NIGERIAN DAIRY DEVELOPMENT PROGRAMME (NDDP)

Baseline Report

Oyo State

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LIST OF ACRONYMS

AI	Artificial Insemination
DDP	Dairy Development Programme
FCW	Friesland Campina WAMCO
FMARD	Federal Ministry of Agriculture and Rural Development
GDP	Gross Domestic Product
KII	Key Informant Interviews
LGA	Local Government Area
L&Z	Lami and Zubaida Integrated Farms Limited
NGN	Nigerian Naira
MCC	Milk Collection Centre
NDDP	Nigerian Dairy Development Program
PPP	Public Private Partnership Model
R&D	Research and Development

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 ("Sahel") in partnership with leading dairy processors - Friesland Campina Wamco (FCW) in Oyo State and L&Z Integrated Farms Ltd. in Kano State. The aim of NDDP is to strengthen the Dairy Transformation Agenda of the Government by demonstrating proof-of-scale in Nigeria's processor-led initiatives for dairy development.

This report summarizes key findings from a baseline study conducted on 679 households in 5 Local Government Areas (LGAs) in Oyo State, using a purposive sampling method[1]. Of the 679 households assessed in the study, 460 (68%) are currently integrated into FCW's supply chain (i.e. they currently supply FCW with fresh milk); the remaining 219 households (32%) have been identified as potential suppliers but have not yet been integrated. A household was defined as a man, his wives, and unmarried children. The husband and 1st wife were interviewed, bringing the total number of questionnaires administered as part of this study to 1,358. Moreover, information was collected from FCW's dairy development program (DDP) team including the R&D and DDP Manager, Lawrence Ohue; Dairy Extension Manager, Dr. Akinade Samson Adebayo; and the Milk Collection Manager, Adekunle Olayinwola.

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 catalyse the dairy sector in Oyo 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. Finally, the baseline study will serve as an entry point for the experts engaged to conduct gender and nutrition studies to examine cultural beliefs, knowledge attitudes and practices that influence social norms among the NDDP's participating dairy households in Oyo Sate, and which could impact the success of the program.

B. Key Findings

This baseline study yielded several key findings listed below regarding participating dairy households in Oyo State.

Characteristics of the Study Population

The gender composition of the households interviewed stood at 38% male and 62% women. The average household size is 7. The population interviewed is relatively young with an average age of 36 years old. This is particularly true for the women, as 60% of them are within the age range of 18-30 years old compared to 64% of male farmers who are within 31-59 years old. Just over half (56%) of the farmers have one wife. Approximately 60% of the respondents have between 1-5 children. 74% of the respondents are Fulani by tribe. Most of the farmers (82%) do not have formal education.

[1] 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 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 judgement.

Occupational Characteristics

The respondents are actively involved along the different nodes of the dairy value chain. 74% of the female farmers are involved in milk processing while 96% of the men are involved in cattle rearing. In terms of source of income, the men make the bulk of their income from cattle sales while women derive most of their income from milk sales.

Asset Ownership

The average cattle per household is 100. On average, male farmers own 94 cattle. Most women do not own cattle of their own; the 28% that own their own cows possessed an average of 6 cattle. The dairy farmers are predominantly landless with only 10% of the male farmers and 3% of the female farmers owning land. In terms of financial inclusion, less than 5% of the dairy farmers have bank accounts and only 0.1% have access to formal credit. The average monthly income for the male dairy farmers at the time of the study was N86,919 while the women earned N52,754. The average household income was N69,748. This information will be further examined during the gender study.

Participation in Formal Dairy Sector

93% of the households interviewed are aware of the activities of FCW, though only 68% (460) of them are currently integrated into FCW's value chain. 41% (189) of the integrated households have been supplying milk to FCW for 1-3 years, demonstrating their relative recent entry into the formal dairy value chain. A large portion of the identified farmers sell their milk to the market or to other local and community-based processors. With regards to extension visits, only 15% of the integrated households have been visited by FCW extension agents in the last year, demonstrating the need for more coverage. While 15% of the farmers have been educated about artificial insemination (AI) only 2% have previously participated in AI intervention, which proved unsuccessful; however, 51% of the respondents stated that they would be willing to have their cows artificially inseminated.

Social Amenities

The farmers have limited access to social amenities. Only 29% of the surveyed households had access to professional health care. Access to veterinary services was also very low at 8%. 2% of the respondents reported having access to electricity. 81% of the surveyed households noted having access to water, though mostly from a stream; in addition, it takes them on average over an hour (78 minutes) to access the water source. The main constraints to dairy production as reported by the respondents are diseases and illnesses their cattle face, limited access to social amenities and lack of 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 FCW 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**:
  - **Genetics & Breeding:** In spite of past failures, the willingness of approximately half of the farmers to participate in an AI intervention is very positive. Nevertheless, the past failures also underscore the importance of developing a robust strategy that maximizes the chances of success in order to minimize the risk of failures and disappointments.

  - **Extension Services & Training**: The baseline demonstrated a need for more training and extension services for the farmers. This is a key area of focus of the program through a training of trainers' approach that will leverage community livestock workers, state and federal government extension workers on aspects such as good hygiene practices, model ways of cattle rearing and animal practices.
  - **Feed & Fodder:** The lack of access to land among the farmers re-emphasized the importance of the feed and fodder intervention now centered around 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 15 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 analysed 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, sources and uses, 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 channel for receiving payments.

1. INTRODUCTION

1.1 Background

The Gross Domestic Product (GDP) of Nigeria was estimated at NGN83 trillion (USD522 billion) in 2013 post-rebasing.[2] 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 16million cattle.[3] 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, flavour and nutrient profile compared to the fresh milk.

As of 2012, Nigerian milk mainly from pastoral herd was estimated at 606,827 metric tonnes meeting just 54.2% of the annual national demand of 1,120,001 metric tonnes, while the balance was imported.[4] Imports of milk powder and other processed dairy products were valued at USD4750 million in 2012.[5] Just 600,000 litres 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.[6] 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, limited infrastructural

[2] 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.
[3] Anon (2014). Gross Domestic Product for Nigeria, 2013. Published by the National Bureau of Statistics, p15.
[4] 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.
[5] Global Agricultural Information Network. (2013). Nigeria Food Processing Ingredients Market 2013. Pp. 5.
[6] Ibid.

resources including water, pastures, health facilities and market facilities diminish accessibility by the majority of producers.[7]

Friesland Campina Wamco (FCW) is the largest processor of milk in Nigeria with the capacity to process upwards of 1.5 million kilograms of milk per day. FCW in collaboration with 2Scale has successfully piloted the 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. FCW has learnt critical lessons from their initial involvement with the farmers and are committed to expanding the reach of their work.

Against this backdrop, the Nigeria Dairy Development Programme (NDDP) was launched to deepen and expand this processor-led program. 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 is to better understand the characteristics of the milk suppliers targeted by the program. It aims to provide socioeconomic and demographic data among. This baseline data provides a factual basis against which Sahel will track 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. This report summarizes the relevant findings from data collected from 679 households (1,359 individuals) in 5 communities in Oyo State.

1.2 Study Area

The study was carried out in Oyo State, south-western Nigeria which has 28 Local Government Areas (LGAs), with its capital being Ibadan. Oyo State covers a land area of 32,249 sq./kilometres and is bounded by Kwara, Osun, Ogun states as well as Benin Republic. Within Oyo State, the study focused on FCW integrated clusters: Iseyin – Iseyin Local Government, Saki – Saki West Local Government, Alaga – Itesiwaju Local Government, Fashola – Fashola Local Government, and Maya – Surulere Local Government.

The state has a population of 5.6 million people with climatic conditions that favour agriculture. The wet season is from April to October, with the mean temperature of 27°C. The dry season is between November and March. The mean annual rainfall is 1,194mm in the North and 1,264mm in the South.[8] The inhabitants of the area are predominantly Yoruba speaking people and migrant livestock farmers. The people of the area are predominantly farmers who cultivate cash and arable crops. Some of the farmers are also involved in livestock production.

Within Oyo state, the Zebu cattle (White Fulani and other Zebu breeds) are herded in the lowlands, amidst land progressively used by the Yoruba for crop production. Conflicts between Fulani herdsmen and Yoruba crop farmers with respect to land (and water) are a source of regular incidents with varying degrees of violence.

[7] 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.

[8] Oyo State Ministry of Agriculture and Natural Resources (OYMANR). (2013). Agricultural Investment Opportunities in Oyo State, 1-5.

There are three milk production systems in Oyo: "Fulani nomadic", "Fulani grazing reserve", "Fulani semi-settled" and changeovers between the three systems.[9] According to the International Fertilizer Development Center (IFDC)'s Dairy Development Programme Baseline Report (2012), the milk production of the "Fulani nomadic" system is extremely low at 0.75 litres per day per lactating cow; the yearly average is 0.3 litres per day per lactating cow. For "Fulani semi-settled", the yearly milk production average remains low at 0.7 litres per day per lactating cow. [10]

Figure 1: Map of Oyo, Nigeria

[9] International Fertilizer Development Center. Dairy Development Programme in Nigeria Baseline Report. Nigeria: N.p., 2012: 22

[10] Maphill. "Gray Simple Map of Oyo". 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 679 households in FCW's existing dairy clusters/communities in Oyo State. The five clusters visited were Fashola, Alaga, Iseyin, Maya and Saki. 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 Oyo State, provided by FCW.[11] Stratified cluster sampling of smallholder dairy households was adopted for the quantitative study.[12] 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. Participants are selected according to the needs of the study (hence the alternate name, deliberate sampling). The key selection criteria for inclusion was that the dairy farmers had to either be integrated into the FCW supply chain (they currently supply FCW with milk) or have been identified by FCW as potential milk suppliers.[13]

The administered 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' using smartphones. 1,359 interviews were conducted in Oyo as the man (head of household) and the 1st wife were interviewed in each household. Surveys were administered by enumerators fluent in the local language of each interviewee (Yoruba and Hausa).[14] In order to respect culture norms, male enumerators interviewed male farmers and female enumerators interviewed female farmers. Additionally, key informant interviews were conducted with FCW employees, and state Extension Officers.

Data processing and analysis was done using the electronic quantitative data analysis tool STATA. Descriptive statistical tools and Likert Scale were used to analyse relevant data.

2.1.3 Ethics

To guarantee that this study adhered to proper ethical behaviour, enumerators were trained to respect participants' rights, differences in culture, customs, religious beliefs and practices from the outset and throughout the study. All data was obtained openly and transparently with appropriate consent. This study, and program as a

[11] Kothari, C. R, and Gaurav Garg (2016) 1st ed. Research Methodology. New Delhi: New Age International (P) Limited.
[12] Hansen, M. H., Hurwitz, W. N., & Madow, W. G. (1953). Sample Survey Methods and Theory (Vol. 1, p. 638). New York: Wiley.
[13] Given, L. (2008). The Sage Encyclopedia of Qualitative Research Methods. Los Angeles: Sage Publications. p.816
[14] The questionnaires were administered in Hausa and Yoruba as all of the Fulani farmers spoke either Hausa or Yoruba in addition to Fulfulde.

whole, abides by strong ethical practices and ensures that the approach aligns with The Economic and Social Research Council (ESRC)'s Ethics Framework.

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 that were fluent in the local languages (Yoruba, Hausa and Fulfulde). Locating enough qualified Fulfulde-speaking enumerators was challenging. This challenge was alleviated by the fact that the Fulfulde households were also fluent in either Yoruba or Hausa. Some enumerators were disqualified during the training and deployment 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 FCW. 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 Accessing remote communities

Sahel encountered difficulties in accessing remote communities in record time as male farmers take their cattle for grazing in the mornings. In order to resolve the issue of getting the male farmers for the study Sahel visited communities as early as 6.30 a.m. in some cases and pre-informed some contact farmers to schedule an interview for residents of distant communities. Still, we were unable to access some households in Iseyin where the men had travelled to other states for grazing purposes and due to customary law, the women did not want to be interviewed without their husbands' consent.

2.2.4 Managing expectations of respondents

Another limitation was management of expectations of the respondents who wanted infrastructure and conflict issues resolved by the research team. In order to curb these expectations, the enumerators informed the farmers that as much as we understood their difficult situations, this research was for the purpose of a baseline study and that the team did not represent any government or donor agency.

2.2.5 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.

In addition, the reliability and validity of the data provided by 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 issues spotted were addressed before surveying continued the next day. Lastly, enumerators were informed of the payment reduction clause for consistent, intentional carelessness. These mitigation strategies were used to ensure that errors and/or mistakes made 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 analysed during the gender or nutrition study which will be conducted from June to August 2017 in the same communities.

2.2.6 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. The data collection tools such as the questionnaire 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. FINDINGS

The results/key findings of the analysis of relevant data are presented in this section.

3.1 Characteristics of the Study Population

3.1.1 Population

A total of 1,359 dairy farmers in 679 households were interviewed as part of this study. Fasola village accounted for 43% of the surveyed households while Maya, Iseyin, Alaga and Saki accounted for 23%, 14%, 15% and 5% respectively.

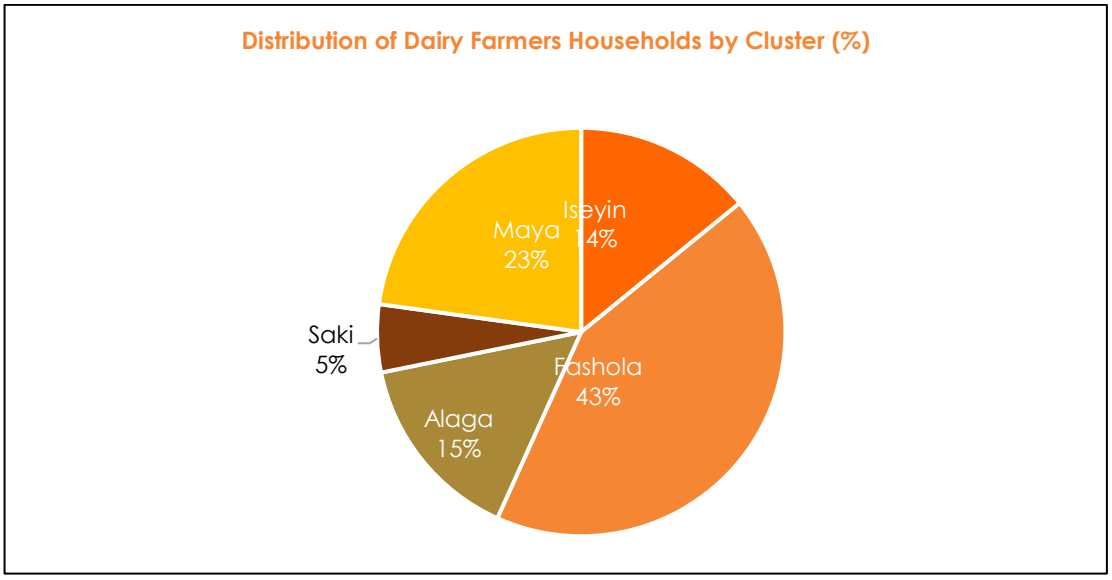

Figure 2: Distribution of dairy farmers by cluster

The gender distribution of dairy farmers reveals that female farmers account for 62% of the population while male farmers account for 38% of the population. Among the Fulani tribe who constitute the bulk of this study, polygamy is widely accepted and considered to be the norm.[15] Consequently, each male dairy farmer typically has more than one wife, which explains why the number of females exceed their male counterparts in this study.

[15] 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.

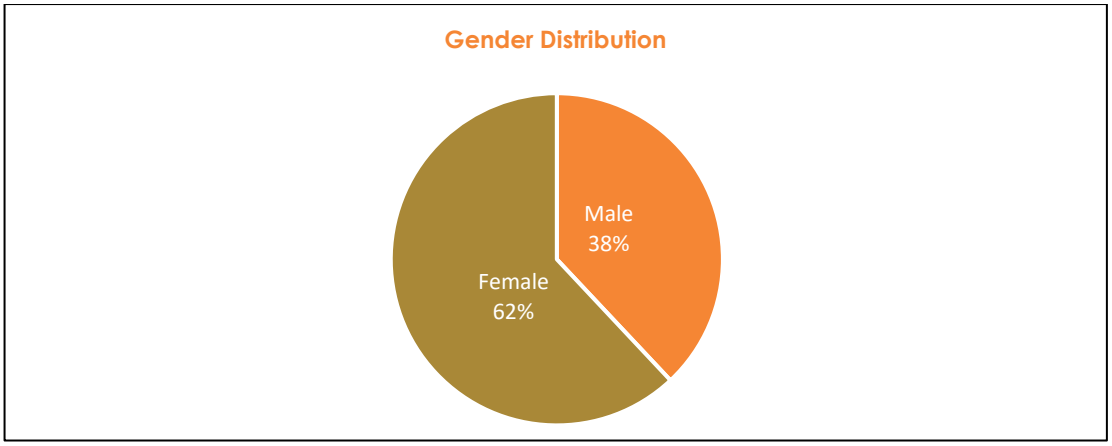

Figure 3: Distribution of dairy farmers by gender

3.1.2 Ethnic Group

The majority of dairy farmers interviewed were Fulani as presented in figure 4 below. 74% were Fulani while 24% were Bororo. The high Fulani rate can be linked to the extensive livestock management practices of Fulani herdsmen. This implies that dairy farming in Oyo State is dominated by Bororo and Fulani farmers. Generally, these are the 2 tribes known for cattle production in Nigeria.[16]

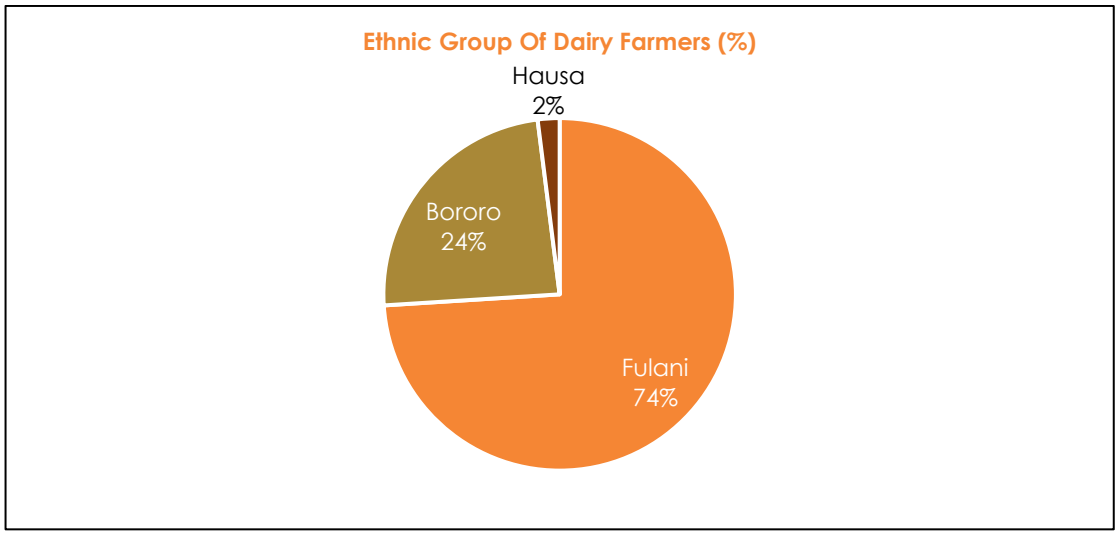

Figure 4: Distribution of dairy farmers by ethnic group

3.1.3 Age Distribution

The dairy farmers are within the economically productive periods of their lives. The mean age of the farmers was 36 years. However, the female farmers were relatively younger than their male counterparts. 60% of the female farmers were within the age range of 18-30 compared to 64% of the male farmers who were within 31-59 years.

[16] 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.

[16] Babayemi O.J. and M.O. Daodu (2007). Milk Production Capacity of Dairy Cattle under Limited Resources and Distribution Pattern in Peri-Urban Area of South West, Nigeria, pp1-4.

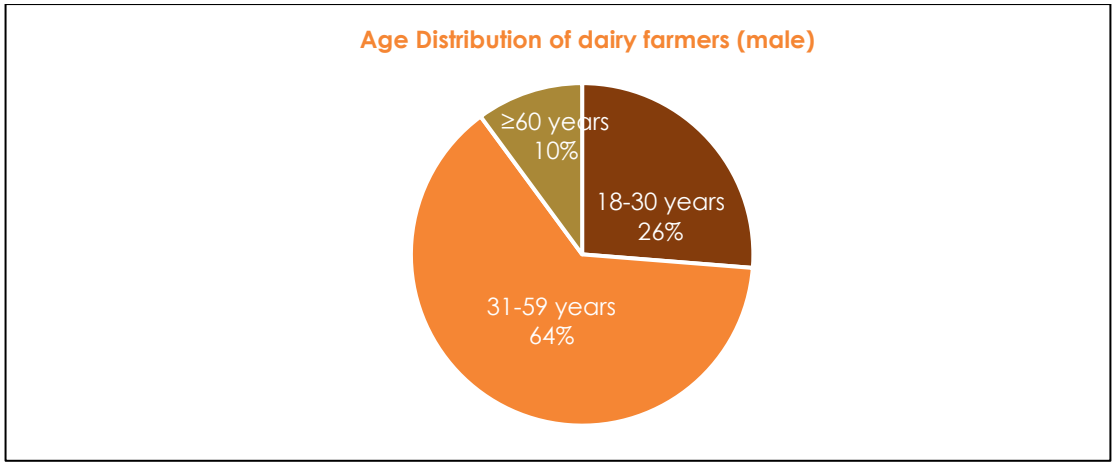

Figure 5: Age Distribution of Male Farmers

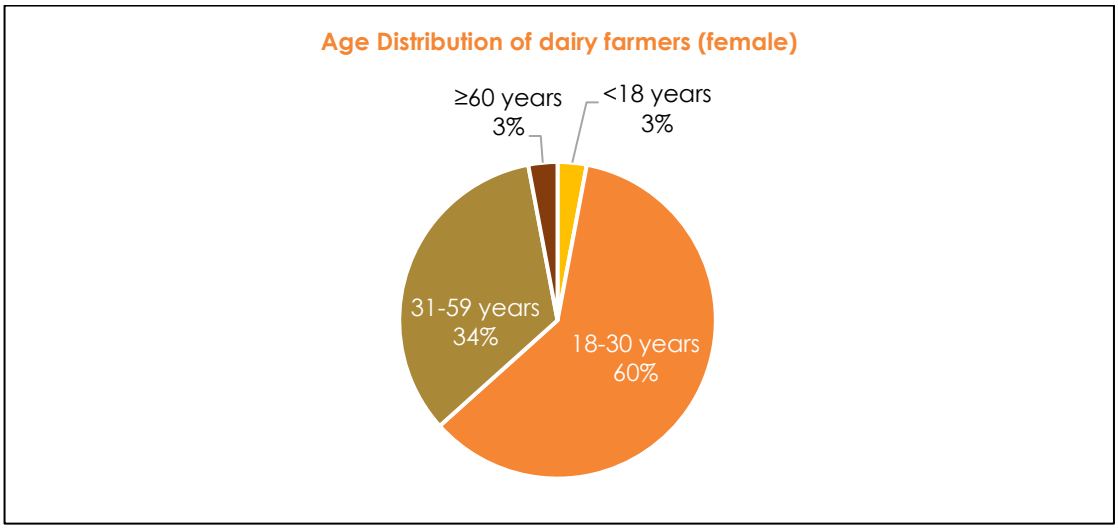

Figure 6: Age Distribution of Female Farmers

3.1.4 Average Number of Wives

Despite the cultural acceptance of polygamy within the Fulani culture, more than half (56%) of the male respondents had only one wife while 35% had two wives. The percentage of farmers with 3 and 4 wives stood at 7% and 2% respectively.

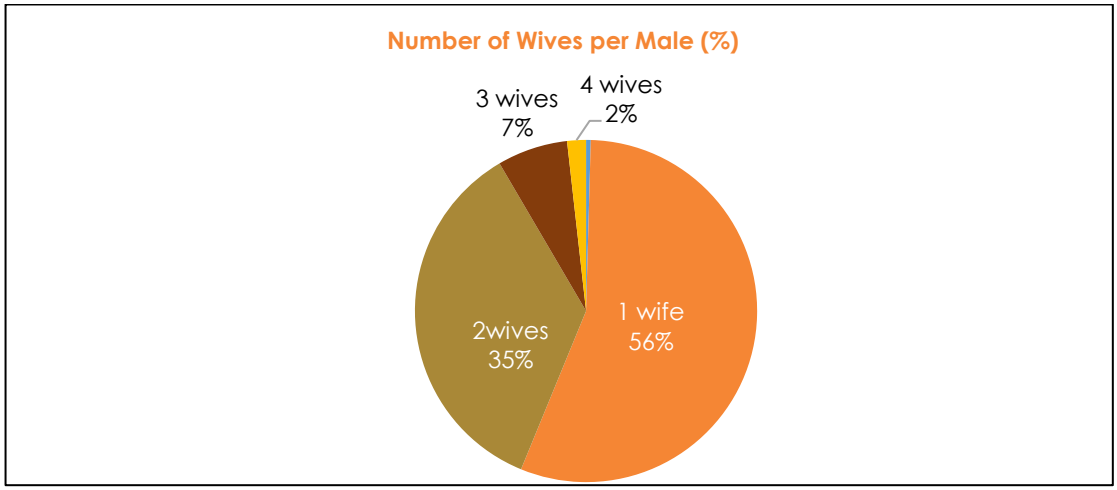

Figure 7: Distribution of dairy farmers by the number of wives

60% of the farmers had between 1 and 5 children compared to the 30% with 6-10 children.

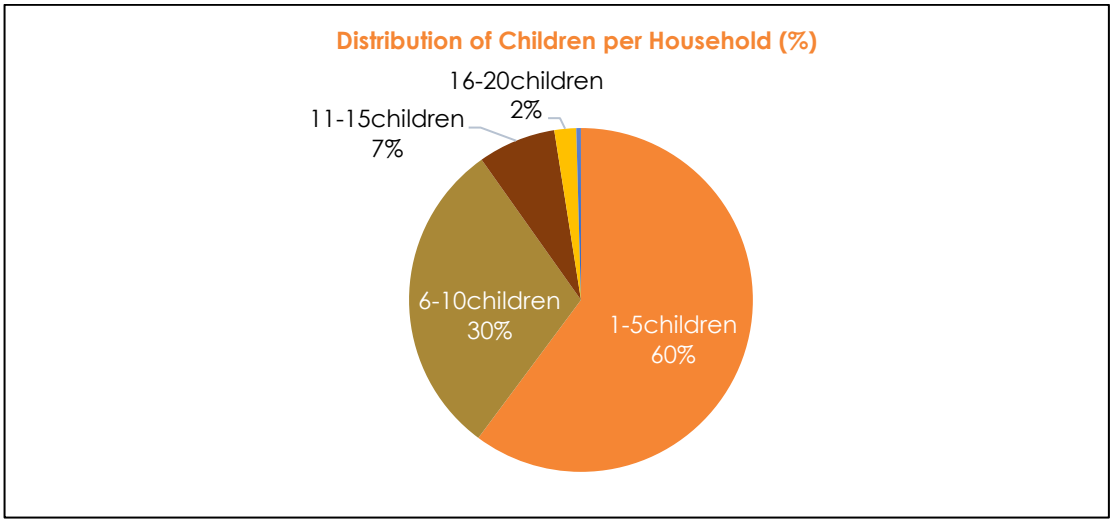

Figure 8: Distribution of dairy farming households by number of children

3.1.5 Average Household Size

The mean household size is 7. 41% of the sampled population have a household size of 6-10 people.

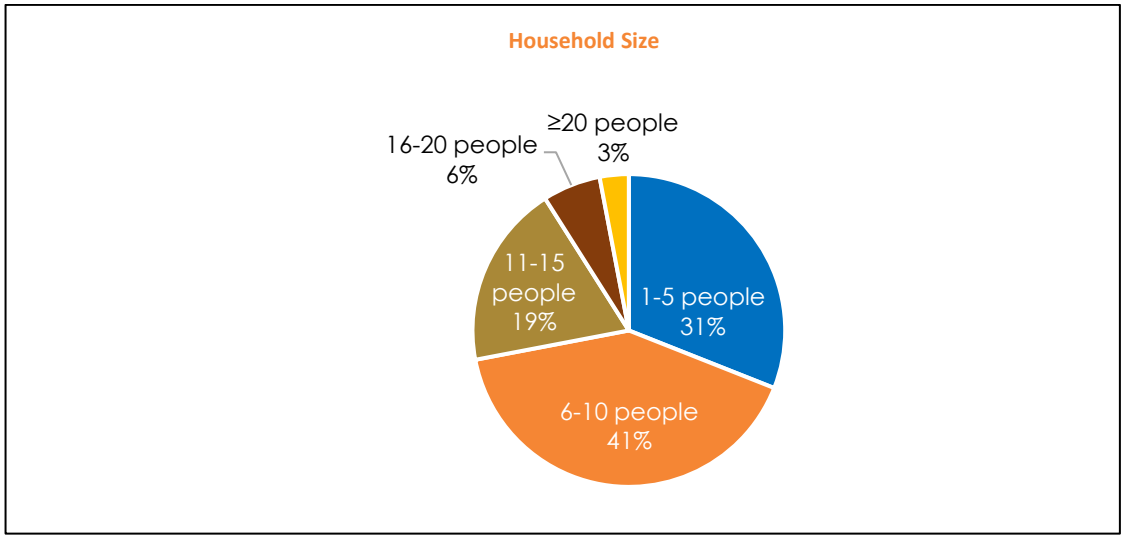

Figure 9: Distribution of dairy farmers by household size

3.1.6 Migration Patterns

The majority of the dairy farmers interviewed migrated to Oyo State. Specifically, 78% of the farmers migrated while about 23% were born in Oyo State. This is because cattle production in South Western, Nigeria is dominated by migrant herders. The breakdown was similar when disaggregated by gender.

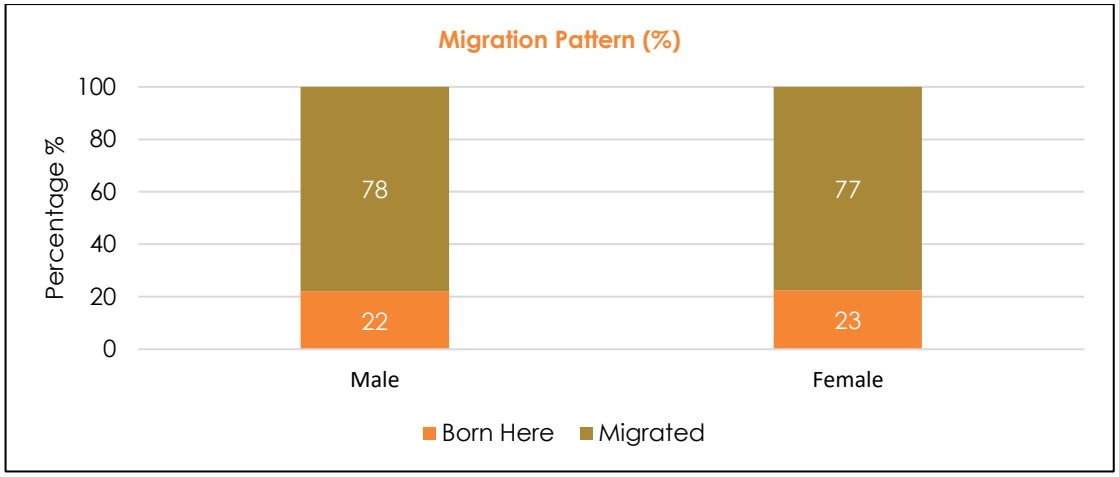

Figure 10: Distribution of dairy farmers by migration pattern

3.1.7 Educational Attainment

The results presented below show that the vast majority (82%) of the dairy farmers do not have formal education while less than 5% have post-primary education. Moreover, 14% of the dairy farmers had Arabic education. The breakdown is fairly similar when disaggregated by gender.

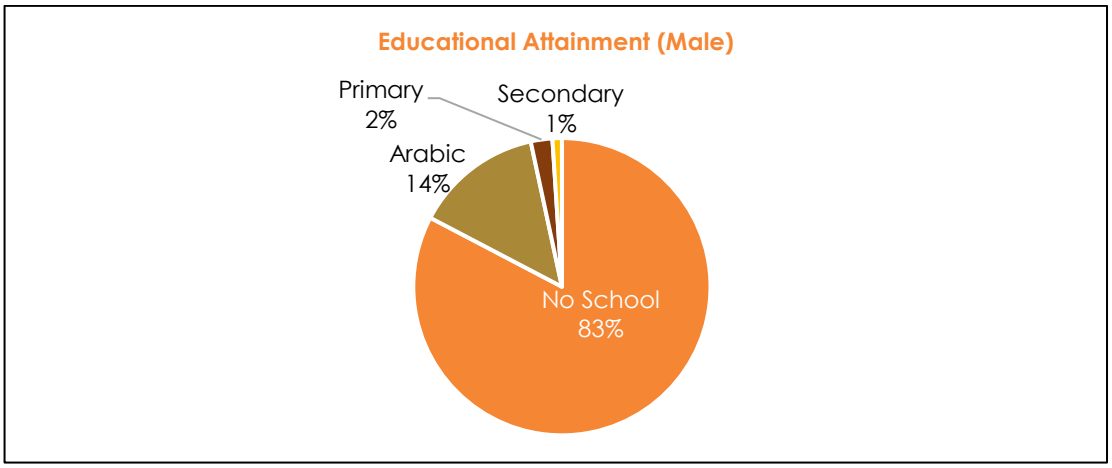

Figure 11: Distribution of educational attainment by male dairy farmers.

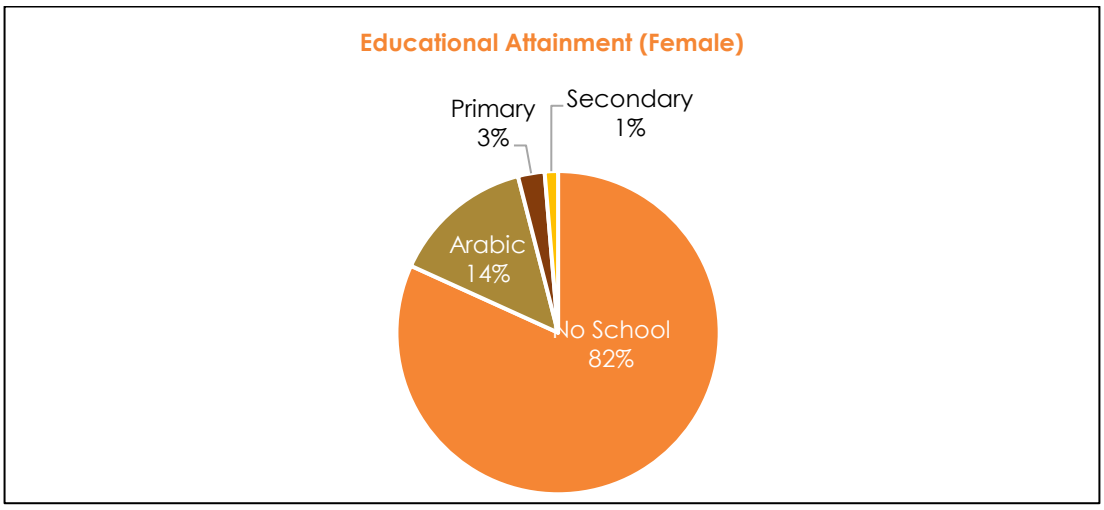

Figure 12: Distribution of educational attainment by female farmers

3.1.8 Reason for Leaving School

The main reasons cited by dairy farmers for leaving school were lack of funds, support for family, marriage and no specific reason. The reasons were similar across gender.

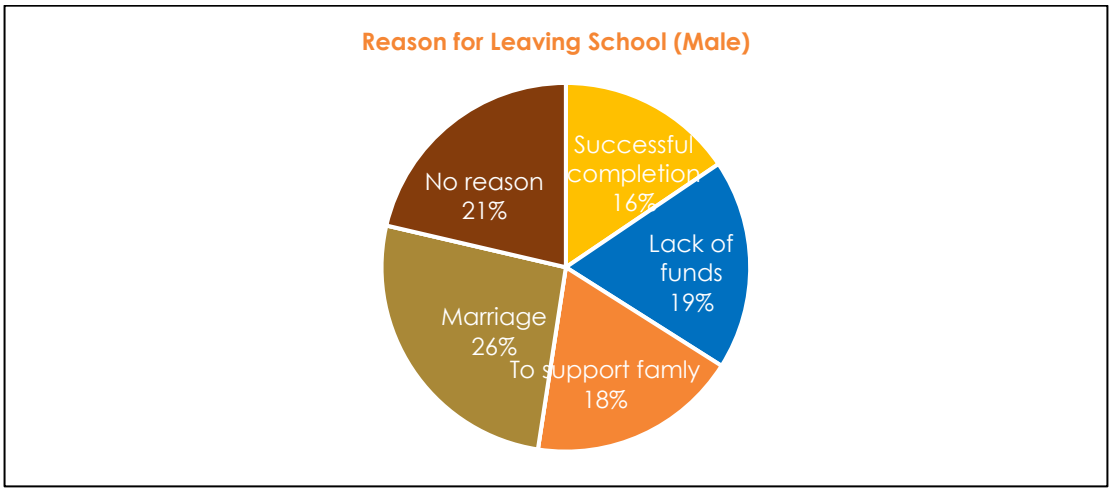

Figure 13: Male dairy farmers' reasons for leaving school

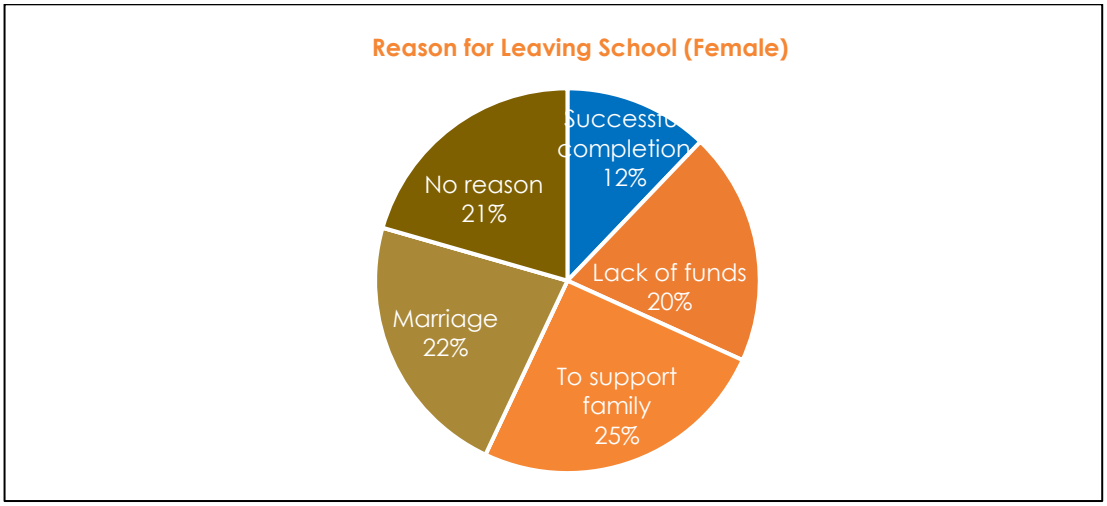

Figure 14: Female dairy farmers' reasons for leaving school

3.2 Occupational Characteristics

3.2.1 Primary Occupation

The respondents were actively involved along the different nodes of the dairy value chain. The main activities included cattle rearing (51%), milk processing (38%) and selling of milk (5%).

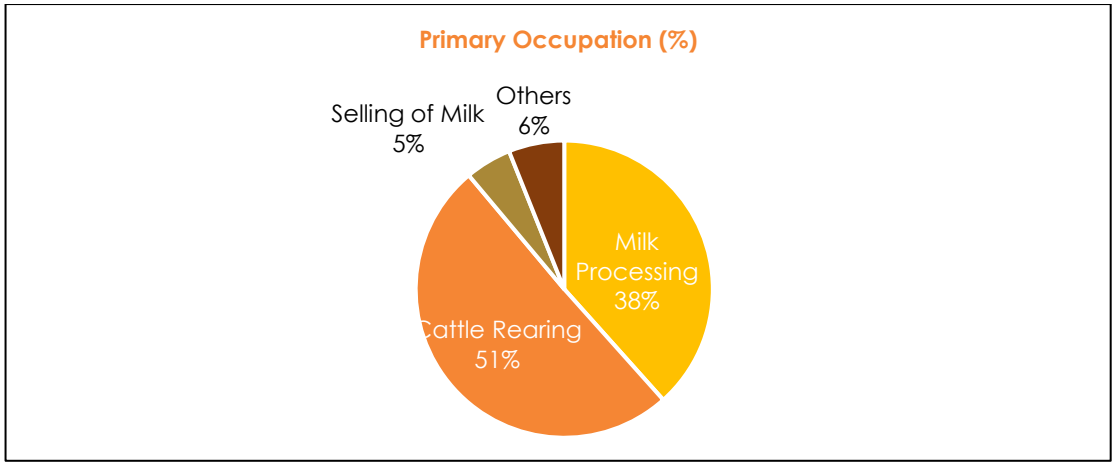

Figure 15: Distribution of the dairy farmers by primary occupation

3.2.3 Primary Occupation Disaggregated by Gender

Milk related activities is the primary occupation of female dairy farmers. 74% are involved in milk processing, 12% in the sales of milk while about 9% are full housewives (captured as others). The quasi majority of men (96%) are involved in cattle rearing.

Occupation	Male (%)	Female (%)
Cattle Rearing	96	4
Milk Processing	0	74
Selling of milk	0	12
Others	4	10
Total	**100%**	**100%**

Table 1: Distribution of primary occupation of dairy farmers by gender

3.2.4 Primary Occupation Disaggregated by Cluster

The distribution of primary occupation of the respondents disaggregated by cluster is similar and reveals that the majority of the respondents were involved in cattle rearing and milk production across the clusters.

Primary Occupation (%)	Iseyin	Fashola	Alaga	Saki	Maya
Processing and selling of milk	41	45	40	44	41
Cattle rearing	52	48	55	48	50
Others	7	15	6	8	8
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Table 2: Distribution of primary occupation of dairy farmers by cluster

3.2.5 Sources of Income

The majority of the households derive their income from sale of cattle and milk. 49% of the farmers reported that milk processing accounted for the largest proportion of their income followed by 44% from the sales of cattle.

Sales of cattle accounted for the largest share of the income - 57% of male farmers while sale of milk and milk products accounted for the largest proportion of 80% for female farmers. This is indicative of gender dimensions in the roles of male and female farmers in dairy production.

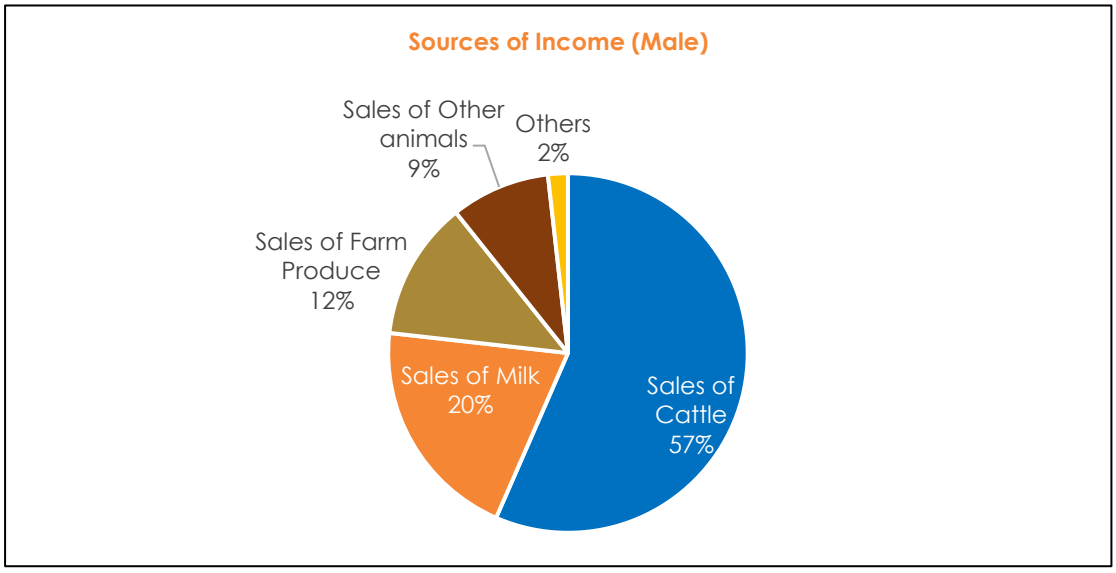

Figure 16: Distribution of male dairy farmers' income sources

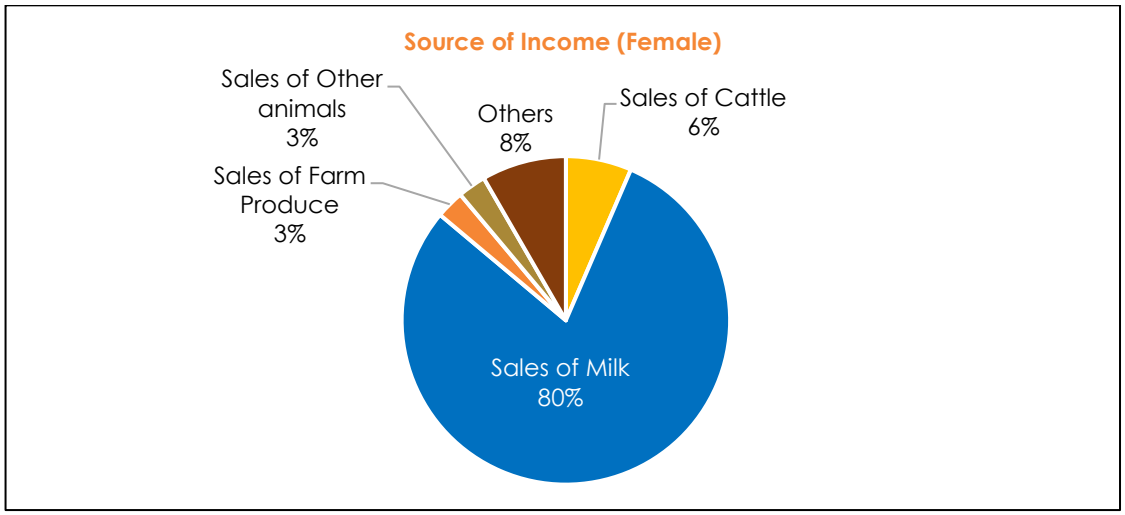

Figure 17: Distribution of female fairy farmers' income sources

3.2.6 Income from Milk

The average monthly income for the male dairy farmers at the time of the study was N86,919 while the female earned an average of N52,754 per month. The average household income was N69,748. This information will be validated in the gender study.

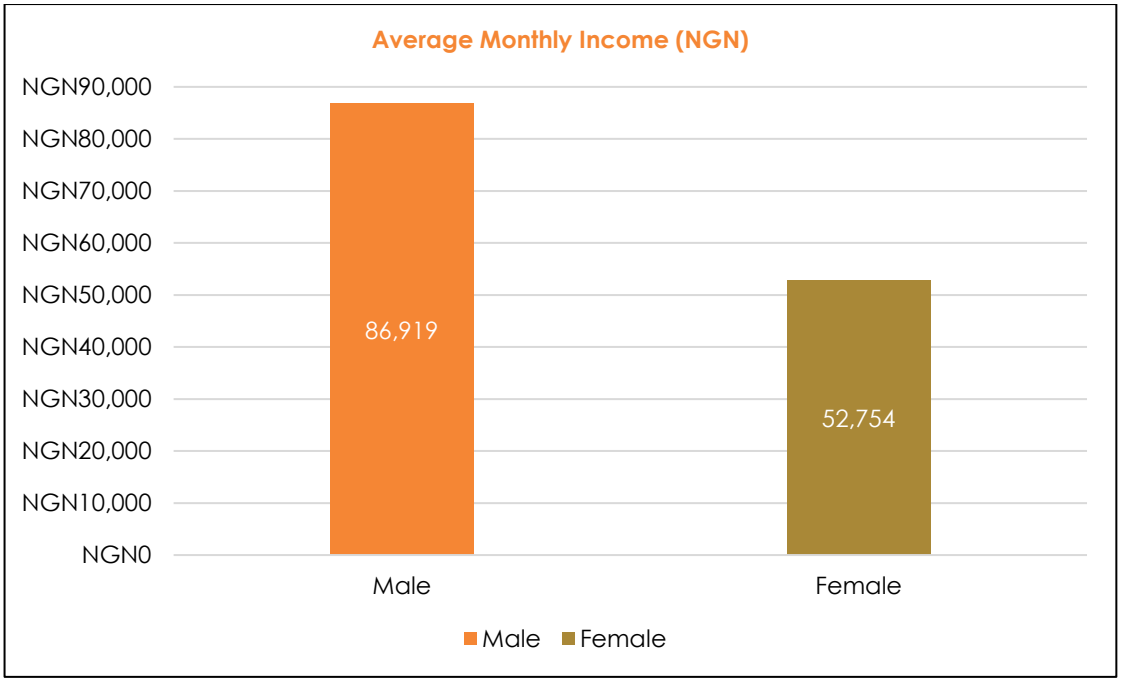

Figure 18: Average monthly income

Disaggregating the monthly income from milk by gender illustrated that for women, monthly income from milk was much higher than for the males. In fact, almost half (48%) of the male farmers derived less than 20% of their income from milk production monthly. This can be compared to 28% among female farmers. Milk production contributes above 41% of the monthly income of 62% of the female dairy farmers compared to 46% among male farmers.

The percentage of annual income from milk was greater among female dairy farmers than their male counterparts. Milk accounts for 81-100% of the annual income among 41% and 34% of female and male dairy farmers respectively.

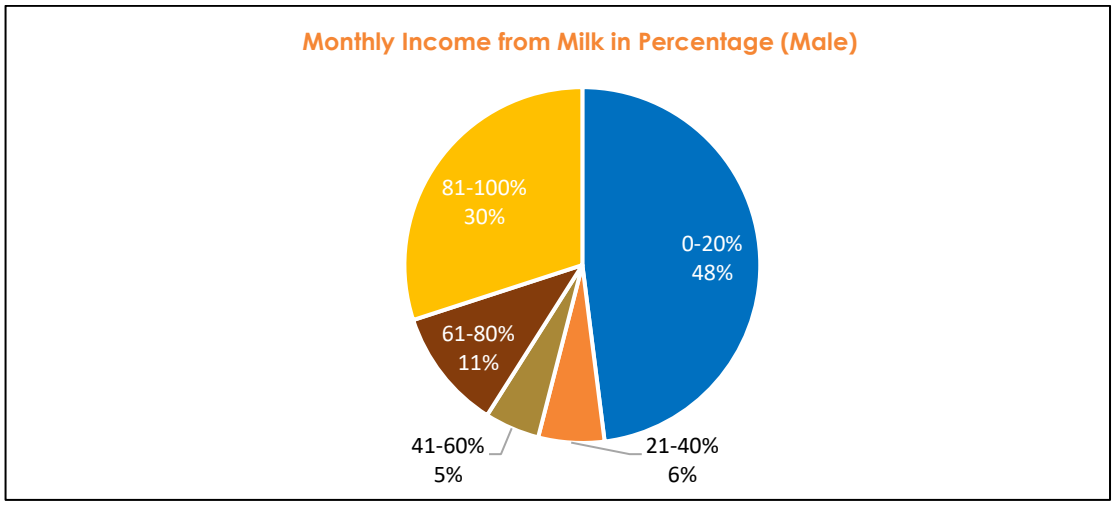

Figure 19 Distribution of male dairy farmers monthly Income from milk

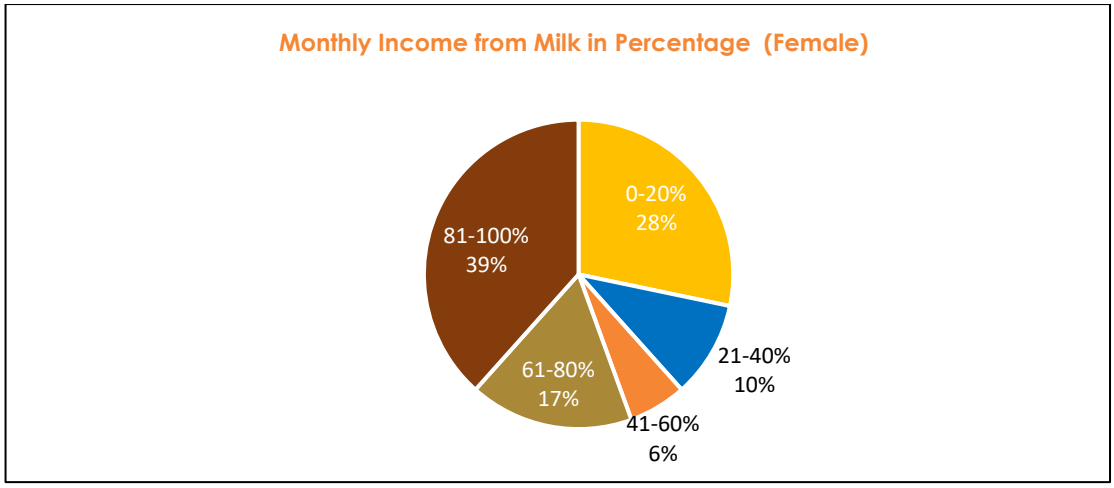

Figure 20: Distribution of female dairy farmers' monthly income from milk

3.2.7 Average Monthly Expenditure

The average cost involved in cattle production is presented in the table below. The cost of food roughages and cost of feed supplement accounted for the bulk of the cost of inputs in cattle production. Cost of medical care and labour were relatively low because the dairy farmers did not usually pay for labour. Moreover, they lacked access to medical care for cattle hence the low cost of medical care. This is consistent with literature as cost of feeding accounts for 70% of production cost in a livestock business.[17]

Expenditure	Mean	Standard deviation	Percentage
Cost of feed supplement	N 43,234	N 64,255	31%
Cost of food roughages	N 68,851	N 112,930	50%
Cost of veterinary services	N 10,555	N 11,370	8%
Cost of labour	N 15,644	N 20,813	11%
Total	**N 138,284**	**N 209,368**	**100%**

Table 3: Distribution of selected average inputs cost.

3.3 Assets and Ownership within Household

3.3.1 Distribution of Cattle Ownership

Collectively, the average number of cattle per household is 100. Male farmers have more cattle on average compared to their wives. On average, male farmers own 94 cattle. Most women did not own cattle of their own, the 28% that owned their own cows possess an average of 6 cows.

[17] Ladele A.A. (2016). Extension Everywhere, Extending Nowhere: The Cacophony of Agricultural Extension in Nigeria. Inaugural Lecture delivered on behalf of Faculty of Agriculture and Forestry at the University of Ibadan on 15 September 2016.

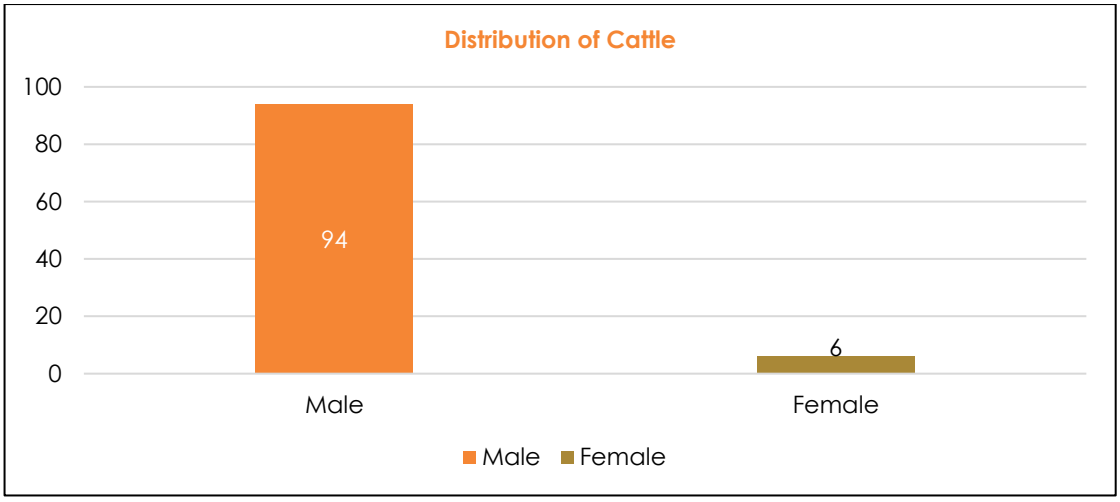

Figure 21: Distribution of cattle among dairy farmer households.

3.3.2 Ownership of Land Disaggregated by Gender

Access to land among the dairy farmers was low across the board (6%). However, male farmers had more access to land (10%) than their female counterparts (3%). This is because as previously mentioned, most of the farmers are not natives of Oyo State, which may make it challenging for them to acquire land. Moreover, due to cultural dimensions in the allocation of communal land in Nigeria, women are rarely given land except through their children or relatives. Low access to land has grave consequences on cattle production because livestock production requires space for grazing.

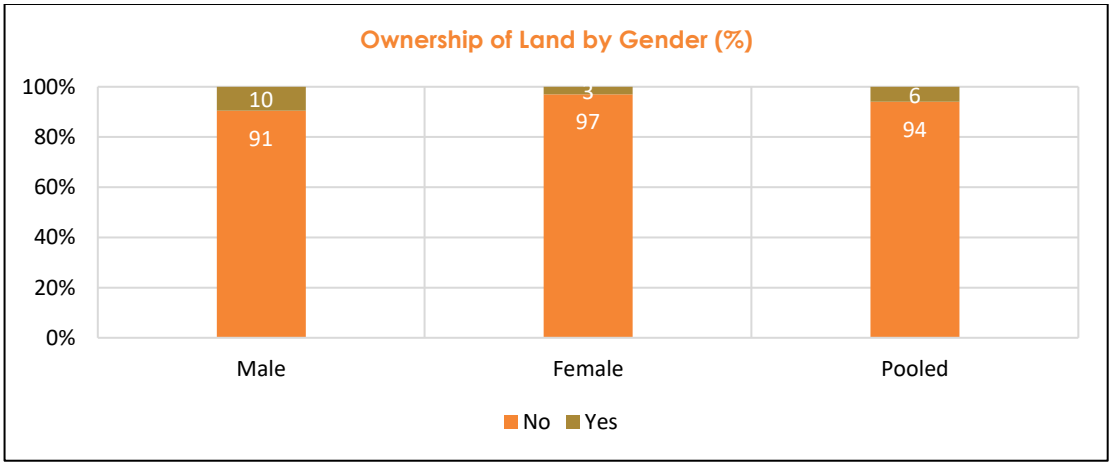

Figure 22: Distribution of dairy farmers by ownership of land

3.3.3 Farmers Who Pay for Grazing Land

Only 6% of the interviewed dairy farmers paid for grazing land. The farmers lived around crop farmers who were at the receiving end of cattle grazing. This implies that the farmers were hardly compensated for grazing and has contributed to frequent clashes between herdsmen and local crop farmers.

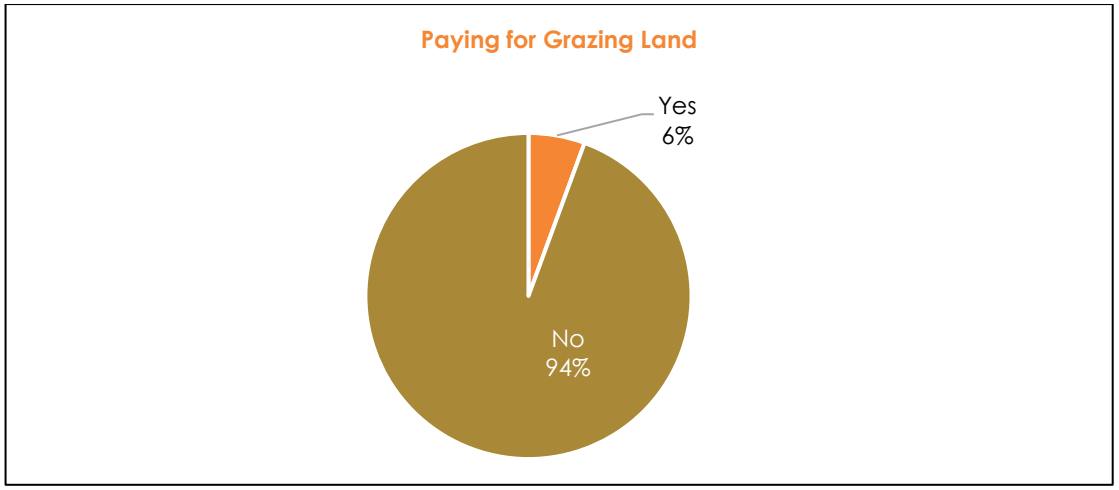

Figure 23: Distribution of dairy farmers by payment for grazing land

3.3.4 Ownership of Bank Accounts

Only 5% of the pooled dairy farmers owned bank accounts. This may be because they lived in rural areas where there is a dearth of formal financial institutions. Surprisingly, female dairy farmers stated owning slightly more bank accounts than male dairy farmers in Oyo State. The gender study will further investigate these findings.

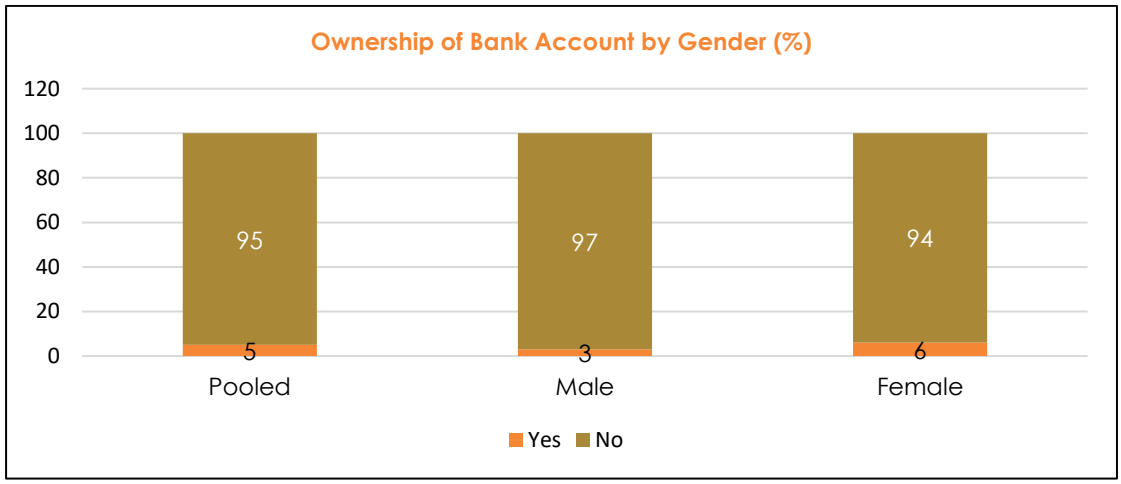

Figure 24: Distribution of dairy farmers by ownership of bank account

3.3.5 Access to Credit Facilities

Access to formal credit was very low at 0.1% among the farmers. This was because the farmers lacked collateral, especially land or property as most of them were migrants. Another reason could be the lack access to financial institutions as mentioned above.

This means that the inadequate access to land and financial services (using ownership of bank accounts and access to formal credit as proxy) was indicative of financial exclusion among dairy farmers.[18]

[18] 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.

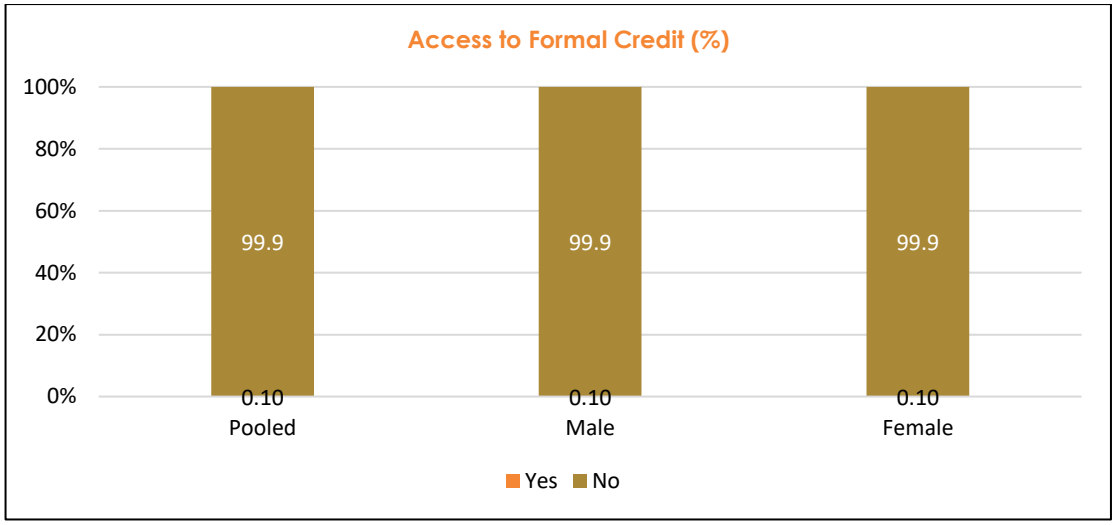

Figure 25: Distribution of dairy farmers by access to formal credit

3.4 Participation in Formal Dairy Sector

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

The female counterpart to a bull is a cow. Considering figure 26 below, there were more cows (76%) than bulls in the herd of interviewed dairy farmers. This provides the opportunity for women to be actively involved in milk production and processing.

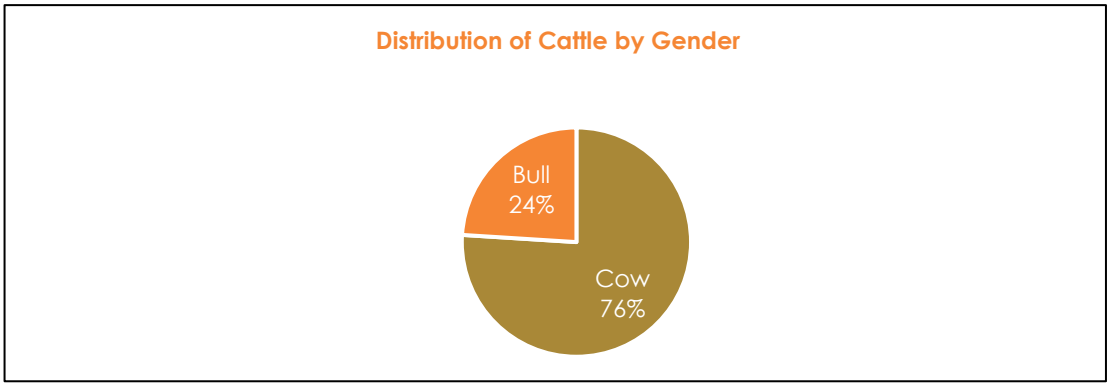

Figure 26: Distribution of cattle by gender

The herd mobility was investigated using the mean number of cattle sold, bought, born and dead in the last 2 years. The result presented in the figure below showed that mortality rates were significantly lower than birth rates for cattle. However, the average number of cattle sold was higher than the number of cattle bought by the farmers.

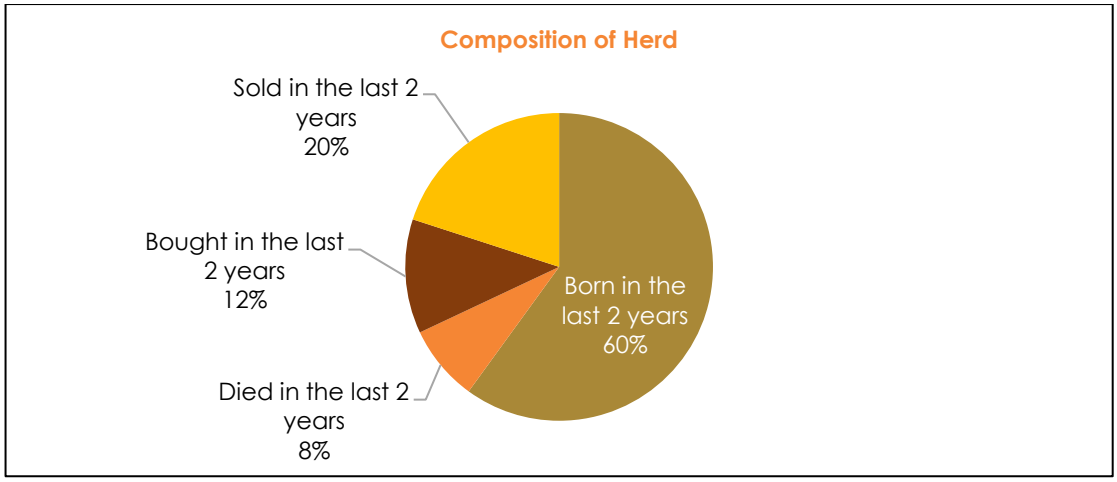

Figure 27: Composition of herd (born, died, bought and sold)

3.4.2 Awareness of FCW Activities

Awareness of the activities of FCW was high among male and female dairy farmers (91% and 94% respectively) as shown in figure below. This presents a good opportunity to positively influence advocacy and sustainability of processor-led interventions. Moreover, it will be instrumental in integrating the identified households into the program.

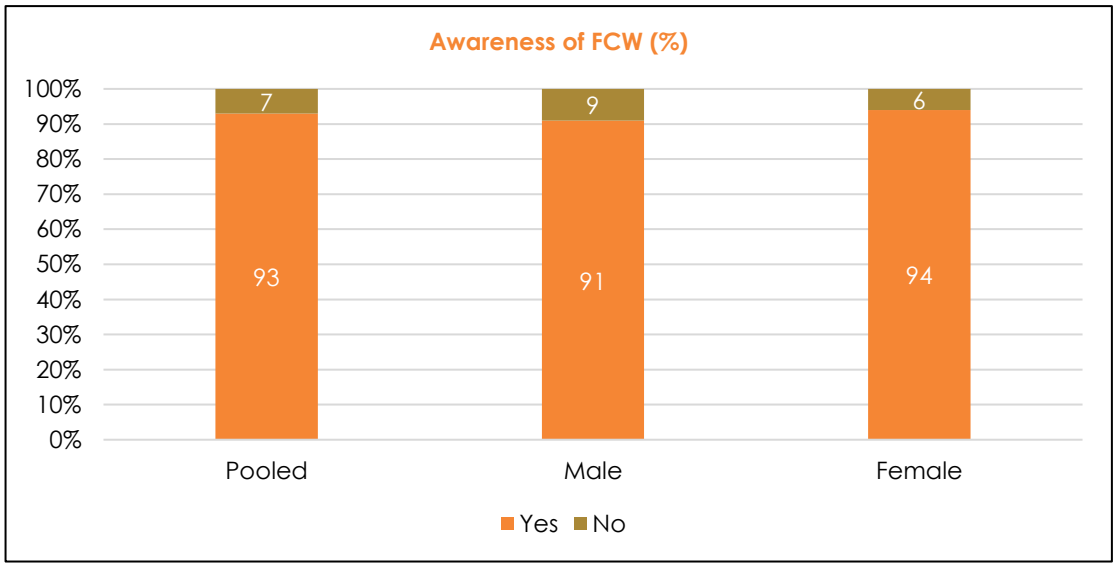

Figure 28: Distribution of dairy farmers by awareness of FCW activities

Analysis of the awareness of FCW by cluster shows high level of awareness (over 90%) across all clusters.

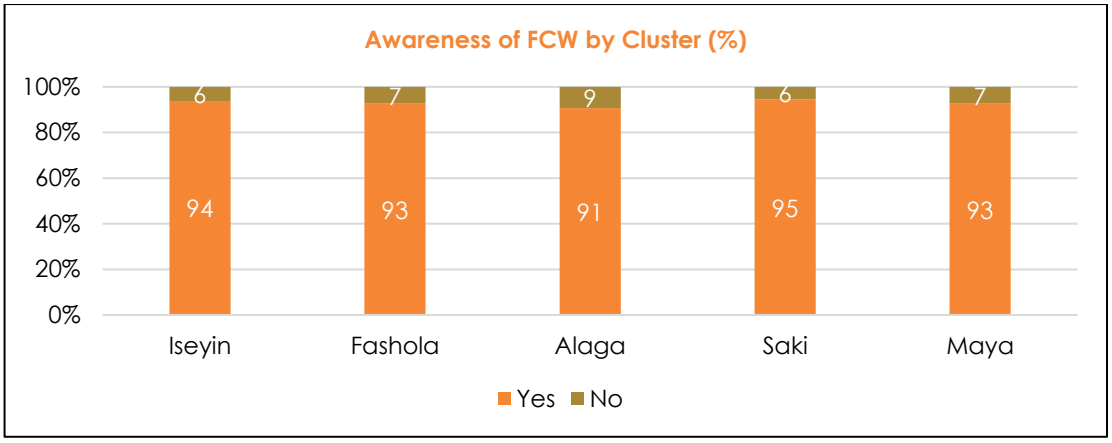

Figure 29: Distribution of awareness of FCW activities by cluster

3.4.3 Integration into FCW Supply Chain

Most of the interviewed dairy households are integrated into FCW's production process with the exception of Saki. FCW had not started operations in Saki when the interviews were conducted. Fashola had the highest number of integrated households at 207 followed by Maya (109).

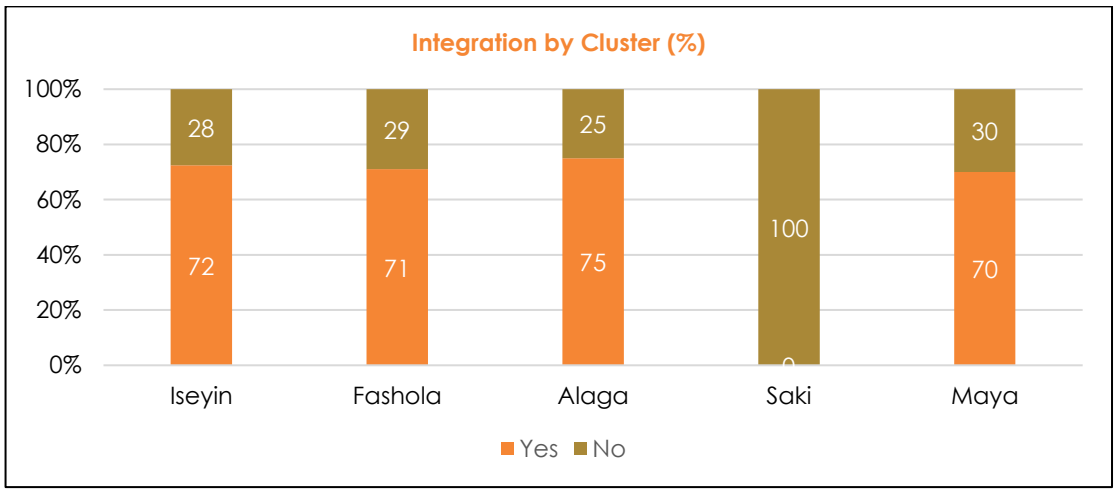

Figure 30: Distribution of integrated dairy farmers by cluster

The table below illustrates the distribution of farmers' households by clusters.

	Iseyin	Fashola	Alaga	Saki	Maya	Total
Integrated Households	68	207	76	0	109	**460**
Identified Households	27	85	26	34	47	**219**
Total	**95**	**292**	**102**	**34**	**156**	**679**

Table 4: Distribution of farmers' households by cluster

The result presented in figure below show higher levels of integration among female farmers compare to their male counterparts. Exactly 74% of the female farmers are integrated compared to 62% of male farmers due to the dominance of women in milk production in Oyo.

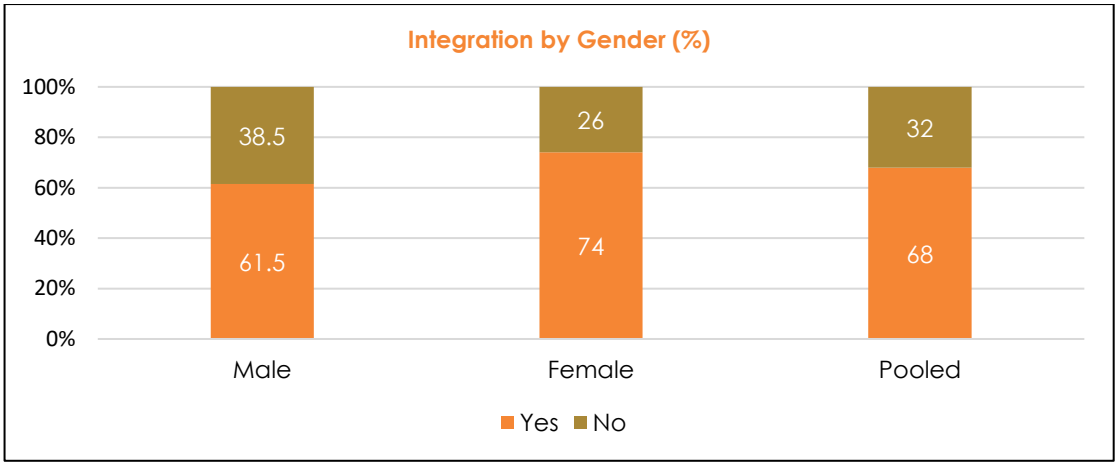

Figure 31: Distribution of integrated dairy farmers by gender

3.4.4 Years of Integration into FCW Supply Chain

Dairy farmers with 1-3 years of integration constituted the majority (41%), followed by farmers with less than one year of integration (33%). The distribution of dairy farmers by year of integration into FCW revealed the farmers were early adopters as the majority of the farmers were integrated in the last 3 years.

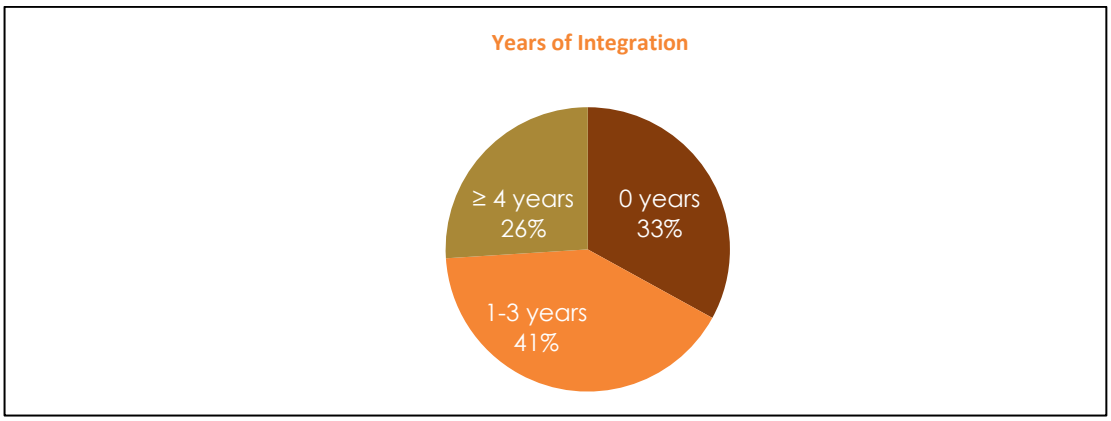

Figure 32: Distribution of integrated dairy farmers by years of integration

3.4.5 Sale of Milk to Processors

The majority (47%) of the sampled dairy farmers sold between 1 and 5 litres of milk daily to community-based processors. 33% and 20% sold between 6-11 litres and 11 litres respectively to other processors that use the milk to create cheese and then sell directly to the market.

The farmers stated that they earned an average of N100 per litre sold to FCW. FCW stated that they buy milk from the dairy farmers at a fixed rate of N105 per litre. However, as the farmers' community covers a 30km radius, young men with motorbikes in the community help deliver the milk to the milk collection centre (MCC) situated within the community. N15 is given to these local transporters that bring the milk. As a result, the farmer receives the remaining N90. 41% of the farmers sell their milk to other processors at rates below N200 per litre; 47% indicated a rate between N200 and N300 per litre; 12% noted a rate above N300 per litre. This has created some contention between FCW and the farmers; they are currently in talks about renegotiating the purchase prices.

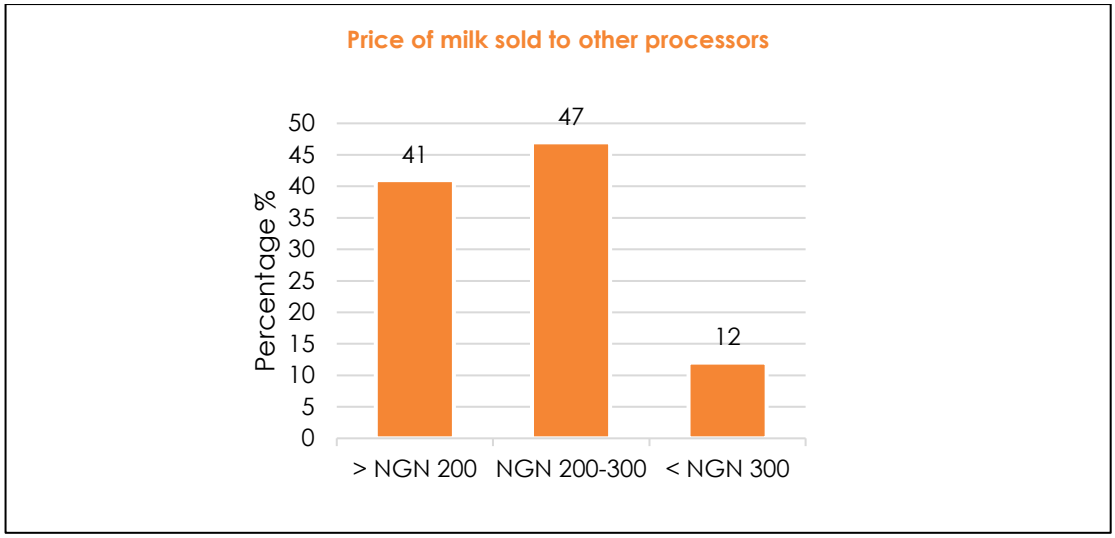

Figure 33: Price of milk sold to other processors

3.4.6 Extension Agents Visits from FCW

About 15% of the farmers reported extension visits from FCW while 85% claimed they had not been visited. This demonstrates an opportunity to increase extension visits to farmers.

3.4.7 Distribution of Services by FCW and the Government

The analysis depicted in figure below reveals that FCW provided services and training to dairy farmers on a variety of subjects such as hygiene, milk production and processing, artificial insemination, sustainable cattle management and vaccination, and infrastructure. The infrastructure training modules covered hygienic use, and operation and maintenance of boreholes installed by FCW.

The dairy farming households visited by government Extension Agents was extremely low at 2%. The majority of the households interviewed stated that the government Extension Agents came for peace meetings between pastoralists and crop farmers in the study area. The few government Extension Agents that provided services to the dairy farmers taught them about hygiene, vaccination and care of cattle. No government Extension Agent taught the farmers new techniques in milk production and processing.

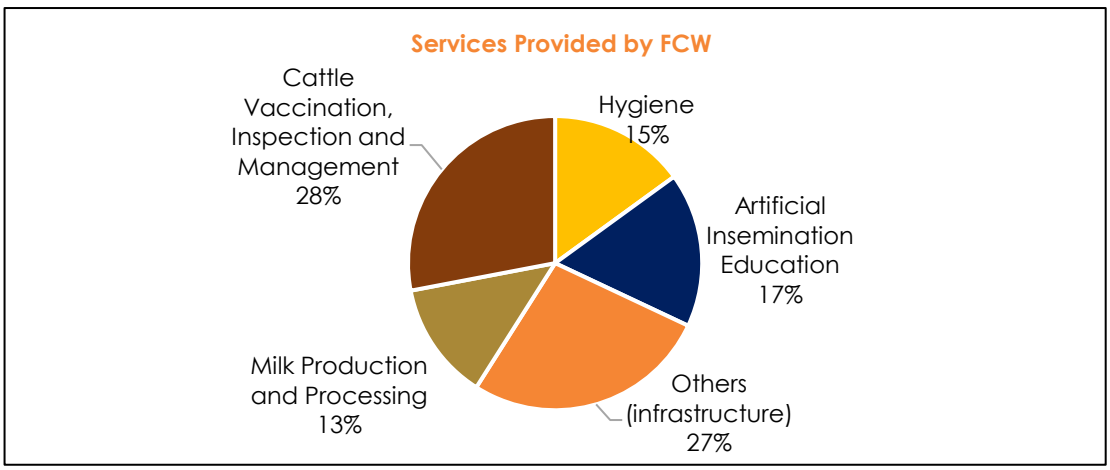

Figure 34: FCW provided services received by dairy farmers

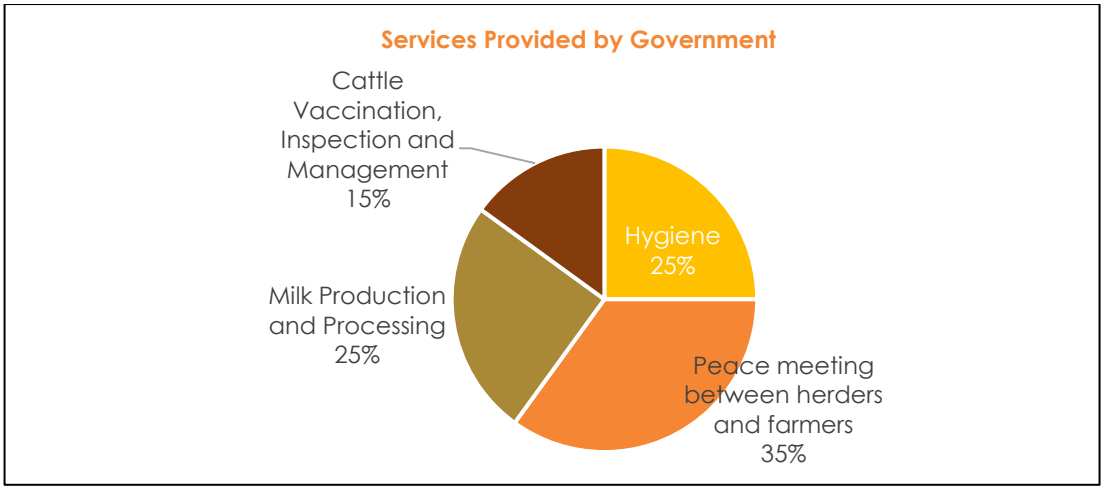

Figure 35: Government provided services received by dairy farmers

3.4.8 Farmers Who Have Previously Participated in Artificial Insemination

Analysis of past insemination of cattle among dairy farmers revealed low previous adoption. In fact, only 2% of the farmers had inseminated their cattle previously. The KII interviews uncovered that the inseminations were not successful due to the Fulani pastoral's lack of knowledge and basic skills for post AI management of cattle, which ultimately led to their engagement in practices that constrained calving. The second cause was the poor feeding regime of dairy cattle as most inseminated cows had travel long distances to secure quality pasture immediately after AI. Thirdly, the quality of the semen used for the AI could have also been a factor.

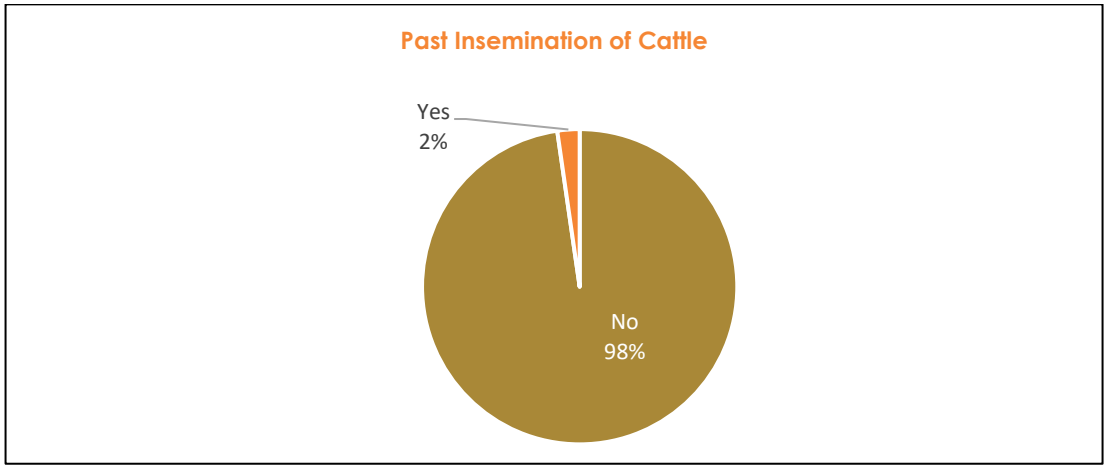

Figure 36: Percentage of farmers who have previously participated in AI

The majority of the 2% that have previously inseminated their cattle funded the exercise themselves.

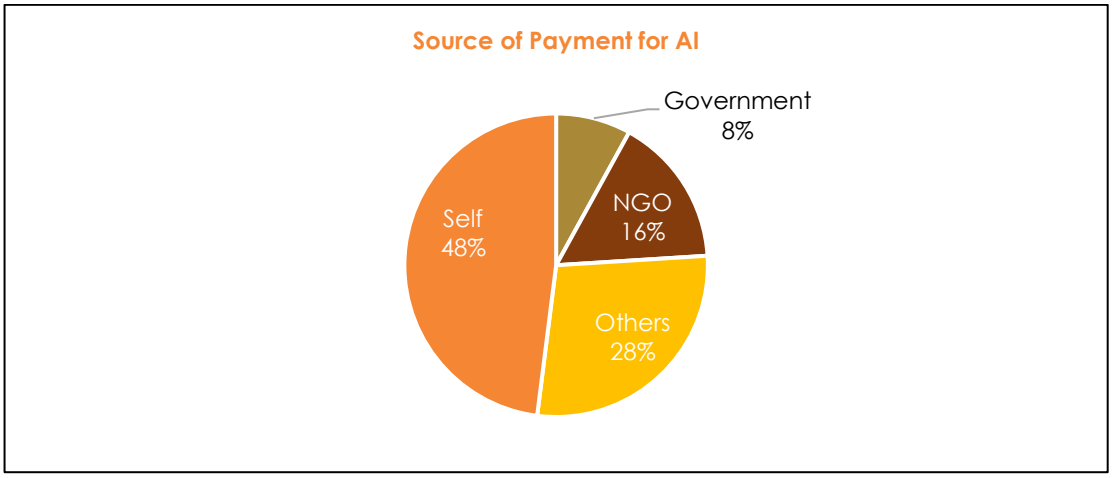

Figure 37: Distribution of farmers by sources of payment for AI

3.4.9 Willingness to Participate in Artificial Insemination

51% of the farmers are willing to participate in the artificial insemination exercise (AI). The remaining were skeptical as some community members had tried AI in the past with limited success. Another review of the explanations provided by the dairy farmers show that the farmers did not adhere to the instructions for the care of artificially inseminated cows.

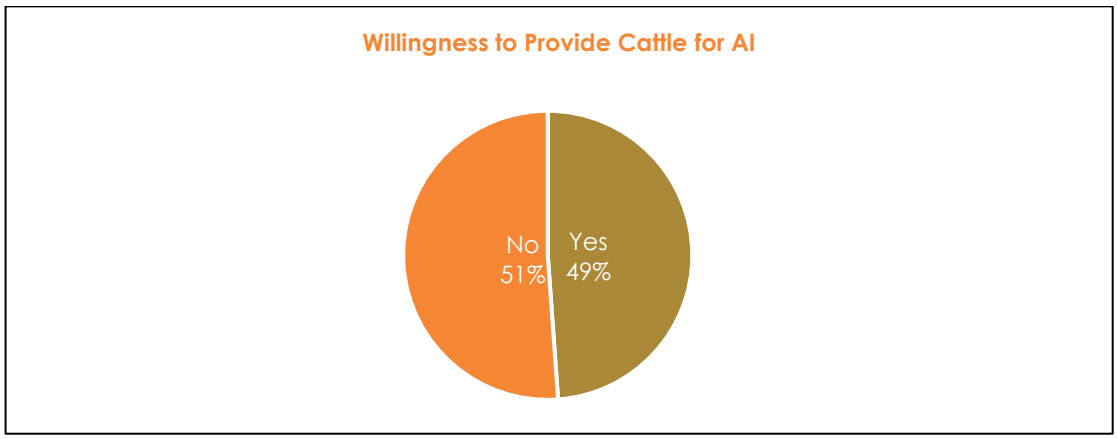

Figure 38: Distribution of dairy farmers by willingness to participate in AI exercise

3.5 Access to Social Amenities and Basic Services

3.5.1 Access to Professional Healthcare

There is low access to professional health care among the respondents. Specifically, 29% of the interviewed dairy farmers had access to professional health care. This can be as a result of infrastructure deficits that characterize rural Nigeria.

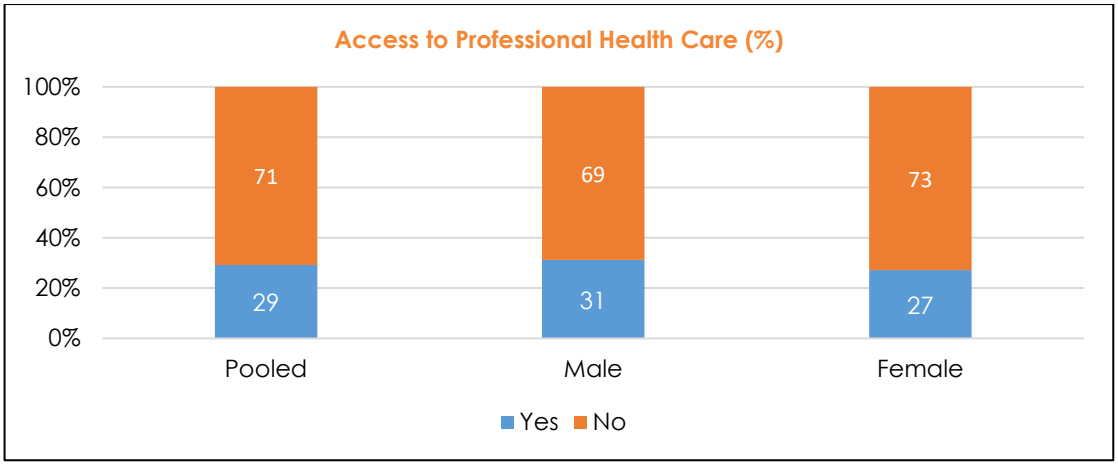

Figure 39: Distribution of those who have access to professional healthcare

3.5.2 Access to Electricity

Access to electricity was low among the dairy farming households as only 2% had access to electricity. This will impede storage of their milk especially for women who are actively involved in production and processing of milk.

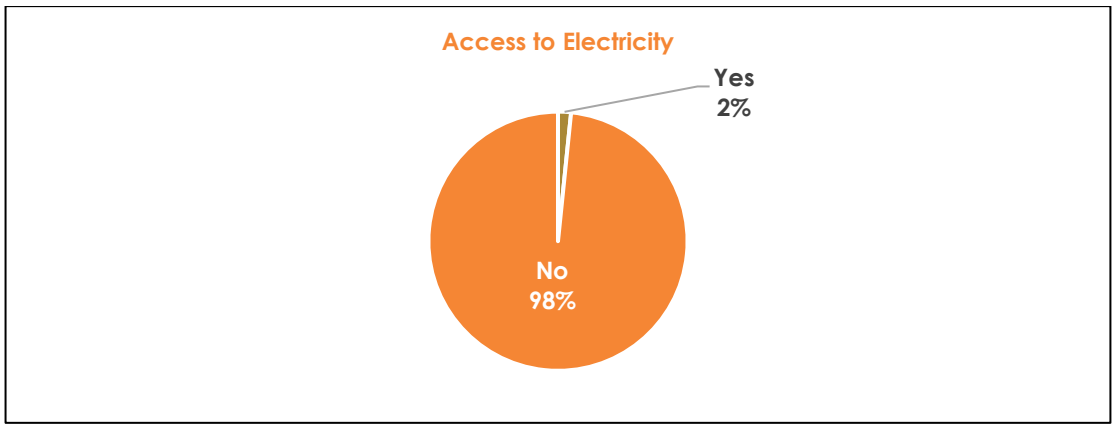

Figure 40: Distribution of farmers by access to electricity

3.5.3 Access to Water

The majority (81%) of the dairy farmers stated having access to water. However, they indicated that it takes an average of 78 minutes (1 hour 18 minutes) to access the nearest water source in the study area. A further analysis into the source of water showed that most of the farmers did not have access to improved water sources. While 63% accessed water from streams, only 16% had access to boreholes. This implies that the dairy farmers are highly vulnerable to waterborne diseases.

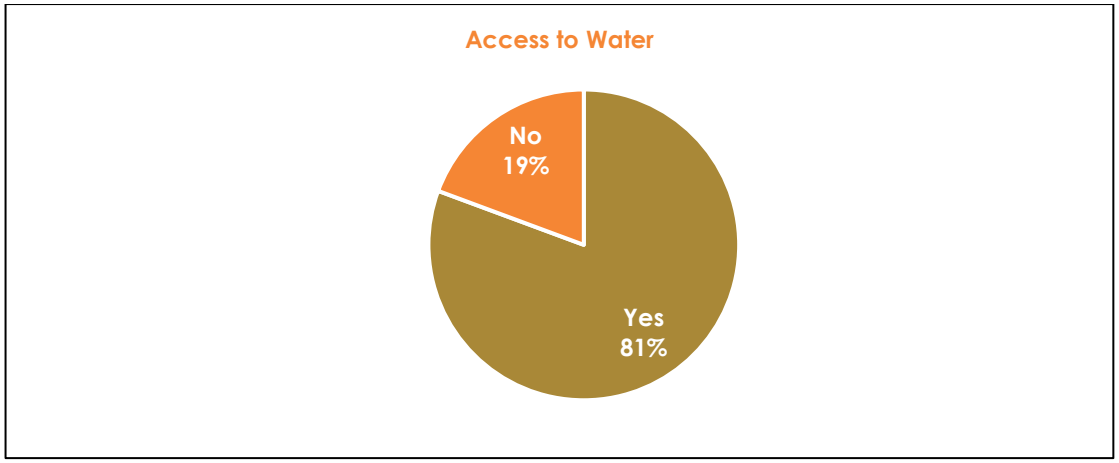

Figure 41: Distribution of farmers by access to water

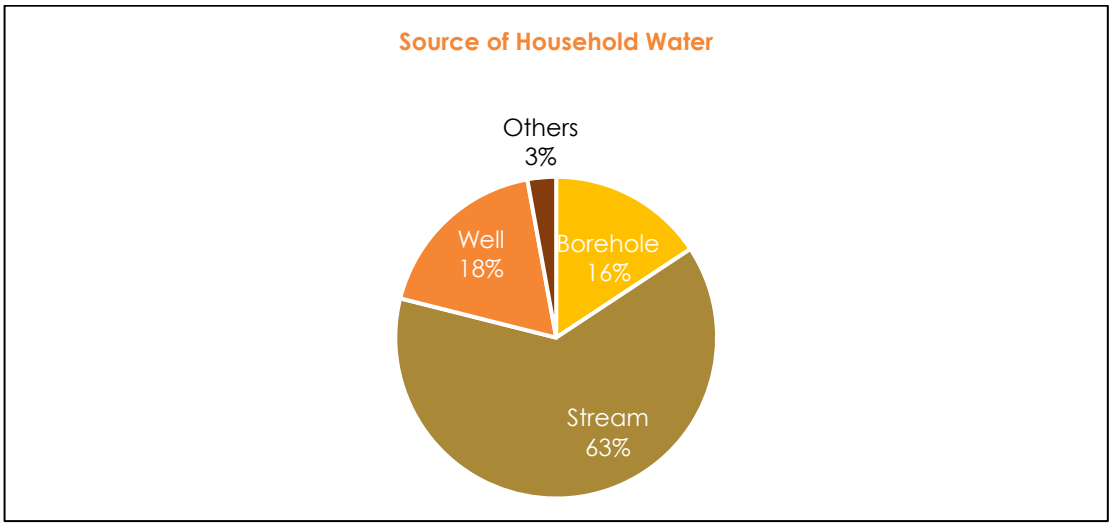

Figure 42: Distribution of farmers by source of water

3.5.4 Access to Mobile Phones

The majority of the dairy farmers (71%) had access to mobile phones. This will be further analyzed in the gender study as this important finding can be used as for mobile banking for the farmers.

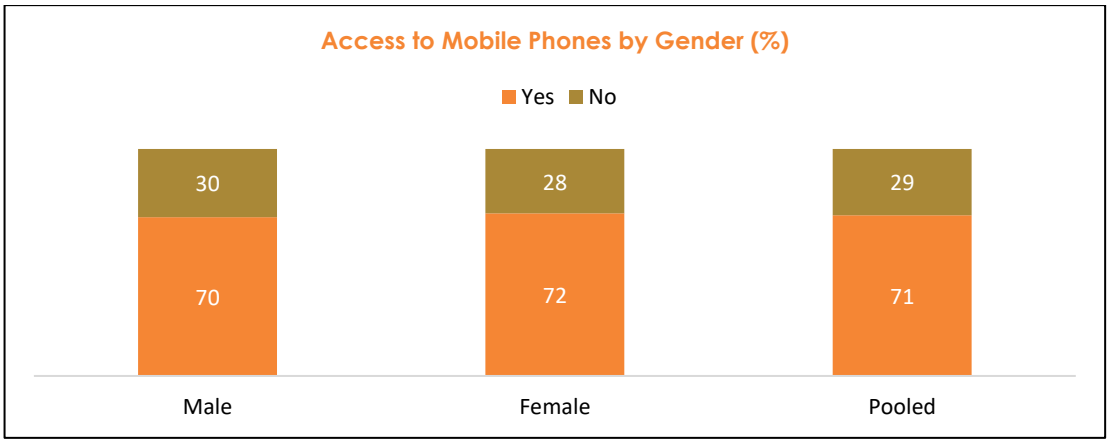

Figure 43: Distribution of farmers by access to mobile phones

3.5.5 Access to Veterinary Services

Access to veterinary services among the dairy farmers is extremely poor at only 8%. The result implies the farmers might be losing their cattle to diseases that could be managed by veterinary doctors. The prevention of zoonotic diseases and management of cattle meant is not handled by veterinary doctor. This could be as a result of the distance to obtain support and care given the remote location of the farmers within the state.

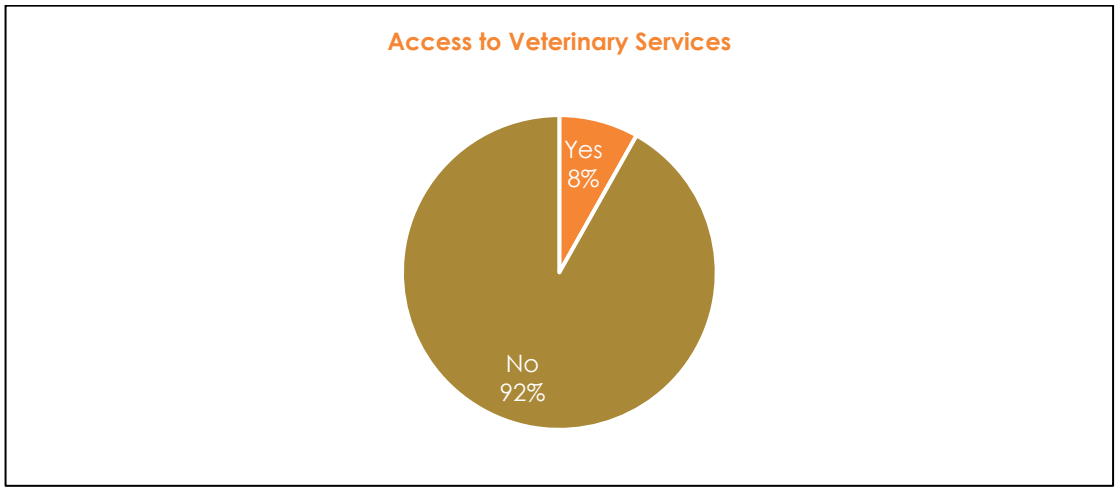

Figure 44: Distribution of farmers by access to veterinary services

3.5.6 Household Illnesses

Just over half (51%) of household members that have experienced one illness or the other in the last one year were women. While more female household members were affected by illnesses in the last one year, males were also severely affected. The distribution of household members who were sick in the last 2 years disaggregated by age revealed high incidences among children less than 18 years, making up 68% of the total. This can be traced to factors including inadequate access to potable water and access to professional health services as indicated earlier.

3.5.7 Constraints

The results as presented in figure 43 show disease and illness of cattle, limited access to social amenities and limited access to veterinary services as the top three challenges faced by the dairy farmers. The three least ranked constraints were inadequate access to grazing land, not having land and human diseases.

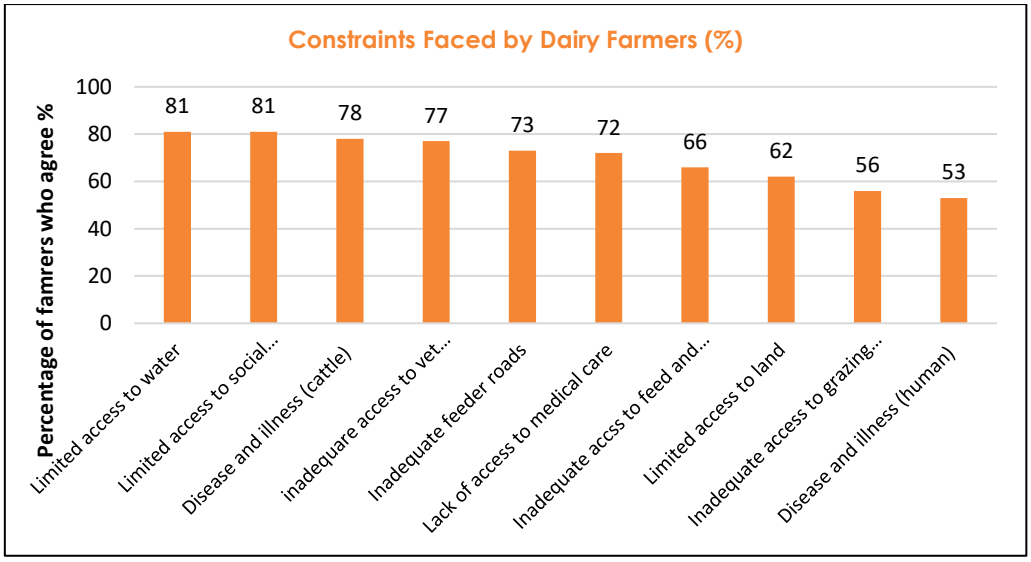

Figure 45: Distribution of the constraints faced by the farmers

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 Oyo State.

These findings will inform the implementation of the NDD Program's various interventions around farmers' identification and mobilization, productivity improvements, and infrastructure development. For example, the high level of awareness of FCW 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 designing 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 installation of 15 boreholes, strategically placed within the communities, will directly improve the source and quality of water that the farmers and their cattle can access.

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

REFERENCES

Adegbola A.A. (1982). Forage Resources and Beef Production in Nigeria. Proceedings of the National Conference on Beef Production, Kaduna, Nigeria, July 27-30.

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.

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.

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.

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

Babayemi O.J. and M.O. Daodu (2007). Milk Production Capacity of Dairy Cattle under Limited Resources and Distribution Pattern in Peri-Urban Area of South West, Nigeria, pp1-4.

Friesland Campina Wamco Nigeria. "Dairy Development in Nigeria - FrieslandCampina Nigeria". FrieslandCampina Nigeria. N.p., 2017. Web. 12 May 2017.

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

International Fertilizer Development Center. Dairy Development Programme in Nigeria Baseline Report. Nigeria: N.p., 2012: 2-25.

Ladele A.A. (2016). Extension Everywhere, Extending Nowhere: The Cacophony of Agricultural Extension in Nigeria. Inaugural Lecture delivered on behalf of Faculty of Agriculture and Forestry at the University of Ibadan on 15 September 2016.

Maphill. "Gray Simple Map of Oyo". Maphill.com. N.p., 2017. Web. 21 Apr. 2017.

Nworgu F.C. (2006). Prospects and Pitfalls of Agricultural Production in Nigeria. Blessed Publications, Ibadan, Nigeria, p181.

Ogundipe G.A.T. (2014). Protecting Animals, Preserving Our Future. Inaugural Lecture Delivered on behalf of Faculty of Veterinary Medicine at the University of Ibadan on 4 September 2014, pp6-43,

Odaibo A.B. (2017). Parasites of Poverty and Poverty of Parasitism. 400th Inaugural Lecture of the University of Ibadan, delivered on 30 March 2017, pp12-16.

Oluwatayo I.B. and A.O. Ojo (2016). Awareness and Adaptation to Climate Change among Yam-Based Farmers in Oyo State, Nigeria. Journal of Developing Areas, 50(2):97-108.

(OYMANR) Oyo State Ministry of Agriculture and Natural Resources (2013). Agricultural Investment Opportunities in Oyo State, 1-5.

Salman K.K. (2017). Naira's Free Fall: Any Hope for Nigerian Farmers? Faculty Lecture of the Faculty of Agriculture and Forestry, University of Ibadan delivered on 15 March 2017, pp1-38.

APPENDIX: OYO STATE BASELINE QUESTIONNAIRE

SAHEL Consulting AGRICULTURE & NUTRITION LTD.

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 Oyo State.

The Nigerian Dairy Development Programme (NDDP) is a processor-led dairy programme implemented by Sahel Capital Partners & Advisory Limited (Sahel), in partnership with Friesland Campina Wamco (FCW) – a leading dairy processor in Oyo 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: 679 Smallholder dairy farmer households (approx. 1359 individuals)
Venue: 5 LGAs in Oyo 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 migrating here? What is the distance (Km/Walking days) between the old and new place?**	Place		Distance (Km/Walking days)	
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?**	Yes:		No:	
		If yes, state gender of those affected: a. Male= b. Female=		If yes, state age(s) of those affected: c. -- d. -- e. --	 f. --- g. --- h. ---
	If yes, give gender, age, length of illness, if anyone was not consulted and reason for this. **(see codes below)**	If yes, state number of days/months for those affected: i. -- j. -- k. --		l. m. 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:	
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**	Yes:	No:	If yes, how many times?		

	visited you in the last 1 year?			
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?** **<u>Pls. state the measure used clearly.</u>**	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**	a-- Tick infestation b-- Foot and mouth rot disease c-- Trypanosomiasis		

	in your herd in the last one year?	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**					