



<https://doi.org/10.33003/jaat.2022.0801.092>

SURVEY OF CHARACTERISTICS AND CHALLENGES OF LOCAL MILK PRODUCERS IN DAURA LOCAL GOVERNMENT AREA OF KATSINA STATE

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ABSTRACT

Milk is essential for human consumption in view of its nutritive value. The study was therefore carried out to characterize milk production based on some socio-economic point of view of the producers and challenges in Daura Local Government area (LGA) of Katsina state. Using a two-stage sampling procedure, ten (10) communities were purposively selected in the first stage based on the high number of milk producers in the LGA while in the second stage, 6 participants were randomly selected from each of the ten (10) villages which totalled 60. The data gathered was analysed using descriptive statistics. The study showed that the respondents' age group of 31-45 was highest with 60% while the distribution of age and formal education revealed that even the young members of the milk producers and other stakeholders were not well educated with 31-45 age range having the highest percentage of 11% in the primary education level. The female involvement in the milk business was more than that of men (80%). *Red Bororo* cattle breed were predominantly used (73%) and all the respondents utilized the traditional milking method and fermenting for milk processing and preservation. Poor storage facilities was reported to be the greatest challenge of the respondents while foot and mouth disease was more prevalent (58.3%). A quarter of the respondents received interventions to support the business. It was concluded that milk production, processing and marketing is still well undeveloped despite the inherent potentials. It was then recommended that government and non-governmental organisations should intervene in the area of training and capacity building to develop the milk production industry in the study area.

INTRODUCTION

Milk is a common food for humans especially those from cow although other sources include goat, sheep, buffalo etc. It is rich in protein and other essential nutrients having being recognized as nature's single most complete food. Milk and its products plays significant role in growth, reproduction, supply of energy, maintenance and repair of body tissues and, appetite satisfaction. The demand for milk increases as population increases with tendencies for shortage of supply. Iyiola-Tunji *et al.* (2019) reported that the demand for most essential food commodities are expected to move up with increasing population resulting in shortage in supply gaps for such food commodities like milk and that this is most times bridged by importation in a lethargic economy that is not capable of expanding productive value chain to meet and surpass demand. The main stakeholder in the production and processing of milk are the pastoralist and the agro-pastoralist who practice traditional methods of production, processing and marketing. However, their capacity to meet up with demands has dwindled over a period of time. FAO (2019) reported that the contributions of the pastoral sector to total milk

production has significantly decreased although pastoralism remains the largest production system in terms of cattle population (66 percent). The report of Aruwayo *et al.* (2021) shows that despite the significant large number of nomads involved in ruminant production, their productivity has dropped over time. There are myriads of challenges that have been advanced for the reduced efficiency of production, processing and the marketing of marketing. Among these challenges are low milk producing capacity of cattle, shortage of feed both in quantity and quality, the use of inefficient traditional processing and storage methods, the security challenges that have impeded all the milk value chain activities etc. According to FAO (1990), the average quantity of milk produced per person per year in developing tropical countries is 34 liters as compared to 311 liters in developed countries (FAO, 1990). Production of milk of Nigeria increased from 220,000 thousand tonnes in 1971 to 524,733 thousand tonnes in 2020 growing at an average annual rate of 1.94% (World Data Atlas, 2022). Aruwayo and Maigandi (2013) reported that the resultant low yield and availability of poor quality herbage gives rise to scarcity of energy and protein feedstuffs during the dry

season which constitute a major setback to ruminant livestock production in the tropics while FAO (2016) reported that among such problems in Nigeria are low milk output of indigenous cows, poor grass quality that leads to low milk yield, and inadequate storage and processing equipment. There are other teething problems like that of infrastructural deficits in terms of access roads, electricity for power, transportation and storage facilities etc. Iyiola-Tunji et al. (2019) succinctly reported that the inefficient method of collection and distribution of milk also hinder dairy development and most milk producing areas are in the villages where vehicles cannot reach easily coupled with lack of access roads and specialized vehicles necessary for the delivery of milk by foot or by animals. This study was therefore conducted to assess the characteristics and challenges of local milk production, processors and marketers in Daura Local Government area of Katsina state.

MATERIALS AND METHODS

Daura is in Daura Local Government area (LGA) of Katsina state, Nigeria which is located on Latitude 13.03639°N and Longitude 8.31778°E (Wikipedia,2020) and with an estimated population of 303,600 people by 2016, based on 2006 census (Katsina State Government, 2021). It borders Sandamu LGA to the South, Zango and Sandamu LGA to the East, Dutsi LGA to the West and the Maiadua LGA to the North. The Local Government area occupies an area of about 217.3Sq kilometres. The major tribes and languages spoken are Hausa and Fulani, and Islam is the predominant religion (Katsina State Government, 2021).

The climate of Daura Local Government area extends from the tropical grassland, known as the Savannah in the South to the Arid Zone in the North. It has a tropical climate with marked period of rainfall and a temperature that fluctuates between 18.5°C minimum in cool season and 39.5°C maximum in hot season. The Zone has a relative humidity which ranges from 22 to 52 (Wikipedia, 2020). Agriculture and animal husbandry is the main occupation of the people of the Local Government and the State.

The Local Government area was chosen for the survey because of the high proportion of pastoralist and agro-pastoralist who produces, process and market milk. A 2-stage sampling procedure was used in the selection of the respondents. In the first stage, 10 communities were purposively selected within Daura Local Government area based on the number of high milk producers they have. In the second stage, 6 participants were randomly selected from each of the ten (10) villages selected in

the LGA. The selection of 6 participants was due to the convenience of data handling by the researcher. A total of 60 respondents consisting of selected milk handlers were then used for the data collection with the aid of a well-structured and pre-tested questionnaire. Using a sample size of 60 people it was estimated that there would be a 10% acceptable error rate (<https://www.surveymonkey.co.uk/curiosity/how-many-people-do-i-need-to-take-my-survey/>). A larger sample would have resulted in a smaller error, but this was not feasible within the timeframe for this study. The data was analysed using descriptive statistics such as frequencies and means

RESULTS AND DISCUSSION

Demographic Characteristics of Local Milk Producers, Processors and Marketers

The age distribution of the respondents as shown in Table 1 reveals that the survey participants with in the range of 31 and 45 years constituted the largest percentage (60%). This depicts that the majority of the stakeholders in milk value chain are in active phase of life with experience that could be considered adequate and that could be amenable to training for improved skills. Aruwayo *et al.* (2021) reported that active working phase of life portends ability to get verse experience in livestock production and be well favourably disposed to new development in latest production techniques. Aruwayo *et al.* (2019) also reported that farmers within active farming age could adopt new techniques. Aruwayo *et al.* (2019) reported that experience increases with age which is an advantage for ruminant production while Nganga *et al.* (2010) reported that the age of farmers is an important factor in livestock production because it may affect the level of rearing and awareness on modern system of rearing.

TABLE 1: Age Distribution of Respondents

AGE	FREQUENCY	PERCENTAGE
15-30	4	7
31-45	36	60
46-60	8	13
>60	12	20

Table 2 shows the nexus between age of respondents and their level of education. It shows that formal education is unexpectedly low even among the very young people. It further shows that the most populous education acquired is Quranic (72%). The age category of 32-45 years are the most educated (52% Quranic education, 11% primary school education and 6% tertiary education. amazingly, none of the respondents are have secondary school certificate as their highest level of education. This could have implication on

respondents' ability to adopt new technologies and access to information that are relevant to the development of the milk production and the value chain. Aruwayo *et al.* (2021) reported that low level of formal education may imply that the respondents may not have touch with the modern way of rearing animals except those that might have diffused from other farmers around them as similarly reported by Aruwayo *et al.* (2015) in a study on an empirical analysis of

ruminant production in Dutsin-Ma Local Government Area, Katsina state. Aruwayo *et al.* (2019) also reported that high level of education observed in a previous study could boost their productivity through improved adoption of innovations and skills of the respondents in ruminant production. The demographics findings are somewhat similar to other surveys conducted by other researchers in Nigeria (Alhaji *et al.*, 2019; Ugwu *et al.*, 2012).

Table 2: Distribution of Milk handlers by age and level of education

AGE	EDUCATIONAL LEVEL			
	QURANIC	PRIMARY	SECONDARY	TERTIARY
15-30	0	0	0	6%
31-45	52%	11%	0	6%
46-60	5%	5%	0	0
>60	15%	0	0	0

Table 3 shows a disproportionate gender distribution of the respondents. The females dominated the milk handling industry in the study area constituting 80% of the respondents while the male folks were only 20%. The trend observed could be due to the fact that females are involved even in production and are majorly the ones that process and sell the products. This indicates that majority of dairy business especially processing and marketing were carried out by women. Women were shown to be the main players

in milk production, processing and marketing (Hemme and Otte, 2010; Tona, 2014). Milking and processing as well as marketing are the major aspects of milk value chain that women are mostly engaged in (Thornton, 2001).The business serves as a means of livelihood for the female population and as an occupation for them; while on the other hand men engage in majority of farming activities and crop trading (Ayanwuyi *et al.*, 2012; Ugwu *et al.*, 2012).

Table 3: Other Socio-economic characteristics of the respondents

Socio-Economic Variables	Frequencies	Percentages
Gender		
Male	12	20
Female	48	80
Other Occupation		
Trading	40	67
Crop Farming	16	27
Civil Service	4	6
Labour Sources		
Family	55	91
Hired	1	2
Both Family & Hired	4	7
Animal Production System		
TOTAL	60	100

Also, based on the result from table 3, milk handling activities are not taken as full time engagement by the respondents. About 67% of the respondents also engaged in trading, while about 27% participate in

various kinds of crop production activities. This probably is so because the volume of milk produced, processed or marketed are not so large in the study area. The distribution of occupation is also in consonance

with other studies (Ugwu *et al.*, 2012; Fakayode *et al.*, 2012). Furthermore, the major source of labour for milk production, processing and marketing in the study area (as shown in table 2) is family labour (91%). Hired labour is being used by only 2% of the respondents while 7% used labour from both family and hired sources. The predominant use of family labour portends an advantage for production because of the usually large family size that is identified with the rural ruminant producers. Aruwayo *et al.* (2019; 2015) reported large family size for ruminant producers and the positive impact on ruminant production.

The breeds of cattle predominantly used by cattle producers in Daura LGA were Red Bororo (n=44, 73%), followed by White Fulani breeds and Sokoto Gudali breeds with 33% (n=20) and 13% (n=8), respectively. However, four (7%) respondents indicated that, they keep other breeds different the common breeds in the area as shown in Table 4.3. Being a semi-arid region, Daura and neighboring areas were shown to rear predominantly Red-Bororo breeds because of their draught resistance and ability to graze on crop residues to convert them into meat and milk (FAO, 2019; Lawal-Adebowale, 2012). Moreover, the production system of most of respondents was shown to be extensive system

(73%), while intensive systems and semi-intensive systems had 14% and 13%, respectively (Table 2). This supports the assertion that most of local milk producers were pastoralists who engage in extensive system of cattle production for their livelihood while few were agro-pastoralists who engage in intensive and semi-intensive systems of production (FAO, 2019).

The method of milking used by all participants (n=60, 100%) was hand milking. This is so because majority of the local milk producers, processors and marketers were located in remote villages and therefore had no access to social amenities such as electricity, roads, milking tools etc. Moreover, the cost and unavailability of milking machines would make it difficult for them to employ any milking method other than the hand-milking. These difficulties have been described as additional bottlenecks to advancement of livestock production in Nigeria (FAO, 2019).

Furthermore, the method of processing and preservation of milk used by all the respondents was shown to be Fermenting method (n=60, 100%) as against boiling and freezing or combination of both, each of which had no respondents (Table 3)

Table 4: Production parameters employed by the respondents

Production Parameters	Frequency	Percentages
Breed of Cattle		
Red Bororo	44	73
White Fulani	20	33
Sokoto Gudali	8	13
Others	4	7
Production systems		
Intensive	8	14
Extensive	44	73
Semi-Intensive	8	13
Method of Milking		
Hand Milking	60	0
Machine Milking	0	0
Both	0	0
Method of milk preservation		
Fermenting	60	0
Boiling	0	0
Refrigeration	0	0

Challenges of Local Milk Producers

Table 5 shows that all the respondents indicated rainy season as the time during which they experience challenges of low production of milk in their herds. While the rainy season should have been the season

with the highest production, the challenge could be attributed to other factors such as diseases, bad terrains, low grazing areas, low quality pasture and/or cost of supplement feed during the early to mid-rainy season in the region (FAO, 2019; Lawal-Adebowale, 2012).

The major challenges faced by milk producers and processors in storage and processing of milk include lack of electricity 13% (n=8), while a disproportionately high respondents indicated lack of storage facilities 67% (n=40) as significant challenge; others described inadequate storage facility, inadequate processing facility and inadequate technical know-how as other challenges each with 7% (n=4), respectively. On the other hand, all the

participants responded that harmattan is season in which they experienced a significant low milk sale when compared to hot and rainy seasons. Moreover, most of the respondents claimed that, they consume their milk at home whenever they experienced low sales in the market (n=33), and nineteen respondents (n=19) sell at low prices, the remaining participants showed that they discard the unsold milk perhaps due to spoilage.

Table 5: Challenges of Local Milk Producers, Processors and Marketers

Challenges Parameter	Frequencies	*Percentages
Season of Low Production		
Rainy	60	100
Dry	0	0
Season of Low Sale		
Rainy	0	0
Harmattan	60	100
Major challenges		
Poor Electricity	8	13
Poor storage facilities	44	74
Poor processing facilities	4	7
Low technical know-how	4	7

*Multiple responses were allowed

Diseases that affect milk yield in the study area

The diseases that affect milk yield in study area are shown in Figure 1. The diseases that affect the milk yield according to the respondents are Foot and Mouth Diseases (FMD), Contagious Bovine Pleuropneumonia (CBPP), Brucellosis and Mastitis

with 58.3% (n=35), 16.7% (n=10), 16.7% (n=10) and 8.4% (n=5), respectively. The diseases mentioned are already endemic in the area even though annual vaccinations exercises are being carried out in the region against CBPP and sometimes FMD

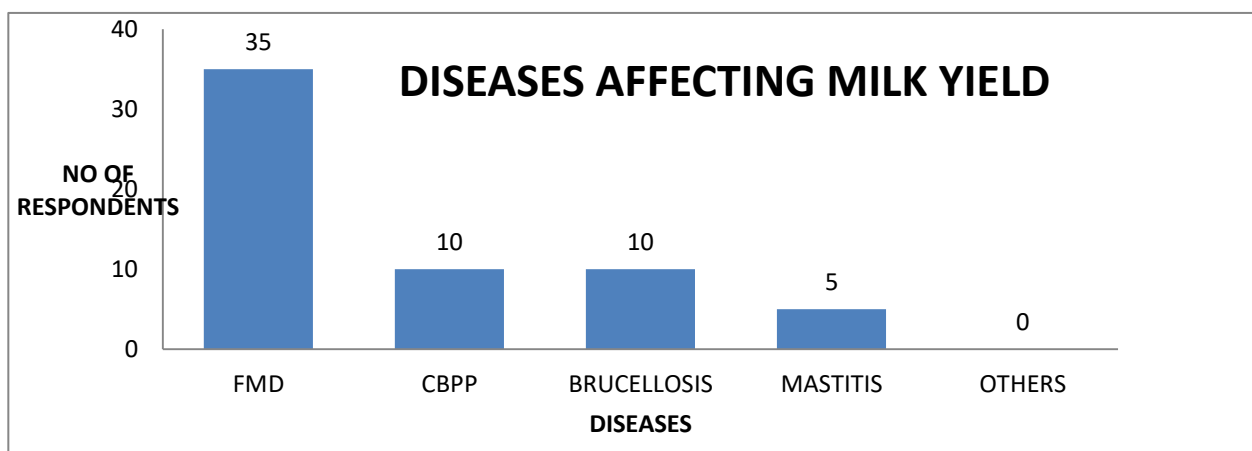


Figure 1: Distribution of Common diseases affecting milk yield among respondents

The challenges of milk production are shown in figure 2. The overall common challenges faced by respondents in the survey were shown in figure 4.8 below. The challenges include low production breeds (n=20), high cost of feeds (n=30), diseases (n=40),

insecurity (n=31), milk sales (n=28), lack of storage (n=16) and lack of processing facility (n=12). The challenges are similar to challenges mentioned in many studies in Nigeria and Africa (Ayanwuyi *et al.*, 2012; FAO, 2019; Osoimehin *et al.*, 2006.)

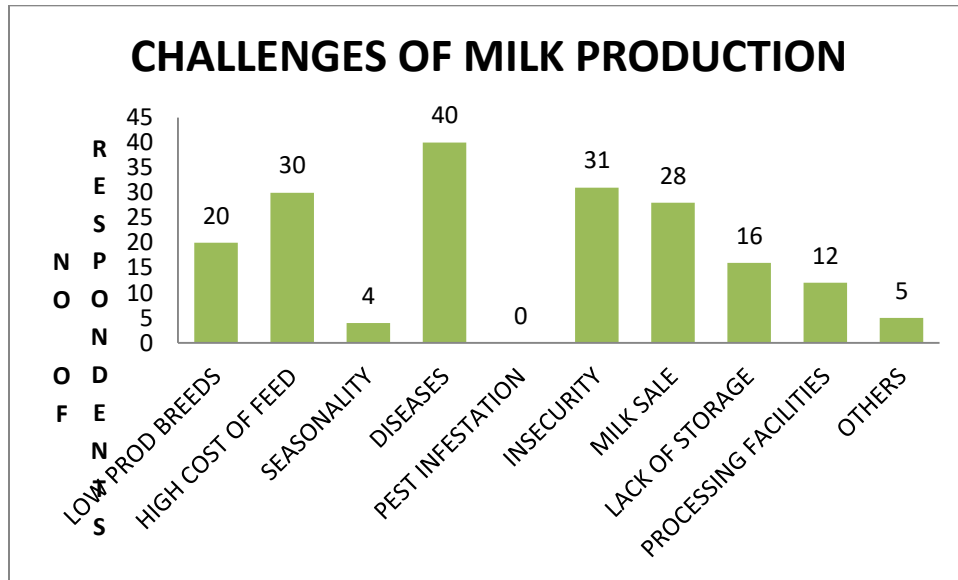


Figure 2: Distribution of main challenges in marketing of milk and milk products among respondents

Asked whether they receive interventions from governments or non-governmental organizations, only a quarter of respondents indicated that they ever received intervention in milk production, processing and marketing. The three-quarter showed that they have never received any intervention from any organizations as shown in Figure 3. The interventions commonly

received by the few participants were financial support, technical support, facility provision and input subsidy depicted Figure 4. However, the interventions received by some of the respondents were reported to be inadequate and criticized for not reaching the real milk producers at the grassroots (FAO, 2019; Fakayode et al., 2012)

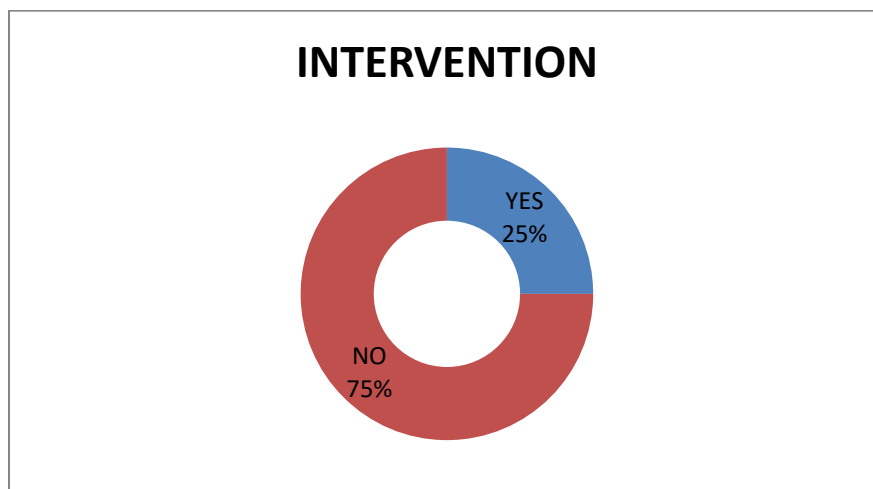


Figure 3: Distribution of access to intervention among respondents

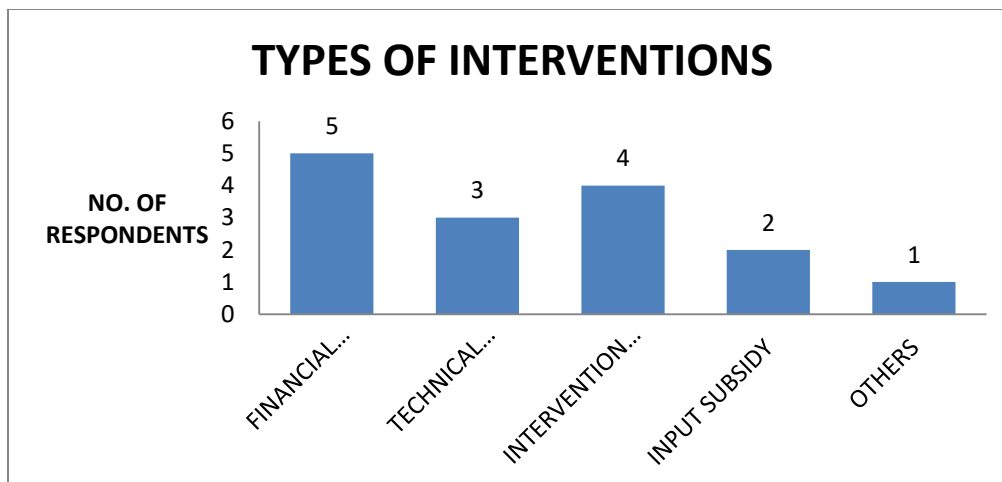


Figure 4: Distribution of types of intervention accessed by respondents

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it is concluded that milk production, processing and marketing is still in its undeveloped state even though the business has the potentials of causing socio-economic transformation of the respondents in the study area. The study therefore recommends that:

- Efforts should be made to improve the socioeconomic conditions of the milk producers through construction of schools in their villages to improve literacy and access to knowledge; providing feeder roads for transport of animals and, milk and its products along other infrastructural facilities.
- Effort should be made to improve the productive capacities of the cattle through breed improvement programmes.
- Insecurity should be tackled.
- Participants should be encouraged through skill development trainings to see milk production activities as business and not just a *cultural or traditional* system.
- Finally, more interventions from governments at all levels and Non-governmental organizations need to be directed at the milk production and the value-chain.

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