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AFD AGENCE FRANÇAISE DE DÉVELOPPEMENT

IN-DEPTH VALUE CHAIN ANALYSIS OF KEY AGRICULTURE CHAINS IN JERE, MONGUNO, KUKAWA AND KAGA LOCAL GOVERNEMNT AREAS, BORNO STATE, NORTH EAST NIGERIA

CONDUCTED BY:

McAkins Consulting Limited RC: 1013970

ABUJA, NIGERIA
FEBRUARY 2020

ACTION AGAINST HUNGER · care · Groupe URD · Search for Common Ground · NEEM FOUNDATION

ACKNOWLEDGEMENT

This study was funded by the European Union (EU) and Agence Française de developpement (AFD). We acknowledge the contribution of the stakeholders from Borno State as well as experts from Federal Ministries and NGOs for the validation of the profile content.

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ACRONYMS

ABP	Anchored Borrower Programme
AEZ	Agro Ecological Zone
BCA	Benefit-Cost Analysis
BOSADP	Borno State Agricultural Development Programme
CBN	Central Bank of Nigeria
FAO	Food and Agricultural Organization of the United Nations
FAOSTAT	Food and Agricultural Organization Corporate Statistical Database
GAP	Good Agricultural Practises
GDP	Gross Domestic Product
ILRI	International Livestock Research Institute
IPM	Integrated Pest Management
LGA	Local Government Area
NBS	National Bureau of Statistics
NERICA	New Rice for Africa
NIRSAL	Nigeria Incentive-Based Risk-Sharing System for Agricultural Lending
NURTW	National Union of Road Transport Workers
SME	Small and Medium Scale Enterprise
SPSS	Statistical Package for the Social Science
SWOT	Strength, Weakness, Opportunity, Threat
VC	Value Chain
WFP	World Food Programme

EXECUTIVE SUMMARY

An in-depth value chain analysis of Ten (10) pre-selected values in four (Jere, Kukawa, Monguno and Kaga) Local Government Areas (LGAs) of Borno states was conducted. The study was aimed at producing a clear recommendation for enhancement and value chain recovery plan for these LGAs in Borno State.

The methodology used in this study combined both the qualitative and quantitative strength of baseline data gathering with the high-level precision data collection from both focus group discussion (FGD) and Key Informant Interview (KII). A total number of Four hundred and ten (410) respondents were captured in the individual survey across ten (10) value chains in four selected LGAs of Borno state. For Key Informant Interview (KII), forty respondents were interviewed base on their level of activities and involvement in each of the value chain. Focus group discussions (FGD) were conducted to gather data on actor group perspectives of the value chain. All data gathered were subjected to different analysis using the SPSS application software. These analyses include commodity process flow analysis, constraint analysis, SWOT analysis, profitability and gross margin analysis.

It was discovered, after the analysis, that all the selected commodities are very vital in boosting the economy of the Borno state viz-a-viz job creation and empowerment of women and youths in skills acquisition However, some specific value chain crops have been carefully selected and prioritized based on the following criteria namely; mandatory value chain, high economic impact value chain, private sector appeal, empowerment and employment creation, and feasibility of the value chain. In addition, BCA was used to corroborate those criteria in order to identify these VCs. Maize, rice, onion, cowpea and millet were identified as priority value chain crops in the study areas.

The study tried to compare the state of agricultural economy of these four selected LGAs in Borno state ten years pre and post insurgence. Analysis showed there is a huge gap created in the agriculture value chain of these four LGAs which increase the number of poor people and the food supply chain actors in these areas as a result of the insurgency.

It is recommended that alleviating the affected actors who are suffering presently is key to strengthening the value chain, which all of the respondents are major stakeholders. This can be achieved by enhancing the food chain through value creation and ensuring needs are met at the appropriate time. The following interventions have been developed into actionable plan that can be adopted in the study areas. These actions are:

1. Strengthening the Priority Value Chains through Technology
2. Institutional Support for Agricultural Extension Services
3. Value Chain Financing of Critical Actors in form of credit facility and Grant
4. Human Capacity Development in Key Priority Value Chains
5. Strengthening Farmers' Groups and Community Engagement

INTRODUCTION

The insurgency in North eastern region of Nigeria which has lasted close to 10 years (2009 till date) has resulted in one of the most severe humanitarian crises in the world today with over 1.8 million people been displaced (human right watch, 2020). The consequences of this have resulted into widespread loss of livelihoods, and difficulty for farmers to effectively produce crops. This is further compounded with restrictions on movement and transportation of goods; affecting economic activities of major stakeholders along the agricultural value chain.

The challenges ravaging the North eastern region are multifaceted and intricately interwoven; this includes political instability, socio-economic, climate changes effect on the ecological biodiversity.

As part of a wider attempt aimed at rebuilding and enhancing economic recovery of the communities, institutions and individuals affected through support to agricultural value chains. EU and AFD sponsored Project RESILAC - Economic and Socially Inclusive Recovery in the Lake Chad Region is implementing resilience activities aimed at improving means of livelihood and social inclusion across the affected region in Nigeria, Cameroon, Chad, and Niger.

In line with her broader objective, RESILAC country team along with her implementation partner in Nigeria (Action Against Hunger), put forward a project aimed at carrying out an in depth analysis of the main agricultural value chains pre-identified in Jere, Monguno Kukawa and Kaga LGAs with the purpose of producing clear recommendations for enhancement in those areas and Borno State more broadly.

Objectives of the Study

The broader objective of the study was to propose and recommend viable options support program to enhance key value chains in the 4 selected LGAs, based on the analysis of current trends, processes and actors.

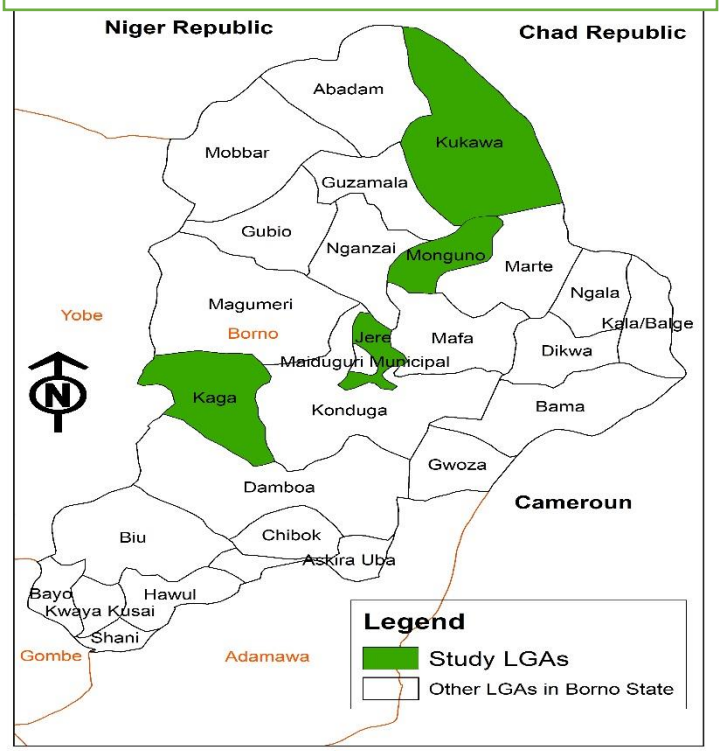
Other specific objective includes:

1. To produce a full mapping of pre-selected value chains showing the present state as well as the previous state before the crises (10 year ago). With details of the actors, quantity flow between actors, sources of inputs, summarized production systems and geo-referencing of their locations.
2. To conduct a SWOT Analysis of major actors along the value chains.
3. To conduct a detail market assessment for the pre-selected commodities, including an analysis of current market trends (demand and supply), price-scheduling mechanisms, market determinant factors, supply chains and government market regulatory and control mechanisms
4. To identify priority value chain which could be supported by the project; with detail analysis with respects to the competitiveness, business models adopted, opportunities it presents to promote small enterprises for each pre-selected value chains. Developed into a value chain recovery and enhancement plan for the preselected commodities (in collaboration with the Action Against Hunger team).

METHODOLOGY

For this study, an in-depth value chain analysis of ten (10) selected agro-commodities in four (Jere, Kukawa, Monguno and Kaga) Local Government Areas (LGAs) of Borno states was conducted. These agro-commodities were maize, millet, rice, cowpea, sheep, goat, fish, tomato, onion and chili pepper.The study was aimed at producing a clear recommendation for enhancement and value chain recovery plan for these LGAs in Borno State. To achieve this, we employed a participative approach to stimulate a self-reflection by key value chain actors.

Figure 1: Map of Study Borno State showing the Study Areas



The methodology used in this study combined both the qualitative and quantitative strength of baseline data gathering with the high-level precision data collection from both focus group discussion (FGD) and Key Informant Interview (KII). A total number of four hundred and ten (410) respondents were captured in the baseline survey across the ten (10) value chains in four selected LGAs of Borno state. In Jere; 44input suppliers, 46 farmers, 56 traders,30 processors: in Monguno;70 input suppliers,43farmers, 39 traders, 34 processors: and in Kukawa; 6 input suppliers, 24 farmers, 12 traders, 6 processors were interviewed.

For Key Informant Interview (KII), forty respondents were interviewed base on their level of activities and involvement in each of the value chain. 29 KIIs in Jere, 6 KIIs in Monguno, 4 KIIs in Kukawa and 1 KII in Kaga. Also, focus group discussions (FGD) were conducted in Jere (2) and Monguno (1) to gather data on actor group perspectives of the value chain and only 3 FGDs were conducted. All data gathered were subjected to different analysis using the SPSS application software. These analyses include Value chain analysis; constraint analysis, SWOT analysis, profitability, benefit-cost ratio and gross margin analysis.

Furthermore, we used appropriate mix of open and closed ended questions; generated data collection using semi- structured question techniques to gain more insights into the underlying challenges (qualitative research) upon which we developed sample techniques to be employed for this study. This we did in collaboration with RESILAC Team.

In furtherance to these methods, we adopted the following procedural steps accordingly to achieve the stated objectives of the study:

1. Induction and planning meeting with the RESILAC team.
2. Literature review, expanding on an already preselected body of essential readings,
3. internally produced as well as external.
4. Validation of the pre-selected value chains based on the initial findings from the
5. "Sustainable Agriculture" study, previously conducted.
6. Sampling of key informants and survey respondents
7. Carried out field exercise, to generate data collection (Qualitative data) for analysis using unstructured/semi-structured question techniques including:

a) Focus groups discussions (FGDs),
b) Individual interviews
c) Key Informants Interviews (KIIs)

d) Direct observation.

6. Conducted final selection of priority value chain based on initial findings for in depth investigation;
7. Conducted a comprehensive analysis using data and information collected during the study.
8. Developed an internal dissemination of draft report, to include recommendations, a suggested list of equipment and materials and other relevant attached documents
9. Discussion of the findings with RESILAC technical team
10. Re-elaboration of report on the basis of the received feedback / comments
11. Developed training material based on key findings and Power point presentation for dissemination to a wider audience
12. Internal dissemination of final report and annexes, including all received feedback / comments
13. Subject the findings to external validation and dissemination of the results (Dissemination workshop to be held in Maiduguri in collaboration with AAH team).
14. Conduct a Training of Trainers (ToT) for key stakeholders of Action Against Hunger Team and external stakeholders on the use of findings.
15. Validation / dissemination workshops in Maiduguri.

Limitations of the Study:

In the course of conducting this study, there were some constraints and limitations experienced which are highlighted below:

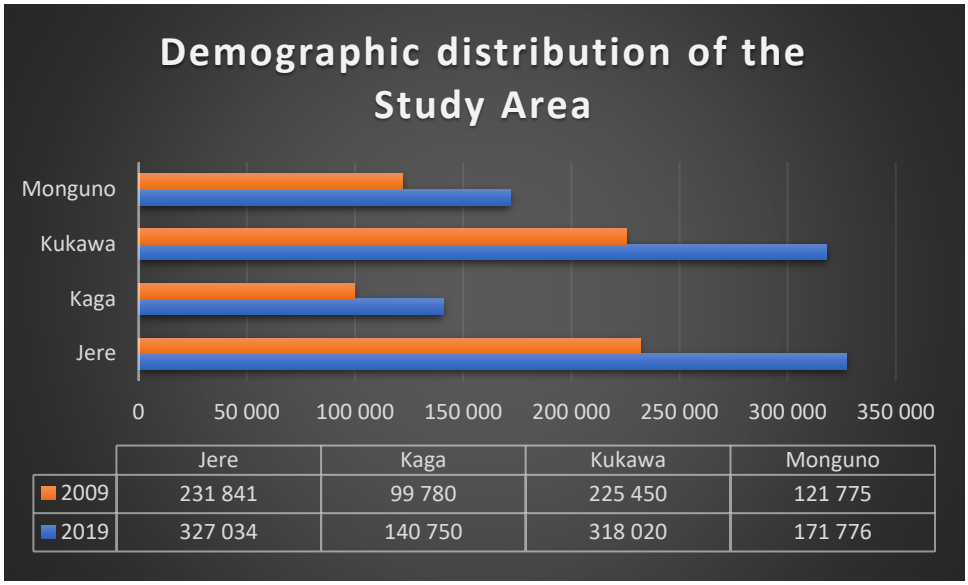
- Insufficient respondents: the research team constantly struggled with getting enough number of demographic groups to conduct our data collection.
- Language barriers: there were about 2 main languages (Kanuri and Hausa) spoken throughout the study area and some of the local enumerators were not native speaker and didn't comprehend some of these languages. These constitute language barrier and transcription difficulties.
- Majority of the respondents were unable to give accurate information of events 10 years ago due to the trauma experienced.
- For the Kukawa respondents, all of them were in IDP camp at Teachers village and were not actively engaged in any farming activities or other activities on the value chain.
- Prices vary significantly throughout the seasons for obvious reasons (harvesting period, production, climate amongst others); the prices adopted in this study signify the prices from a specific time period (between the 17th December 2019 and the 15th January 2020) and are susceptible to change. Nonetheless, they provide a clear understanding of how the value is distributed between the actors of the different chains.
- Absence of record of activities and financial record were major challenges of calculating production cost in the study areas.
- Lack of standardized land measurement was also a challenge as many farmers could not give exact land size rather rough estimation was provided.
- Production or economic activities were on hold for respondents in Kukawa due to displacement caused by insurgency, thus, they were no information about current activities.
- For Kaga LG, only one key informant was provided, Mr. Makinta Modu (Agricultural extension supervisor, who was interviewed remotely and no survey was carried out.

- Data collection was carried out during the dry season farming between 18th – 23rd December, 2019 and 6th – 15th January, 2020. Thus, the prices provided in the study as current market prices are only restricted for that period or farming season.
- Also, only 1 FGD as against 2 was conducted in Monguno due to security threat and restriction of movement between 8th – 15th January, 2020 (date of visit to the study area).
- Farm input and Output of produce were measured in sachets, *mudu*, tin, litres, bags, and baskets which had various weight and was unknown to the respondents. Thus, estimated weight was adopted from secondary data available either from the study area or Borno State of similar value chain.
- Also, it was difficult to determine the land size for cultivating of each commodity selected as a result of mixed cropping practices adopted in the study areas. Also. Population sample of crops planted are unknown as no record was kept.
- Inappropriate respondents and information: Underaged and IDPs were supplied to the consultants, this slows down the study as the need constantly arise to verify the authenticity of the information they were given.

GENERAL FINDINGS

The study areas which consist of 4 local government (Jere, Kukawa, Monguno, Kaga) with a population estimate of 957,579 (2019) and a combine hectarage of about 622,920 hectares croplands. About 80% of the population depend on agriculture and its related activities.

Figure 2: Showing Demographic distribution of the Study Area



	Jere	Kaga	Kukawa	Monguno
2009	231 841	99 780	225 450	121 775
2019	327 034	140 750	318 020	171 776

Source: Estimate figures from Nigeria Bureau of statistics; with annual population growth of 3.5%

All the farmers under the study area are small scale farmers cultivating on average 2.09 hectares of land, cultivating more than one crops year in year out. Livestock production within the study area is majorly practiced as a part time production i.e. carried out along with crop production or backyard farming on a small scale with heard size usually less than 10. The average age of the farmers considered under this study is 48with an average 23 years of experience in various farming across the value chain considered.

Production

Farming production for the period before the insurgency for all the value chain was largely financed from personal savings and from family and friends only few farmers (15.9%) raise funds from money lenders and cooperatives. Borrowing only short-term loans to boost production activities and input supply in the value chain. In most cases, the loan does not require collateral; an average of N119,818.2 (€300) mostly from family and friends were borrowed with 80% indicating for the purpose of supporting farming operations (land preparation) with a grace period mostly between 4 – 6 months. Farmers on average across all value chain cultivate 2.09 hectares of land.

A fair number of the farmers (60.82%) within the study area have access to tractor to carry out land preparation such as ploughing and weeding.

About 40% of the farmers practice irrigation farming; crops mostly cultivated under irrigation in order of importance include Onion, chili pepper, maize and cowpea (60%, 8.97%, 7.69% and 5.13% respectively).

Farming activities for all the value chain except artisanal fishing have since resumed in some parts of the local government considered for this exercise, however some areas are still limited to save corridors within which farming operations can be carried out due to security concerns from the insurgencies. This has reduced productivity of the farmers who now cultivate on average 0.9302 hectares of land along all value chain considered compared to 2.09 hectares previously cultivated. Also cultivating on average 0.6 hectares on irrigation (dry season farming).

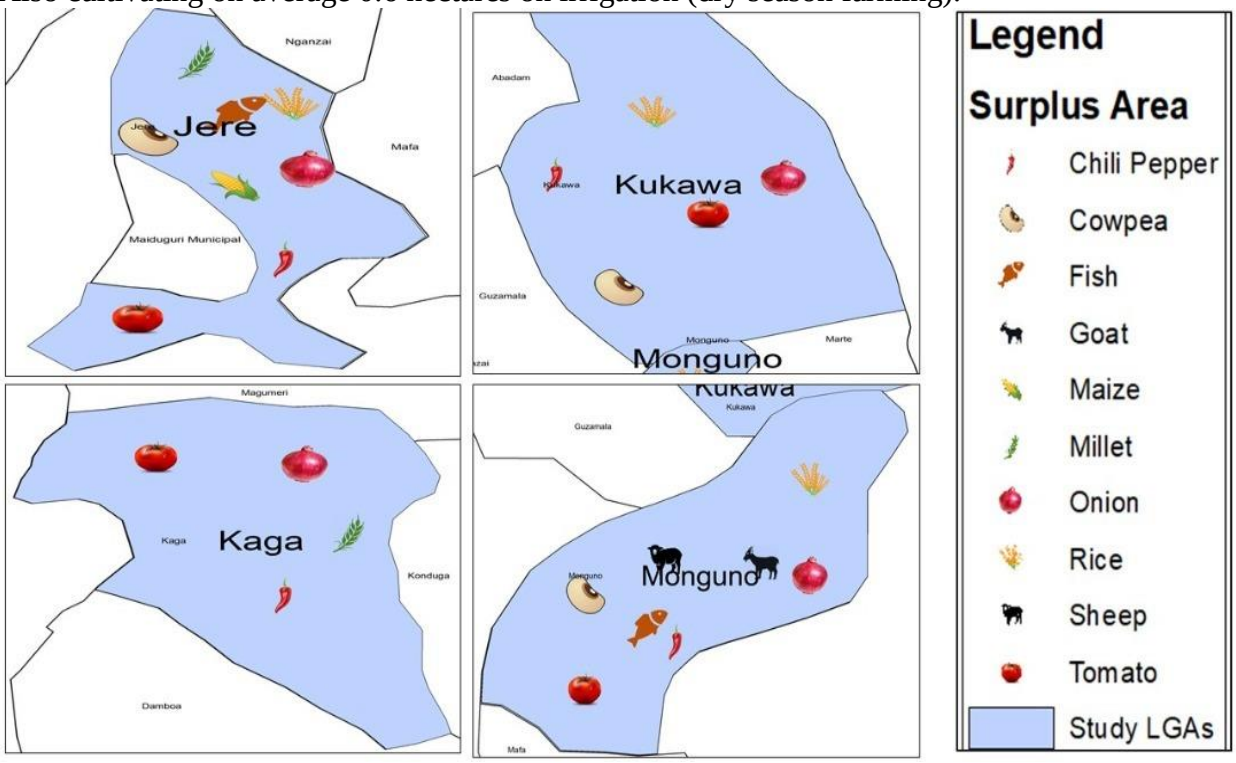


Figure 3: Commodities Surplus Areas in the Study Area

Although irrigation farming has reduced drastically especially in Kukawa where farmers only planted once (0% irrigation) however, production of Onion, chilli pepper are still well produced under irrigation within the study area accounting for more than 80% of irrigated crops others include tomato, cowpea.

Farming operations are now been through personal funding and loans with 40% of the farmers indicating borrowing from family and friends, money lenders and cooperatives to finance farming. On average short-term loans of N 60,878.05 (€152.2) requiring no collateral mostly from family and friends, for the purpose of supporting farming operations with a grace period mostly between 3 – 6 months. 52.04 % of the farmers now find it difficult to get input supplies as against 25% before the insurgency; with some restrictions on certain fertilizers and difficulty in transportation by from main markets where they are sourced to local markets close to the farmers.

Overall crop production follows a seasonal calendar below:

Figure 4: Crops Seasonal Calendar

Crops	J	F	M	A	M	J	J	A	S	O	N	D
Maize												
Maize (second)												
Millet												
Cowpea												
Rice (Rainfed)												
Rice (Irrigated)												

Chilli pepper												
Onion												
Tomato												

Key

	Land preparation
	Planting
	Harvesting
	Growing/Weeding
⟷	Lean period

Input supplier

All the four-local government under this study areas were visited for input suppliers with 25% respondent from Jere, Kukawa (5%), Maiduguri Metropolitan Council (MMC) (10%), and Monguno (58%). The areas where the respondents were are Area market, Baga hausari, Baga market, baga motor park, Baga town lawanti, baga ward, bulamaadamu 2, Bulumkutu, cattle market, fariya, central market, gamboru, gongolong, kirbiri, London city, mile 90 village, Monguno general market, vet market area amongst others. The mean age was 40 years for the respondents and were all male, with average years of experience as 15 years and only 11.2 percent of the respondents belonged to associations such as Allai Sabo Greman Association,

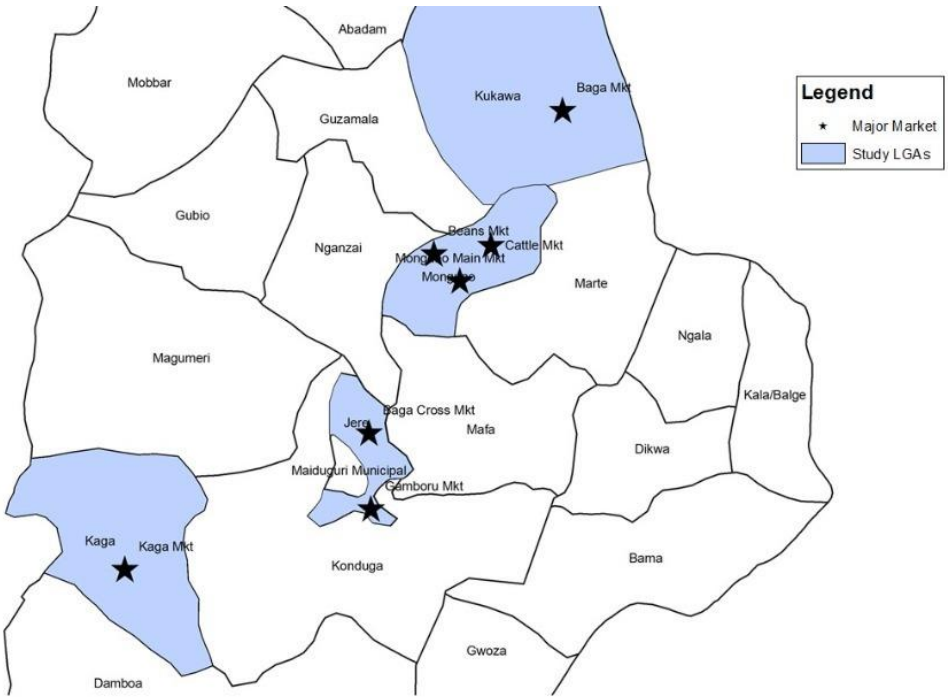


Figure 5: Major Markets in the Study Area

Bester Intl, African Agro, Jubali, Coop society, Corn Sellers Association, Dad Agro Chemical, Garba Gaidam, Jubali Association, Lake Chad Nourpass, Mobile Vet Drugs, Vet Association, and Vet Drugs Coop.

Furthermore, the inputs supplied by the respondents were

- Animal feeds

- Livestock: Poultry, cattle, sheep, goats, calf, lamb, fingerlings
- Agrochemicals: herbicides, pesticides, insecticides, fertilizers etc
- Seeds: Seeds of chili pepper, onions, Tomatoes, maize, millet and rice
- Veterinary drugs: Drugs and medication for goat, camel, dogs, fish, poultry etc

They were sourced from Maiduguri, Monguno, Chad, and Kano. Besides, they purchased their products both on cash and credit depending on situation at hand. For repayment of the credit, it was done between 1 week and 2 weeks after purchase. Also, only few (30.67%) of them were brand representatives of companies such as 50 D brand, Wacot, Jubail, 10 DF brands etc. Many (76.09%) of them sell on credit and it was repaid between 1 week and 3 months.
Capital for running business was sourced from personal savings, suppliers of stocks, friends and family, cooperative and money lenders respectively. The amount of money lent was between N12,000 (€30) to N 6,500,000 (€16,250) with no interest, except few (5%) who paid interest of not more than 10%. The purpose of the loan was to expand business operations, with payback period ranging between 1 month to 6 months, and grace period was 1 month after disbursing the money (and no collateral except trust). In addition, 58.82% indicate repayment was made in full while 41.18% had their payment done in partial and many of them expressed their willingness to borrow again for business expansion. The inputs were transported through rented vehicles from their major suppliers and were stored in rented shops by most (70%) of the respondents, while few (27.78%) owned their shops. Also, additional services were offered to farmers such as advisory, training, and consulting services most especially on how to administer the inputs. Many of the buyers are old customers and referral system was adopted for the new customers.

An important input (equipment hiring) services is provided mostly by government (about 90%) which could either be state/local government or sponsored programs /agric agencies whose operations are highly subsidized to farmers. Tractors are hired mostly on daily usage with the ability to cultivate on average 3.05 ha/day with an average daily rental of N30,000 (€75) as against the average daily rental of N14,363(€36) charged 10 years ago. Other private operators who offer similar services are very few in operations and charge as much as N50,000 (€125) for the same service. These services have drastically reduced from about 77% of the respondent indicating access to the service ten years ago to only 34%. Leaving the farmers to cultivate the land using manual labour, animal drawn implements.

In today's reality, the inputs supplied are animal feeds, calf, fingerlings, lamb, herbicides, pesticides, seeds and vet drugs, which are purchased both on cash and credit basis. However, more credit transaction is being done to purchase the products and repayment is done between 2 weeks and 2 months, and larger percent (77.7%) of the respondents supply their products on credit. Also, the means of transportation employed are rented vehicle, tricycle, and few open head trucks.
About 23.47%of all the inputs supplier under this study provided added services such as

- training and capacity building,
- feed combination advice,
- safe herbicides application,
- Seed planting amongst others.

Figure 6: Showing Seeds Availability in the Study Area

Crops	Availability of seeds	Easy availability of improved seeds	Support from the Government	Local Know how	Availability of quality pesticide	Extension services from Gov.	Support from private sector
Maize	Yes	No	No	Yes	No	No	Yes – some
Millet	Yes	No	No	Yes	Yes	No	Yes – some
Cowpea	Yes	No	No	Yes	No	No	No
Rice	Yes	No	Yes	Yes	Yes	No	Yes - some
Chili pepper	Yes	No	No	Yes	Yes	No	No
Onion	No	No	No	Yes	Yes	No	No
Tomato	Yes	No	No	Yes	Yes	No	No

> "…before the insurgency local government will supply fertilizers at the same time state government will supply at least we used to share 5 to 6 trucks which contain about 600 bags each and we also distribute two to three Thousand kg bags of seeds to be distributed to our farmers but now we cannot get it, if you cannot afford it then you will not get it, if you can afford you go and buy"
>
> ***Makinta Modu***
>
> ***Kaga Local government Agric supervisor***

Government both at the local and state level plays a major role in providing input for farmer. which include improved seeds, fertilizers and agrochemicals. This has reduced considerably over the years as the arms conflicts bites hard on the local economy.

Input suppliers depends on savings, suppliers' stock, friends and family, cooperative and money lenders as source for credits to finance their business. Grace period is 1 month after disbursement and no collateral but relying on personal trust. About 34.95 percent of the respondents kept record such as cash ledger, income and expenses record, buyers' inventory, debtors' list, cash flow, drug records among others. Also, a few (42.02%) of the respondents have account number in commercial banks such as UBA, First Bank, Access Bank and others (Eco bank, unity bank, Polaris, GTB, Skye, Union, and Fidelity

Traders

These are individuals who ensure movement of goods from the farmgate in a series of value exchange till it reaches the final consumers. They are categorized into local traders who does business within the local farming communities, wholesalers and merchant who handle higher volumes and aggregators who bulk goods for processors or larger urban markets outside Borno state. The sector is male dominant with 97% of all the 109 respondents under this study been male with an average age of 44years and 20 years' experience in trading across all the value chain been considered. A few of the respondents belonged to associations notable among which include:

- Alhaji Mallum Ngolloma
- Baga fish trader's association

- Gamboru Market vegetable Association
- Moro pepper association

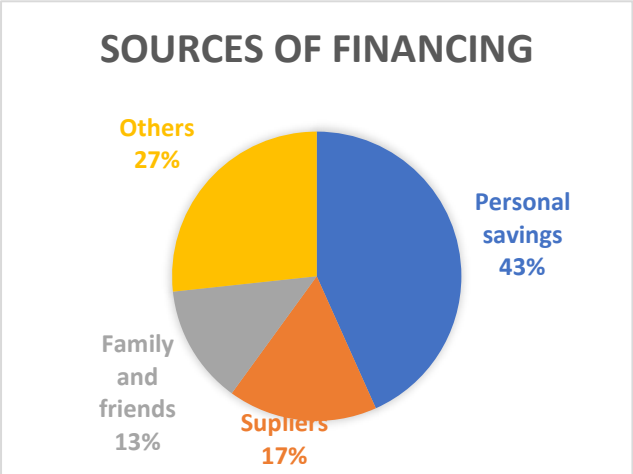
Local traders: These local traders go around the remote rural areas that are usually difficult to access and buy products from farmers directly at the farmers gate. They sell mostly within the community on markets days e.g. Sometimes the farmers double as traders when they bring their products the markets for sale e.g. beans market in Monguno, central market, kuya market among others.

Wholesalers: Wholesalers buy and sale in volumes and sell to buyers from other states and retailers in city center they usually operate stores mostly in big markets e.g. monday market in Maiduguri,Baga fish market,

Processors

Majority of the processor interviewed (52.5%) were in Jere specifically in Fariya, followed by Monguno (40%) and Kukawa (7.5%). The mean age of respondents were 44 years old and majority of them male (80%) while the female was about 20%. Also, the average year of experience was 18 years.

Figure 7: Sources of Financing



Furthermore, majority of the processors purchase their raw materials adopting cash and carry model except few who does credit and repayment was immediately after sale of their products.

The peak period for the processors were September, October, November, December and January. At this period, prices of products are relatively low due to supply. Their challenges were lack of capital, low supply of raw materials, insecurity, inadequate milling machines, and poor irrigation facility for farmers to increase productivity especially during dry season. In addition, records were not kept by them due to ignorance or low knowledge except few (3.57%) of them who kept financial record and had bank accounts with Union Bank, Zenith bank, Diamond/access bank, FCMB, First bank and UBA respectively.

Figure 8:Supply Chain of Agro-Commodities in the Study Area years

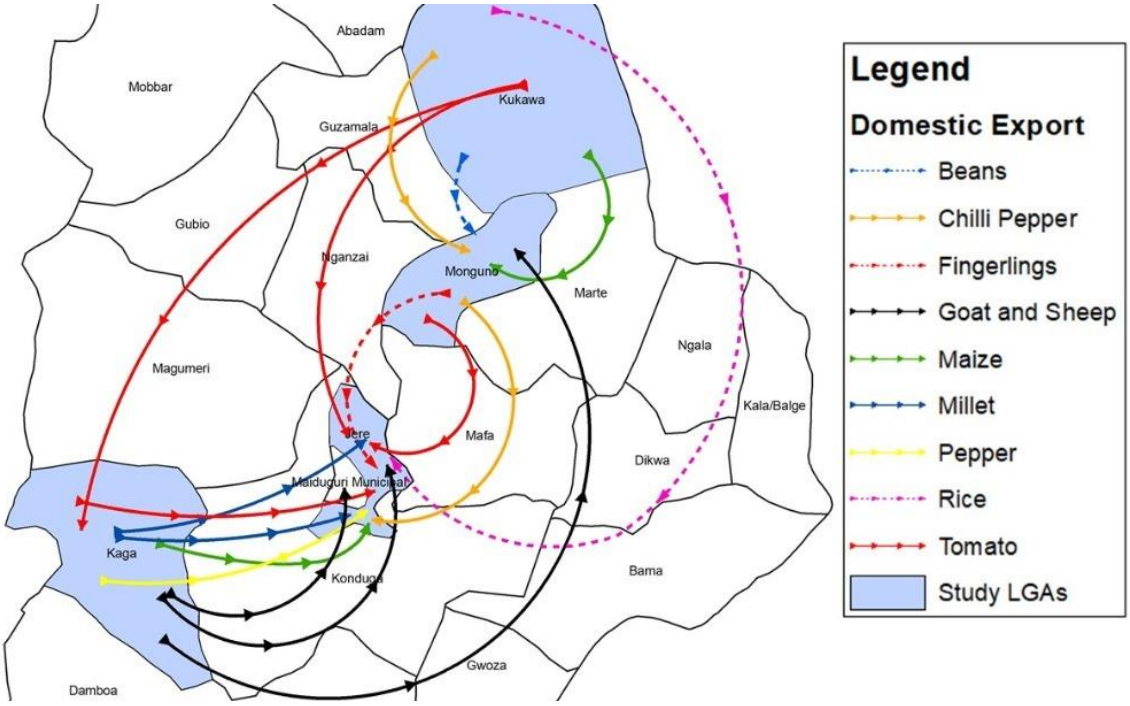
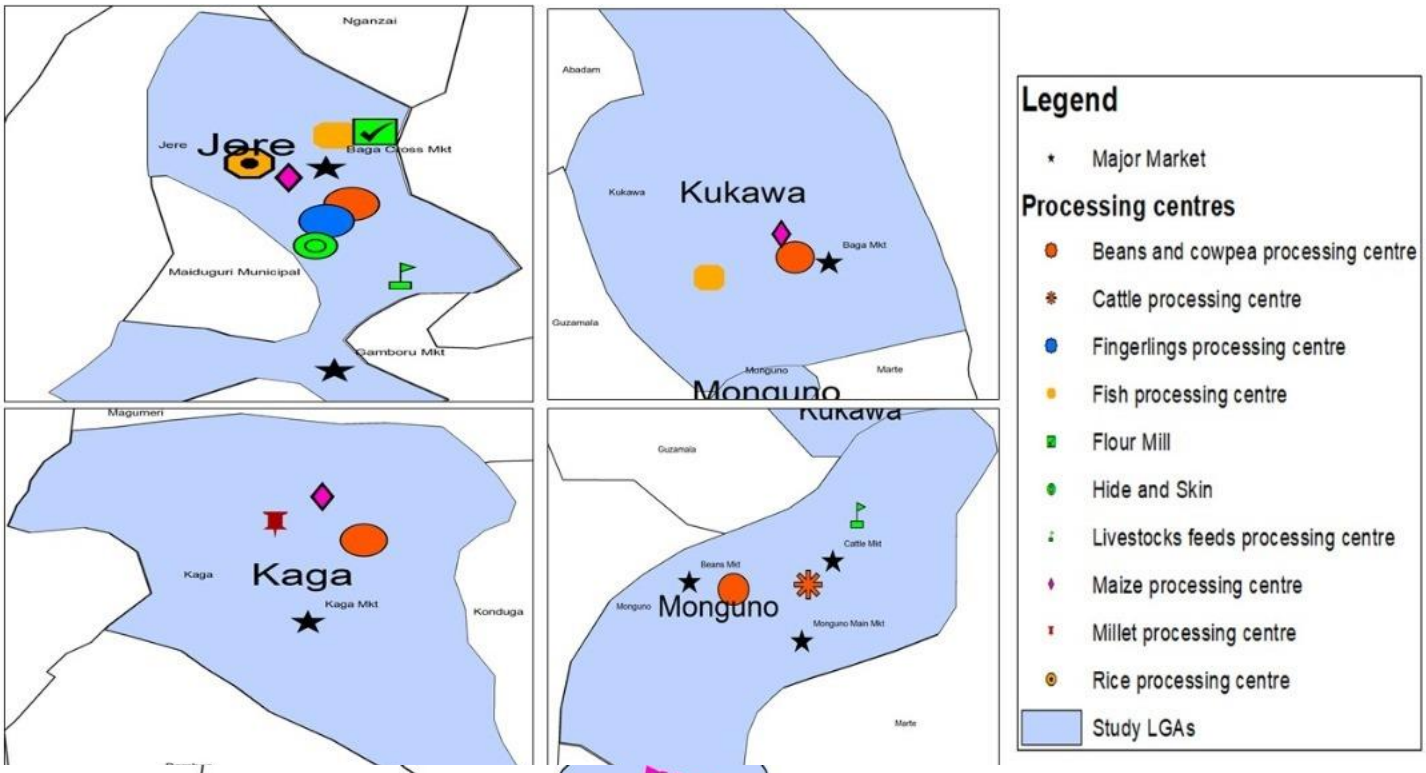
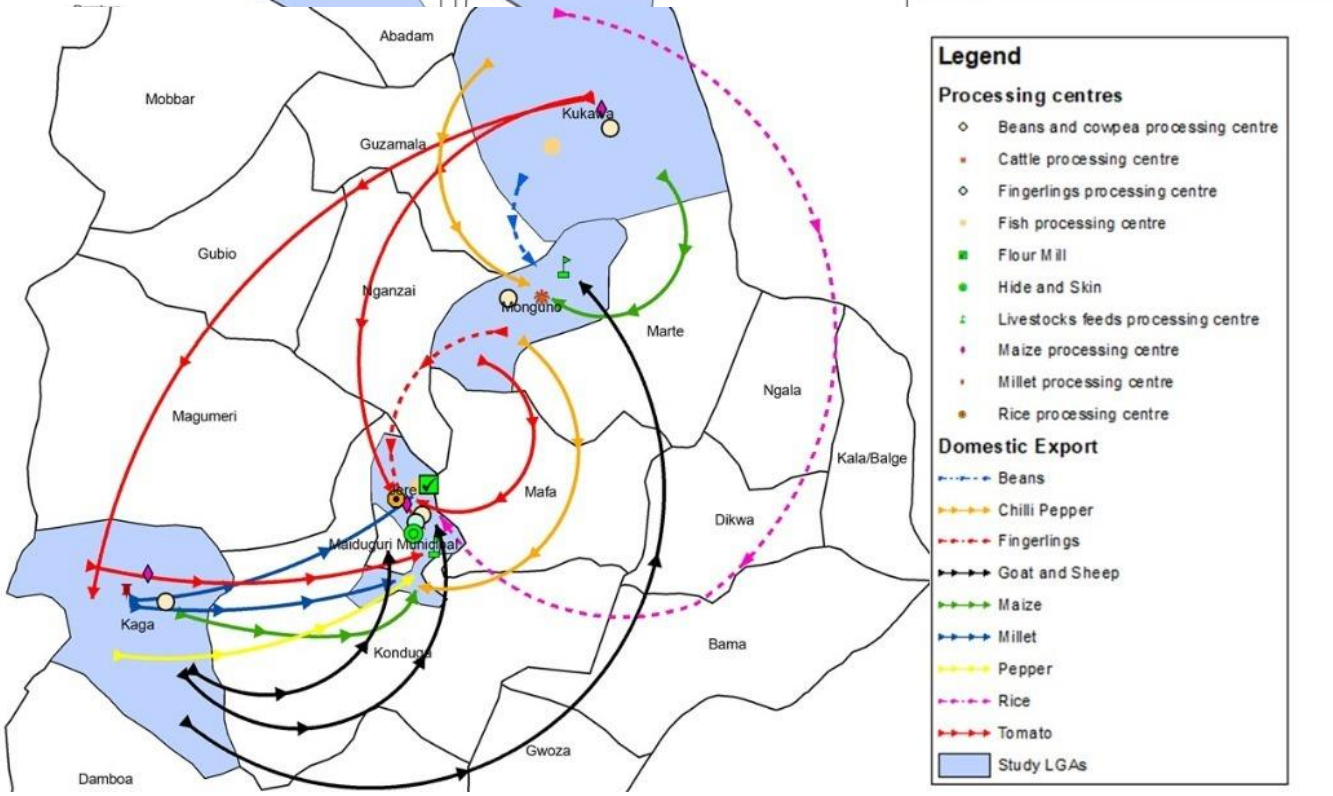


Figure 9: Distribution of Processing Centers and Flow of Commodities


Nganzai
Jere
Jere
Baga Cross Mkt
Maiduguri Municipal
Damboru Mkt
Abadam
Kukawa
Kukawa
Baga Mkt
Guzamala
Monguno
Marte
Magumeri
Kaga
Kaga
Kaga Mkt
Konduga
Kukawa
Guzamala
Cattle Mkt
Beans Mkt
Monguno
Monguno
Monguno Main Mkt
Marte
Legend
Major Market
Processing centres
Beans and cowpea processing centre
Cattle processing centre
Fingerlings processing centre
Fish processing centre
Flour Mill
Hide and Skin
Livestocks feeds processing centre
Maize processing centre
Millet processing centre
Rice processing centre
Study LGAs


Abadam
Mobbar
Kukawa
Guzamala
Gubio
Nganzai
Monguno
Marte
Ngala
Magumeri
Kala/Balge
Jere
Mafa
Dikwa
Maiduguri Municipal
Kaga
Konduga
Bama
Gwoza
Damboa
Legend
Processing centres
Beans and cowpea processing centre
Cattle processing centre
Fingerlings processing centre
Fish processing centre
Flour Mill
Hide and Skin
Livestocks feeds processing centre
Maize processing centre
Millet processing centre
Rice processing centre
Domestic Export
Beans
Chilli Pepper
Fingerlings
Goat and Sheep
Maize
Millet
Pepper
Rice
Tomato
Study LGAs

SPECIFIC VALUE CHAIN

Maize Value Chain

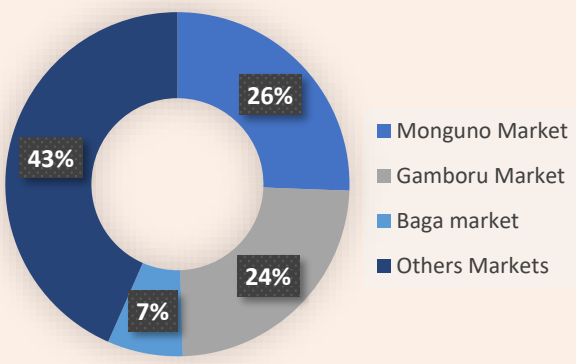
Borno state has a significant maize production sub sector, this is due to factors such as market availability, low production cost, quality and consistent production, labour availability, favourable climatic conditions and soils suitable for maize production. These factors positioned the state as one of the top 4 maize producing States (Kaduna, Jos, Niger, Taraba) account for over 40% of the total production. Borno state produces between 500,000 – 700,000 tons (NBS, 2012) of maize annually 10 years ago and with an estimated production of 45,000 - 65,000 tons presently from the study area. Maize is currently produced in Jere LG with some restrictions due to the insurgence. In the study area, intercropping is often practiced as cereals (maize and millet) and legumes (cowpea and groundnut) are often grown in annual double-cropping systems, which includes maize-cowpea, millet-maize, millet-cowpea and groundnut-maize

.Maize value chain actors

Input Suppliers and services providers

These are responsible for the supply of raw materials and services required for the Maize. Input suppliers include agrochemical dealers and retailers who are located within the local government areas and major markets around the study areas. Majority of the farmers (56.6%) within the study areas source for their inputs such as seeds, fertilizers, pesticides, herbicides from the major markets which include Monguno central market (25.6%) Gamboru market (23.9%), and Baga market (7.1%) Others include: Muna market, Konduga market, Kukawa market, motor park, muna market etc.

Figure 10: Major Souces of Input



Major inputs used include NPK fertilizers, seeds, , pesticides, and herbicides.

Most of the farmers in all the local government under this survey enjoys the support of tractor hiring services which the majority (60.82%) used for their operations such as ploughing, weeding, transportation, among others. Tractors are hired mostly on daily usage with the ability to cultivate on average 3.05 ha/day with average daily rental of N14,363 (€36) depending on the source. Majority of the respondents (80%) hiring/ day at N 20,000 (€50) and less.

Producers

Farmers within the study area presently cultivate maize on average 0.5 hectares of land produces an average of 1.8 tons of maize per annum

Local variety (Open pollinated), oba super 2, are majorly grown in the area. Majority of this seeds are obtained from previous planting season; however, some farmers buy improved maize varieties (SAMMAZ 15, SAMMAZ 16, SAMMAZ 27, Corn 5 DT, SAMMAZ 53 and SAMMAZ 54). Majority (90%) of the farmers under this study do not buy seeds but uses the open pollinated variety. While less than 10% indicate buying improved seeds at some point. However, they occasionally get improved variety through government support, which has reduced due to insurgency.

Land preparation practices usually starts after the first rain of the year; using either tractor or animal drawn plough to turn the soil. After planting, application of NPK fertilizer at 1 bag per hectare as result of high cost and non-availability due to restriction due to insurgency (this was not a problem 10 years before the insurgence). Weeding is done twice or thrice depending on the weed management adopted. Pesticides are applied based on the type of pests observed on the plants. After 3 months (depending on the variety), it is mature for harvest (October and November). However, the maize is left on the field to dry up before harvesting. After harvest, the cob is threshed, bagged for market.

The impact of the insurgency has greatly affected the cultivation of the crops in all the local government area under the study area. On average before the insurgency, each farmer cultivates on average 1.93 hectares as against the current average of 0.5 hectares.

The obvious reduction in land available for cultivation mean most farmers consume more of their products; currently, 43% of the maize output is consumed directly by the farmers household within the study as against 20% of the total output consumed before the insurgency.

The study revealed that before the insurgency, Jere local government produce more maize with 40.7% of all the respondent followed by Monguno 38.1% and Kukawa 21.2%. Majority of the farmers within the study areas(73.6%) indicate the planting month to vary between June and August. In Monguno (53.5%)they plant more in June while in Jere (47.7%) in July and Kukawa (26.1%)plant more in July

The period under consideration on the maize value chain also saw slight change on the number of production cycle in a year.

> *"As I told you, the last 10 years we transported 15 to 20 trailers which contain 30 to 35 cows every week and about 10 to 15 trailers transported maize to Maiduguri, a trailer will carry 600 bags of onions which we sell for 35 thousand Naira* (€87.5) *each and we transport about 10 to 15 trailers each week in the harvest season but now everything is gone and living in IDP because of the insurgence."*
>
> ***Usman abba, Secretary, Farmers Association in Kukawa***

Majority of the farmers planted once a year under rainfed production with no significant difference meanwhile there is a reduction in the number of farmers who planted twice a year from 14% ten years ago to 12.7%. Kukawa demonstrate significant difference in the partner of production with 7.1% of the maize farmers who indicated growing maize twice a year (Irrigation) reduced drastically to 0% while Jere had irrigation practice by farmers reduced from 6.8% to 2.7%

Traders

Traders are categorized either as wholesalers or retailers based on their customers and volume of maize handle. Farmers at times doubles as a trader when he takes his produce to the local markets for sale. Some of the farmers in study areas fall into this category. However, majority of the farmers already had customers who are majorly wholesalers in the major market such as Jere Market, Monguno central market and Kukawa where they sale their product to.

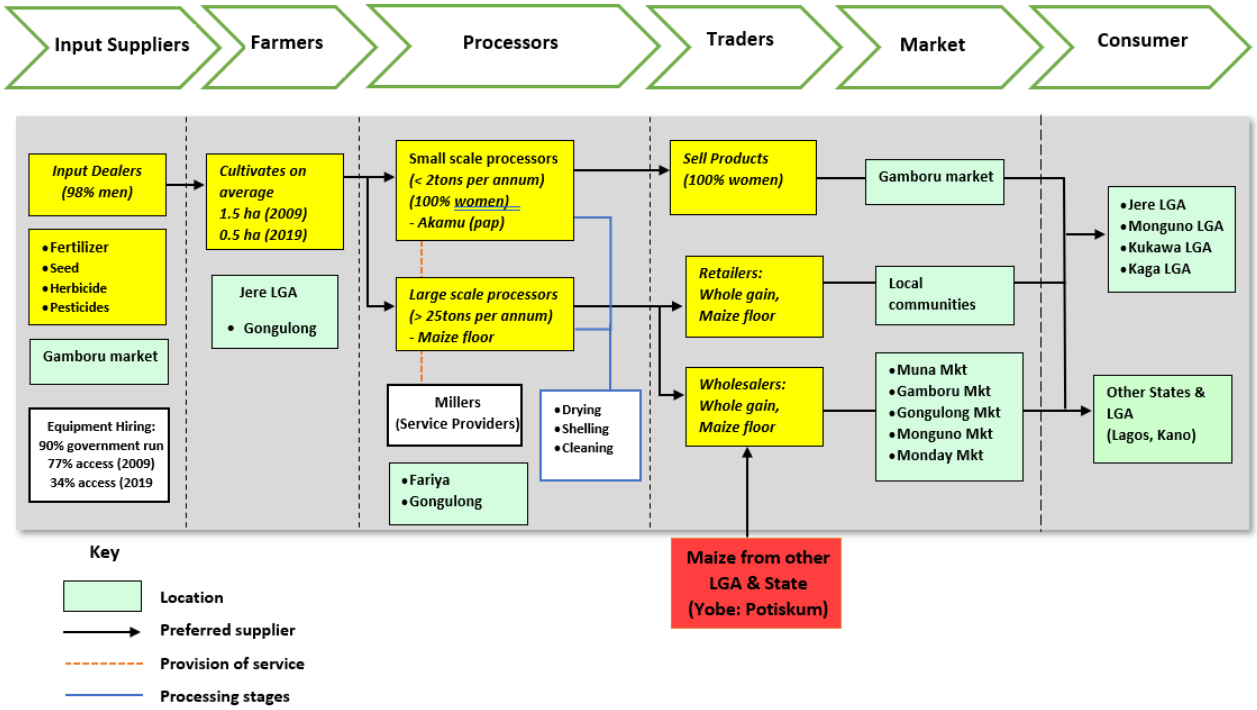
Presently, an average trader sells 2.7 tons of maize per annum and sells majorly to retailers who comes to the markets to buy; a sharp decline in trade volume of about 6.1tons annually ten years ago.

The price of maize presently ranges from N5,000 (€1.25)- N7,000 (€17.5)per bag (100 kg bags) which varies significantly based on market situation such as seasonality (dry or raining season), importation waivers given to major maize users by the government which affects local demands and price mechanisms amongst others.

Processors (Millers)

Maize is processed into different products and serve as raw materials to produce finished products such maize floor (Tuwomasara), Akamu (Pap). Small to medium scale millers (service providers) are found in rural areas or market square such as Gongulong and Gamboru markets. They receive the maize grain or fermented grain (fermented) and processed it into floor or paste form depending on the final intended use by the consumers. The processor most cases sells their products in the markets ready for final consumers in form of maize flour or Akamu (Pap). However, large scale industrial processor which operates on similar system blending maize with other ingredients to produce products such as poultry feed, baby foods etc. are not present within the study area except for Maiduguri processing company (located close to Baga road market) which process only wheat. Processors (processing maize flour) within the study area processed presently about 3.9 tons annually as against 7.6 tons ten years ago while processors who blend maize to produce Akamu (Pap) process on average an estimate of 2.5 tons annually

Maize value chain Mapping



Maize are processed into powder, paste or as ingredient for animal feed such as Poultry feed, fish feed, ruminant feed etc. Farmers either sells directly to processors (millers), which are located within the markets (Gamboru, Baga road market etc) and within the local communities (Jere), or wholesalers in (Gamboru, Baga road and Monday markets), local traders (within the villages). Local traders (retailers) in turn sells either whole grain consume within the community or maize flour after taking it to the miller for processing. Wholesalers whose stores are located within (Monday markets, Muna markets, Baga road markets, Gamboru markets) sell about 60 – 70% of their stock directly to processors and merchants who buys large quantities from these markets and transported to urban centers (Kano, Lagos). These are more preferred buyers as they guarantee higher sales volume and returns compared to local retailers. About 5% of the wholesaler process and sell maize flour to retailers and finally to consumers. Wholesalers source for their products from the study area and all over the state even as far as Potiskum, Yobe state.

Gross Margin Analysis to Value chain Actors

Producers: The production data collected shows a reflection of the varieties grown in the three-local government under this study. The average cost of producing maize were almost the same in the three-local government. This reveal that before the insurgency ten years ago, an average annual output of farmers in the study on 1.93 hectares was 5.6 tons with a total revenue of N 565,126.11(€1412.8). However, household consumption of about 31% leave a total income of N383,287.22 (€958.22) with a total expenditure of N209,240.66 (€523.1), leaving a gross margin of N 174,046.57 (€435.1). This implies that maize production was profitable. However, the impact of the insurgency on the production presently leaves the farmer with a 48% reduction in production output to 2.9 tons per annum from cultivating 0.5 hectares of land. This leaves a total expenditure of N130,485.41 (€326.2) and an income of N70,359.77 (€175.9); however, the farmer consumes about 70% of his production leaving him with a gross margin of N 60,125.64 (-€150.3)

Traders: Traders data within the study areas shows that traders on the average sells over 300 bags of maize annually ten years ago with a total annual revenue of N790,000 (€1975) and a total expense of N686,500 (€1716.25) leaving a gross margin of 6% N103,500 (€258.8)). The trading volume has reduced to an average of 251 bags with a total revenue of N2,007,000 (€5,017.4) and a total expenditure of N 2,016,850 (€5,042.1) with a gross margin of 10% N9,850 (€24.6). Inflation rate is negligible over the period considered for this study, 10 years. In 2009 inflation rate was 11.54% while the inflation rate 2019 at 12.32%

Processors (Millers): Processors presently records on average a total revenue of N236,416.67 (€591.04) and a total expense of N240,317 (€600.8) leaving a negative margin of (€9.8) Operating at a loss as a result of several constrains such as restriction on the cultivation of maize in Monguno and Kukawa area, increased in household consumption of about 40% of other processed product.

Constraints to Maize Value chain

Production Constraints

As pointed out in the value chain analysis, the major constraint to maize production within the study area include the following:

- **Availability of Land:** As indicated by the farmers, insurgency and the level of security has impacted on the availability of farmland for their operations. 20.8% of the farmers in Kukawa indicated not having access to land, In some cases, especially in remote areas of the communities, farmers are yet to return to their ancestral home living in IDP camps with limited areas of land available for maize production.
- **Restriction on maize planting**: Due to the persistent security challenge, government place certain restrictions on crop production to enhance security measures put in place. This affected maize production in remote areas far from the town e.g remote farmlands in Kukawa, and Monguno **Inadequate water and irrigation facilities:** Inadequate water supply especially in Monguno, where water is a scarce "commodity" for crop farmers. This has discouraged most farmers from practicing dry season irrigation farming
- **Difficulty in getting quality seed:** 80% of the farmers reported to using seeds from previous seasons production which has been an age long practice. This affected the yield performance of the crop. Although, some producers indicated they got seeds occasionally when shared by ADPs or government intervention programs
- **Lack of machinery and equipment:** About 70% of the tractor hiring services in the study areas is been carried out by the government or government related institutions. This a critical service which helps in land preparation and cultivation, which has drastically reduced due to the security situations in the area.

> *"…. ten years ago, we use to plant maize and millet but now we can only plant onions and tomato. (The security agencies have instructed that any plant that grows to a certain height should not be planted)"*

Trading/Marketing Constraints

- Reduction in supply: One of the major constraints to trading of maize in the study area is the reduction in the supply end of the value chain. Traders both at the wholesale level and retailer level could not source for adequate product for the market.
- Insecurity along the road networks: Merchant and aggregators, who usually patronize major markets from other states such as Monguno central market, Gamboru Market,

Muna market, Baga market etc., have deserted the markets due to incessant attacks and loss of goods. This is attributed to the activities of the insurgency along the road.

- High cost of transportation as a result of few transporters operating along the roads

Processing Constraints

- Inadequate processing facilities (milling machine)
- Lack of finance to expand processing
- Lack of Improved packaging knowledge and materials of products

Input supplying Constraints

- Result from the research indicate that presently 52.04% of the farmers find it difficult to get required input supplies. This is partly due to restrictions on certain input such as nitrogen fertilizers due to security concerns by the government.
- Price fluctuation of input supply due to different market situations and government policy restricting importation and distribution of urea fertilizers. Also, difficulties in transporting goods to the area which attracts more prices than what is usually obtainable under normal conditions.

SWOT ANALYSIS OF THE MAIZE VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Producer	• Availability of vast arable area of land and climatic conditions suitable to produce maize • The number of years of experience in cultivating maize is considerably high • Availability of manpower	• Reduced cultivated land • Lack of capital • Inadequate water supply especially in Monguno, where water is a scarce "commodity" for crop farmers. • Poor quality seed • Low knowledge on good agricultural practices leading to low yield.	•A huge increasing domestic demand occasioned by Nigeria's population of over 200 million people is the greatest opportunity for the farmers •Provide a good opportunity for recovery from the impact of insurgency - Job creation for the youths	• Limited access to farmland for production activities • Insecurity • Price fluctuations occasioned by inconsistent government policy on importation of maize • Urea fertilizers had been banned and the cost of NPK is very high and inaccessible. • Climate change
Traders	• The number of years of experience in trading is considerably high	• Low supply of farm produce from the farmers. • Lack of capital	•Job creation for youths (men and women) •Availability of trucks and trailers in large numbers for transportation of goods. •Availability of labor •Availability of suitable climate for production •Expected recovery in the global economy •Favourable government policies for agribusinesses in Nigeria	•Price fluctuation •Insecurity •Poor road infrastructure
Processor	• Availability of abundant raw materials within the state • Access to raw materials along the trans-sahara transit route across three countries such as Lake chad • Vast area of land for production of raw materials	•Low supply of raw materials due to insurgency and restriction on goods movement •Inadequate processing equipment	• Ability to expand processing industries e.g. Poultry feed production • Improved productivity through using modern processing and packaging of products (e.g. maize flour production)	•Weak domestic policies and institutions to support processing activities. •Inadequate funding

Input suppliers	• The number of years of experience in supplying inputs is considerably high. • Input suppliers are strategically situated in the markets to enable easy access all through the year.	• Low technical know-how of the sellers.	•Presence of big market in the farming community •The Agrarian community has the potential to expansion her production and invariably will need more supply of inputs	•Price fluctuation of inputs supplied as a result of changes in market situations •Insecurity in the study areas which restricted distributions of products to major towns and city. •Poor road infrastructure connecting towns which increase costs of doing business in the study areas.

Millet Value Chain

Nigeria is one of the leading producers of millet in the world currently produce about1.3 million tons. Nigeria has a local consumption of about 2000 metric tons with an average annual consumption of 1868.8 metric tons over the past decade (2019 USDA)[i]. A national average yield of 440kg per hectare. It is one of the most reliable crops grown under short duration rainfall semiarid climatic conditions of Bornu state. According to FAO, Borno state produced 217,795 tons of millet in 2011. It is estimated that the study area has the capacity to produce over 60,000 tons of millet annually but presently production is limited to Jere local government estimated at about 11,000 tons per annum

Value Chain Actors

Input suppliers

Basic inputs and actors involve in provide materials such as improved Millet seeds (Pearl), fertilizers, Plant protection products (insecticides, herbicides etc.), Equipment hiring services for land preparation. About 90% of the input suppliers are not involve in selling of seeds as majority of the farmers rely on using seeds derived from previous planting. However, improved seeds are normally given as incentives by government or aid organizations to the farmers. Major suppliers of input within the study areas are located as in major markets as shown below:

Figure 11: Table Showing Input Suppliers across the Study Area

Jere LGA	Kukawa LGA	Mungun LGA	Others
Gamboru market	Kukawa market	Munguno central market	Muna garage market
Gongulong	Baga market		Konduga market

Hiring of tractors for land preparation follow the same pattern with maize value chain as the crops are planted simultaneously.

Producers

Millet is widely cultivated and consumed as a staple food and fodder across the study areas considered for this value chain. Majority of the farmers indicating the crop along with other crops as the choice crop for planting. It is usually intercropped with cowpea, maize, sorghum etc. Farmers within the study areas grow majorly Pearl millet varieties and the seeds were obtained from the previous planting season. It's usually planted once a year between May and November.

Farmers within the study area presently cultivate millet on average 0.95 hectares of land produces an average of 0.99 tons of millet per annum. Local variety such as Pearl millet are majorly grown in the area. Majority of this seeds are obtained from previous planting season. The impact of the insurgency has greatly affected the cultivation of the crops in all the local government area under the study area. On average before the insurgency, each farmer cultivates on average 2.09 hectares as against the current average of 0.95 hectares.

Farmers usually produce about 2.2 tons of millet annually raking an average revenue of N 724,589.2 (€1,811.5). This has drastically reduced to an average of 0.99 tons with an annual revenue of N 72,952.18 (€182.4).
Majority of the farmers within the study areas indicate the planting month to vary between July and August and harvest in November- December. The partner of millet production for the period under consideration has been affected in certain areas with majority of the farmers still planting once a year under rainfed production. However, Kukawa demonstrate significant difference in the partner of production with 7.1% of the millet farmers who indicated growing millet twice a year (Irrigation) reduced drastically to 0% while Jere had irrigation practice by farmers reduced from 6.8% to 2.7% except Monguno where farmers experience increase in irrigation activity by 4%
The reduction in land available for cultivation as well change in production pattern has seriously affected the farmers output and revenue among other limiting factors

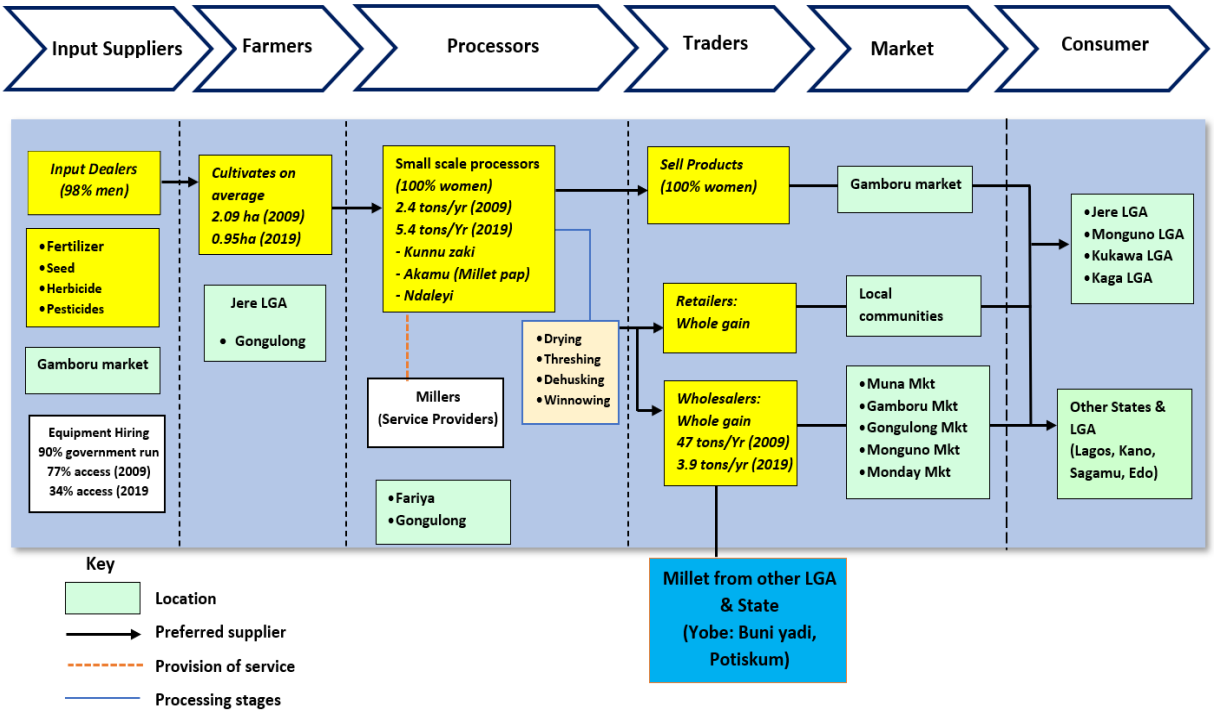
Traders

Millet is traded virtually in all major markets within the three local government where this study was conducted. The actors involve include local traders, retailers, aggregators, major dealers (wholesalers). They al source millet through various methods directly or indirectly from the farmers. Traders of millet either at the local level or wholesalers have been grossly affected by the reduced supply from the producers due to insurgency. On average traders within the study area sells about 47 tons the product per annum ten years ago, this has since reduced to about 3.9 tons per annum. During the study, one of the dealers in Muna market said due to insufficient supply from the farms, the traders bring products from Damaturu, Potiskum, Buni yadi or Ganjarma. These also had impact on interstate trading of millet; Before the insurgency, the traders from the muna market for example enjoy sending products to Lagos (Agege, Ikorodu, Mile 12) Shagamu, Edo state and other southern cities in tune of with at least a truck moving every day to those locations but due to heighten security especially along the road with the risk of the goods been confiscated by the insurgency along the road, this has drastically reduce to about one week. Millet is presently sold for N 8,000 (€20)per bag

Processors

Millet is processed into various products locally for consumption such as Ndaleyi, Kunnuzaki (Millet drink), Akamu (millet pap). It is also used in the manufacturing of animal feed such as poultry feed etc. Processors usually buys products either directly from the farmers or from the open market. The products undergo several processes depending on the end products in sight such as steeping and fermentation, wet milling, sieving, sun drying among others. Several additives are usually added to flavor the drinks. Majority of the processors usually required the services of a miller which are strategically located within the community or near marketplaces to mill their products before further processing into final products.
An average processor presently processes on average 2.4 tons of millet as against 5.5 tons annually been processed ten years ago.

Millet value chain Mapping



Gross Margin Analysis to Millet Value chain Actors

Producers: The production data collected shows a reflection of the variety grown (pearl millet) in the three-local government under this study. This reveal that before the insurgency ten years ago, farmers in the study makes a total revenue of N 944,532.14(€2,361.3). However, household consumption of about 22% leave a total actual income of N 724,589.29 (€1,811.5) with a total expenditure of N 234,353.81 (€585.9), leaving a gross margin of N 490,235.48 (€1,225.6). This implies that millet production was profitable. However, the impact of the insurgency on the production presently leaves the farmer with a total expenditure of N132,963.94 (€332.4) and a reduced income of N 72,952.18 (€182.4). A negative gross margin of N 60,011.77 (€150) clearly highlights the farmers problem of non-profitability of cultivating millet now. As most of the farm produce are consumed by the farmers household

Traders: Traders data within the study areas shows that, an average trader ten years ago made a revenue of N2,310,723.88 (€5,776.8) and an annual gross margin of N 563,977.73 (€1,409.9) from trading an average of 47 tons of millet annually at an average price of 50,001.52 (€125) per ton. But presently, the trading volume has reduced to an average of 3.9 tons at an average price of N8,000 (€20) per ton leaving a negative gross margin of N 99,314.29 (€248.3)

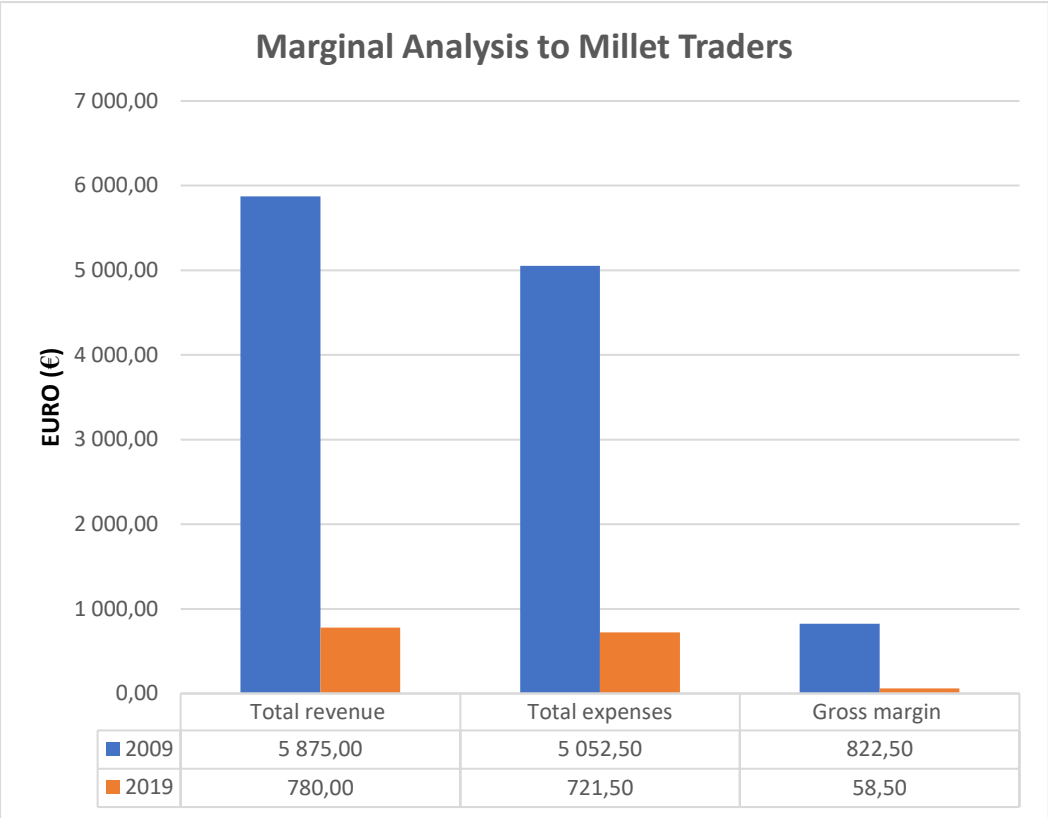


Figure 12: Gross Margin Analysis of Millet Traders

Processors: In similar pattern with maize processors, millet processors presently record on average an annual total revenue of N 230,814.29 (€577) with a total expense of N251,242.86 (€628.1) leaving a negative margin of N20,428.57 (€51.1). This was a sharp contrast to what was obtainable in terms of average annual revenue of N2,846,428.57 (€7,116.1) ten years ago.

Constraints to Millet Value chain:

Production Constraints: Millet share similar production constrains with maize value chain. Several the constrains are highlighted bellow: As pointed out in the value chain analysis, the major constraint to millet production within the study area include the following:

- **Low soil fertility:** Although millet perform better on harsh weather condition however, low soil nutrient is a major challenge affecting yield obtainable.
- **Availability of Land:** largely due to insurgency especially in Kukawa local government where about 20.8% of indicated not having access to land.
- **Restriction on millet planting**: Due to the persistent security challenge, government place certain restrictions on crop production that can affect visibility of security personnel to combat insurgency. Limiting production of millet to areas within the community excluding remote areas far from the town. This affect millet production in remote farmlands at Kukawa, and Monguno.
- **Inadequate water and irrigation facilities:** Inadequate water supply especially in Monguno both for domestic and crop production
- **Lack of machinery and equipment:** land preparation has increasingly been difficult due to reducing number of government subsidized tractor hiring services as it was

obtainable before the insecurity challenge leaving the farmers with manual processes and reduced productivity.

Trading/Marketing Constraints: Over the past decade, traders are increasingly been faced with reduction in supply of millet as a result of the challenges faced by the producers. This reduced the trade volume available for the traders who could not source for adequate millet to sell. However, some traders go to neighboring states to source for millet increasing for their local markets at a higher price. Merchant and aggregators from other states who usually patronize markets within the area under this study such as Monguno central market, Baga market, Kukawa market, Gamboru market etc has drastically reduced due to the higher prices of millet within the locality and also insecurity along the road network. Infact certain road are inaccessible due to security concerns

Processing Constraints

- Inadequate processing facilities such as thresher:
- Lack of finance to brand, better package their products
- Limited technical skill of local fabricators

.

SWOT ANALYSIS OF MILLET VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Producer	• Availability of vast arable area of land and • Millet adapt to stress which suits the prevalent semi-arid climatic conditions in the study areas • The number of years of experience in cultivating millet is considerably high • Availability of manpower	•Reduced cultivated land •Lack of capital •Inadequate water supply especially in Monguno •Low knowledge on good agricultural practices leading to low yield.	•A huge local market for milletby way of increasing Nigeria's population of over 200 million with domestic consumption of about 2000 metric tons per annum. • Provide a good opportunity for recovery from the impact of insurgency - Job creation for the youths	• Insecurity • Urea fertilizers had been banned and the cost of NPK is very high and inaccessible. • Limited access to farmland for production activities
Traders	• Ability to source for products from a wider source within and outside the areas and across the boundaries e.g Niger • Highly experience traders in the value chain with years of experience to show	•Low supply of farm produce from the producers •Lack of capital	•Opportunity to create job for youths (men and women) •Availability of manpower •The study area holds comparative advantage in trading millet (trans-Sahara trading route) with across west-central Africa.	•Prevalent Insecurity in the area •Poor road infrastructure affecting movement of goods
Processor	• Availability of abundant raw materials within the locality and across the trans-Sahara transit route	•Low supply of raw materials due to insurgency and restriction on goods movement •Inadequate processing equipment	• Ability to expand processing industries to utilize raw materials e.g. Poultry feed • Improved value addition using modern processing & packaging of products (KunuZakki)	•Weak domestic policies and institutions to support local processing activities. •Inadequate funding
Input suppliers	• Availability of producers (product users) within the catchment of operations • Businesses are strategically situated in markets places to	• Low technical know-how of the sellers.	•Farmers have the potential of increasing production of the crops. This will translate to increasing trade volume of input suppliers •Presence of big market in the farming community	• Price fluctuation of inputs supplied as a result of changes in market situations • Insecurity in the study areas which restricted

	enable easy access all through the year.			distributions of products to major towns and city. • Poor road infrastructure connecting towns which increase costs of doing business in the study areas.

RICE VALUE CHAIN

Rice is one of the staple foods in Nigeria consumed across all geo-political zones and socio-economic classes. As at 2019 Nigeria is ranked the highest rice producer in Africa after topping Egypt with a production capacity of 7.4 million metric, although not enough for the consumption estimated at 7 million metric tons. Borno state with a large land mass suitable to produce rice has the capacity to contribute to the increasing demand estimated at 2.16% annually. Rice is produced in more than 20 Local government areas in Borno state. Borno state has one of the highest per hectare yield of rice in Nigeria at an average of 3.5 ton/ha and a potential yield of 6 - 7 tons/ha. While the national average yield stands at 1.51 ton/ha (NIRSAL, 2018)

Rice value chain actors

Producers

Rice producers are well distributed within the study areas of Jere local government around communities surrounding Ngadda river which are naturally susceptible to flooding and hence suitable for rice production including areas such as Fariya, Zabarmari and Gongulog. According to FAO submission, Jere Bowl comprising of 22,000 hectares of moist land has the capacity to produce more than 30,000 tons of rice annually[ii]. However, overall production in the area fall short of this potential as farmers within the study area presently cultivates on average 0.92 hectare of land, which was a sharp decline from an average of 1.5 hectares cultivated by farmers about a decade ago. Farmers within the study areas usually plant varieties of rice which include local varieties (such as Dias, Santana, Ashawa, Yarsawaba and Yarkuwa) also known as FARO 46 (ITA 150) and enhanced varieties of traditional rice (such as NERICA) (Bayou 2009).

These varieties usually takes a period of 3-4 months from planting to maturity, with several hurdles to overcome especially the issue of bird control during flowering stage.. The crop is planted during the rainy season; thus, land preparation starts after the first rain in the year. Tractor or cow plough is used by farmers to turn the soil and cow dung could be incorporated during ploughing. Seeds are obtained from previous planting season. Seeds are broadcasted and likewise the NPK fertilizer at 1 bag per hectare. Water must be available throughout the production period and periodic weeding is done twice or thrice. Rice farmers do manual weeding as against herbicide application in order to reduce cost. Pesticides are applied based on the type of pests observed on the plants. After 3 months or more (depending on the variety), it is mature for harvest. On average each farmer produces on average 1.8 tons per annum worth N190,937.50 (€477.3) compared to the current annual production of 1.2 tons of rice value at N

> *"I have looked for a place to farm rice but I couldn't get that of onion and chi-pepper we are doing it close to the river. After we harvest it we use to sell it in gamboru market and buy maize or sorghum to eat in our homes. The farm is not big is not more than 1 plot I have looked for a bigger place but I didn't get…"*
>
> ***Alhaji Dugje***
>
> ***Farmer in Maiduguri Fariya***

241,544.23 (€603.9). The low volume produced has a downward spiral effect on the economy of other value chain actors either processors, traders, or input suppliers. Rice is grown mainly during the (April-August) rainy season harvested during the (September-January) dry season. There is usually a scarcity of rice during rainy season; and oversupply is observed in the market during the dry season as most farmers dispose of their harvests.

Processors (Millers)

Most of the farmers in the study areas doubles as the processors of their cultivated rice paddy, processing the products themselves as a cost saving method by the farmers. However, this was not the case before the insurgency as farmers engaged the services of processors some of whom are women who work as parboilers, millers and threshers for the paddy.
Processing is usually carried out using an age-long indigenous method by rice processors in Jere called "Wufatu". The method involves soaking the rice paddy for about 24 hours after which it is then parboiled, spread on trampoline to sun dried till it dries off (about 3 days). The paddy is then milled to remove the bran and husk. This method is very tedious and expensive as it consumes a lot of firewood and water during the processing. However, the new method of rice processing entails washing the paddy rice 3 times after harvest, soaked in lukewarm water for 18 hours under room temperature and steamed for thirty minutes before milling.
Business activities had been on the rise since the border closure, with increase in demand for local rice, leading to increase in prices of the product.
Also, there are local processing units in Jere local government headed by women (about 5% of all the respondent) gainfully involved in processing: threshing, parboiling, drying and milling. The parboilers wash, boil, soak, steam and dry the rice. Little or no expenses is incurred at this stage. The parboilers sell to the milling points or at market points for the millers. The millers accept supply from farmers, parboilers and traders. The millers are sited close to markets and incur cost on electricity or diesel to power their equipment. Millers sell at their location to agents.

Traders/Wholesaler

The interaction of traders with farmers is similar to that of maize value chain as they belong to the same cereal or grain family. Basically, traders bag the processed riced in 50kg sacks ready for sale. Agents source processed rice for traders based on desired volume, choice and requirements. Agents deliver procured rice to the trader. The trader offsets all costs with procurement and payment for service rendered, usually commission per tonnage.

> "…if you load a bag with the one that has good quality you can sell it at N14000 (€35), but it is the normal one you cannot say is bad they sell it at N13000 (€32.5) or N13500 (€33.75) yes. But when there were no crises is 5000 (€12.5) or 6000 (€15) but now N13, 500, $36.21 and so on."

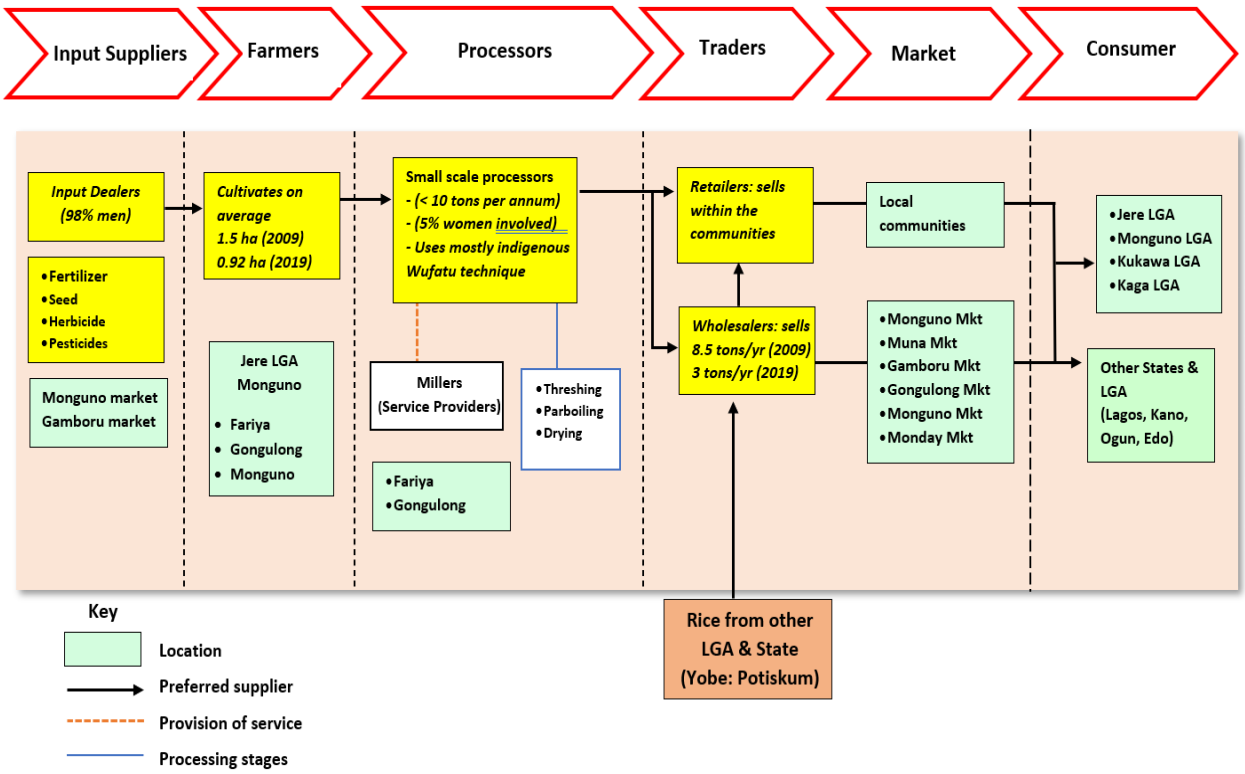
Traders from other parts of the country procure through agents stationed in the study areas, while local traders buy rice at any of the stages of production from the actors for storage. Local traders can also act as agents and buy to resell to other traders outside the state. They sell to retailers within the state as well.
The prices are determined by quality of the processing methods. Also due to the decade long arms conflict in the state affecting the supply of the products, coupled with the boarder closure,

the price has skyrocket. However, due to the high financial requirements, some of the traders could not marshal funds to transact high volume of the products. Some traders collect goods on credit especially with farmers who had built trust over a period and credit are repaid immediately after selling off the products.

Retailers

Retailers mostly are the final stage of production and sell to the final consumers. They procure from any stage of production from parboilers, millers, local traders and agents. The retailers use the popular measurement standard *'mudu'* to sell and retain a profit of between 25 (€0.06)-30 (€0.08) Naira per *mudu.*

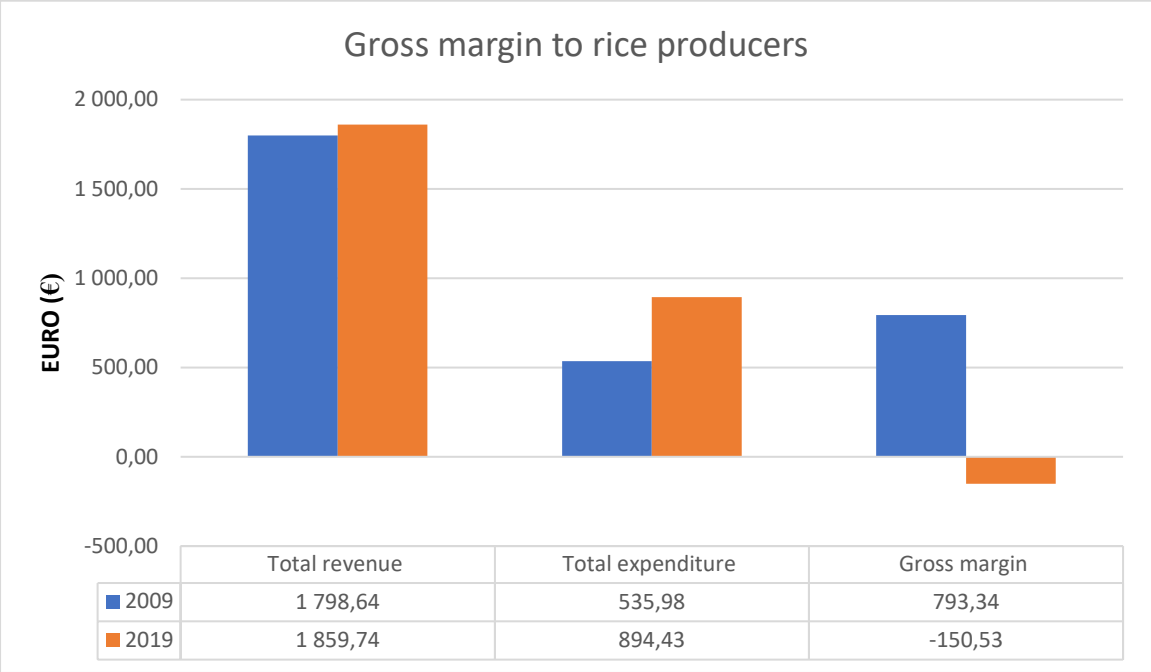
Rice value chain Mapping



Gross Margin Analysis to Rice Value chain Actors

Producers: The production data collected shows a reflection of the varieties FARO 46 (ITA 150) and NERICAcultivated in Jere and Monguno local government under this study. Ten years ago, farmers produce an average of 8 tons (159 bags)per annum at an average price of N4,524.87 (€11.3) with household consumption of 26% leaving an actual revenue of N531,727.57 (€1,329.3) and a gross margin of N317,337.35 (€793.3). Presently, production has dropped to an average of 2.7 tons (53 bags) per annum and household consumption of 60%. This leaves an actual revenue of 297,557.15 (€743.9) and total annual expenses of N357,772.22 (€894.4) at an average price of 14,000 (€35) per bag leaving a negative gross margin of N60,213.39 (€150.5)

Figure 13: Gross Margin Analysis of Rice Producers in the Study Area



Traders:

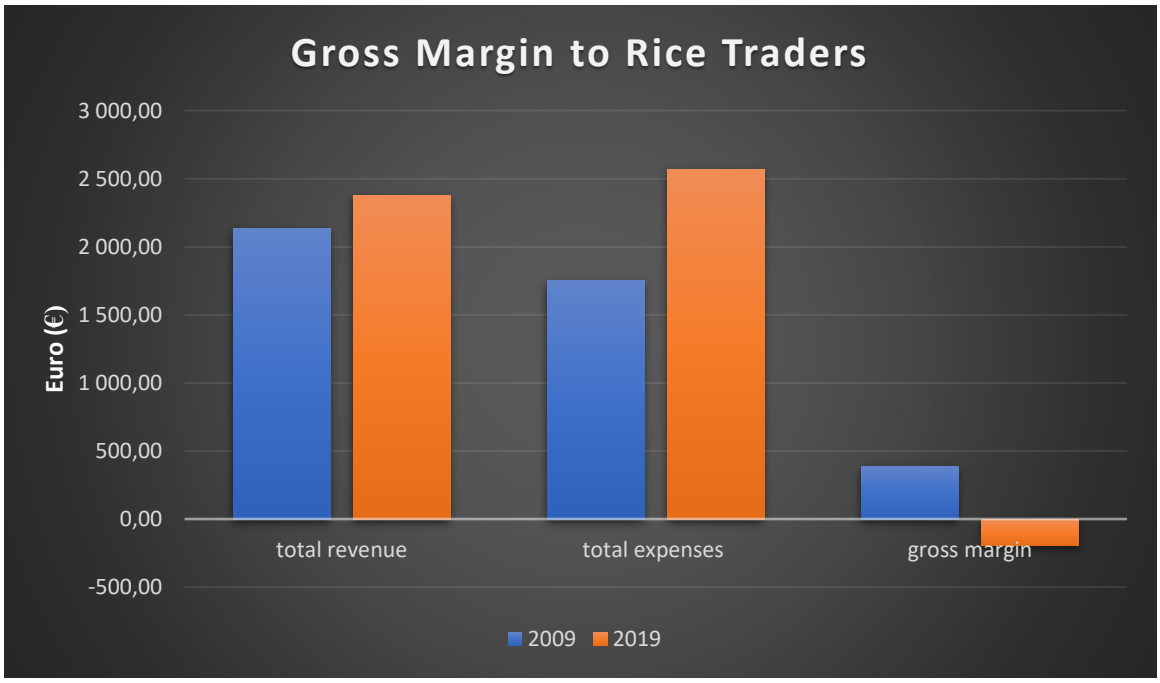


Figure 14: Gross Margin Analysis of Rice Traders in the Study Area

Processors

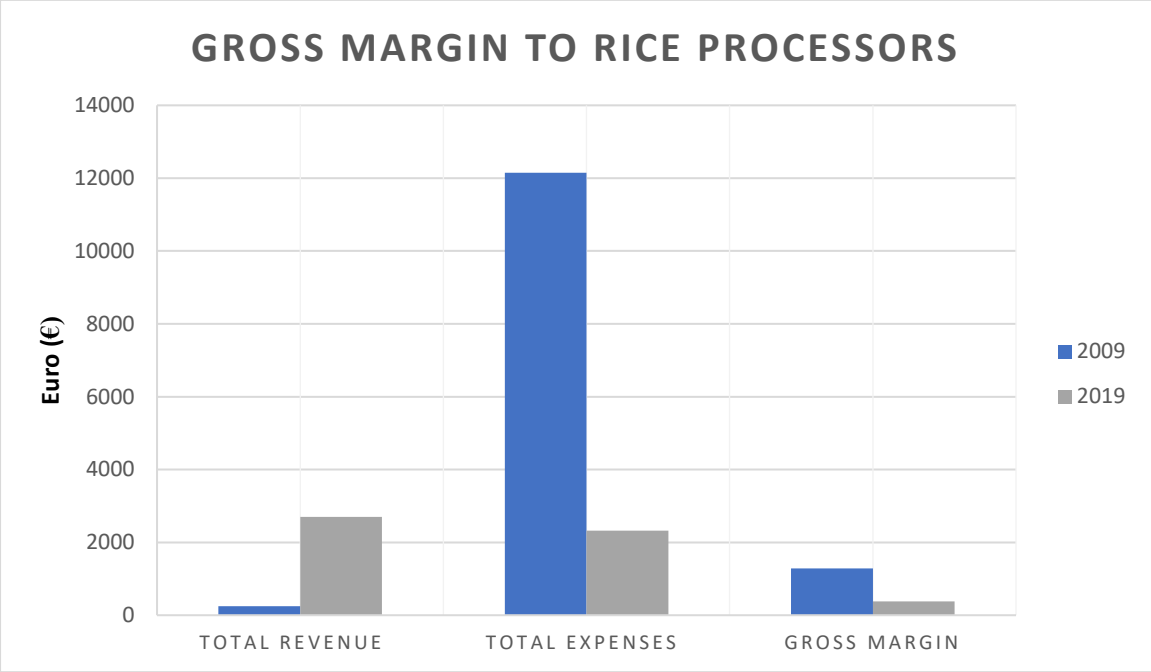


Figure 15: Gross Margin Analysis of Rice Processors in the Study Area

Constraints to Rice Value chain

Input Constraints: The major constraint with input is usually low demand for critical input such as high yielding rice seeds as majority rely on supports from government for improve seeds. Also, inadequate access to appropriate packaging materials for rice value chain actors.

Production Constraints:

- **Poor access to credit**: This is one of the major problems currently limiting production by the farmers many of whom are economically disadvantage due to decade long conflict in the region.
- **Poor quality seed:** Over the years, farmers practice replanting of local varieties seeds (old seeds) of FARO 46 (ITA 150) for several years and only get improved seeds (such as NERICA L41 and L42 for lowland and NERICA L1 and L4 for upland) through government or NGO supports programs. This has tremendously affected yield obtainable from reuse of such seeds.
- **Lack of equipment and tools:** Most of the famers cultivating rice uses manual labour for all operations of weeding, planting and harvesting which limit average area of land under cultivation. Also, due to arms conflict
- **Pests Management**: Inadequate technical knowledge on how to deal with pests for example farmers in Monguno and Jere complain about attack by birds close to harvesting period.

Trading/Marketing Constraints: Presently, due to the government policies ban on rice importation in the country and the subsequent demand for locally produced rice, traders are faced with decrease in sales volume due to non availability of smuggled rice through Chad and Cameroun which dominate customers preference. Also, increased cost of transportation added to the already high price of local rice affects the marginal profit for the traders. The high transportations cost is due to insecurity and restrictions on the road networks within the state.

Processing Constraints: Processors in Jere and Monguno mostly adopt local processing technique for their processing called “Wufatu”. This processing technique is time consuming and require more resources (firewood and water). Although, about 15% of the respondent in Jere indicate awareness of the improved processing technique courtesy FAO assisted program in the area. Old milling machine are widely in use which affects output and increase broken grains from the processing.

SWOT ANALYSIS OF RICE VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Producer	• Availability of wetland which gives the community comparative advantage for both raining season and dry season (fadama) rice production • Availability of manpower	• Lack of capital and credit facility to expand production • Inadequate water supply especially in Monguno, where water is a scarce "commodity" for rice farmers • Low level of mechanization of production activities	•Increasing local & National demand for locally processed rice due to government policy on rice importation. Domestic demand of rice estimated at 7 million metric tons. •Rice production provide a good opportunity for economic recovery from the impact of insurgency; through increased production	• Prolong insecurity situation • Climate change • Limited access to farmland for production activities
Traders	• Guaranteed market for their product • Has a good knowledge of the actors on the different stages of the chain • Has capital, although insufficient to conduct the activity They are organized and have an advocacy power to access funding from financial institutions.	• Insufficient capital to pursue business effectively	• Favourable government policies on sustained ban on rice importation • Expected growth in rice consumption and demand both locally and throughout the country • The density of the population and its high demand for locally produced and processed rice	•Insecurity affecting goods transit •Poor road infrastructure
Processor	• Availability of abundant raw materials within the area state • Standby market locally to absorb processed products	•Milling rice using old machine that produced broken and unwholesome rice •Insufficient processing equipment	• Ability to expand processing capability to key into government policies on local rice production and expanding market • Provides opportunity to empower women and youth as post conflict economic recovery strategy	•Poor processing technique and milling equipment. •Poor hygiene and non-adherence to food safety requirements

Input suppliers	• Availability of customers within the community	• Low technical know-how of the sellers on products	●Expanding activities of markets drivers such as production within the catchment area with potential to increase demand for more supply of inputs	●Insecurity limiting distributions of products ●Low level adoption on usage of improved inputs for production

Cowpea Value Chain

According to IITA, in 2017 Nigeria being the largest producer and consumer of cowpea account for 46% global production (3.4 million tons) of more than 7.4 million tons on a total of 3.7 million hectares cultivated annually[iii]. According to FAO data (2001-2010) Nigeria produces an average of 2.58 +/- 0.31 million metric tons. Nigeria's cowpea demand deficit is met by imports from neighboring countries like Niger and Burkina Faso. Due to lower rainfall and favorable soil conditions, cowpea production is concentrated in the northern states with Borno, Bauchi and Zamfara accounting for more than 50 % of the national output (N2Africa, 2015)
The bulk of the cowpea enters commercial trade from the surplus producing areas in the north to high centres of consumption in the southern urban markets through Dawanu market in Kano, the access point for legume grain flows (N2Africa, 2015). Cowpea processing is dominated by household enterprises and SMEs. In addition, formal industrial processing firms are emerging. These include Kitchen Friendly and Convenient Home Foods. The processing firms mostly produce cowpea flour for instant preparation of home foods. These include cake (akara), moi-moi, pan cake, buns, chin-chin, porridge and beans soup. The processors use dry dehulling milling and produce better quality products compared to traditional processing that uses soaking. Processors sell mostly to urban consumers through supermarkets, local stores and open-air markets.

There are no specific policies identified that are related to grain legumes as they are all inclusive within the framework of agricultural policies in the state. However, the Federal Government support many states in Nigeria with some specific policies to develop the agricultural sector. Some of the policy issues relating to Borno State include; policy on youth empowerment by Borno State government (selected youths sent to Malaysia to learn different agricultural practices and development of construction value chain for youths within Borno State) and Policy framework developed for local rice processing in southern Borno and policy on production of wheat in Lake Chad Basin (LCB). Also some of the recent policies of the FGN relating to Borno State include; NIRSAL project of CBN (Anchor Borrower Scheme), commodity zoning (Guinea corn development zoned to Borno State), and Agricultural promotion policy (APP).

Cowpea value chain actors

Producers

Cowpea is one of the major crops widely grown across the study areas considered for this value chain analysis. Majority of the farmers who planted cowpea usually intercrop it with either maize, millet or sorghum. The two major local varieties usually grown is *Kannanado white and Borno brown* with a potential average yield of 0.8 tons/ha and 0.9 tons/ha, which are usually obtained from previous planting season. It is usually planted between August – September with the addition of cow manure mixed with NPK are most times used for those who can afford it. Cowpea is largely cultivated in Monguno and Jere local government areas
However, the major issue of cowpea is pests. The most important pest attack the crop during

> *"…whenever we are planting maize, millet, sorghum we use cow dung or NPK, but urea is not available now because of the security challenge. We only applied the fertilizer once or twice depending on the size of our land. Cowpea is planted afterward when your first crops are getting matured. We ensure we weed which is done once, apply pesticides and you wait for 3 months to harvest it……. FGD at Fariya*

flowering stage and could reduce the yield by 80 percent (*Maruca testulalis).* Also, *Callosobrochus maculatus* whose effects are more pronounced during storage reduces the quality of the whole harvest. In Gongulong, different pesticides had been applied but no solution in sight yet. Presently, farmers within the study area cultivates on average 0.46 hectares of land as against the average of 1.2 hectares cultivated about a decade ago; producing about 0.5 ton of cowpea and 1 ton respectively. This reduction in quantity has strongly affected availability of the product for other value chain actors.

Due to price action especially during harvest season, about 30% of the farmers indicated storing their product immediately after harvest in the homes for a period ranging from 3 – 6 months to attract better price margin of between 30% - 40%. However, this practice has reduced drastically to less than 5% of the farmers due to reduced area under cultivation and increase in household consumption.

Traders

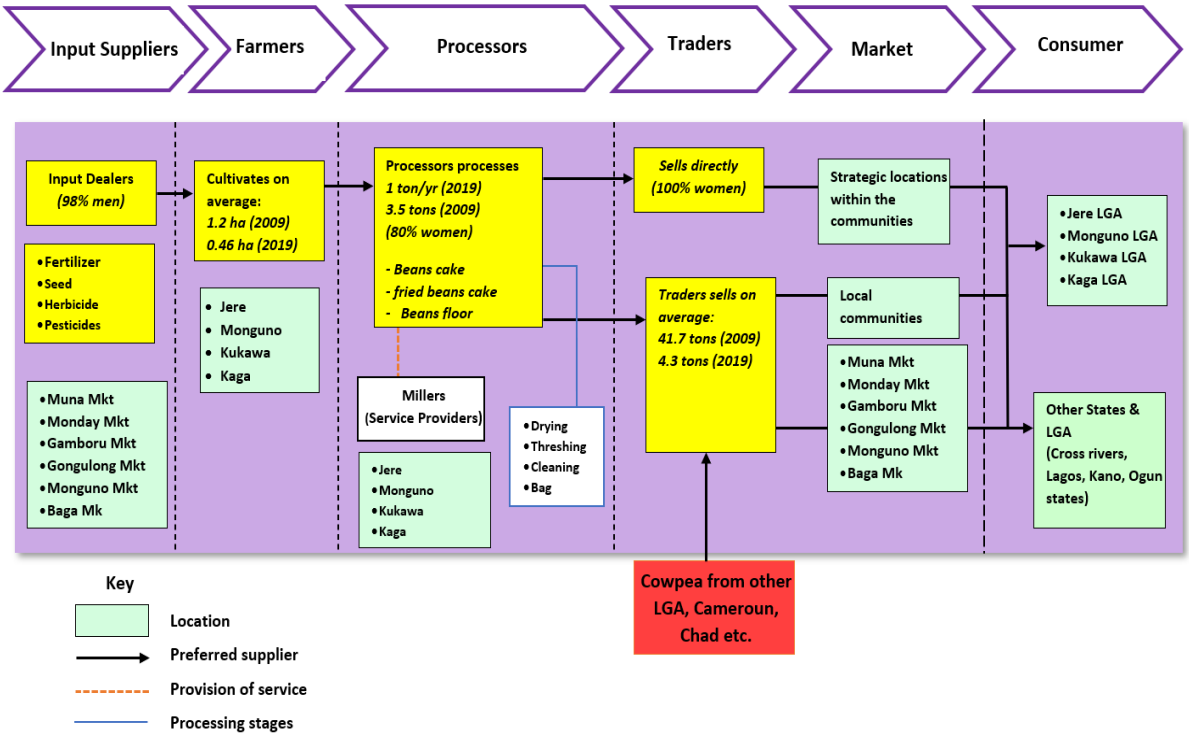
Cowpea is traded in all the markets within the study areas with traders sourcing for produce from farmers to bring to the markets. Traders both retailers and wholesalers sell their products in markets such as Monguno central market, Muna market, Monday market, Kukawa market, Baga market, Gamboru market. However, Muna market usually described as the largest big market in Borno state enjoy cowpea supply from various locations across the state and from neighboring countries of chad and Cameroun. On average, traders within the study area presently trade on average 4.3 tons of cowpea annually as against 41.7 tons ten years. The traders after sourcing for their products employ the services of youths who are engaged in threshing, cleaning and packaging of the cowpea in the market which are then graded based on the wholesomeness and priced accordingly. The major challenge traders are faced with is the issue of post-harvest pest (weevil) which affects their beans and reduces its quality over time. Some of the traders/ wholesalers interviewed had a private storage facility for storing their products. The products are bought especially during harvest season when supply is high; the products are cleaned, packaged, and stored using materials that keep out storage pest. This can be kept for 3 – 6 months depending on the trader's financial capacity with an overall increase in value of up to 30% - 40%. Storage practices by most traders has been on a decline due to reduce capital outlay for the business.

Many of the producers are in remote locations and difficult to reach, leading to high marketing costs. Buyers in Lagos complain of Boko Haram insurgency in Borno State which has made them not to venture into visiting the location for many years. This has increased cost of doing business by 35% (N2Africa,2015) which has impacted negatively on their profit. However, it has improved a trust building process in business transactions as traders in Borno (Gamboru market) now send produce to Lagos on credit while buyers also send money to Borno, all on trust. No incidence of breach in this informal agreement could be confirmed.

Processors

Cowpea processing under this value chain specifically target local processors who process cowpea into fried beans cake (Akara), Steamed beans cake (Moin-moin), cowpea floor. Processing involves soaking, peeling, drying and milling the cowpea with or without the addition of other spices depending on the final output. Cowpea processing usually involve mostly women who usually process and sells the beans cake. About 80% of the respondent are usually women who ply their trade (process and sell) in marketplaces, strategic locations within the community. Also involve in processing are millers who operate equipment and provide services to processors. Presently, an average processor processed about 1 ton of cowpea annually as against 3.5 tons

Cowpea value chain Mapping



Gross Margin Analysis

A. Gross margin to Cowpea producers

Presently, cowpea producers average revenue was N46,817.88 (€117), with average expense of N120,990.61 (€302.5) and gross margin of -74172.73 (-€185.4) .

B. Gross margin to Cowpea traders

Presently, cowpea traders trade on average 4.3 tons with a total average revenue of N1,850,989.70 (€4,627.5) with an average expense of N 1,791,969.73 (€4,479.9)and average gross margin of N 59,019.97 (€147.5). However, ten years ago, cowpea traders trade on average 41.7 tons of cowpea and earn on average an annual revenue of N 11,134,098.96 (€27,835.2) with a total expense of N 10,291,062.50 (€25,727.7) and margin of N 843,036.46 (€2,107.6). A drastic reduction in trade volume reflected on the profitability of the business within the time frame.

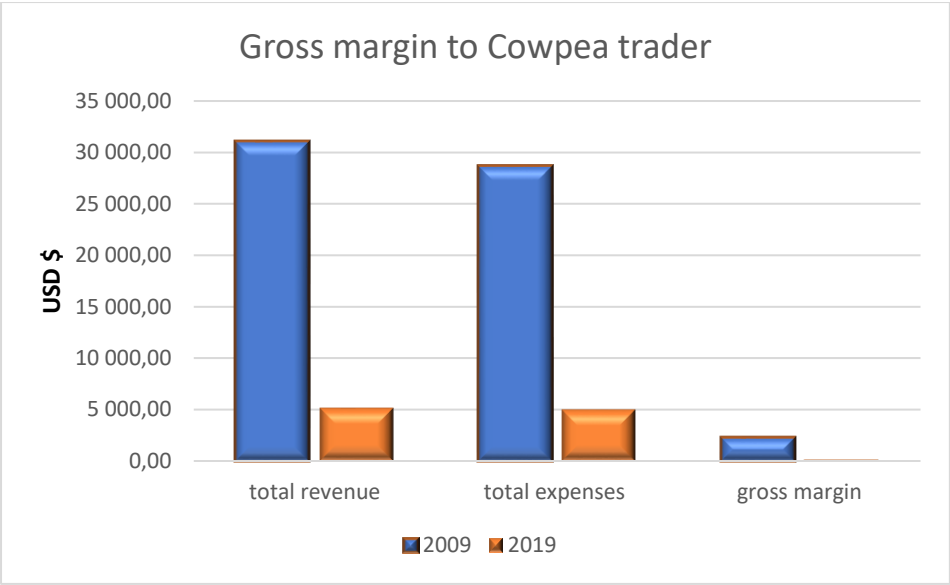


Figure 16: Gross Margin Analysis of Cowpea Traders in the Study Area

C. Gross margin to Cowpea processors

The average revenue of cowpea processors presently is N191,666.67 (€479.2), with average expense of N171166.67 (€427.9) and average gross margin of N 20, 500.00 (€51,25)

Constraints to Cowpea Value chain

Input Constraints

- Poor distribution channel due to insecurity
- Inadequate knowledge and information of input suppliers

Production Constraints

- **Pests and diseases attack:** This account for most of the farmers challenge in terms of agronomic practices. These pests attack the crop during flowering stage and could reduce the yield by 80%. In Gongulong, farmers complained of having used different pesticides with no solution in sight.
- **Availability of Land:** Due to the arms conflict in the area, availability of land has greatly reduced and in some cases not available for example in Kaga local government where majority of the respondent presently live in IDP camps. Also, about 20.8% of the respondent in Kukawa local government indicate having challenge accessing land for production.
- The production of cowpea is always considered secondary in association with cereal crops, (millet or maize as main crop) which does not facilitate its production development as a main crop.

Processing Constraints

- Reliance on inefficient traditional technologies for production
- Poor handling practices
- Poor techniques for processing
- Poor quality of processed products due to the use of inefficient traditional methods.
- Lack of capital/credit facility

Trading/Marketing Constraints

The decade long insecurity threat has had a fair share on the trading of cowpea within the study area, worse hit is Muna market known for its beehive of trading activities which has drastically reduced due to low turnout of buyers especially merchants from outside the states. Also, the traders are faced with low capital outlay to boost their trade and reduced access to suitable credit facility. Traders are also faced with storage pest (Weevil) which reduces the products quality and market value. To control this pest comes with an increase in cost incurred of their inventory.

SWOT ANALYSIS OF COWPEA VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Producer	• The area has a comparative advantage on the production of cowpea (favourable environmental and climatic condition). • Availability of manpower	•Low knowledge on effective pest control •Lack of credit facility to support production expansion •Low level of mechanization of production activities	•Increasing demand for cowpea both domestically and nationally. •Proximity to market hubs	• Prolong insecurity situation limiting access to farmland for production activities • Pest prevalence both on and off the field of production
Traders	• Guaranteed market for their product • Enjoy patronage throughout the federation	•Insufficient capital to expand business	• Availability of market for their products	• Prolong insecurity disruption trading routes and affecting movement of goods • Poor storage facility for products and pest control
Processor	• Proximity to abundant raw materials within the catchment area	• Insufficient processing equipment • Low knowledge on better processing standards	• Ability to improved productivity through using modern processing and packaging of products (e.g. cowpea flour packaging)	•Poor adherence to food safety process and handling of food products.
Input suppliers	• Availability of customers within the community	• Low technical know-how of the sellers on products operations	•Expanding activities of markets drivers such as production within the catchment area with potential to increase demand for more supply of inputs	•Insecurity limiting distributions of products

SHEEP VALUE CHAIN

The sheep value chain has a strong potential in the livestock subsector and is an important part of the farmer's livelihood in the study area. Besides being consumed directly by households as food and a critical source of protein, herds of sheep are also used as stores of wealth and are sold when the need for money arises. Most farmers involved in sheep rearing were smallholder farmers and often involved in the rearing of other livestock and in many cases crop production activities. West Africa long legged type are the commonest sheep found in the study area. This breed comprises mainly of Uda, Yankasa, and Balami.Balami breed is the most common breed in Monguno and Jere local government.

The market for sheep is driven by meat and skin production, demand for meat is highest during the festive period of Eid Fitr.

The sheep business is done as backyard production by many of the farmers. 10 years ago, the sheep were brought from Monguno, Baga, Mallam Fatori, Konduga, Dikwa and Bama, where they were aggregated and distributed to butchers, who slaughtered them for meat and skin. Presently, the quantity has reduced due to the insecurity and sheep are purchased from farmers within the locality or neighborhood where there is accessibility. Also, there is no improved breed of sheep raised and no such development in sight.

Furthermore, rearing livestock in the past was easier especially during the rainy season, where the herders move the animal from agricultural areas to the Niger side (pastoral areas rich in fodder) because of absence of water, infestation of flies and mosquitoes. However, this is not possible now as the livestock are forced to remain in the region due to fear of being killed and restriction of movement by security authorities. This has resulted in an outbreak of diseases and increased mortality of livestock in the study area as the technical know-how to proffer solution is low. For instance, sheep experience pink-eye causing tearing eye, which could result in death when left untreated. Also, the efforts of the State Government in relations to vaccination of the herd has been reduced over the years in the study area as a result of insecurity.

PRODUCTION CAPACITY

The bulk of production in sheep is carried out by smallholder farmers who rear it as a backyard business. The size of herd in the local government area of study is about 2-10. Gestation period for sheep is between 144 days – 152 days and the ewe must be between 6 months and 12 months to attain puberty. The normal cycle for ewes is approximately 17 days between heat periods

The supply of sheep in the area has dramatically reduced from what's obtainable 10 years ago before the insurgency, this is due to insecurity and accessibility issues pertaining to inputs, market opportunities and demand. This has resulted to continue decline in people's livelihoods due to reduced economic opportunities, reduced agricultural production and fishing. Small ruminants are a source of savings for producers and are therefore gradually being sold to make up the shortfall in household livelihoods in the intervention zones. These animals are not also replaced because of the lack of surplus production to sell and secure savings.

In Monguno, only 2 percent of the farmers had sheep and it ranged between 2-10 herds and are reared with goat. However, no farmer is rearing sheep in Kukawa. Sheep fattening also a major practice within the study area with farmers buying a mature animal especially ram and are fed mostly for a short period targeting specific festive season and sell off.

Sheep were fed cowpea remnants and maize, and drugs (input suppliers) were purchase at open market (Monguno main market), which is readily available.

SHEEP VALUE CHAIN ACTORS

- **Producers**

Sheep farmers cuts across the gender, usually, sheep rearing is a household business with negligible cost of production. The sheep are mostly fed with household leftovers and left to graze in the open field. A sizeable portion of the farmers (40%) only practice ram fattening, where mature animals are purchased and are fed to gain weight for a short period. These are sold in the open market or sold during festive period. Farmers engaged in this production practice has reduced to less than 5% due to the insurgency activities, reduced capital, and little or no veterinary access to the farmers. In an interview with the official of the Borno State ministry of agriculture, he claimed the ministry has a center where farmers are encouraged to bring their livestock for vaccination. The major cost of production for producers is the cost of the lamb.

- **Traders**

The traders in this chain are local traders who go around the villages and buy from the farmers. They aggregate the sheep and sell to other traders outside Borno, local traders, tanners, abattoirs and butchers. They are also sold in open markets of such as the cattle market, Monguno market. However, the farmer can sometimes take up this role when it sells directly to processors. For traders, they only buy and sell live animals. A matured ram sells from N55, 000 (€137.5) to N70, 000 (€175) and the ewe from N 30,000 (€75) – N45,000 (€112.5) depending on the season or time. Domestic individual consumers are the major final consumers for sheep and goats. High demand for sheep and goat meat
is quite seasonal as it follows the religious calendar of fasting periods and festivities such as New Year, Christmas, Easter, and Ramadan

- **Processors**

The butchers are the major player in the processing chain, followed by the skin processors. The skin processors are located close to Monday market and custom area (before College of Agriculture) and central collection at Bulabilin area. Traditional method of processing is being used for processing and about 1,500-1,600 skins were processed daily before the insurgence and currently about 100-120 skins were being processed, that is, 93% fall in supply. The processors offtakes from the traders and the farmers. Sheep are processed into sheep meat for consumption and skin for making leathers. The sheep are slaughtered, cut into different parts and sold as meat while the other parts are processed into skins, which are sold to tanners and the skins are sundried and preserved with salt.
Ten years ago, sheep were bought from all the local governments and processed into skin. The skins were transported to Maiduguri from Konduga, Dikwa, Bama, cattle market, culumba and Kirenuwa and neighboring country. Presently, skins are gotten from Jere and Monguno and

preserved with salt, which is transported and sold in Kano. The processing facility for leather in Maiduguri is no longer in operation (Maiduguri Neital Nigeria Ltd for shoes and tannery).

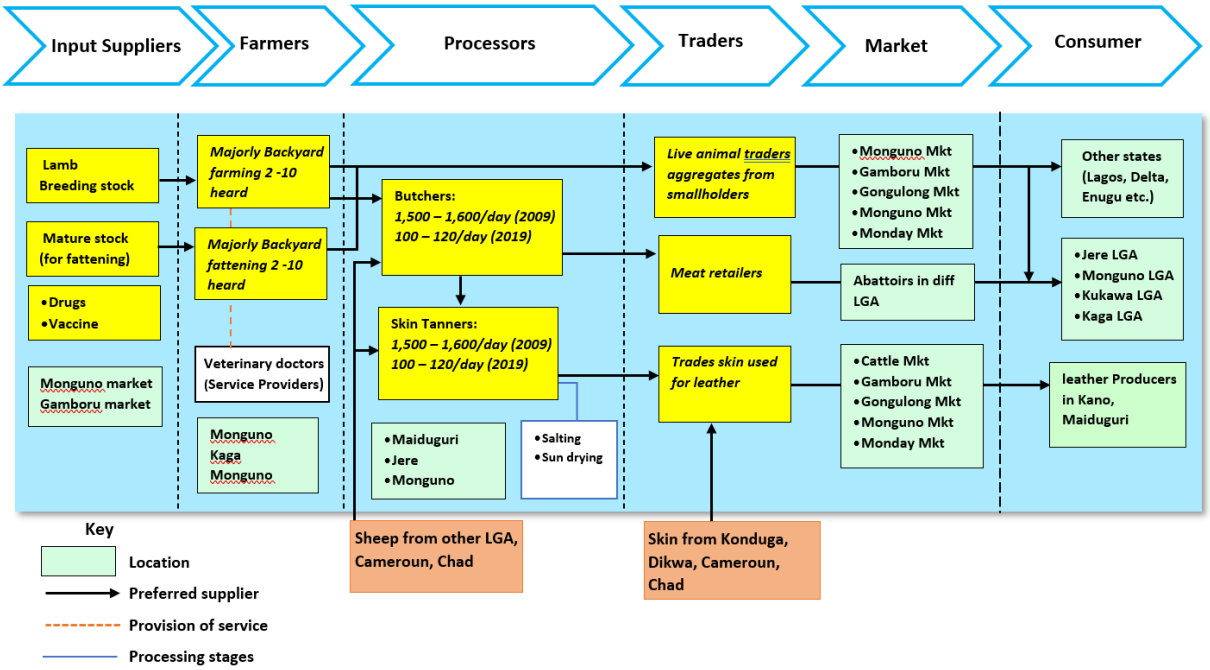
Butchers are important actors in the sheep and goat value chain in all the study areas. They pay attention to body condition and body size, but not coat colour and tail type when buying sheep and goats. There was no preference for male and female animals, and it was observed that some slaughterhouses serve both fried and raw sheep meat at their premises while others only raw sheep meat. One of the main issues is the inability of butcher to flay properly as a result of poor technical know-how, majority of the butchers are only interested in meat and not the skin, which result in destroying the quality of skin during slaughtering. Therefore, proper sensitization on importance of hide should be provided and training for butchers. Also, provision of flaying knife and wares to improve the hygienic practices and food safety of processed meat.

The government regulates by issuing license of operation to hide and skin buyers at the rate of N500(€1.25), one-time payment and Trade fee is charged for loading hide and skin depending on the type of vehicles used: pickup (N500 (€1.25), lorry (N1,000 (€2.5)) and trailer (N1,500 (€3.75)) per loading.

- **Input suppliers**

The input suppliers are comprised of lamb suppliers, breeding stock suppliers who also sometimes double as farmers and hay suppliers for cattle. Farmers usually buy from pastoralists within their locality. Buying lambs from the locality is done in order to ascertain the adaptability of the sheep to the environment they will be raised. Smallholder farmers are the major producers and suppliers of roughage (hay and crop residues). They produce feed mainly for their own use while a small portion of it is supplied to the market. Farmers that do not have livestock or those who have only a limited number of animals sell crop residues either at the farm gate or in the towns to traders and livestock owners. Feed traders (in Gamboru market) collect crop residues during harvest, then store them to sell at better prices especially during dry seasons. In general, there is no regular commercial supply of roughage from known sources in the study areas.

Sheep value chain Mapping



Gross Margin Analysis

Gross margin to Sheep producers

Sheep are sold based on financial needs of the farmers and each sheep is sold between N25,000 (€62.5) to N35,000 (€87.5) depending on the sizes and festive season. There was no accurate record of sheep sold in the last 10 years.

Presently, average revenue of N71,918.17 (€179.8) with average expenses of N131,676.97 (€329.2) and average gross margin of -N59,758.80 (€149.4)

Gross margin to Sheep traders

Presently, sheep traders make an average revenue of N4,644,625 (€11,611), having spent average expenses of N3,912,093.75 (€9,780.2) with average gross margin of N83,800 (€209.5) compare with average revenue of N12,632,020.83 (€31,580.1) ten years ago with average expenses of N10,948,425 (€27,371.1) and average gross margin of N1,683,595.83 (€4,209)

Gross margin to Sheep processors

Ten years ago, about 1,500 to 1,600 sheep were slaughtered daily in Maiduguri and processed to obtain sheep meat and skins for making leather. Presently, only 100 to 120 sheep and goats are slaughtered and processed. Sheep is sold for N500 per skin, the cost of transport to Kano was N50 (€0.125) per skin and sold at N600 (€1.5) - N670 (€1.7) per skin.

Constraints to Sheep Value chain

- **Production Constraints**

Producers have decried lack of capital as the most important challenge in production. This manifests in form of inadequate financial resources for investments, lack of access to finances to invest on inputs and business expansion. The smallholder nature of production made it difficult for a formal financial inclusion hence reliance on informal credit system and personal savings. Also lack of adequate institutional support in terms of extension services, veterinary services contributed to constraints to producers the bulk of the farmers are illiterate. The lack of critical skills and knowledge such as business management skills, animal health production skill etc. among sheep farmers are all important constraints facing producers.

- **Trading/Marketing Constraints**

The market for sheep suffers from seasonality of high demand and high selling price which is caused by festivities such as Eid El fitr. Generally, the market is characterized by low demand and a case of multiple intermediaries consequently creating a ripple effect of price. The continued hostility in the state has led to decimation of demand due to the destruction of the physical market and the market system.

- **Processing Constraints**

The tannery in the Borno state for skin processing has become moribund due to insecurity issues in the area. Lack of funding, and inadequate supply of raw materials has also been fingered as a major constraint to processing. The meat processing segment (butchers and cooked meat seller) is highly fragmented with several players. The cooked meat sellers can be found at street corners, roadsides and in all the major markets.

Poorly skilled butchers affecting the quality of skins being traded.

Restriction by Military personnel to in regulating the slaughtering of sheep and goat due to the insurgence.

- **Input Supplying Constraints**

The input supply system consisting of the lamb market supply, drugs and veterinary services are constrained by an unstructured market. The veterinary services available are majorly supplied by the government, as most farmers do not have access to private extension service due to cost and availability.

SWOT ANALYSIS OF SHEEP VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	Number of years of experience in sheep business. Family labour in charge of the production Valorization of residues/ household food leftovers	Lack of credit facility/financing. Low knowledge on disease control • Lack of operating account in production • Knowledge and production practice still traditional	Presence of Interventions by International NGO Large customer base Close proximity with customer	economic downturn Insecurity Poor market structure Disease infestation during rainy season Inadequate water supplies due to climate change (Lake chad drying up)
Traders	Readily available demand for their goods. Low cost of trading	Lack of access to finance business expansion	Presence of Interventions by International NGO	Poor transportation infrastructures Multiplicity of middle men Dwindling market opportunities
Processors	Ancestral knowledge in the practice of the activity and good mastery Formal/informal organization of actors in the field Has capital, although not enough individually to run the business	Infrastructure Deficit (storage, cold chain, transportation) Poor slaughtering of sheep, which makes skin difficult to get.	Experts support facilitated by iNGOs and development organizations presence. Availability of market for Local consumption of processed goods	Poor adherence to processing standards Lack of knowledge on food safety
Input supplier	Large customer base	Lack of optimum market opportunities Lack of access to financing.	Experts support facilitated by iNGOs and development organizations presence	Unstructured market High level of illiteracy of producers Low technology adoption

Goat Value Chain

Goats are known for their hardiness and capability to survive in different environments; hence goats are a common feature of livestock farming in Nigeria and by extension our study area. According to 2011 National Agricultural Sample Survey, Nigeria has an estimated 72.5 million goats. The three popularly raised varieties of goats in Nigeria are the Maradi red (Sokoto red), Borno Sahel white (Sahel white) and the West African Dwarf goats. The Sokoto reds are the most raised goat in the area of study. Sokoto red produces good milk and meat and vastly famous in the production of fine leather materials. The major overhead cost for goat in most goat farming household is the cost of the kid or the breeding stock costs. Goats, like sheep are also used as a store of wealth and sold when the farmer need to raise capital.

Demand is driven by meat consumption in different forms as snacks, household protein and for skin production. The skins are processed into leather which are then transported to other states where it is high in demand, especially Kano.

Production Capacity

Goats are raised on small scale production between 2-10 herds per farming household and are raised by confinement to a location or allowed to range around the neighborhood. There has been a sharp decline from about 1500-1600 sheep and goats supplied to cattle market per day to 100-120 before the insurgency and now.

Goat value chain actors

- **Producers**

The producers in the goat value chain are farming households or farmers usually owning other livestock and practicing crop production. The goats are kept as a free range or in confinement. In all the study areas, breeding bucks are obtained from the market (cattle market in Monguno and Jere) or from other farmers. No breeding center or other responsible body was found to supply breeding goat. The major sources of breeding stock in all the study sites are farmers and pastoralists themselves. Farmers buy animals from known locations for breeding purposes or fattening. Producers also get breeding stock from community members. Goat fattening usually practice by 40% of the farmers surveyed in the study area before the insurgency, a practice where matured goats are bought from pastoralist and fed in confinement for a short period of time (3 – 4 months). Presently, less than 5% indicate practicing goat fattening at a much-reduced level. Goat fattening are usually starts in months presiding festive seasons as a quick source of cash for the farmers; although some fatten goat regularly for sale to butchers or personal consumption.

*"…**…….** Before I get used to rear animals, I will buy small sheep, goats and cows and keep them at home when they grow up. I will sell it later on after the insurgency I don't have money to continue my business again. I also buy and sell animals but now I don't have capital to continue the business. I have been a trader before but know I don't have money to continue with my business..." FGD Fariya*

Households in the different study sites reported that they slaughter goats only during celebrations of religious festivals. This means, goats are mainly kept for sale to meet immediate cash demands of the households rather than for consumption. Also, goats are sources of milk for the household,

even during the dry seasons. However, consumption of goat milk is not common in all the study areas

- **Traders**

The local traders buy from the farmers aggregating them to sell at cattle market (Monguno), and cattle market (Jere). They aggregate goats from farmers and sell to butchers, other traders outside Borno (Ibadan, Ogun, Lagos), local traders within Borno and farmers (for breeding). They are also sold in open markets in cattle markets in Jere and Monguno. However, the farmer can sometimes take up this role when it sells directly to processors

- **Processors**

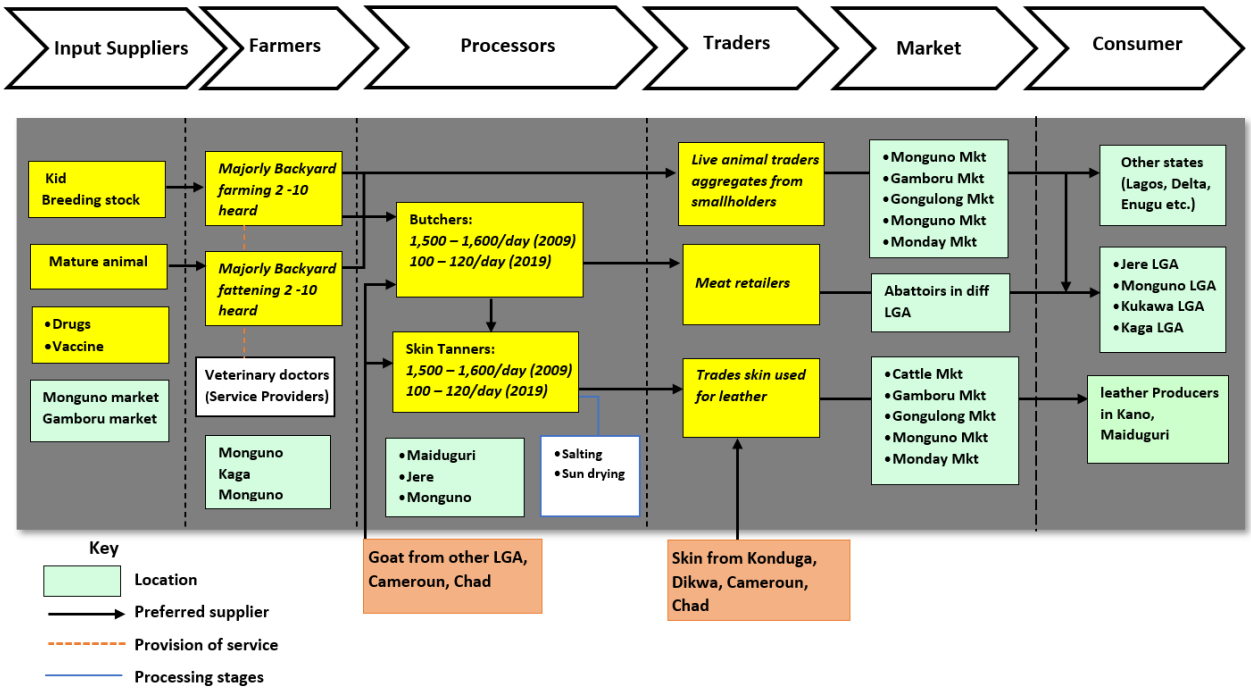
The processors comprise of the leather making, tanners, and the butchers. Tanners buy from the skin traders, who buy from abattoirs/butchers. Skin markets are located in Monguno main market, Monday market and custom area (before College of Agriculture) and central collection at Bulabilin area in Maiduguri. This is transported to other states like Oyo, Lagos (consumed as *ponmo*) but the main tannery market is in Kano

- **Input suppliers**

The market for input in the goat value chain is quite crude in the study area, the major input supplied to the producer is the kid, drugs and breeding stock. Most farmers raise between 2-10 herds at once .Farmers are the major producers and suppliers of roughage (hay and crop residues). They produce feed mainly for their own use while a small portion of it is supplied to the market. Farmers that do not have livestock or those who have only a limited number of animals sell crop residues either at the farm gate or in the towns to traders and livestock owners. Feed traders (in Gamboru market) collect crop residues during harvest, then store them to sell at better prices—especially during dry seasons. There was a local feed mill (Taibu oil mill industry Nigeria Ltd at Gamboru market) identified processing livestock feed for sheep and goat.

Figure 17: Taibu oil mill industry Nigeria Ltd at Gamboru market

GOAT VALUE CHAIN MAPPING



Gross Margin Analysis

Gross margin to goat traders

For goat traders, average revenue was N3,736,000 (€9,340), with average expenses of N2,988,750 (€7,471.9) and average gross margin of N747,249.50 (€1,868.1) presently.

Gross margin to goat processors

Presently, average revenue of N1,852,666.67 (€4,631.7) with an average expense of N2,920,000 (€7,300) and average gross margin of -N1,067,333.33 (€2,668.3)

Constraints to Goat Value chain

- Production Constraints

Lack of capital has been identified by goat farmers as the major constraint facing them. Lack of quality veterinary services, and high cost and unavailability of inputs also constitute constraints. Farmers lack basic knowledge and skills and production, business management and planning.

- **Trading/Marketing Constraints**

The market system for goat and sheep are similar and both suffers from seasonality of high demand and high selling price which is caused by festivities such as Eid El fitr. Generally, the market is characterized by low demand and a case of multiple intermediaries consequently creating a ripple effect on price. The demand has declined as there is a restriction of movements from one place to another making it difficult for trades to access producers.

- **Processing Constraints**

Processing into skin and consumption meat dominates the processing component of the goat value chain. Unfortunately, activities of tannery have declined since the beginning of insurgency up till present day. Some of the constraints includes lack of infrastructures, funds, knowledge on post-harvest handling, lack of knowledge on food safety and simple processing methods.

- **Input Supplying Constraints**

The input supply system is constrained by lack of credit facilities for suppliers, lack of adequate infrastructures shortage of drugs, shortage of veterinary clinical equipment and a largely unstructured market.

SWOT ANALYSIS OF GOAT VALUE CHAIN

VALUE CHAIN ACTOR	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	Years of experience Availability of local breed.	Lack of credit facility/financing. Low knowledge on disease control Unstructured market Lack of knowledge on modern practices	Presence of Interventions by International NGO Large customer base Close proximity with customer	economic downturn Insecurity Poor market structure Disease infestation during rainy season Inadequate water supplies due to climate change (Lake chad drying up)
Traders	Readily available demand for their goods. Low cost of trading Readily available demand for their goods	Lack of access to finance business expansion	Presence of Interventions by International NGO	Poor transportation infrastructures Multiplicity of middle men Dwindling market opportunities
Processors	They have required skills in processing the meat into Suya meat, goat meat and skin	Poor slaughtering of goat, which makes skin difficult to get.	Experts support facilitated by iNGOs and development organizations presence. Availability of market for Local consumption of processed goods.	Poor adherence to processing standards Lack of knowledge on food safety.
Input supplier	Easy access to drugs for goat. Indigenous knowledge on goat management.	Lack of access to financing. High level of illiteracy of input suppliers.	High demand for goat in other markets aside Borno State.	Unstructured market Low technology adoption. Lack of optimum market opportunities

Fish Value Chain

Fish is an important commodity in Borno state and very strategic to food and nutrition security in the area. About 90% of fish produced in Nigeria is sold in the local market as a cheap source of protein to the growing population and fish is made up 40% of dietary protein consumption in the country (Kainga and Adeyemo, 2012). Nigerianfish market is characterized by indigenous mechanism depending on season, ability of buyer to bargain and of course the concept of demand and supply. Interesting, Borno state boasted as the first major hub of fish production in the Northern Nigeria before the insurgency. According to director of fisheries, Borno state ministry of agriculture (Saleh Ibrahim), there is an estimated over 1 million fishermen who made their livelihood from fishing in Borno state. The Lake Chad provided a water body to the vast fishing population unfortunately due to climate change which has caused shrinkage of the lake and also the hostilities, which as a result caused restrictions, fishing activities has been severely affected while several men and women engaged before have been rendered jobless. This draws a nexus between the impact of climate change and Insecurity on food security and sustainable livelihood. The current production is vastly centered on aquaculture. The fish processed in current time are taken to destinations in the southern part of the country which are Lagos, Enugu, Asaba. The main fish species in Borno state are catfish and tilapia, which were captured along the lake chad 10 years ago. Presently, catfish is the only species available, which are smoked and sold in the open markets.

"...Yes, concerning our fish production business because the selling price is high now is not everybody that can afford to buy it if we will be given a chance to find a place and staff rearing our own them on our own so that we can be selling it. It will be better for us than going to the market and buying the one that is already processed." FGD Fariya

Production Capacity

As a major fishing hub in Northern Nigeria, before the insurgency the area processes over 100 trucks of fish weekly at Baga market which happens to be the biggest fish market in West Africa, currently it processes less than two trucks per week. Production is mostly aquaculture which is limited to catfish production. Fish is sold as fresh, smoked or fried fish in Baga, custom and Monday market while in Monguno, it is sold to food vendors. Furthermore, fish feed takes about 70-80% of fish production cost. This suggests that if fish farmers can reasonably reduce cost of feed and/ properly manage feeding following the Best Management Practice (BMP), a significant increase in profit margin will be recorded. However, it is well noted that high quality feed gives better fish growth performance, but cost more money.

Fish value chain actors

- **Producers**

The producers are the fishermen involved in captured fish and farmers engaged in aquaculture. The volume of captured fish had been on a steady decline due to the restrictions of fishing and the shrinking of the Lake Chad, production in current time is predominantly aquaculture practice. Aquaculture is done in Monguno and Jere, and the farmers in Monguno were supported with fiberglass, fingerlings and feeds by Food and Agriculture Organization (FAO).

Fishermen have been rendered jobless as Lake chad had become inaccessible in the last 5 years, thus over 1 million unemployed created in the state, this was obtained from KII conducted with the Director of Fishery and Organizing secretary of fish producer and marketers Association. However, small ponds in homes have been constructed for aquaculture to boost fish production in the study areas but the challenges being faced were numerous. These constraints identified were inadequate quality brood stock, poor quality fish seed – prone to cannibalism, diseases, poor local feed, high cost of imported feed, poor supply of locally manufactured feed, poor infrastructure within hatcheries and grow out farms, scarcity of fingerlings, poor access to modern technologies and inappropriate management practices, poor extension services to promote adoption of new technologies to interface between extension technologists and fish farmers, and lack/inadequate policy support.

Lack of technical know-how of production process, which makes management ineffective (difficult) and poor output as mortality becomes high. Also, commercial feeds are not readily available in Borno state. It was sad to note that there had never been any commercial feed company in the state, even before the insurgency. Thus, feeds are transported from Kaduna, kano and neighbouring states into Maiduguri. Another challenge is unavailability of hatchery, which is a big blow to raising fish. Presently, there is only one functional hatchery controlled by the government, which capacity is still low and no privately owned hatchery was identified for fish during the study. Thus, adequate support is need to help revive this subsector. For instance, in Monguno, Food and Agriculture Organization (FAO) provided training and support to 100 fish farmers, who were living in the IDPs. The support provided included 10 fiberglass (10 farmers in a group) of 500 fish capacity,500 fingerlings and feed and monthly allowance for the first cycle of production, while the farmers bought generator, purchased additional feed, sunk borehole, ensure maintenance, day-day activities, and marketing of the fish. which was sold to vendors as fresh fish. The smallest size was sold for N500 (€1.25) and the biggest was N1,200 (€3) and it was raised for 6 months to reach table size.

- **Traders**

Traders buys either fresh fish or smoked fish directly from farmers, processors or agents. In term of purchase capacity, there are two types of trader namely, small and big traders. The small traders sell fresh fish to processors at the market (Monguno main market, Gamboru market and Baga road market) or to big traders and sometimes, they serve as agents who earn commission by sourcing for fresh fish and supplying big trader. For the smoked fish market, traders sell to other traders outside Borno especially the southern part of the country and within the region aggregates fish from the producer and transport to different part of the country. Transaction between traders and farmers are mainly carried out through cash, with few exceptions on credit (based on relationship and trust). Also, transaction between local traders and big traders is on cash and likewise with processors. For those outside Borno State, part payment is provided in advance and the remaining payment is done immediately after delivery.

"...Our role is to go between the business and the government this is an Association that helps the government to know exactly what we are doing and the main thing you're doing this market here is buying fish selling Fish and processing it Across The Nation this was the largest fish market in West Africa before the insurgency

The precise story is that if our people were being allowed to go and fish across Lake Chad fish is going to be available it's been 5 years we have not been allowed to go and fish across the lake Chad the fish are there but there is no access. fish were brought to the market it's left for the buyers to come and buy and take to wherever you want but now the fish is not there and the little you get is very expensive and the transportation is also very costly because formerly the cost of carrying a carton of fish from here to Asaba state was 300 naira (€0.75) *but now it cost about 1500* (€3.75) *per carton"... Mallam Baba Musa, organizing Secretary of the fish producer and marketers Association, Baga*

Fish is available all through the year, however, supply tends to reduce during dry season as growth tends to slow down and the price tends to increase during this period.

- **Processors**

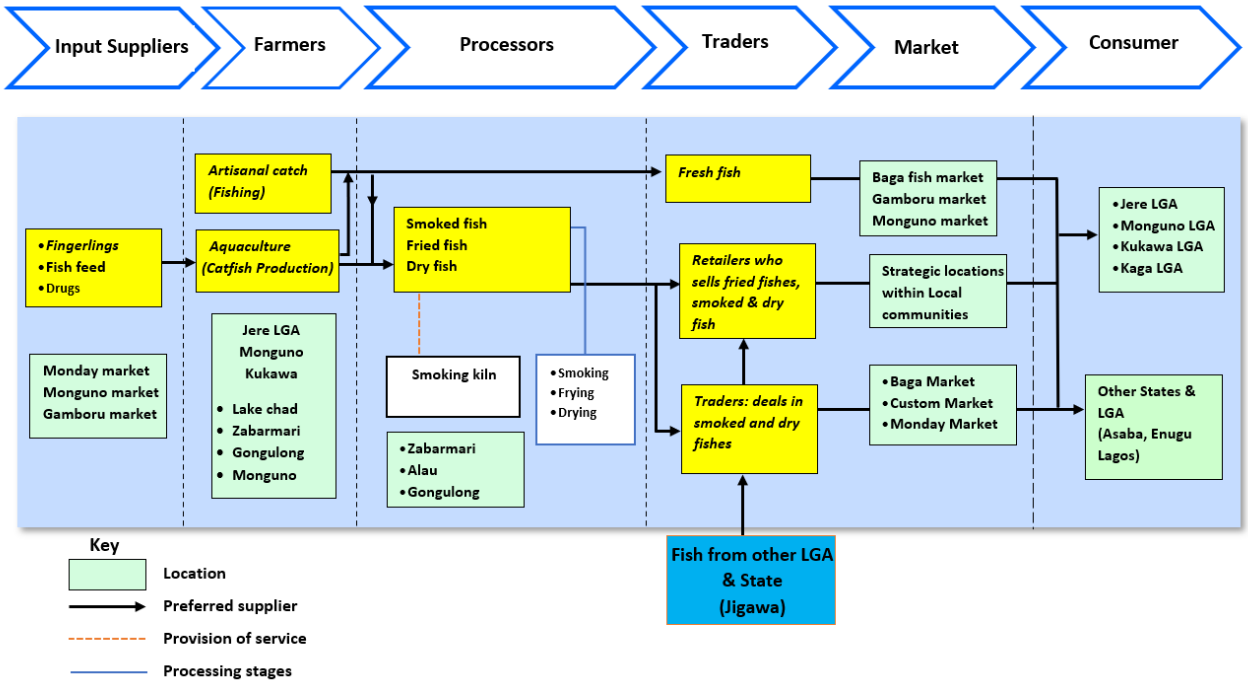
The farmers and traders are also involved in processing but mostly carried out by traders due to the volume of their enterprise. The fish are smoked and sold in the open market. Processors buy from the traders or directly from the farmers either in wholesale or retail. Fish were processed into smoked fish, fried fish, "suya fish[1]" and dried fish. There is a seasonal demand for fish in the study area which tends to increase during the dry season and price fluctuation depends on price of feeds. Majority of the processors are into smoked fish business and distributed to different states of the nation .At Baga cross market, most of the smoked fishes are not from Borno rather from Jigawa state and few others (smaller sizes) are from Alao and Zabarmari. The main challenges here are accessibility to rivers, transportation, and unavailability of modern equipment for smoking (smoking kilns).

[1] Local spiced fish.

- **Input suppliers**

The inputs for the fish industry are not readily available in the areas of study, for instance, important elements such as feeds are procured from neighboring states making them expensive. It would cost an additional N10 (€0.025) per kg for feed transported from Kaduna to Borno (Maiduguri), which increases the cost of production (cost increase by 5-9%) and also the insecurity along the road could endanger the lives of the transporters. Other inputs such as fingerlings are not readily available (Monguno) or insufficient quantity (Jere). In Jere, feeds are available in local stores, which are bought from Kaduna, Jos, Kano and only 1 hatchery unit for fingerlings production owned by the government (Fish multiplication facility under Ministry of Agriculture and private owned) and private owned hatcheries in Jere. In Kukawa, Kaga and Monguno, there was no hatchery unit and no feed store. All feeds were bought from Maiduguri.

Fish value chain Mapping



Gross Margin Analysis

- **Gross margin to fish producers**

Presently, N70,507.73 (€176.3) was the average revenue generated with average cost of N131,451.12 (€328.6) and average gross margin of N60,943.39 (€152.4). The cost of inputs is expensive such as fingerlings, feeds and cost of running the business. In Monguno, feeds were purchased from Maiduguri and the cost of transportation is also high and included. The farmers are not making any profit as the selling price is very low N500 (€1.25 - N1,200 (€3).

- **Gross margin to fish traders**

The annual average revenue of the fish traders was N12,301,666.67 (€30,754.2) with average expenses of N9,864,666.67 (€24,661.7) and average gross margin of 2,437,000 (€6,092.5) ten years ago compare to average revenue of N3,069,360 (€7,673.4), average expenses of N2,985,560 (€7,463.9) with gross margin of *N83,800 (€209.5) currently. The change in revenue is as result of decrease in the quantity of fish traded due to insurgence and restricted activities at the lake chad

- **Gross margin to fish processors**

The average revenue of fish processors 10 years ago was N11,003,642.86 (€27,509.1), with average expense of N10,484,203.57 (€26,210.5) and average gross margin of N519,439.29 (€1,298.6).

Constraints to Fish Value chain

- **Production Constraints**

The most important constraint to fish production is the restrictions to access the Lake Chad this is due to the fact that production has been buoyed by the access to the Chad and the fishing activities taking place. Second to this is the critical lack of express access to essential inputs such as hatchery, feedmill, credit facilities. The state does not have a feed mill forcing the actors to look to neighboring states for feed supplies, fingerings etc. This inevitably increases the cost of production and minimizes their returns while also creating a barrier to entry. The producers are also constrained by skills and knowledge gap, limited access to extension services.

- **Trading/Marketing Constraints**

Lack of new market opportunities as a result of limited access to market-related information. Also low demand is a major constraint affecting the trading and marketing component of the chain. As a result of restriction of movement. Buyers from other States no longer visit the market rather look for other places. Lack of cold storage or cold room is also a major constraint facing the trade and marketing aspect of the value chain.

- **Processing Constraints**

The constraints posed to Processors ranges from lack of capital for equipment financing, lack of infrastructures, and smallholder nature of fish producers. Also, lack of modern processing equipment (kiln) and lack of knowledge on handling and value addition all serves as constraints.

- **Input Supplying Constraints**

Input Supplying faces the biggest constraint in the fish value chain in the study area. The absence of functioning feed mill and adequate hatcheries makes the sourcing of inputs very difficult for actors. Also, the low demand of inputs due to subsistence practice of aquaculture all pose a setback to the input Supplying enterprise of the fish value chain.

SWOT ANALYSIS OF FISH VALUE CHAIN

VALUE CHAIN ACTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	Years of experience Well trained fishermen Basic knowledge on fish farming	Small scale of production. Conservative nature of farmers towards adoption of modern technology Unavailability of feedmill in the study area Unavailability of fingerlings.	Periodic interventions thrust by NGOs and government institutions. High Local and national demand Large market share	Prolonged Insecurity Climate change Aging of farmers
Traders	Readily available demand for their goods. Low cost of trading Readily available demand for their goods.	Lack of access to finance for business expansion for building ponds or building fiber glass, generator, feeds and fingerlings.	New market opportunities Periodic interventions thrust by NGOs and government institutions Ready market for fish	Poor transportation infrastructures Multiplicity of middle men Dwindling market opportunities Insecurity. Extreme high temperature during dry season.
Processors	Long number of years in processing fish. Large customer base for processed fish.	Lack of technical know-how on processing Lack of capital Poor adherence to processing standards Lack of knowledge on food safety.	Availability of market for Local consumption of processed goods.	Lack of infrastructures Dwindling supply Insecurity
Input supplier	Large customer base	Lack of optimum market opportunities Lack of access to financing. Inability to meet input demands Low technology adoption. High level of illiteracy of producers	Unavailability of feed mill in the study area. Increasing demand for fingerlings in Jere and Monguno.	Unstructured market Lack of infrastructures Insecurity

TOMATO VALUE CHAIN

Tomato is cultivated as an important vegetable in all the local government where study was carried out. Over 45% (750,000 metric tons) of tomatoes produced in Nigeria is estimated as annual loss due to poor food supply chain management, price instability resulting from seasonal fluctuation in production and the supply preference of farmers and middle men to urban market than processors due to low farm gate price (FAO,2010).

Vegetables and especially tomatoes are a major part of Nigerian diet and also popularly consumed across our study area. Vegetables are a rich and cheap source of vitamins and minerals and it's critical to nutrition security. In the study area, tomato is mostly grown in the dry season under irrigation and or close to water bodies. Though the yield varies with available varieties (Dan-Syria, Roma, UTC, Dan-Baga and Tandino), the average yield in the study area is 4.28 tons/ha. Planting takes place during the months of August through September, and inputs are sourced from the popular local markets of Gamboru, Monguno and Muna. In all the study areas, tomato wastage occurs mainly at the processing, packaging and distribution stages. This is due to the poor processing technology, lack of good storage system and the transporting system used for the distribution of fresh tomatoes.

PRODUCTION CAPACITY

Tomato is one of vegetable crops widely grown within the study area and still carried out on a small scale, however there is a potential for growth in the sector. It is mostly grown during the dry season under irrigation or close to rivers; to reduce the prevalence of diseases associated with the crop during the rainy season. The farmers in the study area cultivated on average 1.95ha before the insurgency and presently cultivate 1.63 ha, with an average output of about 1.5 tons per annum (valued at N62,500.05 (€156.3)) and 1 ton per annum (valued at N68,864.03 (€172.2)) respectively. Planting is usually done during August - September with input such as seeds, fertilizers, pesticides sourced from open market, Gamboru market, Monguno and Muna markets. In all the study areas, tomato is harvested between January and April (Peak period), and thus consumers rarely use other tomato products. However, from April to September, the supply of fresh tomato drastically declines representing the off season during which consumers turn to other forms (imported tomato paste). These changes result in fluctuation of tomato product prices and affect consumption pattern. At off season, imports of paste and concentrates increase to fill the gap in demand of tomatoes. Between September and November, both imports and fresh tomato supply decrease, while, towards the end of the year, imports of tomato paste increase due to the low supply of fresh tomato. Thus, to ensure steady supply of tomato, processing systems should be developed further

Tomatoes are harvested and sold fresh in the local markets and equally to traders who aggregate produce from different farmers and transports to other States for sale. This process was seamless 10 years ago with traders coming to transact business in and out of the state. This has been limited due to the insurgency which reduce available land for cultivation and also transportation routes.

TOMATO VALUE CHAIN ACTORS

- **Producers**

The producers are farmers who cultivate on a small scale on less than 2 hectares of land. They majorly source their inputs from the open market and farming activities carried out by households on family owned lands. The seeds planted are locally sourced or from previous planting season. The common tomato varieties in the study areas are Dan-[2]Syria (3.4 tons/ha), Roma VFN (6.1 tons/ha), UTC (4.1 tons/ha), Dan-Baga[3] (2.6 tons/ha) and Tandino (5.2 tons/ha)t. Tomatoes at harvest are either sold fresh in the local markets or to traders who aggregate and move them to the major markets within the study areas or the southern part of the country.

Tomatoes are first raised in nurseries before transplanting to the field. The input supplies required include: seeds, fertilizer, pesticides, nursery supplies, ancillary equipment, etc. The difficulty in accessing inputs and technology makes it impossible for farmers to optimise production. Most of them have very small holdings, making commercial production impossible. Land preparation is done with manual tools, cattle-plough and some make use of tractor operated ploughs.

Harvesting is done manually. Tomato is sold to end users either in the vicinity of the farm or through wholesale marketers to local market. Tomatoes are delicate fruit and if they are not handled carefully, they deteriorate. In the study areas, fresh tomatoes are packed in baskets for transportation to the market. Although the aim is to allow air for ventilation, the baskets end up being stacked on top of each other, resulting in many injured fruits. Grading simply consists of arranging the tomatoes into a number of uniform categories according to the economically important physical and quality characteristics. The process involves identification, classification and separation. Grading of tomatoes is carried out because uniformity is one of the first attributes that buyers look for. The appearance attracts customers and the different qualities can be sold to different customers, while the standards will create customer confidence in the product and more importantly in the producer

- **Traders**

The traders in the value chains are involved by aggregating the produce from different farmers. Local traders buy directly from farmers and sell to big traders. Sometimes, they serve as agents who source for tomato from farmers and local markets for big traders and they are compensated based on commission. They buy at the farm gate and also at open markets (Gamboru, Monguno market, Kaga market) gathering the tomatoes into large volumes for big traders within the study areas or outside the State where they are transport to different parts of the country especially Mile 12 market (Lagos), Agege market (Lagos)

- **Processors**

Tomato fruits are highly perishable and thus have an inherently short shelf life. Deterioration of fresh commodities can result from physiological breakdown due to natural ripening processes, water loss, temperature injury, physical damage, or invasion by microorganisms. All of these

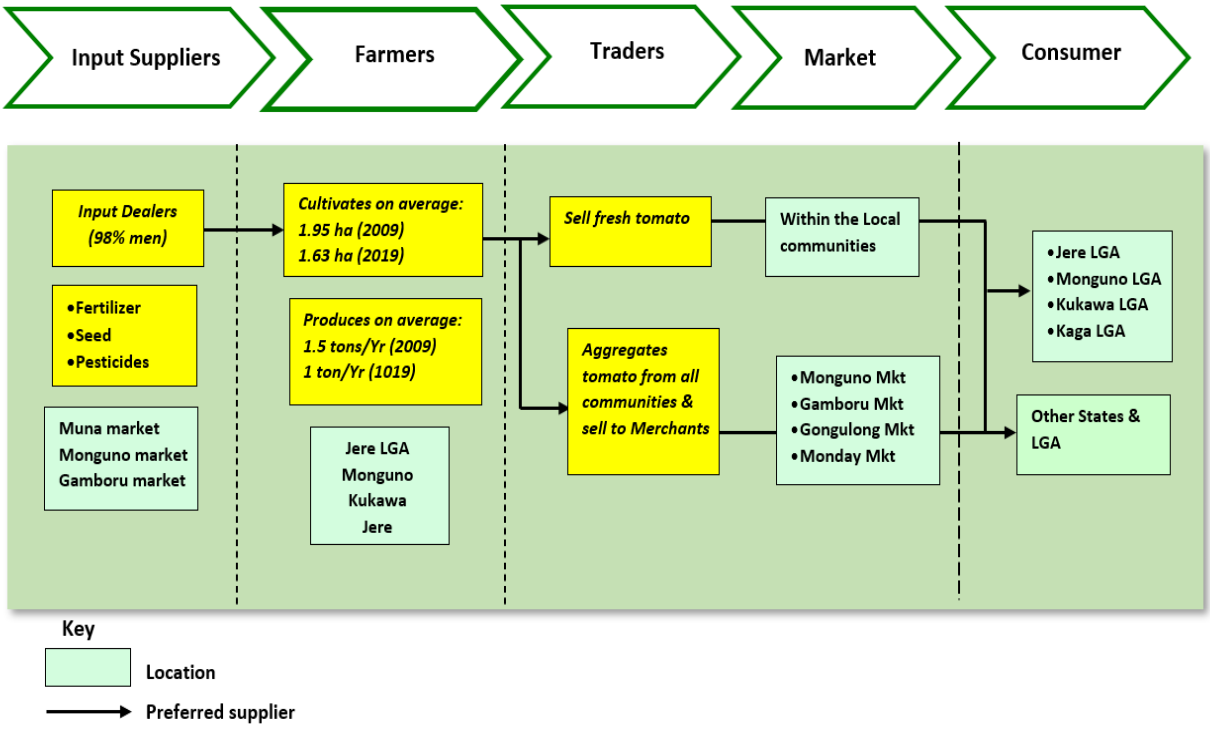
[2] Local variety that has suppose origin Syria
[3] Local variety name originated from Baga Niger

factors can interact and all are influenced by temperature. The rapid quality loss at relatively short period of 4-7 days calls for an efficient means of storing or processing the fruits to reduce wastage. Sadly, there is no processing units in all the study area and the only form of primary processing is grinding into paste and sundried afterward to increase the shelf life. Farmers usually do this during glut period to reduce post-harvest loss. Most times, it is used as part of household meal making and acceptance by consumers is still low. This component of the value chain is not organised in the study areas resulting in little or no value addition to the product. Thus, about 45% of their produce is being lost as a result of price instability, lack of storage facility and no processing units.

- **Input suppliers**

The input suppliers provide farmers with seeds, fertilizers, and agrochemical such as pesticides, herbicides etc. They are located in in the open markets of Gamboru, Monguno and Muna, However, they buy inputs from big input suppliers from Kano, Kaduna, while others are distributors for Jubail, Notore Chemical Industries, Premier Seeds Nigeria Limited, WACOT, Value Seeds, amongst others. In Jere, there was no difficulty supplying inputs to farmers, whereas in Monguno, more than half of the respondents faced difficulties getting inputs from the Maiduguri due to periodical closure of road by the Military. In Kukawa, there is no access to the community due to the insurgence ravaging their communities. There is limitation to input that can be supplied due to lack of capital for business expansion and also, there is no opportunity getting inputs on credit from the major input dealers.

Tomato Value Chain Mapping



Gross Margin Analysis

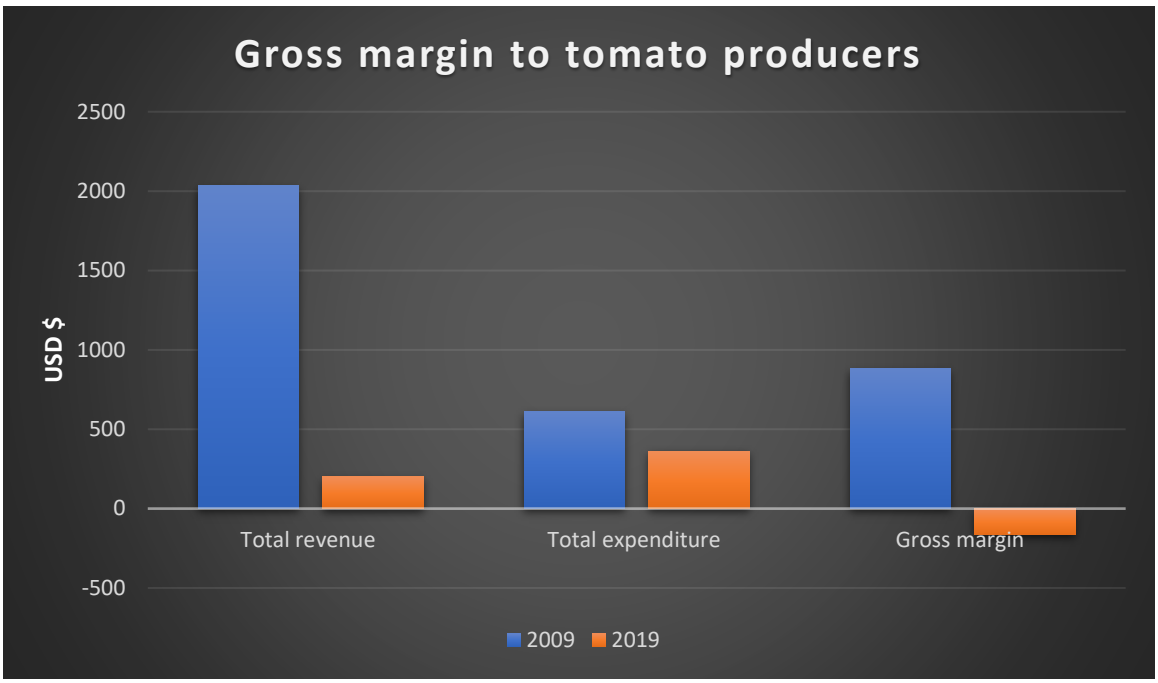


Figure 18: Gross Margin Analysis of Tomato Producers in the Study Area

Gross margin to tomato traders

For tomato traders, average revenue was N349,500 (€873.75), having spent an average expenditure of N294,400 (€736) and with average gross margin of N55,100 (€137.75)from average output of 4,660kg.

CONSTRANTS TO TOMATO VALUE CHAIN

- **Production Constraints**

The farming methods are crude which is due to factors such as high cost of improved seed, most farmers use saved seeds from past harvests, these reduces productivity. Also lack of access to extension workers and knowledge of modern farming techniques constitute a constraint to production. Farmers lack knowledge on post-harvest handling and also the equipment. Tomatoes are also highly susceptible to pest and diseases which most farmers don't have enough knowledge on managing.

- **Trading/Marketing Constraints**

The market is highly fragmented causing the traders a considerable length of time to aggregate economically viable volumes. Tomatoes are highly perishable and thus involves a risk during trading. Also, the lack of access roads to many farms and markets coupled with traveling restrictions in the study area makes tomato trading difficult.

- **Processing Constraints**

Commercial tomatoes processing is limited by lack of industrialization in the study area, lack of capital and technical know-how. Also, the small scale and hence supply of the produce is a major impediment to processing. In addition, lack of storage facilities and standardization of produce poses are Constraints.

- **Input Supplying Constraints**

Tomato production is quite disaggregated in the region giving rise to low demand of input supplies. Restrictions of movement due to insecurity also affects distribution of inputs to farmers. Furthermore, lack of adequate credit structure for farmers disenfranchises them from buying high processed inputs such as seeds, soil improvements and treatments.

SWOT ANALYSIS OF TOMATO VALUE CHAIN

VC Actors	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	Years of experience Large consumer base	Small scale of production. Conservative nature of farmers towards adoption of modern technology Poor agricultural practices. Late adoption of technology Lack of modern storage facility during glut.	High demand for tomatoes nationally	Prolonged Insecurity Climate change Water scarcity during dry season.
Traders	Large set of farmers and market Established business relationships with farmers	Lack of access to finance for business expansion Poorly structured market Inadequate access to supplies Lack of affordable credit and financing High cost of inputs for the production of tomato.	New market opportunities Availability of Tomato from Jos, which is traded from May during scarcity in Borno. High demand for tomatoes	Over-dependence on dam water, which dry ups in April/May. Multiplicity of middle men Dwindling market opportunities Lack of infrastructures Insecurity. Restrictions to movement
Processors	Availability of market for Local consumption of processed goods. Large customer base	Lack of technical know-how on processing Lack of capital Poor adherence to processing standards Infrastructure deficit Lack of knowledge on simple processing	Leather market Periodic interventions thrust by NGOs and government institutions	Lack of knowledge on food safety. Lack of infrastructures Dwindling supply Insecurity. Fragmented supplies Insecurity Fluctuations in prices
Input supplier	Large customer base Large number of inputs users	Lack of optimum market opportunities Lack of access to financing. Inability to meet input demands Low technology adoption. High level of illiteracy of producers Inadequate capital		Unstructured market Lack of infrastructures Low patronage of inputs insecurity Poor purchasing power of producers

		Market is highly segmented		

ONION VALUE CHAIN

Onion is one of the important vegetable crops cultivated in Borno state and production cuts across our study area. Nigeria cultivates 1.1 million tons out of 2.5 million tons being demanded in West Africa and the demand is increasing with population size. Onion is grown in large quantity during the dry season and the storage facility used are mostly constructed with local materials, which could retain the quality of onion within 3 months. As a result, during this period prices are very low due to glut situation. Thereafter, the rise in prices is quite rapid and sometimes wide fluctuations occur leading to dissatisfaction amongst the producers as well as consumers. During this bulk production period (January- April), onion growers either sell their produce at low price in fear of high storage loss or store for a few days using traditional methods under ambient environment. In both cases, traders have more control of onion price in favor of the farmers because of inefficient or unavailability of storage facilities. This situation influences the decision of the farmers in selling their produce directly to the market after harvest in order to avoid post-harvest loss. According to Mrema and Rolle (2002), that about 20-40% of onion are lost to post-harvest losses largely due to inefficient storage techniques.

In the study areas, Bama red variety is the most common and has higher demand than the white variety. Onion cultivation is a high value crop in the study area and enjoys a competitive advantage hence it is important to promote it among stakeholders so as to maximize its growth potential. Onion is cultivated during the dry season and can be cultivated in the study area.

Onion sets are either purchased in the market or saved from the previous season. It is planted directly into the soil after ploughing with tractor or cow-plough. It is irrigated by construction of water channels or furrow to the farm to ensure it is well irrigated throughout the production cycle. Pesticides are used when necessary and many of the farmers do not use fertilizer except for cow dung when available. After maturity, it is harvested and cured with the sun to reduce spoilage. According to farmers, this is the major reason onion is not cultivated during the rainy season. Farmers sell their bags of onion in the open markets or directly to traders who distribute to other parts of the state or region unlike 10 years when they were distributed to Gwoza, kano and Cameroon. There is no processing done on onion rather it is sold directly to final consumers who use it for personal or commercial consumption.

> *"…Yes, before we used to plant onion, I used to do it with my three wives, I can get over 100 bags, plus and bring it to Maiduguri to sell and go back to my place that is how we do it. But now to get the farm is a problem, I did not find a better farm and even our vehicles we left them there and they burnt it all. They have no use, I came to muna and settled down but there was no land to plant onions so I moved to this place. I wanted to rent a place but my inlaw gave me a place so I set my tent and later on fire burnt the whole of this place. My wives brought their properties that is worth 400 thousand also burnt, now all the bulamas here in fariya went and witness it. But now since we are alive and in good health, we thank God and if everything will be fine and will go back to my place, I am the former bulama. I have my family and my place is peaceful I thank God..." Alhaji Dugje, Fariya*

Production Capacity

Onions are mostly cultivated in a mixed cropping system with other vegetables such as tomato and pepper. The average yield of onion in the study area is put at 1.6 tons/ha Farmers in the study area produced an average of 2.5 tons (25 bags of onion) annually before the insurgency and currently produce average of 1.4tons (14 bags) per annum.

ONION VALUE CHAIN ACTORS

Input suppliers

The input suppliers are medium scale enterprise serving the various commodities chain in the state. At this stage of the value chain, there are many actors who are involved directly or indirectly in the agricultural input supply in the study areas. Currently, private-owned input suppliers are the main source of farm inputs, farmers also contributed in this stage. All such actors are responsible to supply agricultural inputs like improved seed varieties, fertilizers, herbicides, pesticides and farm implements which are essential inputs at the production stage. For major onion produced in Monguno, Kaga and Jere, the majority of the farmers used their own bulbs. Regarding fertilizers, organic fertilizer (manure and compost) were used by almost all the farmers while other farmers used liquid inorganic fertilizer. Also, pesticides are supplied mostly by private vendors (SMES).They can be found in the open markets of Muna, Bolori, Monguno central market, Gamboru and Kaga market.

Producers

The producers are predominantly farmers and farming household. They are the major actors who perform most of the value chain functions right from the farm; procurement of farm inputs, land preparation and maintenance to post harvest handling and marketing. The major value chain functions that farmers perform include ploughing, planting, fertilization, irrigating, weeding, pest/disease controlling, harvesting and postharvest handling. Postharvest handling, which includes different activities like sorting, grading, packing, storing, transportation, loading and unloading, are performed by the farmers themselves or traders.Their role in the onion value chain is to ensure steady production. Usually they cultivate on a small scale of average 1.5 hectare of land and rely on the use of crude implements for operations. There's widespread of illiteracy among the producers and at the same time, no contact with extension agents, which often affect adoption of innovation (practices, technology) and this was observed in their poor agricultural practices (For instance, spraying of pesticides without observing the pre-harvest interval (PHI) Also, the diverse agro-climatic conditions can make growing onion crops highly cost-effective and competitive, and provide vast opportunities in the study areas. Unfortunately, these opportunities have not been exploited by the farmers due to the lower price they receive for their produce in the markets, as well as bearing the cost of post-harvest losses. There are high postharvest losses (40%) due to improper harvesting, handling, packaging and poor facilities to market.
They sell to aggregators (traders), wholesalers and consumers at their farm gates and open markets. Some of the markets are Monguno market, Monday Market, Gamboru, Muna and Kaga market

Traders

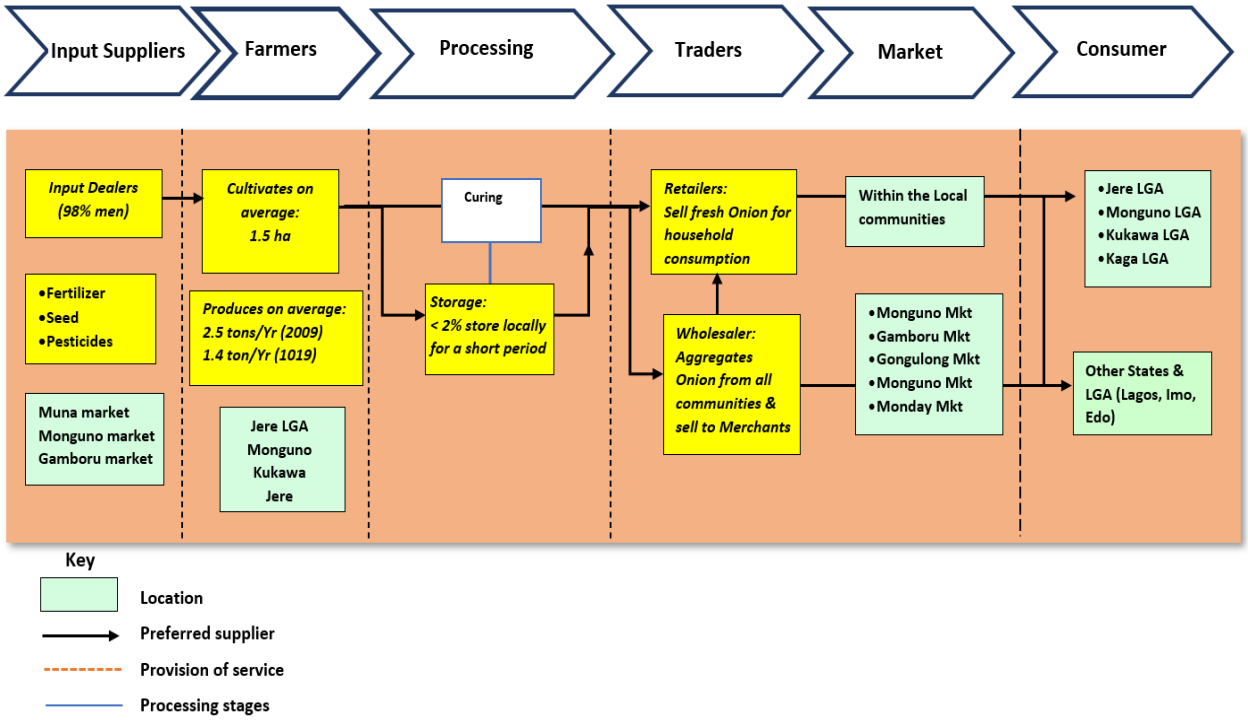
There are two types of traders, the local traders (collectors) and the big traders (also known as wholesalers).
The local traders are in assembly markets who collect onions from farmers in village markets and from farms for the purpose of reselling it to wholesalers and retailers. They use their financial resources and their local knowledge to bulk onion from the surrounding areas. They play important role and they do know areas of surplus well. The trading activities of local traders include buying and assembling, repacking, sorting, transporting and selling to wholesale markets, retailers, as well as consumers. The major onion markets in the study area are Monguno main market and Gamboru market where big traders or wholesalers are mainly involved in buying onion from local traders and farmers who deal in large volumes than any other actors and supplying them to long distance major markets in other part of country like Katsina, Yobe, Mile 12 and Agege markets in Lagos). They also store product, usually for a maximum of three days. Survey result indicates that wholesale markets are the main assembly centers for onion in the surrounding areas. They have better storage, transport and communication access than other traders. Almost all wholesalers have a warehouse in a market either self-owned or rental basis. They are located in market.

The trader's aggregates and sometimes store the onions till market price is at peak before distribution. A bag of onion at the goes for average of N25 000 (€62.5) and as low as N8,000 (€20) per 100-kg bag at the peak period in March

Processors

The major notable processing activity in the study area is the curing/drying of harvested onions after harvest This account for about 25% of the total production which is usually carried out by farmers and trader who are not ready to sell their onion at the time of harvest. The main issue at this stage is that majority of the farmers do not sort rather heap all their harvest to sundry (to reduce the moisture content). Local storage is also done in specially constructed barns to provide a safe place to store onion till market prices are favorable.
Retailers and Consumers
Retailers involvement in the chain includes buying of onion, transport to retail shops, grading, displaying and selling to consumers. They are the last link between producers and consumers. They mostly buy from wholesalers and sell to urban consumers. Sometimes they could also directly buy from the producers. Consumers usually buy onions directly from retailers as they offer according to requirement and purchasing power of the buyers.
Consumers are those purchasing the products for consumption. About two types of onion consumers were identified: households and, restaurants/food vendors. Private consumers purchase onion directly from producers, retailers and wholesalers, though most of the consumers purchase from retailers. Farmers also make important segment of the rural consumers since they consume part of their produces (about 10-20%). Consumers prefer medium size, circle shape, red colour, strong, dray and free from damage

ONION VALUE CHAIN MAPING



Gross Margin Analysis

Gross margin to onion producers

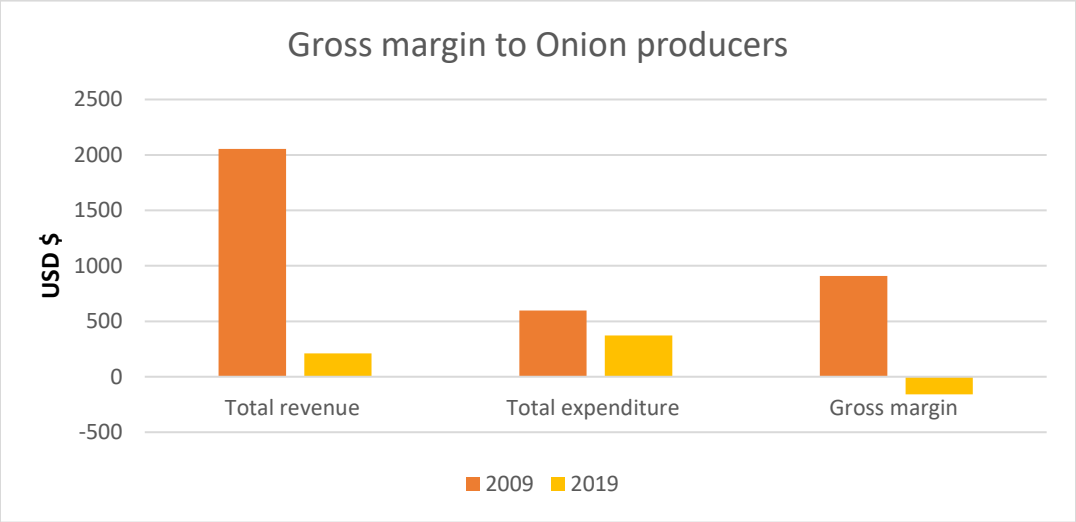


Figure 19: Gross Margin Analysis of Onion Producers in the Study Area

Gross margin to onion traders

For onion traders, the results showed that the average revenue made was N1,335,333.33 (€3,338.3) (output of 6,678kg), having spent an average expense of N1, 251,133.33 (€3,127.8) and average gross margin of N84,200 (€210.5).

Constraints to onion Value chain

Production Constraints

Farmers are faced with lack of capital to finance inputs, as a result resort to the use of saved seeds from past harvests. Also, there is limited access of extension services to the study area, making it difficult to break the cycle of old cultivation practices. Water unavailability is also posing grave threats to production, places like Kukawa, Monguno, Gongulong, Fariya and Kirbiri are constrained by lack of adequate water for irrigation. Furthermore, farmers are faced with post-harvest losses due to lack of knowledge on post-harvest handling.

Trading/Marketing Constraints

Restrictions to movement and insecurity ranks as a major limiting barrier to trading in the study area. Also, the fluctuations in market prices, lack of access to market information, poor transportation and storage infrastructures are factors inhibiting trade and marketing in the study area.

Processing Constraints

Processing activities are non-existent as farmers sell directly to consumers.

Input supplying Constraints

The demand for inputs such as seeds, fertilizer is limited in the study area, this stems from ban placed on fertilizer importation and small-scale nature of production. Farmers produce their onion sets from their previous harvest and also use manure in the production of onion. Also, inputs suppliers are faced with lack of capital to expand their business and unavailability/inaccessibility of improved onion seeds. The restrictions of movement and insecurity is also contributing to limitations of the inputs' supplies chain.

SWOT ANALYSIS OF ONION VALUE CHAIN

VALUE CHAIN ACTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	High demand for produce Long years of experience in cultivation Large consumer base Long years of experience	Small scale of production. Late adoption of technology Lack of capital and access to inputs Aging of farmers	Periodic interventions thrust by NGOs and government institutions. Access to Land	Prolonged Insecurity Climate change Aging of farmers
Traders	Readily available demand for their goods. Low cost of trading Readily available demand for their goods. Large set of farmers and market Established business relationships with farmers	Lack of access to finance for business expansion Poorly structured market Inadequate access to supplies Lack of critical infrastructures such as storage Fragmented supplies of produce Poor post-harvest handling	New market opportunities Periodic interventions thrust by NGOs and government institutions Economic opportunities for young people No barrier to entry.	Poor transportation infrastructures Multiplicity of middle men Dwindling market opportunities Lack of infrastructures Insecurity. Lack of storages infrastructure Restrictions to movement.
Processors	Availability of market for Local consumption of processed goods. Large customer base High demand for processed fish	Infrastructure Deficit (storage, cold chain, transportation) Lack of technical know-how on processing Lack of capital Poor adherence to processing standards Lack of knowledge on simple processing	Leather market Periodic interventions thrust by NGOs and government institutions	Lack of knowledge on food safety. Lack of infrastructures Dwindling supply Insecurity. Fragmented supplies Insecurity Fluctuations in prices
Input supplier	Large customer base High demand. Large number of inputs users (herbicides, fungicides)	Lack of optimum market opportunities Lack of access to financing. Inability to meet input demands Low technology adoption. High level of illiteracy of producers	Periodic interventions thrust by NGOs and government institutions	Unstructured market Lack of infrastructures Insecurity Poor purchasing power of producers

		Inadequate capital Market is highly segmented		

CHILLI PEPPER VALUE CHAIN

Chili pepper cultivation is an important food and economic crop throughout the state and especially our study areas. The short maturity period, nutritional and economic relevance all contributed to its popularity among farmers in the state. However, production is predominantly carried out by small holder farmers with very limited value addition. The cultivation is carried out during the dry season under irrigation system; hence availability of water is a major determinant in the cultivation of chili pepper across the study areas. The methods of cultivation adopted by farmers is still crude however the process of raising seedlings for 3-4 weeks before transplanting is widely practiced. In addition, fertilizer usage is common among farmers using an average of 1 bag of NPK per hectare. The seedlings are raised and transplanted to land already prepared into ridges and heaps and local seeds were planted obtained from the previous planting season. This crop is cultivated in Jere, Kukawa, Kaga and Monguno and the commonest variety is the Damasak, which has its origin from Damasak (Mobbar Local Government Area) with an average yield of 2.4 tons/ha. The major pepper market (Gesgeru market) is located in this town and pepper are transported to Gamboru market, where it is distributed to secondary markets like Muna and Monday markets.

Production Capacity

Chili pepper is also planted during the dry season and irrigated to increase yield. The system of production follows the same as that of onion except that seedlings are raised first for 3-4 weeks before transplanting on ridges or heaps. fertilizer is applied at one dosage (1 bag per hectare) and properly irrigated through water furrow and it is ready for harvest in 3 months. It is harvested and sold in baskets in the open markets. On average, farmers in the study area produce on average 3 tons per annum before the insurgency but presently produce an average of 1.6 tons per annum, as production activities commences from August till December while harvesting takes place from December to April.

The major issue is land availability for expansion for most of the farmers in the study areas, whose livelihood had been shattered and needs to increase their income to make a living.

"...Since I was born I have been rearing cattle, since I was born any father died and left for us more than thousands of cows, known him I left my village with only shirt and trouser, those people went away with six of my children, there is twins and 4 of my daughter up to now I have not heard about them. Now I came to this town and started onion business and chi-pepper, I have looked for a place to farm rice but I couldn't get that of onion and chi-pepper. We are doing it close to the river. After we harvest it we use to sell it in the gamboru market and buy maize or sorghum to eat in our homes. The farm is not big and has no more than 1 plot. I have looked for a bigger place but I didn't get one." Alhaji Dugje, Fariya

CHILLI PEPPER VALUE CHAIN ACTORS

Producers

The producers are farmers working on less than two hectares of land. Chilli pepper is cultivated as a small scale while farmers mostly cultivate other vegetables as mixed crop using the same irrigation system. The use of mechanization is also limited due to lack of access and also fragmentation of lands. Farmers sell chili pepper as fresh or dried produce to local traders, big traders or consumers within their vicinity.

Traders

The traders are either indigenous people of the state engaging in intra state trading or traders from other part of the countries. The local traders act as aggregators or collectors, who buy from farmers in villages or local markets and sell in bulk to wholesalers, who sell at the open markets in baskets and bags to retailers and other traders outside the state. Besides, local traders serve as suppliers/agents for the traders outside the state such as Yobe, Katsina, Lagos, and Ibadan.

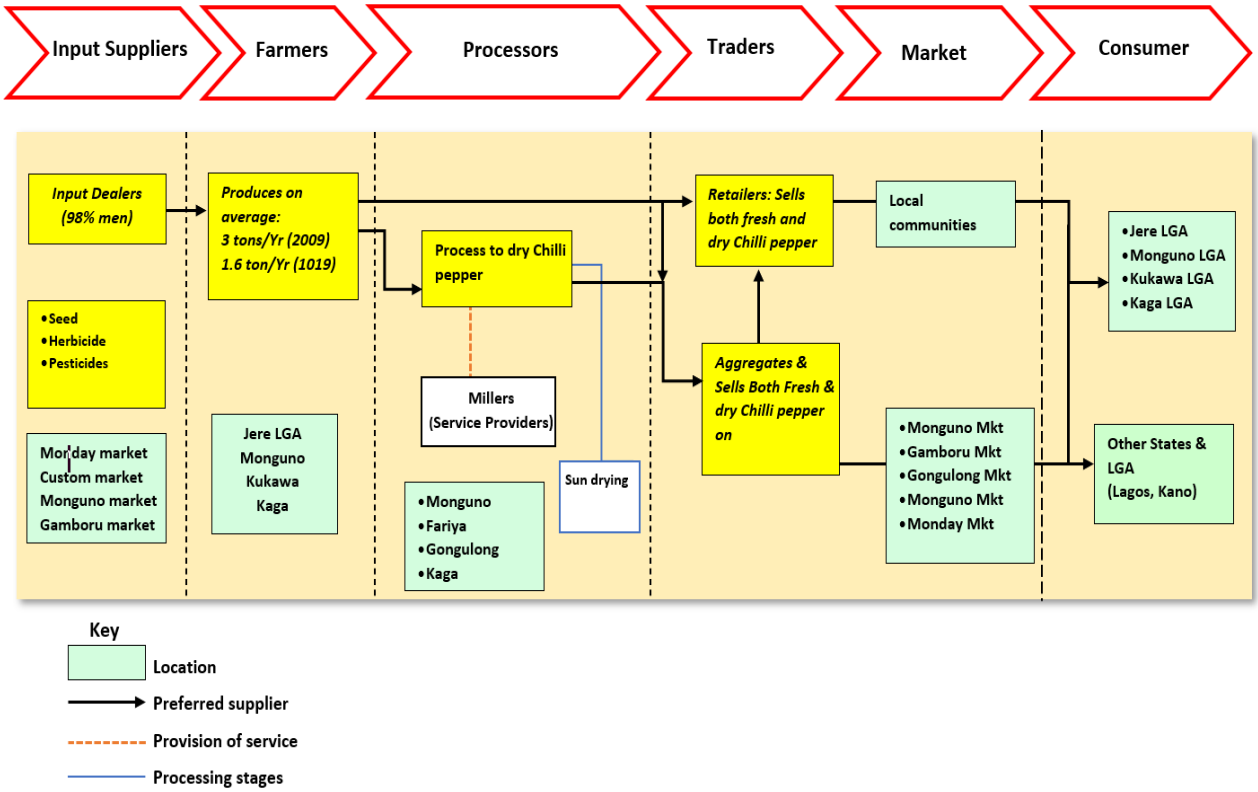
Processors

Processing of chili pepper is done at the primary level in the study area. The processing observed involves sun drying and milling pepper into powdered form. The farmers and traders are also involved in processing and the simple equipment of grinding machines is used. The chili pepper is dried to remove moisture content and subsequently taken to the mill for conversion into powder. No Additives are added, and the dried pepper is used for condiment in local meals and on popular meat snacks 'kilishi and suya'

Input suppliers

The chemicals, soil improvement, improved seeds, are all limited in use due to economic factors, security situations, climate change and conservative nature of farmers. The input suppliers sell their goods in open markets, usually offering credit to farmers as necessary. However, majority of the farmers in the study area save their seeds from previous season. Only pesticides and herbicides are purchased from input suppliers.

CHILI PEPPER VALUE MAPPING



Gross Margin Analysis

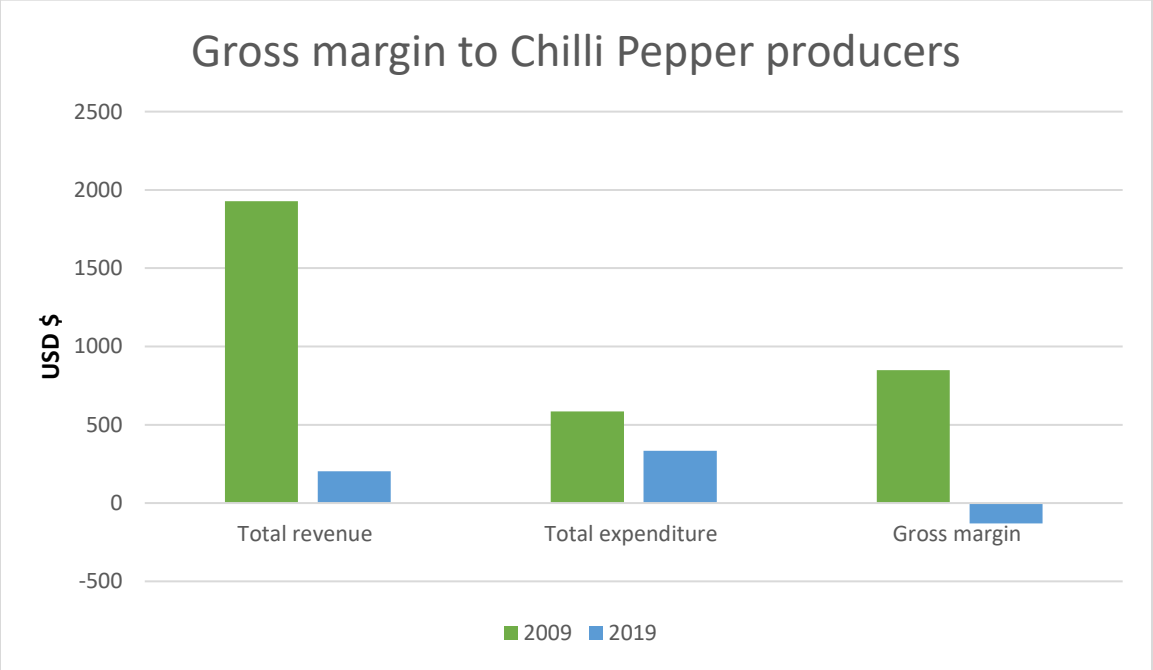


Figure 20: Gross Margin Analysis of Chili pepper Producers in the Study Area

Gross margin to Chili Pepper traders

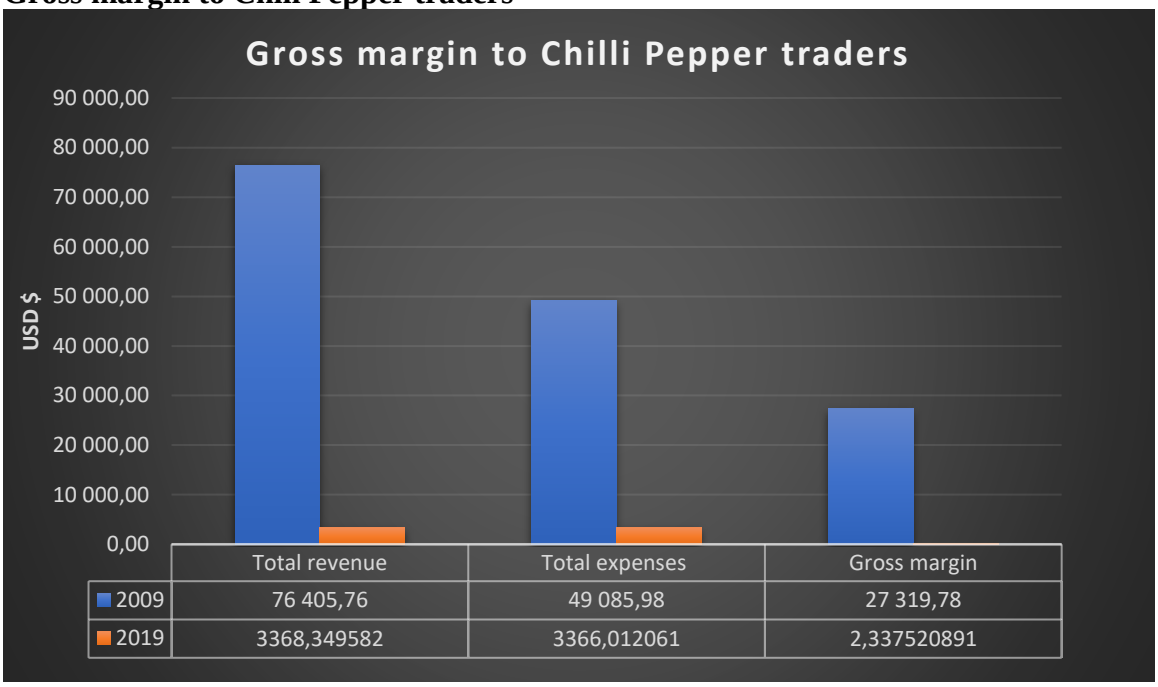


Figure 21: Gross Margin Analysis of Chili pepper Traders in the Study Area

CONSTRAINTS TO CHILLI PEPPER VALUE CHAIN

Production Constraints

Farmers in the study area highlighted lack of capital to finance inputs as the major constraint in the production of chili pepper also the restrictions on movement makes it impossible to access some of their market hence dwindling market opportunities. Climate change and the resultant loss of water bodies is a limiting factor in production given that the farmer rely on irrigation for cultivation.

Trading/Marketing Constraints

Traders and the marketing actors are faced with a Lack of a structured market, and appropriate pricing mechanism, restriction to movements and poor infrastructure such as storage and Dwindling supplies from the farmers.

Processing Constraints

The processors in the study area are affected by lack of modern processing equipment, capital to expand processing operations. In addition, there is a technical know-how gap on modern processing.

Input supplying Constraints

Restricted movement of goods and people due to insecurity has caused a major disruption to flow of trade and inputs, also poor roads infrastructure and displacement of farmers remains a constraint in the input suppliers' chain. Farmers often rely on seeds from previous harvest for cultivation.

SWOT ANALYSIS OF CHILIPEPPER

VALUE CHAIN ACTORS	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Producers	Long years of experience Closeness to customer base	Small scale of production Lack of capital and limited access to input in Monguno and Kaga. Poor agronomic practices High illiteracy level and late adoption of modern technology.	Readily available market	Prolonged Insecurity Aging of farmers Climate change (High evapotranspiration) Government policy to ban Urea
Traders	Existing relationship with farmer Long years of experience Low cost of trading Readily available demand for their goods. Large set of farmers and market Established business relationships with farmers	Lack of access to finance for business expansion Inadequate access to supplies Lack of affordable credit and financing Lack of critical infrastructures such as storage Fragmented supplies of produce Poor post-harvest handling	New market opportunities Economic opportunities for young people No barrier to entry. Availability of trucks for goods movement	Multiplicity of middle men Dwindling market opportunities Insecurity Lack of storages infrastructure Restrictions to movement. Poorly structured market poor price mechanism
Processors	Availability of market for local consumption of processed goods. Large customer base Long years' experience in processing	Lack of technical know-how on processing Lack of capital Poor adherence to processing standards Poor processing technique Lack of knowledge on post-harvest handling	Leather market Periodic interventions thrust by NGOs and government institutions. No barriers to entry Job creation opportunities Interventions by INGOs.	Lack of infrastructures Insecurity. Infrastructure deficit Fragmented supplies Fluctuations in prices Dwindling supply from farmers Low quality supplies
Input supplier	Large number of inputs users. Knowledge of customers preference Inputs availability all year round	Lack of optimum market opportunities Lack of access to financing. Inability to meet input demands Low technology adoption. Poor after sales service Poor handling of product after sales	Availability of untapped and new markets in the study region.	Poor road network Movement restrictions disenfranchising farmers from making purchase. Conservativeness of farmers. Insecurity.

SELECTED PRIORITY VALUE CHAIN FOR INTERVENTION BY RESILAC

All the pre-selected commodities are very vital in boosting the economy of the Borno state viz-a-viz job creation, income generation and empowerment. However, some specific value chains have been carefully selected and prioritized based on certain factors. (This method adopted in identifying priority value chain was adapted from Senegal's Projet Croissance Economique supported by USAID in 2005 (*Carlton Jones and Martin Webber, 2007)*. The considered factors are highlighted below:

1. Mandatory value chain
2. High economic impact value chain
3. Private sector appeal
4. Empowerment and employment creation
5. Feasibility of the value chain

1. **Mandatory value chain (MC):** If the Government prioritized development of a subsector, it was automatically given strong consideration. These priority subsectors were identified based on Government policies that emphasized the subsectors because they were considered vital to the state, had high value added, or were import substitutes. Using these criteria, Maize, millet, rice, chili-pepper, tomato, onion, sheep, goat, fish and cowpea were priorities. However, it differs across the study areas.

2. **High economic impact value chain (HE)**: Next, subsectors with extensive economic impact on the study areas were given priority. We examined for subsectors with perceived competitive advantage, perceptions of high impact on rural incomes and employment, or export market potential. Maize, millet, rice, chili-pepper, tomato, onion, sheep, goat, fish and cowpea were priorities identified through these criteria. This is the same across the study areas.

3. P**rivate sector appeal (PS)**: Next, we examined subsectors that were of interest to private enterprise, were already a focus of the private sector, or that had a high likelihood of attracting private domestic and foreign direct investment. Thus, Maize, millet, rice, chili-pepper, tomato, onion, sheep, goat, fish and cowpea subsectors were also considered priorities. It differs across study areas.

4. **Empowerment and employment creation (EC)**: Supplementing the criteria highlighted above were crosscutting themes like poverty reduction, women's empowerment, and employment creation. Maize, millet, rice, chili-pepper, tomato, onion, sheep, goat, fish and cowpea were selected as priorities. It cut across all the study areas in a similar way.

5. **Feasibility of the value chain (FA)**: Finally, a value chain analysis and feasibility analysis were conducted to verify soundness and opportunities, to determine which three of the initial six subsectors would be selected for the interventions, and to guide the nature of the particular value chain emphasis within each sector. Maize, millet, rice, chili-pepper, tomato, onion, sheep, goat, fish and cowpea were selected as priorities. However, it differs across study areas.

However, considering these factors, empirical information was not employed rather qualitative data, thus the shortcoming.

To better understand the market competitiveness, benefit-cost analysis was used to augment the initial analysis.

The benefit-cost analysis (BCA) directly measures the profitability of an economic activity. Suppose the benefit-cost (BC) is greater than 1, it implies that the production of the commodity *is* profitable (i.e. the revenue is greater than the cost); then this study area is deemed as having "comparative advantage" in producing the particular commodity. The larger the BC ratio becomes, the greater the advantage is. In contrast, *BC* less than 1 indicates that the production of a particular commodity is not profitable, would imply that it has "comparative disadvantage" in producing the commodity. The smaller the BC ratio is, the greater the disadvantage would be.

Against this backdrop, five (5) commodities were selected as priority value chains in the study area namely maize, rice, onion, cowpea and millet respectively.

Figure 22: Table Showing Ranking of Priority Value Chains in the Study Areas

Commodities	**MC**	**HE**	**PS**	**EC**	**FA**	**Mean**	**BC**	**Grand Mean**	**Ranking**
Maize	1	4	4	4	4	3.4	3.11	3.26	1st
Millet	1	4	4	4	4	3.4	0.93	2.17	5th
Rice	4	4	4	4	4	4	1.07	2.54	2nd
Cowpea	4	4	4	4	4	4	0.66	2.33	4th
Tomato	4	4	4	4	1	3.4	0.8	2.10	6th
Chili pepper	4	4	4	4	1	3.4	0.8	2.10	6th
Onion	4	4	4	4	4	4	1	2.50	3rd
Sheep	4	4	1	4	4	3.4	0.55	1.98	9th
Goat	4	4	1	4	4	3.4	0.55	1.98	9th
Fish	4	4	4	4	2	3.6	0.54	2.07	8th

Source: Field Data, 2019

Rating is 0 or 1 based on the factors in each of the study areas. Thus, the maximum point for all the study areas is 4, while the minimum is 0.

These priority VCs have been discussed in detail in subsequent paragraphs:

Maize Value Chain

Borno State has good climatic conditions which supports the growth and development of maize and all the study areas cultivated maize in large proportion before the insurgence. However, this subsector has been plagued with several challenges since the insurgence started 10 years ago, some of which were inaccessibility to land as a result of insurgence, low yield due to unavailability of fertilizer, increasing pests attack, increasing cost of production, low market supply, and lack of capital and credit facility. These challenges have impacted negatively on the livelihood of the people especially the women and youth who serve as labourers for maize threshing, cleaning and

bagging in the study areas. Notwithstanding, this value chain poses to rejuvenate the economy of the State owing to its unique characteristics as it has a high value addition, adaptable to the climatic conditions of the study areas and perceptions of high impact on rural incomes and employment. Therefore, proffering viable solutions to identifiable problems will go a long way to strengthen the value chain. For instance, farmers in Jere LG lamented on the infestation of caterpillar-like worm in the last 2 years with no viable solution and had impacted on the yield of their maize by 40% reduction and in worst cases 70%.During FGD in Fariya, the farmers complained bitterly of infestation of fall army worm which had ravaged their maize farm with no successful control yet as synthetic pesticides used had been ineffective. Sadly, there is no technical personnel to assist on the solution, and even the input suppliers have no idea of the appropriate pesticide to be used. Way forward, farmers in this study area (Jere) need to be trained on integrated pest management (IPM) and the preparation and use of neem extract and neem oil (since neem trees were available in the study area and underutilized).

Furthermore, the ban placed on urea fertilizer by the Federal Government of Nigeria has affected its availability and that of NPK by overzealous Military personnel, who believe both fertilizers are the same. These fertilizers are sources of nutrients to maize and provide fertility to the soil (it improves soil structure). Thus, majority of the farmers are forced to use liquid fertilizer (of low nutrients) and few others use cow dung. This was the situation in all the study areas and the effect of insufficient nutrients to maize could reduce yield by 41% (Tolera, et. al, 2017). The introduction of organic fertilizer to the farmers would be a welcome idea as none was found in all the study areas and also, training on compost making would be a viable option especially for farmers in Monguno, Kaga and Kukawa. This will help to create more jobs for those in the IDPs and promote empowerment for women and youths.

Besides, all the respondents at one time or other lost their capital, which affected/ still affecting the economic activities in all the study areas. In Kukawa, they are yet to recover as all the respondents were living in IDP at teachers' village in Maiduguri and depend solely on handouts and food relief from INGOs. In Monguno, the situation is not different but economic activities had commenced and all the respondents earn a living with little support from INGOS. In Jere, it is the same. It is worthy to note that all the respondents do not have access to credit facility, although few had got loan from family members and friends in the past years and repaid fully, with no collateral and interest. Currently, such loan is unavailable as majority of the population is still struggling to earn a living. There is a willingness to access such credit facility for business expansion especially for Jere and Monguno only, however, with no interest (with strong religious belief). This would lead to job creations as business expansion would be possible especially for the maize farmers and traders. In essence,traders should be supported with soft loan. As this was buttressed during the KII with Head of traders in Kirbiri, he complained that many traders were out of business as a result of lack of capital, and it was difficult to access credit from commercial banks. Besides, only no interest loan can be collected due to religious belief. In disbursing this type of loan, traders 'associations should be empowered to provide members who genuinely needs it and repayment through them, thus they serve as guarantor. AAH should ensure to build partnership with Islamic banking institution such as Jaiz bank in Maiduguri.

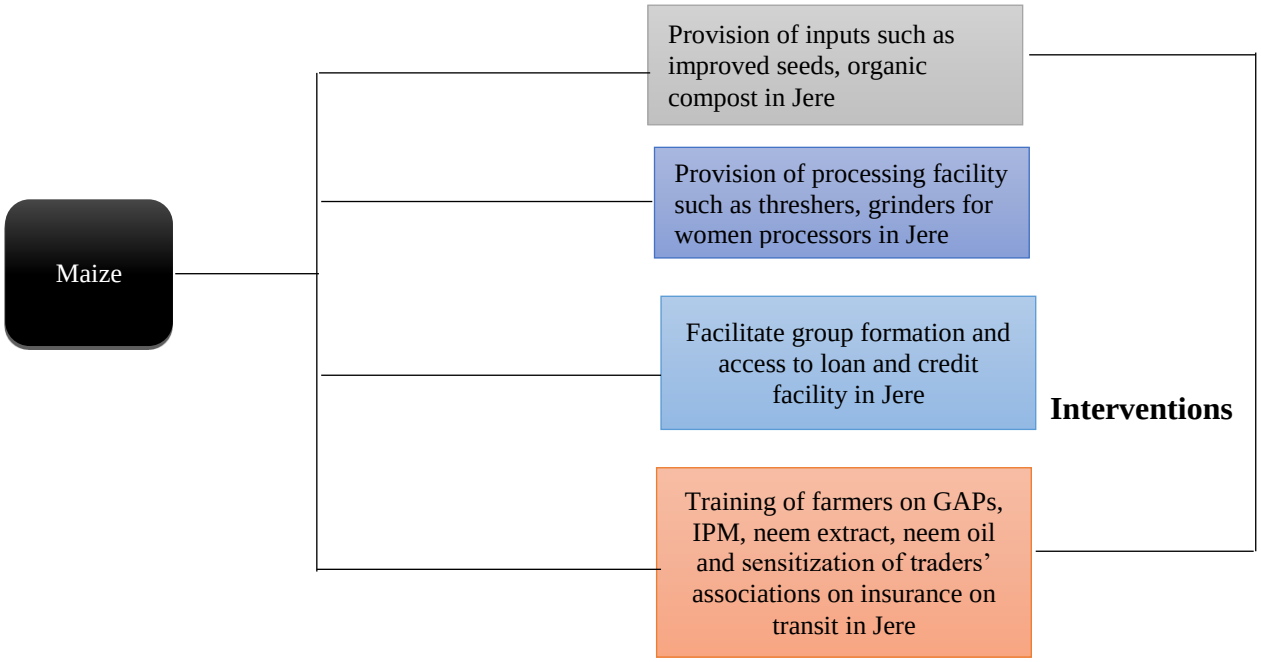
Consequently, distribution of maize is favored by availability of sufficient number of trucks This was efficient before the insurgence as more than 10 trucks uplift commodity from Gamboru to Lagos and Ibadan per day. Sadly, this has reduced drastically to about 8 trucks per week (about 775% reduction) and the cost of transportation increased largely due to insecurity and other factors like price of fuel and inflation. This situation has been discouraging for many maize traders whose buyers are outside Borno state and those buyers had resorted to buying from other relatively peaceful States. Furthermore, the traders in the study areas highlighted few cases of accident and theft due to attack on the road, which resulted to total losses. It is recommended that AAH work with insurance companies (IGI, Niger insurance company etc) to create awareness of the importance of goods-in-transit insurance package for traders to share risks and minimize losses.

Maize cultivation is predominant in Jere local government as there was no restriction compared to Monguno whose restriction has been due to the insurgence. Furthermore, land is more accessible in Jere LGA compare to Kukawa and Monguno. In Kukawa, all of the respondents live at internal displaced camp (IDP) in Teacher's village, where farming activities are very restricted and land unavailable for the production of maize. The cost of production is borne by the farmers through planting, threshing, cleaning and bagging. The farmers provide wages for its labourers at various stages. Selling of maize is determine by prevailing market prices, if it is low, farmers keep it. This always happen between September to December as harvest period falls between that period in the study areas. By January, the price of maize tends to increase till the rainy season. Farmers sell their products in major markets such as Gamboru, central market, and Kaga market or traders come to farmers house to make the purchase. In all, the transaction is cash and carry basis at agreed based or market price depending on the situation at hand and place of purchase.

Sadly, the yield of maize in the study areas is still very low (1.5 tons per hectare) as a result of the continuous use of seeds from previous harvests, inappropriate planting population, inadequate fertilizer application, and pest infestations. Input suppliers in muna market and Monday markets do not sell improved maize seeds as the demand was very low and not readily available in Borno except from other states such as Kano, Kaduna and Plateau states. Thus, awareness creation should be done for the farmers on the use of improved seeds (SAMMAZ 53, SAMMAZ 54, Seedco hybrid)for their planting operations and local seed companies should be identified and empowered to ensure easy accessibility to the farmers at lower cost.

Trading of maize is predominantly in Muna, Monday, Gwoza and amongst other markets and are done by local traders, who buy directly from smallholder farmers through aggregation, then sell to large traders or processors. The payment mode across these actors is always by cash on delivery after quality inspection by the buyers. The demand for white maize is still very high as large processing companies such Animal care (Kano), Flour Mill of Nigeria (Top feeds) in Ibadan use it as major ingredients for their products (livestock feed) in other states. Processing of maize involves grinding the maize into a powder form, which is purchased by direct consumers to make local delicacy. The commercial demand for the maize powder is still very low compare to the whole grain market. However, consumers prefer grinding their maize compared to buying ready-made, largely due to price factor. The revenue model for all the actors on this value chain is the same, fee-for-products. Simply put, cash payment for produce sold. Prices of produce are based on the forces of demand and supply at any given period.

Figure 23: Maize Value Chain Interventions



Rice Value Chain

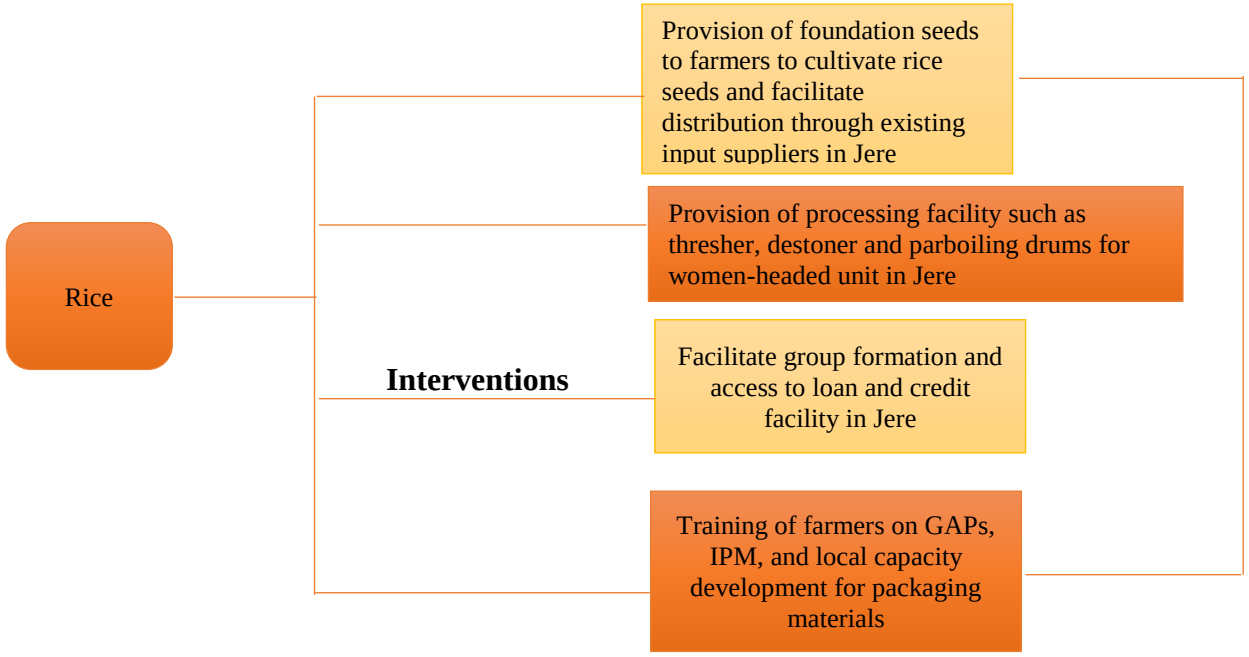
Rice production is common in Jere and Monguno LG among the study areas due to the nearness to Zabarmari, which is the hub for rice cultivation in Borno State and the Lake chad basin respectively. Since the Federal Government of Nigeria ban importation of rice, several programmes have been implemented to increase supply of local rice in Nigeria. Through the Anchor Borrowers Scheme, the FG had invested heavily in this subsector, and encouraging consumption of local rice to help improve the economy. Since the border closure, the demand for local rice had increased tremendously, thus increasing production capacity from 4 million metric tons to about 8 million metric tons. Part of the communities in Jere local government (Gongulong, Fariya), hasa total land of about 22,000 hectares suitable for rice and can contribute to more than 30,000 tons to the country rice production capacity. Furthermore, rice farming has been an age long practice, thus has competitive advantage in production as all of the farmers are experienced and understood their environment; pattern of rainfall. Sadly, the absence of mechanization in production, poor knowledge of modern rice processing and packaging methods had been major challenges plaguing this subsector. In addition, replanting of rice seeds harvested in previous season resulting to low yield and unavailability of water pumping machine for dry season farming. There is opportunity in investing in modern rice processing facility and mechanization, SMEs for rice seed, collaboration with private tractor hiring services, and employment opportunities for women and youths in the study area.

Local processing units headed by women were available in gongulong and fariya, and they adopted the traditional processing method (*Wafutu*). It is laborious, time-consuming and inefficient. There were very few modern processing facilities in the study area. The activities involved in rice processing are threshing, parboiling, drying, milling, cleaning and bagging, and can be done simultaneously using a modern rice milling machine. This will increase rice processing efficiency,

increase paddy rice demand and create more jobs in the study area. Also, the demand for packaging material is on the high side and the supply is still low. The packaging materials are insufficient and women can be empowered to produce more bags for not only rice but other commodities. This would provide employment opportunities, increase and growth of SMEs in the study area.
Moreover, building a low-cost, small-scale agro-input SMEs for rice seed will create more jobs for women, youths in the study area. Rice seeds production is still novel in this area as no local input supplier was found during the study and it was observed that its availability will create its own demand. This was suggested as a result of feedback from the farmers during the FGD. Many of the farmers only use rice seeds from previous planting season because they were not aware of improved varieties and those that were aware did not have access to it and others complained of its high cost. For instance, improved seeds are available in Zarbamari such as NERICA L41 and L42 for lowland and NERICA L1 and L4 for upland and ITA 150 (old improved variety). ITA 150 is the most preferred as it matures after rainfall (December) and breaking of rice is reduced compared to NERICA varieties It is recommended that AAH partner with the Ministry of Agriculture to sensitize the farmers on rice seed production and its importance in yield increment. This should be done by extension agents in this study area.

For the rice value chain operations, farmers sell rice directly to local traders in Zabarmari, gamboru, and Monday market, and local traders sell to big traders and other markets in Lagos. The big traders sell to representatives of processing companies (livestock feeds) in other states.The revenue model is fee-for-product and credit sale is discouraged by the farmers except for few exceptional cases, and payment is made immediately after sales (based on trust). There are other actors who benefit such as transporters, who move products from one point to another, those who sell bags for packaging the products (mostly women), the parboilers, millers, and threshers.

Figure 24: Rice Value Chain Interventions



Onion Value Chain

Onions are perishable commodity, cultivated in the dry season with perceived competitive advantage, perceptions of high impact on rural incomes and employment. It is a high value crop among the vegetables, with low cost maintenance and pest attack is minimal, thus the need to strengthen the value chain in the study areas. Statistically, Nigeria cultivates 1.1 million tons out of 2.5 million tons being demanded in West Africa and the demand is increasing with population size. In the study areas, Bama red variety is the most common and has higher demand than the white variety. It is planted in November and December when rainfall is low and production is done under irrigation.

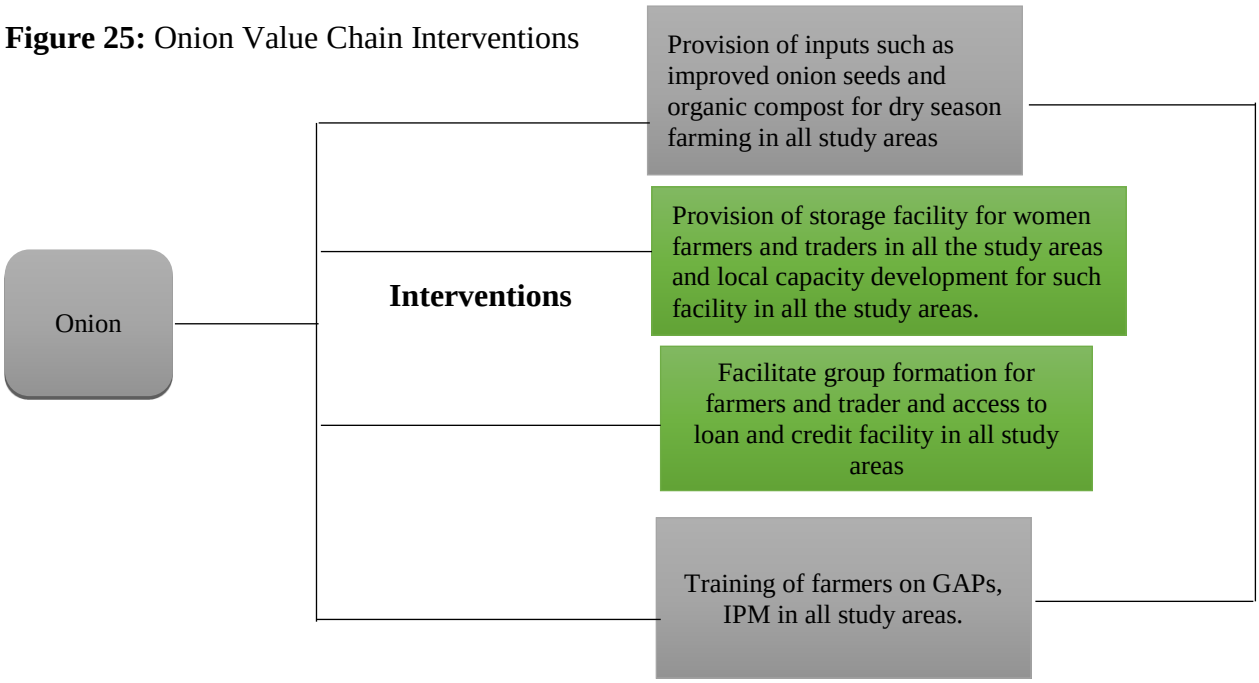
The issues in the study areas were shortage of water for irrigation during the dry season and lack of storage facility contributing to post-harvest losses. For instance, Monguno and Kukawa have shortage of water for cultivating onion in the dry season. With limited access to borehole facility, irrigation becomes very difficult and the available water is only shared for domestic uses. This issue is very critical in Monguno were military personnel, IDPs and local farmers compete for the same water which was meant for dry season irrigation. A climate smart intervention support will go a long way in boosting their productivity with little impact on the physical environment. Support like provision of drip irrigation kits which consumes less water and require less fuel for the water pump into the water storage tank. Additional boreholes or shallow wells could be constructed for the registered farmers' group in Monguno.
For Gongulong, Fariya and Kirbiri, irrigation water is not a hindrance to the cultivation of onion but lack of storage facility. This is a general problem in the study areas as post-harvest loss is very high during the peak period or glut. It was recorded that about 50% (Worldveg, 2018) of harvested onions are being lost as a result of poor post-harvest practices. Therefore, farmers have no other choice than to sell onion at low prices during glut period, affecting income. AAH should invest in training of SMEs in constructing local storage facility for farmers in the study and also, training of farmers on proper grading/sorting of onion stored in the facility to reduce rot. This will create more jobs and income generation especially for IDPs.

Furthermore, choice of seeds or bulb is very important in yield determination. In the study areas, onion bulbs from previous planting serve as their planting materials, thus promoting transferring of undesirable traits such as disease, stunted growth among others, and therefore reduces the quality, disease infestation, and yield. Training of farmers in good agricultural practices is vital to improve their farming skills in onion production. Also, since all the farmers interviewed saved bulbs from previous production season and do not buy from input suppliers, whereas the input suppliers do not have access to onion seeds. AAH should work with Government research institutes in Borno to provide farmers with improved seeds for onion through the local input suppliers.

The onions are sold to traders who have potential markets outside Borno state such as Lagos and Oyo state, and thus creating more demand. The transaction between them is direct and cash and carry basis, since consumers also buy directly from secondary market paying cash for the produce. It is important to note that processing of onion to powder or paste is still not yet common in the study areas as acceptability of the products is unknown. However, there is opportunity in medium-scale processing facility of onion, since the raw materials (onion) are readily available from March

to May, and scarcity afterward. More research work should be carried out to understanding the perception of consumers and the profitability.

Figure 25: Onion Value Chain Interventions



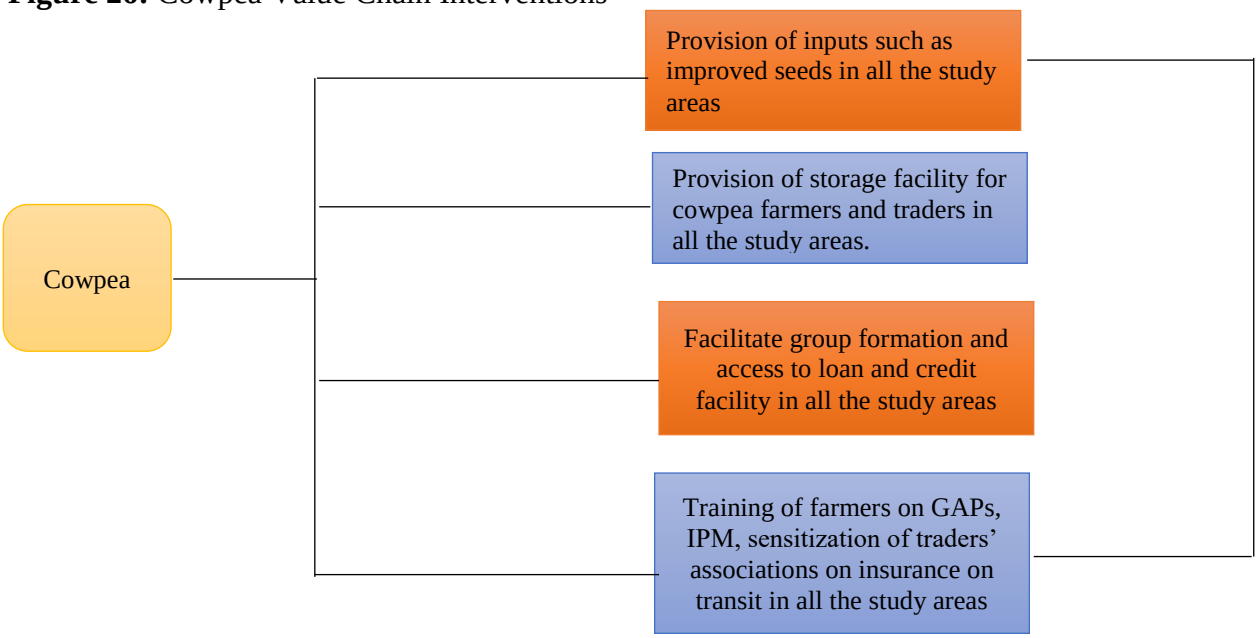
Cowpea Value Chain

The demand for cowpea is all time high as it provides substitute to rice, and it is cheaper and affordable for many consumers. Cowpea is a drought tolerant and warm weather crop that is adapted to the study areas. Also, it provides food, livestock feed and income for the respondents and can be cultivated when rainfall is at the lowest into the dry season, thus water is not needed in large quantities compared to rice, millet and vegetables. This made cowpea suitable for the study areas. especially in Monguno and Kukawa where water is scarce for irrigation and only for domestic uses. The two local varieties common in study areas were Kannanado white and Borno brown which were cultivated by farmers, where Borno brown is the most demanded amongst the two varieties. Also, there are improved varieties for cowpea such as IT90K-277-2. IT97K-568-18, IT89KD-288, IT97K-499-35, IT98K-131-2 and IT89KD-391, which adoption has been low due to lack of sensitization and unavailability of the seeds in commercial quantity (others were ability for relay planting with creeping habit and ability to smoother weeds). Sadly, the yield per hectare for cowpea is around 200-250kg, which is very low. The low yield is as a result of pests' attack during the vegetative stage of the crop. In Monguno for instance, pests have been a major challenge for the farmers on the field as pesticides are not readily available to control it and the few effective pesticides available are expensive to purchase. In Kirbiri, the situation was different as pesticides were available but are becoming ineffective as pest has developed resistance to them. As a result of pest, farmers can lose about 56% to 90% (Samaila et. al, 2019) of the yieldand its effect has been observed on the yield. A deep understanding of IPM system will help the farmers to reduce its impact on the crop and reduce the population. AAH should collaborate with extension agents

in the study areas to train farmers on IPM system. This will help to improve crop quality and yield, increase in market supply for cowpea and increase their earning.

Besides, bean weevil has also been a challenge causing a loss of up to 90% in few months after storage as a result of poor threshing, cleaning, drying and storing techniques. It was observed that all the farmers and traders do not have proper storage facility, and only keep within few weeks. Sadly, many of the farmers make use of a dangerous chemical, DDVP, to preserve their cowpea against this pest and increase the shelf life, thus, could result to increase in health complication of the consumers. It is recommended that AAH work with traders' association to establish warehouse/storage facility to increase the shelf of the commodity, promote quality product and create new jobs for the people.
The interaction among actors in the cowpea value chain is a direct and simple transaction process. The farmers sell the produce in cash to the local traders at an agreed price through negotiation, and the trader in turn, sell in cash to the household, small-scale processors or large markets. The consumers buy the as raw produce or processed product in form of powder, paste or cake. This simple transaction model is known as the fee-for-product.

Figure 26: Cowpea Value Chain Interventions



Millet Value Chain

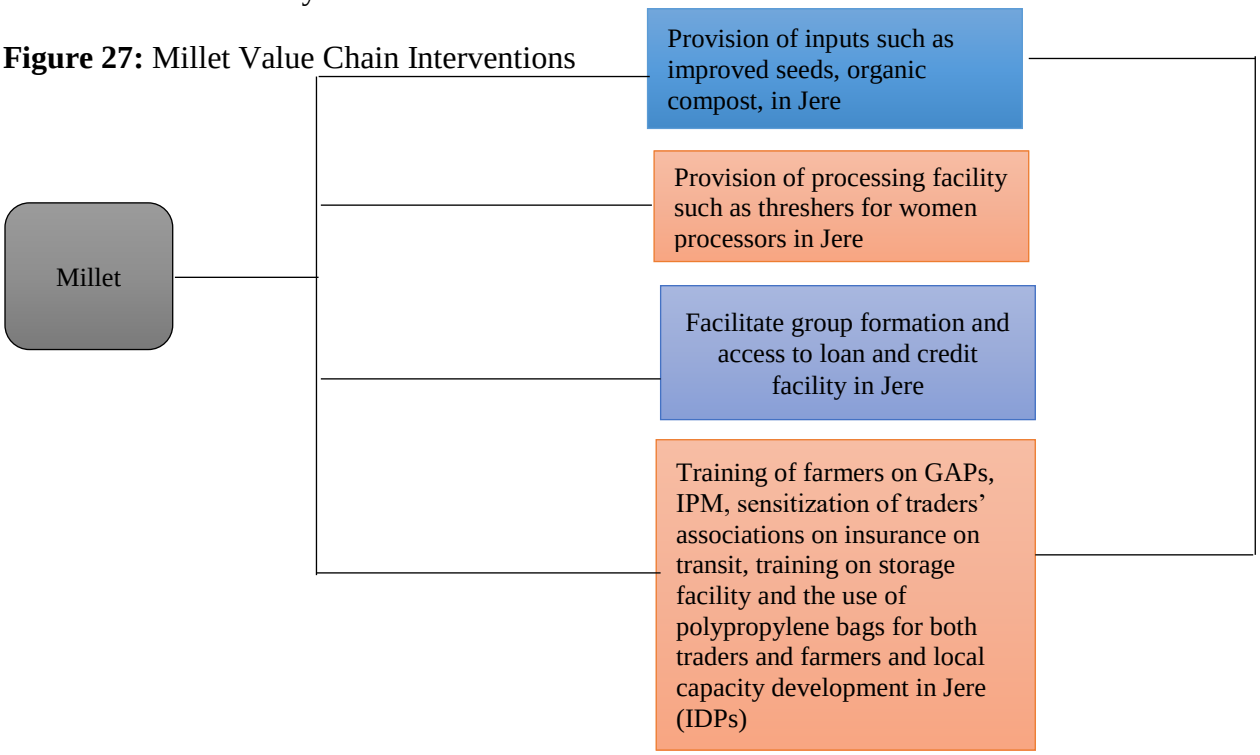
Millet is a desert resistance crop and can grow in sandy soil with poor organic matter and low rainfall. Millet is a vital food for the vulnerable because it is very cheap and affordable. Some of the primary processes employed are de-hulling and milling in order to produce flours, grits and de-hulled whole grains. These intermediate products are used to prepare staple foods like cooked whole grain, thin and thick porridges, steam cooked products such as couscous, *burabosko*, *kununzaki*, preparation of *tuwo* and *fura*.

Millet is a profitable crop since the cost of production is low and it can be cultivated in all the study areas as they are semi-arid. However, due to insurgence which were still prevalent in Monguno and Kaga, the military personnel had banned the its cultivation and that of maize due to their height, which can be used as camouflage and pose threat to the community's security. Thus, millet cultivation is more cultivated in Jere during the rainy season. However, Kukawa respondents don't have land for cultivation as all were living in IDP camp at teachers' village.
Millet production is faced with some challenges similar to that of maize such as low yield due to poor agricultural practices, infestation of army worm, lack of improved seeds and continuous usage of seeds from previous season. However, there were specific challenges affecting the millet value chain in the study area, specifically, lack of modern processing facility and lack of storage facility. Threshing of millet is done by women using traditional method- beating the millet panicle with a stick, over a log of wood or by pounding using mortar and pestle. This method is inefficient, laborious, time-inefficient, prone to drudgery, low output and product is prone to contaminants like sand, stone and metals. AAH should empower women in the study area with modern millet threshing machine and provide seed capital for initial operations.

For storage, polypropylene grain bag lined with hermetic zipper should be recommended and local capacity should be built to manufacture such packaging material and also, locally fabricated storage facility should be constructed for the farmers' associations and traders' association in the study area. This will help to increase investment in this value chain and strengthen the weak link especially between the farmers and traders.

Furthermore, AAH should partner with Lake chad Research institute for improved millet seeds and local agro-input should be empowered for continuous access of the millet seeds to the farmers at a low cost. This would create more jobs, and increase income and improvement of market supply for millet as a result of yield increase.

Figure 27: Millet Value Chain Interventions

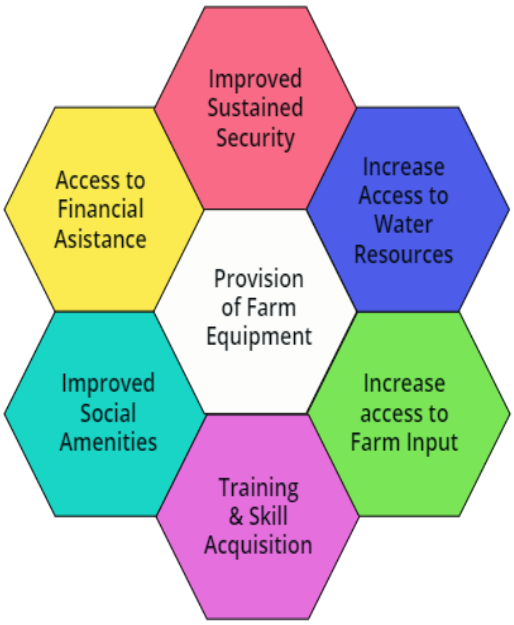


RECOVERY AND ENHANCEMENT PLAN

The last 10 years had been dreadful ones for many of the farmers, traders, processors and input suppliers, without excluding the transporters (for goods and people) who had been hit by the uprising of the insurgence resulting to loss of lives and livelihood. Thus, the need for enhancement and recovery plan in order to effectively improve the livelihood of the people, create jobs for rural poor, women and young people and localized returns on development investment with macro impacts. To achieve these, there is need for proactive measures of establishing linkages among the value chain actors that will be appropriate and sustainable. Also, enhancing the food chain through value creation and ensuring needs are met at the appropriate time. The following interventions have been explained in detail outlining the plan to achieve this mission.

1. Strengthening the Priority Value Chains through Technology
2. Institutional Support for Agricultural Extension Services
3. Value Chain Financing of Critical Actors in form of credit facility and Grant
4. Human Capacity Development in Key Priority Value Chains
5. Strengthening Farmers' Groups and Community Engagement

Strengthening the Priority Value Chains through Technology



Value chain actors are always in need of support services to improve the efficiency of their activities. Production and cost efficiency are the two important parameters that are considered by producers in order to maximize their revenue. In this study, a larger proportion of the farming communities are in dire need of water pump, drip irrigation kits (Monguno and Gongulong), organic fertilizers/compost specifically for maize, millet, tomato and chili pepper (Monguno, Kukawa, Kaga and Jere), improved seeds for onion (Monguno, Kukawa, Kaga and Jere), maize (Jere), and rice (Kukawa, Kaga and Jere) in order to improve their production efficiency and be competitive in the market. Other supplies needed were organic pesticides such as neem extract and neem oil. These supplies are unavailable for the farmers, thus, affecting production activities. Therefore, providing this support would increase yield, create more jobs, market supply of priority commodities, and source of revenue leverage for other actors on the value chain. To implement this, AAH work with farmers' groups and input suppliers in the study areas such as Allai Sabo Greman Association (Jere), Dad Agro Chemical, Beans, maize and millet farmers' association (Jere), Lake Chad Nourpass (Kukawa), Kukawa farmers' association, , mobile vet drugs cooperative (Monguno), and irrigation farmers' cooperative society ltd (Monguno) and input suppliers in Monguno such as Alhaji Mallam Ngolloma, Alhaji Gagari, Abubakar Bunu, Mustapha

Mallum Sheriff, Ba Girgiri, Bukar Garba, AlhSiniya, BukarKachalla, and Bab Charama, Baba Sule,

Furthermore, prior to the insurgency, the farmers enjoyed incentivized tractor hiring services which were largely provided by the government in all the study areas. However, this has reduced drastically (in Jere) and, in some cases, not available (Monguno and Kukawa). Collaboration with private-owned tractor services would help to create jobs for local operators and increase cost efficiency. AAH should further foster the relationship among farmers' groups and cooperatives in carrying out this activity to increase cost efficiency.
Programs that support distribution of inputs such as improved onion bulb or seeds (Monguno), cowpea seeds (Jere and Monguno), rice seeds (Jere), and vaccination for sheep and goat (Monguno and Kaga) should be adopted by AAH in collaboration with Borno research institute and private companies (Jubail, Dad Agro Chemical, Garba Gaidam, Bester international). Also, the actors should be supported with grants for construction of storage facility for farmers in Kirbiri, and distribution of water pump for dry season farmers in Monguno in order to stimulate and reactivate local economies and creating jobs opportunity.

Due to climate change and the attendant effect on water resources, demand for water for domestic use is all time high and concerted effort to provide water for farmers should be a priority, In Monguno, water scarcity is hindering production as competition for irrigation water had become high, including the military personnel, who use the water for domestic purpose. Drilling of additional borehole within strategic location would go a long to increase dry season farming production. AAH should work with irrigation farmers' cooperative society ltd in Monguno as a point of entry.

In addition, agro-processing initiative has a direct impact on the lives of vulnerable groups (specifically women and young people) through increased job creation in agro-processing activities, as well as through increase in demand for primary agricultural produce. This is possible as it is labour-intensive and provides various opportunities for self and wage employment. Also, women and young people make up the majority labour force in the study areas and an investment in this initiative will create employment opportunities and improve their livelihoods. The agro-industry is fairly accessible and can be pursued at small-scale. It also requires low start-up cost and has low technical barriers to entry. Small and medium enterprises (SMEs) remain important actors in the largely informal networks that dominate urban Sub-Saharan Africa and have proved fairly adaptive amidst various challenges. Therefore, provision of modern processing equipment such as thresher (Gongulong and Fariya), grinding machine/milling (Baga road market, Monday and Gamboru) for maize, cowpea and millet flour will further enhance value addition and empower processors along the value chain and thus boost the market value of agricultural products and women empowerment. Also, supporting SMEs to provide modern rice processing mill for women headed processors in Jere is essential to promote women empowerment and improve livelihood.
Furthermore, creation of low-cost storage facilities is essential at village level to enable local processors to benefit from seasonal price fluctuations and to reduce losses. AAH should partner with BOSADP to train women and youths in appropriate storing methods and to encourage the use of PICS bags, and appraise the use and efficiency of Mud rhombus and thatched rhombus for storage of cowpea, millet, maize and onion.

Institutional Support for Agricultural Extension Services

Extension service delivery is the bedrock for sustainable agriculture, poverty reduction, food security, rural empowerment and development. Thus, the need to build a resilient agricultural extension system in the study area to promote consistent food supply chain and stronger linkage among value chain actors.

In the study area, all the farmers were aware of the importance of extension agents and only government-owned extension services are provided to the farmers. Structurally, every Local government in Borno state has extension agents whose duties are to ensure periodic farm visits, training of farmers, establishment of demonstration plots and provide support to farmers. However, the services rendered by the extension agents have been ineffective in the last 10 years due to various reasons such as lack of transport medium to the farmers, inadequate extension agents due to lack of funding, lack of technical know-how of priority crops, lack of policy framework for extension activities and dearth of farmers' database.

It is recommended that training of trainers should be provided for extension workers on simple financial management, IPM, GAP to be stepped down for farmers 'groups in order to increase knowledge on credit facility, easily access credit and improve the production effectiveness of farmers. This in turn expand extension agents' capacity to promote financial inclusion, which is the key to livelihood improvement. Also, AAH facilitate development of policy framework for extension programmes and ensure effective monitoring and evaluation is built into the programme. This would serve as a guide for sustainability of extension activities in the State and could be used to attracting relevant funding.

Also, provision of motor-bike to extension agents in Jere, Monguno and Kaga to aid transportation to farming communities. This would expose farmers to new knowledge from the agents as a result of frequency of visits, improve farming practices through new knowledge and thereby increase yield of priority crops.

Engaging more extension workers to assist the farmers in combating new challenges such as climate change, disease diagnosis and prevention should be considered by the government. Some higher institution graduates were identified in Fariya and Monguno who could serve as extension workers for their communities after undergoing basic training on agricultural extension services and skills development. AAH should facilitate the employment of more extension workers at the village by BOSADP

Value Chain Financing of Critical Actors in form of credit facility and Grant

The key asset among the various actors in the study area is their wealth of experience under their belt in carrying out business operations. Many of the actors are members of various cooperatives and associations, which can be supported with soft loan to boost their business. This is so important as 90% of the actors lost their capital and investment to the insurgencies and in the process of recovery their losses but faced with the constraint of financing their business. Thus, to stimulate both demand and supply sides of market, increase access to finances should be well underway.
Access to finance is a critical challenge to small-scale farmers and other players along the value chain in the study area. This is largely due to limited experience, risk aversion, administrative and opportunity costs, and limited bank branch offices. Furthermore, many commercial banks are

cautious to loan to the agricultural sector — in particular, to smallholder farmers or farmer groups. Besides, many smallholders do not know how to access available credit from banks or other sources (e.g., producer organizations, input suppliers, or buyers), how to qualify for credit, how to use credit effectively for their commercial activities, and how to properly manage repayment obligations. The following farmers' groups can be considered for such programme: Fadama Men Farmers' Association, Fariya Fadama Farmers, Beans, maize and millet farmers' association (Jere) Kukawa farmers' association, Baga farmers' association, Kanem farmers' association (Kukawa) and irrigation farmers' cooperative society ltd (Monguno.

To help bridge the gap between smallholders and creditors, there is need for a multi-level approach. First, at the farm level, improving the financial management of selected smallholder farmers' organizations using capacity building training tools, and training modules should include alternate sources of credit (informal credit facility), timely and bulk purchases of inputs, timely and bulk sales of commodities, and organization of farmers 'group/association savings and credit programs. Secondly, identification of opportunities to link borrowers (trained farmers' groups/associations) with lenders (such as Jaiz bank, Keystone) should be established, and ensure to build capacity of lenders for improved service delivery to borrowers.
In the same manner, credit facilities that model on encouraging business interaction between value chain actors such as farmers, processors, input suppliers and traders should be encouraged. A typical example is the Anchored borrowers' scheme where the processors provide inputs and materials that assist the farmers to produce raw materials for his business operations. AAH should also partner with BOA to facilitate credit for farmers 'groups/associations in the study areas at a considerable low interest rate.

Figure 28: Table showing financial needs and equivalent types of finance in priority value chains

Value chain actors	Finance need/Purpose	Type of finance
Input suppliers	Working capital (including credit to customers)	Overdraft Revolving credit line Asset-based finance- factoring (accounts receivable), inventories
	Fixed assets (plant, property)	Term loan Commercial property finance
Farmers/Producers	Inputs/land preparation	Short-term agricultural production loan Revolving credit line Supplier credit (from input suppliers) Advance payment (from traders)
	Operating expenses	Short-term agricultural production loan Revolving credit line Supplier credit (from input industry) Advance payment (from traders)
	Equipment	Term loan Vehicle and asset finance (leasing, rental, instalment sales)
Processors	Working capital (including advance payments to suppliers)	Overdraft Revolving credit line

		Asset-based finance- factoring (accounts receivable), inventories etc
	Fixed Assets (plant, property)	Asset finance (leasing, rental, instalment sales) Commercial property finance (warehouses, factories, industrial premises)
	Equipment (Machinery, capital equipment)	Term loan Commercial property finance Vehicle and asset finance
Traders	Working capital	Overdraft Revolving credit line
	Fixed assets	Term loan Commercial property finance
Transport	Working capital Vehicles	Overdraft Vehicle and asset finance

Human Capacity Development in Key Priority Value Chains

One of the set attributes of an economically active population include the availability of quality human capital well equipped with knowledge, expertise, leadership capabilities, professional and technical skills. The years of insurgency has seen the disruption in human capital development in these areas as a result of death, brain drain, injuries and displacement, interrupted education, loss of skills, poor vocational training amongst others.

> *"…training of personnel, training and retraining of vet and health animal workers go along way in stimulating the re growth of the animal sector because you know if you have extension agents well-trained and equipped the will stimulate a lot of progress so training and retraining is very key" – Permanent secretary Ministry of Animal Resources and Fisheries Development*

Delivery of training supports on vocational training for youths and women in different areas will go a long way in enhancing economic recovery in these areas, increase human capital for priority value chain actors, increase productivity and promote economies of scale. Sensitization to new economic opportunities arising from new skills aimed at utilizing the available resources should be encouraged. In the study areas, specific trainings to be carried out are:

- Integrated pest management for crop farmers in all the study areas
- Modern rice processing techniques in fariya and gongulong.
- Training of farmers on Good Agricultural practices for priority commodities
- Training of farmers on integrated pest management (IPM) in all the study areas
- Training on neem oil and neem extract for IDPs (Kukawa)
- Training on modern rice processing for women-headed processing units in Jere and Monguno.
- Training of farmers on climate smart agriculture (adaptive and mitigation measures to climate) in all the study areas.

Strengthening Farmers' Groups and Community Engagement

Commercial agriculture for Nigerian smallholder farmers requires strong, effective producer organizations. For example, effective producer organizations enable members to achieve economies of scale through bulk purchases of inputs and crop marketing activities, access and provide credit, afford technologies to mechanize farm activities and improve post-harvest handling, advocate for their members to local governments and in negotiations with buyers, and develop into small-scale rural agribusinesses — in short, to provide genuine economic benefits and services to their members and communities. Producer associations have a range of capacity in Nigeria.

Effective producer organizations provide real advantages to members and offer a platform for developmental project to reach more farmers. Therefore, AAH should ensure that participating in a farmer group a criterion for being networked into the project. Where farmer groups do not exist or non-functional. AAH should render assistance to establish them or re-organize and offer support to transit to farming as a business via crop management training as well as soft skills and business development training to help groups function more effectively and profitably. Using a participatory approach, these soft skills training activities such as group dynamics and leadership would help farmer groups have well-defined vision (what they could achieve as a team), mitigate conflicts and mobilize resources for common benefits, and help leaders work effectively with group members. Furthermore, it would help build extension agents or lead farmers' confidence to conduct step-down training and give farmers a deeper understanding of key concepts to successfully operate agricultural enterprises, which were often neglected by farmers due to a subsistence approach to agriculture. This training should cover farm business cycles, recordkeeping, simple financial management, business planning, purchasing decisions, group membership, basic cash flow, assessing costs and benefits, and savings and credit. Also, at household level, farmers should be trained on simple financial management and resource planning to achieve their personal and business goals and identify key steps to improve household nutrition, hygiene, and homestead income generating opportunities, such as homestead gardening. This should be targeted to women, youth, and IDPs, with the goal of promoting small-scale business development.

Security is cardinal point which revolved round all economic and recovery plan. Without which all efforts will be exercise in futility. While certain areas are less vulnerable and the inhabitant have partially settled down to commence business activities, such as Jere, Kaga and Monguno while Kukawa is still under heightened security tension with incessant attacks. Achieving sustained security will boosts the confidence and encourage the value chain actors to renew their investment in production, processing, and trading of commodities without fear of been sabotage by the insurgency. This is very important for remote areas which provide the vast amount of land needed for increased production. Effective sustained coordination of security strategies in close collaboration between government and communities affected as its been recently deployed will go a long way to providing lasting solutions to these challenges.

The insurgency activities in the past years has grossly affected critical infrastructure in the affected areas. Identification and rebuilding pre-existing critical infrastructures should be a priority in the study areas, precisely in Fariya. Importantly, road reconstruction is critical to their business specifically from Alitel to Ajimari as this contribute to increase in cost inefficiency. Furthermore, Kukawa, fariya and Kaga do not have a well-functioning health care facility. It is recommended AAH engaged with relevant stakeholders to verify the extent of functionality and partner with the

State Ministry of Health to provide basic health infrastructure in the affected areas. Furthermore, provide scholarship for their children to continue schooling and employment opportunity for graduates. This will further prevent urban drift and retain the required manpower within the communities for growth and development.

Figure 29: Table Showing Recovery and Enhancement Plan tor The Study Area

Identified Challenges	Action plan activities	Expected effects	Lead actors	Resources Needed	Role of Government	Support if needed from whom
Intervention 1: Strengthening the Priority Value Chains through Technology						
Lack of improved seeds	Facilitate seed production with selected lead farmers for rice in Jere. Provide improved seeds for millet, maize in Jere and cowpea, onion in all the study areas.	Availability of improved seed varieties for cowpea, maize, rice, millet and onion	Borno state research institute, input suppliers (Jubail, Dad Agro Chemical, Garba Gaidam,Bester international)	Funds & Foundation seeds	Through BOSADP/Min of Agric & creating enabling environment	Government/ Private Sector and AAH
Unavailability of organic fertilizer and organic pesticide	Training and provision of organic manure (compost) and organic pesticide such as neem oil, neem cake and neem extract in all the study areas.	Improvement in yield or output of selected crops and employment creation for women, youths, IDPs	AAH	Fund, resource persons, raw materials (cow dung, goat and sheep dung and crop residues)	Creating enabling environment	Government/ private sector and AAH
Low level of farm mechanization	Facilitate Provision of more water pumping machines in Monguno and Jere, borehole construction for dry season farmers in Monguno and link tractor service providers from either the government or private sector in all the study areas.	Expansion of cultivable area, increased production and cost efficiency in the study areas.	Private sector tractor hiring service and Government owned tractor service and irrigation farmers' cooperative society ltd	Financing, machineries equipment	FGN to give priority to Youth and women in Borno available machineries	AAH

					& equipment in the ministry can be released for use	
Pest & diseases infestation	Training of farmers (including youth and women) on good agricultural practices (pre-planting, planting and post planting operations) and Integrated pest management in all the study areas.	Increase in yield of selected crops, reduction of post-harvest losses	BOSADP, AAH	Training fund, demonstration plot and technical personnel	Availability of BOSADP staff to step down the training in order communities	Government and private sector/ extension, AAH
Lack of storage facilities	More research and development on effectiveness of existing storage facilities and low-cost storage systems for local producers for steady supply of produce. Development of local capacity for fabrication/construction of storage facility in all the study areas. AAH should partner with BOSADP to train women and youths in appropriate storing methods and to encourage the use of PICS bags, and appraise the use and efficiency of Mud rhombus and thatched rhombus for storage of cowpea, millet, maize and onion in the study areas.	Steady & even supply of selected crops to processors will be achieved. Creation of low-cost storage facilities is essential at village level to enable local processors to benefit from seasonal price fluctuations and to reduce post-harvest losses. Create more jobs for youths in the study areas.	BOSADP, AAH	Finance for establishment of efficient storage, technical personnel	Support fund for youth on establishment of storage facilities	Government. AAH
Lack of processi	Facilitate identification/ investors 'interest towards establishment of functional & efficient small and	Demand for selected crops will increase – through value addition, packaging & consumption. Enhanced	Government, and local processors and AAH	Capital, human resources raw	Provide enabling environment	Government/ private

ng facility	medium scale processing facility in the study areas in Jere, Kaga and Monguno. Provision of modern processing equipment such as thresher (Gongulong and Fariya), grinding machine/milling (Baga road market, Monday and Gamboru) for maize, cowpea and millet and modern rice processing mill (Jere) for women headed processors.	value addition and empowerment of SMEs along the value chain, increase in the market value of selected products, and creation of more jobs through women empowerment		materials & processing machines		individuals
Intervention 2: Institutional Support for Agricultural Extension Services						
Lack of technical know-how of priority crops	Provision of ToT for extension agents on financial management, IPM, GAP. Step down training for farmers' groups on financial management, IPM and GAP in all the study areas.	increased knowledge on credit facility, easily access credit, improve the production effectiveness of farmers and expansion of extension agents' capacity to promote financial inclusion, which is the key to livelihood improvement.	AAH, BOSADP	Fund, resource persons on financial management, extension agents	Availability of extension agents for training	Government and AAH
Inadequate extension agents due to poor funding	Engaging more extension workers to assist the farmers in combating new challenges such as climate change, disease diagnosis and prevention and training of recruits on basic extension services in all the study areas.	To bridge the information gap between the farmers and research institute	AAH. BOSADP	Fund	Government support in providing the necessary information to develop an effective extension policy framework	Government, humanitarian organizations

Lack of policy framework	AAH facilitate development of policy framework for extension programmes and ensure effective monitoring and evaluation system is built into the programme.	Provision of guide for sustainability of extension activities in the State and attract relevant funding.	AAH, BOSADP,	Resource persons, blueprint policy framework	Political will to pass into law as a working document for the State	Government, policy makers
Lack of means of transport to the farmers	Provision of motor-bike to extension agents in Jere, Monguno and Kaga to aid transportation to farming communities	Exposed farmers to new knowledge from the agents as a result of frequency of visits, improve farming practices through new knowledge and thereby increase yield of priority crops.	AAH. BOSADP	Fund, motor bikes	Provision of register of extension agents in the study areas.	Government and AAH
Intervention 3: Value Chain Financing of Critical Actors in form of credit facility and Grant						
Farmers inability to access loan from banks (MFBs & Commercial Banks)	Facilitate inclusive business model to access soft loans at competitive interest rates (one digit). AAH should also partner with BOA to facilitate credit for farmers 'groups/associations in all the study areas .	Increase in agricultural value chain investment, Business expansion by creating more SMEs and easy financing of agricultural activities	Financial institutions e.g. Bank of Agric, NIRSAL, Keystone, Jaiz bank. AAH and farmers'groups Fadama Men Farmers' Association, Fariya Fadama Farmers, Beans, maize and millet farmers' association (Jere) Kukawa farmers' association, Baga farmers' association, Kanem farmers' association (Kukawa) and irrigation farmers' cooperative society ltd (Monguno.	Loans & credit facilities	CBN and NIRSAL project to be used to consolidate the process. FGN – Commercial Agric loans State Govt. – Micro credit	Bank of Agric, MFBs & Commercial Banks/ NIRSAL, AAH
Intervention 4: Human Capacity Development in Key Priority Value Chains						
Limited knowledge on various	Take inventory of existing local products and train local processors (mainly women/youth) on best practices	Better attractive and consumable products and	Ministry of agriculture/B OSADP (Home Economics dept.), AAH	Expertise & finance	Use staff to be involved in the training for	Food Companies to be

method of local processing of selected value chains	on handling and processing of these products in Jere, Monguno, and Kaga.	improvement on nutrition in the study areas			replication at own cost	involve as corporate social responsibilities (CSR)
Inadequate local capacity to develop modern processing facilities	Identifying and training of local fabricators and youths on specific processing facilities and establish processing facilities such as rice processing, maize and millet processing, Beans thresher and processing facility for packaging materials	Increase agriculture value add to GDP and economic growth, new technologies catalyze better output and advanced agribusinesses, and also create more jobs through skill acquisition	Government and private sectors	Capital, technical personnel, technicians, Training manual	Suitable government policies should be adopted to promote local content development and capacity building	Government & AAH
Inadequate training on GAP for priority value chain actors	Training on integrated pest management for crop farmers in all the study areas, training on modern rice processing techniques in fariya and gongulong, training of financial management, training of farmers on Good Agricultural practices for priority commodities, training of farmers on integrated pest management (IPM) in all the study areas, training on neem oil and neem extract for IDPs (Kukawa), training on modern rice processing for women-headed processing units in Jere and Monguno, training of farmers on climate smart agriculture (adaptive and	Increase human capital for priority value chain actors, increase productivity and promote economies of scale	AAH, Extension agents	Resource persons, training manual on subject matter.	Availability of extension agents for the training programme	AAH

	mitigation measures to climate) in all the study areas.					
Intervention 5: Strengthening Farmers' Groups and Community Engagement						
Near absence of farmers groups and cooperatives	Facilitate group/cooperative formation in Kukawa, Monguno and Kaga	Access to loans to finance their activities either from Bank of Agric or Commercial Banks (Keystone and Jaiz bank) and increase cost efficiency in production activities.	AAH, Extension agents	Capital, farmers & extension services	Government agency is support via sensitization & massive awareness programmes	Extension services from BOSADP, AAH and media organizations
Insecurity/lack of critical infrastructure	Information provision towards ongoing approach to curtail security situation in the study areas. Identification and rebuilding pre-existing critical infrastructures should be a priority in all the study areas. Critical infrastructure such as road (precisely in Fariya from Alitel to Ajimari). Kukawa, Fariya and Kaga do not have a well-functioning health care facility. AAH engaged with relevant stakeholders to verify the extent of functionality of the health care facility	Create enabling environment for emergence of viable businesses and increment in investment opportunities, which will improve local economy of the study areas.	Government Security agencies, Ministry of works, State Ministry of Health and community leaders	Finance, security, gadgets and security personnel	Security sector should be energized to stimulate investors to invest favourably without fear or intimidation	Government/ private individuals
Lack of fund for education and unemployment of	Scholarship for children/youths to continue schooling,employment opportunity for graduates in all the study areas.	Reduce out-of-school children in the study areas, reduce dependency on handouts from INGOs as a result of job opportunity and	AAH, Ministry of Education and Ministry of Agriculture	Fund	provision of free education programmes for primary and	Government, AAH

graduates		availability of manpower for growth and development			secondary schools	

CONCLUSIONS

This in-depth value chain analysis has revealed and comparatively exposed the true state of affairs vis-vis the ten (10) pre-selected agro-commodities in Jere, Monguno, Kukawa and Kaga local government areas of Borno state in the last ten years. The weak links in the value chain which are the identified gaps show the direction where intervention activities should focus in order to achieve remarkable impact. The conclusions of the study are highlighted as follow:

- Production of studied commodities (maize, rice, millet, cowpea, onion, tomato, chili pepper, fish, goat and sheep)) is done mainly by smallholder farmers with minimal use of modern production practices and technologies.
- Rice, maize, and millet are cereals, which were grown in Jere, Kukawa and Monguno 10 years ago but only Jere LG still cultivate these crops, which is done during rainy season.
- Onion, tomato and Chili pepper are vegetables which are grown in dry season in all the study area and it is restricted for male farmers only except in Monguno.
- Rice has a great potential for expansion as a cash crop in Jere LG only since both lowland and upland rice can be grown profitably both in rainy and dry season. However, rice production is labour intensive (especially lowland rice) and the rice market is booming due to border closure with farmers being protected from outside competition.
- Cowpea is the most cultivated crops in all the study area, which is profitable and demand is very high. The major markets were beans market in Monguno, Gamboru and Monday markets.
- In Kukawa, farmers cultivated maize, cowpea, Chili pepper, tomato and raised goat, sheep before the insurgence. However, all of them had been displaced from their villages and live in Maiduguri with no job but depends on humanitarian organizations for handouts.
- Maize has also a great potential for expansion as a cash crop in Jere LG. However, local varieties are still in use, although profitable. In Monguno, millet and maize were discouraged to be grown due to prolonged insecurity, thus restricted to short crops. However, the demand for it in urban areas and the region is increasing daily.
- Sheep and goats are raised for meat and skin production. Skins are traded in major markets in Monguno and Jere, and they sold in Kano to leather companies.
- Fish production is low and many of the farmers do not have the necessary skills for aquaculture. In Monguno, Food and Agriculture organization had offer training and inputs such as glass fiber, fingerlings to 50 farmers. However, farmers in Kukawa and Jere had not been exposed to such trainings. In Jere, trading of smoked fish is very lucrative and the processed fish were distributed to other Northern States.
- Maize, rice, onion, cowpea and millet were identified as priority value chain crops in the study areas based on the following qualitative factors: mandatory value chain, high economic impact value chain, private sector appeal, empowerment and employment creation, and feasibility of the value chain. In addition, BCA was used to corroborate those factors in order to identify these VCs.

Recovery and enhancement plan were developed based on identified interventions in the study areas, which include strengthening the priority value chains through technology, institutional support for agricultural extension services, value chain financing of critical actors in form of credit facility and grant, human capacity development in key priority value chains, and strengthening farmers' groups and community engagement.

RECOMMENDATIONS

1. AAH should facilitate the training of value chain actors on record keeping in order to track the efficiency/profitability of its business activities. Also, record kept are used for future business plan by providing guide for trend analysis, business decision and credit worthiness.
2. AAH in collaboration with BOSADP provide training for farmers on standardized land measurement as this poses a main challenge during the study, and it was observed in all the study areas. In the same vein, standardized measurement for local scales should be established. For examples, weight for small basket of tomato, big basket of tomato, bags for cowpea etc.
3. AAH in collaboration with trade unions/associations, processors' organizations, relevant government agencies and media organizations to sensitize value chain actors on the importance of produce handling, hygiene practices, sanitation and food safety especially at the market level. This can be achieved through jingles on radio and campaigns at market days.
4. Borno State Ministry of Agriculture in collaboration with AAH and other relevant stakeholders should ensure that extensive consultations are carried out with agricultural value chain actors through stakeholders meeting and town hall meeting in the development of agricultural extension policy framework to promote bottom-top approach in policy development and acceptance.
5. For future engagement with consultants, inception meeting should be mandated before commencing the project. At the inception meeting, each objective of the TOR should be discussed extensively in line with the research instrument to be used. This would help the consultant to better understand the expectations of the AAH with regards to the assignment.

APPENDIX 1: Training Plan for AAH RESILAC Team and Extension Agents

Days	Training Objectives	Resources	Target Audience
Day 1	Provide training on organic manure (compost) making. Provide step-by-step methods for making organic pesticide such as neem oil, neem cake and neem extract IPM, GAP. Provide insight on modern rice processing and its operations. Training on various climate smart agriculture practices to reduce the impact of climate change on food production.	Resource persons, projector, training venue, neem seeds, oil extractor and training manual	AAH team and Extension agents
Day 2	Provide detail information on financial management such as cash flow, record keeping, risk assessment	Resource persons, projector, training venue and training manual	AAH team and Extension agents

APPENDIX 2: BUSINESS CASE FOR PRIORITY VALUE CHAINS

PRIORITY VALUE CHAIN	MAIZE
SUMMARY	Maize, locally called 'Masari' is one of the most popular crops cultivated across the study area. It is processed into a variety of local meals and it is essential for food and nutrition security in our study area. Asides the popularity as a source of food, maize is processed into feed for livestock and it's also an important income earner for farmers in the region when they sell to aggregators who in turn sell to

	food processing and producing companies in large volumes. It is crucial to analyze the maize value chain of the area given the role the crop plays in nutrition and it's potential to enhance the economic livelihood of the farmers in our study area.
PRODUCTION	Maize is cultivated at the onset of the rainy season, there are two growing seasons, the first at the onset of the first rains around may and the second planting season at the second rain in August. Production starts by land preparation few weeks before the rains. Maize grows and is ready for harvest in approximately three months from date of planting. Production has gone on for a long time hence there is relatively good knowledge of local production. The farmers currently cultivate on an average of 0.9 hectares and in most cases maize crop is grown alongside other crop such as millet and vegetables. Inputs for maize production used by farmers in the area includes seed, herbicides, pesticides and fertilizer however use of improved hybrid seed is not widespread among the farmers due to cost prohibitiveness and inaccessibility, also the use of inorganic fertilizer (N:P:K) is almost nonexistent mainly due to government and security regulations on restrictions of fertilizer distribution. It is worthy of note that before the insurgency, farmers had unfettered access to fertilizers as provided by government and private supply chain. The Non-use of the above inputs has significantly reduced the cost of production of maize in the area as farmers now make use of alternative local inputs such as open pollinated maize seeds and cattle manure to enhance soil fertility. The major cost for farmers in maize cultivation in the area constitutes the cost of land preparation, herbicides and pesticides. These costs however are not cut-across as some farmers use family labour for land preparation while others rent tractors provided by government and or the private operators. The general inadequate access to important inputs such as fertilizer and improved seeds have had a significant effect on productivity of farmers. Also, the continuous use of open pollinated variety seeds has led to decline in harvest year in year out.
BUSINESS MODEL	The farmers obtain inputs from the input's suppliers both on credit and cash at the market segment of Agricultural inputs trader at the major markets including

	Monguno central market, Gamboru market, Konduga market, Kukawa market, muna market etc. The inputs suppliers in most cases have developed relationships with the farmers making it easy to give credit facilities to them. The supply chain of harvested maize can follow two paths, farmers sometimes act as a trader when they take their harvested products to the market while aggregators also move from one farm to another to buy up maize. The transactional arrangement in this case is cash payment to farmers upon the receipt of maize by the buyer. Aggregators play a major role in creating access to market for the maize supply chain, bulk of the maize are transported to different parts of the country notably the southern part of Nigeria where is it sold to food processing companies, feed mill and Processors. Occasionally the aggregators may engage in backward integration with the farmers where credit facilities will be provided upfront to the farmer and this will be recouped by collecting equivalent quantities of maize of credit provided. Both models have proven to work effectively for both farmers and buyers so far.
OPPORTUNITY	The Maize production and maize value chain when optimized will provide a sustainable source of income and also enhance food and nutrition security in the study area. Production at primary level is profitable and can be greatly improved upon by thrusting interventions as recommended. Jere local government has a competitive advantage in maize production in which it also predominantly produces, catalyzing specific interventions in areas where farmers are constrained will lead to rapid recovery of the local economy, recovery and development of small and medium agro-industries and overall increase in wealth creation along the maize value chain. In order to have a meaningful development, It is imperative to enhance the productivity of farmers by increasing the yield per hectare, This can be achieved by increasing farmer's access to improved maize seeds (subsidy or distribution), training on local compost making and other soil improvements inputs. These interventions will create increased production capacity farmers and also improve on their local knowledge. This will create a situation of knowledge

	transfer into other crops. Also, to revive the processing sector, interventions tailored towards increased financial inclusion such as equipment financing, credit facilities is instrumental in providing jobs for women and young people in the local government area.

PRIORITY VALUE CHAIN	RICE
SUMMARY	Rice is a staple food across the country with a constantly growing demand due to population increase and government policies to stop importation of same. The demand for rice is both local and national as it forms part of the diet of the populations in the study area. Rice production is of great importance due to its potential to significantly increase the income of rice farmers in the study area.
PRODUCTION	Rice is cultivated under rain fed and irrigated conditions in the study area. Planting under rain fed takes place between April and July. The farmers currently cultivate on land size of average 0.92 hectares. Long years of rice cultivation has enabled the farmers to develop adequate local knowledge on production. The bulk of the inputs includes seeds, pesticides, herbicides and fertilizer. In most cases the family household provides labour which is complimented with minimal hired help. As in the case of maize, access to inputs are largely hindered due to cost and unavailability. The use of local inputs is widespread among farmers leading to reduced cost of production as well as low yield of rice at harvest.
BUSINESS MODEL	The production and value chain of rice centers on the rice farmer being the producer the feed mill processor and the aggregators. The farmers buy the input on cash and sometimes on credit from the input suppliers. The farmer either sell to the aggregators who comes to the farm gate to buy with cash or take it to the rice mill where rice paddy is sold for cash as well.

	This transactional method ensures financial inclusion for farmers whereas the money goes into buying inputs for next production, pay back credits as well as take care of other needs.
OPPORTUNITY	Rice production can be used to foster the recovery Agricultural economy in the study area, this is due to the sustained increase in demand across the country. The ban on rice importation by the federal government provides incentive to local producer. Rice at the current market price of N18,000 (€45) per bag provides an opportunity to increase rice farmer's income, improve standard of living while also increasing capital available for business sustenance and expansion. Interventions recommended for the rice value chain will lead to the growth of Small and medium Agro industry necessary for the processing of the paddy rice produced by farmers. Jere local government is the main rice producing area of the local governments under study. Communities such as Gongulong and Fariya are renowned for rice cultivation with land size of about 22,000 hectares suitable for rice cultivation. Rice has a robust value chain including farmers Aggregators, processors, traders which cuts across gender and age groups. This makes the rice value chain ideal for job creation, gender inclusion and equitable distribution of income. In order to maximize the potentials in the rice value chain, it is important to tailor interventions to address the current gaps mapped during the study in the sector in Jere local government. They include provision of improved seeds (foundation seeds) to farmers, financing and provision of processing facility for women-headed unit in Jere local government, facilitate and encourage cluster/group formation and increased access to loan and training of farmers on Good agronomic practices, climate resilience agriculture and local capacity development on rice packaging.
PRIORITY VALUE CHAIN	MILLET
SUMMARY	Millet is grown in across all part of the study area, however restrictions on cultivation applies at the moment in areas with fragile security situations. Millet is a hardy crop and can grow in very harsh weather conditions. This hardiness factor makes it desirable for cultivation and boosting Agricultural economy in a region

	confronted with various challenges. Millet is grown majorly for food and fodder and also in a mixed cropping system with other crops, a characteristic of the farming system prevalent in the study area.
PRODUCTION	Currently production of Millet occurs on average of 0.95 hectares and producing an average 0.99 tons of millet per annum. The bulk of the cost of production goes to land preparation and chemicals hence cost of production is reduced. Farmers mostly use open pollinated variety from previous season and also receive improved seeds from the government.
BUSINESS MODEL	The business model is similar to other crops cultivated in the area and this cuts across the different crop value chains. The business model comprises of the various actors; farmers, traders, processors and input suppliers. The farmer who usually consume part d their produce has limited access to finance business hence may in some cases request inputs on credit. The inputs suppliers already established long standing relationships with some of the farmers and offers credit based on trust. The tenure of the loan can span from few weeks to the period after proceeds from harvest. The farmers would sell in cash to the aggregators or traders at the farm gate or in the open markets.
OPPORTUNITY	The benefits and opportunities inherent in developing interventions recommended for the millet value chain will create a ripple effect on the development of the local economy, nutritional enhancement and livelihood of farmers. Millet is cultivated both for food consumption and cash, boosting the millet crop sector will translate to more food and more income for actors in the Millet value chain. Millet is cultivated everywhere across the study area thereby making a cut across interventions plans throughout the study area possible. The low cost of production creates a very low barrier to entry, low capital requirement for value chain financing by AAH or other development organization and also potentials of high

	revenue for across. Developing the millet value chain in the study area will invariably contribute to nutrition security owing to the fact that millet is a popular staple food in the area primarily grown for consumption. The involvement of women in the processing of millet presents an opportunity for empowerment and income creation for the women demographic in the study area. To unlock the potentials, it is recommended to provide modern processing facilities to increase the efficiency of processing by the female headed processing units identified in the area. Also, farmers should be given improved inputs ranging from hybrid seeds, soil improvement materials (compost, organic fertilizer). Training should also be provided to the farmers and a centralized storage facility where Millet can be stored before sales. The study area is suitable for Millet production due to favorable climate, knowledge of local production hence timely intervention thrusts will lead to increased yield, value Addition, increased household income and enhanced food security. It it important to note that there is currently restrictions on cultivation in few places in the study area. These places fall under Monguno and Kaga local government.

PRIORITY VALUE CHAIN	COWPEA
SUMMARY	Cowpea is an important crop in the study area and it's usually grown as intercrop with other maize or Millet. Its cultivation takes place between the months of September and October. It is processed into food, feed and flour
PRODUCTION	Production of the crop is currently carried out on average of 0.46 hectares making it one of the least produced crop in the crops value chain under consideration. Despite the high potential and profitability prospect of cowpea, production at the current level in the study area is not profitable on the average for the farmers. While expenses are N120,990.61 (€302.5) the average revenue stands at N46,817. 88 (€117) this is partly due to the high susceptibility of cowpea to pest which can wipe up to 80% of farm during outbreak and also the existing security challenges

BUSINESS MODEL	The farmers in the study area are socialized into cropping more than one crop at a time, hence cowpea production is done alongside other crops. The value chain begins from the inputs suppliers whom the farmer gets his inputs from. The transactions at this level could be cash upfront or credit which will be repaid by the farmer at an agreed date or period. The farmer at harvest however sells his produce to either the aggregators, processors or wholesalers at the popular market or farm gate and cash paid upfront
OPPORTUNITY	In order to meet the increasing demand for Cowpea and also to reposition production back to the previous high, it becomes pertinent to prioritize the Cowpea value chain. This works in two ways, enhancing the Cowpea crop sector via the recovery plans highlighted will lead to increased capacity of farmers to produce profitably and also to meet local and national demand for food, animal feed and processing activities. Cowpea is well adapted and grown across the study area this making it possible for AAH to centralize the interventions for it. Cowpea being an alternative to rice is grown for different reasons that is for consumption, as feeds for livestock and also for cash. Water scarcity is one of the biggest challenges in the study area especially in places like Monguno and Kukawa hence however it's with low water ensures that Cowpea cultivation can be carried out successfully all over our study area therefore interventions can be carried out without the fear of low water availability unlike other crops like rice and maize. Interventions such as training of farmers on integrated pest management will lead to the increase in yield in areas prone to pest infestation (kirbiri and Monguno). Providing storage facilities for farmers throughout the study area will reduce post-harvest loss and maintain the integrity of produce. Also AAH should provide training and processing equipment to processors comprised majorly of women on better processing procedures. Interventions in the Cowpea value chain will enhance the study area to realize its potential in Cowpea production through increased yield, reduction in post-harvest loss, capacity development, impact on local economy, increase household income and financial inclusion.

PRIORITY VALUE CHAIN	ONION
SUMMARY	Onion production is a popular and important crop venture throughout the study area and it has been profitably cultivated for a long time. Farmers produce using both rain fed and irrigation and also characterized by farmers who are have adequate knowledge of local production based on long years' experience in cultivation.
PRODUCTION	In line with the predominant cropping system in the study area, Onion is cultivated in a mixed system with other crops especially vegetables and pepper where farmers produce an average of 1.4 tons per annum. The bulk of the Onion is consumed in meals hence there is little of no processing in the study area.
BUSINESS MODEL	The business model adopted by the actors in the Onion chain is simplified and follows same form as the other priority value chain analyzed. The farmer and the inputs supplier enter into an arrangement where inputs can be supplied in cash or in credit. The farmers pay back at a convenient time or after the harvest in the case of credit financing. The farmers sell to final consumers, wholesalers, traders and aggregators on cash payment at the farm gate or at the open market.
BENEFITS	The study area has a competitive advantage in onion production, due to factors such as favorable climate conditions, knowledge of production as such it is imperative to facilitate programs which will catalyze productivity of the crop sector. This will ensure the growth of the local economy, diversification of investments, improve farmer's resilience and ensure sustainability and livelihood of farmers engaged in it. Onion is one of the crops cultivated across the study areas and primarily cultivated for income. The area is generally suitable for cultivation making it possible to improve production however areas of Kukawa and Monguno suffers shortage of water during the dry season which implies that borehole and other water scheme interventions in required for the area. The demand for onion is both national and regional with a growing demand gap. This presents an opportunity to develop the capacity and productivity of the actors in the Onion Value in our study area to position to satisfy

	this growing demand. Interventions solving issues of water unavailability, storage, pest control and post-harvest loss will enhance production activities. Onion is a high valued crop across the study area as such improvement in the Onion Value Chain will bring about wealth creation for the farmers, improvement in standard of living, positive impact on the macro economy of the study area, and also expansion of business.

APPENDIX 3: GENERAL BUSINESS MODEL

The predominant method of payment in the study areas was cash between input suppliers and farmers (Monguno, Jere, Kaga and Kukawa), farmers and traders, farmers and local processors, local traders and local processors, local processors and consumers and few transactions through banks, largely between local traders and big traders or traders outside Borno like in case of markets in Lagos, Kano, Kaduna, Delta, Enugu amongst others. Credit sale is very limited and occurs only within the upstream actors (farmers and input suppliers, and farmers and traders) of the chain possibly due to inadequate and high cost of credit access from financial institutions. As most chain actors are self-financing, high credit exposure could mean limiting working capital at any given time besides default risks. Trust, ability to honour repayments and longstanding relationships are key factors for accessing credit sales.

Also, it was observed that advance payment (pre-finance) was possible in Jere and Monguno between farmers and local traders as a result of long-term relationship and it serves as a source of finance for the farmers to boost their production, and it exists between local traders and big traders outside Borno (this is usually done to show commitment). Trust, ability to delivery produce (right quality and quantity) as at when due and longstanding relationships are key factors for this type of model.

Furthermore, farmers in the study areas were involved in the cultivation of at least 3 different commodities per production cycle, likewise the traders, who trade different produce based on seasonality. However, processors are constrained and most of them are involved or known for a business line. Thus, diversification is limited.

References

[iii] www.iita.org/copsnew/cowpea

Cette publication a été produite avec le soutien financier de l'Union européenne et de l'Agence Française de Développement. Son contenu relève de la seule responsabilité du Groupe URD et ne reflète pas nécessairement les opinions de l'Union européenne ni de l'Agence Française de Développement.

Cofinancé par l'Union européenne et l'Agence Française de Développement