from the area. Most millers are influenced this factor and motivated by friends who are already in the business.	Production of rice in makarfi area, Milling is a profitable activity.	Milling is a profitable activity. Potential entrants are motivated by success of others.
Factors critical to sustainability of rice Parboiling	<ul style="list-style-type: none"> • Cost of fuel • Electricity supply 	Profit	Machinery quality and cost
What can keep Parboiler in the	Means of livelihood	It is a means of	Means of livelihood

commodity business in spite of all odds	and profitable	livelihood	and profitable
Factors influencing product price	Quality of milling which depends on paddy quality and type.	Quality and demand influence produce price	Quality of milling services which depends on the facilities used
Challenges facing the commodity chain	Poor supply of electricity	Expansion of market outlets and adoption of improved processing techniques	Millers provide services on credit and sometimes processors refuse to pay as and when due. Customers bring poor quality parboiled paddy and that result to poor milling and millers sometimes hold viable for such poor quality.
Action taken to improve the situation	None	None	None
Environmental problems of dumping rice husk	Rice husk is sold to cattle owners and industrial users.	There are presently no environmental hazards. Rice husk is sold to cattle owners who feed their animals with it.	Rice husk is sold to cattle owners and industrial users.

Table 3.3.4c: Structure, prospects and constraints in rice value chain among sampled millers

Number of household members engaged in other employment				
Number of Male:				
1	13 (18.5)	5 (33.3)	-	-
2	13 (18.5)	5 (33.3)	15 (100)	15 (100)
3	-	(33.3)	-	-
Number of female				
2	26 (37.5)	10 (66.7)	-	-
Availability of source of information on grades and standard				
Available	19 (27)	-	-	-
Not Available	51 (73)	15 (100)	-	-
Availability of improved technology				
Available	16 (22.7)	-	15 (100)	4 (25)
Not available	54 (77.3)	15 (100)	-	11 (75)
Usage of improved technology				
Benefits of using improved technology:				
Obtain higher profit	25 (35.3)	-	-	11 (75)
Do not obtain higher profit	45 (64.7)	15 (100)	-	4 (25)
Willingness to invest in new technology if credit is obtained				

Willing to invest	68 (96.8)	7 (44.4)	15 (100)	10 (66.7)
Not willing to invest	2 (3.2)	8 (55.6)	-	5 (33.3)
Training available on improved technology from private sector				
Available	25 (36.4)	-	-	-
Not available	45 (63.6)	15 (100)	15 (100)	15 (100)
Miller affordability to training				
Affordable	64 (92.1)	15 (100)	-	10 (66.7)
Not affordable	6 (7.9)	-	-	5 (33.3)
Effectiveness of available training				
Effective	23 (32.3)	-	-	-
Not effective	-	-	-	-
Miller trains producers, labourers, household on quality standards in processing				
Trained them	6 (8.1)	15 (100)	13 (90.9)	10 (66.7)
Do not train	64 (91.9)	-	2 (9.1)	5 (33.3)
Training to improving quality, meet market demand-grades and standards				
Available	11 (15.8)	14 (93.3)	-	4 (25)
Not available	59 (84.2)	1 (6.7)	-	11 (75)
Credit availability and access				
Available	19 (27.5)	-	1 (6.7)	-
Not available	51 (72.5)	15 (100)	14 (93.3)	15 (100)
Accessible	17 (23.7)	-	1 (6.7)	-
Not accessible	53 (76.3)	15 (100)	14 (93.3)	15 (100)
Areas of high costs in milling:				
Electricity bill	19 (27.6)	15 (100)	10 (69.2)	-
Fuel	18 (25.9)	-	5 (30.8)	-
Handling	24 (34.5)	-	-	-
Parboiling	8 (12.1)	-	-	-
Which provide more income:				
Process own product	12 (17.3)	-	-	4 (27.3)
Process for a fee	26 (37.3)	-	3 (20)	-
Both	32 (45.3)	15 (100)	12 (80)	11 (72.7)
Major changes observed in the commodity chain:				
Higher commodity price	43 (60.9)	12 (80)	-	-
Increased profit	-	-	-	-
High cost of diesel	27 (20.3)	-	8 (53.3)	12 (80)

3.3.5 Risks and uncertainties associated with rice milling

The millers encounter a number of market risks and uncertainties ranging from business set backs to physical injuries (amputation of limbs). In Garko and Dandume processing centres milling services are offered on credit basis to large processors and such customers when they incur losses at trading level may fail to pay milling services done on credit. Sometimes the officials of their associations have to intervene before they could recover their money. In other places like Tudun Wada the risks are not as much rather the middle men who usually manipulate the market may cause some delays for personal gains. Another common problem is the breakdown of the machine as a result of fluctuations in electricity or due to wear and tear which ultimately reduce produce or the quality of milled rice. In some

instances, the paddy or milled rice may be lost while in their custody. If this happens the millers are to replace or pay back the owner.

The millers employ some measures to manage or reduce the risks by being more careful while operating the machines, insisting on collecting at least part payment before milling, use of vigilante groups to improve security, and use of machines which are more rugged and diesel powered to avoid power fluctuations.

In places like Tudun Wada, Garko and Makarfi there are not many improvements in the management of market risks. However, in Hadejia and Dandume it is possible to have improvements with the use of better machines or diesel powered mills.

Some market risks still persist in Makarfi and in particular the issue of bad debt at Garko. Here the market dictates the ability of customers to pay the debt. Electricity has remained a persistent problem in almost all places.

Table 3.3.4d: Risk and Uncertainties Associated with Rice Value Chain: Millers ' Perspective in Kano Areas

Issues	Response		
	Kura-Kano Corridor	Garko	Tudun Wada
Market risk in the commodity chain	Accident from use of machines	Milling services are offered on credit basis to large processors and such customers when they incur losses at trading level may fail to pay milling services done on credit.	No risk except middle men could cause delay in market for personal interest
Action taken	Have learnt to be careful through experience and	Try to reduce debt by taking part payments	None
Improvements in market risks	This is less accidents among millers now.	Bad debts still occurs	None
Persistence of market risk	None	Bad Debt	

Table 3.3.4e: Risk and Uncertainties Associated with Rice Value Chain: Millers' Perspective in other outlying clusters

Issues	Response		
	Hadejia	Makarfi	Dandume
Market risk in the commodity chain	Breakage and malfunctioning of machines due to weak electricity voltage or fluctuations resulting to poor quality of milling.	Breakage of machine and theft of customers' produce at milling rooms in the night Market glut Injuries sustain during	Theft of paddy or milled rice while in miller's custody. Break down of milling machines due to power failure or malfunctioning

		machine operation	Physical injuries during operation such as amputation of limb.
Action taken	Use of diesel machines to avoid problem of power failure or fluctuations.	Improve security by using vigilante groups in the community	Use better machines that a more rugged Ensure maximum security at milling units Take precautionary measures during operation.
Improvements in market risks	Improvement is obtained if diesel machines	No much improvements	Improvement is noticed for those who use better machines and precaution.
Persistence of market risk	Electricity fluctuations still persist.	Market risks persist	None

3.4 Rice trading

In Kano area and other outlying rice production clusters, processing and marketing is a major economic enterprise employing various categories of actors. The most important of these actors are the traders who by their activity link production with consumption. There is high level of integration in rice commodity chain for example; a trader is also a farmer and at the same times a processor. Three types of traders were identified;

Those involved in purchasing paddy rice from farmers and selling it to other traders and processors

Those involved in purchasing paddy rice from farmers and other traders and then processed the paddy into milled rice and sell to both retailers and consumers.

Those who purchase only processed rice and sell to other traders, consumers and other buyers directly.

In the Kura-Kano axis the second category is the predominant, while in Dawanau , Rimi and Sabon Gari market the third is the predominant. But in Dawanau Market the first and second category can also be found in significant number. In other areas that is Garko and Tudun Wada the second and first category is the predominant. In Hadejia, most traders are also farmers and processors and thus the second category is the predominant. In Makarfi and Dandume the first category is predominant. The focus group discussions and enumerator survey were conducted in all these market clusters and thus information about the different types of traders were obtained and summarized and presented in tabular forms. The results from the focus group discussions and enumerator conducted survey are synthesized and presented as follows:

3.4.1 Socio-economic characteristics of traders

Both male and female operate as traders in the commodity value chain. However, majority are male operating at different levels of the commodity value chain. Female traders mostly operates as retailers where as men are found across all levels of the marketing chain. Generally, the traders are married and depend on an income that is below one million naira per annum. The scale of operation varies among the traders with majority operating at a medium category. In Makarfi-Kaduna State, majority (80%) of the traders involved in the study are small scale operators. The age of the operators and their years of experience

could be termed as intermediate with the exception of traders at Makarfi where those with experience of between 1 and five years were identified as the majority (60%). Most of the traders operating in Kano (59%), Jigawa (53.33%) and Kaduna (53.33%) have no formal education. As much as 60% of traders operating in Dandume-Katsina State have undergone primary education. The household responsibilities of the traders could be enormous considering the fact that most of the traders in Kano (69.47%), Jigawa (46.67%), Kaduna (80%) belongs to households with members ranging between ten and fifteen. It is therefore not surprising that some of the farmers combined trading with other business such as farming. Farming is a major occupation to traders in Jigawa (60%) and Kaduna (60%) while a number of the traders in Kano (25%) and Katsina (13.33%) take farming as a major occupation while trading is second. Table 3.4.1 shows details of the socio-economic features among traders in the clusters studied.

Table 3.4.1: Socio-economic Characteristics of Traders

Characteristics	Kano Area (n=100)		Hadejia (n=15)		Makarfi (n=15)		Dandume (n=15)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Sex								
Male	98	98.00	15	100	12	80.00	15	100
Female	2	2.00	-	-	3	20.00	-	-
Marital Status								
Single	7	7.07	-	-	1	6.67	-	-
Married	91	91.92	15	100	11	73.33	15	100
Separated/Widowed	1	1.01	-	-	3	20.00	-	-
Divorced	-	-	-	-	-	-	-	-
Category of Business								
Small	37	37.00	-	-	12	80.00	5	33.33
Medium	52	52.00	6	40.00	2	13.33	10	66.67
Large	7	7.00	9	60.00	1	6.67	-	-
Years of Experience								
1-5	8	8.16			9	60.00	-	-
6-10	39	39.80	1	6.67	6	40.00	3	20.00
11-15	30	30.61	3	20.00	-	-	4	26.67
16-20	15	15.31	6	40.00	-	-	7	46.67
>20	6	6.12	5	33.33	-	-	1	6.67
Age Group								
Below 26	10	10.00	-	-	3	20.00	1	6.67
26-35	41	41.00	-	-	6	40.00	4	26.67
36-45	36	36.00	3	20.00	3	20.00	4	26.67
46-55	11	11.00	5	33.33	1	6.67	5	33.33
>55	2	2.00	7	46.67	2	13.33	1	6.67
Education								
Primary	11	11.00	3	20.00	5	33.33	9	60.00
Secondary	25	25.00	2	13.33	2	13.33	2	13.33
Tertiary	5	5.00	2	13.33	-	-	0	0.00
None	59	59.00	8	53.33	8	53.33	4	26.67
Household Size								
<10	2	2.11	-	-	2	13.33		
10-15	66	69.47	7	46.67	12	80.00		
16-20	12	12.63	1	6.67	1	6.67		
21-25	4	4.21	4	26.67	-	-		
26-30	5	5.26	1	6.67	-	-		
>30	6	6.32	2	13.33	-	-		
Primary Occupation								

Farming	25	25.00	9	60.00	9	60.00	2	13.33
Trading	74	74.00	4	26.67	5	33.33	13	86.67
Processing	0	0.00	-	-	-	-	-	-
Housewife	1	1.00	-	-	1	6.67	-	-
Service	0	0.00	-	-	-	-	-	-
Civil servant	0	0.00	2	13.33	-	-	-	-
Income (N)Group								
50,000-200,000	28	28.00	1	6.67	6	40.00	1	6.67
0.2-0.5 million	31	31.00	3	20.00	-	-	9	60.00
0.5-1.0 million	22	22.00	8	53.33	1	6.67	4	26.67
1.0-3.5 million	2	2.00	2	13.33	1	6.67	1	6.67
>3.5 million	1	1.00	1	6.67	-	-	-	-
Don't Know	2	2.00	-	-	4	26.67	-	-
No Response	14	14.00	-	-	3	20.00	-	-

3.4.2 Traders perspectives on rice quality

The most preferred rice in the Kura axis (Chiromawa, Kura, Karfi, Kwanar-Dawaki) is the WITA-4 which is tasteful and of small grains though SIPI is more popular because of its availability. The supply of WITA-4 was described as inadequate in the area. The best quality rice is SIPI followed by WITA-4, Yar-Das, Nerica and Jollof. The supply of Nerica could be considered as negligible because its production is not popular among farmers. Traders were of the opinion that the least quality rice (Jollof) according to their ranking found its path into the area from Zaria. Although consumers tend to buy more of what is available and affordable to them, SIPI is more commonly purchased by the consumers because it is less expensive in relation to its quality.

The ranking of rice varieties among traders operating in Sabon-Gari and Rimi markets where sales of milled rice is predominant was based on location where the rice is sourced. In Sabon Gari and Dawanau markets Yar-Tudun-Wada was ranked as best quality rice followed by Yar-Mubi. Rice found its way from Dandume in Katsina State and Banki in Cameroon to Dawanau and Sabon Gari markets respectively. Traders at Rimi market considered Yar-Garko as best quality rice followed by Yar-Tudun-Wada, Yar-Kura and then Yar-Niger. This confirmed the assertion of parboilers and millers in Garko that rice traders from Kano purchase large quantities of their commodity. It was believed that such rice was being re-packaged and sold as imported rice to consumers in Kano. Yar-Tudun-Wada and Yar-Kura are more purchased by consumers at Rimi market because they are relatively cheaper compared to Yar-Garko. However, rice from Tudun-Wada was preferred by traders in Sabon-Gari and Dawanau markets because it is drier, thus can be stored for longer period without incurring loss. Irrespective of the variety of rice in question, Tudun-Wada is commended for good processing. Best quality rice in Garko is Jamila followed by Santana, Kilaki etc. At Tudun-Wada, Dukusa was ranked as best followed by Maiádda, Jollof, etc. In the outlying clusters, Kilaki was ranked as first in Dandume-Katsina State (Kilaki is ranked as third in Garko); Yar-bunkure, SIPI, Yar-Yamidi were ranked as the best by traders in Hadejia-Jigawa State in that order.

Traders in Makarfi-Kaduna State considered Jollof (white and red) followed by Yar-Das, Maibiro, as the best in quality. Jollof is more preferred by consumers though its supply at Makarfi is not adequate. Traders in Hadejia explained that when processed, Yar-Bunkure, SIPI, Yar-Yamidi and TOX gives higher output thus, more profitable relative to others. Despite the variation in opinions on quality of rice among respondents, there is general consensus across all clusters that the present qualities of milled rice is not at its best and could be improved upon by employing better processing (parboiling and milling) techniques and equipment. Poor parboiling techniques and lack of good milling machines were

identified as the factors limiting optimum quality products from processing. This in turn affects the market value of the commodity as well as gives rise to variations in the value across the clusters. The factors which influence people choice for the commodity are basically product's quality and price. Results from the survey revealed that traders operating in Kano area (87.0%), Jigawa (93.33%), Kaduna (93.33%) and Katsina (100) observed that their customers showed higher preference to quality compared to price. Marketing of higher quality product is also important to the traders (Kano-93.0%, Jigawa-93.33%, Kaduna-86.67% and Katsina-100%). This contributes to standardization of the products in all the clusters. Opinions of traders in all locations (Kano-84.0%, Jigawa-863.67%, Kaduna-53.337% and Katsina-40%) shows standard products exist in all the locations. The availability of training on quality improvement is not common in all the clusters studied. In fact only fifteen percent (15%) and 6.67% of traders operating in Kano and Jigawa areas indicated that training is available to them; while only 4.0% of traders in Kano received such training (Table3.4.2c).

The market price of Yar-Tudun-Wada varied from NGN 225, NGN 260 and NGN280 per tiya at Dawanau, Sabon-Gari and Rimi markets respectively. In contrast the prices of Yar-Garko at Rimi market ranges from NGN 350 to NGN 400. There are other grades which generally attract lower prices at the different markets (see table 3.1.2a). It is apparent that Yar-Garko attracts the premium price compared to other grades. Although various grades of the commodity exists in all the locations, there is the existence of a grade or two that is considered as standard product in the locations. Traders in Rimi and Dawanau markets considered Yar-Tudun-Wada as standard product because it is of long grains, very well dried, free of stones and impurities (can be stored for longer period). Storage is an important issue to the traders in the aforementioned markets since rice is traded in large quantities among large number of wholesalers. However, in Rimi market where most of the traders are retailers, Yar-Garko is considered as Standard product because of its good quality and attributes which include long grains, well dried and absence of impurities. Traders in Kura axis (Chiromawa, Kura, Karfi, Kwanar-Dawaki) considered processed forms of SIPI and WITA varieties as standard products where as Jamila and Santana in Garko and Dukusa in Tudun-Wada were identified by traders as standard products. Generally, grain's length, colour, brightness absence of impurities are the quality attributes considered by the traders in these locations. The same quality attributes are considered in outlying areas (Dandume-Katsina, Hadejia-Jigawa and Makarfi-Kaduna States). Red and white Jollof is a standard product in Makarfi. Tables 3.1.2a(i-iv) summarized the above discussion.

Table 3.4.2a: Rice Quality, Standards and Attributes: Traders' Perspective in Kura axis (Chiromawa, Kura, Karfi, Kwanar-Dawaki)

Issues	Responses
Best Quality Varieties	SIPI
Ranking of Varieties according to quality	SIPI, Wita, Yar-Das, Nerica, Jallop
Consumer preference	Wita preferred by people
Quality & price influence on consumer preference	SIPI
Attainment of best quality product	Quality not at its best
Factors limiting optimum quality of product	Poor parboiling practices
Prices for Various Grades	SIPI = Wita = Yar-Das = Jallop =
Existence of standard product	SIPI & Wita are generally considered as standard product
Qualities of a standard product	Quality attributes considered by traders in

	marketing rice are mainly grains' length, colour, and shininess.
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Table 3.4.2b: Rice Quality Standards and Attributes: Traders' Perspective in Kano Market Area (Rimi, Sabon-Gari & Dawanau)

Issues	Response		
	Rimi	Sabon Gari	Dawanau
Ranking of Varieties according to quality	Yar-Garko Yar-Tudun Wada Yar-Kura Yar-Niger	Yar-Tudun Wada Yar-Mubi Yar-Banki (Cameroon)	Yar-Tudun Wada Yar-Mubi Yar-Dandume
Attainment of best quality product	Garko and Tudun Wada rice have very good quality comparable to imported rice.	Tudun Wada rice have very good quality	Quality of Tudun Wada rice and other rice coming from large scale processors is good because the quality can be compared with that of imported rice.
Factors limiting optimum quality of product	Even the best grade have some impurities due to problem with processing techniques	Lack of good processing machines and inadequate supply of electricity	Lack of good processing machines and inadequate supply of electricity.
Prices for Various Grades	Yar-Garko = NGN350 to 400 per tiya; Yar-Tudun Wada = NGN280 per tiya; Yar-Kura = NGN240 per tiya; Yar-Niger = NGN 220 per tiya	Yar-Tudun Wada = NGN 260 per tiya Yar-Banki (Cameroon) = NGN 220 per tiya	Yar-Tudun Wada = NGN9,000 per Bag of 100kg; Yar-Mubi= NGN8,000 per Bag; Yar-Dandume = NGN97,500 per Bag
Existence of standard product	Yar-Garko	Yar-Tudun Wada	Yar-Tudun Wada
Qualities of a standard product	Minimal trace of impurities, well dried and long grain	Well dried, long grain, stone free and with no impurities.	Standard Quality attributes considered by traders in marketing rice are mainly well dried, long grain and stone free rice.

Table 3.4.2c: Rice Quality Standards and Attributes: Traders' Perspective in Other Clusters in Kano (Garko and Tudun-Wada)

Issues	Response	
	Garko	Tudun Wada
Ranking of Varieties according to quality	Jamila Santana Kilaki Yardigigir Kurkura Yar Kera	<ul style="list-style-type: none"> • Dukusa • Maiadda • Jallof • Das
Attainment of best quality product	Jamila and Santana are very good grades. But best quality not yet achieved.	Dukusa is of very good quality but still not at its very best
Factors limiting optimum quality of product	Quality of the raw paddy and skills of parboiler	Lack of good processing machines and inadequate supply of electricity
Prices for Various Grades	Jamila and Santana = NGN350 per tiya of processed rice. Others = NGN300 per tiya of processed.	Dukusa- NGN8000-9000 per 100kg bag of processed at peak price. Harvest price is lower= NGN5000-7000 per 100kg bag of processed Dukusa.

		Other grades range between NGN5500-6000 per 100kg bag of processed rice.
Existence of standard product	Jamila and Santana are the standard grades.	Dukusa
Qualities of a standard product	Minimal trace of impurities, well dried long and bright grain	Well dried, long grain, stone free and with no impurities.

Table 3.4.2c: Rice Quality Standards and Attributes: Traders' Perspective in other outlying states (Katsina, Jigawa & Kaduna)

Issues	Responses		
	Dandume	Hadejia	Makarfi
Best Quality Varieties	Kilaki	SIPI; TOX; Wita 1,2,3,4; Yar-Bunkure; Yar-Saminu; Yar-Yamidi; Yar-Jeji; Yar-Saidu; Galaware; Jan Kankogi; Yar-medeggi; Bakin iri	Jollof (white, red)
Ranking of Varieties according to quality	Kilaki	Yar-bunkure SIPI Yar-Yamidi TOX Yar-saidu Galaware	Jollof Yar-Das Maibiro 2BC/Yar-Kura Yar-Thailand Gajeruwa Yar-Syria
Consumer preference			Jollof (white, red)
Quality & price influence on consumer preference	Consumer preference mostly influenced by consumer's financial capability.		
Attainment of best quality product	Quality not at its best	Quality not at its best	Quality not at its best
Factors limiting optimum quality of product	Processing: Poor parboiling and milling practices	Processing: Poor parboiling and milling practices	Maturity of grains at harvest Poor parboiling practices
Prices for Various Grades		There is no significant price differential among varieties with exception of whether it is white or black. Price range between NGN 3000 to NGN 3200 per bag of 38 tiyas.	Red Jollof = NGN3000 White Jollof = NGN2800 Yra-Das = NGN2800 Maibiro = NGN2600 2BC/Yar-Kura = NGN2700 Yar-Thailand = NGN2500 Gajeruwa = NGN2200 Yar-Syria =

			NGN2500
Existence of standard product			Red Jollof & White Jollof are generally considered as standard product
Qualities of a standard product	Long grain, shinny, bright and devoid of impurities.		Quality attributes considered by traders in marketing rice are mainly: Unbroken grains, cleanliness without impurities or stones, shininess and brightness

Table 3. 4.2d. Quality issues among sampled traders

Variable	Kano (n= 100)	Jigawa (n= 15)	Kaduna (n= 15)	Katsina (n= 15)
Factors which influences people choice for the commodity				
Quality	87 (87.0)	14 (93.33)	14 (93.33)	15 (100)
Price	13 (13.0)	1 (6.67)	1 (6.67)	-
Marketing higher quality Product				
Important	93 (93.0)	14 (93.33)	13 (86.67)	15 (100)
Not important	-	-	-	-
Standard product				
Exist	84 (84.0)	13 (86.67)	8 (53.33)	6 (40.0)
Not exits	16 (16.0)	2 (13.33)	7 (46.67)	9 (60.0)
Training on quality improvements				
Training available	15 (15.0)	1 (6.67)	-	-
Training not available	61 (61.0)	14 (93.33)	15 (100)	15 (100)
Training on quality improvements				
Received	4 (4.00)	-	-	-
Not received	96 (96.0)	15 (100)	15 (100)	15 (100)
Reasons for trading the commodity				
Availability of the commodity	5 (5.0)	-	-	3 (20.0)
Trader produce the commodity	5 (5.0)	3 (20.0)	-	-
Trading the commodity is profitable	68 (68.0)	12 (80.0)	14 (93.33)	10 (66.67)
Inherited the trade	8 (8.0)	-	-	-
Demand for the commodity	13 (13.0)	-	-	2 (13.33)
Places to buy commodity :				

Have a number of places to buy	93 (93.0)	12 (80.0)	11 (73.33)	12 (80.0)
Do not have a number of places to buy	7 (7.0)	3 (20.0)	4 (26.67)	3 (20.0)
From whom the commodity is bought :				
From own production	15 (15.0)	-	-	-
Farmers	25 (25.0)	3 (20.0)	13 (86.67)	6 (40.0)
Millers	14 (14.0)	-	-	-
Co-traders	46 (46.0)	12 (80.0)	2 (13.33)	9 (60.0)
To whom the commodity is sold:				
Any interested buyer	19 (19.0)	3 (20.0)	-	1 (6.67)
Consumers	58 (58.0)	12 (80.0)	14 (93.33)	14 (93.33)
Co-traders	6 (6.0)	-	-	-
Processor	7 (7.0)	-	1 (6.67)	-
Retailer	7 (7.0)	-	-	-
Wholesaler	3 (3.0)	-	-	-
Scale of Trading activity (in Bags)				
<100	31 (31.0)	3 (20.0)	15 (100)	10 (66.67)
100-200	13 (13.0)	-	-	-
201-400	17 (17.0)	-	-	5 (33.33)
401-1000	20 (20.0)	1 (6.67)	-	-
> 1000	19 (19.0)	11 (73.33)	-	-

3.4.3 Traders' perspectives on the structure of rice value chain

The general perception of traders in Kano (80%), Jigawa (86.67%), Kaduna (86.67%), is that the commodity market is functioning well. However, traders (80% in Katsina) have a contrary opinion. Increased income, consumer satisfaction and improved quality of output are reasons given by traders to support their opinions. With the exception of traders in Katsina cluster, majority of those in Kano (79%), Jigawa (66.67%) and Kaduna (80%) revealed that the present market structure is favourable to them. Eighty percent of traders interviewed at Katsina cluster operate under unfavorable market structure. Generally, traders in the clusters (Kano-52%, Jigawa-93.33%, Kaduna-86.67%) have observed positive change in their income status with the exception of those in Katsina where 86.67% of the traders recorded decrease in income obtained from trading the commodity. Entry into the commodity market is free to large proportion of traders (Kano-47%, Jigawa-93.33%, Kaduna-80% and Katsina-73.33%). Traders associations have a significant influence in determining entry into market. The major constraint to entry into the market is capital required for startup. Unavailability of credit and its non affordable cost restrict the traders from expansion and constrained other interested people from gaining entry into the market (Table 3.4.3d).

Traders have observed structural changes in the marketing of rice over time. Generally, both supply and demand for locally produced rice has increased over time in all the clusters leading to increase in the volume of the commodity traded. There is also increase in number of market participants (traders, marketing agents, etc) in the Kura axis which led to the emergence of new marketing arrangement in terms of weighing and measures between sellers and buyers at the market level. In the past, transaction between buyers and sellers is based on the sellers' packaging and measure. But recently, buyers tend to use their own

unit of measure to re-measure the commodity at the point of transaction. Although buyers consider this new arrangement as a means for verification of quantity and quality of the commodity, traders generally consider this new arrangement as detrimental to them. In the past, rice husk (by product of milling) had no value but is now valuable especially that of the non-parboiled rice because of its demand by livestock feed companies, individual livestock owners and cement companies (Sokoto cement company) who uses the husk as raw materials. Traders at Tudun-Wada observed improvement in quality of milled rice which they associated with the improvement in skills among parboilers and millers. In the market area, traders operating in Rimi market reported decrease in demand for rice which may be related to alternative source of rice especially among civil servants who receive imported rice on credit at their respective working places.

The Entry of large scale commercial processors in urban areas into the commodity business and also increased level of integration of the traders into processing was reported at SabonGari market. Apart of the similarities mentioned above, the outlying areas have trends that are specific to them. Traders at Dandume-Katsina State explained that rice transactions in the area used to be cash and carry only until now when sales on credit is on the increase among many of the traders operating in the area. In Hadejia-Jigawa State, the influx of traders who buys rice have declined because of more emerging competing markets. The increased in output from production of the commodity was viewed as improvement in food security though there is evidence of seasonal glut as recorded from traders in Makarfi-Kaduna State. Occasionally, fuel scarcity inhibits traders from Sokoto, Lagos, and Kano to buy rice from Makarfi thus contributing to the market glut.

These trends brings along changes both liked and disliked by traders. For instance, traders in the Kura axis dislike the new arrangement of re-weighing of produce during transaction. Buyers who do not usually accept the packaging and measures as presented by traders employ other people to re-measure for them using slightly different unit of measure which is not in favour of the traders. Inadequate and poor milling services, poor supply of electricity and high cost of transportation due to fuel scarcity, heavy taxes, adulteration of the commodity and increase in prices due to activities of commission agents are dislikes reported by traders (see table 3.1.2 (ii) for specifics).

The major constraint to entry into the commodity market common among all clusters is capital required for investment and operation in the marketing system. Rice trade is capital intensive especially at the wholesale level. Therefore lack of adequate operating capital can hinder potential entrants into the market. Traders operating in Kura axis, Tudun-Wada and Makarfi considered knowledge and skills about the commodity marketing as an important constraint that could hinder potential entrant to gain entry into the commodity market. Inadequate space for operation is a hindering factor to new entrants and also expansion of the trade in Rimi market.

In all the clusters, potential entrants into the commodity market may need the facilitation of an experience trader in acquiring the necessary knowledge and skills about the market. In addition the entrants must register with the traders association. These conditions are used in order to maintain standard practice and good trade conduct. The situation is similar in other clusters.

During off season period when local supply of the commodity is not adequate, traders in Kura axis travel to other locations to purchase rice and they are in some markets (Bidda in Niger State & Cameroon,) restricted by commission agent to directly purchase the commodity from sellers. But in Talatan Mafara market in Zamfara State, traders can purchase directly from sellers. Traders in the market area (Rimi, Sabon-Gari and Dawanau markets) and Garko have not experienced access restriction to markets outside their domains. However, heavy taxes levied on traders in other markets are considered to be an indirect restriction.

Table 3.4.3a: Structural Characteristics of the Rice Value Chain: Traders' Perspective in Kura axis (Chiromawa, Kura, Karfi, Kwanar-Dawaki)

Issues	Responses
Traders' dislikes in the rice market	Weighing and measure arrangement at the point of sale
Trend in the rice value chain	Traders observed changes in the commodity chain which include: <ul style="list-style-type: none"> • Increase in demand for local rice, • Increase in number of market participants, • Emergence of new arrangement in terms of weighing and measures between sellers and buyers at the market level • Rice husk now valuable especially that of the not parboiled rice
Constraints to entry into the commodity market	Knowledge and skill about the commodity marketing Capital requirement
Who determine entry into the market	<ul style="list-style-type: none"> • Kinship relationship • Registration with traders association
Access restrictions to other markets	Traders are restricted from buying rice directly from sellers in markets outside Kano

Table 3.4.3b: Structural Characteristics of the Rice Value Chain: Traders' Perspective in Kano Market Area

Issues	Response		
	Rimi	Sabon Gari	Dawanau
Traders' dislikes in the rice market	Commission agents at rural market who causes price to go high	High taxes, lack of electricity, high cost of transportation due increase in fuel prices, adulteration of quality by traders	Heavy taxes in other market outside Kano e.g Mubi market in Adamawa State Lack of good processing techniques in some rice based areas
Trend in the rice value chain	Demand has decrease over time Supply of local rice is higher now	Entry of large scale commercial processors in urban areas into the rice business. Level of integration among traders has increased. Most traders are now involved in processing	Decreasing market demand over time Wide spread acceptance of locally processed rice.
Constraints to entry into the commodity market	Place of business (shop or temporary stalls)	Capital requirement and experience	Capital requirement and experience
Who determine entry into the market	Traders association	Traders association	Traders association
Access restrictions to other markets	Traders generally do not experience access restrictions in other markets.	Traders generally do not experience access restrictions in other markets.	Traders generally do not experience access restrictions in other markets.

Table 3.4 3c: Structural Characteristics of the Rice Value Chain: Traders' Perspective in Garko and Tudun-Wada Areas

Issues	Response	
	Garko	Tudun Wada
Traders' dislikes in the rice market	Milling services not adequate	Lack of electricity, High cost of transportation due increase in fuel prices,
Trend in the rice value chain	Demand for Garko rice has increase over time among urban traders in Kano Production of rice has increase over years in the area.	Processing and selling of raw rice(white) without parboiling is now emerging. Processing skills have improved over time. Tudun Wada have the best skills and quality products among rice processing clusters. Volume of transaction at market level has increase. Production has also increase at farmer level. New varieties are introduce by traders from other places
Constraints to entry into the commodity market	Lack of capital could be a constraint. But no physical or	Capital requirement and experience Registration with trader association but is not

	tactful barrier to entry.	compulsory.
Who determine entry into the market	Traders association only registers new entrants to keep track of what is going on in the market.	Capital and skills
Access restrictions to other markets	None.	In other markets visited traders are charged taxes per bag and this may indirectly discourages entry.

Table 3.4.3d. Structural characteristics of the rice value chain among sampled traders

Variable	Kano (n= 100)	Jigawa (n= 15)	Kaduna (n= 15)	Katsina (n= 15)
Ownership of product				
Trade own product	56 (56.0)	7 (46.67)	4 (26.67)	15 (100)
Work as agent	41 (41.0)	8 (53.33)	5 (33.33)	-
Both	3 (3.0)	-	-	-
Quantity sold (Bag)				
Min	3	30	5	-
Max	2000	20000	135	-
Mean	564 [491.3681]	5302.86 [5987.16631]	29.55 [37.0550]	-
Quantity of the rice commodity consumed (Bag)				
Min	1	4	1	-
Max	50	35	10	-
Mean	6.97 [7.91182]*	15.29 [8.91350]	3.91 [2.94803]	-
Quantity given out as gift (Bag)				
Min	0.25	1	1	-
Max	80.0	20.0	6.0	-
Mean	6.36 [7.91182]*	7.36 [5.13850]	2.63 [2.13391]	-
Market functioning				
Functioning well	80 (80.0)	13 (86.67)	13 (86.67)	3 (20.0)
Not functioning well	20 (20.0)	2 (13.33)	2 (13.33)	12 (80.0)
Reasons related to market functioning well				
Increase income	27 (27.0)	8 (53.33)	6 (40.0)	-
Consumer satisfaction	5 (5.0)	-	-	-
Improve quality	27 (27.0)	-	-	-
Others	41 (41.0)	7 (46.67)	9 (60.0)	-
Market structure				
Favorable	79 (79.0)	10 (66.67)	12 (80.0)	3 (20.0)
Not favorable	21 (21.0)	5 (33.33)	3 (20.0)	12 (80.0)
Change in income obtained from rice trading over the years:				
Decreased	9 (9.0)	1 (6.67)	2 ((13.33)	13 (86.67)
Increased	52 (52)	14 (93.33)	13 (86.67)	2 (13.33)

Who determine entry:				
Entry is free	47 (47)	14 (93.33)	12 (80.0)	11 (73.33)
Traders Association	53 (53.0)	1 (6.67)	3 (20.0)	4 (26.67)
Major Constrains or barriers to market entry:				
Capital	49 (49.0)	12 (80.0)	3 (20.0)	10 (66.67)
Credit availability and access				
Available	7 (7.0)	13 (86.67)	9 (60.0)	10 (66.67)
Accessible				
Not accessible	99 (99.0)	15 (100)	15 (100)	15 (100)
Affordable	-	-	-	-
Not affordable	100 (100)	15 (100)	15 (100)	15 (100)

3.4.4 Prospects and constraints in rice trading

In the Kura axis, rice is an important cash crop. It is produced by almost every household. Rice trading is therefore considered as the most feasible and profitable economic activity in the area. This serves as a motivation for many inhabitants to go into trading of the commodity. There are a number of specific reasons why inhabitants of the studied clusters are involved in rice trading. These reasons varied from availability of the commodity, involvement of the trader in production activities, profitability of the trade and high demand for the commodity. To some traders involvement is because they inherited the trade. However, the most important reason to traders operating in Kano (68%), Jigawa (80%), Kaduna (93.33%) and Katsina (66.67%) is the profitability feature of the commodity trade. In the market area, some traders were motivated into trading of the commodity through their interactions with other rice traders, coupled with the facts that revenue from rice trading is attractive and thus, serve as incentive for motivation of people to participate in the trade. Rice production and hence processing has been on the increase in the locations and this tends to attract more participation among traders.

Trading of the commodity is therefore a means of livelihood to the teaming participants in the value chain. This situation is true in all clusters studied. Majority of traders (Kano-93%, Jigawa-80%, Kaduna-(73.33% and Katsina-80%) buys the commodity from a number of places. Therefore, traders handled different varieties and grades of the commodity because of variations arising from what is obtainable from the locations. Major sources from which traders purchase the commodity include co-traders and farmers. Some (14%) traders operating in Kano area also purchase from millers. It is important to note that farmers are the major suppliers of the commodity to traders in Kaduna. Generally, traders in Kano (58%), Jigawa (80%), Kaduna (93.33%) and Katsina (93.33%) supply the commodity directly to consumers. The scale of trading activities among traders varies between their clusters. In Kano area, 31% of the traders have capacity for trading less than one hundred bags of the commodity per season, while 20% and 19% could trade as much as 401 to 1000 and above 1000 bags respectively. Fifty-six percent of traders in Kano area have ownership title to the commodity they trade, while the corresponding proportions of these traders in Jigawa, Kaduna and Katsina were estimated at 46.67%, 26.67% and 100% respectively. Those who serve as agent in trading the commodity were approximately 41%, 53% and 33.33% in Kano, Jigawa and Kaduna areas respectively. Few (3%) traders in Kano sales their own commodity and serve as agent for other owners (operate as both owners and agents)

In Kaduna (100%) and Katsina (66.67%) majority of the traders have capacity for trading less than one hundred bags. The capacity of most traders (73.33%) interviewed in Jigawa was estimated at above one thousand bags of the commodity per season. It is worth noting that in addition to sales of the commodity, traders also utilize it for home consumption and dispose part as gift to friends, relatives etc. The respective average quantities of rice used for home consumption by traders in Kano, Jigawa and Kaduna were estimated at about 7, 15 and 4 bags. The respective quantities given out as gift vary from 6, 7 and 3 bags per season. There is religious obligation (Zakkat) to the quantity given out as 'gift'. This indicate that in addition to its economic value, rice have religious and social value (Appendix 4). Factors which influence prices of the commodity and hence traders revenue include demand and supply interaction. When there are few buyers (low demand) traders have to sell at lower price and vice versa. Also at harvest period, excess supply (glut) can cause traders to sell at a lower price. In addition to price fluctuations there are other challenges facing traders in the commodity value chain. Poor quality output from processors (parboilers and millers), wide variation in quality of paddy are commonly reported across the clusters studied. The mixing of different rice varieties pose a serious challenge to traders operating at Dawanau market where large number of wholesalers are involved in purchase of the commodity from many sources. In Kura axis, use of different units of measure, mixing of different varieties of rice and sell of rice on credit are serious challenges to traders. The increasing competition between traders at Hadejia-Jigawa State and other emerging markets causes low sales to the traders. Rising transport cost due to fuel scarcity coupled with inadequate transportation facilities added to the challenges of traders operating in all the clusters (Kano-84%, Jigawa-93.33%, Kaduna-66.67% and Katsina-73.33%). This is despite the availability of transportation facilities in all the locations. The types of transport available to the traders include haulage, wheel barrow, bus, motor cycle, pick-up van, truck, and tractor. Pick-up van is more available in Kano and Jigawa while haulage is a major means of transport in Katsina area. The proportion of the traders who owns transport facility is low in all the locations. Majority (Kano-51%, Jigawa-93.33%, Kaduna-73.33% and Katsina-60%) rely on commercial transport services. The areas of transport cost were identified as handling charges, costs of hiring the facility and fuel. Traders (Kano-94%, Jigawa-93.33%, Kaduna-100% and Katsina-100%) have no other cheaper means of transport. This left the operators at the mercy of commercial service providers who frequently increase their charge depending on factors such as fuel price and availability, distance to transport goods and also how good roads to the destinations are. Traders in addition incurred other marketing cost in form of tax paid to local Authorities. This is common across the clusters. Some traders in Kano (6%) and Jigawa (6.67%) also pay for association fees.

Some of the challenges facing the traders are beyond their handling. However, issues related to marketing practices are usually reported to market chiefs, while processors (parboilers and millers) are often sensitized by the traders on the importance of good processing practices.

Inadequate operating capital is a factor critical to sustainability of rice trading in all the clusters studied. Significant proportion of traders operating in Kano (49%), Jigawa (80%), and Katsina (66.67%) emphasized the importance of capital to new entrants and expansion of the business among existing traders.(Table3.4.4e)

In Dawanau market transactions are mainly wholesale and thus capital requirement is very high. The level of profit is paramount to traders operating in Kura axis and Dandume. Traders in these location explained that traders are generally operating for profit and if there is continually negative net return, many traders will not continue to operate. To the traders in Kura axis, only lack of other feasible business opportunities will make traders incurring negative profit continue with the trade. They further explained that some traders may sustain negative net return for some period but still remain in operation because rice production and marketing has become a dominant business activity in the cluster. There is however a supportive mechanism in Dawanau which keeps traders in business despite all odds. Experienced and trusted traders who lost capital are provided with financial support by co-

traders and their associations. In other locations like Garko, rice trading is a legacy that traders struggle to sustain against all odds.

There are non-income benefits associated with trading of rice in the clusters studied. Trading of the commodity in all locations leads to employment creation to many other participants (Commission agents, haulers etc.) apart of the traders along the commodity value chain. Activities of the traders also contribute to the development of their localities through payment of tax and levies to local authorities. Traders also establish linkages with people outside their locations thereby building social networks within and outside the locations. Interactions and linkage with people and organizations link traders to sources of information on better trading techniques and market opportunities. Such cooperation facilitate social interactions among the traders and also provide platform for pursuing common objectives such as seeking for loan and ensuring good conduct among traders.

Table 3.4.4a: Prospects and Constraints in Rice Value Chain: Traders' Perspective in Kura-axis

Issues	Responses
Non Income benefits of rice trading	<ul style="list-style-type: none"> • Interactions and linkage with people and organizations such as PropCom, MARKETS, and Local Authorities. • Rice trading form the basis for cooperation among traders • Creation of employment opportunities for others • Rice trading serve as means of revenue generation
What motivate and influence traders into the trade	<ul style="list-style-type: none"> • Rice production is a major economic activity in the area. • Trading in rice serve as means of income and livelihood.
Factors critical to sustainability of rice trade	Sustained negative net return from rice trading
What can keep traders in the commodity business in spite of all odds	Lack of other feasible business opportunities
Factors influencing product price	Demand and supply interaction
Challenges facing the commodity chain	<p>High moisture content of the rice as a result poor drying of paddy at farmer level.</p> <p>Farmers do not use standard unit of measure in packaging the commodity.</p> <p>Farmers mixed different varieties of rice together in the same bag when selling.</p> <p>Credit sale arrangement with other traders leading to bad debt.</p> <p>Irregular price fluctuation of the commodity at the market level.</p> <p>Inadequate and inefficient milling services during harvest period as a result of fewer numbers of millers and poor supply of electricity.</p>

Action taken to improve the situation	Traders together with millers association linked with local authorities and the electric power company on the problem of poor power supply.
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Table 3.4.4b: Prospects and Constraints in Rice Value Chain: Traders' Perspective in Kano Market Area

Issues	Response		
	Rimi	Sabon Gari	Dawanau
Non Income benefits of rice trading	Creation of employment opportunities for others Means of revenue generation for local authorities.	Creation of employment opportunities for others Means of revenue generation for local authorities.	Rice trading lead to formation of trader association which serve as means tackling both trading and non trading issues. Creation of employment opportunities for others Means of revenue generation for local authorities.
What motivate and influence traders into the trade	Friends influence		
Factors critical to sustainability of rice trade	Inadequate operational capital and place of business Low profit margin	Inadequate operational capital	Loss of capital can cause traders to abandon the business.
What can keep traders in the commodity business in spite of all odds	If trader have less number of dependents, can still continue with the business even with little profit.		There is supporting mechanism between individual traders and their associations.
Factors influencing product price	Level of demand and supply. Quality of product	Level of demand and supply	Level of demand and supply
Challenges facing the commodity chain	Low quality due to poor milling	Low quality of processed products	Wide variations in quality of paddy rice between production areas
Action taken to improve the situation	Report to wholesalers and millers about quality		Traders concentrate purchase of the commodity from areas with high quality paddy.

Table 3.4.4c: Prospects and Constraints in Rice Value Chain : Traders' Perspective in Garko and Tudun-Wada Areas

Issues	Response	
	Garko	Tudun Wada
Non Income benefits of rice trading	<ul style="list-style-type: none"> • Food security • Creation of employment opportunities for others 	Creation of employment opportunities for others Means of revenue generation for local authorities.
What motivate and influence traders into the	Trade is influence by production. Most traders	Volume of production and level of processing is very high in the area.

trade	are also producers and at the same processors	This tends to influence many people into the business. Profitability is also another influence
Factors critical to sustainability of rice trade	Inadequate operational capital	Inadequate operational capital Price fluctuations
What can keep traders in the commodity business in spite of all odds	Rice business is a legacy	Profit motive
Factors influencing product price	Market forces. Quality of product	Level of demand and supply Quality of product
Challenges facing the commodity chain	Low quality due to poor processing	Processing is constraint by poor electricity supply
Action taken to improve the situation	Report to millers about quality	None

Table 3.4.4d: Prospects and Constraints in Rice Value Chain: Traders' Perspective in other outlying states

Issues	Responses		
	Dandume	Hadejia	Makarfi
Non Income benefits of rice trading	Generation of employment and linkage with people from outside	Generation of employment and linkage with people from outside	<ul style="list-style-type: none"> • Interactions and linkage with people and from within Makarfi and outside places like Sokoto, Lagos, Kano.
What motivate and influence traders into the trade	To get means of income and enhance their livelihood	Means of livelihood. It is profitable	<ul style="list-style-type: none"> • Learnt trading from parent. • Seasonal unemployment after farming season
Factors critical to sustainability of rice trade	When rice trading is no longer profitable and there is consistence lost of capital.	Inadequate capital can make many people to abandon the business.	Frequent temporary withdrawal of the traders from business when traders go bankrupt.
What can keep traders in the commodity business in spite of all odds	Profit even if it is little.	It is means of livelihood and no adequate alternatives.	
Factors influencing product price	Quality influence product price. Demand and supply interaction	Quality influence product price. Demand and supply interaction	
Challenges facing the commodity chain	High transportation cost due to fuel price increase Insistence of buyers to buy on credit Inadequate transportation facilities e.g vehicles Mixture of well and poorly filled bags of rice and contaminated bags.	Low demand for local paddy because people are generally poor. Low income and sell is dropping Competition with other markets	

Action taken to improve the situation	Alert market chief on unethical traders and farmers practices in marketing the commodity. Sensitizing parboilers by showing samples of properly parboiled rice. Sensitizing millers by showing samples of properly milled rice		
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Table: 3.4.4e. Prospects and constraints in rice value chain among sampled traders

Variable	Kano (n=100)	Jigawa (n=15)	Kaduna (n=15)	Katsina (n=15)
Challenges with regard to transport or transaction costs:				
There are challenges	84 (84.0)	14 (93.33)	10 (66.67)	11 (73.33)
No challenges	16 (16.0)	1 (6.67)	5 (33.33)	4 (26.67)
Availability of Transport				
Available	92 (92.0)	14 (93.33)	11 (73.33)	12 (80.0)
Not available	8 (8.0)	1 (6.67)	4 (26.67)	3 (20.0)
Type of transport available				
Haulage	6 (6.0)	-	2 (13.33)	9 (60.0)
Bus	30 (30.0)	-	1 (6.67)	3 (20.0)
Motorcycle	7 (7.0)	-	-	-
Wheel barrow	11 (11.0)	-	-	-
Truck	3 (3.0)	-	-	-
Pick-up van	34 (34.0)	14 (93.33)	1 (6.67)	-
Tractor	1 (1.0)	-	-	-
Ownership of transport				
Commercial	51 (51.0)	14 (93.33)	11 (73.33)	9 (60.0)
Privately own	41 (41.)	1 (6.67)	4 (26.67)	5 (33.33)
Areas of high costs in transport and transaction:				
Handling	13 (13.0)	-	-	-
Fuel (Transport)	33 (33.0)	14 (93.33)	-	-
Transportation facilities	10 (10.0)	-	9 (60)	-
Availability of other cheaper means of transport				
Available	11 (11.0)	4 (26.67)	5 (33.33)	-
Not available	89 (89)	11 (73.33)	10 (66.67)	15 (100)
Other costs encountered in marketing:				
Taxes	94 (94.0)	14 (93.33)	15 (100)	15 (100)
Association fees	6 (6.0)	1 (6.67)	-	-

3.4.5 Risks and uncertainties associated with rice trading

Rice trading is not devoid of risks and uncertainties. Some of the risks associated with trading of the commodity include insecurities of lives and properties while on transit. Rice

trading involves traveling to various markets especially for purchase of paddy during off season. Traders sometimes become victims of armed robbery, theft and accident leading to loss of capital and lives. This is a situation common in all the studied clusters. Wholesalers from Dawanau travel with large amount of money in cash to markets in remote areas with no banking facilities thereby being exposed to a lot of risks. These security issues are usually beyond the control of traders. However, traders avoid night journeys and traveling with large amount of cash to places where banking facilities are available. In addition wholesalers conduct transaction through known commission agent who will not reveal to others the amount of cash trader is traveling with. These have not completely solved the problem because insecurity is generally on the increase. The traders operating in Kura axis complained of loss of capital from the bad practices of some farmers who mixed different types of varieties of rice in same bag before selling to the traders. Some farmers adulterate paddy rice by mixing it with weeds (empty rice panicles). All these affect the quality and quantity of the commodity thereby reducing trader's revenue.

Traders individually and collectively provide feed back to farmers on the quality status of the product purchased from the farmers and advice them to abide to market standards in packaging the products. This has improved the situation over time. The irregular fluctuation of price is also a disincentive and uncertainty associated with trading of rice in the Kura axis and Tudun -Wada. In Garko, and Rimi sales of rice on credits is a risk that has lead to loss of capital to traders and there are extreme cases where traders were put out of the commodity business. Many traders have reduced and put control over the amount of sales on credit and the types of customers that could enjoy from the sales. Available market space for operation of traders in Rimi market is temporary and hence not secured. In the outlying clusters, uncertainties in the commodity value chain include fluctuations in the volume of sales, theft and purchase of stolen goods.

Table 3.4.5a: Risk and Uncertainties Associated with Rice Value Chain: Traders' Perspective in Kura axis.

Issues	Responses
Market risk in the commodity chain	<ul style="list-style-type: none"> • Insecurity during transit • Irregular Price fluctuation • Poor quality and lack grading at farmer level
Action taken	Traders negotiate with farmers on quality issues.

Table 3.4.5b: Risk and Uncertainties Associated with Rice Value Chain: Traders' Perspective in Kano Market Area

Issues	Response		
	Rimi	Sabon Gari	Dawanau
Market risk in the commodity chain	Insecurity and accidents during transit; Credit sales to buyers leading to bad debts which can keep trader out of business; Market place is temporary hence not secured		Insecurity during transit Inefficient transportation system Poor market demand Poor quality products
Action taken	Reduction in amount of credit given out No action taken on other issues		Purchase of paddy from trusted wholesalers in the production areas to ensure quality. Where banks exist close by traders use the available banking facilities instead of moving with cash
Improvements in market risks	No improvements,		Action taken helps in addressing the issue of quality to some extent and insecurity in moving with cash but other risks persist.
Persistence of market risk	insecurity is on the increase, market place is becoming increasingly congested		Problem of insecurity

Table 3.4.5c: Risk and Uncertainties Associated with Rice Value Chain: Traders' Perspective in Garko and Tudun Wada

Issues	Response	
	Garko	Tudun wada
Market risk in the commodity chain	Credit sales to buyers leading to bad debts which can keep trader out of business	Price variation and Glut which affects profitability.
Action taken	None	None
Improvements in market risks	No improvements,	Price variation is on the increase.
Persistence of market risk	Credit arrangements still persist.	Price variation and glut persist as a result of increase in supply of rice without creation of alternative outlet.

Table 3.4.5d: Risk and Uncertainties Associated with Rice Value Chain: Traders' Perspective in other outlying states

Issues	Responses		
	Dandume	Hadejia	Makarfi
Market risk in the commodity chain	<p>Armed robbery especially on high ways when traveling to or from distance markets.</p> <p>Purchased of over dried and poorly dried rice.</p> <p>Non payment after selling on credit</p>	<p>Glut at harvest especially at harvest period.</p> <p>Market facilities are kept in the open and this affect the quality of the commodity because of the effect of direct sun on the commodity.</p>	<p>Risks in the commodity market include: Low sales, theft, purchase of stolen commodity, problems of armed robbery, menace of swindlers who pose as either buyers or traders</p>
Action taken	<p>Offer serious prayers while moving out to distance markets.</p> <p>Also avoid night journeys as much as possible.</p> <p>Conduct transaction through known commission agent who will not reveal to others the amount of cash trader is traveling with.</p> <p>Report payment defaults to traders association.</p>	None	None

3.5 Socio-economic and environmental issues in rice commodity chain:

3.5.1 Farmers perspectives

Resources control and conflict

Major resources that are used among farmers and other actors for productive and reproductive purposes in the rice producing and processing clusters include; land, water and forest resources. Land and water are central to production and constitute the most important resources farmers managed in rice and other production enterprises. The results of the survey as contained in appendix 1 indicated that land conflict among farmers across the clusters is not a major issue. For example, 62.8%, 76% of farmers in Kano and Jigawa clusters respectively and 98% each in Kaduna and Katsina clusters indicated that they do not experienced any conflict related to land in their areas. Land conflict is relatively more important in Kano and Jigawa clusters where 37.2% and 24% of the farmers mentioned that they experienced some form of land conflict in managing resources for rice and other production. In Kaduna and Katsina cluster only 2 % in each cluster experienced land conflict. The nature of land conflict generally experienced include; the sporadic farmer-pastoralist conflict over grazing land encroachment, the issue of land fragmentation due to increase in farming population and land tenure system, double allocation of land by irrigation project authority as obtained in Jigawa cluster only, trespassing of farm land by transporters, pedestrian and animals and land encroachment as a result of expansion of residential areas. Farmer-pastoralist conflict is the most important issue as indicated by 42% of farmers in Kano cluster. As a result of the Kano River Irrigation Project which bring about the possibility of double cropping season in the areas and also the availability of green pastures and plants for almost all the times pastoralist settled down in the periphery of the irrigation project on temporary and permanent basis with their heads of cattle and conflict with farm

owners usually erupt as a result of encroachment on farm lands by pastoralists or on grazing areas by the farmers (Table 3.5.1)

Other resources on which conflict is experienced include mainly the water resources in the river and in the irrigation project canals. 44% and 32% of farmers in Kano and Jigawa clusters respectively indicated that they experienced such conflict. Untimely release of water along irrigation canals by project authority and blockage of the main river course which causes water shortages and in some cases flood are some of the issues of conflict as per as water resources are concerned.

Some of the mitigation measures taken by farmers on these issues on conflict include; use of Farmer Organizations (FOs) to negotiate with irrigation project officials on issue of water release, control and payment of water charges and in situation of water shortages farmers used their association to design irrigation schedule to ensure efficient and even use of water in the fields.

HIV/AIDS perception, effects and mitigations

Based on the qualitative FGDs it was noted that market chain actor's perception and knowledge about HIV/AIDS is high especially in terms of awareness and responsiveness to the issues particularly among the youth. Youth are generally aware of precautionary measures that can take to prevent the spread of the diseases. Most people have knowledge of the means through which the disease can be acquired or spread and of its pandemic tendencies. Those affected face the tendencies of being stigmatized by their communities.

The results of the enumerator survey as shown in Table3.5.1 indicated that the issue of HIV/AIDS and its implication is not taken seriously by majority of farmers despite their awareness on its severe consequences on human lives and livelihoods. Among the farmers interviewed only 6.4%, 14% and 24% in Kano, Jigawa, and Katsina clusters indicated that HIV/AIDS is a serious issue. The remaining percentage does not take HIV/AIDS issue a serious one. Some of the effects or consequences of HIV/AIDS commonly mentioned include; death, chronic illness, threat on labour availability and household income. Some of the mitigation measures mentioned by farmers across the clusters include; use of drugs or medication, creating awareness through public lectures and radio programme and preaching by religious leaders against indiscriminate sexual intercourse.

Soil fertility status

Fertility of the soils is a major determinant of productivity of agricultural production enterprises. The issue of soil fertility status is dynamic and it is influenced by many factors which are both biophysical and socio-economic. Continuous cropping, low use or application of farm yard manure, soil erosion and improper use of chemical fertilizers were some of the factors causing changes in soil fertility status in the rice production clusters as mentioned by the farmers and as indicated in Table3.5.1. From the table it can be noted that 56%, 39.5%, 41.7% and 70% of the farmers in Kano, Jigawa, Kaduna and Katsina clusters respectively were of the opinion that soil fertility status is getting worse and the remaining percentage in each of the cluster indicated that fertility is getting better.

Access to fuel wood and water

Fuel wood is the main source of energy used by rural women for cooking and also used by rural entrepreneurs such as rice parboilers, blacksmith and so on. The use of fuel wood over time has in most cases resulted to decline in forest resources with severe environmental and climatic consequences. In the rice producing clusters under consideration majority of the farmers in most of the cluster indicated having difficulty in accessing fuel wood. For example in Kano cluster 75.6% of the farmers interviewed indicated not that fuel wood is not easily accessible. In Jigawa, Kaduna and Katsina clusters 44%, 66% and 56% of farmers indicated that fuel wood is not easily accessible. Some of the measures that can be taken to improve access to fuel wood as mentioned by farmers across the clusters include; tree planting and provision of alternative source of cooking energy for rural women.

In the case of water which is a major input in productive and reproductive activities access is also generally poor among farmers in all the clusters. Majority of farmers represented by 80.8%, 84%, 66% and 70% in Kano, Jigawa, Kaduna and Katsina clusters indicated that water as a resource is not easily accessible. Some of the measures that can be taken in improving access to water construction of water wells, dams and adequate release of irrigation water by irrigation projects.

Women involvement in business: challenges and conflict

In addition to reproductive roles at the household level, women in rural areas particularly in production areas are usually engaged in value addition and transformation of agricultural product. Such activities include rice parboiling, trading of commodities and in some cases women are also involve in production enterprises. Such dual responsibility of women is over burden and sometimes leads to conflict with spouses. In all the clusters majority of farmers represented by 85.6%, 84%, 68% and 76% in Kano, Jigawa, Kaduna and Katsina clusters respectively indicated that women involvement in business does not cause any conflict. In most cases the businesses the women operate usually compliment both income and primary occupation of their spouses or household (Table 3.5.1).

Table 3.5.1 Cross cutting issues among sampled farmers

Land conflict				
Experienced conflict	93(37.2%)	12(24%)	1(2%)	1(2%)
Not experienced	157(62.8%)	38(76%)	49(98%)	49(98%)
Nature of conflict on land				
Land encroachment	5(2%)	5(10%)	-	-
Conflict with pastoralists	105(42%)	5(10%)	1(2%)	
Fragmentation due to increase in population	12(4.8 %)	-	-	-
Double allocation of land by project official	-	2(4%)	-	-
Trespassing	27(10.8%)	-	-	-

High rent price		-		1(2%)
Salinity	16(6.4%)	-	-	-
Conflict on other resources(water resources in the river and field canals)				
Experienced conflict	44(17.6%)	16(32%)	-	-
Not experienced conflict	206(82.4%)	34(68%)	50(100%)	50(100%)
Mitigation measures	Use farmer association to approach irrigation projects and ensure timely payment of fixed water charges by members. Farmers associations developed irrigation schedules based on agreement	Use farmer association to approach irrigation projects and ensure timely payment of fixed water charges by members. Farmers associations developed irrigation schedules based on agreement	-	-
HIV/AIDS issue:				
Serious issue	16(6.4%)	7(14%)	-	12(24%)
Not serious	234(93.6%)	43(86%)	50(100%)	38(76%)
Effects of HIV				
Death	10(4%)	3(6%)	-	-
Chronic illness	6(2.4%)	2(4%)	-	-
Threat on labour availability	6(2.4%)	2(4%)	-	-
Household income	4(1.6%)	-	-	-
No effect	9(3.6%)	-	-	-
Mitigation measures on HIV/AIDS				
Nothing is being done	1(1(2%)	-	-
Use of drugs	8(3.2%)	3(6%)	-	9(18%)

Awareness through public lectures and radio programme	7(2.8%)	4(8%)	20(40%)	3(6%)
Religious preaching against indiscriminate sexual intercourse	17(6.8%)	2(4%)	2(4%)	5(10%)
Soil fertility status				
Fertility getting worse	112(56%)	17(39.5%)	20(41.7%)	35(70%)
Fertility getting better	88(44%)	26(60.5%)	28(41.7%)	15(30%)
Factors responsible for declining soil fertility				
Continuous cropping	112(44.8%)	22(44%)	6(12%)	8(16%)
Lack of application of enough farm yard manure	80(32%)	18(36%)	20(40%)	23(46%)
Soil erosion	20(8%)	2(4%)	21(42%)	24(48%)
Improper use of chemical fertilizers	98(39.2%)	30(60%)	25(50%)	27(54%)
Access to fuel wood				
Easily accessible	61(24.4%)	28(56%)	17(34%)	22(44%)
Not easily accessible	189(75.6%)	22(44%)	33(66%)	28(56%)
Measures to improve access to fuel wood	Tree planting Fuel particularly kerosene should be made available	Tree planting Provide alternative source of energy to women.	Tree planting	Tree planting
Access to water				
Easily accessible	48(19.2%)	8(16%)	17(34%)	15(30%)
Not easily accessible	202(80.8%)	42(84%)	33(66%)	35(70%)
Measures to improve water availability	Irrigation project should release water when needed. Construction of wells	Irrigation project should release water when needed. Construction of boreholes and wells	Construction of wells and dams	Construction of boreholes
Women involvement in business and conflict with spouse				

Conflict occur	36(14.4%)	8(16%)	16(32%)	12(24%)
No conflict	214(85.6%)	42(84%)	34(68%)	38(76%)
Description of conflict	Women tend to neglect household activity due to their business	Women tend to neglect household activity due to their business	Women tend to neglect household activity due to their business	Women tend to neglect household activity due to their business
Mitigation	Create awareness among spouse Use less time consuming cooking devices.	Create awareness among spouse Dialogue with spouse	Dialogue with spouse	Dialogue with spouse

Table3.5.1.a Results of the second FGD in Kano cluster : Cross-cutting issues farmer's perspectives

Issues	Response		
	Kura-Kano corridor	Garko	Tudun Wada
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is one of the major issues. Pastoralist encroach on farmers farm land with their cattle especially during dry season cropping Land encroachment by motorists, pedestrians and residential areas especially for farm lands located near highways and other roads is also a source of conflict. 	<p>Land access is difficult especially in FADAMA areas as a result of more people getting involved in farming activities.</p> <p>Erosion is becoming a problem in some upland areas making farm lands less productive.</p>	<ul style="list-style-type: none"> Farmer pastoralist conflict is one of the major issues. Pastoralists encroach on farmers' farm land with their cattle during harvesting seasons. Access to farm land is not very difficult but farms are becoming more fragmented due to population increase.

HIV/AIDS	<ul style="list-style-type: none"> • AIDS is a deadly disease but its prevalence is low in the community. • Youth are more aware of the AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion • Farm labour is sometimes temporarily affected by diseases such as malaria which is more prevalent. • There are various organizations involved in creating awareness about HIV and its pandemic consequences • Youth are more prone to the diseases and thus if it becomes prevalent farm labour will be affected. 	<ul style="list-style-type: none"> • AIDS is acquired from indiscriminate sexual intercourse. • Its prevalence can reduce farm labour availability but no such cases were recorded in the communities 	<ul style="list-style-type: none"> • prevalence of AIDS is very low in the community and does not affect farm labour • Youth are more aware of the AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion
Soil fertility status	High use of chemical fertilizers and other agrochemicals such as herbicides is affecting soil fertility negatively.	Low usage of farm yard manure due to its scarcity and reliance on chemical fertilizers is reducing soil fertility. Poor flood in FADAMA areas is also affecting fertility of soils.	High utilization of chemical fertilizers is affecting fertility of soils. Farmers do not practice fallow or crop rotation and hence fertility is not improving. Access to farm yard manure is difficult and it affects fertility.
Use of fuel wood and access	Access to fuel wood is difficult and thus making it costly. Sourcing of fuel wood	Fuel wood is not easily accessible	Fuel wood is easily accessible but the price is high.

	is affecting the trees population and government is involved in campaign against excessive cutting of trees		
Women involvement in business	Women are mostly involved in rice processing business such as parboiling and also provide hired labour in harvesting and winnowing of rice and other crops. Their involvement does not cause conflict with their spouses.	Women are involved in rice processing and trading and such compliment household survival strategies and do not lead to conflict with spouses.	Women are involved in rice parboiling and other business such as food processing and such does not cause any conflict.

Table 3.5.1a Results of the second FGD in other outlying clusters : Cross-cutting issues farmer's perspectives

Issues	Response		
	Hadejia	Markarfi	Dandume
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is a major issue. Pastoralist encroaches on rice fields with their cattle at harvest times Excessive flooding makes farm lands less accessible. 	<p>.</p> <p>Erosion is a problem in upland areas making farm lands less productive.</p> <p>Access to FADAMA lands is difficult.</p> <p>Encroachment of residential areas is another source of conflict</p>	<p>Rent value of land is high due to dominance of large scale commercial maize and rice farmers</p>
HIV/AIDS	<ul style="list-style-type: none"> AIDS is a deadly disease but its prevalence is low in the community but some few cases were reported and those affected were mostly youth. Those suspect of the diseases are stigmatized by other community 	<ul style="list-style-type: none"> AIDS is a deadly disease and can affect farm labour. Its prevalence is very low in rural areas. 	<ul style="list-style-type: none"> Youth are more aware and more prone to AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion Its prevalence is low and those affected are usually stigmatized

	<p>people.</p> <ul style="list-style-type: none"> • Such occurrence had no impact on farm labour availability. • There are various organization involved in creating awareness about HIV and its pandemic consequences 		
Soil fertility status	<p>High use of chemical fertilizers and low application of farm yard manure are reducing soil fertility. Typha grass invasion due to flood is also causing reduction in soil fertility in the area. Chemical fertilizers increase fertility especially in the upland areas</p>	<p>Low usage of farm yard manure due to its scarcity and reliance on chemical fertilizers is reducing soil fertility. Poor flood in FADAMA areas is also affecting fertility of soils.</p>	<p>High utilization of chemical fertilizers is affecting fertility of soils.</p> <p>Farmers do not practice fallow or crop rotation and hence fertility is not improving.</p> <p>Access to farm yard manure is difficult and its affects fertility.</p>
Use of fuel wood and access	<p>Access to fuel wood is difficult and thus making it costly. Cutting trees is affecting the farming ecology by making the area increasingly prone desert encroachment</p>	<p>Fuel wood is not easily accessible as a result of government restriction on indiscriminate cutting of trees.</p>	<p>Fuel wood is generally not difficult to access because in the area there are abundant tree resources. But government is putting restriction to indiscriminate cutting of trees.</p>
Women involvement in business	<p>Women are involved in rice processing business such as parboiling. They also provide hired labour in harvesting and winnowing of rice and other crops. Their involvement does not generally cause any conflict with their spouses but sometimes household obligation are neglected and such may lead to conflict with spouses.</p>	<p>Women are involved in rice processing and trading and such compliment household survival strategies and do not lead to conflict with spouses.</p>	<p>Women are involved in rice parboiling such does not cause any conflict.</p>

3.5.2 Parboiler's perspectives

Conflict on Land

Conflict on land is experienced by 12.5 % of parboilers operating in Kano cluster. Parboilers in other cluster do not generally experience any land conflict. Expert in Hadejia, where 66.7 % of parboilers reported that, they experienced land conflict related to farmer-pastoralist.

HIV/AIDS issue

HIV/AIDS is considered as a serious issue by only 8.8% of parboilers in Kano area and 33.3 % in Jigawa. Majority o in Kano and other clusters believed that HIV/AIDS is not a serious issue. There was no evidence of the effect of HIV/AIDS on productivity in general. Despite this parboilers indicated that there is a serious campaign especially through mass media on HIV/AIDS.

On soil fertility issues the results shows that. 15.1% of parboilers in Kano, 6.7% in Jigawa and Kaduna each and 13.3% in Katsina observed that soil fertility in their locations is on the decline. This is attributed to excessive use of agro-chemicals (fertilizer, herbicide, pesticide) and low utilization of manure by farmers.

Women involvement in business: challenges and conflict

Parboilers generally reported non occurrence of conflict with spouses as a results of women Involvement in businesses. The spouses seem to have accepted the dual roles of women in running household and business activities together. Some of the causes of conflict between women and their spouse is the neglect of household responsibilities by women in favour of their business activities. (Table 3.5.2).

Table 3.5.2: Cross cutting issues among sampled parboilers

Variables	Kano(n= 80)	Jigawa(n= 15)	Kaduna(n= 15)	Katsina(n =15)
Communal conflict on land resources				
Experienced conflict	12.5	66.7	-	-
Did not experienced conflict	81.3	33.3	100	100
Communal conflict over other resources				
Experienced conflict	3.4	-	6.7	-
Did not experienced conflict	96.6	100	93.3	100
HIV/AIDS Issue:				
HIV/AIDS is serious issue	8.8	33.3	20	-
HIV/AIDS not a serious issue	91.3	67.7	80	100
Soil fertility issue				
Soil fertility getting better	15.1	6.7	6.7	13.3
Soil fertility getting worse	78.8	46.7	93.3	86.7
Access to fuel wood:				
Accessible	40	33.3	53.3	80
Not accessible	60	66.67	46.7	20
Conflict with spouse due to involvement in parboiling business				
Experienced conflict	10	6.7	13.3	26.7
Did not Experience conflict	90	93.3	86.7	73.3

Table3.5.2.a Results of the second FGD in Kano clusters: Cross-cutting issues parboiler's perspectives

Issues	Response		
	Kano area	Garko	Tudun Wada
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict. Pastoralist encroaches on farmers' field and such lead to conflict. 	<p>.</p> <p>Not experienced.</p>	Land conflict not experienced
HIV/AIDS	<ul style="list-style-type: none"> AIDS is a deadly disease but it prevalence is low and more common among young men who 	<ul style="list-style-type: none"> Many rural women are now aware of HIV/AIDS and its consequences as a 	<ul style="list-style-type: none"> Many women are now aware more of HIV/ AIDS.

	travel to cities and they are aware of preventive measures.	result of awareness lectures in the media	
Soil fertility status	soil fertility is declining	Fertility status is now poor due to low use of organic manure among farmers	Increase in the use of chemical fertilizers in farming is causing a decline in soil fertility.
Use of fuel wood and access	Access to fuel wood is difficult. In urban areas women uses fuel wood in cooking and its price is high.	Fuel wood is not easily accessible. It is costly and thus add to the cost of parboiling.	Fuel wood is costly.
Women involvement in business	Women are involved in parboiling and food processing business. Such does not lead to conflict but its affects household obligations and many spouses are not happy about that.	Women involvement in parboiling and rice trading businesses does not cause conflict. Spouses encourages their wives to get involved because its assist household livelihood.	Women are involved in rice parboiling and such does not cause any conflict with spouses.

Table3.5.2.b Results of the second FGD in other outlying clusters: Cross-cutting issues Parboilers perspectives

Issues	Response		
	Hadejia	Markarfi	Dandume
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is generally experienced. 	<p>.</p> <p>Land conflict not experienced.</p>	Land conflict not experienced
HIV/AIDS	<ul style="list-style-type: none"> There are various organization involved in creating awareness about HIV and its pandemic consequences and many women are now aware. 	<ul style="list-style-type: none"> Many women are aware of HIV/AIDS through mass media. 	<ul style="list-style-type: none"> Many people are now aware more of HIV/ AIDS. It prevalence is low and those affected are usually stigmatized

Soil fertility status	Soil fertility is declining	Fertility is not improving	fertility is declining
Use of fuel wood and access	Access to fuel wood is difficult and it is costly	Fuel wood is not easily accessible	Fuel wood is fairly accessible but costly.
Women involvement in business	Women are involved in parboiling and food processing business. Such does not lead to conflict. But it affects household activities or obligations.	Women involvement in business assist their spouses and hence does not cause conflict	Women are involved in rice parboiling and other business such as food processing and such does not cause any conflict. It affects household obligations

3.5.3 Miller's perspectives

Conflict on Land

Conflict on land is experienced by 63% of millers operating in Kano cluster. This could be because generally millers rent the pieces of land on which they make the required investment for milling operations. Millers revealed that land owners often increased the rental charges on land which is detrimental to the progress of enterprises. Millers in other cluster are not involved in land conflict. Communal conflict on other resources is not common among the respondents with the exception of millers in Jigawa where 100% of those involved in this study have experienced such conflict in the past.

HIV/AIDS perception, effects and mitigations

HIV/AIDS is considered as a serious issue by only 34% of millers in Kano area. Majority of traders in Kano and other clusters believed that HIV/AIDS is not a serious issue. There was no evidence of the effect of HIV/AIDS on productivity of the millers and their communities in general. Despite this there is a serious campaign especially through mass media on how people could protect them selves from the disease and also relate with infected people. Opinions on soil fertility shows that 48.6% of millers in Kano, 92.9%, 100% and 88.9% in Jigawa, Kaduna and Katsina respective observed that oil fertility in their locations is on the decline. This is attributed to excessive use of agro-chemicals (fertilizer, herbicide, pesticide) to generate higher out in order to meet the rising needs market and ensure food security. Other important reasons for declining soil fertility include the effect of flood in Jigawa and Katsina (Table3.5.3)

Women involvement in business: challenges and conflict

Except for millers in Kano (7.7%) and Kaduna (100%) clusters, millers reported non occurrence of conflict between women and their spouses as a results of women involvement in business. The business environment seems to have accepted the dual roles of women in running household and business activities together. Major cause of conflict between women and their spouse is the serious neglecting of household responsibilities by women in favour of their business activities. Generally, involvement of women in business activities does not lead to conflict with their spouses (Table 3.5.3).

Table 3.5.3: Cross cutting issues among sampled millers

Variables	Kano(n= 70)	Jigawa(n= 15)	Kaduna(n= 15)	Katsina(n =15)
Communal conflict on land resources				
Experienced conflict	44 (63)	-	-	-
Did not experienced conflict	26 (37)	15 (100)	-	15 (100)

Communal conflict over other resources				
Experienced conflict	33 (47.6)	-	-	-
Did not experienced conflict	-	15 (100)	-	-
HIV/AIDS Issue:				
HIV/AIDS is serious issue	34 (48)	-	-	-
HIV/AIDS not a serious issue	36 (52)	15 (100)	15 (100)	15 (100)
Soil fertility issue				
Soil fertility getting better	36 (51.4)	1 (7.1)	-	2 (11.1)
Soil fertility getting worse	34 (48.6)	14 (92.9)	15 (100)	13 (88.9)
Factors affecting soil fertility				
Fertilizer	47 (66.7)		15 (100)	8 (53.3)
Flood/soil erosion		12 (80)		5 (33.3)
Access to fuel wood:				
Accessible				
Not accessible				
Conflict with spouse due to involvement in parboiling business				
Experienced conflict	5 (7.7)	-	15 (100)	-
Did not Experience conflict	65 (92.3)	15 (100)	-	15 (100)

Table3.5.3.a Results of the second FGD in Kano clusters: Cross-cutting issues miller's perspectives

Issues	Response		
	Kano area	Garko	Tudun Wada
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is generally experienced in Kura-Kano axis Rent value of land charged by land owners including government is high especially in market areas. most millers rent the land space where they operate. 	<p>.</p> <p>Farmer pastoralist conflict sometimes occur especially in the beginning of wet season</p>	Land conflict not experienced
HIV/AIDS	<ul style="list-style-type: none"> AIDS is a deadly disease but it prevalence is low. There are 	<ul style="list-style-type: none"> Many people are now aware of HIV/AIDS and its consequenc 	<ul style="list-style-type: none"> Many people are now aware more of HIV/ AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion It prevalence is low and

	various organization involved in creating awareness about HIV and its pandemic consequences . Thus people are now more responsive.	es as a result of awareness lectures in the media	those suspected may be stigmatized
Soil fertility status	Fertility is improving as a result of better farming practices in rural areas Low use of manure is causing a decline in soil fertility.	Fertility status is now poor due to low use of organic manure among farmers	Increase in the use of chemical fertilizers in farming is causing a decline in soil fertility.
Use of fuel wood and access	Access to fuel wood is difficult. In urban areas women uses fuel wood in cooking and its price is high.	Fuel wood is not easily accessible	Fuel wood is costly.
Women involvement in business	Women are involved in parboiling and food processing business. Such does not lead to conflict. In urban areas women are involved in petty trading, local restaurants business and in some cases government employment and sometimes conflict do occur as a result of paying less attention to household obligation.	Women involvement in parboiling and rice trading businesses assist their spouses and hence does not cause conflict in most cases	Women are involved in rice parboiling and other business such as food processing and such does not cause any conflict.

Table. 3.5.3.b Results of the second FGD in other outlying clusters: Cross-cutting issues millers perspectives

Issues	Response		
	Hadejia	Markarfi	Dandume
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is generally experienced. 	<p>.</p> <p>Land conflict not experienced.</p>	Land conflict not experienced

HIV/AIDS	<ul style="list-style-type: none"> • AIDS is a deadly disease but its prevalence is low in the community but some few cases were reported among youth. • There are various organizations involved in creating awareness about HIV and its pandemic consequences. 	<ul style="list-style-type: none"> • AIDS is a deadly disease and can affect labour availability and productivity. But its prevalence is very low. • Many people are now aware of HIV/AIDS and its consequences as a result of awareness lectures in the media. 	<ul style="list-style-type: none"> • Many people are now more aware of HIV/AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion. • Its prevalence is low and those affected are usually stigmatized.
Soil fertility status	Typha invasion is a major cause of soil fertility decline in the area.	Fertility status is now poor due to low use of organic manure among farmers.	Farmers do not use local manure and thus fertility is not improving.
Use of fuel wood and access	Access to fuel wood is difficult. People are engaged in excessive cutting of trees and such practice is affecting the environment.	Fuel wood is not easily accessible.	Fuel wood is costly.
Women involvement in business	Women are involved in parboiling and food processing business. Such does not lead to conflict.	Women involvement in business assists their spouses and hence does not cause conflict.	Women are involved in rice parboiling and other businesses such as food processing and such does not cause any conflict.

3.5.4 Trader's perspectives

3.5.4.1 Conflict on Land

Conflict on land is more prevalent in Jigawa and Kaduna clusters. There is however evidence from results of the survey that some traders in Kano (15%) and Katsina (20%) have experienced conflict on land. Apart from this, only 9% of traders in Kano experienced conflict on other resources. Ninety-seven (97%) percent of traders in Kano cluster have no easy access to fuel-wood in their communities. In Jigawa (73.33%) and Katsina (60%) clusters, traders observed that this resource is not easily accessible to people. This could influence the cost of parboiling the commodity in the locations.

3.5.4.2 HIV/AIDS perception, effects and mitigations

HIV/AIDS is considered as a serious issue by only 2% of traders in Kano area. Majority of traders in Kano and other clusters believed that HIV/AIDS is not a serious issue. There was no evidence of the effect of HIV/AIDS on productivity of the traders and their communities in general. Despite this there is a serious campaign especially through mass media on how people could protect them selves from the disease and also relate with infected people.

3.5.4.3 Soil fertility status

Soil fertility is a serious issue to traders and their farming communities. In Kano 31% of traders observed that soil fertility in their locations is on the decline. In the clusters of Jigawa, Kaduna and Katsina, about 40%, 73% and 80% of traders observed decline in soil fertility. Declining soil fertility increase production cost, reduce level of outputs from rice production leading to increase in prices of the commodity, thereby reducing the purchasing power of traders operating in the area.

3.5.4.4 Women involvement in business: challenges and conflict

Except for traders in Kano (12%) and Jigawa (6.67%) clusters, traders reported occurrence of conflict between women and their spouses as a results of women involvement in business. Major cause of conflict between women and their spouse is the neglecting of household responsibilities by women in favour of their business activities. Generally, involvement of women in business activities does not lead to conflict with their spouses (Table3.5.4)

Table 3.5.4. Cross cutting issues among sampled traders

Land conflict	Kano(n = 100)	Jigawa(n=15)	Kaduna(n = 15)	Katsina(n=15)
Experienced conflict	15 (15.0)	13 (86.67)	12 (80.0)	3 (20.0)
Not experienced	42 (42.0)	2 (13.33)	3 (20.0)	12 (80.0)
Conflict on other resources				
Experienced conflict	9 (9.0)	-	-	-
Not experienced	91 (91)	15 (100)	15 (100)	15 (100)
HIV/AIDS				
Serious issue	2 (2.0)	-	-	-
Not serious	89 (89.0)	14 (93.33)	12 (80.0)	12 (80.0)
Soil fertility status				
Fertility getting worse	31 (31.0)	6 (40%)	11 (73.33)	12 (80.0)
Fertility getting better	9	9 (60%)	4 (26.67)	3 (20.0)
Access to fuel wood				
Easily accessible	3 (3%)	4 (26.67)	-	6 (40.0)
Not easily accessible	97 (97%)	11 (73.33)	-	9 (60.0)
Women involvement in business and conflict with spouse				
Conflict occur	12 (12)	1 (6.67)	-	-
No conflict	88 (88)	14 (93.33)	15 (100)	15 (100)

Figures in parenthesis are percentages

Table3.5.4.a Results of the second FGD in Kano clusters: Cross-cutting issues trader's perspectives

Issues	Response		
	Kano area	Garko	Tudun Wada
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is generally experienced in Kura-Kano axis In market areas traders do not experienced land conflict 	<p>.</p> <p>Farmer pastoralist conflict occasionally occurs.</p>	Land conflict not experienced
HIV/AIDS	<ul style="list-style-type: none"> There are various organization involved in creating awareness bout HIV and its pandemic consequences . Thus people are now more responsive. 	People are aware of HIV/AIDS but the occurrence of the disease is not experienced in the local communities.	<ul style="list-style-type: none"> It prevalence is low and those suspected may be stigmatized. HIV/AIDS is a deadly disease and can affect human lives and livelihood. But its impact is not felt in the communities.
Soil fertility status	Fertility of soil is declining because	Fertility status is now poor due to low	Fertility is declining because farming is becoming more input

	farmers can not use fertilizers adequately.	use of organic manure among farmers	intensive.
Use of fuel wood and access	Access to fuel wood is difficult. In urban areas women uses fuel wood in cooking and its price is high.	Fuel wood is not easily accessible	Fuel wood is not easily accessible. Alternatives sources of energy should be sought for rural women.
Women involvement in business	Women involve in other business usually affect household obligation but do not usually cause confluct	Women involvement in parboiling and rice trading businesses assist their spouses and hence does not cause conflict in most cases	Women are involved in rice parboiling does not cause any conflict in most cases

Table3.5.4.b Results of the second FGD in other outlying clusters: Cross-cutting issues millers perspectives

Issues	Response		
	Hadejia	Markarfi	Dandume
Land resources and conflict	<ul style="list-style-type: none"> Farmer pastoralist conflict is generally experienced. 	<p>.</p> <p>Farmer pastoralist conflict sometimes occur but not rampant.</p>	Land conflict not experienced
HIV/AIDS	<ul style="list-style-type: none"> AIDS is a deadly disease but it prevalence is low in the community but some few cases were reported among youth. There are various organization involved in creating awareness about HIV and its pandemic consequences 	<ul style="list-style-type: none"> AIDS is a deadly disease and can affect labour availability and productivity. But it prevalence is very low. 	<ul style="list-style-type: none"> Many people are now aware more of HIV/ AIDS. It is acquired from indiscriminate sexual intercourse or blood transfusion as a result of awareness lectures in media
Soil fertility status	Occurrence of flood affects soils fertility in the area	Fertility status is now poor due to low use of organic manure among farmers	Farmers do not local manure and thus fertility is of soils is becoming poor

Use of fuel wood and access	Access to fuel wood is difficult. People are engaged in excessive cutting of trees and such practice is affecting the environment.	Fuel wood is not easily accessible	Fuel wood is costly.
Women involvement in business	Women are involved in parboiling and food processing business. Such does not lead to conflict.	Women involvement does not cause conflict	Women are involved in rice parboiling such does not cause any conflict.

3.6 Case studies

One objective of the survey is to carry out case studies to investigate financial performance of the various production and processing enterprises in the study sites in order to determine their financial viability and also to have an idea on the financial ability of entrepreneurs to invest in new technology and identify priority for increasing the profitability of the enterprises.

Several assumptions or proxies need to be use to arrive at the various enterprises budgets. First and foremost it is important to take the method of data collection into consideration that is data were collected at a point in time and all cost and benefits data were collected based on respondent's memory recall. The instability of the Nigerian economy may also present difficulty in estimating fixed costs of equipment and facilities because for most processors machines and other facilities were procured long ago and it is difficult to have a good estimate of its present value. However, for parboilers and farmers most of the equipment and facilities they used are locally fabricated or procured and their values not very much affected by changing economic trend and thus estimation could be more accurate.

3.6.1 Rice producer in Kura-Kano corridor

Our first case study is that of a small-scale rice producer operating within the perimeter of the Kano River Irrigation Project (KRIP) producing rice during the wet season. The farm size is an acre which is the usual farm size cultivated by resource poor farmers. Rice is produced as a cash crop and thus production and marketing strategies or objectives are that of profit maximization. The farmer do not owned the field but rather obtained access by paying a seasonal rental of NGN3,000 to Kano River Irrigation Project in addition water charges of NGN1,000 per season. Rice is produced during the rainy season but water shortages necessitate the need for supplementary irrigation as a strategy to ensure good productivity. Intermediate inputs such as fertilizers and seeds were obtained from private sources. SIPI rice was the variety of seed used for planting. The farmer used hired labour for operating the farm which is readily available in the locality. Family labour was used in the upland where food crops such as millet and cowpea were grown for household consumption.

The farm keep no records of its transactions and thus all quantities, costs and prices for inputs and output were estimated based on memory recall of the farmer.

Name of Farmer: Sai'du Jibrin
Farm size: acre
Location: KRIP
Date of Information: February, 2004
Modalities of collection: Interview

Yield/ output:

- Local unit: Bag
- Local unit metric equivalent: 100 kg
- Production in Local unit: 25 bags
- Production in metric equivalent: 2500kg

Prices:

Local unit price: NGN3000

Metric unit price: NGN 30 per kg

Analysis of Cost of Production**Table 3.6.1.a. Fixed inputs and costs in rice production(Naira)**

Input	Unit	Value(NGN)
Land rent	acre	3000
:	Season	1000
Total		4000

Table 3.6.1.b. Variable inputs and costs in rice production(Naira) Cost of Labour Input

Input	Quantity	Value
Land preparation(harrow, dice and leveling)	Acre	6400
Herbicide application	One	500
Nursery preparation	-	500
Transplanting	-	2800
Fertilizer applications	Two	2000
Weeding/thinning	One	1200
Supplementary irrigation	10 times	2000
Harvesting and threshing	One	7000
Winnowing and bagging	Per bag	1250
Total2		23,650

Table 3.6.1.c. Material Inputs and costs in rice production (Naira)

Input	Quantity	Unit price	Value
Herbicide	2 litres	1000	2000
Nursery(seed, Fertilizer)	-	-	1500
Fertilizer NPK	4	3200	12800
Fertilizer UREA	2	3000	6000
Total3			22,300

Table 3.6.1.d. Marketing inputs and costs in rice production (Naira)

Input	Unit price	Value
Transportation	50 per bag	1250
Packaging(bags)	30 per bag	750
Total4		2000

Cost –benefits Analysis

Total cost of production = Total Fixed costs + Total Variable costs
 Total1 +2 +3 +4 = 4000 + 23,650 + 22,300+ 2000 = NGN 51,950

Gross returns = Total output x unit price
 = 2500Kg x NGN30 = NGN75, 000

Net return = Gross return- total costs
 = 75,000- 51,950 = NGN23, 050

3.6.2 Case study of Parboiler in Garko cluster

Name: Durba Ado (Female)
Type/size: Small –scale Household
Location: Rariyar Kamfa, Garko
Date of Information: February, 2004
Modalities of collection: Interview

Table 3.6.2.a: Costs and Returns in Rice Parboiling

Items	Capital Expenditure in Rice Parboiling			Annual Depreciation (₦)	Capital Consumption (₦)
	Quantity	Unit Price (₦)	Total Cost (₦)		
Metal pot	1.00	3500.00	3500.00	35.00	35.00
Metal Basins	2.00	600.00	1200.00	600.00	600.00
Metal Bowls	2.00	50.00	100.00	20.00	20.00
Sub-total				655.00	655.00
Depreciation value per day				1.80	
	Operational Expenditure				
Paddy	2 bags	3000.00	6000.00		
Fire Wood	2 Bundles	100.00	200.00		
Water	14 Buckets	5.00	70.00		
Cost of Parboiling	2 bags of paddy	350.00	700.00		
Cost of Milling	2 bags of paddy	5 per tiya	400.00		
Removal of Black and	1 bag of milled	2 per tiya	80.00		

burnt grains	rice			
Polishing of grains using sand	1 bag of milled rice	2 per tiya	80.00	
Transport (to and fro)	rice			
	-	250.00	250.00	
Packaging (Marketing)	1 bag of milled rice	70 per sack	70.00	
Sub-total				7850.00
Total cost (Operational + Depreciation)				7851.80
Revenue				
Sales of milled Rice	40.00	285.00	11400.00	
Profit from Processing 2 bags of Paddy				3548.20
Profit from Processing a bag of Paddy				1674.10

*A bag contains 40 tiyas and a tiya is about 2.5 Kg in weight.

3.6.3 Case Study of rice miller in Garko

1. Location: Garko
2. Modalities of data collection: Interview
3. Date of Data collection: February , 2007
4. Size of milling unit: 2 diesel machines
5. Machine capacity: 10horse power .
6. Efficiency : 4 bags per hour per machine
7. Estimate of hours of operation per day in peak season: 14hrs
8. Estimate of hours of operation per day in off-peak season: 8hrs
9. Estimate of bags of rice milled per day in Peak season : 56 bags per machine = 112 per unit per day
10. Estimate of bags of rice milled per day in off- Peak season : 32 bags per machine = 64 per unit per day
11. Usual customers: Women parboilers-traders.

Table 3.6.3.a Costs and Returns in Rice milling enterprise

Items	Fixed costs in Rice milling				
	Quantity	Unit Price (₦)	Total Cost (₦)	Annual Depreciation (₦)	Capital Consumption (₦) per day
Diesel machine	1	120,000	120,000	40,000	111
Housing	1	100,000	100,000	5,000	14
Containers and other equipment(drums, pipes, bucket and shovel)	var	-	7500	1500	4
Salary operator	1	10,000	10,000	-	333
Assistants	2	5,000	10,000	-	333
				Sub- total	795

1

Operational costs per day in rice milling(one machine)			
Diesel	3 gallons per day	344	1032
Casual labourer(assistants): feeding	2	200	400
Operator: Feeding	1	300	300
Cost of machine	-	-	100

Maintenance per day				
Revenue or tax paid per day	-	-	20	
		Sub-total2	1852	
Total costs (Operational + capital consumption per day)				2647
		Revenue		
Fees charged per bag	1	240	240	
Total gross revenue generated per day in peak period	56	240	13,440	
Total gross revenue generated per day in peak period	32	240	7680	
Net revenue per day per machine in peak period: 13,440 minus 2647 = NGN10,793				
Net revenue per day per machine in off peak period: 7680 minus 2647 = NGN5033				

3.6.4 Case Study of a processed rice Retailer in Rimi Market, Kano

Name of Trader: Habibu Mohd Yakasai
Type of Trader: Retailer of processed rice
Location: Rimi, Market Kano

Table 3.6.4.1: Costs and Returns in Rice Trading

S/No	Variables	Markets Prices/Cost in Naira
1.0	Women Parboilers-Traders in Garko	
1.1	Average Selling Price	11,400
1.2	Paddy processing/Marketing*	7851.80
1.3	Net Return	3548.2
2.0	Wholesaler	
2.1	Purchase price	11,400
2.2	Average Selling Price	12,000
2.3	Transport Charges	50
2.4	Loading/uploading per bag	10
2.5	Re-packaging	70
2.6	Total marketing cost	130
2.7	Net Return	340
3.0	Retailer in Rimi Market-Kano	
3.1	Purchase price	12,000
3.2	Average Selling Price (Consumer price)	14,000
3.3	Transport Charges	100
3.4	Loading/uploading per bag	15
3.5	Packaging	-
3.6	Total marketing cost	115
3.7	Net Return	1,885

4.0 CONCLUSION

The production of rice was in the past mostly at the subsistence level to meet the food needs of the family. However, in recent years rice production is becoming increasingly geared for the market, thus becoming an important food and cash crop to the smallholder farmers in Nigeria. The establishment of KRIP and HVIP and existence of low land and upland production ecologies for rice, introduction of new varieties and technologies of production coupled with increase in demand for local rice as a result of changing pattern of consumptions, national trade policies and market incentives has lead to a continuous increase in local production of rice over the years. However increase in the costs of production, decrease in extension support and use of poor quality seeds were some of the negative trends in the rice commodity chain.

Rice processing in Nigeria is mainly a cottage industry carried out by small scale enterprises operating either as a household based small businesses in the case of parboilers or as commercial points located mainly within the rice production clusters across the country. The chain of activities associated with rice production, transformation and marketing has created a chain of economic units and actors providing services and support to enable the functioning, development and sustainability of rice production, processing and commercialization in the country. Notably among these actors are the producers, parboilers, millers and traders. There is a high level of vertical integration of activities and processes in the rice commodity chain resulting in the involvement and motivations of women and other members of households to benefits from the gains and incentives of rice production and commercialization activities. Parboiling is women dominated activity and it is generating a lot of economic and social benefits to rural households in the traditional rice production clusters. Production and milling of rice are men dominated enterprises but women are sometimes involved as hired workers in harvesting and winnowing.

Quality issue in production, processing and marketing is a major concern and it is affected by technical, economic and institutional factors. Quality attributes at market levels are those typical of imported rice which is currently competing with locally processed rice among consumers particularly in urban centres where the bulk of consumption is concentrated. The availability of improved technologies and techniques of processing among the small scale processing units is not adequate and thus processors are incapable of meeting the quality standards that can compete favorably at the market level. Technical change in processing and production may not necessarily solve the issue of quality and standards. Building technical skills and investment in improved technologies and equipment are some of the necessary ingredients to improving competitiveness of the commodity chain functioning but understanding the socio-economic, cultural and institutional context under which the commodity chain function would help in making a better efforts towards establishing an enabling production and commercialization environment that would work favorably for all the concern stakeholders particularly the resource poor producers, processors and consumers whom are continuously operating in a context of increasing resource constrain, poor and inadequate infrastructures and services.

Recommendations

Based on the main issues identified in the study the following are recommended;

- High costs of inputs especially fertilizers and labour is a major constraint in rice production and such inputs were mainly obtained in the open market from private input sellers. There is the need to link farmers associations with major distributors or manufacturers of fertilizers so as to enable bulk purchase at a lower price.

- Issue of quality of seeds is also important and extension agents and organization should improve their activities with regard to choice of varieties and quality and improved production techniques.
- Supplementary irrigation is a strategic practice among rice farmers operating in irrigated and Fadama systems. Irrigation agencies in Kura-Kano and Hadejia areas should ensure timely and adequate release of irrigation water so that rice farmers can use it for supplementary irrigation to improve and sustain productivity in rice fields.
- High cost of fuel wood, access to water and poor access to improved technologies in parboiling were some of the major constraints in parboiling enterprise across the clusters. There is the need to improve parboiling practices through the provision of alternative source of energy, improved parboiling practices and access to water as a resource. Access to credit was generally poor among parboilers and there is therefore the need to link parboilers with credit suppliers to improve access and productivity.
- Poor and inadequate supply of electricity and high cost of diesel are major problems in rice milling enterprise. There is the need to improve electricity supply in the rice processing clusters and also to improve access to diesel and machine maintenance equipment and services in the clusters.
- The issue of quality standard is important and investment in new equipment such as polisher and destoners is necessary at the processing level to meet the desired quality that can compete favorably with imported rice in the markets. But there is also the need to carry out a detail demand and preference analysis at the market and consumer level in order to ascertain the consumer preference in relation to locally processed rice vis-à-vis imported rice especially at the urban areas where the bulk of consumption is undertaken.
- There is also the need to establish a mechanism that would monitor market flows and fluctuations along the commodity chain such as level of production, marketable surplus, volume of trade at market level, commodity utilization among local consumers, inflows and outflows of paddy and processed rice and so on. This would help in measuring the impact of future interventions targeting the market chain actors.
- All information obtained from the market chain actors were collected based on recall memory since records of transactions and activities were traditionally not kept. There is the need to sensitize, mobilize and build capacity of the market chain actors towards inculcating the habit of keeping proper and up- to –date records of all transactions and activities regarding the commodity.

REFERENCES

- Hardcastle, J. E. 1959. The development of rice production and research in the Federation of Nigeria. *Tropical Agriculture*, 36: 79-95
- Ogundele O. O. and O. O. Okoruwa. 2006. Technical Efficiency differentials in rice production technologies in Nigeria. AERC Research Paper 154, African Economic Research Consortium, Nairobi, 37 pp

Appendix 5: Kano-Kura Baseline Data Related to PrOpCom's Logframe OVIs

OVI: 03-1.1 Increase efficiency in the production and marketing of selected commodities by reduced costs of processing and production

Source	Questions	State					
		Kano	Jigawa	Kaduna	Katsina		
Farmer	Main crops grown	Rice	250(100%)	50(100%)	50(100%)	50(100%)	
Farmer		Maize	134(53.6%)	9(18%)	30(60%)	32(64%)	
Farmer		Groundnut	168(67.2%)	-	1(2%)	2(4%)	
Farmer		Cowpea	88(35.2%)	30(60%)	13(26%)	7(14%)	
Farmer		Millet	27(10.8%)	16(32%)	-	2(4%)	
Farmer		Cotton	-	-	-	37(74%)	
Farmer		Onion	82(32.8%)	8(16%)	-	-	
Farmer		Tomato	124(49.6%)	12(24%)	-	-	
Farmer		Sugarcane	2(0.8%)	-	17(34%)	1(2%)	
Farmer		Sorghum	52(20.8%)	3(6%)	25(50%)	24(48%)	
Farmer		Water melon	8(3.2%)	-	-	-	
Farmer		Ranking of crops grown by importance	Rice (cash and food)	250(100%)	50(100%)	50(100%)	50(100%)
Farmer			Maize (cash and food)	126(50.4%)	9(18%)	32(64%)	40(80%)
Farmer	Groundnut (cash and fodder)		168(67.2%)	-	1(2%)	2(4%)	
Farmer	Cowpea(cash and Fodder)		88(35.2%)	30(60%)	13(26%)	7(14%)	
Farmer	Cotton (cash)		-	-	-	45(90%)	
Farmer	Sugarcane(cash)		2(0.8%)	-	17(34%)	4(8%)	
Farmer	Millet (Food)		27(10.8%)	16(32%)	-	2(4%)	
Farmer	Tomato		124(49.6%)	12(24%)	-	-	
Farmer	Area cultivated	Mean area cultivated in hectares	5.01	1.68	4.68	62.8	
Farmer	Main rice ecology	upland	67(26.8%)	-	41(82%)	48(96%)	
Farmer		lowland	83(33.2%)	8(16%)	9(18%)	2(4%)	
Farmer		Irrigated perimeter	100(40%)	42(84%)	-	-	
Farmer	Varieties of rice produced	SIP1	82(32.8%)	15(30%)			
Farmer		WITA 4	70(28%)	8(16%)			
Farmer		TOX 1011	12(4.8%)	7(14%)			
Farmer		ITA 150	20(8%)		25(50%)	12(24%)	
Farmer		MAIZABUWA(NERICA(upland))	10(4%)		10(20%)	6(12%)	
Farmer		ITA 212	-	2(4%)			
Farmer		SANTANA	21(8.4%)				
Farmer		Yar –Das(upland variety)	15(6%)				
Farmer		Yar-Yamidi(Local variety)	-	8(16%)			
Farmer		Yar-Galaware(local variety)	-	8(16%)			
Farmer		Yar kera(local variety)	10(4%)				
Farmer		Yar-Digis(local variety)	10(4%)				
Farmer		Jana	-	2(4%)			
Farmer	Kilaki (upland varieties)	-			32(64%)		

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Farmer	Ranking of varieties and reasons)	SIPI(grain quality, high yield and disease	127(50.8%)	23(46%)	-	-
Farmer		WITA4(Draught resistance, good tillering ability)	95(30%)	10(20%)	-	-
Farmer						
Farmer		TOX(high yield, tolerant to pests and diseases)	28(4%)	7(14%)	-	-
Farmer		NERICA(grain quality and suitable to upland)			20(40%)	5(10%)
Farmer		Yar Galaware(low input requirement, high yield	-	10(20%)		
Farmer		Kilaki, (draught resistance and grain quality)	-	-	5(10%)	10(20%)
Farmer		ITA 150			25(50%)	35(70%)
Farmer	Places of selling the commodity	Kura market, Chiromawa, K/Dawaki and Karfi	100(40%)	-	-	-
Farmer		Kano main markets	50(20%)	-	-	-
Farmer		Tudun wada	40(16%)	-	-	-
Farmer		Kwanar Dangora market	10(4%)	-	-	-
Farmer		Kibiya and Darki market	15(6%)	-	-	-
Farmer		Garko market	35(14%)	-	-	-
Farmer		Gujungu Market	-	20(40%)	-	-
Farmer		Hadejia market	-	30(60%)	-	-
Farmer		Makarfi market	-	-	50(100%)	-
Farmer		Dandume market	-	-	-	50(100%)
Farmer	To whom the commodity is sold	Agents	24(9.6%)	50(100%)	2(4%)	12(24%)
Farmer		Traders /processors	220(88%)	-	48(96%)	37(74%)
Farmer		Consumers	6(2.4%)	-	-	1(2%)
Farmer	Chain of selling	Directly to buyers(traders, consumers,	226(90.4%)	-	48(96%)	38(98%)
Farmer		Sell through agents	24(9.6%)	50(100%)	2(4%)	1(2%)
Farmer	Areas of high costs in production	Fertilizers	233(93.2%)	50(100%)	43(86%)	49(98%)
Farmer		Labour	83(33.2%)	31(62%)	17(34%)	47(94%)
Farmer		Land preparation	155(62%)	43(86%)	36(72%)	44(88%)
Farmer	Labour intensive operations	Weeding	167(66.8%)	26(52%)	21(42%)	23(46%)
Farmer		Harvesting	233(93.2%)	38(76%)	41(82%)	47(94%)
Farmer		Land preparation	125(50%)	18(36%)	20(40%)	44(88%)
Farmer	Contribution of household members to farm labour	Adult male:				
Farmer		0	61(24.4%)	15(30%)	3(6%)	2(4%)
Farmer		1 to 10	126(50.4%)	34(68%)	47(94%)	7(14%)
Farmer		11 to 20	16(6.4%)	1(2%)	-	-
Farmer		more than 20	2(0.8%)	-	-	1(2%)
Farmer		Adult female:				
Farmer		0	186(74.7%)	36(72%)	49(98%)	1(2%)
Farmer		1 to 10	12(4.8%)	13(26%)	1(2%)	-
Farmer		11 to 20	-	-	-	-
Farmer	more than 20	-	1(2%)	-	49(98%)	

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Farmer	Engagement of household members in off -farm employments	Number of males engaged				
Farmer		0	118(47.4%)	24(48%)	15(30%)	19(38%)
Farmer		1 to 10	111(44.4%)	25(50%)	35(70%)	31(62%)
Farmer		11 to 20	17(6.8%)	-	-	-
Farmer		more than 20	2(0.8%)	-	-	-
Farmer		Number of females engaged				
Farmer		0	167(66.8%)	37(74%)	29(58%)	22(44%)
Farmer		1 to 10	75(30%)	13(26%)	21(42%)	27(66%)
Farmer		11 to 20	6(2.8%)	-	-	-
Farmer		more than 20	-	-	-	-
Farmer	Availability of hired labour and cost	Adult male	222(88.8%)	44(88%)	49(98%)	19(38%)
Farmer		Adult female	106(42.4%)	19(38%)	1(2%)	-
Farmer		Male Children	156(62.4%)	28(56%)	29(53%)	-
Farmer		Female children	89(35.6%)	17(34%)	-	48(96%)
Farmer	Means and ways of storage	Packaged in Bags and store.	202(80.8%)	48(96%)	50(100%)	8(16%)
Farmer		Packaged in Bags using storage chemicals and store.	30(12%)	-	-	40(80%)
Farmer		Sell instantly at farm	18(7.2%)	2(4%)	-	2(4%)
Farmer	Production inputs availability and usage	Fertilizers availability	162(64.8%)	42(84%)	50(100%)	7(94%)
Farmer		Agrochemical availability	216(86.4%)	44(88%)	49(98%)	47(94%)
Farmer		Fertilizers usage and affordability	223(89.2%)	44(88%)	50(100%)	36(72%)
Farmer		Use of agrochemical and affordability				
Farmer	Most commonly used fertilizers and prices	NPK	N2931	N2070	N2955	N2993
Farmer		UREA	N2751	N2320	N2824	N2893
Farmer		SSP	2650	-	N2079	-
Farmer	Knowledge of Specific buyers and sellers	Know specific buyers:	176(70.4%)	22(44%)	48(96%)	1(2%)
Farmer		Don't know specific buyers:	74(29.6%)	28(56%)	2(4%)	49(98%)
Farmer	Advance Payment	Advance payment incentives from buyers	33(13.2%)	22(44%)	16(32%)	1(2%)
Farmer	Major challenges in rice production	Water shortages (draught or insufficient rainfall)	20(8%)	8(16%)	13(26%)	18(36%)
Farmer		poor and untimely release or flow of irrigation water	98(39.2%)	32(64%)	-	-
Farmer		High cost of fertilizer	222(88.8%)	47(94%)	48(96%)	47(94%)
Farmer		Inadequate capital	125(50%)	29(58%)	26(52%)	30(60%)
Farmer		Pests and diseases	43(17.2%)	10(20%)	33(66%)	28(56%)
Farmer		Flooding	24(9.6%)	27(54%)	-	-
Farmer		High cost of labour	168(67.8%)	23(46%)	25(50%)	34(68%)
Millers	Type of customers and fees charged 100kg bag for milling	Farmers	NGN100 (77.4)	NGN100 (100)	NGN225 (53.3)	NGN50 (100)
Millers		Parboilers	NGN100 (55.9)	NGN100 (100)	NGN225 (53.3)	NGN50 (45.5)
Millers		Traders	NGN100 (68)	NGN100 (100)	NGN225 (53.3)	NGN60 (100)
Millers		Self	NGN100 (81.5)	NGN100 (100)	-	-
Millers	Storage of commodity before or after processing	Provide storage	26 (37.5)	1 (9.1)	-	5 (33.3)
Millers		Do not provide storage	44(62.5)	14 (90.9)	-	10 (66.7)
Millers	Availability of non-household labour	Readily available	69 (98.3)	15 (100)	15 (100)	12 (78.6)
Millers		Not readily available	1 (1.7)	-	-	3 (21.4)
Millers	Number of months for processing in year	6 months in a year	-	-	-	10 (66.7)
Millers		Year round	70 (100)	15 (100)	15 (100)	5 (33.6)

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Millers	Areas of high costs in milling	Electricity bill	19 (27.6)	15 (100)	10 (69.2)	-
Millers		fuel	18 (25.9)	-	5 (30.8)	-
Millers		Handling	24 (34.5)	-	-	-
Millers		Parboiling	8 (12.1)	-	-	-
Parboilers						
Parboilers	Type of parboiling equipment and average cost (N)	Aluminium Pots	1,551	2,262	1,143	-
Parboilers		Half Drum	-	60	1,200	700
Parboilers		Full Drum	-	1,700	-	1,400
Parboilers		Hanigha	-	-	-	-
Parboilers		Others (shafa)	660	-	-	-
Parboilers						
Parboilers	Period of holding commodity before sale or pick up by customer	1-3 days	49.9	100	92.8	100
Parboilers		4-7 days	29.5	0	7.2	0
Parboilers		More than a week	0	0	0	0
Parboilers		Period of processing activity in year or season (in months)				
Parboilers		1-3 months	1.3	6.7	0	0
Parboilers		4-6 months	0	46.6	6.7	60
Parboilers		7-9 months	0	6.7	6.7	0
Parboilers		10-12 months	98.7	40	86.7	4
Parboilers	Usage of commodity					
Parboilers		Quantity sold in bags	192	54.8	67.6	232.7
Parboilers		Quantity given out in bags	2.4	4.2	2.3	-
Parboilers		Quantity consumed in bags	2.4	4.2	2.3	-
Parboilers						
Traders						
Traders	Scale of Trading activity (in Bags)	<100	31 (31.0)	3 (20.0)	15 (100)	10 (66.67)
Traders		100-200	13 (13.0)	-	-	-
Traders		201-400	17 (17.0)	-	-	5 (33.33)
Traders		401-1000	20 (20.0)	1 (6.67)	-	-
Traders		> 1000	19 (19.0)	11 (73.33)	-	-
Traders						
OVI: 03-1.2	Increase efficiency in the production and marketing of selected commodities by increased quality awareness and use of grades and standards					
Farmer	Standard product	Exist	121(51.6%)	45(90%)	48(96%)	49(98%)
Farmer		Not exists	129(51.6%)	5(10%)	2(4%)	1(2%)
Farmer	Qualities of standard product	Long grain	92(36.8%)	34(68%)	18(36%)	-
Farmer		Well filled grain	13(5.2%)	22(44%)	-	11(22%)
Farmer		Well dried grain	22(8.8%)	7(2%)	-	1(2%)
Farmer		Brightness of grain	64(25.6%)	8(16%)	1(2%)	46(92%)
Farmer		High yield	64(25.6%)	15(30%)	46(92%)	4(8.0%)

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Farmer	Source of information on grades and qualities	Extension agent	9(3.6%)	15(30%)	13(26%)	10(20%)
Farmer		Traders	35(14%)	2(4%)	15(30%)	6(12%)
Farmer		Consumes	59(23.6%)	-	2(4%)	-
Farmer		Co-farmers	8(3.2%)	2(4%)	19(38%)	4(8%)
Farmer		No access to information	111(44.4%)	31(62%)	1(2%)	30(60%)
Farmer	Buyer preference	Quality	12(4.8%)	3(6%)	3(6%)	22(44%)
Farmer		Price	166(66.4%)	6(12%)	32(64%)	25(50%)
Farmer		Both quality and price	42(16.8%)	-	15(30%)	22(44%)
Farmer	Rice Quality	Existence of premium price for higher quality	213(85.2%)	39(78%)	50(100%)	39(78%)
Farmer		Importance of quality of production	195(78%)	43(86%)	50(100%)	13(26%)
Farmer	Training on quality improvements	Training available:				
Farmer		Received by self	49(19.6%)	-	28(56%)	1(2%)
Farmer		Household members	36(14.4%)	-	1(2%)	2(4%)
Farmer		Hired workers	17(6.8%)	1(2%)	-	2(4%)
Farmer		Training not available	201(80.4%)	50(100%)	22(44%)	49(98%)
Millers	Types of milling machine commonly used	Amuda	21 (30))	-	-	-
Millers		Colba	4 (5.71)	-	-	-
Millers		Colin	1 (1.43)	-	-	-
Millers		Eamex	4 (5.71)	-	-	-
Millers		Liberty	1 (1.43)	-	-	-
Millers		Lisen Emes	2 (2.86)	-	-	-
Millers		Madras	4 (5.71)	-	-	2 (13.33)
Millers		OPC	-	-	-	5 (33.33)
Millers		PMX	-	1 (6.67)	-	-
Millers		Selia	3 (4.29)	-	-	-
Millers	Source of milling machine	Kano	69 (98.57)	15 (100)	9 (60)	15 (100)
Millers		Zaria	-	-	6 (40)	-
Millers	Millers categories	Small(1 mill)	40 (57.1)	12 (80)	14 (93.3)	8 (53.3)
Millers		Medium1(2-3 mills)	22 (31.4)	3 (20)	1 (6.67)	5 (33.3)
Millers		Medium2(3or more mills)	-	-	-	2 (13.3)
Millers		Medium3(Non Indian mill)	8 (11.4)	-	-	-
Millers	Availability of a standard product	Available	48 (68.2)	-	13 (84.6)	11(75)
Millers		Not Available	22 (31.8)	15 (100)	2 (15.4)	4 (25)
Millers	What is more important to buyers	Quality	60 (85.1)	-	15 (100)	12 (78.6)
Millers		Price	10 (14.9)	15 (100)	-	3 (21.4)
Millers	Aspects important to miller in rice processing	Quality of output	17 (24.6)	-	9 (60)	-
Millers		Higher income	46 (66.4)	15 (100)	6 (40)	15 (100)
Millers	Aspects of quality important to miller	Dryness	35 (49.3)	-	-	-
Millers		Brightness	25 (36.2)	15 (100)	10 (66.7)	8 (53.3)
Millers		Grain length (long grains)	-	-	5 (33.3)	-
Millers	Availability of source of information on grades and standard	Available	19 (27)	-	-	-
Millers		Not Available	51 (73)	15 (100)	-	-
Millers	Farmer trains producers, labourers, household on quality standards in processing	Trained them	6 (8.1)	15 (100)	13 (90.9)	10 (66.7)
Millers		Do not train	64 (91.9)	-	2 (9.1)	5 (33.3)
Millers	Training to improving quality, meet market demand-grades and standards	Available	11 (15.8)	14 (93.3)	-	4 (25)

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Millers	Credit availability and access	Available	19 (27.5)	-	1 (6.7)	-
Millers		Not available	51 (72.5)	15 (100)	14 (93.3)	15 (100)
Millers		Accessible	17 (23.7)	-	1 (6.7)	-
Millers		Not accessible	53 (76.3)	15 (100)	14 (93.3)	15 (100)
Parboilers	Standard Product	Availability of a standard product	100	60	33.3	100
Parboilers	Source of information on grades and standard	Source available	75.3	846	85.7	0
Parboilers		Sources not available	24.7	15.4	14.3	100
Parboilers	Criteria buyers used	Quality	76.9	100	100	100
Parboilers		Cost	23.1	0	0	0
Parboilers	Important aspects of quality	Grain lustre (brightness)	2.5	35.7	0	0
Parboilers		Grain Colour	2.5	14.3	0	0
Parboilers		Long unbroken grains	1.3	0	0	0
Parboilers		Dryness and colour of grains	93.8	50	100	100
Parboilers						
Traders	Standard product	Exist	84 (84.0)	13 (86.67)	8 (53.33)	6 (40.0)
Traders		Not exists	16 (16.0)	2 (13.33)	7 (46.67)	9 (60.0)
Traders	Training on quality improvements	Training available	15 (15.0)	1 (6.67)	-	-
Traders		Training not available	61 (61.0)	14 (93.33)	15 (100)	15 (100)
Traders	Training on quality improvements	Received	4 (4.00)	-	-	-
Traders		Not received	96 (96.0)	15 (100)	15 (100)	15 (100)
Traders	Reasons for trading the commodity	Availability of the commodity	5 (5.0)	-	-	3 (20.0)
Traders		Trader produce the commodity	5 (5.0)	3 (20.0)	-	-
Traders		Trading the commodity is profitable	68 (68.0)	12 (80.0)	14 (93.33)	10 (66.67)
Traders		Inherited the trade	8 (8.0)	-	-	-
Traders		Demand for the commodity	13 (13.0)	-	-	2 (13.33)
Traders						
OVI: 03-1.3	Increase efficiency in the production and marketing of selected commodities by improved market linkages and lower transaction costs					
Millers	Fees charged per 100kg bag for milling	Average at Peak Period	NGN100 (44.8)	NGN100 (100)	NGN225 (33.3)	NGN70 (40)
Millers		Average off Peak Period	NGN100 (50)	NGN100 (100)	NGN200 (60)	NGN70 (45.5)
Millers	Variation in Price for different quality of service	Variation exist	12 (16.7)	-	3 (23.1)	15 (100)
Millers		No Variation	58 (83.3)	15 (100)	12 (76.9)	-
Traders	Challenges with regard to transport or transaction costs	There are challenges	84 (84.0)	14 (93.33)	10 (66.67)	11 (73.33)
Traders		No challenges	16 (16.0)	1 (6.67)	5 (33.33)	4 (26.67)
Traders	Areas of high costs in transport and transaction	Handling	13 (13.0)	-	-	-
Traders		Fuel (Transport)	33 (33.0)	14 (93.33)	-	-
Traders		Transportation facilities	10 (10.0)	-	9 (60)	-
Traders	Other costs encountered in marketing	Taxes	94 (94.0)	14 (93.33)	15 (100)	15 (100)
Traders		Association fees	6 (6.0)	1 (6.67)	-	-
Traders						

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
OVI: 03-1.4	Increase efficiency in the production and marketing of selected commodities by increased private sector investment					
Farmer	Credit availability and access	Available	51(20.4)	30(60%)	19(38%)	12(24%)
Farmer		Not available	199(79.6%)	20(40%)	31(62%)	38(76%)
Farmer		Accessible	28(11.2%)	14(28%)	15(30%)	25(50%)
Farmer		Not accessible	222(88.8%)	36(72)	35(70%)	25(50%)
Farmer	Costs and conditions	Repayment after harvest (informal)	76(30.4%)	14(28%)	-	2(4%)
Farmer		Collateral and	28(11.2%)	-	15(30%)	18(36%)
Farmer		Repayment after one year with 8% interest rate(formal)				
Farmer	Major changes observed in the commodity chain	High yielding varieties	125(50%)	37(74%)	38(76%)	23(46%)
Farmer		Increase in production leading to higher volume of paddy supply in markets.	157(62.8%)	12(24%)	22(44%)	21(42%)
Farmer		Increase in number of buyers(positive)	87(34.8%)	10(20%)	20(40%)	30(60%)
Farmer		Increase in value of local rice i.e. higher price(Positive)	187(74.8%)	12(24%)	14(26%)	16(32%)
Farmer		Increase in demand at market level. (positive)	111(44.4%)	14(28%)	14(28%)	18(36%)
Farmer		Decrease in price(Negative)	68(27.2%)	21(42%)	27(54%)	21(42%)
Farmer		Increase in costs of production(negative)	223(89.2%)	47(94%)	50(100%)	46(92%)
Farmer		Improvement in grain quality (positive)	88(35.2%)	15(30%)	21(42%)	27(54%)
Farmer		Higher consumption of local rice(positive)	176(70.4%)	22(44%)	22(44%)	25(50%)
Millers	Training available on improved technology from private sector	Available	25 (36.4)	-	-	-
Millers		Not available	45 (63.6)	15 (100)	15 (100)	15 (100)
Millers	Miller affordability to training	Affordable	64 (92.1)	15 (100)	-	10 (66.7)
Millers		Not affordable	6 (7.9)	-	-	5 (33.3)
Millers	Effectiveness of available training	Effective	23 (32.3)	-	-	-
Millers		Not effective	-	-	-	-
OVI: 03-2.1	Programme interventions demonstrate pro-poor outcomes through increased incomes					
Farmer	Production and sales	Average number of bags(100kg) of rice produced	98.5 bags	68.9bags	82.5 bags	103 bags
Farmer		Average Selling Price per bag	N3000 per bag	N3000 per bag	N3000 per bag	N3000 per bag
Farmer		Average quantity sold per season	77.9 bags	57.2bags	65.4 bags	90 bags
Farmer		Average consumed	13.9 bags	5.6 bags	8.9 bags	7bags
Farmer		Average quantity given out per season	6.7bags	6bags	8.2 bags	6.4bags
Farmer		Average income or revenue obtained per season	N233,700	N171,600	N196,200	N270,000
Millers	Benefits of using improved technology	Obtain higher profit	25 (35.3)	-	-	11 (75)
Millers		Do not obtain higher profit	45 (64.7)	15 (100)	-	4 (25)

Source	Questions	State					
		Kano	Jigawa	Kaduna	Katsina		
Millers	Which provide more income	Process own product	12 (17.3)	-	-	4 (27.3)	
Millers		Process for a fee	26 (37.3)	-	3 (20)	-	
Millers		Both	32 (45.3)	15 (100)	12 (80)	11 (72.7)	
Traders	Ownership of product	Trade own product	56 (56.0)	7 (46.67)	4 (26.67)	15 (100)	
Traders		Work as agent	41 (41.0)	8 (53.33)	5 (33.33)	-	
Traders		Both	3 (3.0)	-	-	-	
Traders	Quantity sold (Bag)	Min	3	30	5	-	
Traders		Max	2000	20000	135	-	
Traders		Mean	564 [491.3681]	5302.86 [5987.16631]	29.55 [37.0550]	-	
Traders	Quantity of the rice commodity consumed (Bag)	Min	1	4	1	-	
Traders		Max	50	35	10	-	
Traders		Mean	6.97 [7.91182]*	15.29 [8.91350]	3.91 [2.94803]	-	
Traders	Quantity given out as gift (Bag)	Min	0.25	1	1	-	
Traders		Max	80	20	6	-	
Traders		Mean	6.36 [7.91182]*	7.36 [5.13850]	2.63 [2.13391]	-	
Traders	Change in income obtained from rice trading over the years	Decreased	9 (9.0)	1 (6.67)	2 ((13.33)	13 (86.67)	
Traders		Increased	52 (52)	14 (93.33)	13 (86.67)	2 (13.33)	
Traders							
OVI: 03-2.2	Programme interventions demonstrate pro-poor outcomes through increased employment						
Millers	Number of household members engaged in processing employe	Number of Male:					
Millers		1	-	-	7 (44.4)	-	
Millers		2	25 (35.6)	-	-	-	
Millers		3	-	-	-	3 (22.2)	
Millers		4	-	9 (57.1)	-	-	
Millers		Number of female					
Millers		1	28 (40)	-	-	4(28.6)	
Millers		Number of household members engaged in other employment	Number of Male:				
Millers			1	13 (18.5)	5 (33.3)	-	-
Millers			2	13 (18.5)	5 (33.3)	15 (100)	15 (100)
Millers	3		-	-33.3	-	-	
Millers	Number of female						
Millers	2	26 (37.5)	10 (66.7)	-	-		

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
OVI: 03-2.3	Programme interventions demonstrate pro-poor outcomes through access to the market					
Farmer	Market functioning and reasons	Functioning well:	202(80.8%)	48(96%)	39(78%)	45(90%)
Farmer		Increase in demand for local rice				
Farmer		Availability of land and water for cultivation from project				
Farmer		Availability of improved varieties				
Farmer						
Farmer		Not functioning well:	48(9.6%)	2(4%)	11(22%)	5(10%)
Farmer		Increase in production level leading to glut				
Farmer		Poor product prices in markets				
Farmer		Unethical conduct of traders and other middlemen				
Farmer		Small profit margin due to high costs of production.				
Farmer		Poor access road to markets				
Farmer	Market structure	Favorable	147(58.8)	43(86%)	17(34%)	26(52%)
Farmer		Not favorable	103(41.2)	7(14%)	33(66%)	24(48%)
Millers	Major changes observed in the commodity chain	Higher commodity price	43 (60.9)	12 (80)	-	-
Millers		Increased profit	-	-	-	-
Millers		High cost of diesel	27 (20.3)	-	8 (53.3)	12 (80)
Traders	Market functioning	Functioning well	80 (80.0)	13 (86.67)	13 (86.67)	3 (20.0)
Traders		Not functioning well	20 (20.0)	2 (13.33)	2 (13.33)	12 (80.0)
Traders	Reasons related to market functioning well	Increase income	27 (27.0)	8 (53.33)	6 (40.0)	-
Traders		Consumer satisfaction	5 (5.0)	-	-	-
Traders		Improve quality	27 (27.0)	-	-	-
Traders		Others	41 (41.0)	7 (46.67)	9 (60.0)	-
Traders	Market structure	Favorable	79 (79.0)	10 (66.67)	12 (80.0)	3 (20.0)
Traders		Not favorable	21 (21.0)	5 (33.33)	3 (20.0)	12 (80.0)
Traders	Who determine entry	Entry is free	47 (47)	14 (93.33)	12 (80.0)	11 (73.33)
Traders		Traders Association	53 (53.0)	1 (6.67)	3 (20.0)	4 (26.67)
Traders	Major Constrains or barriers to market entry	Capital	49 (49.0)	12 (80.0)	3 (20.0)	10 (66.67)
Traders	Credit availability and access	Available	7 (7.0)	13 (86.67)	9 (60.0)	10 (66.67)
Traders		Accessible				
Traders		Not accessible	99 (99.0)	15 (100)	15 (100)	15 (100)
Traders		Affordable	-	-	-	-
Traders		Not affordable	100 (100)	15 (100)	15 (100)	15 (100)
Traders	Availability of Transport	Available	92 (92.0)	14 (93.33)	11 (73.33)	12 (80.0)
Traders		Not available	8 (8.0)	1 (6.67)	4 (26.67)	3 (20.0)

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Traders	Type of transport available	Haulage	6 (6.0)	-	2 (13.33)	9 (60.0)
Traders		Bus	30 (30.0)	-	1 (6.67)	3 (20.0)
Traders		Motorcycle	7 (7.0)	-	-	-
Traders		Wheel barrow	11 (11.0)	-	-	-
Traders		Truck	3 (3.0)	-	-	-
Traders		Pick-up van	34 (34.0)	14 (93.33)	1 (6.67)	-
Traders		Tractor	1 (1.0)	-	-	-
Traders	Ownership of transport	Commercial	51 (51.0)	14 (93.33)	11 (73.33)	9 (60.0)
Traders		Privately own	41 (41.)	1 (6.67)	4 (26.67)	5 (33.33)
Traders	Availability of other cheaper means of transport	Available	11 (11.0)	4 (26.67)	5 (33.33)	-
Traders		Not available	89 (89)	11 (73.33)	10 (66.67)	15 (100)
OVI: 03-2.4	Programme interventions demonstrate pro-poor outcomes through increased market-based choice					
Millers	Use of Polisher by millers	Use polisher	7 (9.4)	-	-	11 (73.3)
Millers		Do not use polisher	63 (90.6)	-	-	4 (26.7)
Millers	Availability of improved technology	Available	16 (22.7)	-	15 (100)	4 (25)
Millers		Not available	54 (77.3)	15 (100)	-	11 (75)
Millers	Willingness to invest in new technology if credit is obtained	Willing to invest	68 (96.8)	7 (44.4)	15 (100)	10 (66.7)
Millers		Not willing to invest	2 (3.2)	8 (55.6)	-	5 (33.3)
Traders	Factors which influences people choice for the commodity	Quality	87 (87.0)	14 (93.33)	14 (93.33)	15 (100)
Traders		Price	(13 (13.0)	1 (6.67)	1 (6.67)	-
Traders	Marketing higher quality Product	Important	93 (93.0)	14 (93.33)	13 (86.67)	15 (100)
Traders		Not important	-	-	-	-
Traders	Places to buy commodity	Have a number of places to buy	93 (93.0)	12 (80.0)	11 (73.33)	12 (80.0)
Traders		Do not have a number of places to buy	7 (7.0)	3 (20.0)	4 (26.67)	3 (20.0)
Traders	From whom the commodity is bought	From own production	15 (15.0)	-	-	-
Traders		Farmers	25 (25.0)	3 (20.0)	13 (86.67)	6 (40.0)
Traders		Millers	14 (14.0)	-	-	-
Traders		Co-traders	46 (46.0)	12 (80.0)	2 (13.33)	9 (60.0)
Traders	To whom the commodity is sold	Any interested buyer	19 (19.0)	3 (20.0)	-	1 (6.67)
Traders		Consumers	58 (58.0)	12 (80.0)	14 (93.33)	14 (93.33)
Traders		Co-traders	6 (6.0)	-	-	-
Traders		Processor	7 (7.0)	-	1 (6.67)	-
Traders		Retailer	7 (7.0)	-	-	-
Traders		Wholesaler	3 (3.0)	-	-	-
OVI: 03-2.5	Pro-poor action include consideration of gender, conflict, HIV/AIDS and environment					
Farmer	Land conflict	Experienced conflict	93(37.2%)	12(24%)	1(2%)	1(2%)

Source	Questions	State			
		Kano	Jigawa	Kaduna	Katsina
Farmer	Not experienced	157(62.8%)	38(76%)	49(98%)	49(98%)

Source	Questions	State				
		Kano	Jigawa	Kaduna	Katsina	
Farmer	Nature of conflict on land	Land encroachment	5(2%)	5(10%)	-	-
Farmer		Conflict with pastoralists	105(42%)	5(10%)	1(2%)	-
Farmer		Fragmentation due to increase in population	12(4.8 %)	-	-	-
Farmer		Double allocation of land by project official	-	2(4%)	-	-
Farmer		Trespassing	27(10.8%)	-	-	-
Farmer		High rent price	-	-	-	1(2%)
Farmer		Salinity	16(6.4%)	-	-	-
Farmer	Conflict on other resources(water resources in the river and field)	Experienced conflict	44(17.6%)	16(32%)	-	-
Farmer		Not experienced conflict	206(82.4%)	34(68%)	50(100%)	50(100%)
Farmer	HIV/AIDS issue	Serious issue	16(6.4%)	7(14%)	-	12(24%)
Farmer		Not serious	234(93.6%)	43(86%)	50(100%)	38(76%)
Farmer	Effects of HIV	Death	10(4%)	3(6%)	-	-
Farmer		Chronic illness	6(2.4%)	2(4%)	-	-
Farmer		Threat on labour availability	6(2.4%)	2(4%)	-	-
Farmer		Household income	4(1.6%)	-	-	-
Farmer		No effect	9(3.6%)	-	-	-
Farmer	Mitigation measures on HIV/AIDS	Nothing is being done	1	1(2%)	-	-
Farmer		Use of drugs	8(3.2%)	3(6%)	-	9(18%)
Farmer		Awareness through public lectures and radio programme	7(2.8%)	4(8%)	20(40%)	3(6%)
Farmer		Religious preaching against indiscriminate sexual	17(6.8%)	2(4%)	2(4%)	5(10%)
Farmer	Soil fertility status	Fertility getting worse	112(56%)	17(39.5%)	20(41.7%)	35(70%)
Farmer		Fertility getting better	88(44%)	26(60.5%)	28(41.7%)	15(30%)
Farmer	Factors responsible for declining soil fertility	Continuous cropping	112(44.8%)	22(44%)	6(12%)	8(16%)
Farmer		Lack of application of enough farm yard manure	0(32%)	18(36%)	20(40%)	23(46%)
Farmer		Soil erosion	20(8%)	2(4%)	21(42%)	24(48%)
Farmer		Improper use of chemical fertilizers	98(39.2%)	30(60%)	25(50%)	27(54%)
Farmer	Access to fuel wood	Easily accessible	61(24.4%)	28(56%)	17(34%)	22(44%)
Farmer		Not easily accessible	189(75.6%)	22(44%)	33(66%)	28(56%)
Farmer	Women involvement in business and conflict with spouse	Conflict occur	36(14.4%)	8(16%)	16(32%)	12(24%)
Farmer		No conflict	214(85.6%)	42(84%)	34(68%)	38(76%)
Millers	Communal conflict on land resources	Experienced conflict	44 (63)	-	-	-
Millers		Did not experienced conflict	26 (37)	15 (100)	-	15 (100)
Millers	Communal conflict over other resources	Experienced conflict	33 (47.6)	-	-	-
Millers		Did not experienced conflict	-	15 (100)	-	-
Millers	HIV/AIDS Issue	HIV/AIDS is serious issue	34 (48)	-	-	-
Millers		HIV/AIDS not a serious issue	36 (52)	15 (100)	15 (100)	15 (100)
Millers	Soil fertility issue	Soil fertility getting better	36 (51.4)	1 (7.1)	-	2 (11.1)
Millers		Soil fertility getting worse	34 (48.6)	14 (92.9)	15 (100)	13 (88.9)
Millers	Factors affecting soil fertility	Fertilizer	47 (66.7)	-	15 (100)	8 (53.3)
Millers		Flood/soil erosion	-	12 (80)	-	5 (33.3)
Millers	Access to fuel wood	Accessible	-	-	-	-
Millers		Not accessible	-	-	-	-
Millers	Conflict with spouse due to involvement in parboiling business	Experienced conflict	5 (7.7)	-	15 (100)	-
Millers		Did not Experience conflict	65 (92.3)	15 (100)	-	15 (100)

Source	Questions		State			
			Kano	Jigawa	Kaduna	Katsina
Traders	Land conflict	Experienced conflict	15 (15.0)	13 (86.67)	12 (80.0)	3 (20.0)
Traders		Not experienced	42 (42.0)	2 (13.33)	3 (20.0)	12 (80.0)
Traders	Conflict on other resources	Experienced conflict	9 (9.0)	-	-	-
Traders		Not experienced	91 (91)	15 (100)	15 (100)	15 (100)
Traders	HIV/AIDS	Serious issue	2 (2.0)	-	-	-
Traders		Not serious	89 (89.0)	14 (93.33)	12 (80.0)	12 (80.0)
Traders	Soil fertility status	Fertility getting worse	31 (31.0)	6 (40%)	11 (73.33)	12 (80.0)
Traders		Fertility getting better	9	9 (60%)	4 (26.67)	3 (20.0)
Traders	Access to fuel wood	Easily accessible	3 (3%)	4 (26.67)	-	6 (40.0)
Traders		Not easily accessible	97 (97%)	11 (73.33)	-	9 (60.0)
Traders	Women involvement in business and conflict with spouse	Conflict occur	12 (12)	1 (6.67)	-	-
Traders		No conflict	88 (88)	14 (93.33)	15 (100)	15 (100)