NIGERIAN DAIRY DEVELOPMENT PROGRAMME (NDDP)

Baseline Report
Kano State

June 2017

SAHEL Consulting
AGRICULTURE & NUTRITION LTD.

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LIST OF ACRONYMS

AI	Artificial Insemination
DTA	Dairy Transformation Agenda
FCW	FrieslandCampina WAMCO
FMARD	Federal Ministry of Agriculture and Rural Development
LGA	Local Government Area
L&Z	Lami and Zubaida Integrated Farms Limited
MCC	Milk Collection Centre
NDDP	Nigerian Dairy Development Program
PPP	Public Private Partnership Model
SHF	Smallholder Farmer
AI	Artificial Insemination
DTA	Dairy Transformation Agenda
FCW	FrieslandCampina WAMCO
FMARD	Federal Ministry of Agriculture and Rural Development
LGA	Local Government Area
L&Z	Lami and Zubaida Integrated Farms Limited
MCC	Milk Collection Centre

EXECUTIVE SUMMARY

A. Overview of the Baseline Study

The Nigerian Dairy Development Program (NDDP) is a processor-led dairy program implemented by Sahel Capital Partners & Advisory Limited in partnership with leading dairy processors FrieslandCampina Wamco (FCW) in Oyo State and L&Z Integrated Farms Ltd. (L&Z) in Kano State. The program aims to strengthen the Dairy Transformation Agenda of the Government by demonstrating proof-of-scale in Nigeria's processor-led initiatives for dairy development.

Sahel Capital conducted a baseline study on 320 households[1] in 6 LGAs in Kano state to gather data on cluster population, household size, income, milk collection volume, milk yields, cattle population and other key social and economic indicators. A purposive sampling method[2] was used. 147 (46%) of the households interviewed are integrated into L&Z's supply chain (they currently supply milk to L&Z); the remaining 173 have been identified as potential suppliers but have not yet been integrated. The husband and 1st wife were interviewed. The Sahel team also randomly interviewed additional wives for validation, bringing the total number of individuals interviewed as part of the study to 715. Moreover, key informant interviews with L&Z staff including the MD, Alhaji Abubakar; Executive Director of Operations, Hajia Rakiya Lami Abubakar; Farm Manager, Dr. Uchenna Ameachina; and the Supply Relations Officer (SRO), Aliyu Abubakar were conducted.

This report provides its intended audience, which includes the program's funders and other relevant stakeholders in the public and social sectors, with findings around respondents' demographic and occupational characteristics, their asset ownership and productivity levels, their participation in the formal dairy sector and their access to basic services and social amenities. These findings can inform potential interventions to catalyze the dairy sector in Kano state. In addition, the baseline data provided in this report will serve as a factual basis against which Sahel will track the performance of the NDDP program. Finally, this baseline study will also serve as an entry point for the experts engaged to conduct gender and nutrition studies in Kano State, in order to examine cultural beliefs, knowledge attitudes and practices that influence social norms which could impact the success of the program among participating dairy households.

B. Key Findings

This baseline study yielded several key findings listed below regarding participating dairy households in Kano state.

Characteristics of the Study Population

Over 90% of the population is Fulani. Roughly 75% is under the age of 45, but above the school-going age of 17. The gender distribution of the households are slightly skewed towards women at 56%. 48% of the men had one wife and another 42% had two wives. The average household size is 9 individuals. 50% of households have less than five children. In terms of education, the majority of both men and women have no formal schooling; only 10% of the population have an educational attainment above primary school.

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[1] A household is defined as a man, his wives, and unmarried children.

[2] Purposive sampling is a non-probability sampling method, otherwise known as selective sampling, where members of a particular group are known to the researcher and sought after. This sampling method is employed in cases when existing knowledge can be used to select a more representative sample that can bring more accurate results than by using other probability sampling techniques. The process involves purposely selecting individuals from the population based on the researcher's knowledge and judgment.

Occupational Characteristics

Most of the annual income for the dairy farmers, comes from sales of cattle and sales of milk and milk products. 45% of the farmers cite livestock rearing as their primary occupation while 41% cite milk selling as their main job. Males make up 91% of the livestock rearing population, while 70% of the milk sellers are female.

Assets and Ownership within Household

The average cattle per household is 56. Male farmers on average own 18 more cattle than their female counterparts. The majority of women who own cows received them through inheritance and typically place them under their husband or head of household's care. This created some confusion during the baseline as some women might have double counted cows owned by their husbands as theirs and vice versa. Cattle ownership will be further explored in the upcoming gender study. Land ownership, similar to cattle ownership, is male dominated with 83% of women not owning land while more than half their male counterparts do (57%). In the case of financial inclusion, 89% of men and 97% of women do not own a bank account. In addition, only 7% of men and 2% of women have access to credit facilities.

Participation in the Formal Dairy Sector

73% of the 320 dairy households interviewed were aware of the L&Z activities. However only 46% (147 households) were integrated into the value chain at the time of the interviews. Of these integrated households, 97 households (66%) stated selling their milk only the L&Z. 85 households have been integrated into L&Z' supply chain for up to 5 years. Very few indicated to have been integrated for more than 10 years.

L&Z provided training to 41% of the dairy farmers compared to the government-led initiatives, which reached 10% of the farmers. Additionally, the government has previously provided 27% of the participants with artificial insemination (AI) for their cattle. However, all past AI participants stated the exercise to be unsuccessful, mostly due three main reasons: lack of knowledge and basic skills for post AI management of cattle; the poor feeding regime of dairy cattle; and the quality of the semen used for AI. Despite failures encountered with the government's AI intervention, 67% of the farmers are willing to participate in another AI exercise.

Access to Social Amenities and Basic Services

52% male farmers and 50% of women stated that they do not have access to professional healthcare. More than half (54%) of the respondents do not have access to electricity. 38% of the famers stated having access to a community based borehole. 61% of respondents stated that they have access to veterinary services.

C. Implications for NDDP

This study confirmed NDDP hypotheses' around the large participation of women in the dairy sector and the fact that dairy represents the largest source of income for these women. This reinforces the program's potential to boost women empowerment within the sector. In addition, the study helped further define the program's interventions:

- **Farmer Identification & Mobilization:** The high level of awareness of L&Z activities among the households identified to date will be beneficial to their quick mobilization and integration, while the extension officers work on finding additional households to bring into the program.
- **Productivity Improvement**:
  o **Genetics & Breeding:** In spite of past failures, the willingness of two-third of the farmers to participate in an AI intervention is very positive. Nevertheless, the past failures also underscore the importance of constructing a robust strategy that maximizes the chances of success in order not to disappoint the farmers once again.

- o **Extension Services & Training**: The baseline demonstrated a need for more training and extension services for the farmers. This is a key area of focus for the program through training of trainers' approach that will leverage community livestock workers, government and federal extension workers on aspects such as good hygiene practices, model ways of cattle rearing and animal practices.
- o **Feed & Fodder:** The lack of access to land among the farmers re-emphasized the importance of the feed and fodder intervention now centered on 1) testing a community-based pastured development & management and 2) developing commercial feed producers that can provide dairy farmers with feed to improve the milk yields of their cows.
- **Infrastructure Development**: While most of the farmers interviewed have access to water, the quality and proximity of the water remains a problem. As such the creation of 10 boreholes strategically placed within the communities will directly improve the source and thus quality of water that the farmers are currently exposed to.

Finally, the baseline study uncovered some findings that need to be further analyzed and validated as part of the upcoming gender and nutrition studies. This includes 1) cattle ownership numbers to ensure there was no double counting and that animals grazing in other states are accounted for, 2) income levels and sources, 3) farmers' access to social amenities including the type of healthcare facilities respondents have access to and the ease at which respondents are able to access them, and 4) the access and potential use of mobile phones as a source of receiving payments.

I.   INTRODUCTION

1.1   Background

The Gross Domestic Product (GDP) of Nigeria was estimated at NGN83 trillion (USD522 billion) in 2013 post-rebasing.[3] The animal sub-sector which consists of livestock and fishery contributed NGN3.1 trillion (USD14.8 billion). Dairy production and processing are important sub-components of Nigeria's livestock sub-sector. Available statistics revealed that Nigeria has more than 16 million cattle.[4] However, there is a missing link between cattle rearers/dairy farmers and the formal market.

The Nigerian dairy market is dominated by imported milk produced from reconstituted milk powder from Europe, United States of America, South Africa, India, Australia, Ukraine and New Zealand among others.[5] However, the imported milk differs in taste, flavor and nutrient profile compared to the fresh milk.

As of 2012, Nigerian milk mainly from pastoral herd was estimated at 606,827 metric tons meeting just 54.2% of the annual national demands of 1,120,01 metric tons, while the balance was imported.[5] Imports of milk powder and other processed dairy products were valued at USD4750 million in 2012.[6] Just 600,000 liters of locally produced milk (valued at NGN232.5 million) make it to the formal marketing channels through corporate, public and other private milk collection schemes from migrant herdsmen and few commercial farmers.[7] The bulk of the milk products is sold informally with the dairy farmers benefiting less from the formal market. Marketing of locally produced milk is done mainly by the Fulani women who only sell excess milk that remains after meeting household needs. Most of this milk is sold as fermented milk.

The productivity of smallholder milk suppliers has remained notoriously low, a phenomenon informed by several constraints including:

- Fulani Control of Local Cattle – Fulani milk suppliers, typically nomadic, control the bulk of the local cattle population and rear indigenous cattle breeds primarily for their beef, with milk being considered a by-product. The Fulani typically do not own land and in most cases, do not have access to the right inputs to ensure optimum productivity
- Disconnect of Smallholder Milk Suppliers from the Formal Processing Industry – apart from the activities of a few dairy processors, the informal dairy sector is largely disconnected from the formal processing industry
- Low Milk Yield – milk yields are extremely low due to:
    - Poor genetic composition of local cattle breeds
    - Poor feeding practices
    - Archaic production practices

The majority of indigenous dairy farmers lack basic education, which precludes them from contributing to policy issues affecting their production. Furthermore, urbanization and expansion in arable farming activities limit their access to grazing lands. Regardless of the grazing reserves being developed by the government,

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[3] Ajibefun I.A. (2015). Nigeria's Agricultural Policy, Productivity and Poverty: The Critical Nexus. Inaugural Lecture Series 69 of the Federal University of Technology, Akure delivered on June 2, 2015, pp3-96.

[4] Anon (2014). Gross Domestic Product for Nigeria, 2013. Published by the National Bureau of Statistics, p15.

[5] Ajuwape A.T.P. (2017). Contending with Wall-less Cities and Fortified Kingdoms: A Veterinary Microbiologist's Testament! 407th Inaugural Lecture of the University of Ibadan, delivered on 27 April 2017, pp29-45.

[6] Global Agricultural Information Network. (2013). Nigeria Food Processing Ingredients Market 2013. Pp. 5.

[7] Ibid.

limited infrastructural resources including water, pastures, health facilities and market facilities diminish accessibility by the majority of producers.[8]

L&Z Integrated Farms was selected for NDDP as it is highly visible in Northern Nigeria where the chunk of cattle herders resides. In addition, L&Z is a pioneer of local sourcing initiatives in Nigeria and already depends on the Fulani for over 60% of its daily raw milk requirements. L&Z have successfully piloted Public Private Partnership Model of dairy development with smallholder farmers and has invested substantive amounts in providing infrastructure and extension support critical for dairy development and productivity improvements. The company has learnt critical lessons from their initial involvement with the farmers and is committed to expanding the reach of its work.

Against this backdrop, the Nigeria Dairy Development Programme (NDDP) was launched to build on such processor-led programs. The NDDP was designed to provide evidence and structure to support the emergence of a vibrant local dairy industry, which will integrate previously marginalized smallholder milk suppliers and increase their incomes, as well as produce actionable evidence on interventions to help improve the nutrition outcomes and promote women empowerment in targeted dairy communities in Nigeria.

The purpose of this baseline study was to better understand the characteristics of the milk suppliers targeted by the program. It aimed to yield socioeconomic and demographic data among other data points. This baseline data provided a factual basis against which Sahel now tracks the performance of the program. It also serves as the entry point through which Sahel will connect the experts that will be conducting the gender and nutrition studies to the processors and the dairy communities in which they are active.

This report summarizes the study-relevant findings from data collected on 320 households (715 individuals) in 6 communities in Kano State.

1.2 Study Area

The baseline study was conducted in Kano state in northern Nigeria. Kano State is made up of 44 LGAs with a population of 9.4 million, with an almost equal distribution of males (51%) and females (49%).[9] Agriculture is the mainstay of the state's economy involving at least 75% of the rural population. The temperature of the state usually ranges between a maximum of 33°C and a minimum of 15.8°C.[10] The average rainfall lies between 63.3mm and 48.2mm in May and 133.4mm and 59mm in August, the wettest month.[11] The rainfall pattern is unimodal with an average rainfall 600mm. Rain-fed and irrigation agriculture are practiced in the state at small and medium scale levels. Crops such as cotton, guinea corn, groundnuts, maize, cowpeas and varieties of vegetables are commonly grown in the state. Kano has an estimated 1,754,200 ha of cultivated land area and 75,000 ha of forest vegetation. Major livestock produced in the state include cattle (Fulani, Bunaji and Rahaji breeds), sheep, goats and poultry.

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[8] Annatte I., Fatima B.A., Wambai Y.S., Ruma B.M., Gideon M.M., Lawal U.S., Lawrence O.I., Aligana M., Shofela A.K., Mark L.K., and Kasim H.I. (2012). Major Issues in Nigeria Dairy Value Chain Development. VOM Journal of Veterinary Science, 9(2012):32-39.
[9] K-Seeds. Kano State Economic Empowerment and Development Strategy. Policy Framework and Project Summary. Kano State: Government House, Kano, 2005. Print.
[10] Kano State Government. Three Years Of Good Governance: Shekaran'S Stewardship to Kano State Ed Ibrahim Ado-Kurawa. Kano State: Government House, Kano, 2005. Print.
[11] Ibid

Figure 1: Map of Kano, Nigeria[12]

[12] Maphill. "Gray Simple Map of Kano". Maphill.com. N.p., 2017. Web. 21 Apr. 2017.

2. METHODOLOGY

2.1 Methods for Baseline Survey on Smallholder Dairy Farmers:

2.1.1 Study Design and Objectives

This report provides findings around respondents' demographic and occupational characteristics, their asset ownership and productivity levels, their participation in the formal dairy sector and their access to basic services and social amenities. This study was administered on 320 households in L&Z's existing dairy (Local Government Areas) LGAs in Kano State. The six LGAs visited were Dawakin Kudu, Kura, Dawakin Tofa, Kumbotso, Garun Mallam, and Gezawa. They are highlighted in the map of Kano State in Figure 1 above.

2.1.2 Sample Design, Data Processing and Analysis

The parameters for this study were largely based on knowledge of smallholder dairy farmer clusters in Kano State, provided by L & Z. [13] Stratified cluster sampling of smallholder dairy households was adopted for the quantitative study.[14] The sampling method used was purposive sampling, a non-probability sampling method, otherwise known as selective sampling, where members of a particular group are known to the researcher and sought after. This sampling method was employed for qualitative sample selection to ensure that key personnel who are integral links of the value chain were identified.[15] The key selection criteria for inclusion was that the smallholder dairy farmers had to either be integrated into the L&Z supply chain (supply L&Z with milk) or L&Z had identified them as potential milk suppliers.[16]

The revised, adapted and validated questionnaire comprised of 112 questions grouped into five main sections: general information; assets and ownership; socio-economic and demographic information; production and marketing activities; and constraints faced in daily living and cattle rearing operations. Each interview was approximately 1 hour in length and was conducted in person at the homes of the smallholder dairy farmers'. With 100% response rate, 715 interviews were conducted in Kano. Additionally, key informant interviews were conducted with L&Z's staff, and state extension officers.

Data processing and analysis was done using quantitative data analysis. Descriptive statistics, Likert Scale, and inferential statistics were used to summarize the data.[17] Qualitative data obtained from the key informant interviews were transcribed verbatim and a thematic analysis was conducted.[18]

2.1.3 Ethics

This study adhered to proper ethical behavior; human rights and differences in culture, customs, religious beliefs and practices of all stakeholders were respected from the outset and throughout the study. All data was obtained openly and transparently with appropriate consent. This study, and program as a whole, abides by strong ethical practices and ensures that the approach aligns with The Economic and Social Research Council (ESRC)'s Ethics Framework.

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[13] Kothari, C. R, and Gaurav Garg (2016) 1st ed. Research Methodology. New Delhi: New Age International (P) Limited.
[14] Hansen, M. H., Hurwitz, W. N., & Madow, W. G. (1953). Sample Survey Methods and Theory (Vol. 1, p. 638). New York: Wiley.
[15] Kemper, E. A., Stringfield, S., & Teddlie, C. (2003). Mixed Methods Sampling Strategies in Social Science Research. Handbook of Mixed Methods in Social and Behavioral Research, 273-296.
[16] Given, L. (2008). The Sage Encyclopedia of Qualitative Research Methods. Los Angeles: Sage Publications. p.816
[17] Dörnyei, Z. (2007). Research Methods in Applied Linguistics: Quantitative, Qualitative and Mixed Methodologies. Oxford University Press.
[18] Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. Qualitative Research in Psychology, 3, 77-101. p. 78

2.2 Study Limitations and Issues Encountered

2.2.1 Recruiting and Training Difficulties

To address logistical, cultural and language barriers, Sahel recruited enumerators from the region. Locating a sufficient number of qualified Fulfulde[19]-speaking enumerators was challenging. This was mitigated by the fact that almost all of the participants spoke Hausa. Some interviewers were disqualified during the training and fielding process due to lack of commitment and/or inability to properly administer the survey.

2.2.2 Household Counts

During the data collection process we encountered households that were not on the initial list provided by L&Z. This may be a result of the migration patterns of the Fulani farmers. This was mitigated by interviewing the households that were not on the list but were encountered during the study. As such, the total number of households interviewed at the end of the data collection was higher than the initial estimated number.

2.2.3 Validity and Reliability of Self-Reported Data

The study relies mostly on self-reported data by the respondents. This form of data has several limitations such as the possibility of exaggeration or omission of information; inaccurate recollection of experiences or events; social-desirability bias or reporting of untruthful information and reduced validity when respondents do not fully understand a question.

Additionally, reliability and validity from the enumerators was closely monitored. Supervisors during the data collection and entry were present to check the completed surveys and data entry respectively before accepting them. Enumerators were sent back to correct the surveys when necessary. Moreover, daily random checks of completed surveys were done during data collection. This ensured that any issue spotted were addressed before surveying continued the next day. Lastly, enumerators were informed of the payment reduction clause for constant, intentional carelessness. These mitigation strategies were used to ensure that errors and/or mistakes during the data collection process were minimized.

In the case of unintentional data analysis errors, three mitigation strategies were utilized. Firstly, reruns/retesting of the analysis were done to ensure that the numbers produced were similar and consistent. Secondly, the findings were compared to prior knowledge of the communities to ensure that they were not contradictory. Thirdly, the findings from the different sections of the analysis were compared to confirm they were no contradictions. Any contradictions that occurred were further investigated to ensure that there were legitimate explanations for it. Some of the questions will also be further analyzed during the gender or nutrition study which will be conducted from June to August 2017 in the same communities.

2.2.4 Other Threats to Accuracy

The potential threat of participants being unwilling to answer the questions was mitigated by ensuring that the enumerators were trained to interact courteously, respectfully and with sensitivity towards the participants.

Additionally, in order to ensure that the instruments used were well suited for the study, preliminary qualitative assessments were conducted to identify the key contextual issues peculiar to the dairy production settings to include in the study.

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[19] The Fulfulde language is spoken among the some of the Fulani population in northern Nigeria. However, the majority of the sampled population speak Hausa.

The data collection tools such as the questionnaires and interview guides were pre-tested as part of the study plan and those conducting the interviews and administering the questionnaires received extensive training on the aforementioned. Any required modifications to the tools were done to enhance accuracy.

3. METHODOLOGY

The results of the analysis of relevant data are presented in this section. For this study, the husband and senior wife were interviewed in each household. The evidence presented in this section will be helpful in designing NDDP interventions. The baseline survey collected basic demographic information on all residents in the respondent households.

3.1 Characteristics of the Study Population

3.1.1 Population

The survey consisted of the Fari community at 28% of the population density of the dairy farmers surveyed, followed by Daginawa (23%) and Danqwala (16%), while Tammawa had the lowest share among the communities considered. In addition, 8% of the population are newly identified clusters (Fagi, Dan Tube, Gidan dankauye, Gabari, and Dan gwauro) where integration into the L&Z supply chain will be extended in the coming months.

Communities	LGA	Number of Individuals	Percentage (%)
FARI	Dawakin Kudu	203	28%
DAGINAWA	Dawakin Kudu	163	23%
DANGWALA	Kura	113	16%
CHIROMAWA	Garun Mallam	49	7%
UNGUWAR RIMI	Kumbotso	51	7%
YADAKWARI	Garun Mallam	42	6%
TAMMAWA	Gezawa	35	5%
FAGI, DAN TUBE, GABARI, DAN GWAURO, GIDAN DANKAUYE	Dawakin Kudu, Dawakin Tofa, Kumbotso & Kura	59	8%
Total		**715**	**100%**

Table 1: Distribution of population by clusters

3.1.2 Ethnic Group

The majority of the male and female dairy farmers are Fulani, at 98% and 91% respectively. Only 6% of farmers are Hausa. However, all farmers were fluent in Hausa.
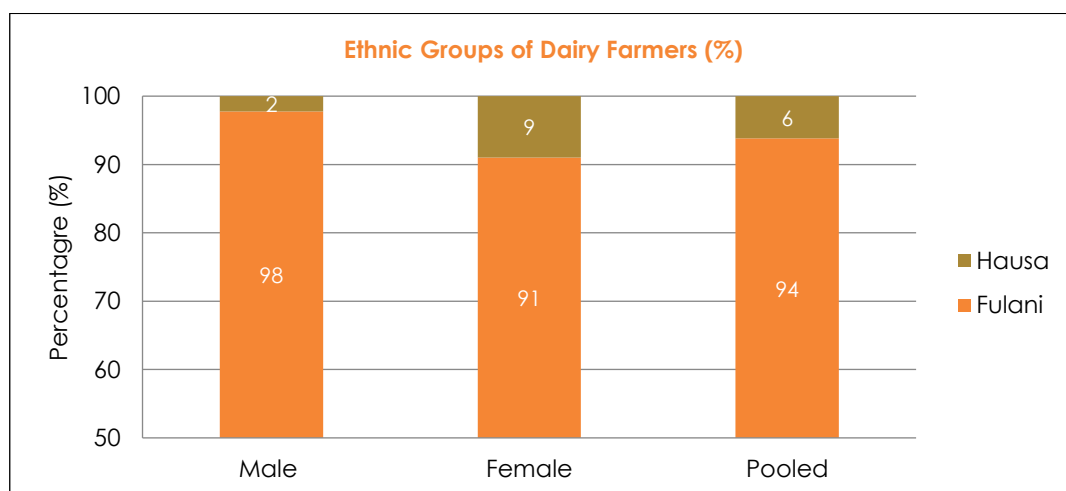

Figure 2: Distribution of the dairy farmers by ethnic group

The gender distribution of the 715 dairy farmers stands at 56% female and 44% male. In the northern part of Nigeria and amongst the Fulani tribe who constitute the bulk

this study, polygamy is widely accepted and considered to be the norm.[20] Consequently, each male dairy farmer typically has more than one wife, which explains why the number of females exceeding their male counterparts in this study.

Gender Distribution of Dairy Farmers
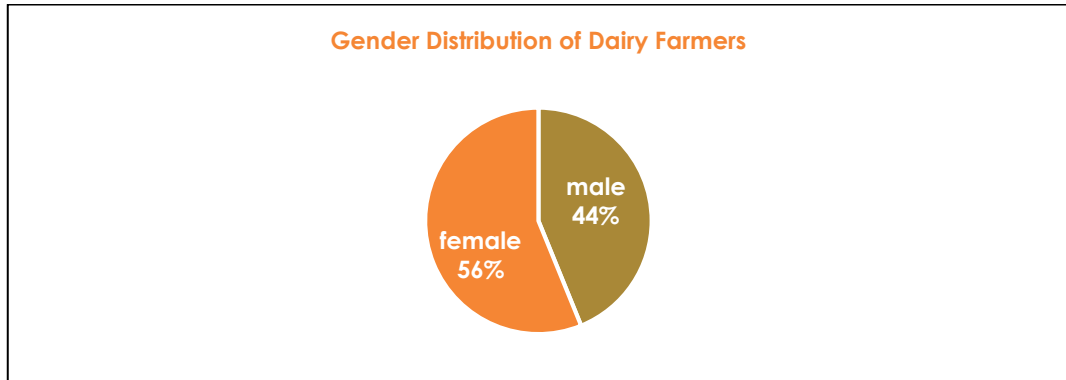
Figure 3: Distribution of the dairy farmers by gender.

3.1.3 Age Distribution

The age distribution in these districts is heavily skewed in favor of the youth. Roughly 75% of the population surveyed is under the age of 45 and a large fraction of this population is above the school-going age of 17. The majority of the women (54%) were between the age of 18-30 years' while the majority (53%) of men were older between the age of 31-59.

Age Distribution of Dairy Farmers (Male)
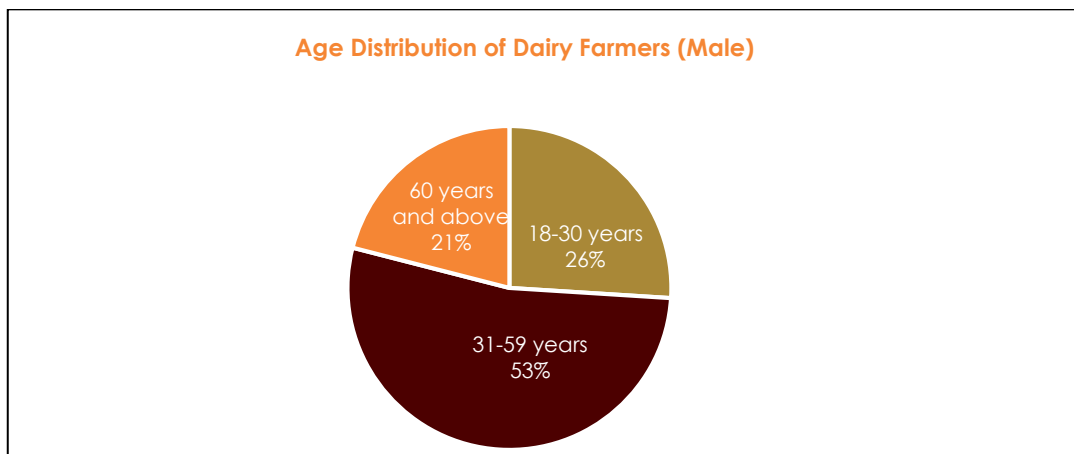
Figure 4: Distribution of male dairy farmers by age

[20] Munro, A., Kebede, B., Tarazona-Gomez, M. & Verschoor, A. (2010). The lion's Share. An Experimental Analysis of Polygamy in Northern Nigeria. GRIPS Discussion Paper GRIPS Discussion Paper Discussion Paper. Pp. 10-27.
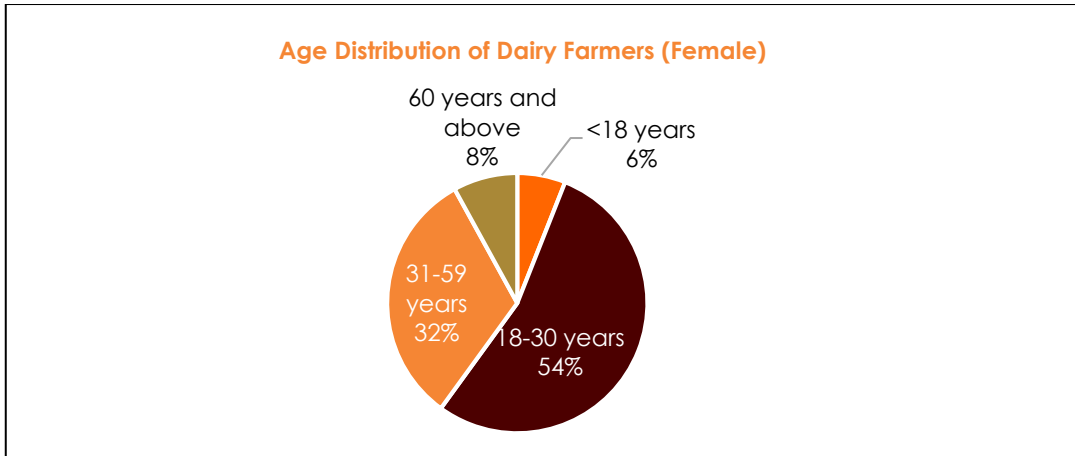
Figure 5: Distribution of female dairy farmers by age

3.1.4 Average Number of Wives

Despite the culture of polygamy among the Fulani, 50% of men were married to only one wife. While 42% of men had two wives. Very few men had more than three wives and none of the participants had more than 4.

Figure 6: Distribution of the male dairy farmers by number of wives

The distribution of the respondents by number of children revealed that 54% of the respondents have between 1-5 children. The figure below reiterates the youthfulness of the population as most families' have a relatively low number of children.
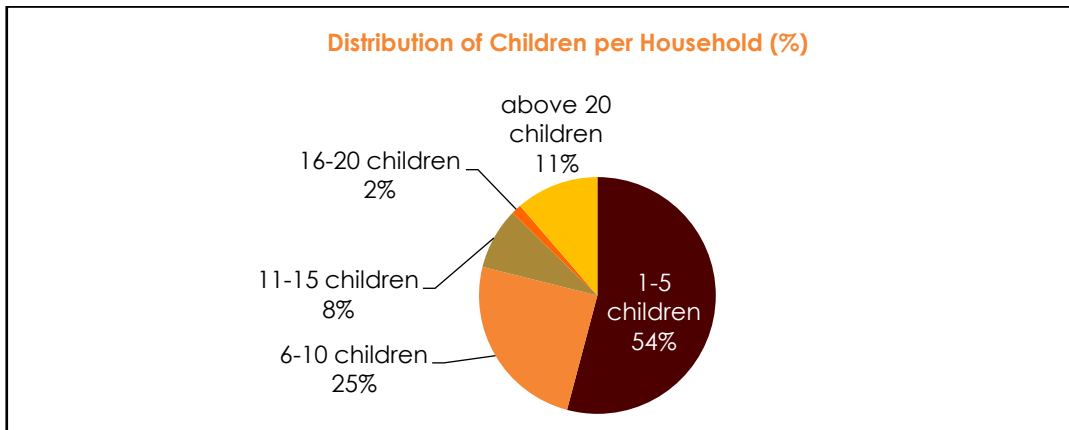
Figure 7: Distribution of children per household

3.1.5 Average Household Size

The average household is made up of 9 individuals, this is in line with Sahel's initial estimate of 10, with the bulk of the households with 6 to 10 members
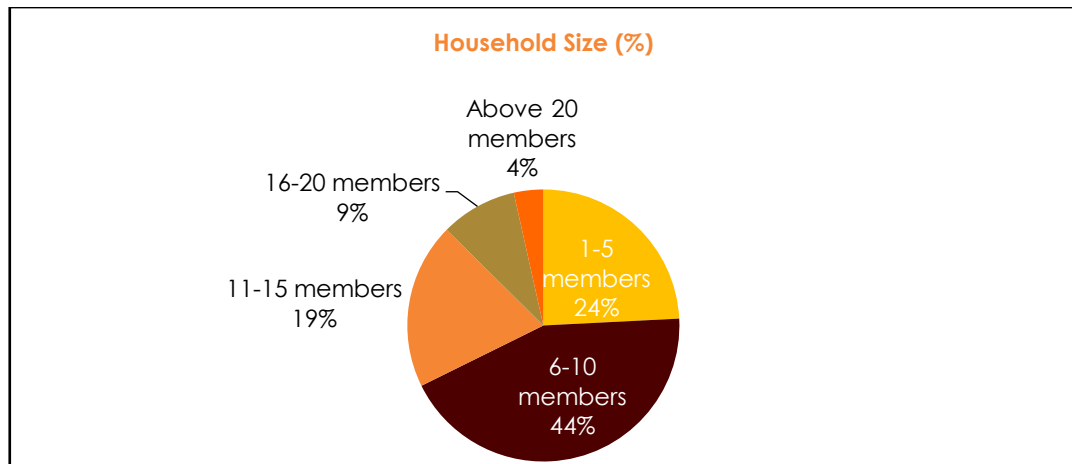
Figure 8: Distribution of the dairy farmers by household size

3.1.6 Migration Patterns

The chart below shows the distribution of the dairy farmers based on whether they were born in their current location of residence at the time of the interview or had migrated to that site. The results reveal that majority (52%) of the male dairy farmers were born in their current place of residence while the remaining 48% had migrated to that location. The opposite was the case for their female counterpart. 71% of the female dairy farmers migrated to their present place of residence. The heavy migration of female dairy farmers is due to marriage.
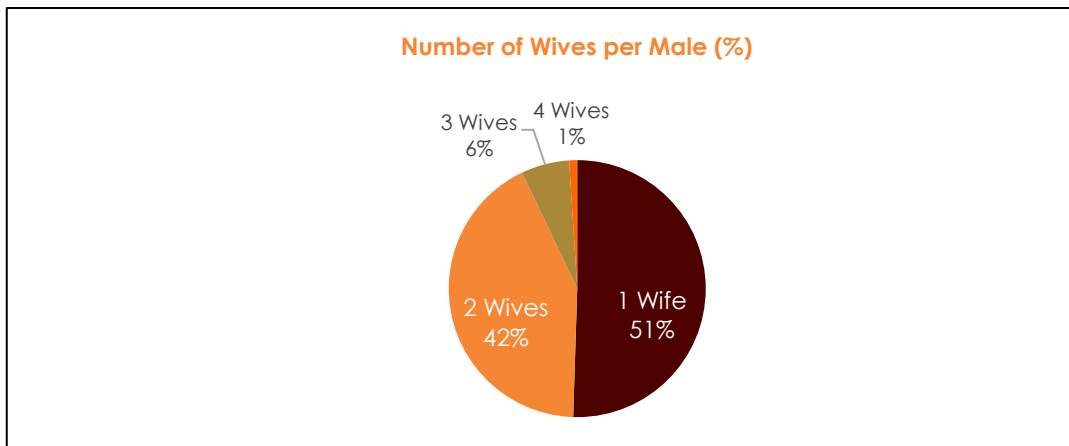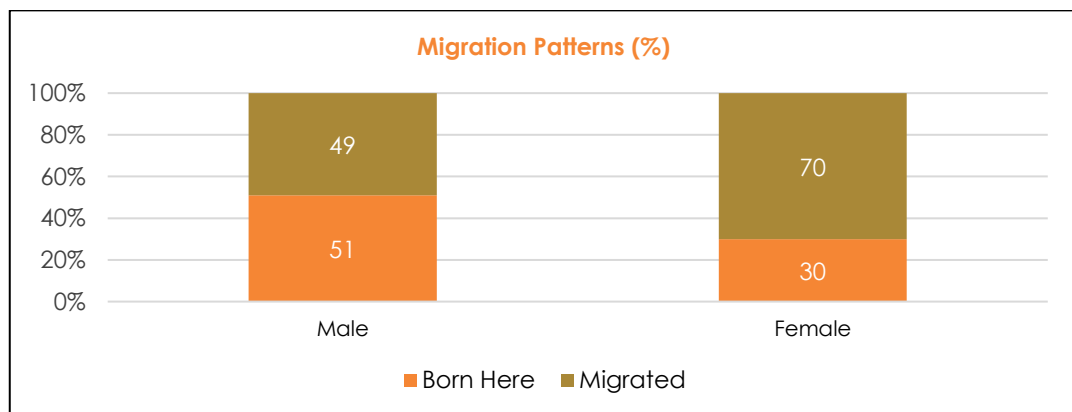

Figure 9: Distribution of the dairy farmers by migration patterns

3.1.7 Educational Attainment

Overall, the population sampled is largely uneducated, with a very small percentage receiving education above primary levels. As depicted in the figure below, about 80% of the population have no formal schooling or have only attended Arabic school (religious school), while only 10% of the population have an educational attainment above primary school. Furthermore, the educational attainment deficit is far more acute among women, as approximately 85% of women vs. approximately 73% men have no formal schooling or have only attended Arabic school.

Education Attainment (Female)
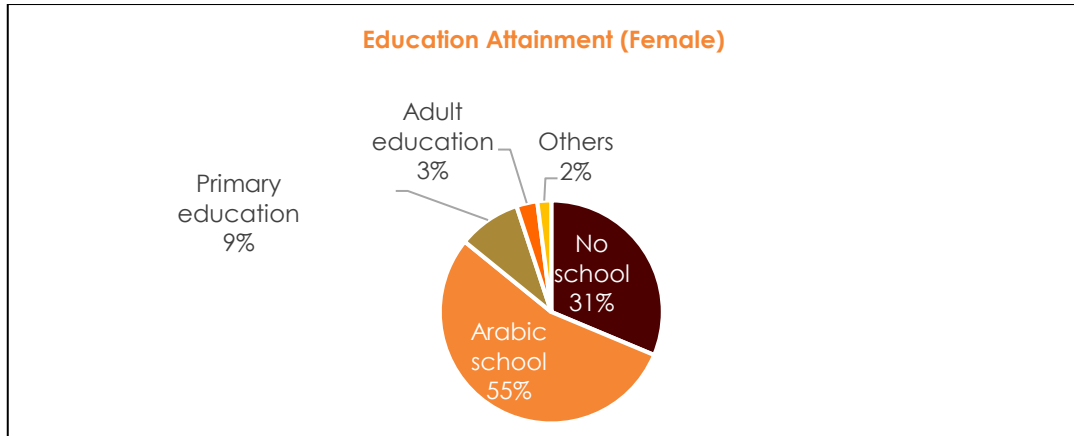
Figure 10: Distribution of educational attainment of the female dairy farmers

Educational Attainment (Male)
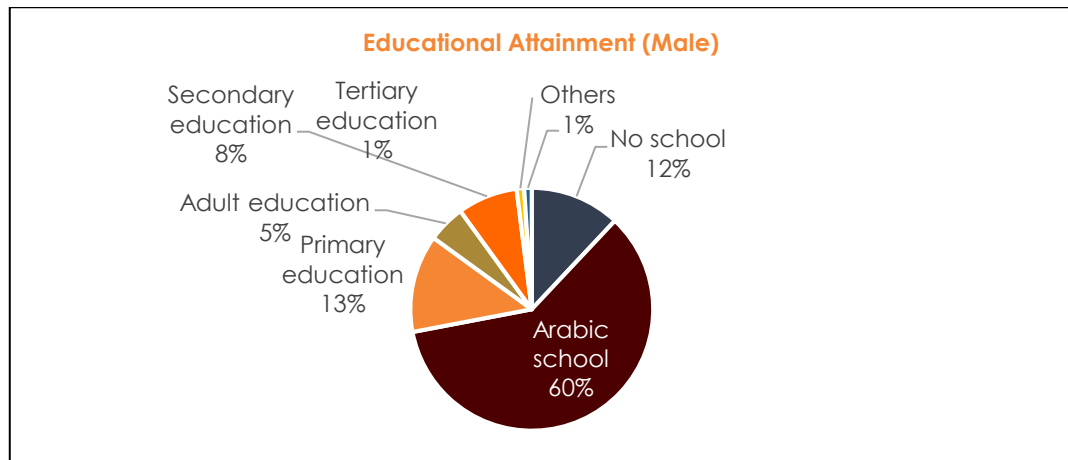
Figure 11: Educational Attainment (male)

3.1.8 Reason for Leaving School

50% of the female dairy farmers leave school because of marriage, while another 43% did not provide a specific reason for leaving school. On the other hand, 38% of men cited the need to support their families as the primary reason for leaving school.

Reason for Leaving School (Female)
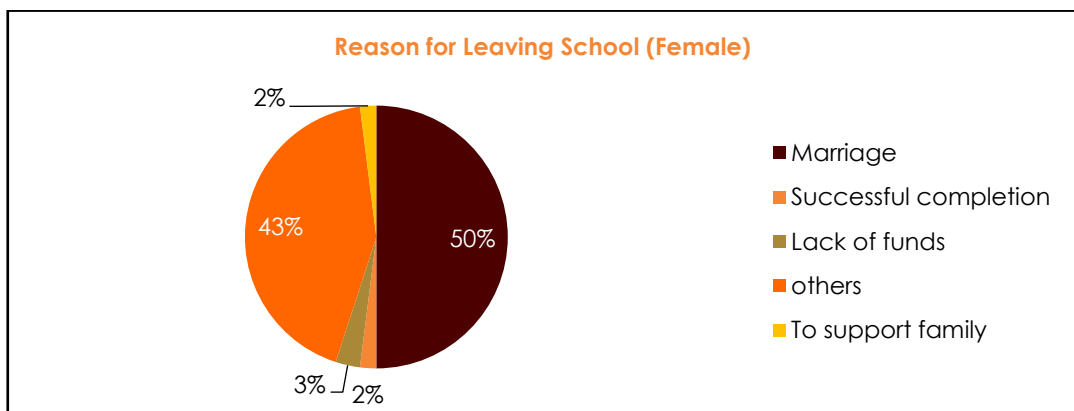
Figure 12: Distribution of the dairy farmers by reasons for leaving school (female)
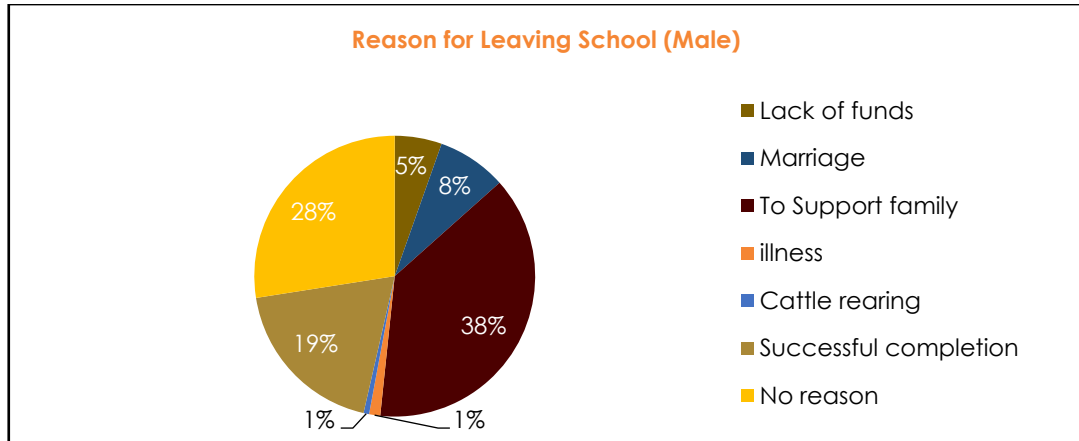
Figure 13: Distribution of the dairy farmers by reasons for leaving school (male)

3.2 Occupational Characteristics

3.2.1 Primary Occupation

The majority of the respondents earn an income in livestock rearing (45%), followed by milk-selling (41%).
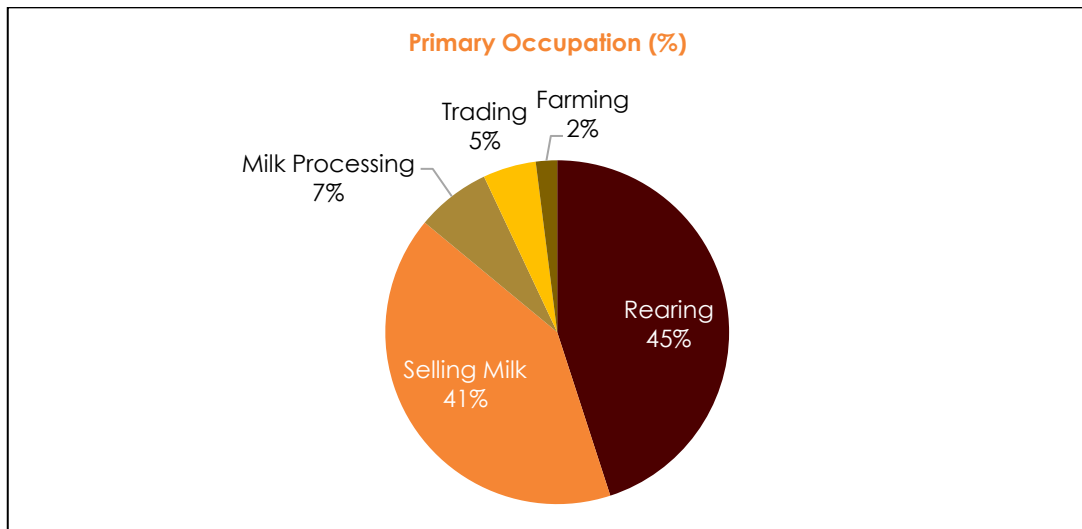
Figure 14: Distribution of the dairy farmers by primary occupation

3.2.2 Primary Occupation Disaggregated by Gender

The distribution of primary occupation of the respondents disaggregated by gender reveals that the majority (92%) of the male population are involved in livestock rearing while 83% of the women are mostly involved in milk-related activities. 70% of female respondents listed selling milk as their primary occupation while 13% listed milk processing.
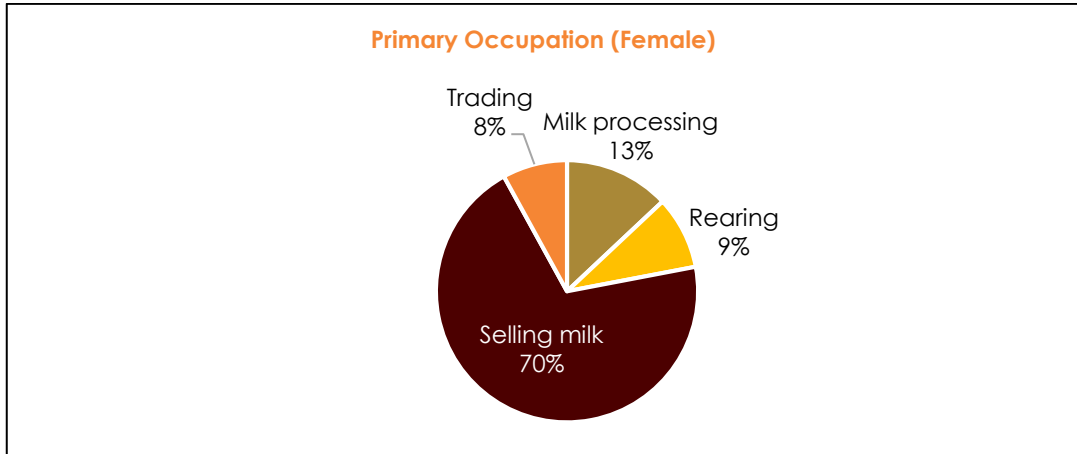
Figure 15: Distribution of primary occupation of female dairy farmers
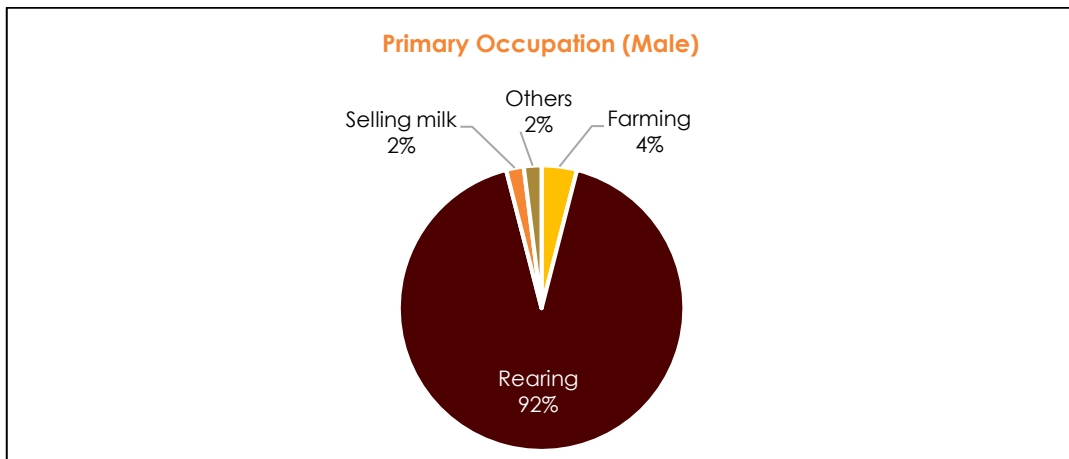
Figure 16: Distribution of primary occupation of male dairy farmers

3.2.3 Primary Occupation Disaggregated by Cluster

The vast majority of the respondents in all the clusters are involved in livestock rearing followed by milk selling. Among the various primary occupations, animal rearing is the most prominent primary occupation (54% participation) in the newly "identified" cluster, compromised of Fagi, Dan Tube, Gidan Dankauye, Gabari, and Dan Gwauro communities. As a community, Ungunwar Rimi is least involved in animal rearing at 37% participation. Milk selling is most predominant in Fari, with 43% participation; it is the primary occupation for only 19% of farmers in Yadakwari.

3.2.4 Sources of Income

For almost 80% of female respondents, the largest proportion of income stems from the sale of milk and milk products. The 2nd source of income for women is the sale of cattle at 15%. For over 80% of male respondents, the largest proportion of their income is from sales of cattle.

Source of Income

- sales of milk and milk products
- sales of cattles
- sales of farm produce and farming
- sales of other animal/animal products
- Remittances
- Trading

48%

43%

2% 2% 4% 2%
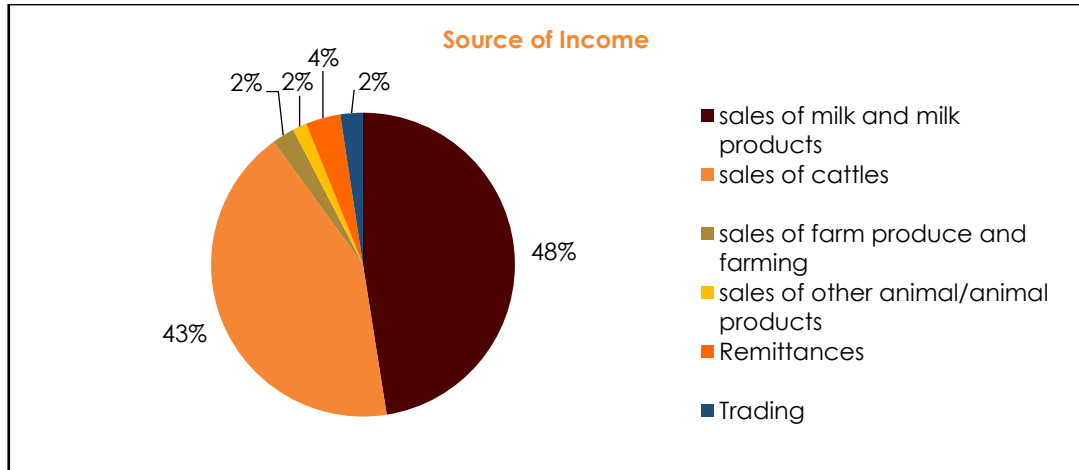
Figure 17: Distribution of the dairy farmers by income source.

Income Source (Female)

- Sales of milk and milk products
- Sales of cattles
- Sales of farm produce and farming
- Sales of other animal/animal products
- Trading

2% 1% 3%

15%

79%
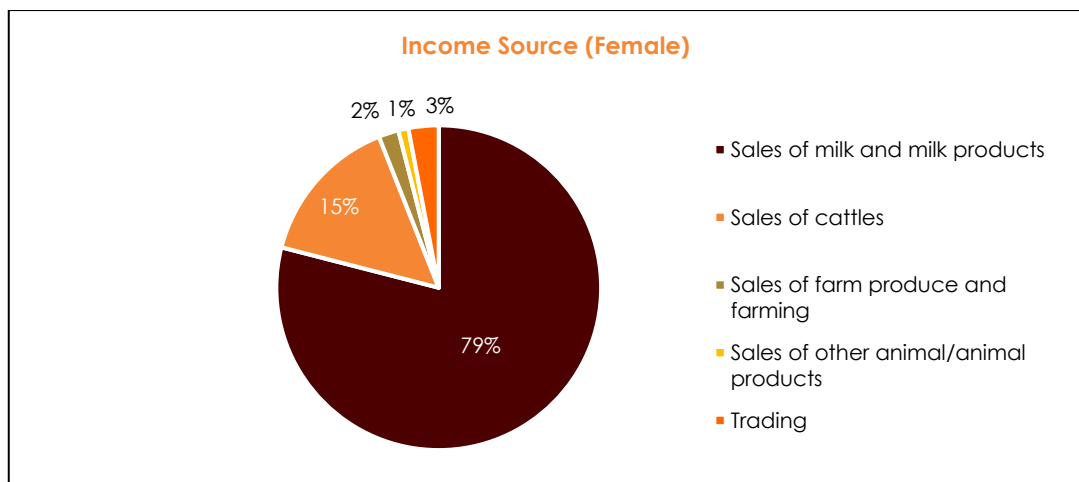
Figure 18: Distribution of women's source of income

Income Source (Male)

- Sales of cattle
- Sales of milk and milk products
- Trading
- Others

4%

9%

6%

81%
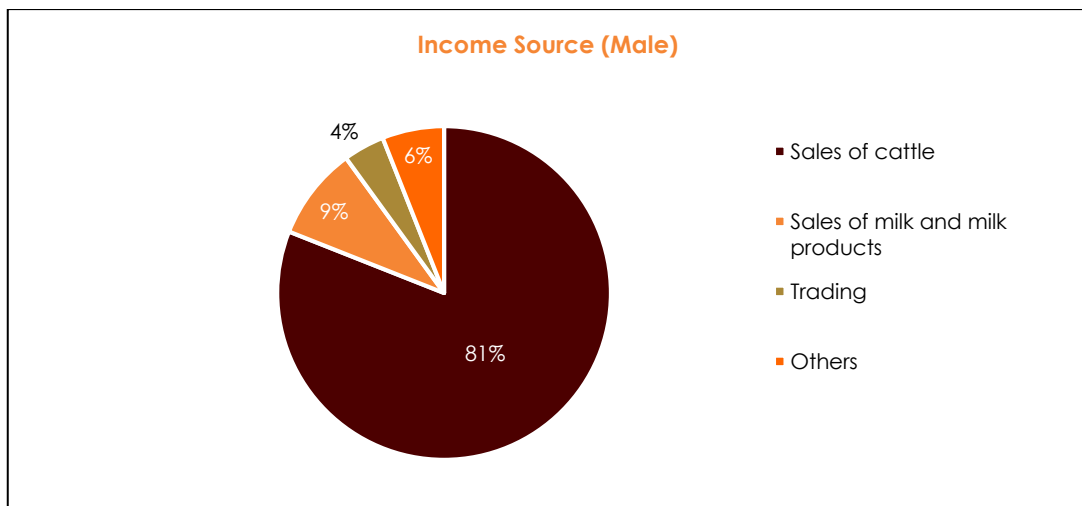
Figure 19: Distribution of men's source of income

The average monthly income for the male dairy farmers at the time of the study was N86,373 while his female counterpart an average of earned N45,152 per month. The average household income was N63,630.

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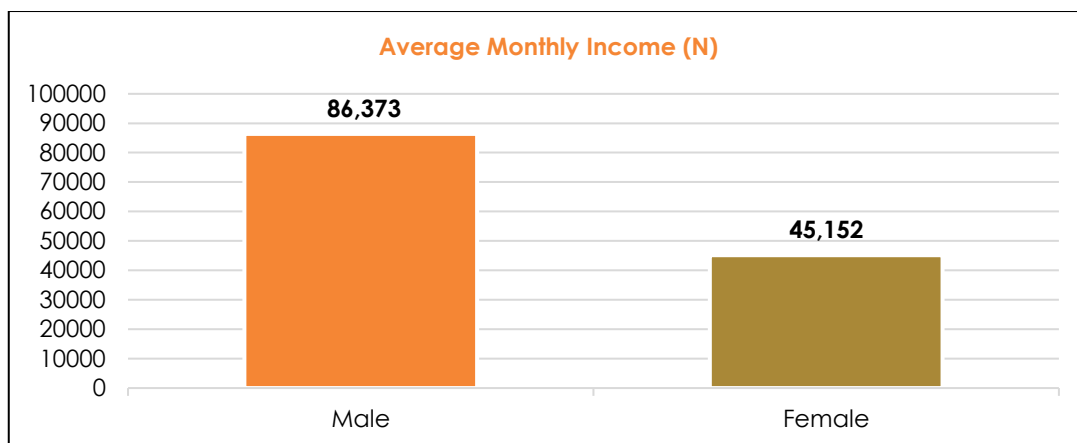
Figure 20: Dairy farmer's average monthly income

3.2.5 Average Monthly Expenditure

The table below shows the mean estimate of the monthly expenditure of some of the inputs used by the dairy farmers. The highest average monthly expenditure goes to the purchase of feed supplements, followed by food roughages for their cattle. The cost of labor was the expenditure least invested in.

Expenditure	Mean	Standard deviation	Total Percentage
Cost of feed supplement	N 52,444	N 2,390	27%
Cost of food roughages	N 30,995	N 3,590	40%
Cost of veterinary services	N 10,889	N 2,349	26%
Cost of labor	N 6,764	N 567	7%
Total	N 101 092	N 8926	100%

Table 2: Distribution of selected average inputs cost.

3.3 Assets and Ownership within Household

3.3.1 Distribution of Cattle Ownership

The average cattle per household is 56. The study found that male farmers on average own 18 more cattle than their female counterparts. This is typical of the Fulani culture where the men maintain ownership of the cattle. On average, 78% of the cattle owned by farmers are cows at different stages of development. This data needs further validation as some women might have double counted cows owned by their husbands as theirs and vice/versa and farmers may not have adequately captured their cows which are grazing in other parts of the country.
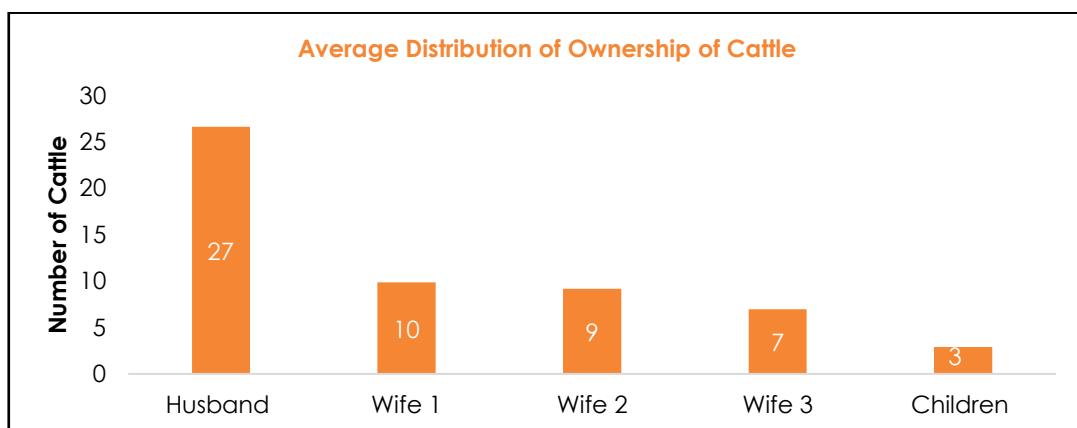
Figure 21: Average distribution of the dairy farmers by cattle ownership

3.3.2 Ownership of Land Disaggregated by Gender

The majority (83%) of the women do not own land, while more than half of the male counterparts stated that they have land of their own. Land ownership is mainly patriarchal in Nigeria. Married or widowed women in Nigeria hold abstract rights of access to land and biodiversity but they are denied real substantive land rights. For example, in most cases women are gifted land through inheritance but are often expected to give it to a male authority to handle.
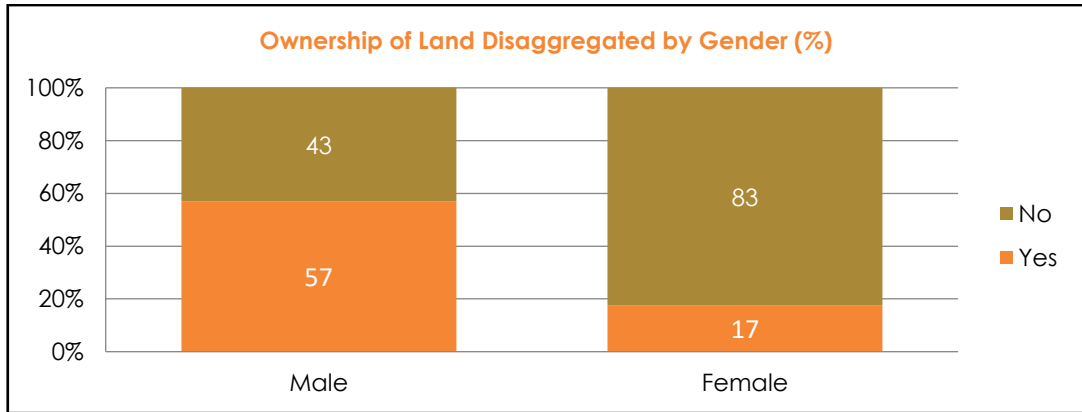
Figure 22: Distribution of land ownership by gender

3.3.3 Percentage of Farmers Who Pay for Grazing Land

Over the years, grazing land and stock-routes top the list of Fulani's demands from the Nigeria government because of the consistent conflict between Fulani herdsmen and crop farmers that has led to loss of lives, farm produce and millions worth of properties. One surprising discovery, however is the sizeable proportion of farmers (56%) reporting that they pay for access to grazing land.
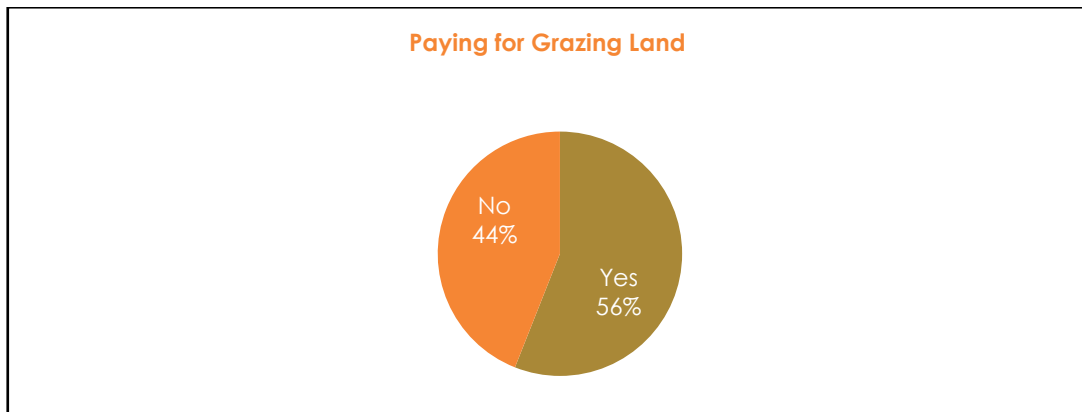
Figure 23: Percentage of farmers who pay for grazing land

3.3.4 Ownership of Bank Accounts

The vast majority of the dairy farmers (89% of men and 97% of women) do not own a bank account. Access to basic banking services in rural Nigeria remains limited, and lags far behind cities and towns. The lack of a formal bank account makes it more difficult for people to save, thus exposing them to vulnerabilities during unexpected emergencies such as household illness.
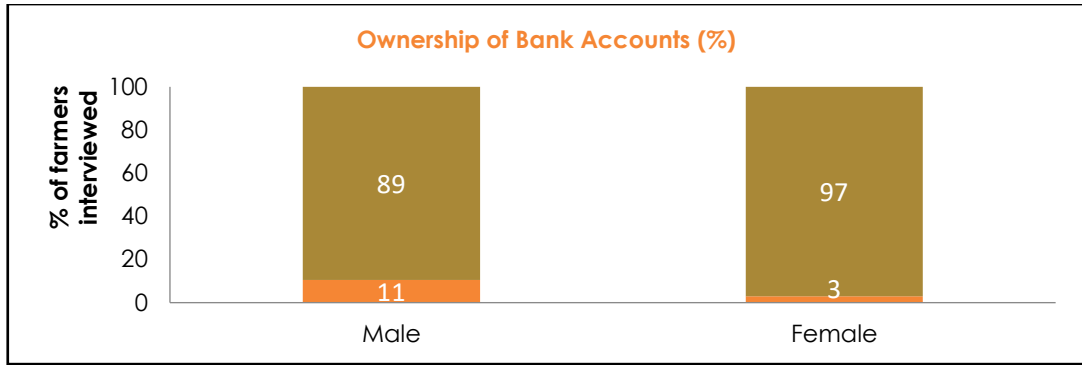
Figure 24: Percentage of farmers by bank account ownership

3.3.5 Access to Credit Facilities

Similar to bank account ownership, almost all of the dairy farmers do not have access to credit facilities. Specifically, only 7% of men and 2% of women have access to credit facilities. Agricultural credit or any credit facility is very important for sustainable agricultural development to be achieved in any country of the world. Rural credit has proven to be a powerful instrument for poverty reduction and development in rural areas.
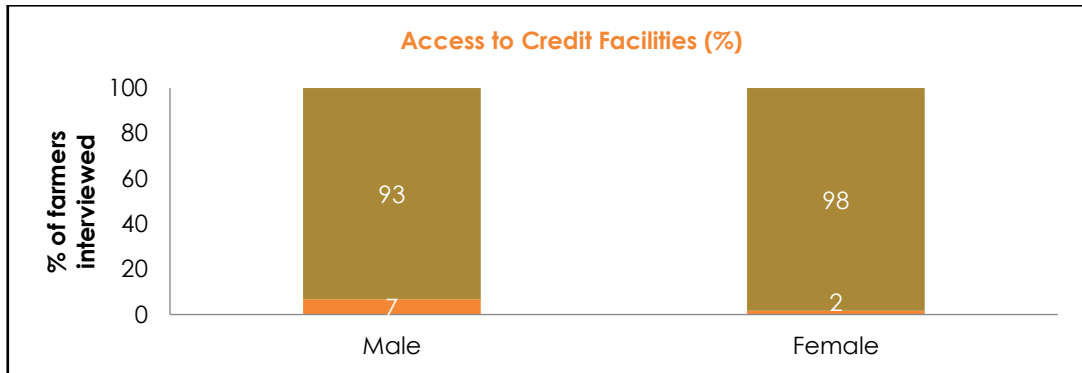
Figure 25: Percentage of farmers by credit facilities

4. PARTICIPATION IN FORMAL DAIRY SECTOR

4.1 Distribution of Cattle (Cows vs. Bulls) & Herd Mobility

On average men owned 27 cows while their female counterparts, if they possessed any cows, owned 26 cows. It is important to note that most women did not own their own cows. There is an average 53 cows per household. This average was lower than expected and will be further investigated in the gender study.

The distribution of herd mobility was assessed using the mean of the herd component in the last two years which involves births, deaths, bought and sold cattle. The data indicated that the fertility rate exceeds mortality rate. Likewise, less cattle were purchased than were sold.
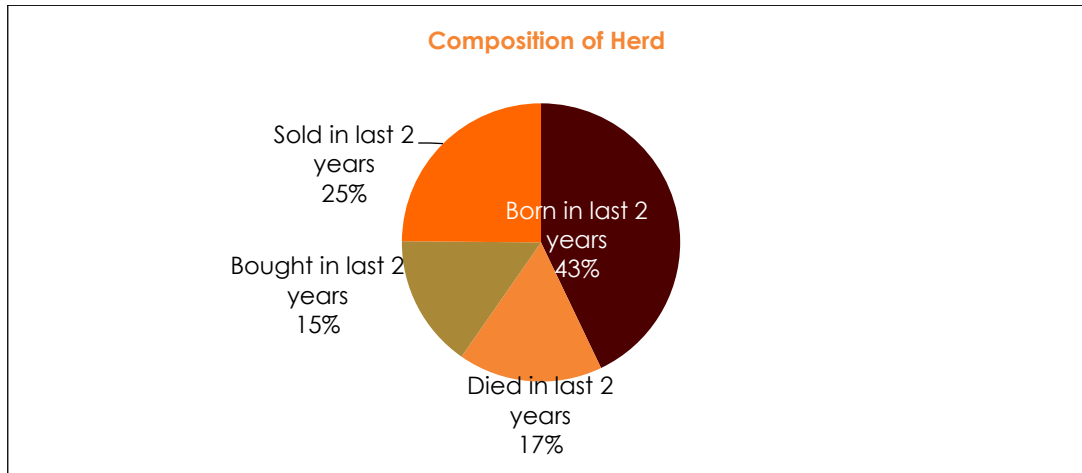
Figure 26: Composition of herd (born, died, bought and sold)

4.2 Awareness of L&Z Activities

The majority of the respondents are aware of the activities of L&Z. However, a slight difference was observed in favor of male dairy farmers (73% vs 68%). Moreover, awareness was surprisingly high among the identified clusters, at 62%, despite not yet being integrated.
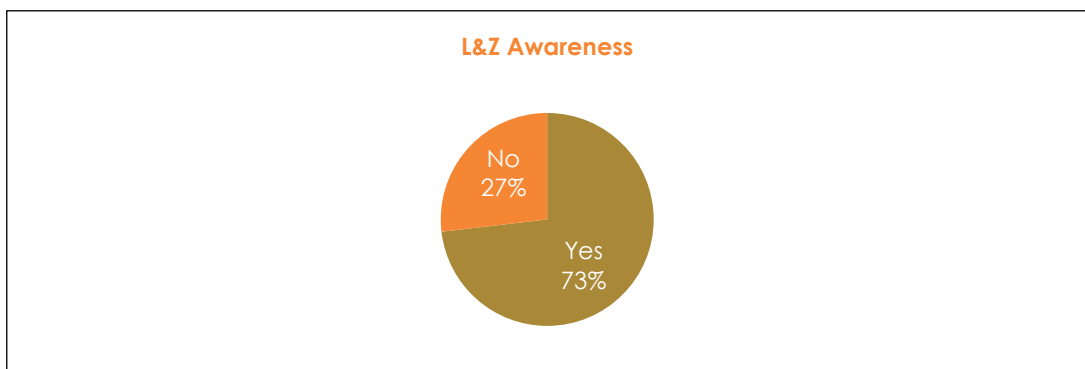
Figure 27: Distribution of the dairy farmers by awareness of L&Z activities
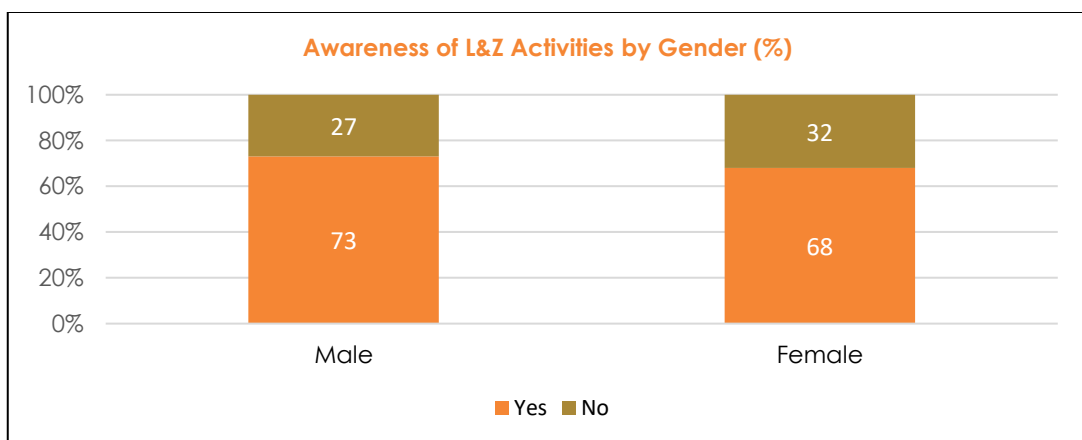
Figure 28: Distribution of awareness and integration of L&Z by gender
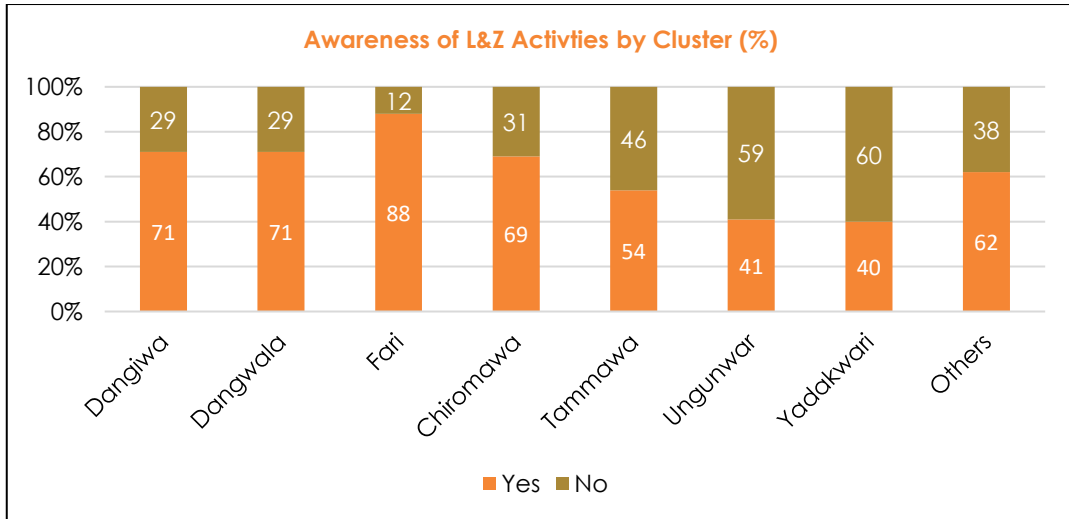
Figure 29: Distribution of Awareness and integration of L&Z by clusters/community[21]
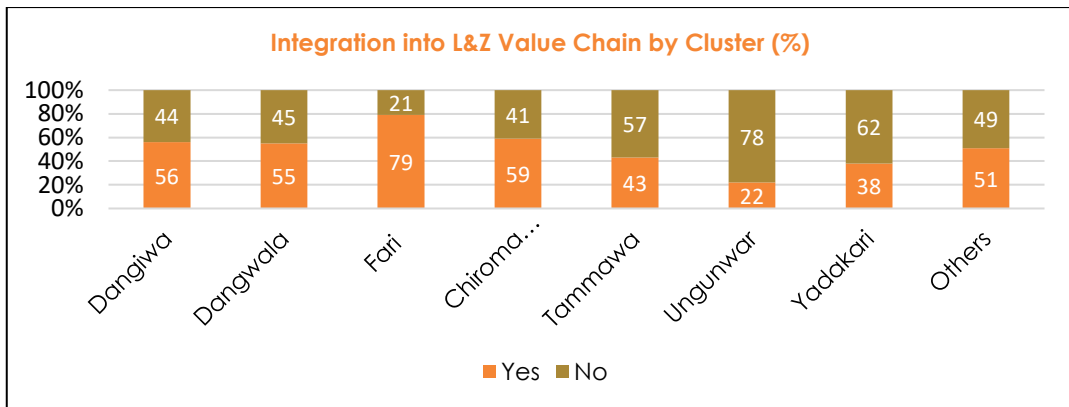
Figure 30: Distribution of dairy farmer integration into L&Z value chain by cluster[22]

4.3   Years of Integration into L&Z Supply Chain

The figure below reveals that more than half (58%) of the population interviewed have been working with L&Z for 1 - 5 years, while 42% are yet to be integrated but have been identified as potential suppliers. Very few of the dairy farmers have been integrated for longer than 10 years.
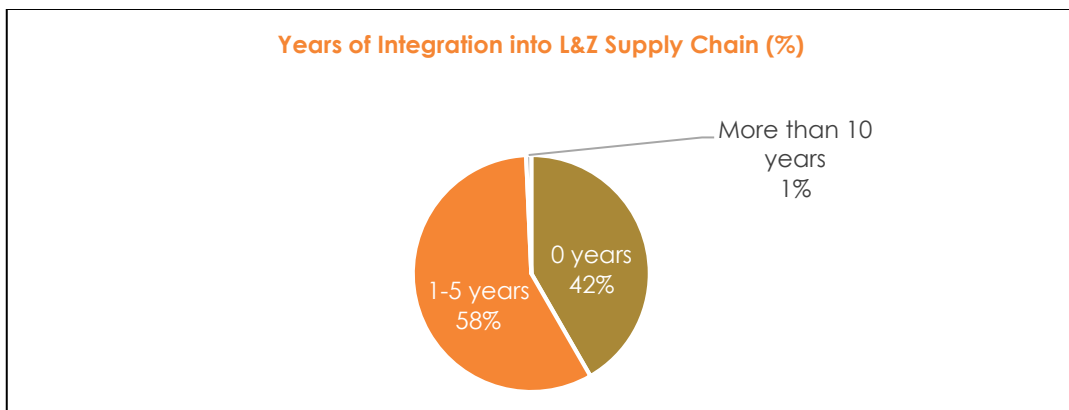
Figure 31: Distribution of dairy farmers by years of integration into L&Z supply chain

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[21] 'Others' refer to Fagi, Dan Tube, Gabari, Dan Gwauro, and Gidan Dankauye clusters.
[22] Ibid.

4.4 Frequency of Extension Agents Visits from L&Z

Less than half of the respondents indicated receiving visits by the L&Z extension agents. Those who received visits from the extension agents noted the frequency to be twice or more a month.

4.5 Distribution of Services by L&Z and the Government

L&Z's support services for farmer households tend to focus on training around improved dairy practices, proper animal care & hygiene for milk products.
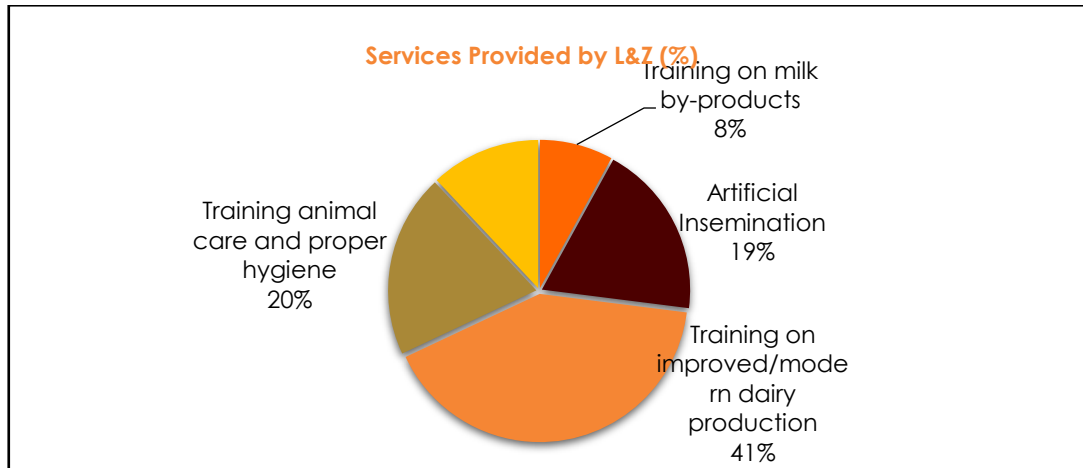
Figure 32: L&Z provided services received by dairy farmers

The government provides animal health services for almost half of the population of livestock including vaccinations and medications. Additionally, the government has previously sponsored 27% of the farmers with artificial insemination for their cattle. However, key informant interviews indicated that the AI was largely unsuccessful.
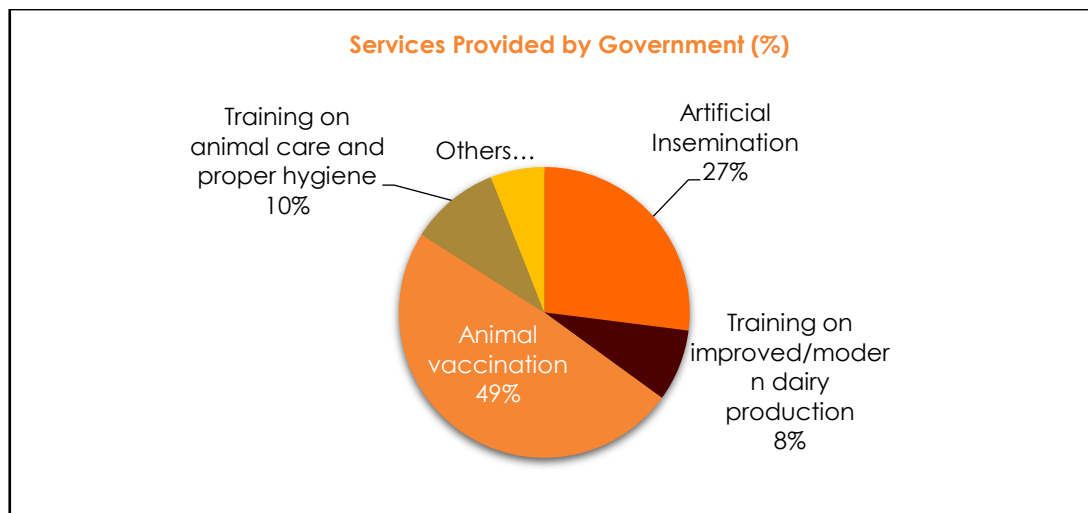
Figure 33: Government provided services received by dairy farmers

4.6 Sale of Milk to Processors

Almost all of the farmers cited L&Z as the only formal processor to which they sell majority of their milk. Of the 12% of farmers that did sell to other processors, 44% only

sold one mudu[23] of milk to other processors followed by 35% that sold 3 mudu and above to the processors.

Sahel further assessed the price points to which the dairy farmers sell the milk to the processors. 47% of the farmers claimed that they sold their milk to the processors at prices between N250 and N300 per mudu, 24% sold the milk at prices between N300 and N400 and 29% sold theirs at prices above N400 per mudu.

Initially, L&Z bought milk from the farmers at a fixed rate. This rate was based on whether farmers enrolled their children in school, in order to incentivize school and education among the youth. Farmers who had their children enrolled in school would receive N158,20 per mudu (N140 per litre) whereas those who did not have their children enrolled in school would receive N135,60 per mudu (N120 per litre). However, during meetings among L&Z and the community (which most of the women were absent and represented by the men) there were complaints about the price of milk being fixed and not fluctuating with the market price. As a result of this, L&Z begun to buy milk from the farmers at market-based prices as of the end of February 2017. During the month of May, L&Z bought milk from the dairy farmers at N237.30 per mudu (N210 per litre). This is slightly below the figures stated by the dairy farmers during data collection in March. L&Z has not received complaints about the change in the pricing mechanism. However, gender dynamics in decision making and perceptions around the revised pricing methods will be further explored in the gender study.
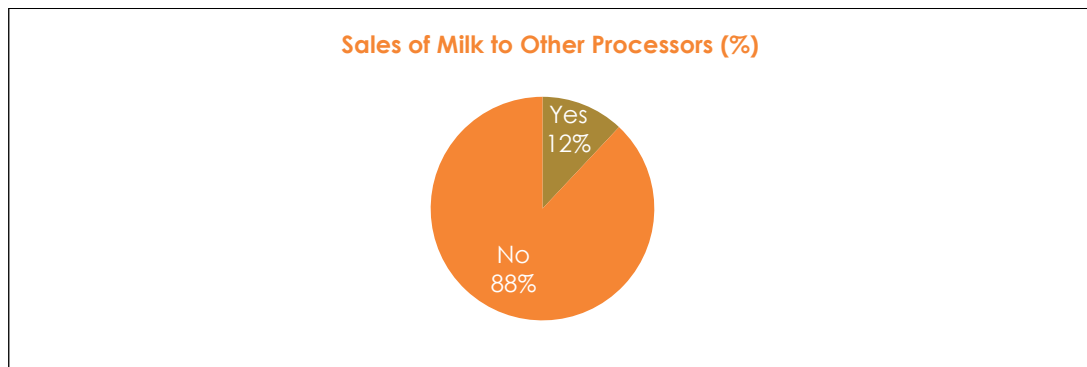
Figure 34: Distribution of sales of milk to other processors
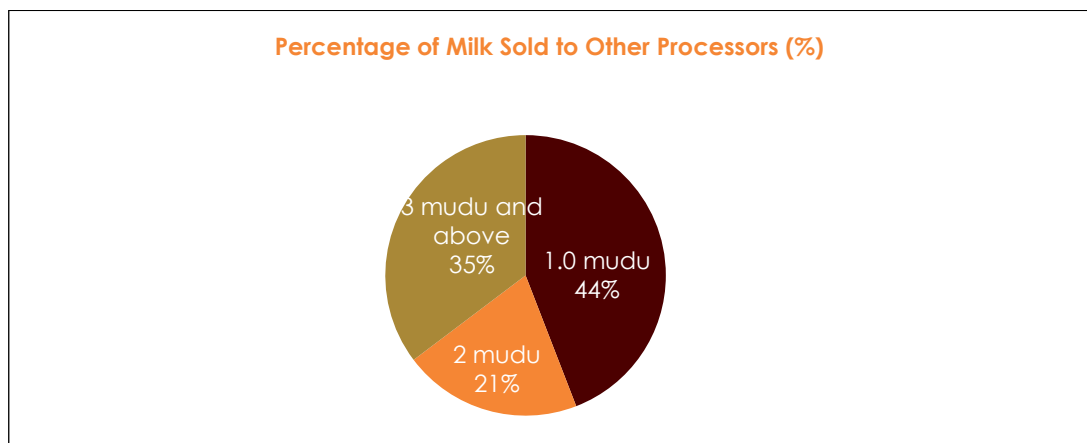
Figure 35: Percentage of milk sold to other processors

[23] In northern Nigeria, a mudu is a unit of mass used to measure products such as milk. One (1) mudu is approximately 1.13 kilograms

Price of Milk Sold to Processors (%)
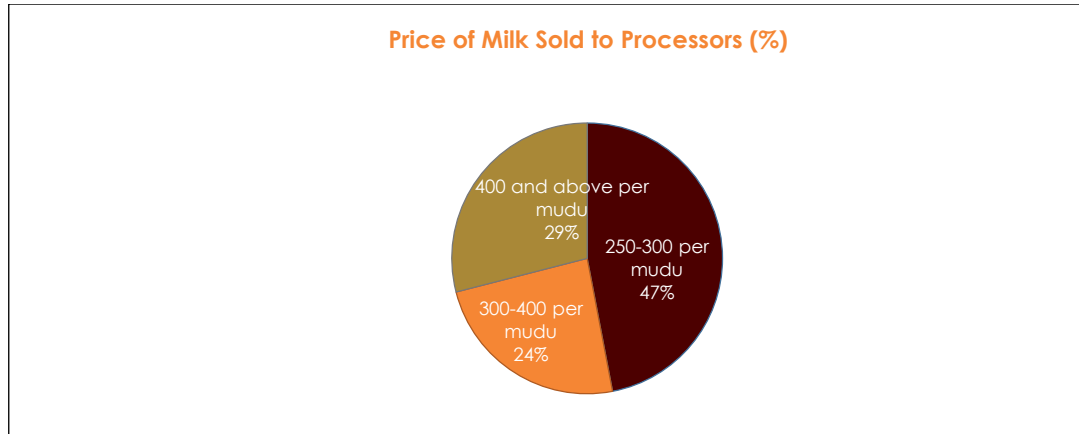
Figure 36: Price of milk sold to processors

4.7 Farmers Who Have Previously Participated in Artificial Insemination

15% of the sampled population has previously participated in AI exercises. The government sponsored 27% of the previously conducted AI exercise. 35% of the previously conducted AI exercise was sponsored by various sources such as NGOs and private companies while 23% was out of personal pocket expenditure by the dairy farmers. L&Z's contribution to the payment of the AI was the lowest among the sources considered.

Sahel noted that of those dairy farmers who have previously participated in an AI program, about half submitted 4 cows or more to the exercise. The study found that none of the farmers who had previously engaged in the AI exercise had succeeded. The three major reasons for this were the Fulani pastoral's lack of knowledge and basic skills for post AI management of cattle which ultimately led to them engaging in practices that constrained calving. The second cause was the poor feeding regime of dairy cattle as most inseminated cows had to go lengths to secure quality pasture immediately after AI. Thirdly, the quality of the semen used for the AI could have also been a factor, however this cannot be conclusively proven.

Previous Participation in AI Exercise (%)
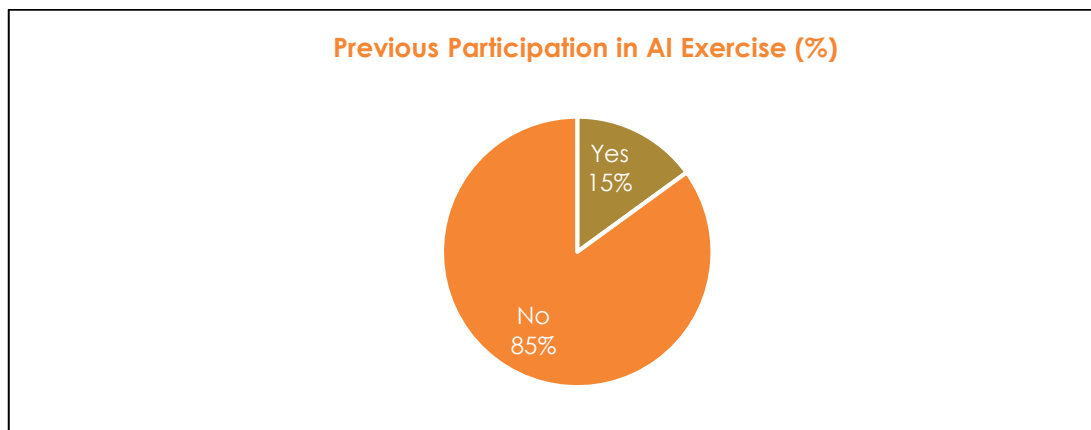
Figure 37: Dairy farmers who have previously participated in AI

Farmers Who Have Previously Participated in AI (%)
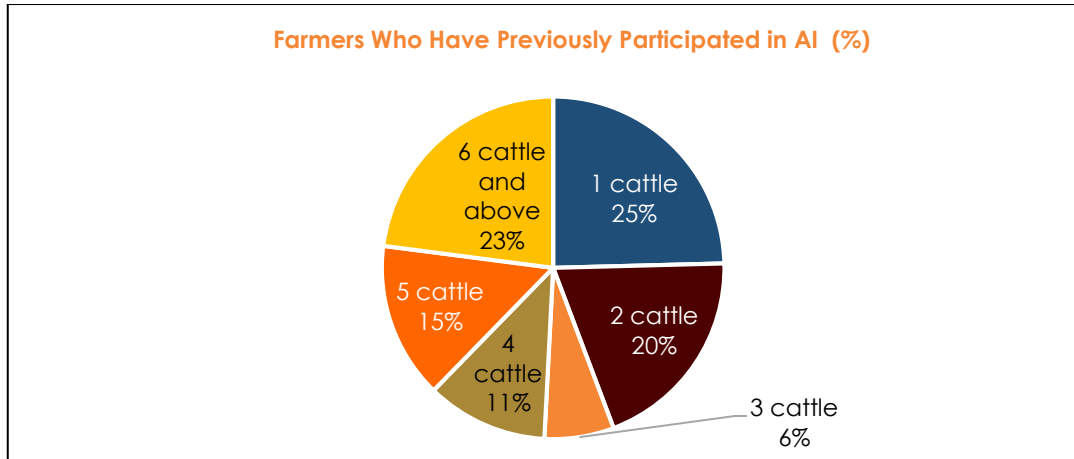
Figure 38: Percentage of farmers who have previously participated in AI and the number of cows they have provided

Source of Payment for AI (%)
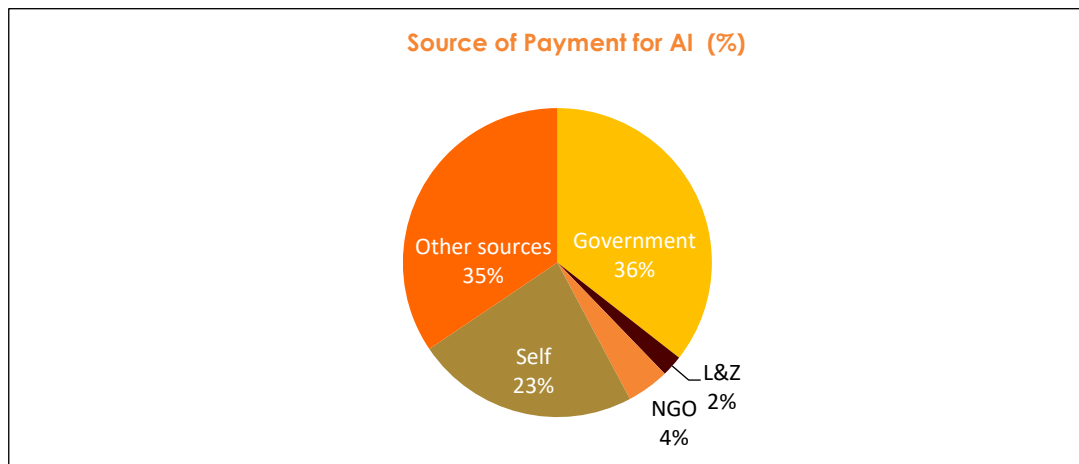
Figure 39: Distribution of dairy farmers by sources of payment for AI

4.8 Willingness to Participate in Artificial Insemination

67% of respondents are willing to participate in the AI exercise, suggesting that convincing farmers to chance participate in another AI intervention may not prove difficult.

Willingness to Participate in Artifical Insemination (%)
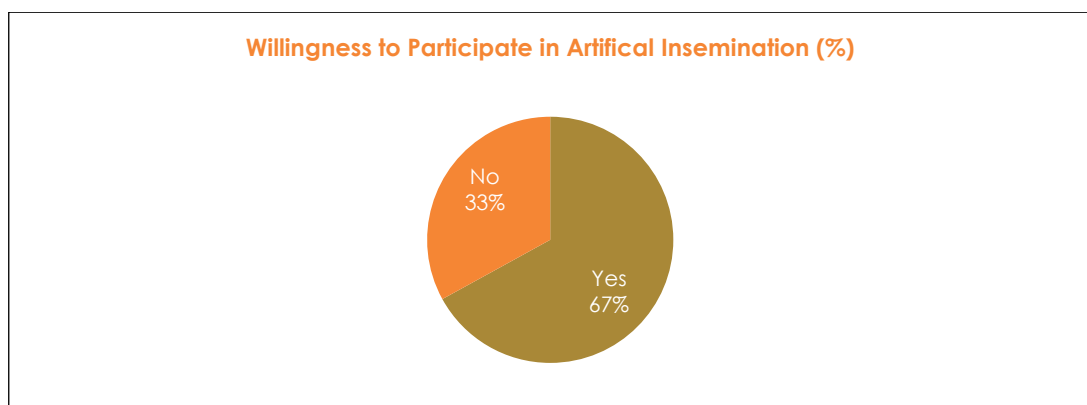
Figure 40: Distribution of dairy farmers by willingness to participate in AI exercise

5 ACCESS TO SOCIAL AMENITIES AND BASIC SERVICES

5.1 Access to Professional Healthcare

The rural residents face difficulties accessing health care services. About 50% of both men and women do not have access to professional healthcare due to a range of reasons including geographic distance, environmental and climatic barriers, lack of public transportation, and challenging roads. This question will be further analyzed in the gender study to understand the type of healthcare facilities respondents have access to.
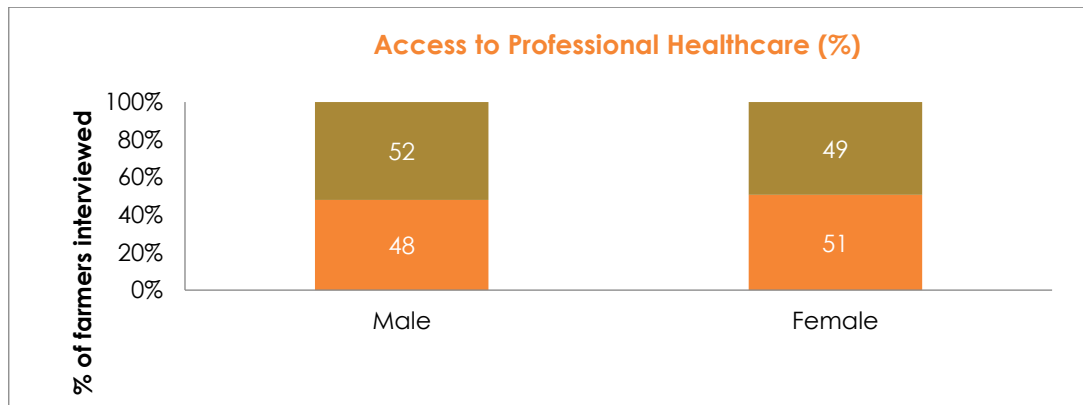
Figure 41: Distribution of those who have access to professional healthcare

5.2 Access to Water

Although access to improved sources of drinking water is generally low in Nigeria, the urban areas have higher proportion of those with access than rural areas. Interestingly, the majority (93%) of the dairy farmers stated that they have access to water. 38% have access to boreholes, which is a community based infrastructure enjoyed by the rural households while 10% have access to streams. This is an unimproved source of water which might be detrimental on the health status of the farmers if not treated. There is a need to probe further into the types of access and quality of the water. Additionally, more than half (54%) of the respondents do not have access to electricity.
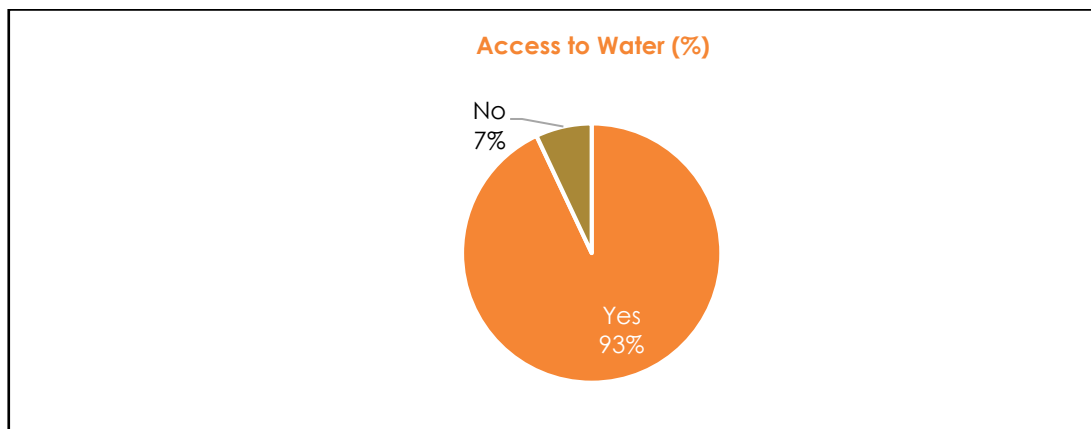
Figure 42: Access to water

Type of Water Source (%)
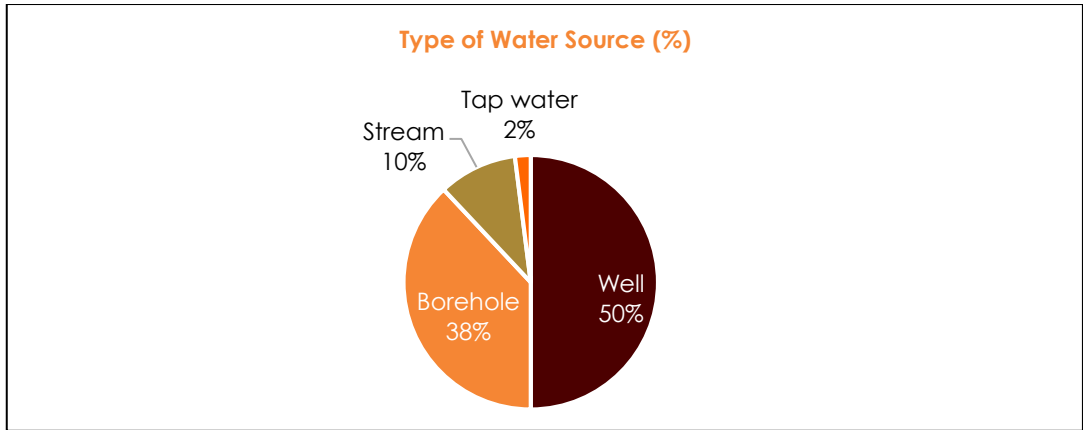
Figure 43: Breakdown of water sources utilized by dairy farmer households

Access to Electricity (%)
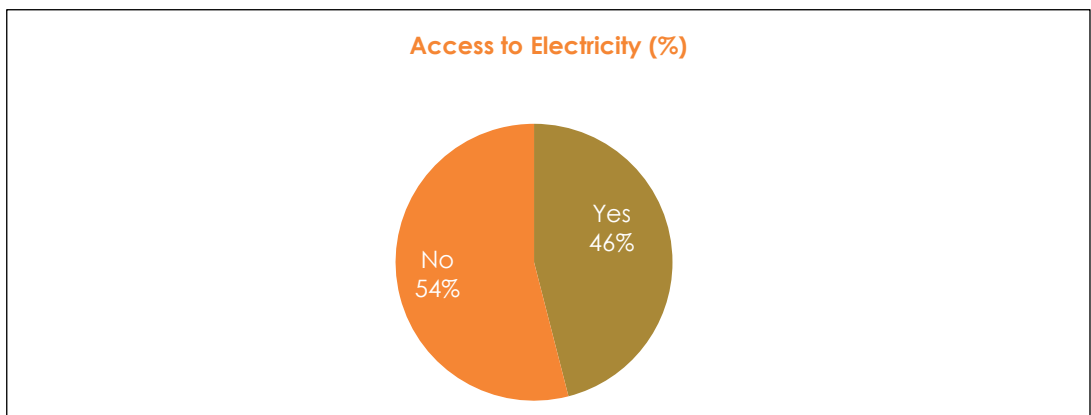
Figure 44: Distribution of access to electricity

5.3   Access to Veterinary Services

61% of respondents have access to veterinary services.

Veterinary Services Recieved (%)
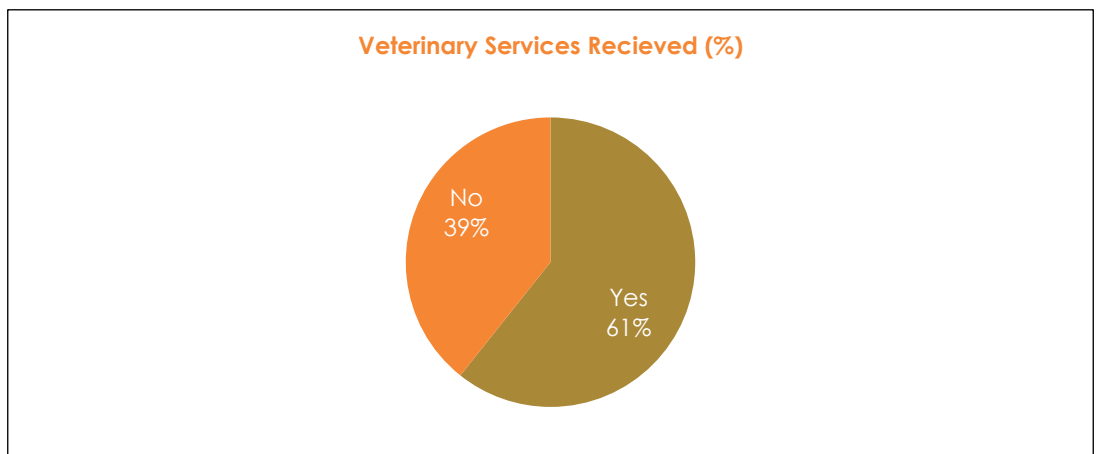
Figure 45: Distribution of access to veterinary services

5.4 Constraints

Sahel noted that the lack of access to financial services specifically credit facilities, followed by limited vet services, access to feeder roads and to medical care were the biggest constraints facing the farmers in the communities interviewed in this baseline study.
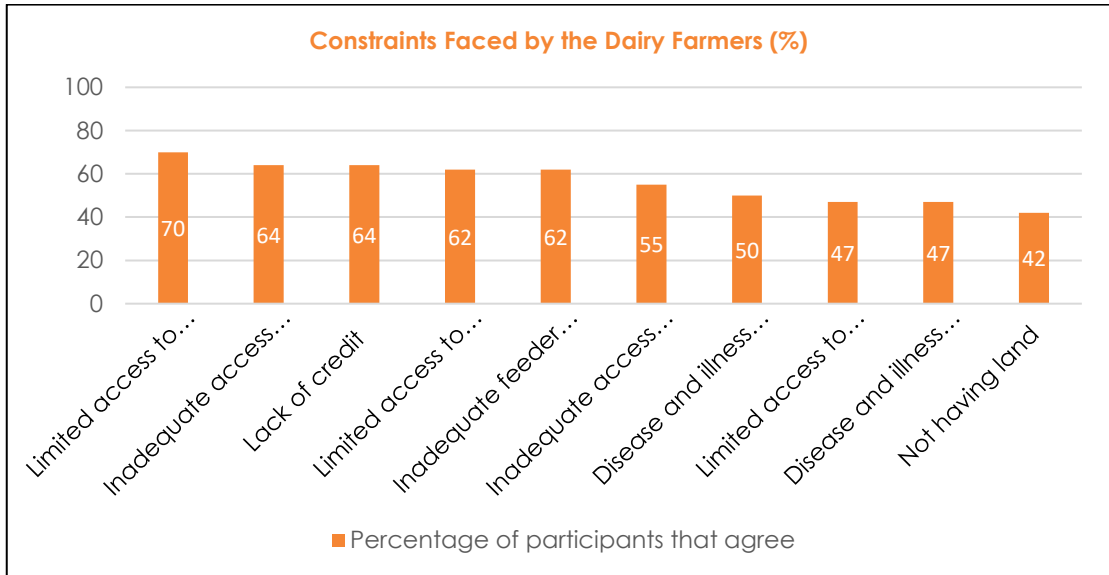
Figure 46: Distribution of the constraints faced by the farmers.

CONCLUSION

This report provided findings around respondents' demographic and occupational characteristics, their asset ownership and productivity levels, their participation in the formal dairy sector and their access to basic services and social amenities. It confirmed the large participation of women in the dairy sector in Kano State.

Its findings are informing the implementation of the program's various interventions around farmers' identification and mobilization, productivity improvement, and infrastructure development. For example, the high level of awareness of L&Z activities among the identified dairy farmers will be beneficial to their mobilization and integration. Moreover, the willingness of the farmers to participate in AI exercises despite past failures is a positive step; it however highlights the importance of constructing a robust plan that maximizes chances of success to avoid further disappointments. The feed and fodder intervention will also be critical given the lack of access to land by the majority of farmers. The quality and proximity of water remains problematic for several of the sampled farmers, thus the creation of 10 boreholes, strategically placed within the communities, will directly improve the source and thus quality of water that the farmers are currently exposed to.

This baseline study has also revealed areas that need to be further analyzed and validated as part of the gender and nutrition studies. These include cattle ownership, sources of and income levels, access and use of mobile phones.

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APPENDIX: KANO STATE BASELINE QUESTIONNAIRE

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The Nigerian Dairy Development Program
Baseline Study Questionnaire

Introduction
This questionnaire is designed to collect information on current dairy production, marketing practices and the livelihood of smallholder dairy households in Kano State.

The Nigerian Dairy Development Programme (NDDP) is a processor-led dairy programme implemented by Sahel Capital Partners & Advisory Limited (Sahel), in partnership with L&Z Integrated Farms (L&Z) – a leading dairy processor in Kano State. The program is geared towards improving the livelihoods of smallholder dairy farmers in Nigeria by improving the productivity of their cattle and integrating them into the formal dairy value chain in Nigeria. The NDDP has nutrition and gender components which are aimed at improving nutrition outcomes and promoting women empowerment in smallholder farming communities.

We assure you that all information provided will be kept confidential. Thank you.

Objectives: To elicit data on socioeconomic, demographic, production and marketing, and livelihoods of smallholder dairy farmers.

Composition: A household is defined as a man, his wives, and unmarried children. "Other inhabitants" captures individuals living with the family that may not be related/married to the man. Man (husband) and women (wives) per household will each be interviewed.

Participants: 300 Smallholder dairy farmer households (approx. 900 individuals)
Venue: 12 Communities located in 7 LGAs in Kano State

A.1	Questionnaire Code		
A.2	Interviewer's name(s) and number(s)		
A.3	Date of interview		
A.4.	Time of interview	Start:	End:

B. General information

B.1.	Respondent's name				
B.2.	Phone number				
B.3.	Age				
B.4.	Sex	Male		Female	
B.5.	Tribe	Fulani	Hausa	Yoruba	Other:
B.6.	Name of village/residence and LGA	Village:		LGA:	
B.7.	Were you born in this village or did you migrate here? *If born in the village go to B.10.*	Born here		Migrated	
B.8.	If you migrated, what year did you migrate to this village and why?				
B.9.	Where was the last place you stayed before	Place		Distance (Km/Walking days)	

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	migrating here? What is the distance (Km/Walking days) between the old and new place?				
B.10.	Do you have plans for migrating away from this village in the future?	Yes		No	
B. 11.	If yes, where do you plan to move to and when?	Place:		Year:	
B.12.	If no, why do you choose to remain in this village?	Access to land/resources	Access to financial means through sales of milk	Do not want to migrate	Others, specify
B.13.	Household size (numeric)				
B.14.	Demographics of household (numeric)	Husband:	Wives:	Unmarried biological children:	Other inhabitants:
B.15.	Ages of people in the household	Husband: <18 years = 19 – 30 years = 31 – 59 years = >60 years =	Wives: <18 years = 19 – 30 years = 31 – 59 years = >60 years =	Unmarried biological children: <18 years = >18 years =	Other inhabitants: <18 years = 19 – 30 years = 31 – 59 years = >60 years =
B.16.	Number of children per woman	Woman 1:	Woman 2:	Woman 3:	Woman 4:
B.17.	Ages of children currently in school per household	<6 years = 7 – 12 years = >13 years =			
B.18.	Number of household members involved/helping in cattle rearing	Men:	Women:	Children:	

Household size: A household is defined as a man, his wives, and unmarried children. "Other inhabitants" captures other individuals living with the family that may not be related/married to the man.

C. Socio-economic and demographic information

C.1.	Level of education	Primary	Secondary	Tertiary	Arabic schooling	No schooling	
C.2	Specify the number of years you spent for formal schooling						
C.3.	Why did you leave school?	Successful Completion	Lack of funds	To support family	Illness	Marriage	Others specify:
C.4.	Can you read and write with understanding in any language?	Yes: If yes, what language(s)?			No:		
C.5.	What is your primary occupation and what is the proportion of your time that it takes in %?					Proportion of time (%):	

C.6.	What is the proportion of time spent on other occupations or means of livelihood in %?			Proportion of time(%):
C.7	Indicate all sources of income you earn	a. Sales of cattle		b. Other, specify
		c. Sales of Milk and milk products		d. Other, specify
		e. Sales of farm produce (crop)		f. Other, specify
		g. Sales of other animals/animal products		h. Other, specify
		i. Rent		j. Other, specify
		k. Remittances		l. Other, specify
		m. Trading		n. Other, specify
		o. Entertainment		p. Other, specify
		q. Service provision		r. Other, specify
C.8.	What is the total amount of income you realize from all sources? *Refer to C.7 above*	Monthly:		Yearly:
C.9.	Which of the sources listed above provides largest income? *Refer to C.7 above*			
C.10.	What proportion (%) of your total income come from Milk sales?	Monthly		Yearly
C.11.	What is your most prized possession?			Why?
C.12.	Do you have access to professional healthcare? If yes, state location.	Yes:	No:	Location: LGA:
C.13.	Do you have access to social amenities (e.g. Schools, hospitals)?	Yes:	No	List the ones you have access to:
C.14.	State the proximity of your community to the nearest tarred road (walking minutes/km).			
C.15.	Do you have access to electricity (NEPA/Solar) in your village?	Yes:	No	Hours per day:
C.16.	Do you have access to water?	Yes:		No:
C.17.	What is the source of your water?	Borehole	Stream	Other, specify:
C.18.	Distance of water supply from your household? (State walking minutes/km)			

C.19.	Do you have a bank account?	Yes:		No:		If yes, which bank?	
C.20.	If you have a bank account is it currently active?	Yes:				No:	
C.21.	Have you had access to formal loans/credit in the past 5 years?	Yes:		No:		Amount:	With whom:
C.22	Do you have savings (in cash)? *Is this ethical?*	Yes:				No:	
C.23.	Do you keep your savings in the bank?	Yes:				No:	
C.24.	Do you bank using your phone? (e-bank)	Yes:				No:	
C.26.	What do you spend the majority of your money on? In order of quantity.	1: %:	2: %:			3: %:	4: %:
C.26	Has anyone in this household suffered from any illness or injury over the last 12 months? If yes, give gender, age, length of illness, if anyone was not consulted and reason for this. (see codes below)	Yes:				No:	

Detailed C.26 sub-sections:

If yes, state gender of those affected: a. Male= b. Female=		If yes, state age(s) of those affected: c. -- f. --- d. -- g. --- e. -- h. ---
If yes, state number of days/months for those affected: i. -- l. j. -- m. k. -- n.		
o-- Was anyone consulted and who?:		p-- Why was anyone not consulted? Why not? (if applicable)

Where they went for consultation: 1 = drugs at home; 2 = neighbor/ friend; 3 = community health worker; 4 = Drug shop / pharmacy; 5 = ordinary shop; 6 = private clinic; 7 = health unit government; 8 = health unit NGO; 9 = hospital government; 10 = hospital private; 11 = hospital NGO; 12 = traditional healer; 13 = other (specify)

Reason for not consulting on illness: 1 = illness mild; 2 = facility too far; 3 = hard to get to facility; 4 = too dangerous to go; 5 = available facilities are costly; 6 = no qualified staff present; 7 = staff attitude not good; 8 = too busy/ long waiting time; 9 = facility is inaccessible; 10 = facility is closed; 11 = facility is destroyed; 12 = drugs not available; 13 = Did not want to go alone; 14 = other (specify).

D. Production & Marketing Activities

D.1.	Size of herd			
D.2.	Demographics of the herd	Cow:	Bull:	
D.3.	Where is the herd currently?	Location 1:	Location 2:	Location 3:
D.4.	Who is taking care of the herd? State relationship: *Son, brother, father, labour, uncle, nephew*	1:	2:	3:

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D.5.	Where do the cows graze?	1:		2:	3:	
D.6.	Age distribution of the herd	0-2:	3-6:	7-13:	14-19:	20+:
D.7.	Provide number of your herd over the last two years	I)Born II) Died:	III) Bought: IV) Sold:	V) Slaughtered VI) Given-out as dowry/gifts		VII) Received as dowry/gifts VIII) Other, _ _ _
D.8.	If sold within the last two years, state reason(s)?	How many:		Why:		
D.9	If died within the last two years, state cause of death?	-- --		-- --		
D.10.	Specify your cattle rearing experience (years)					
D.11.	Other than milk, do you produce any other dairy product(s)?	Yes:			No:	
D.12.	If yes, what dairy products?	Cheese	Butter	Nunu	Others, specify:	
D.13.	Do you know L&Z	Yes		No		
D.14.	Are you integrated into L&Z's supply chain? If no, go to D.19.	Yes		No		
D.15.	If yes, what year were you integrated?					
D.16.	What quantity of milk do you sell to L&Z on average? Pls. state the measure used clearly.	Litres/KG or Mudu per day:			Percentage of total quantity:	
D.17.	Were you visited by L&Z's extension agents in the last 1 year?	Yes:		No:	If yes, how many times?	
D.18.	What modules/topics were you taught by L&Z extension agents in the last 1 year?					
D.19.	Have government extension agents visited you in the last 1 year?	Yes:		No:	If yes, how many times?	
D.20.	What modules/topics were you taught by government extension agents in the last 1 year?					
D.21.	Apart from L&Z and the government is any other organization providing you with services?	Who:		With what:		

D.22	What module/topics would you like to be taught on cattle rearing and dairy production in future?			
D.23.	Are you selling your milk to any other processor other than L&Z	Yes		No
D.24.	If you sell to other processors, since when and to whom?	Since when: 1. 2.	To whom: 1. 2.	
D.25.	How much do you sell to these other processors? **Pls. state the measure used clearly.**	Quantity: 1. 2.	Price per litre/KG/Mudu: 1. 2.	
D.26.	Have you received veterinary services (animal care, vaccination, de-worming, others) from any providers in the last one year?	Yes:		No:
D.27.	If yes, who provided the services to you?	a-- L&Z b-- Govt. c—Private service provider		d-- NGO e-- other f-- other
D.28.	Are you paying for these services?	Yes: Cost:		No:
D.29.	On average, how much is spent on medication for your herd?	Monthly:		January – December 2016:
D.30.	Do you normally de-worm your cattle?	Yes If yes, state frequency:		No
D.31.	When last did you carry out a de-worming exercise? Specify month and years:			
D.32.	Which of the following pests and diseases have you experienced in your herd in the last one year?	a-- Tick infestation b-- Foot and mouth rot disease c-- Trypanosomiasis d-- Other, specify e-- Other, specify f-- Others, specify g-- Others, specify		
D.33	Do you pay for grazing?	a. Yes b. If yes, state how much daily: c. If yes, state how much monthly:		d. No
D.34.	Do you give feed supplements to your cattle in addition to grazing? How often?	Yes If yes, state frequency:		No

D.35.	On average, how much is spent on feed supplementation?	Monthly:		January – December 2016:	
D.36.	On average, how much is spent on fodder and roughages?	Monthly:		January – December 2016:	
D.37.	Do you produce crops for human consumption?	Yes:		No:	
D.38.	Do you produce crops for animal feed (forage and pastures?	Yes:	No:	What crops:	
D.39.	Have you inseminated your cows in the past?	Yes:	No:	If yes, indicate number of Cows inseminated:	Year(s) of AI:
D.41	If yes, who paid for the AI?	a. Govt. b. Self		a. NGO b. others, specify	
D.42.	How many of your cattle are cross-bred	Cow:		Bull:	
D.43.	Are you willing to provide your cows for AI	Yes		No	
D.44.	How many cows are you willing to give to AI in:	2017:	2018:	Total:	
D.45.	Are you willing to provide a pen where the cows will stay after AI?	Yes:	No:	How many:	
D.46.	How many milking cows do you presently have? How many have you had over the last two years (as of December, 2014)?	Presently:		Last 2 years:	
D.47.	Quantity of milk produced by your milking cows during the wet season?	Daily:		Monthly:	
D.48.	Quantity of milk produced by your milking cows during the dry season?	Daily:		Monthly:	
D.49	Average quantity of milk produced per cow?	Daily:		Monthly:	
D.50.	What proportion do you consume personally	%:			

E. Assets & Ownership

E.1.	Distribution of ownership of cows owned by household	Husband	Wife 1	Wife 2	Wife 3	Wife 4	Children	Other Inhabitants
E.2.	Do you own land?	Yes:				No:		
E.3.	If yes, how much land and where?	How much (hectares): 1. 2. 3.				Location(s): 1. 2. 3.		

F. Which of the following constraints do you have in your daily living and cattle rearing operations?

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I.1.	Limited access to water					
I.2.	Not having land					
I.3.	Limited access to social amenities including schools for children					
I.4.	Lack of access to medical care					
I.5.	Lack of access to credit					
I.6.	Disease and illness (human)					
I.7.	Disease and illness (cattle)					
I.8.	Lack of feeder roads					
I.9.	Other, specify					
I.10.	Other, specify					
I.11.	Other, specify					
I.12.	Other, specify					