

SAFE MEAT & DAIRY PRODUCT MARKET DEVELOPMENT
UNDER
RURAL MICROENTERPRISE TRANSFORMATION
PROJECT (RMTP)



SUBMITTED BY

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INTRODUCTION

Agriculture serves as the key economic pillar of Bangladesh. Livestock is one of the significant components of agriculture (crops, livestock, fisheries, and forestry) and plays a significant role in the national economy with a direct contribution to the GDP of about 1.44% and a proportion of the livestock sector in the agricultural GDP of 10.69% in FY 2020–21. Even though the livestock subsector's contribution to the national GDP is limited, it makes a significant contribution to the daily animal protein needs of the population. Within a decade, yearly milk, meat and egg production soared by 42.5%, 142.3% and 106.9% respectively, as the livestock GDP grew at a rate of 2.66% each year (BLRI, 2021).

Zero hunger is one of the sustainable development goals (SDGs) of UNDP. An adequate quantity of balanced and nutritious food is a primary indicator of quality of life, human welfare and development. Animals are an important source of high-quality protein, minerals, vitamins and micronutrients. The value of dietary animal protein is greater than its proportion in diets because it contains essential amino acids that are deficient in cereals. To achieve the goal of zero hunger, therefore, Bangladesh government has identified livestock as one of the key sectors. The government has set strategic targets for meeting protein demand, employment generation, up-scaling export earnings and women's empowerment through the livestock sub-sector. Improved livestock production may contribute to food security and poverty alleviation through increased output of livestock and non-livestock products and by employment and income generation that may assure access to food.

Small-scale commercial livestock (cattle, buffalo, goat and sheep) and livestock products (processed milk, ghee, cheese, sweet, doi, cream etc.) production and related backward and forward linkage activities in marketing, input supply, etc. have the potential for significant employment generation, poverty alleviation and improve nutritional situation. To increase smallholder access to urban and forward markets at a reasonable cost, the challenge is to identify, create, and test viable institutional structures for tying production, marketing and processing operations. Appropriate technology and services (such as breed and breeding services, milk and meat market development, feed & feed technology and health inputs, and financial market development) that specifically target smallholder needs for improving productivity are required to increase smallholders' competitive strength.

GJUS is implementing the sub-project titled "Safe Meat and Dairy Product Market Development" at Bhola sadar, Borhanuddin under Bhola District, Bakergonj of Barishal District and Bauphal and dosmina of Patuakhali district of Bangladesh". This sub-project is jointly funded by the Palli Karma-Sahayak Foundation (PKSF), IFAD and DANIDA under Rural Microenterprise Transformation Project (RMTP) of PKSF. Through effective production techniques and robust market linkages, the sub-project will enable rural producers to expand sustainable micro-enterprises, which will be implemented for the overall business development of small entrepreneurs. The initiative offers assistance in producing and distributing safe dairy and meat products in accordance with Global GAP and HACCP guidelines. For the branding of dairy and meat products, traceability and certification of such items will be offered. This will give participants a useful commercial tool for maintaining product quality. The goals of the sub-project are to increase the income, food security and nutrition situation of marginal, small farmers and small entrepreneurs in the project area through value chain activities. The value chain activities under the project will gradually increase the income, food security and nutrition situation of marginal, small farmers and small entrepreneurs. In other words, after the sub-project is implemented, 70% of the entrepreneurs' income will jump by at least 50%, and at the same time 30% of the project members will be able to add nutritious food to their regular food list. The objective of the project is to ensure sustainable development of selected value chains. Which will result in increased production of 80% targeted entrepreneurs in regards to safe livestock production, increased 30% sales of livestock and livestock products, and increase 20% profitability of the targeted entrepreneurs. The specific outcomes of the sub-project are as:

- a) 90% targeted entrepreneurs of the sub-project have produced safe meat, dairy and dairy product though using quality inputs, improved technologies and Bangladesh Good Livestock Production Practices.
- b) 10% entrepreneurs' groups have achieved capacity of run their business through establishing formal contract with public and private market actors.
- c) 40% targeted entrepreneurs have adopted climate smart/friendly technologies.

METHODOLOGY

In order to understand the existing business, economic, environmental, and climatic circumstances of the MEs who are expected to engage in the project activities, GJUS has taken the initiative to perform a baseline study through an individual consultant. Additionally, the survey will create the baseline position for many factors important to the project participants, including sales, profit, employment, asset development, environment, health and safety situation, etc. The initial status of financial and technical support, adoption of Global GAP and HACCP at the enterprise level, knowledge of production practices and technologies, adoption of technologies and/or management practices, access to business development services by rural enterprises, access to financial services by people living in rural areas, etc. will all be examined in the study.

i) Document review

Prior to baseline survey for this study, the required papers were reviewed for pre-assessment information of the program. This helped us with the formulation of the detailed methodology, work planning, and questionnaire formation.

ii) Data collection strategies

The baseline survey used both a quantitative and a qualitative approach for data collection. The Household Survey (HHS) was a quantitative data gathering method carried out by a team of skilled enumerators. The consultant used the FGD and KII methodologies for collecting data as a qualitative approach. Here we go into the specifics of those techniques.

iii) Development of questionnaires

Close-ended questions (answers of "yes" or "no," or from a multiple options or multiple-choice questions) that can be statistically characterized made up the majority of the questionnaires used in the HHS. Open-ended inquiries, however, are useful for gathering qualitative data and are particularly useful for figuring out people's opinions and sentiments. The project's goals were taken into account when creating the questionnaires. Additionally, because this was a purposeful survey, all questions were customized to the concerns of dairy farming.

iv) Sample size for the survey of households

Although the Cochran's (1963) formula was used to statistically estimate the standard sample size, the client's (GJUS) input was sought to

determine the appropriate sample size for the respondent houses (HHs), the focus group discussion (FGD), and the key informant interview (KII) in order to perform the baseline survey. Additionally, all respondents were picked at random from the MEs in the survey locations. The following formula given by Cochran-

$$n = \frac{z^2 \times pq \times N}{e^2 (N-1) + z^2 pq}$$

Where, N = Total households; P (probability of success) = 0.50; q (probability of failure) = (1-p) = 0.50; z = 1.96: z is the area under standard normal curve under certain confidence limit (at 95% confidence interval); e = 0.05 within 95% Confidence level i.e., desired level of precision (Ref: Sampling Technique by Cochran; page: 78, 79). After taking a value of 0.5 for either p or q (because such value of p and q maximize the sample size), and a confidence limit of 95% (of which value of z is 1.96) with a 5% error level, required sample size has been estimated.

Table- Household Sample distribution

District	Upazila	Union	MEs	HH sample	FGD
Barishal, Bhola and Patuakhali	Bakerganj	14	16153	195	5
	Borhanuddin	9	1766	98	2
	Bhola Sadar	13	7081	96	4
	Bauphal	14		93	7
	Dashmina	7		92	8
Total			25000	574	26

Sl.	Type of actors	Sample	Method
1.	LSP	24	KII
2.	Feed Supplier (Dealer/retailer)	24	KII
3.	Medicine Seller	24	KII
4.	Govt. Official (ULO, DLO)	3	KII
5.	Milk Trader	20	KII
6.	Meat Seller	19	KII

v) Method of obtaining information from respondents

Prior to conducting interviews with any respondents throughout the survey, the study purpose was thoroughly stated to each one of them. Any person who rejected to provide the information or shown any hesitation was not allowed to interview. Verbal consent of each of the respondents was taken before interview. The research team was highly committed to the respondents to keep the privacy of their information

and source of data as well as put heartiest attempt to be unbiased in collecting data.

Household survey (HHS)

In this approach, enumerators randomly visited respondents' house from door to door for face-to-face interviewing with the standardized questionnaires.

Focus group discussion (FGD)

In this technique, information was collected from a group of around 15 participants with different age and sex but similar occupational backgrounds.

Key Informant Interview (KII)

In this technique information were collected by direct interviewing with loosely structured questions from multi-sectorial individuals like GoB officials, Paiker/Private sector/Forward market actors, Business Management Organization, AVCF/VCF and others (Those who are involved in business enabling environment and carrying out/supporting rural microenterprises/support function actors)

Training to the enumerators

The consultant held a debriefing session with the enumerators prior to heading to the HHS to ensure that they had a good knowledge of the questions to ask the interviewers and the procedures to gather information truthfully.

vi) Data validation and quality assurance

Before beginning data entry, all the questionnaires filled by the enumerators was checked and crosschecked by the consultant.

vii) Data analyses

All data were imported into a Microsoft Excel worksheet after being checked and cross-checked, and a pivot table was used to conduct a frequency analysis. The consultant himself used SPSS software to undertake additional statistical analyses. Results were accurately calculated and presented in line with the goals of the project to be carried out.

viii) Report writing

After analyzing field data, the consultant prepared a thorough report that depicts the current state of dairy farming in the survey regions, identifies gaps, and makes suggestions therefor that will serve as the guidelines for successfully executing the project's activities and interventions.

RESULTS AND DISCUSSION

1. Special Information of the Farmers

Educational Qualification

The educational status of the participants is presented in Figure 1. In the survey area, most of the famers (184) had only signature knowledge while 70 are illiterate. Primary education is completed by 172 farmers. The tendency toward livestock farming was lower among highly educated people. JSC, SSC, HSC, Honors and Masters were completed by 94, 50, 15, 14 and 1 respectively. In the survey area about 11% of the people were illiterate. Among the rest about 30% of the people can only write their name. Among the literate people about 28%, 15.6% and 8.3% people has completed their primary, Class-8 and higher than class-8 education, respectively.

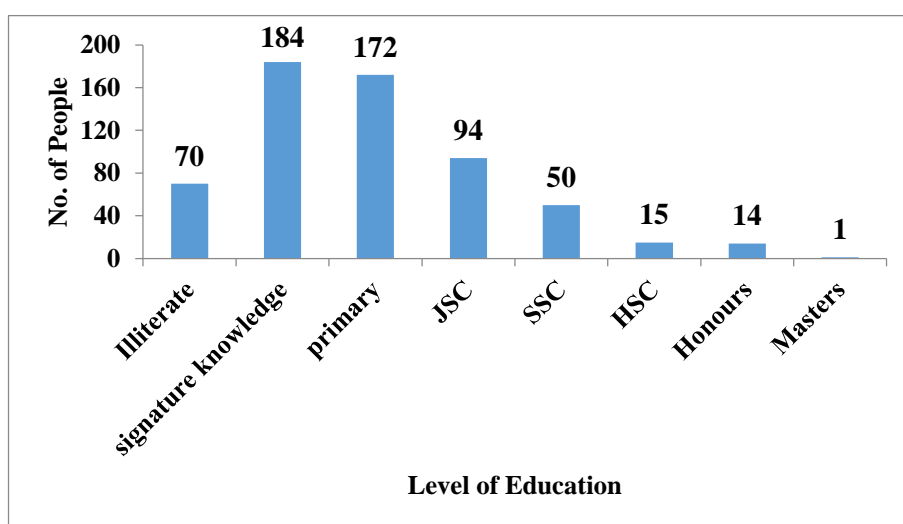


Figure 1: Educational qualification of the members

Types of Members

Distribution of the landless/very poor, poor and small entrepreneurs are illustrated in the Figure 2. It was found that majority of the farmers (401) were poor. However, a large number of people (160) in this area was entrepreneur. Among the farmers, 39 farmers were extremely poor. About 6.5% participants have less than 4 decimal lands. In the survey area most of the farmer (about 66.83%) are poor who has 5-149 decimal land.

Sex and Age of the Farmers

The results in sex and age of the members are shown in Figure 3 and Figure 4, respectively. In our study area, we found that 451 farmers were male and 149 were female. Majority of the farmers aged above 35 years

old about 500. In this, we discovered that 100 farmers aged between 18-35 years old. Most of the member in the collected data are male (about 75.16%). In the survey area about 83.33% of the members were above 35 years of age.

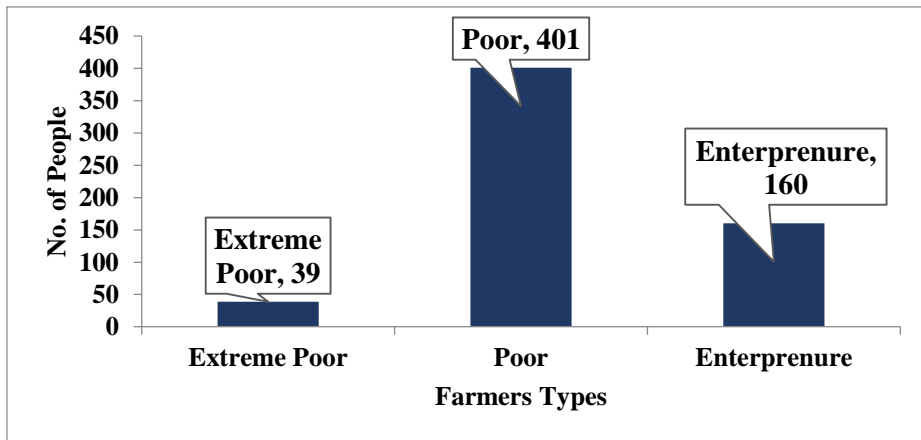


Figure 2: Types of members based on the land area

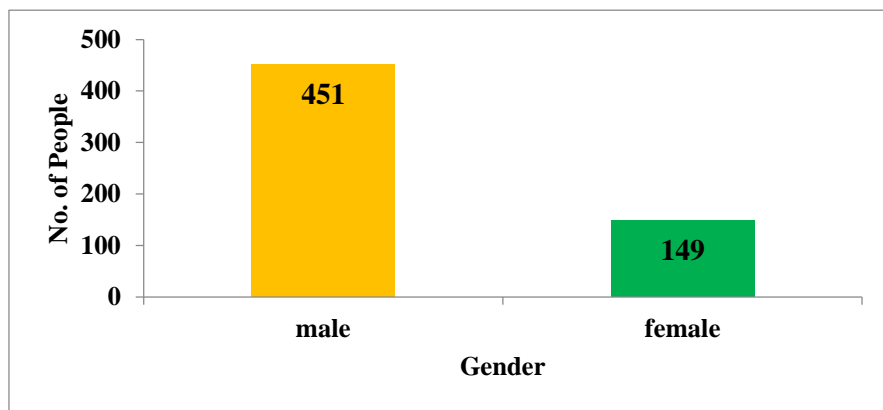


Figure 3: Sex of the farmers

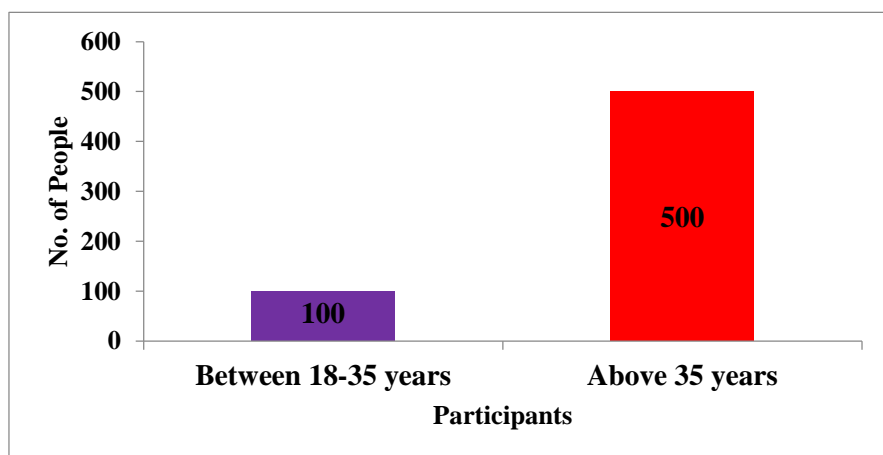


Figure 4: Age Classification of the farmers

Types of Family

The findings revealed that 595 farmers have patriarchy family, 4 matriarchy and 1 divorced (Figure 5). In the survey area 99% of the family is patriarchy type. Only in 0.66% of family is matriarchy. In these families where female is head their husbands are in abroad or in other cities for work. We found 0.16% divorce family in this region.

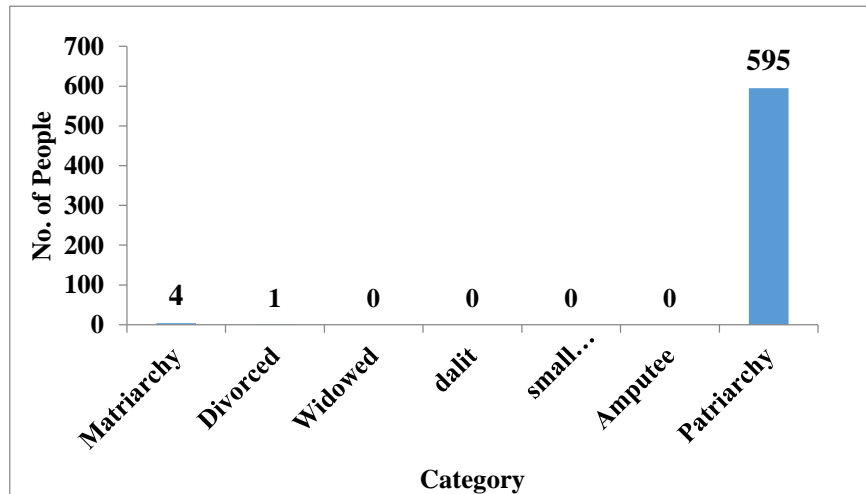


Figure 5: Types of family in the surveyed farmers

Total Amount of Land

The data found on the area of land owned by each of the respondents are presented in the Table 1. On an average, it was revealed that farmers have 145.72 decimal of land. Standard deviation of land is 209.67 decimals.

Table 1: The amount of land (decimal) owned by the participants

Total Land	
Mean	145.71
Median	73
Mode	100
Standard Deviation	209.67574

Income per Month from Livestock Rearing

Income of the farmers from Buffalo, Cattle and Goat farming (Monthly, in BDT) is depicted in Figure 6. In this region, average income of farmers from buffalo rearing was 23228.29 taka per month. From cattle, goat rearing and fattening, farmers earned 7541.29, 2503.33 and 8000 taka respectively per month.

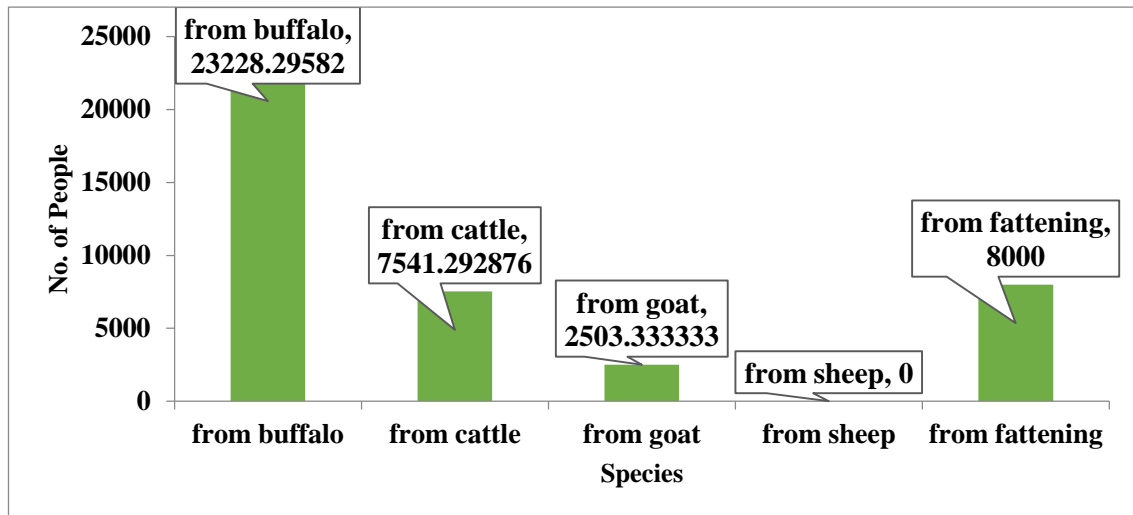


Figure 6: Income of the farmers from Buffalo, Cattle and Goat farming (Monthly, in BDT)

Food Intake of Women in 24 Hours

Food intake of women in 24 hours is presented in Figure 7: Among 600 farmers, 234 farmers were taken nut type food. Milk and meat were eaten by 58 and 43 farmers daily. In that region, daily intake of potato, pulse, egg, green vegetable and vitamin enriched vegetable 2, 171, 35, 39 and 18 farmers respectively. During the survey the female person of about 39% family took nut types food last 24 hours. About 9.66% farmers took milk and dairy products.

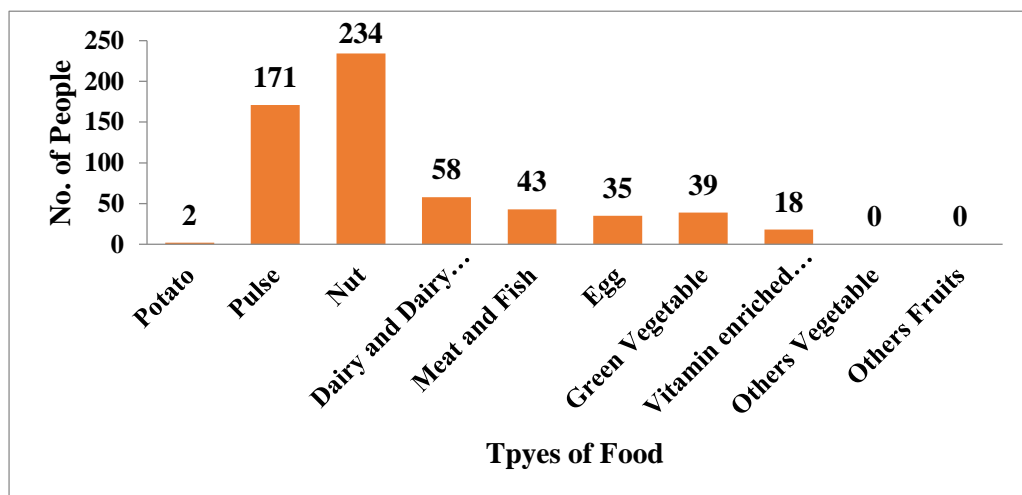


Figure 7: The diversity of the meal taken by the females in last 24 hrs.

2. Livestock, Finance, Employment, Capital and Income

Population size of cattle, buffalo, sheep, goat, chicken, pigeon and duck are showed in Figure 8. On average, farmers have 5 cattle, 5 goat, 3 sheep, 21 buffaloes, 15 chicken, 14 duck and 21 pigeons in our study area. About 72% of the farmer took loan from organization or other sources (Figure 9). They took it mainly for making house or buying land. In our survey area, 27.34% farmers did not taken loan. Amount of loan for animal husbandry showed in bar diagram (Figure 10). On average farmers were taken 127208.58 taka. For cattle rearing farmers was taken 82246.37 taka. Farmers were taken 160227.27 and 15000 taka for buffalo and goat rearing.

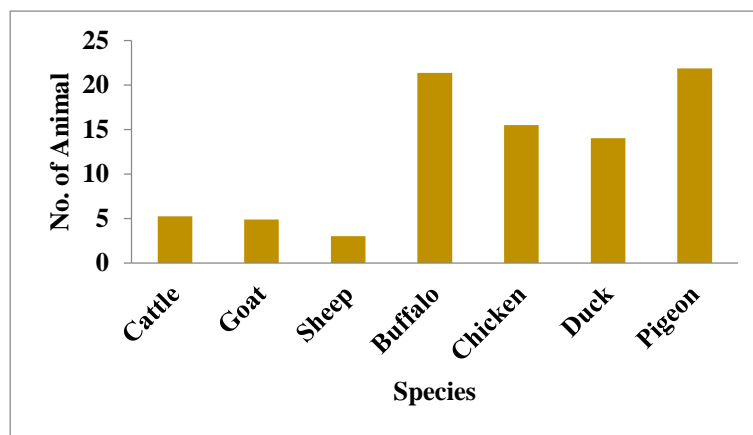


Figure 8: Population size of animals

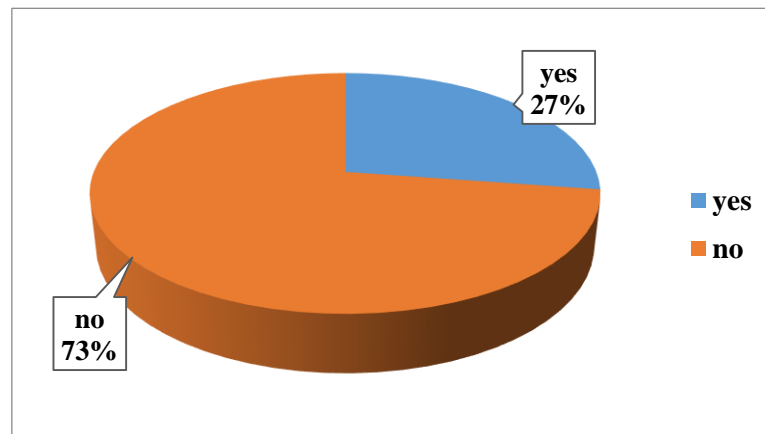


Figure 9: Proportion of farmers in relation to loan

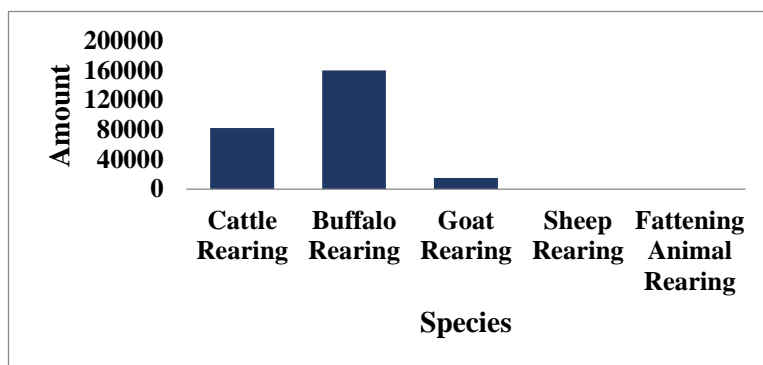


Figure 10: Sources of loan used by the farmers

Figure 11 shows the loan providing organization in our study area. Most of the farmers did not take any loan from the govt. or private bank. In our study area, 100% farmers taken loan from Non-Government Organization. On average, they taken loan from one organization.

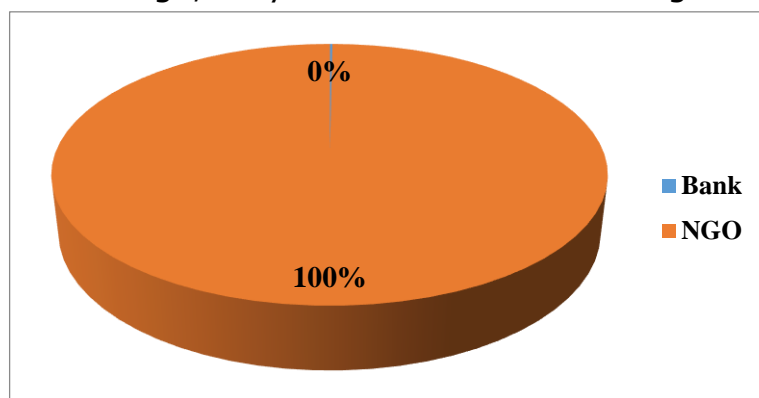


Figure 11: Loan providing organization

Figure 12 shows that total 270 farmers keep buffalo in chor/bathan. It has been observed that 270 farmers rear their buffaloes in bathan/chor and 20 farmers follow the household production system. Among 340 farmers, 50 are found to be reared in both production system. About 45% farmers keep their buffaloes in chor/bathan. In the survey area, only 8.33% farmers keep buffaloes in both chor/bathan and household. We observed (Figure 13) that on average 6, 2, 1, 10, 1, 1, 5, 5 and 3 number of milking buffalo, sellable chela, reproductive chela, reproductive female buffalo, reproductive murrh chela, murrh ox with calf, reproductive murrh chela were reared by the farmers. We found that farmers reared an average of 5, 5, 3, 2, 3 and 2 desi cattle, cross cattle, milking cattle, desi cow, cross cow and cross calf (Figure 14).

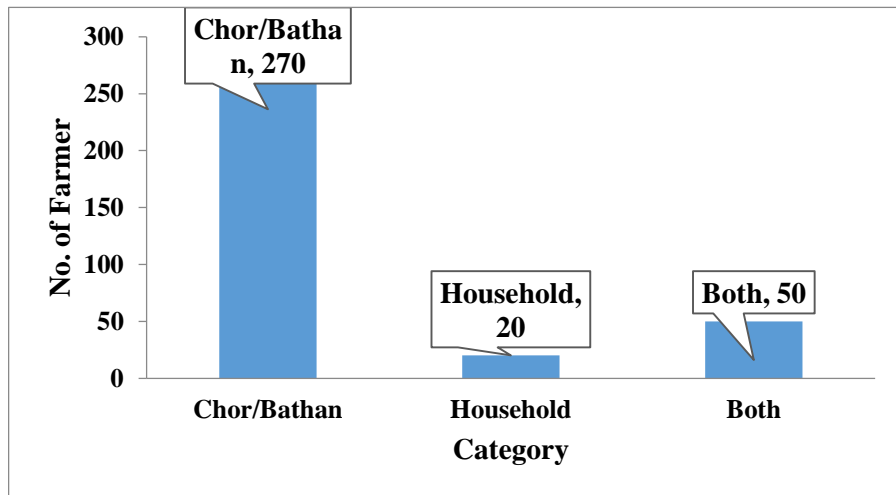


Figure 12: Production system

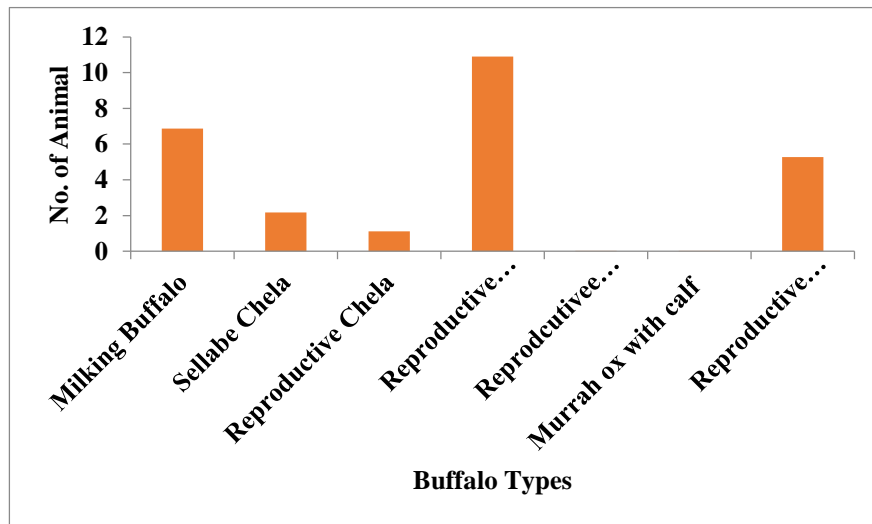


Figure 13: Number of buffalo types

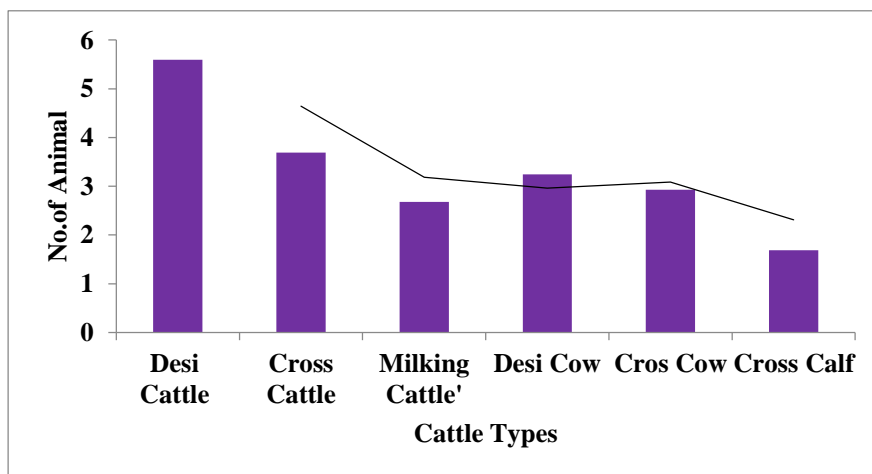


Figure 14: Number of cattle types

Figure 15 present the average number of Black Bengal Goat in this region. The findings revealed that on farmers reared 5, 2, 2, 3 and 2 number (on average) of Goat, Doe, Goatling, Buck, Widder. Number of Jamuna Pari goat shows in the Figure 16. In that region farmers reared on average 3 number of Jamuna Pari widder. Farmers did not rear doe.

Number of fattening animals in our study area are presented in Figure 17. Most of the farmers used cow for fattening. Secondly, they used buffalo for fattening. They did not used goat and sheep for fattening purpose. On average each farmers used 2 cows for fattening. Total number of Animal in Bathan/Farm are presented in the Figure 18. It has been reported that farmers kept their 20 buffaloes in bathan. On average they kept 5, 5 and 3 numbers of cow, goat and sheep in farm. Farmers used an average 132798.78, 62405.34 and 10950 taka per year as a feeding cost of buffalo, cow and goat (Figure 19).

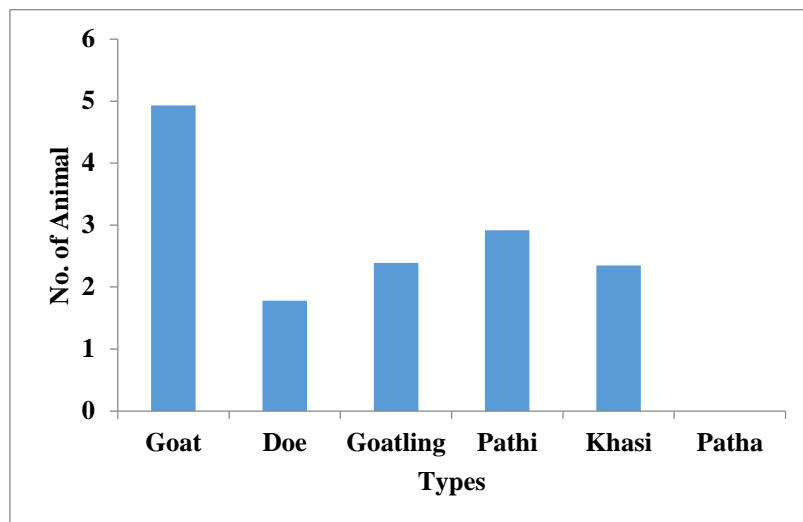


Figure 15: Number of Black Bengal goat types

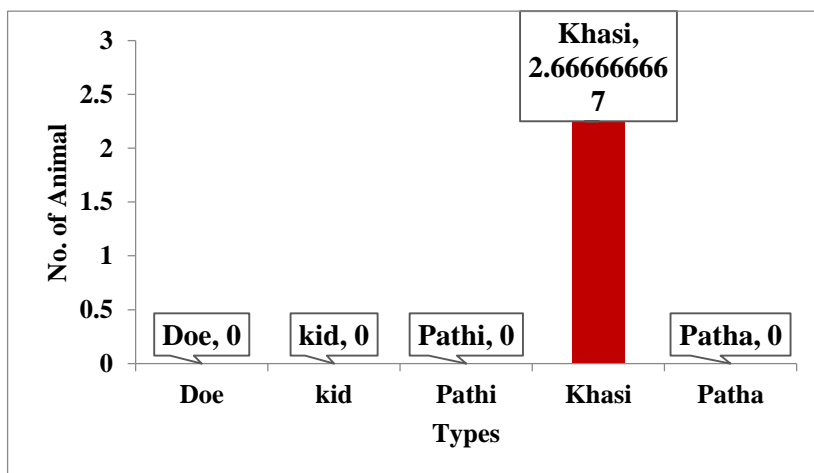


Figure 16: Number of Jamuna Pari goat types

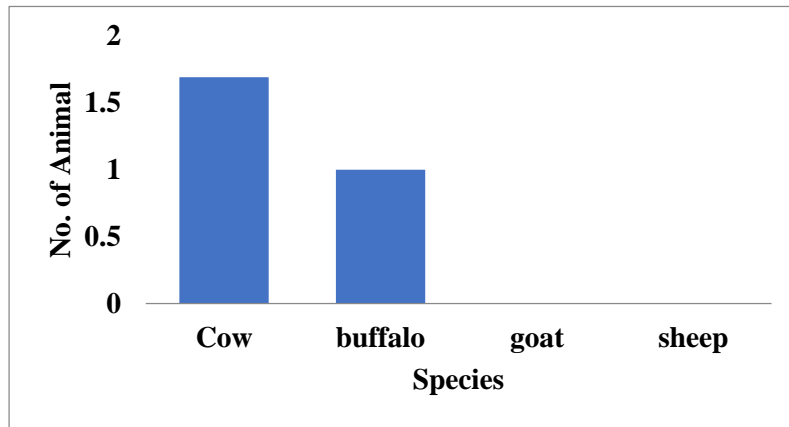


Figure 17: Number of fattening animals

Most of the farmers in this region tensed with the feed cost. The cost of feed is increasing day by day. Labors are available in this region. Figure 20 shows the labor cost. On average, farmers used 124489.79 and 6223.88 taka per year as labour cost for buffalo and cow rearing.

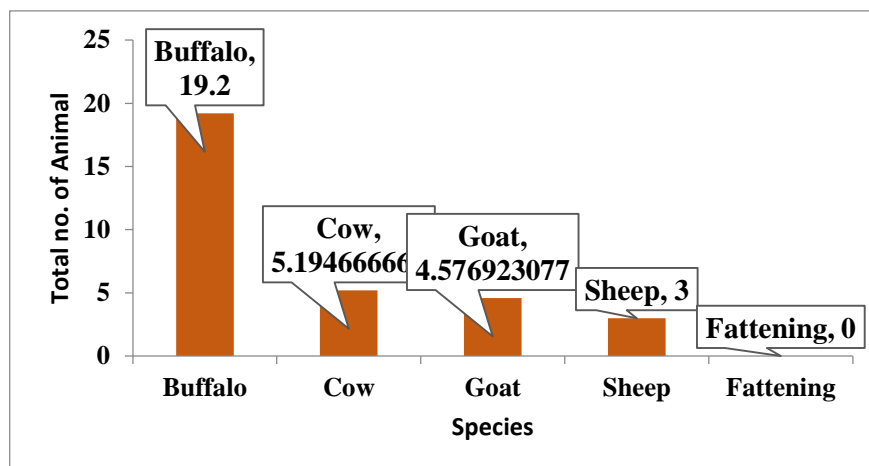


Figure 18: Total number of animal in bathan/farm

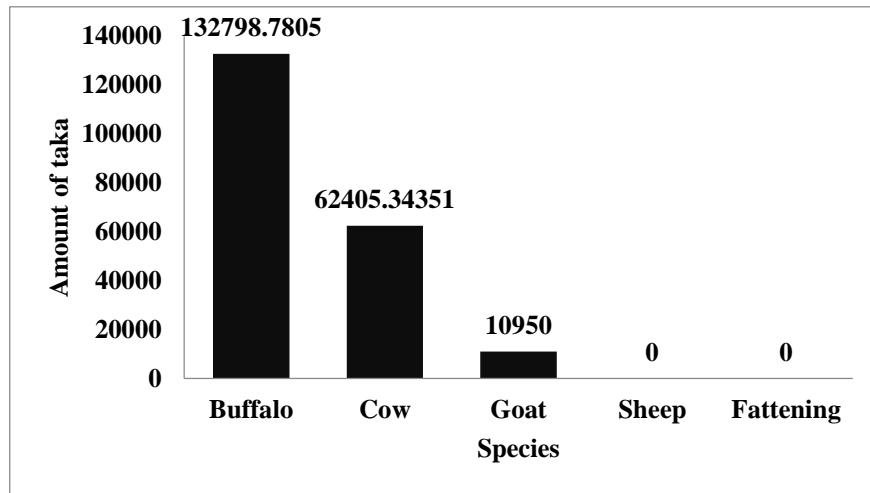


Figure 19: Total feeding cost

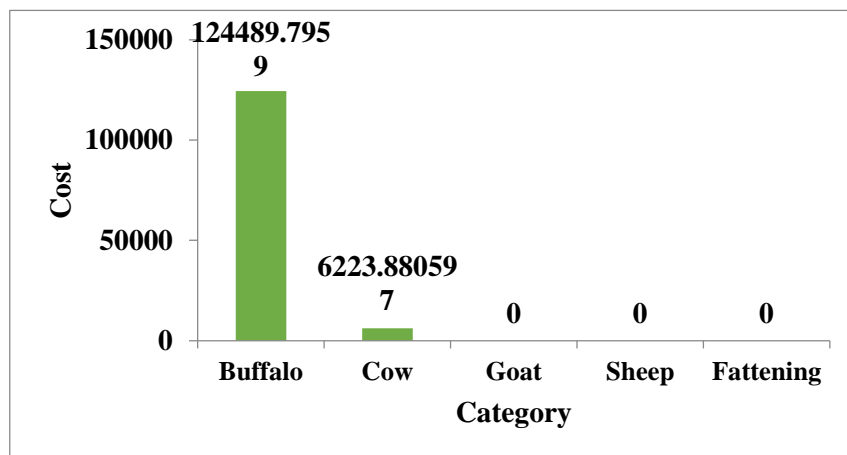


Figure 20: Total labour cost

Farmers spent (Figure 21), respectively 16882.51, 5393.69, 2000 taka annually on treatment for rearing buffaloes, cows and goats. Farmers wants to reduce the cost treatment. Figure 22 depicted the average killa/housing cost. Average killa cost per year for buffalo rearing was 50456.64 taka. 42943 taka per year was spent for cow housing in that region for breeding and instrument cost per year 4339.03, 2307.27, 1120 and 1000 taka spent for buffalo, cow, goat and sheep rearing (Figure 23).

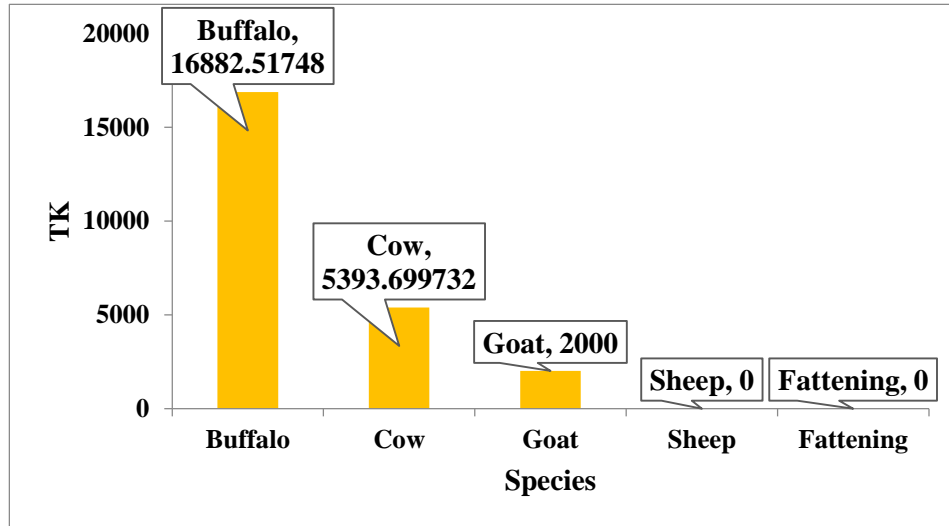


Figure 21: Cost of treatment

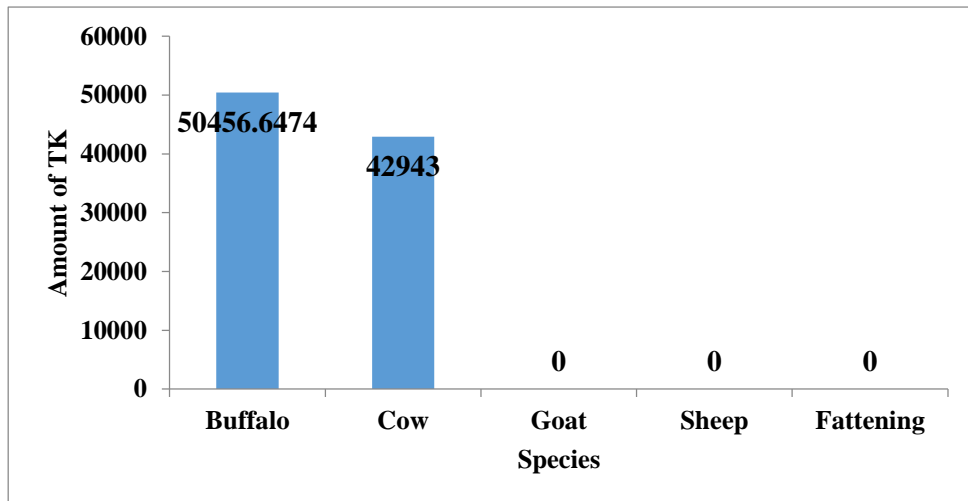


Figure 22: Total killa/housing cost

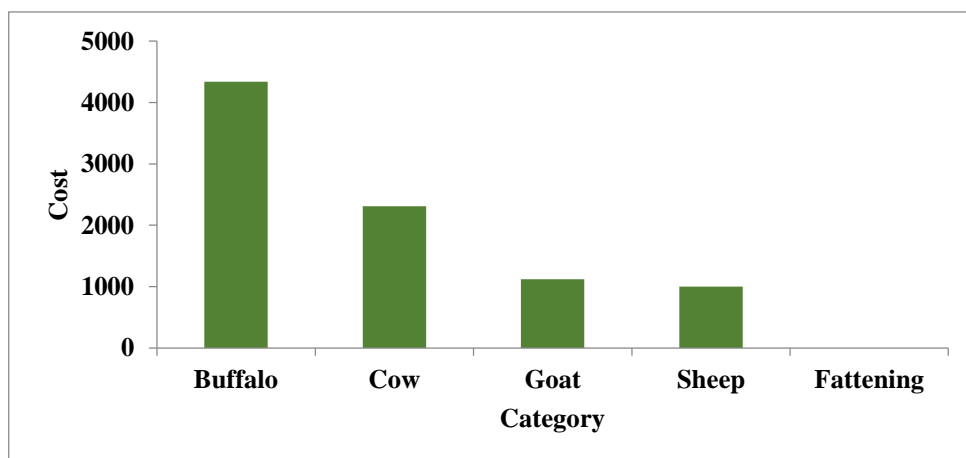


Figure 23: Others cost (breeding and instrument cost)

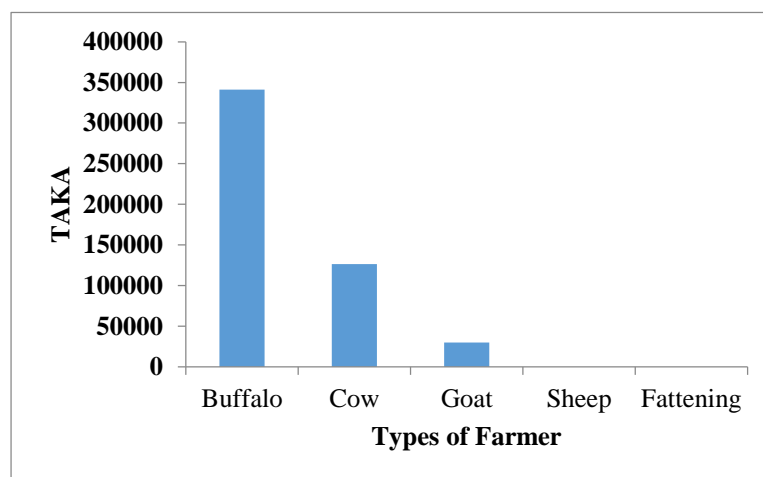


Figure 24: Total cost per year

Average cost for buffalo rearing (Figure 24) is about 341275.09 taka. For cow and goat rearing total cost per year per member is about 126403.57 and 30000 taka respectively. In this region buffalo rearing cost is higher than the cow and goat. In figure 25 investment of farmers for livestock rearing is presented. The average investment of buffalo, cow and goat farmers is about 562438.15 taka and 1358559.60 taka respectively. Figure 26 shows the own investment of farmers for livestock rearing. From the study we found that an average investment of buffalo, cow and goat farmers was 5558415.17, 1136680 and 36250 taka respectively. In the figure 27 savings money of farmers from livestock rearing is presented. The result showed that very few farmers deposit the money from livestock selling. Figure 28 is presented amount of money deposited by farmers. The average amount of deposit from buffalo and cow selling is about 134237.28 and 118701.49 taka. Highest money deposited from the buffalo rearing. Farmers did no deposit any from sheep/ goat and fattening animals

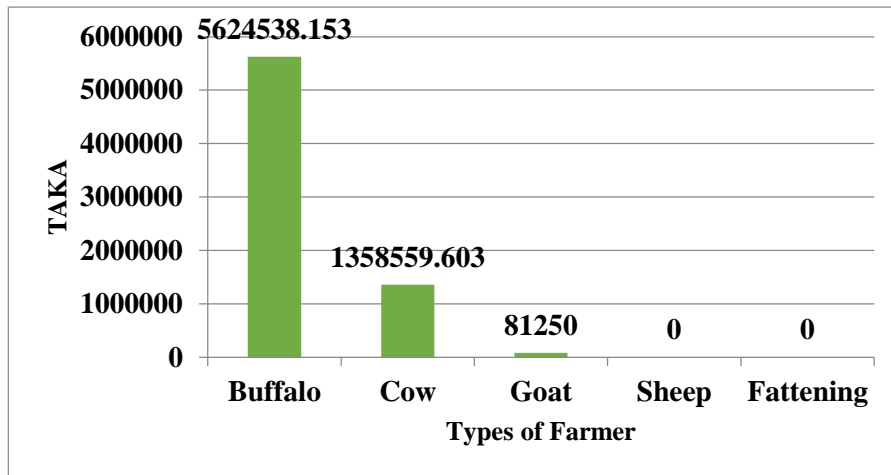


Figure 25: Investment of farmers for livestock

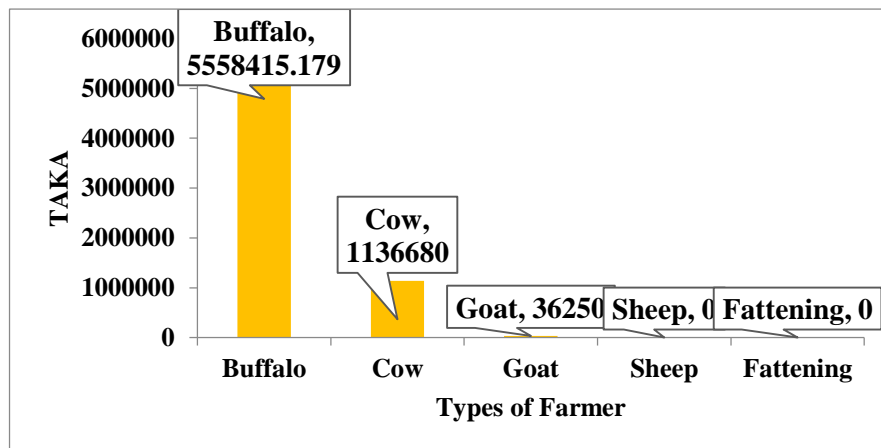


Figure 26: Self-investment of farmers for livestock rearing

Total income per year from livestock rearing are presented in the table 2. Mean, median, mode and standard deviation was analyzed for Total Income Per Year (BDT, TAKA). Total income of farmers included money of selling animals, milk selling, selling of cow dung and others. Average income of buffalo farmer is about 23228.29 taka per year. Cow farmers average income is about 7541 taka. Yearly net income is depicted in Figure 29 It was found that most of the farmers could not made any profit. Average net income of buffalo, cow and goat was 262071.30, 70953.17 and 2165.82 taka respectively.

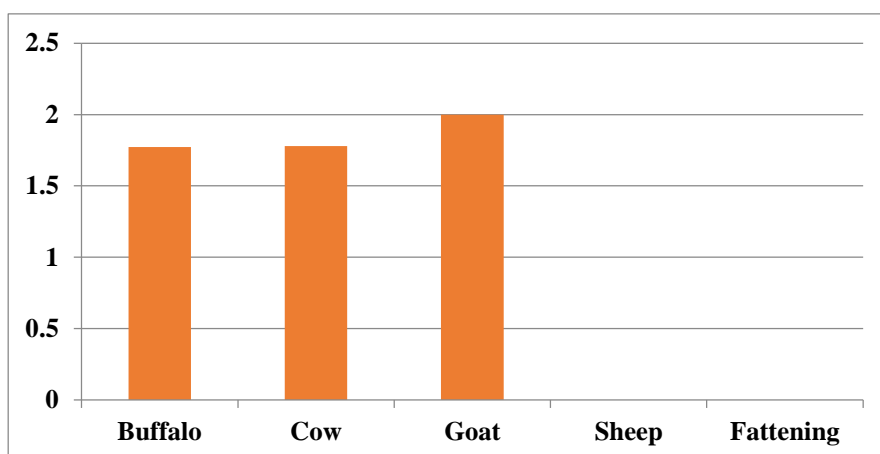


Figure 27: Saving of money from livestock selling

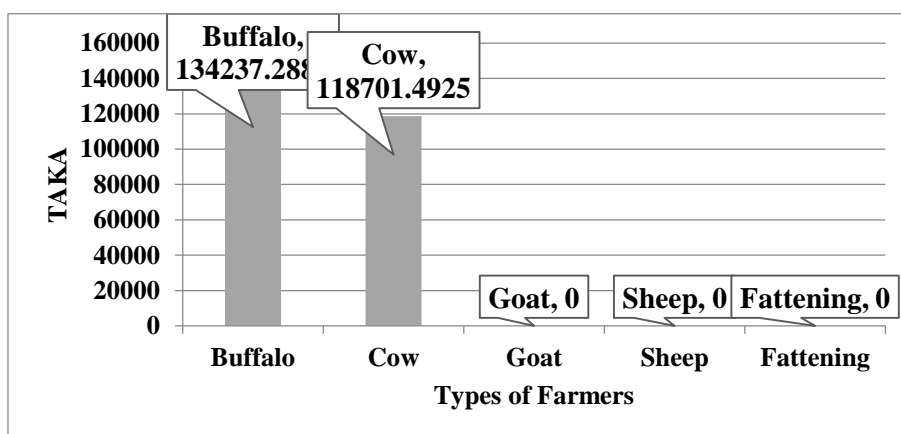


Figure 28: Amount of money deposited by farmers

Table 2: Total income per year (bdt, taka)

Total Income					
	Buffalo	Cattle	Goat	Sheep	Fattening
Mean	23228.29	7541.29	2503.33	0	8000
Median	19000	5000	1400	0	8000
Modde	19000	0	1000	N/A	N/A
Standard Deviation	37170.95948	11599.42884	3582.956142	0	0

Contract selling of live animal and milk is presented in Figure 30 and Figure 31. Farmers could not sell their live animal any contract govt. or non-govt organization. About 92% farmers sell milk without any contract and 8% farmers sell their milk with buyer of milk selling. In our survey area farmers are interested to contract selling of live animal and milk, if they will get proper cost animal and milk.

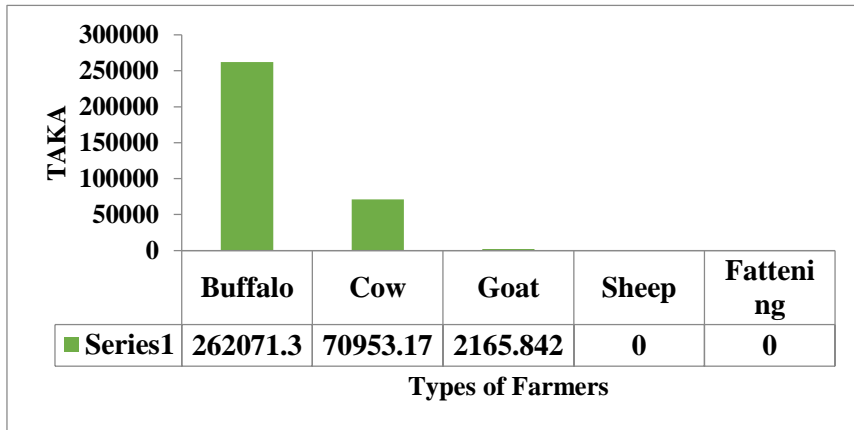


Figure 29: Yearly net income

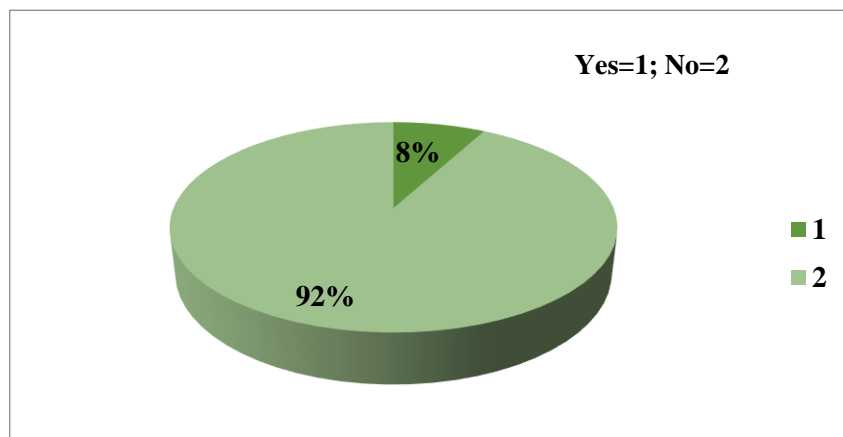


Figure 30: Contract selling of live animal

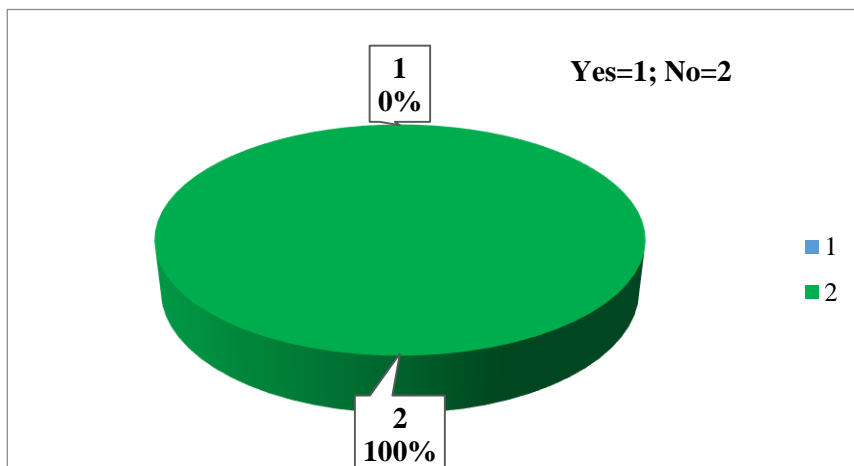


Figure 31: Contract selling of milk

3. Milk and Milk Products-Supply and Value Chain

Biosecurity of buffalo, cow, goat and sheep farm shows in the figure 32. About 100% farmers did not follow biosecurity in the farm. They want more about the biosecurity of farm. Farmers do not follow husbandry practices for buffalo, cow, sheep and goat.

About 1% buffalo and 5% cow farmers provide good quality feed. Sheep and goat farmers did not provide any good quality feed (Figure 33). In their region about 99% buffalo and 95% cow farmer did not prove quality feed (Figure 34). In the study area, cow and buffalo farmers has 7 milking animals on an average (Figure 35). From the survey, we found that average lactation length of cow is 185 days (Figure 36). Average length of buffalo and sheep/goat is 177 and 95 days. In that region cow produce more days in milk than other species.

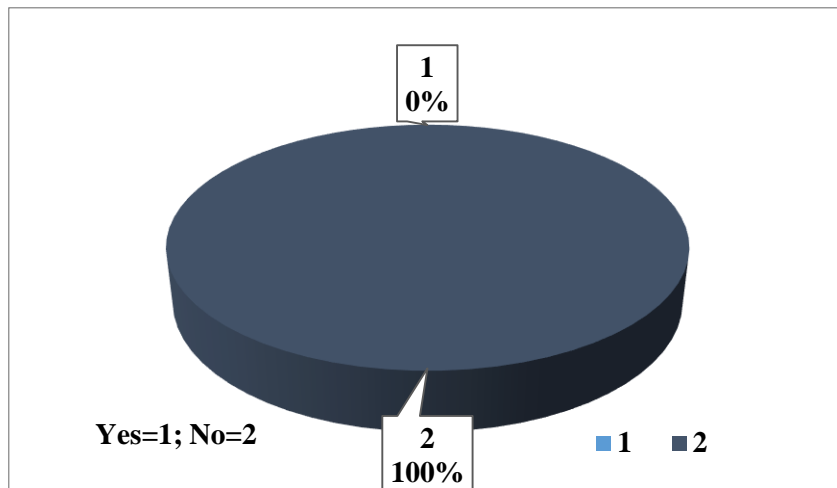


Figure 32: Biosecurity of buffalo, cow, goat and sheep farm

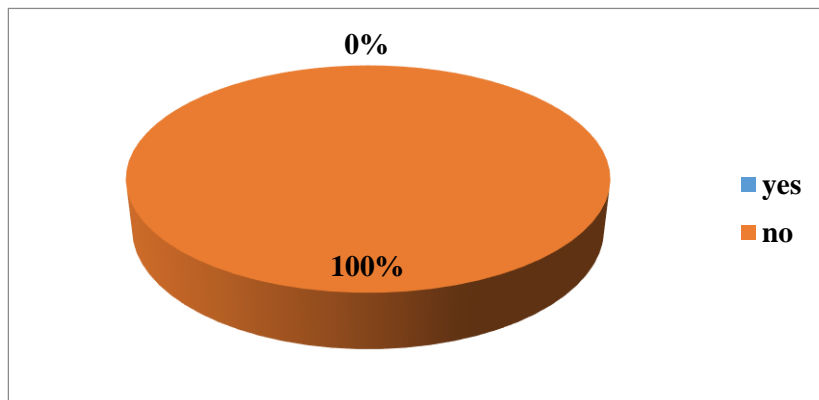


Figure 33: BGAP/GGAP husbandry practices

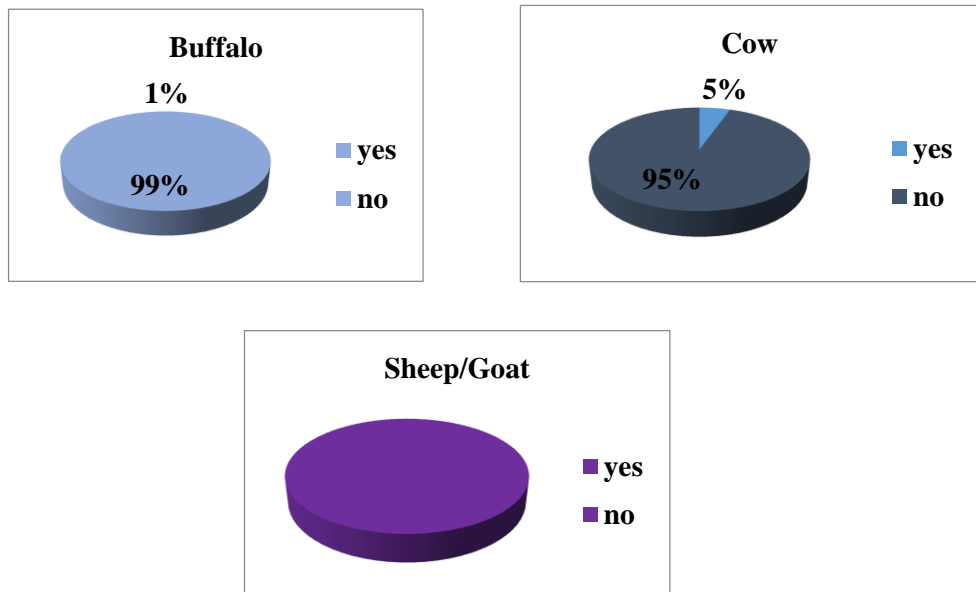


Figure 34: Use of quality feed

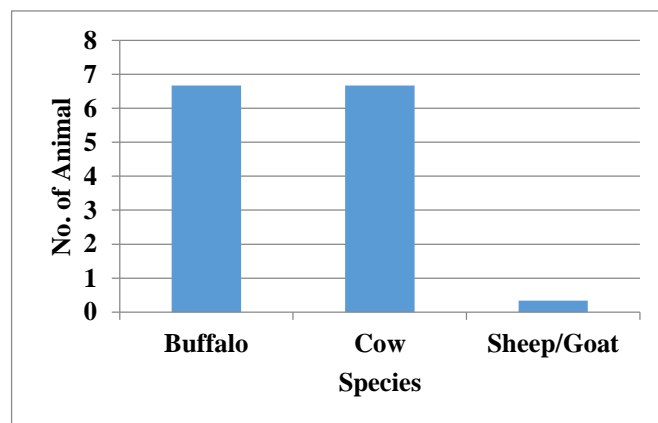


Figure 35: Average number of milks producing animal

Average milk production (Figure 37) of buffalo is about 13 L and of cattle is about 7 L per day. Average price of buffalo, cow and goat milk is presented in Figure 38. Average price of buffalo, cow and goat milk is 74, 57 and 100 tk/L respectively. Goat milk is unavailable in that region and the price of goat milk is higher than buffalo and cow milk.

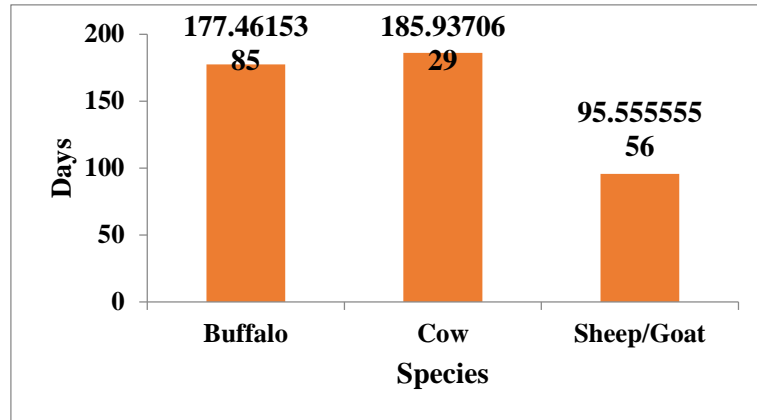


Figure 36: Number of days in milk

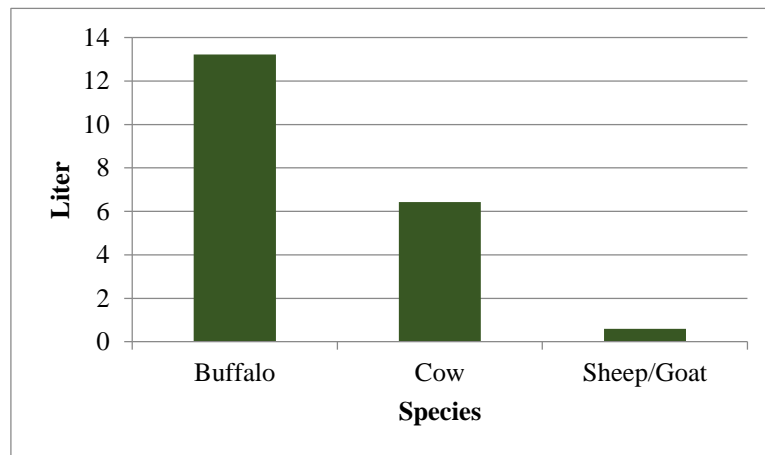


Figure 37: Average Milk Production

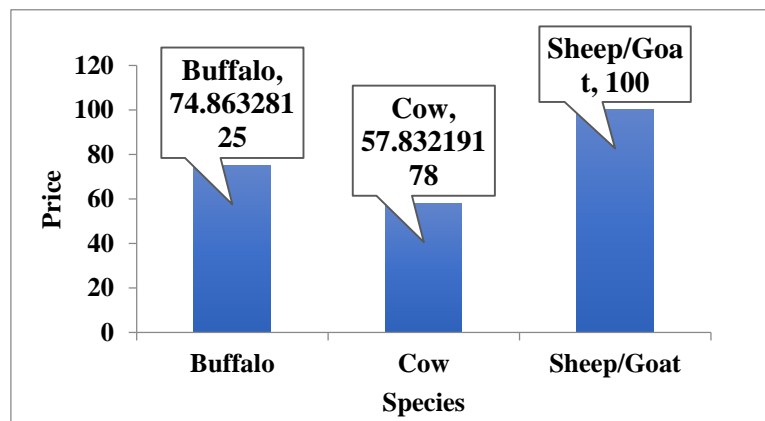


Figure 38: Average price of milk

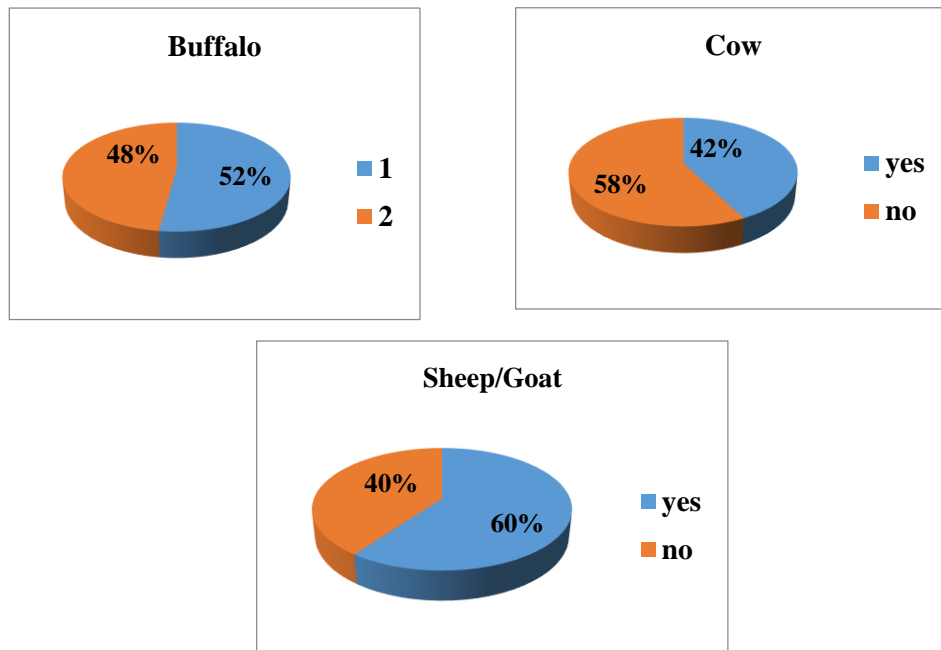


Figure 39: Washing of hand, pot and udder before milking

In that area approximately half of the buffalo, cow and goat farmers did not use any hand sanitizer before and after milking. Before milking about 52%, 42% and 60% buffalo, cow and goat farmer wash their hand, pot and udder of animal (Figure 39). About 6% farmers involved in contract milk selling in the survey area (Figure 40). In the survey area about 94% participants did not contract with the any organization for selling of milk. About 100% farmers did not take any certification for milk testing (Figure 41).

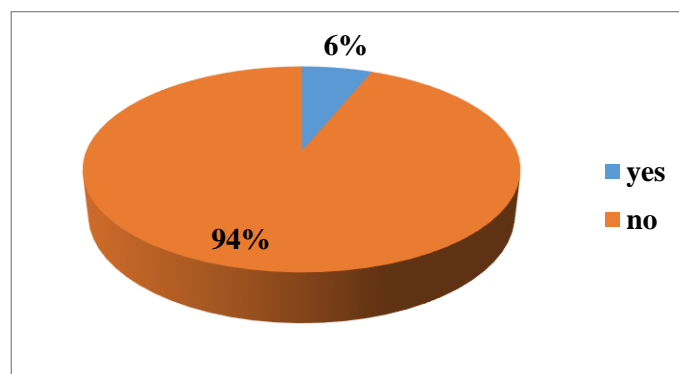


Figure 40: Involvement with contract farming for milk selling

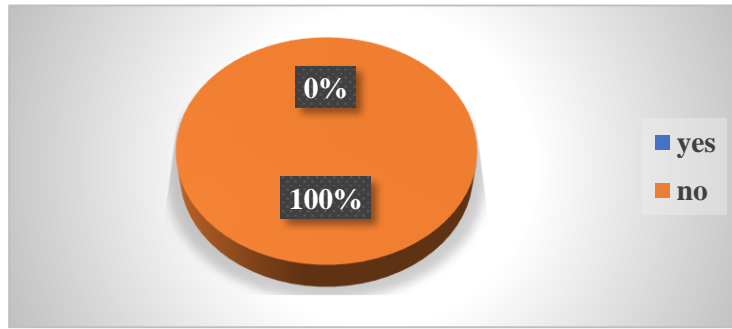


Figure 41: Milk testing and certification

None of the farmer produce milk product from the milk of buffalo, cow and sheep/goat (Figure 42). About 100% farmers sell their milk other milk producing shop. Some farmers want to start their milk product related business. But they have not enough knowledge and training on the dairy technology and dairy products.

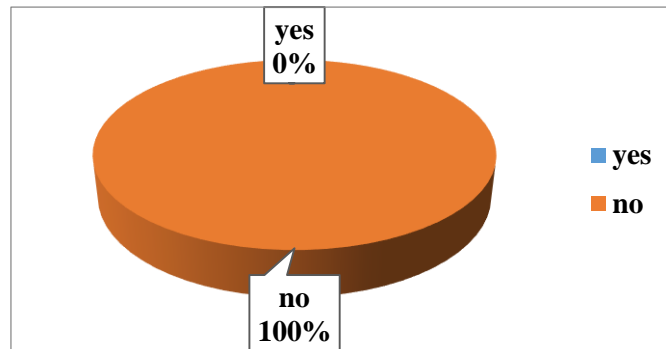


Figure 42: Producing product from milk

Figure 43 shows the milk selling place of farmers. Among the 600 farmers, 248 buffalo, 280 cow and 6 goat farmers sell milk to milkman. In percentage about 46.66% and 41.33% buffalo farmers sell milk in the milkman.

Milk production is lower than the demand of milk. (Figure 44). Farmers cannot supply according to the demand of consumers. So, they did not face any problem for selling of milk. About 351, 397 and 5 buffalo, cow and goat farmers did not face problem for milk selling. About 100% buffalo, cow and goat farmers said they did not face any problem in milk selling. About 5 goats, 265 cow and 174 buffalo farmers (respondents) said that price of did not fluctuates throughout the year (Figure 45).

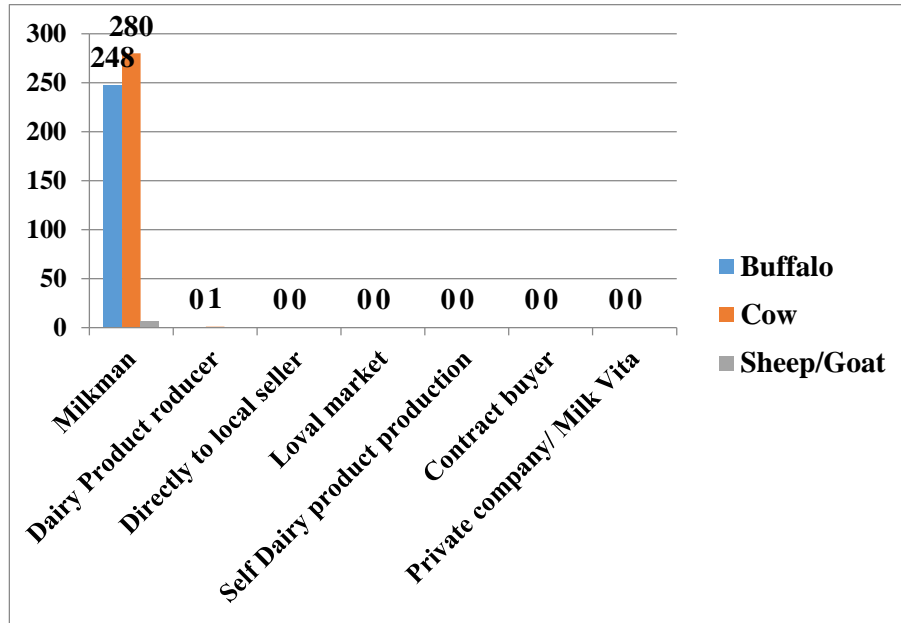


Figure 43: Milk selling place

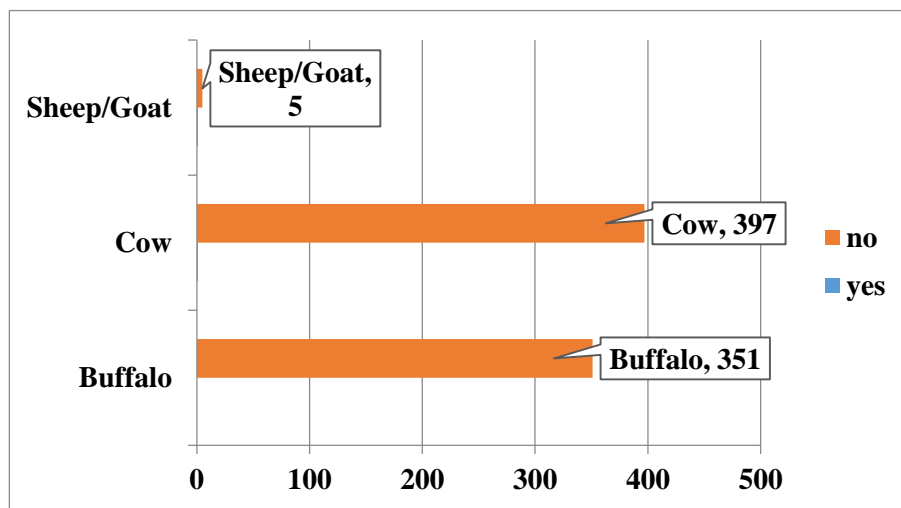


Figure 44: Problem of milk selling

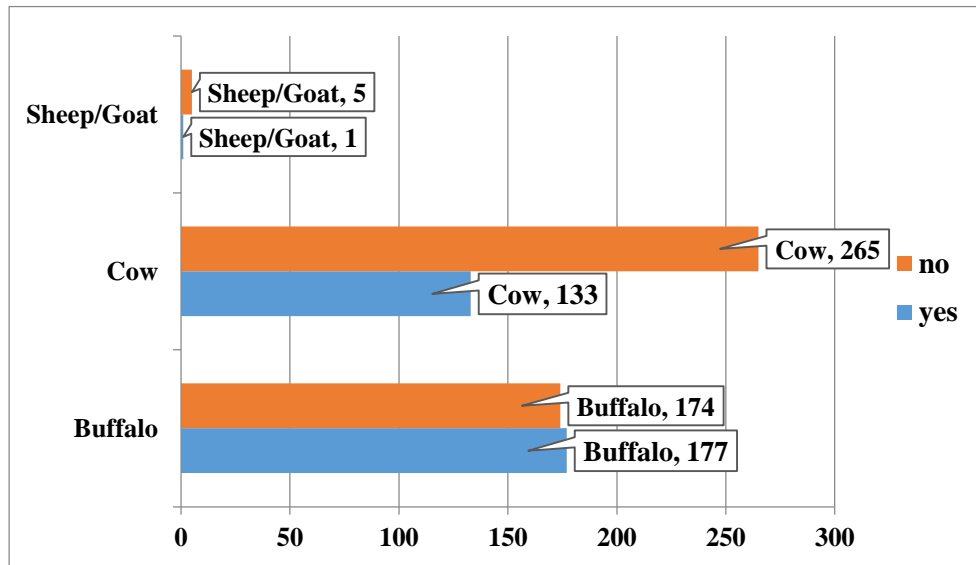


Figure 45: Price of milk throughout the year

Figure 46 shows that Capacity to Sell More Milk in the Existing Channel. From our study, we found that 346 buffalo, 398 cow and 6 goat farmers said they would be able to sell more milk if production of milk increases. About 57.66% buffalo, 66.33% cow and 1% goat farmers would be able to sell milk the market. In the survey area, about 100% farmer did not use any oxytocin for increasing the milk production (Figure 47).

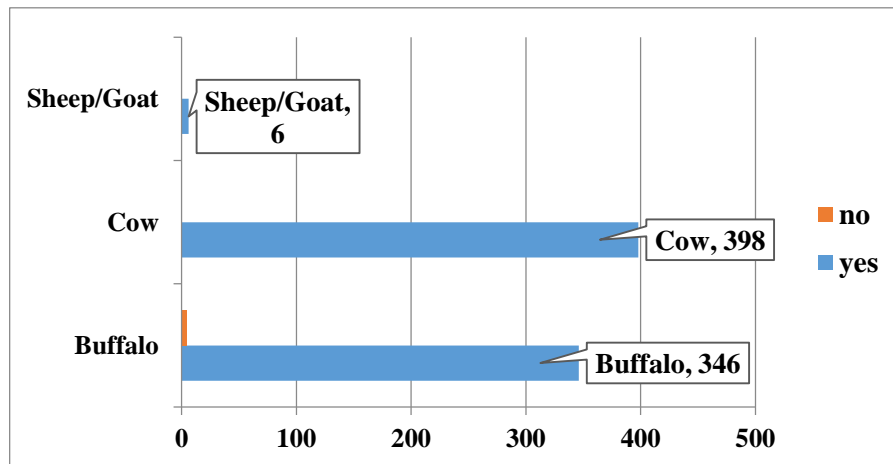


Figure 46: Capacity to sell more milk in the existing channel

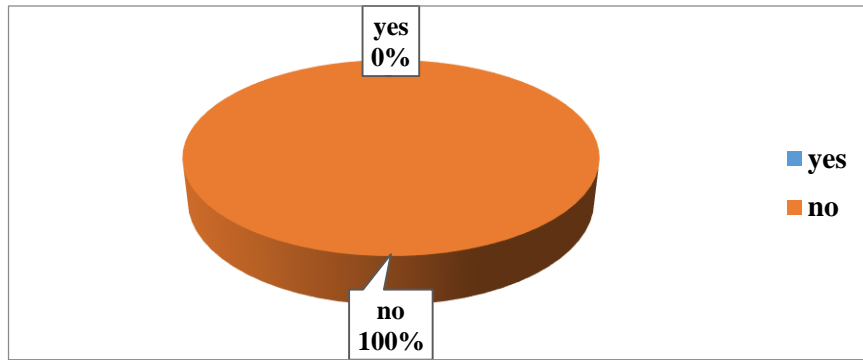


Figure 47: Use of oxytocin for increasing the milk production

This observation (Figure 48) reveals that farmers sell normally 252 L, 23 liters of buffalo milk to milkman, official enterprise and 2 liters for own-selling in the market. For cow milk 282 liters to milkman/LSP ,89 L for own-selling in the market.

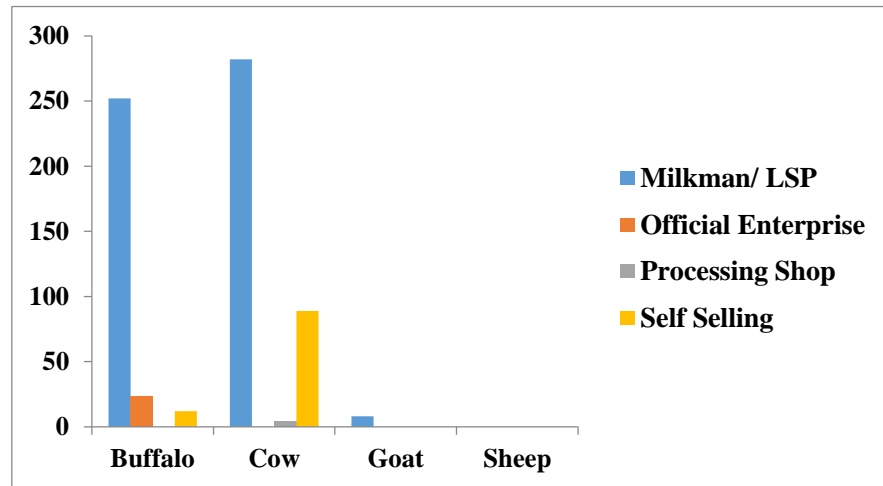


Figure 48: Selling point of milk

This data shows that farmers sold buffalo milk on 79.779 tk, cow milk on 59.787 tk and goat milk on 95 tk respectively (Figure 49).

This data (Figure 50) shows about the methods farmers sell milk. Around 347 L, 206 L and 8 L of Cow, Buffalo and Goat milk are sold without any contract and 45 L & 35 L are sold with contract farming sub-contracting. Meanwhile, 36L of Buffalo milk are being sold by unofficial contact.

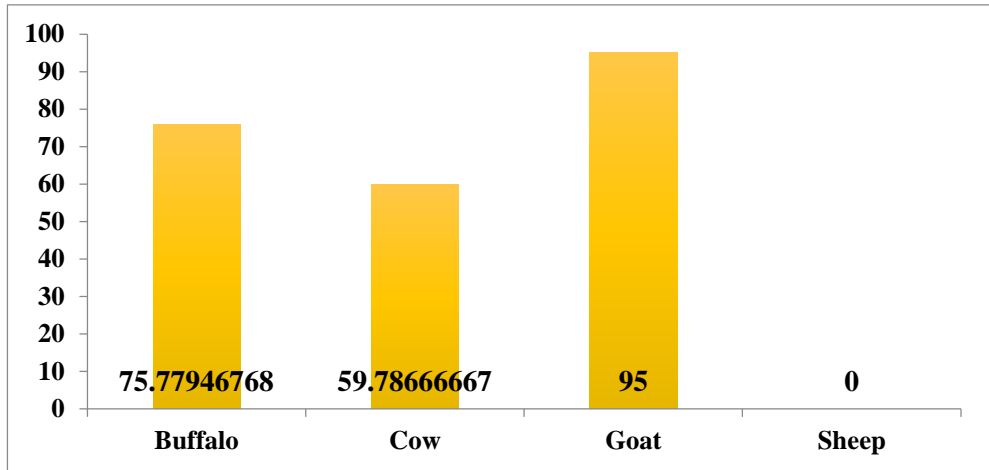


Figure 49: Pricing of milk

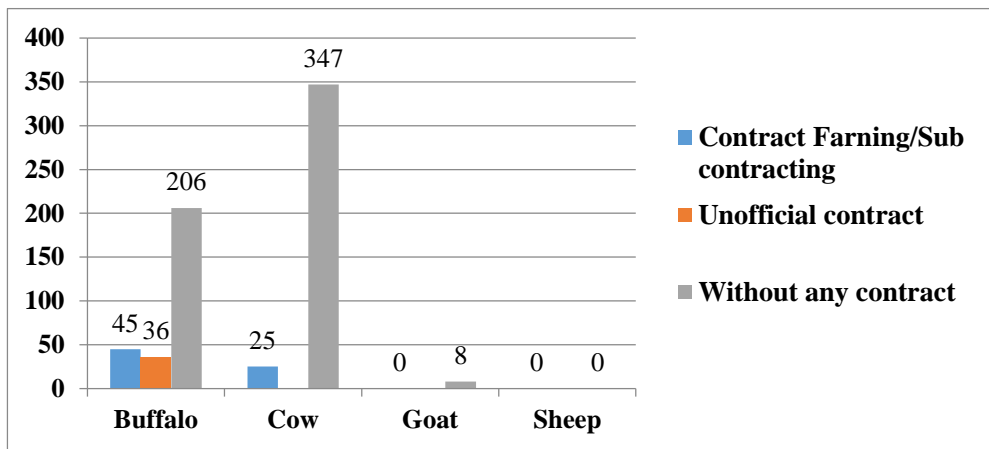


Figure 50: Method of milk selling

Figure 51 is presented the production of milk according to the indicators of global GAP. According to this bar diagram 398, 351 and 114 numbers of farmers said that they did not produce milk according to indicators of global GAP.

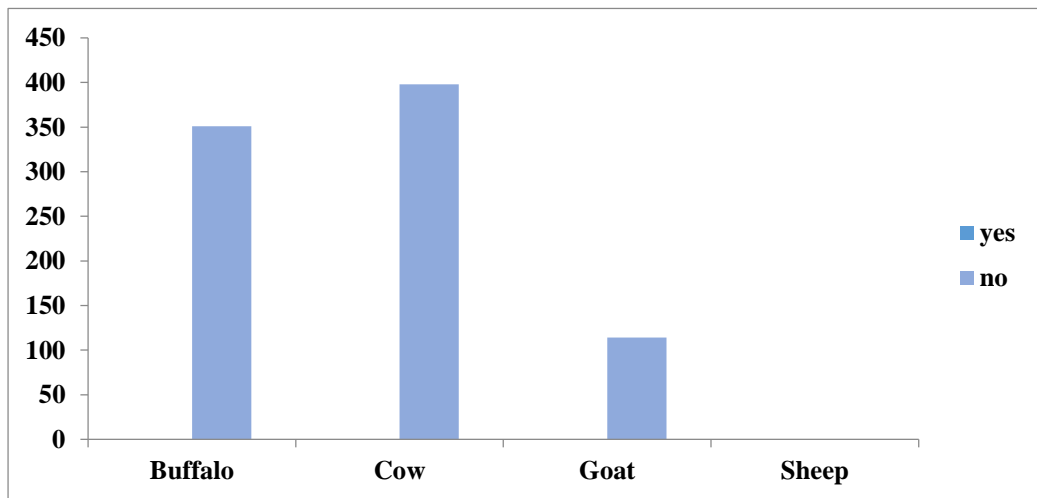


Figure 51: Production of milk according to the indicators of global gap

The fundamental functions, supporting functions and supportive environment make up the milk value chain. Input supply, milk production, milk collection or purchase at the local level of milk processing (chhana/acid curd, fermented curd, ghee, etc.), product making (sweetmeats, used by others like confectionary/bakery, tea stalls, restaurants, etc.), preservation and packaging by processing companies, and distribution to consumers make up the core functions. The departments of livestock services, service providers from development organizations, input sellers, service providers from input manufacturing firms and other organizations supply the supporting services. The outcomes of several laws and regulations put into place by the Department of Livestock Services, the Union Council/Pouroshova, the Department of Public Health and Engineering, the Food Safety Authority, etc. constitute what we call the "enabling environment." They also discuss the value chain's infrastructure-related features.

There is a definite preference for the production of buffalo milk at the level of production. Whether a cow or a buffalo, the majority of animals are of an indigenous variety and produce little milk. Farmers of buffalo were found to produce more milk on average per household than farmers of cattle. In terms of maintaining a hygienic environment, the biosecurity of the farm, and sanitary procedures related to milking, producers lag considerably behind the norm.

The primary input suppliers to dairy farms are feed vendors, veterinary drug vendors, and AI personnel. Suppliers of inputs have the ability to help farmers receive training in milking cow/buffalo rearing, supplemental nutrition, and early illness management to increase milk production. They are connected to the inputs market primarily at the upazilla and district levels, and the providers of medicines are connected to the representatives of various veterinary pharmaceutical businesses. When it comes to milk sales, local customers, milkmen, and markets receive the majority of the milk. There were no producers discovered who processed milk. The majority of farmers deemed the current milk marketing system to be unsatisfactory. Even though they are unaware of product traceability or quality certification, buffalo milk is more expensive than cow milk. Three-fourths of the farmers sell their own milk during the selling process, with the remaining farms using the milkman or LSP. There is no regular milk collection from the established dairy processors like Milk vita, Aarong, Pran dairy, etc., yet a tiny percentage of the farmers sell their milk to local milk processors who make sweetmeats, doi, ghee and chhana etc.

The majority of respondents received loans from MFI to operate their dairy farm and livestock farm. However, credit programs for milking cow programs are offered by local NGOs as GJUS, FDA, BRAC, ASA and others. In this sense, the producers are less favored by the interest rate, payback structure, and installment schedule. Despite the DLS having a small number of field level employees, some growers were nevertheless able to utilize its services, particularly immunization through the LSP. Producers occasionally obtain vaccination from the DLS via the LSP. Additionally, the DLS offers medical care, training in animal husbandry practices, farm management and immunization, farm supervision and loan distribution from programs that assist the growing of cattle. Union Parishad plays supportive roles in maintaining security at the rural level and enhancing law and order through community police, as well as by enhancing the infrastructure of rural roads and culverts for marketing purposes. Additionally, it is important to obtain the Union Parishad's (UP) approval for the farm's registration. The UP also issues trading licenses. The farm registration can only be certified by the DLS. The DLS also validates bank or government project financial support or credit. The Department of Public Health and Engineering are primarily concerned with rules that have public health importance, such as slaughter house management. Union Parishod/Pouroshova is the authority for trade licenses.

4. Meat and Meat Products-Supply and Value Chain

About 100% farmers did not use biosecurity in the buffalo, cow and sheep/goat farm (Figure 52). In the survey area, no one practice Global GAP for fattening. Farmers have no knowledge about GGAP (Figure 53). We found that about 100% farmers did not practice Global GAP for fattening.

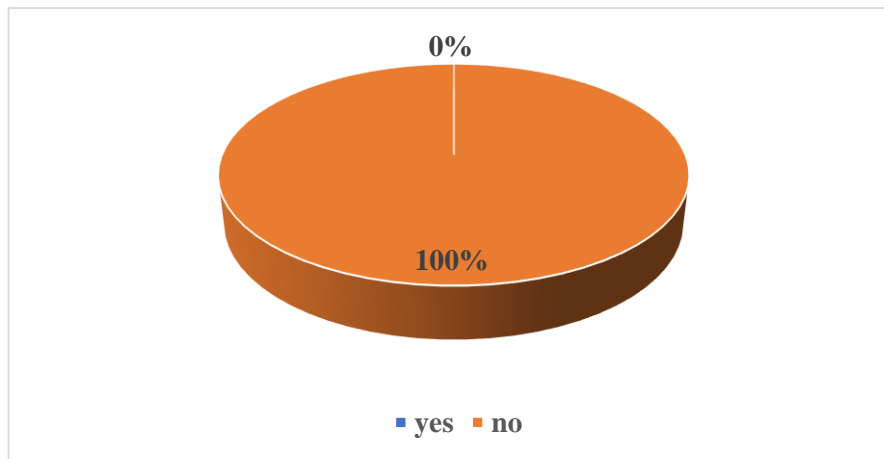


Figure 52: Biosecurity practices

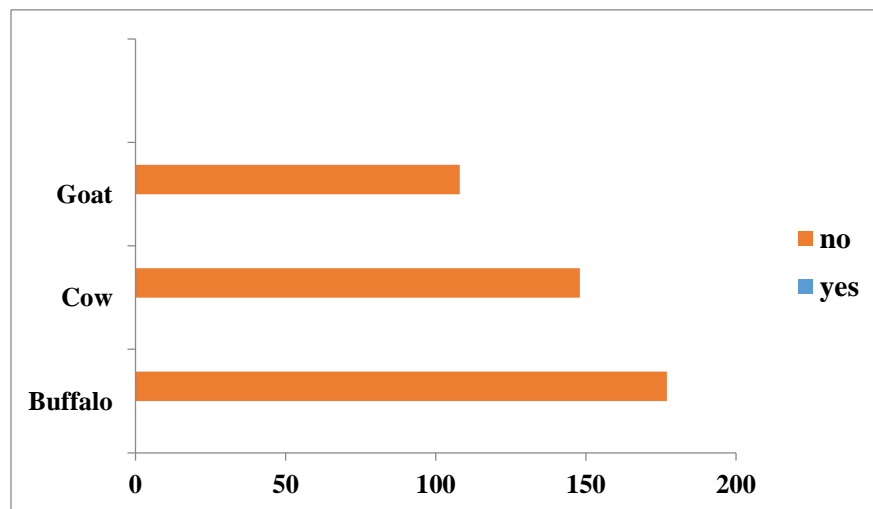


Figure 53: Practicing of GGAP for fattening of animal

Figure 54 shows the quality feed for fattening animal. About 100% buffalo and goat farmers provided poor quality feed. About 9% cow farmers provided quality feed for fattening. From collected data, about 1% buffalo, 5% cow and 2% goat farmers practice fattening (Figure 55).

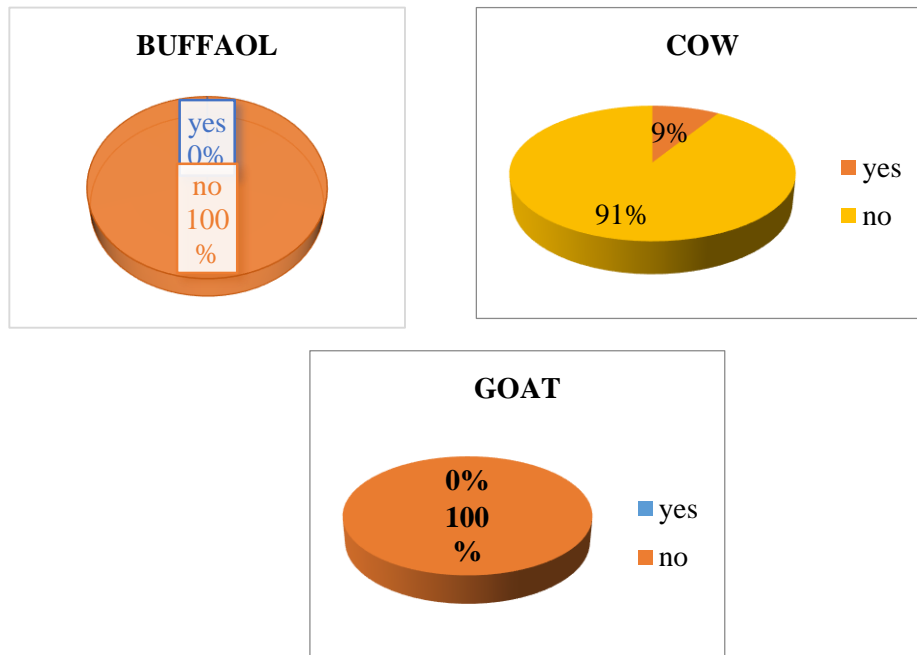


Figure 54: Quality feed for fattening animal

About 99% buffalo, 95% cow and 98% goat farmers did not practice fattening. In the survey area fattening program for buffalo, cow and goat is done for one time per year (Figure 56). In the survey area, farmers fattening their buffalo, cow and goat an average 3, 4 and 2 respectively (Figure 57). Farmers fattened a greater number of cow than buffalo and goat. About 100% buffalo, cow and goat farmers did not contract with Bepari or Meat Processing Organization for selling their fattening animals (Figure 58).

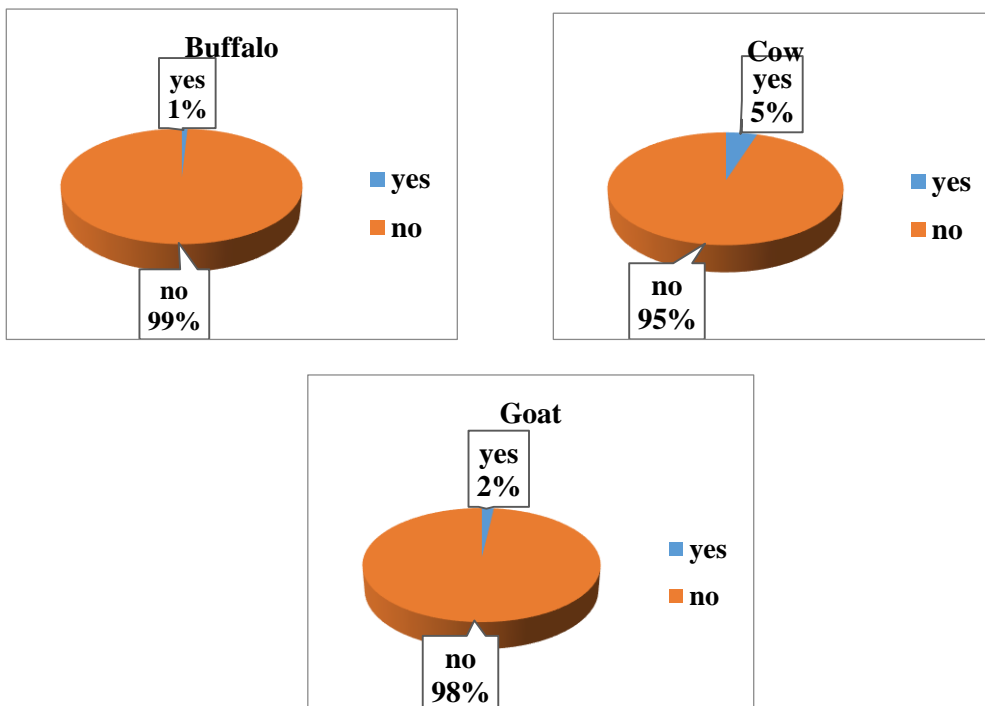


Figure 55: Farmer practices Fattening

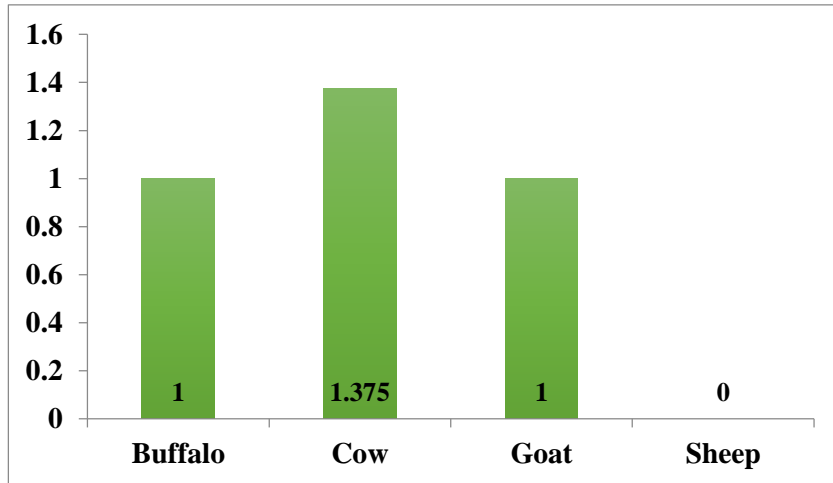


Figure 56: Fattening program per year

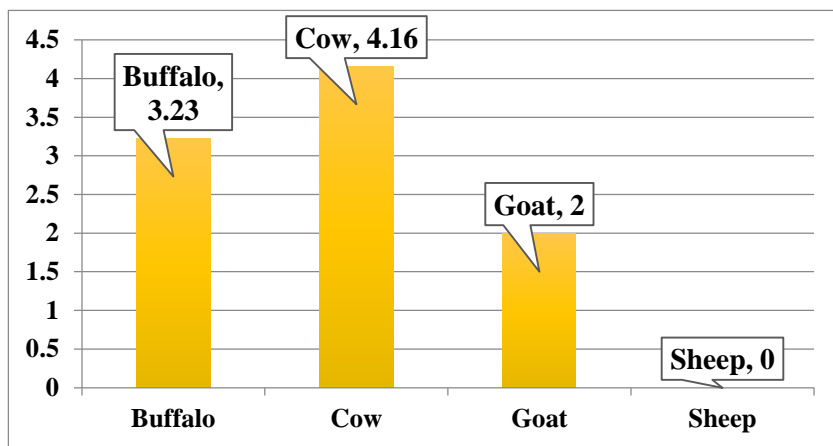


Figure 57: Number of fattening animals

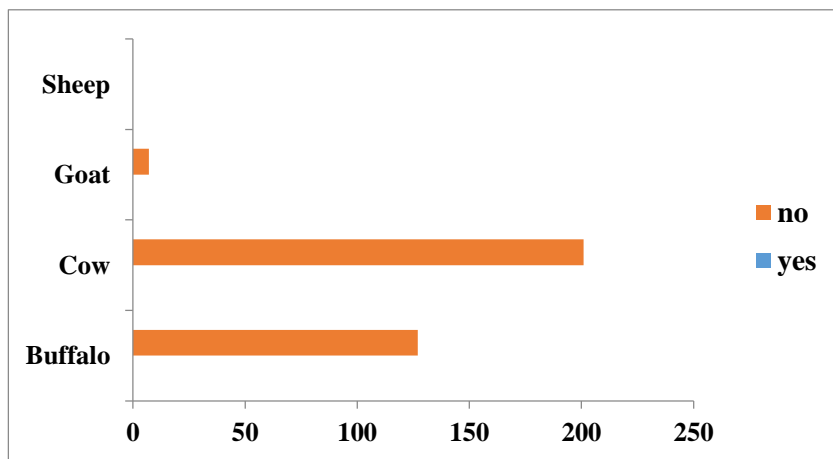


Figure 58: Contract with bepari or meat processing organization

In this survey area, none of the farmers use any types of steroids for fattening (Figure 59). About 100% farmers did not use antibiotics for fattening (Figure 60). Most of the farmers sell their fattening animal in the local market and local bepari (Figure 61). Data shows (Figure 62) about different selling points of meat animal. According to this data 304,251,114 farmers sell their buffalo, cow & goat to unofficial bepari respectively. Here (Figure 63) the observation shows that the prices of buffalo, cow & goat meat are respectively 522.03,576.85 & 653,07 tk BDT. Diagram 64 reveals that about different selling method of meat animal. In our study area, 304, 251 and 114 farmers said that they sell their meat animal without any contract. According to this data 306, 251 and 114 farmers were negative about the production of meat according to the indicator of global GAP in our experimental area (Figure 65).

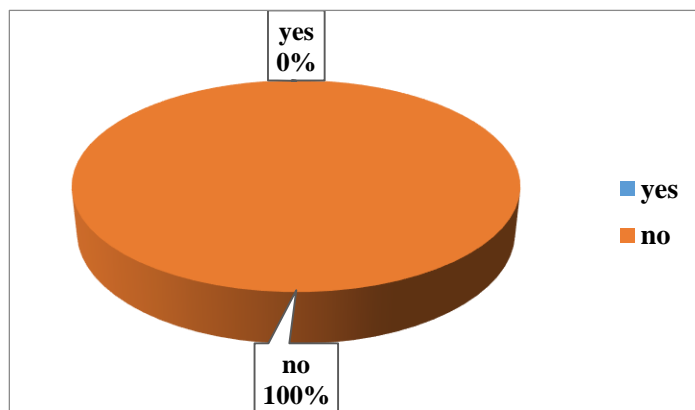


Figure 59: Use of steroid tablet

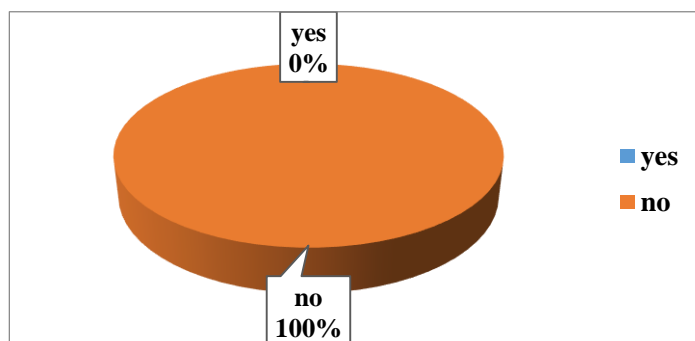


Figure 60: Use of antibiotics for fattening

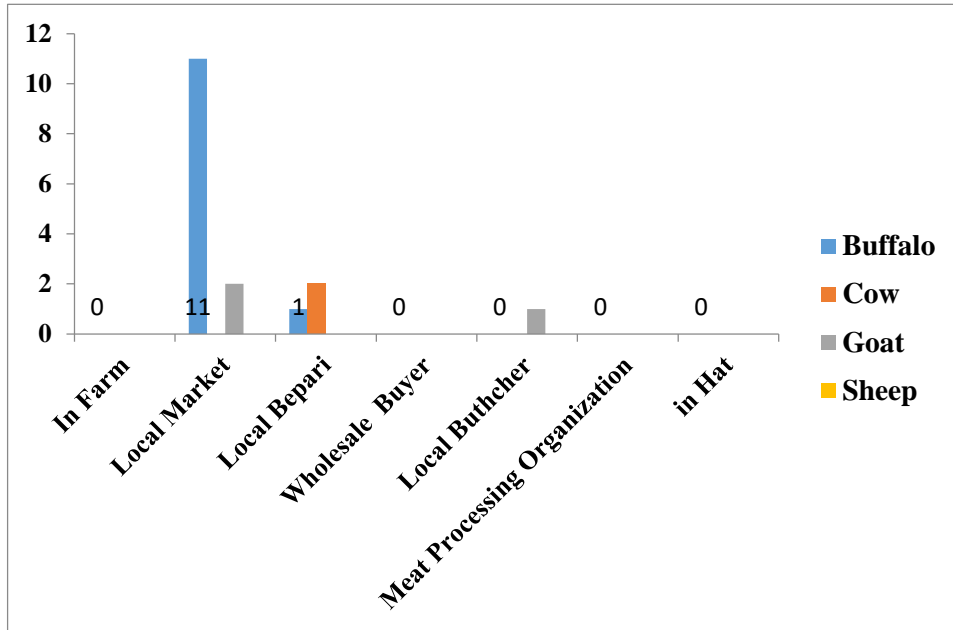


Figure 61: Place of fattening animal selling

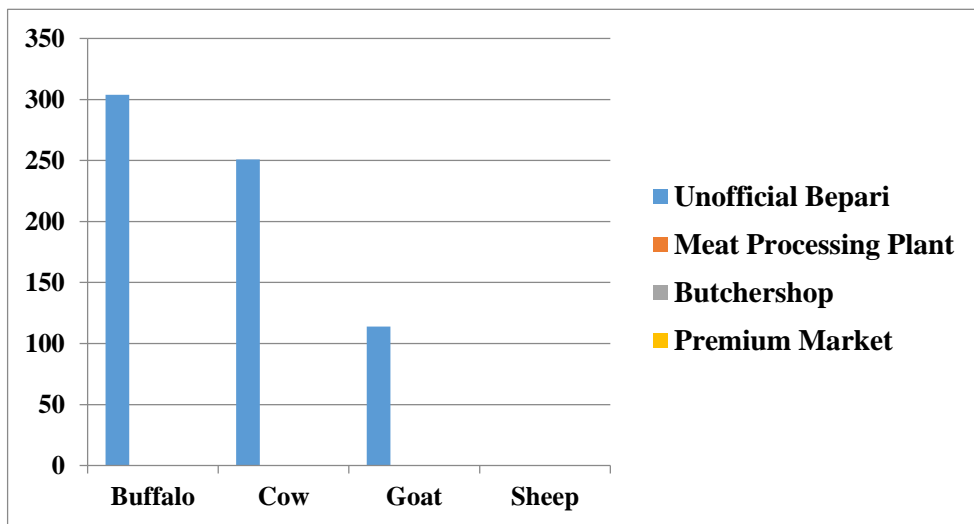


Figure 62: Selling point of meat animal

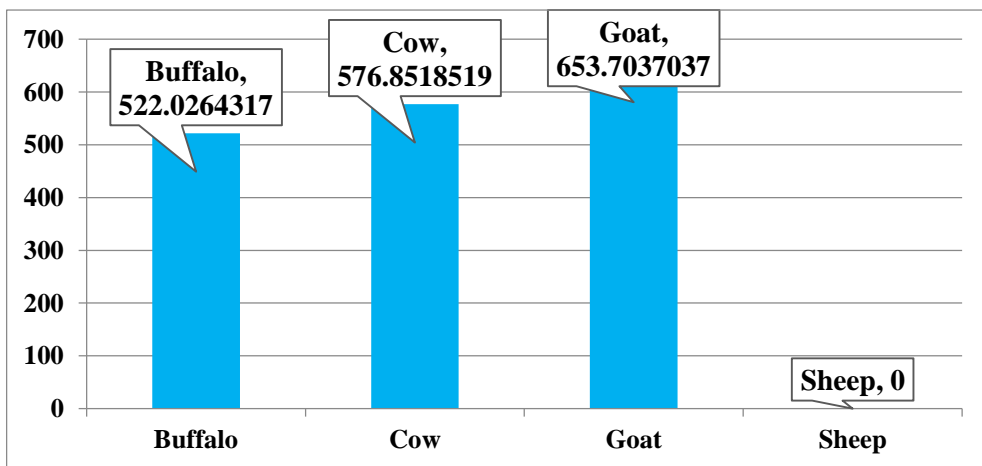


Figure 63: Pricing of meat

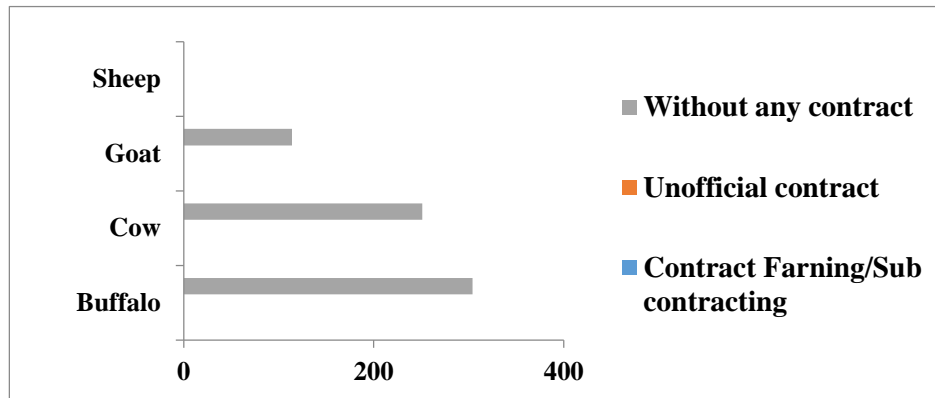


Figure 64: Selling method of meat animal

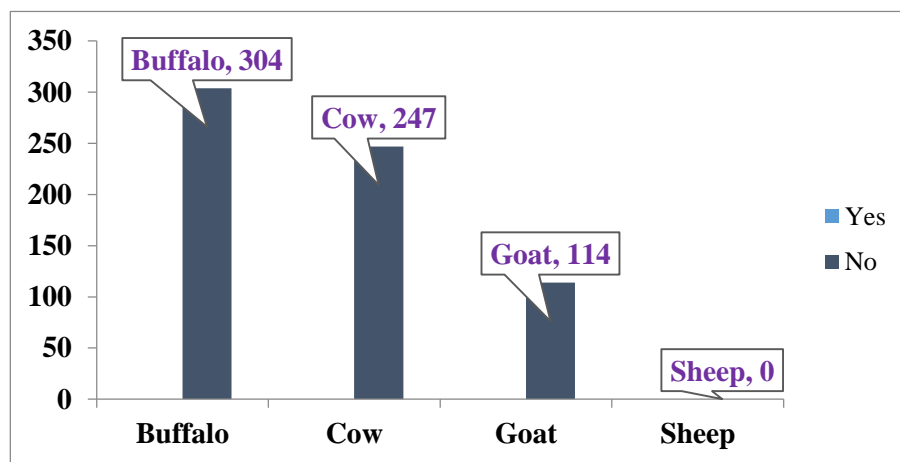


Figure 65: Production of meat according to the Indicator of Global (GAP)

The meat value chain is made up of the key functions, relevant features, and supportive environment. The sum of input supply, meat production, meat wholesaling, meat processing and meat retailing constitutes the fundamental functions. The departments of livestock services, service providers from development organizations, transport agents, trader associations, and other entities supply the supporting services. The outcomes of several laws and regulations put into place by the Department of Livestock Services, the Union Council/Pouroshova, the Department of Public Health and Engineering, the Food Safety Authority, etc. constitute what we call the "enabling environment." They also discuss about the infrastructure-related components of the value chain.

There is a definite preference for beef fattening for meat at the production level. Whether it's a cow or a buffalo, the majority of animals are of the native variety and have healthy bodies. The farmers are far below the norm when it comes to keeping a clean environment, the

biosecurity of the farm, and a fattening plan for the production of meat animals.

The primary sources of input for farmers who raise meat animals include feed suppliers, veterinary treatment and vaccination suppliers, calf suppliers and equipment suppliers. Input providers have the ability to help producers receive training in supplemental feeding, illness prevention and methods for fattening animals to promote growth. They are connected to the inputs market primarily at the upazilla and district levels and the providers of medicines are connected to the representatives of various veterinary pharmaceutical businesses. When it comes to selling meat animals, the majority of them are sold at local and Eid-Ul-Ajha markets. There were no meat animal farmers discovered engaged in the processing and retail sale of meat. The majority of farmers deemed the current meat marketing system to be unsatisfactory. Nearly all farmers sell their livestock for meat in the market on their own, and some do so when they receive a fair price from the bepari.

For the purpose of operating their livestock farm, the majority of respondents received loans from MFI. However, credit programs for fattening programs are offered by the GJUS, FDA, BRAC, ASA and other regional NGOs. In this sense, the producers are less favored by the interest rate, payback structure and installment schedule. Despite the DLS having a small number of field level employees, some growers were nevertheless able to utilize its services, particularly immunization through the LSP. Producers occasionally obtain vaccination from the DLS via the LSP. Additionally, the DLS offers medical care, training in animal husbandry practices, farm management and immunization, farm supervision and loan distribution from programs that assist the growing of cattle. Through community police, Union Parishad can help efforts to maintain rural security at the level of law and order and to upgrade the infrastructure for rural roads and culverts that connect rural areas. Additionally, it is important to obtain the Union Parishad's (UP) approval for the farm's registration. The UP also issues trading licenses. The farm registration can only be certified by the DLS. The DLS also validates bank or government project financial support or credit. The Department of Public Health and Engineering are primarily concerned with rules that have public health importance, such as slaughter house management. Union Parishod/Pouroshova is the authority for trade licenses.

5. Feed, Fodder and Insemination

From the survey report, 93% buffalo, 43% cow and 95% goat farmers did not provide concentrate feed regularly (Figure 66). Only 7% buffalo, 57% cow and 5% goat farmers provide concentrate feed regularly. From data, all the farmers of buffalo, cow, goat and sheep farmers did not use ready feed (Figure 67). Among all the farmers, 124 buffalo farmers, 91 cow and 10 goat farmers used Kazi farm feed. Only 7 farmers used Nourish company feed (Figure 68).

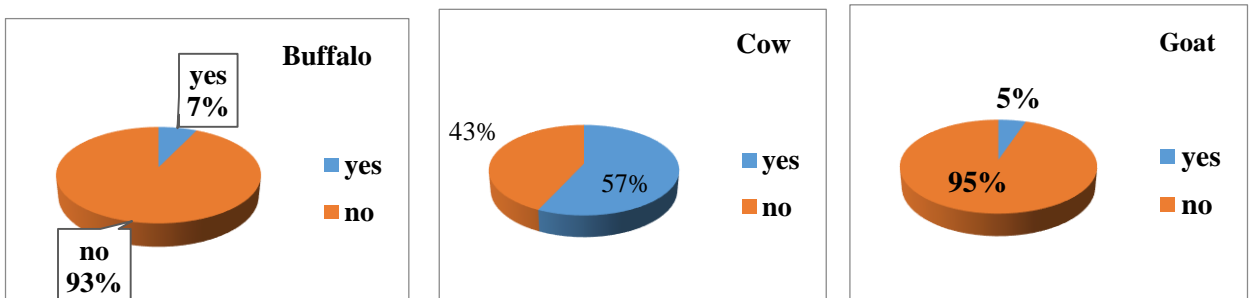


Figure 66: Supply of concentrate feed to animal regularly

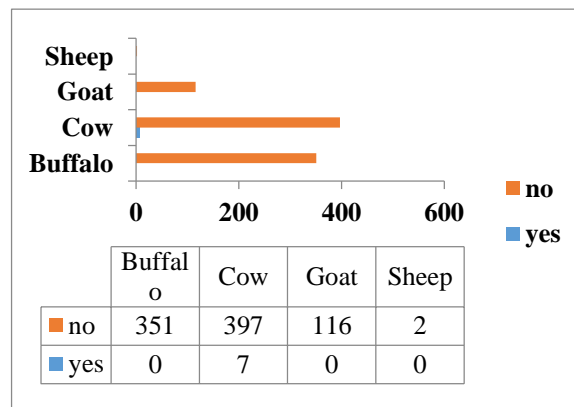


Figure 67: Use of ready feed

In the survey area, none of the farmers have used UMS for animals (Figure 69). In the survey area, only 13 cow rearing farmers cultivate Napier/Pakchong/Other grasses for animals (Figure 70). In this region, farmers did not use silage making technology (Figure 71). In the survey area, none of the farmers have used TMR technology (Figure 72). In the study area, none of the farmers have used calf starter (Figure 73).

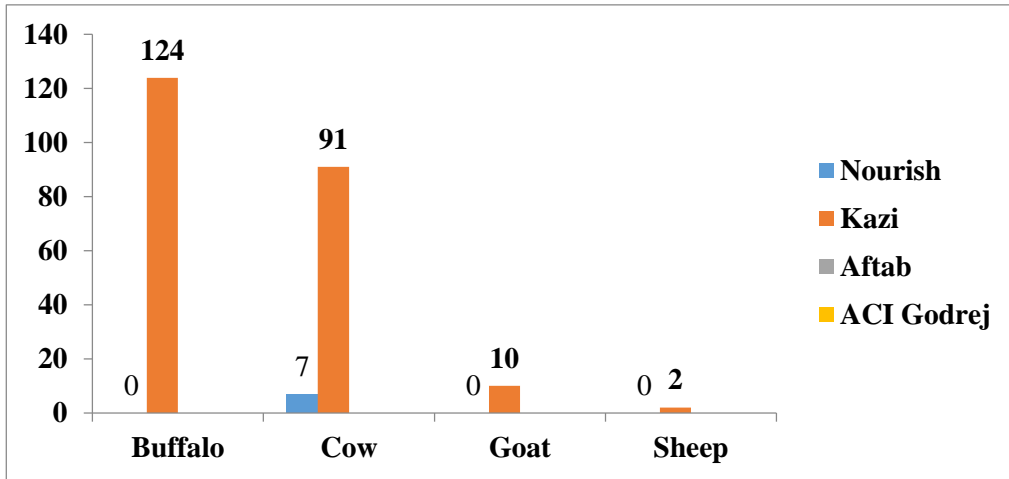


Figure 68: Commercial feed from different company

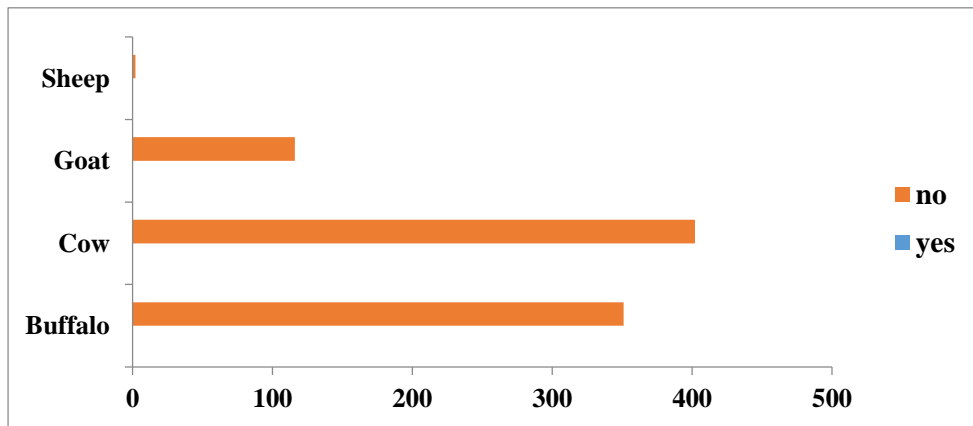


Figure 69: Use of UMS for animal

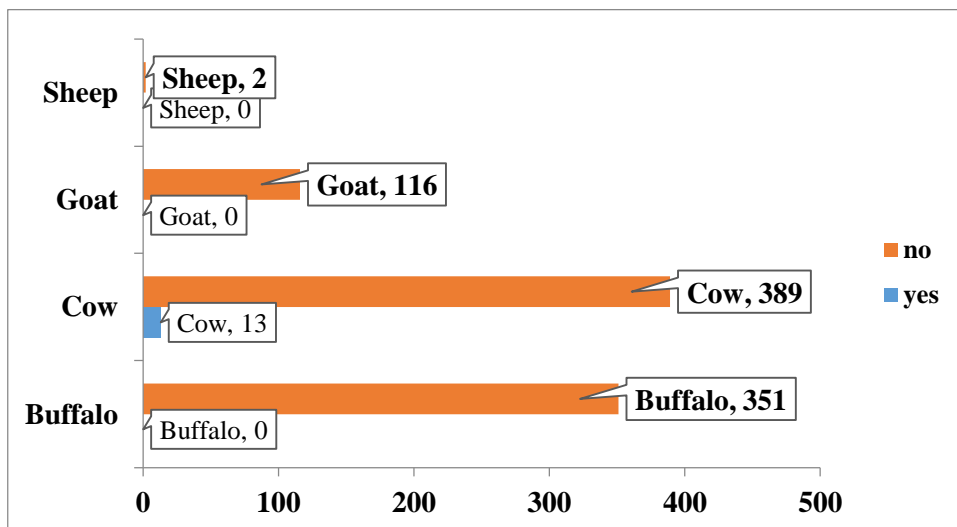


Figure 70: Cultivation of Napier/Pakchong/Other grasses for Animals

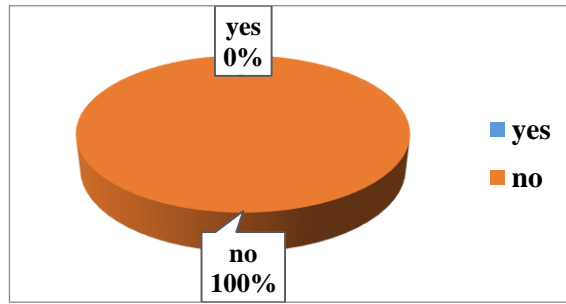


Figure 71: Practicing of silage making

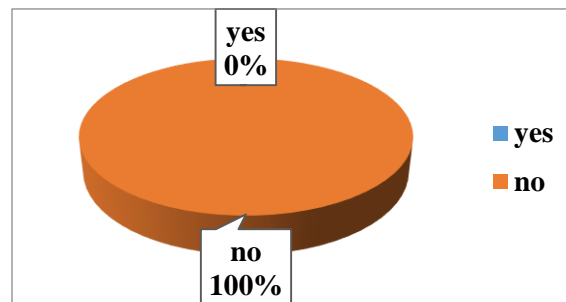


Figure 72: TMR technology

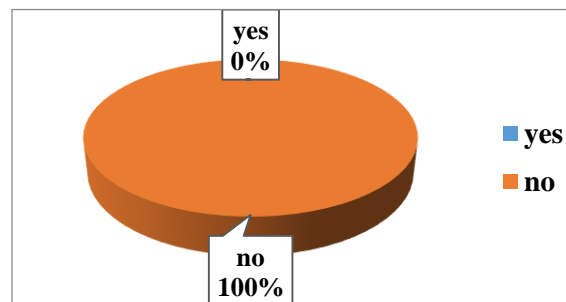


Figure 73: Use of calf starter

Average calving interval of buffalo, cow and goat is about 447, 389 and 191 days respectively (Figure 74). Among 600 farmers, 283 buffalo, 166 cow and 29 goat farmers used natural breeding methods (Figure 75). About 204 cow farmers used AI as a breeding method. Figure 76 shows the Semen of Different Company Used by the Farmers. Among 600 farmers, about 165 cow farmers used BRAC company semen. About 100% cow and buffalo farmer used HF and Murrah breed semen (Figure 77). Among 600 farmers, about 162 farmers used 75% semen for AI. Only 4 farmers used 50% semen. In case of buffalo farmers only 2 farmers used 75% semen (Figure 78).

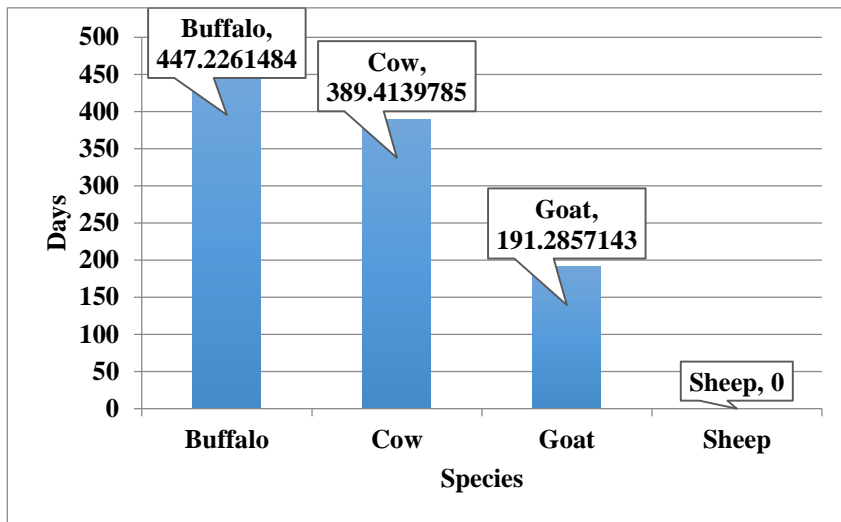


Figure 74: Calving interval of animal

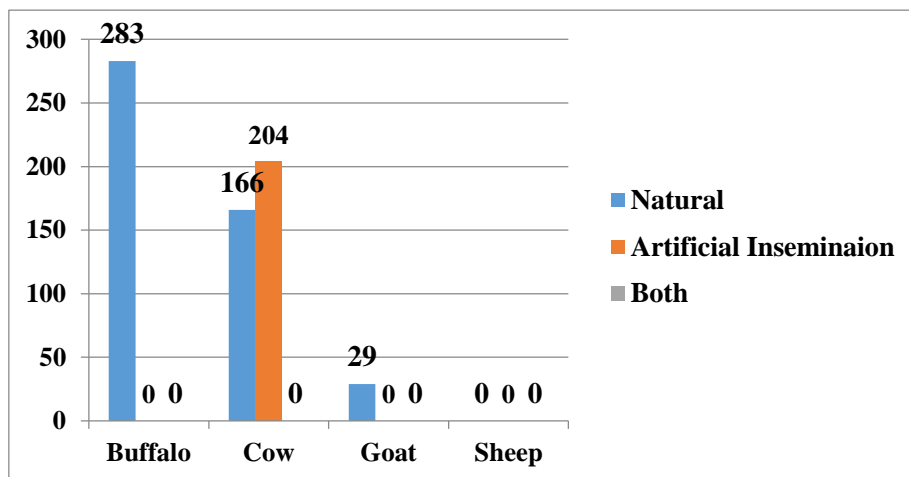


Figure 75: Breeding method

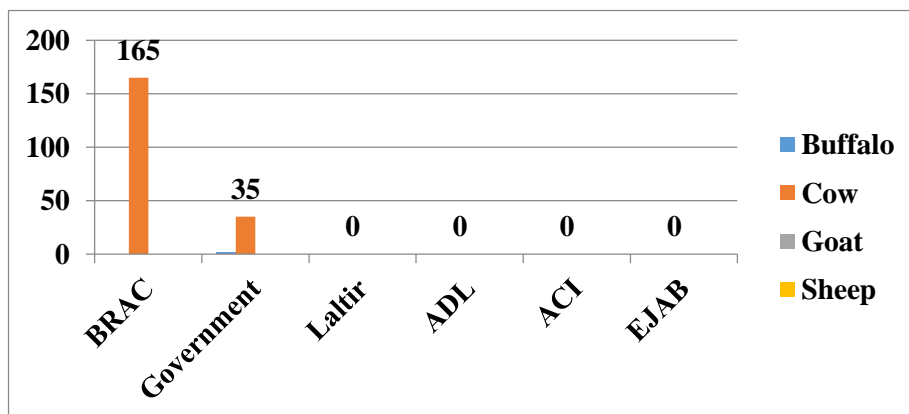


Figure 76: Semen of different company used by the farmers

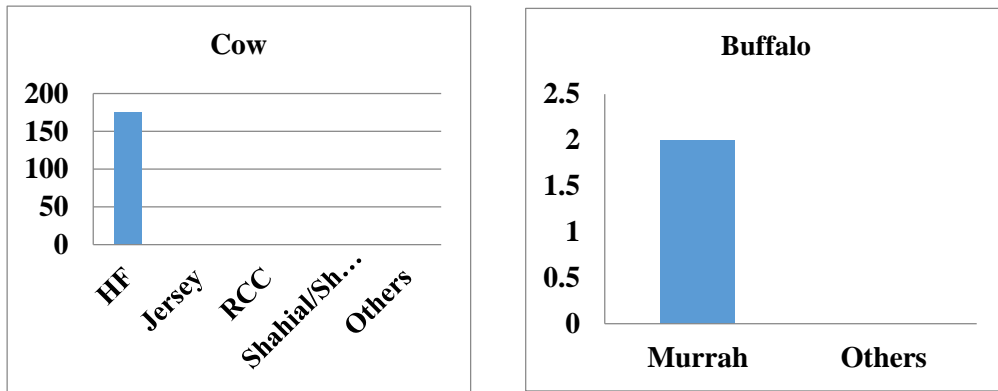


Figure 77: Use of semen from different breeds (cow, buffalo, goat/sheep)

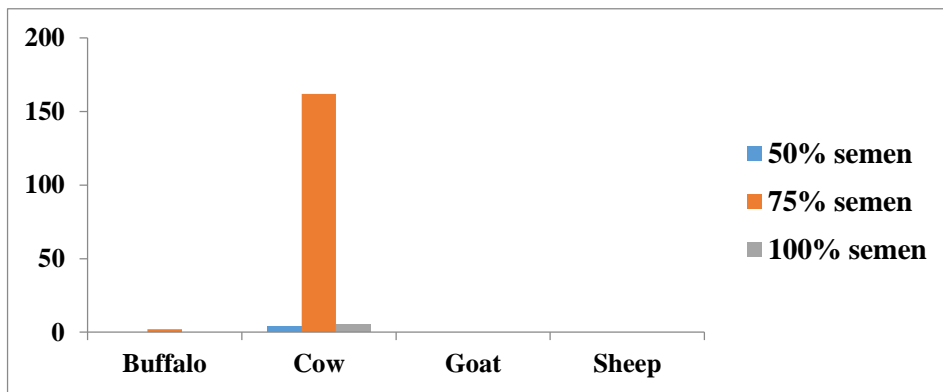


Figure 78: Percentage of the semen used

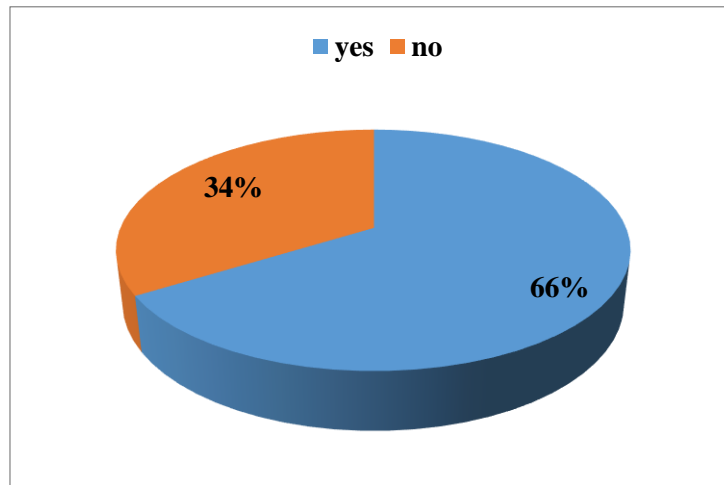


Figure 79: Insemination at correct time

About, 66% farmers inseminate their animals in right time. In that region about 34% farmers did not inseminate their livestock (Figure 79). Among the buffalo farmers, 100% farmers used indigenous/deshi male buffalo (Figure 80). For breeding of buffalo, about 76% farmers said that breeding male buffalo is not available in this region (Figure 81).

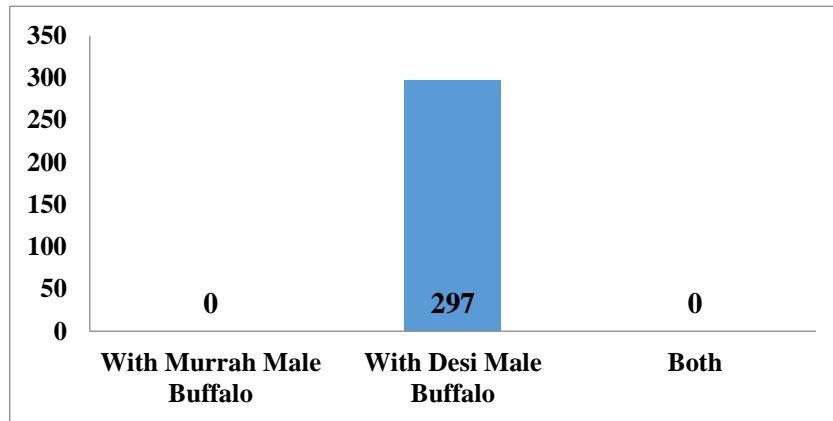


Figure 80: Male buffalo used for breeding

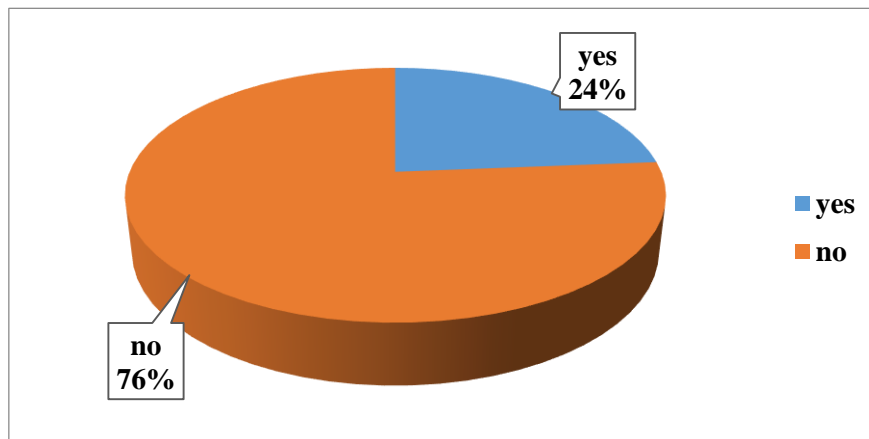


Figure 81: Availability of breeding male buffalo

6. Vaccination, Deworming, Reproductive Disease and Mortality

Figure 82 is presented the deworming of animal. For buffalo, 43% of the farmer practiced deworming. For cow, 60% of the farmer practiced deworming. For goat, 2% of the farmer practiced deworming. In the survey area, 32% percent cow rearing and 68% buffalo rearing farmers used deworming one time per year. About 16% goat, 38% buffalo and 46% cow deworming practices by the farmers two times per year (Figure 83).

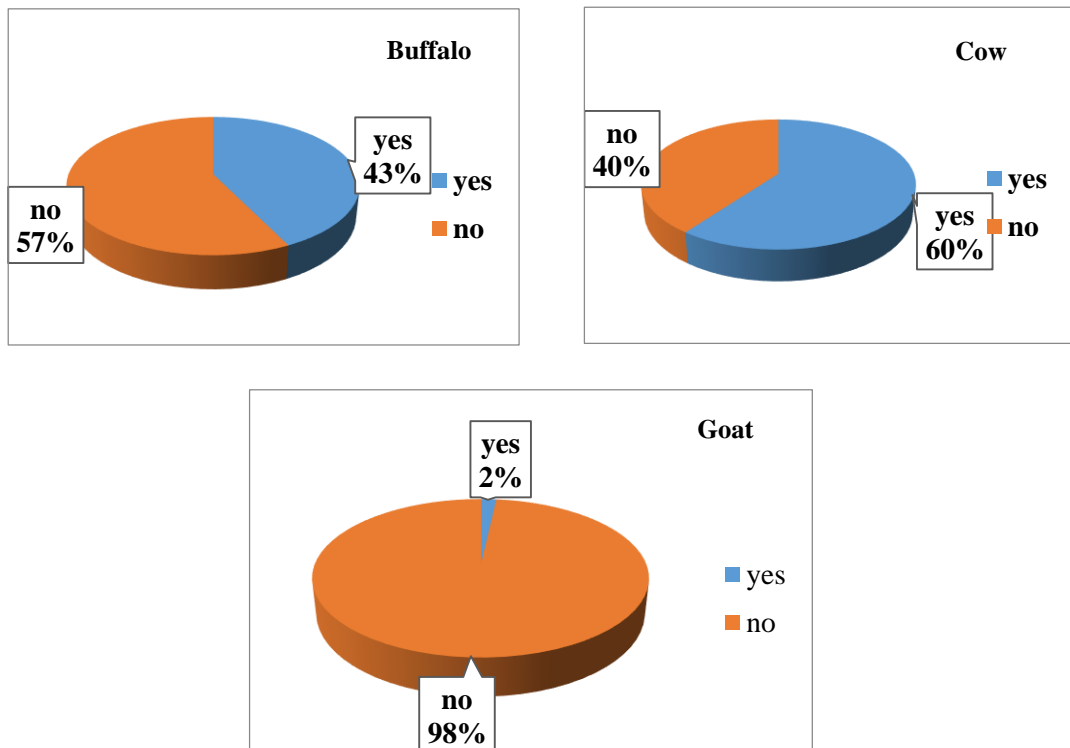


Figure 82: Deworming of animal

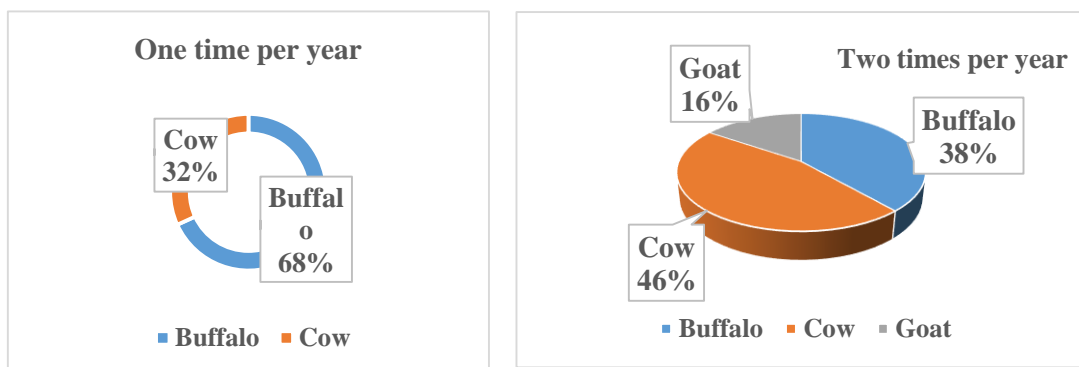


Figure 83: Number of deworming practices per year

About 261 cow famers and 150 buffalo farmers vaccinated regularly (Figure 84). Average vaccination of buffalo, cow and goat 2, 2 and 1 respectively per year (Figure 85). About 43% buffalo, 8% cow and 2% goat died in the last year (Figure 86). Highest mortality of buffalo was found in this study. About 43% buffalo, 8% cow and 2% goat died in the last year (Figure 86). Highest mortality of buffalo was found in this study. Average death of buffalo, cow and goat is 2, 1 and 2 in the last year below 6 months (Figure 87).

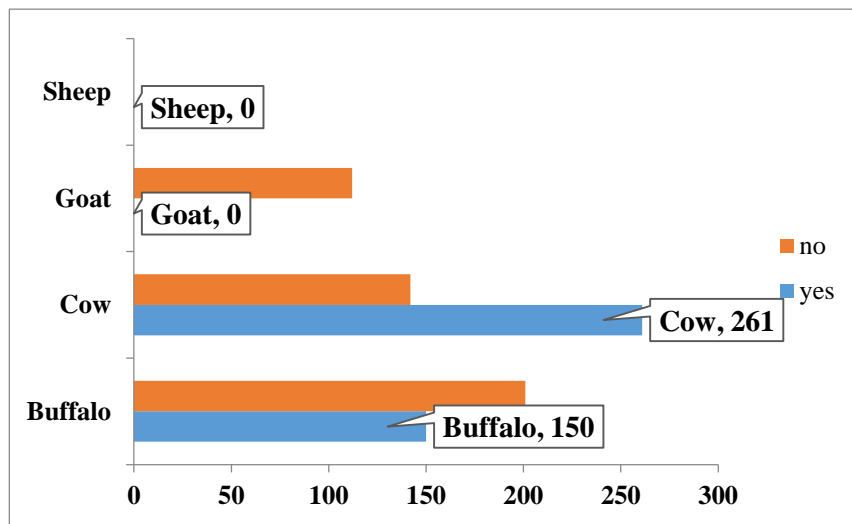


Figure 84: Regular vaccination practices

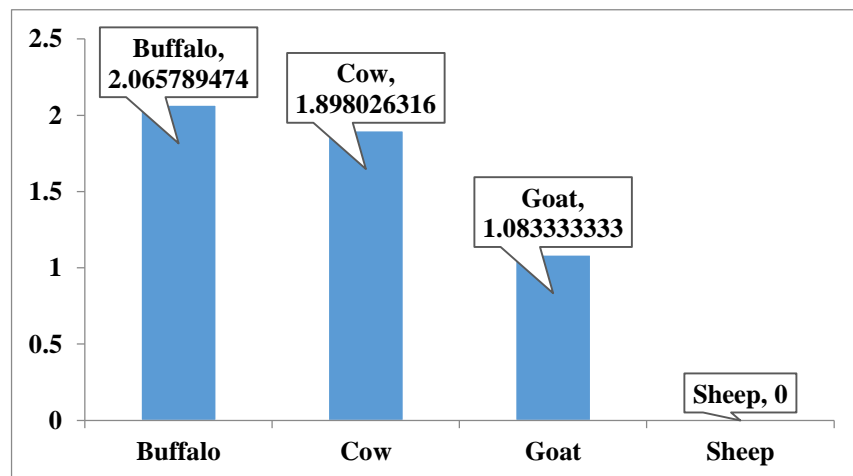


Figure 85: No of vaccination per year

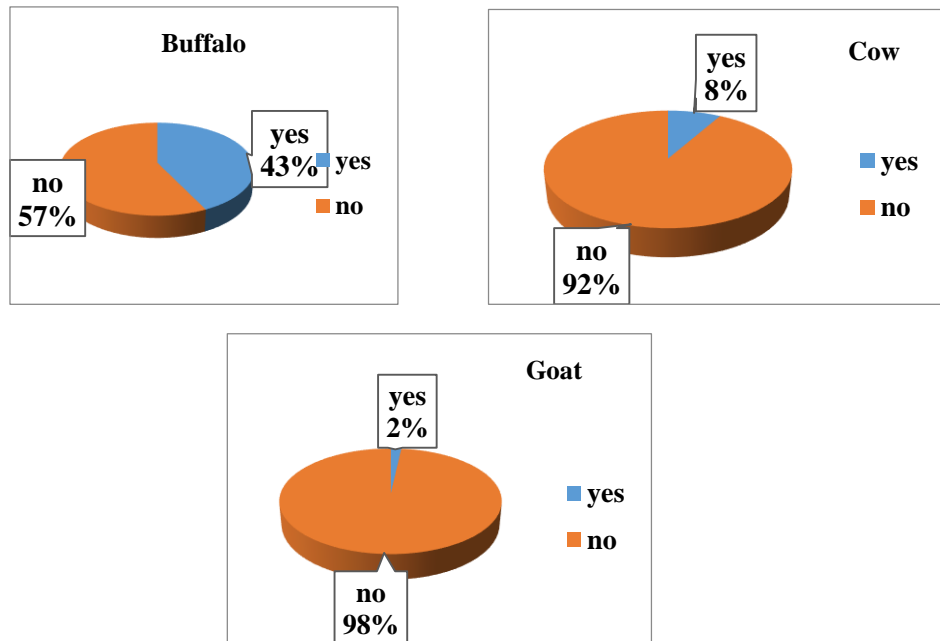


Figure 86: Animal death in the last year (Buffalo, cow, goat)

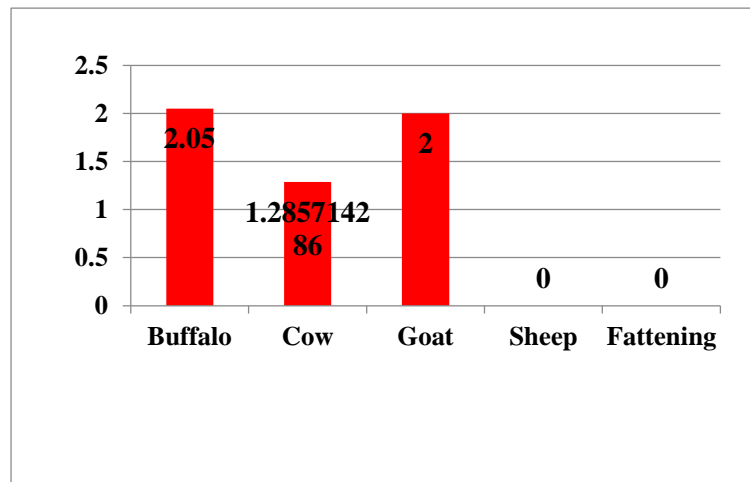


Figure 87: Number of deaths below 6 months

Average death of buffalo and cow 1 and 1 in the last year above 6 months (Figure 88). Average price of dead buffalo, cow and goat were 137304.34, 57758.62, 5000 taka respectively (Figure 89). In the survey area, sick buffalo, cow and goat was 29%, 50% and 21% (Figure 90). About 33% bloat, 26% FMD and 26% pneumonia was affected the animal (Figure 91). Bloat is common disease in this region. Most of animals are affected by bloat.

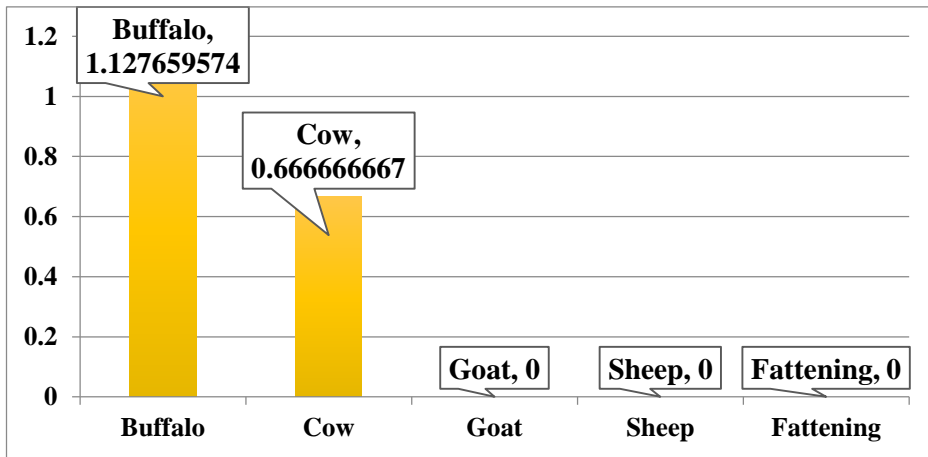


Figure 88: Number of deaths above 6 months

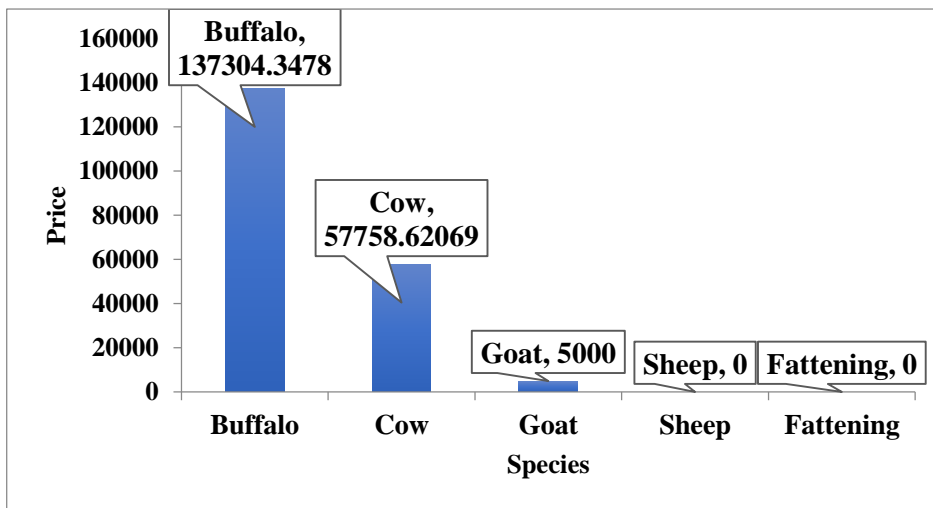


Figure 89: Price of death animal

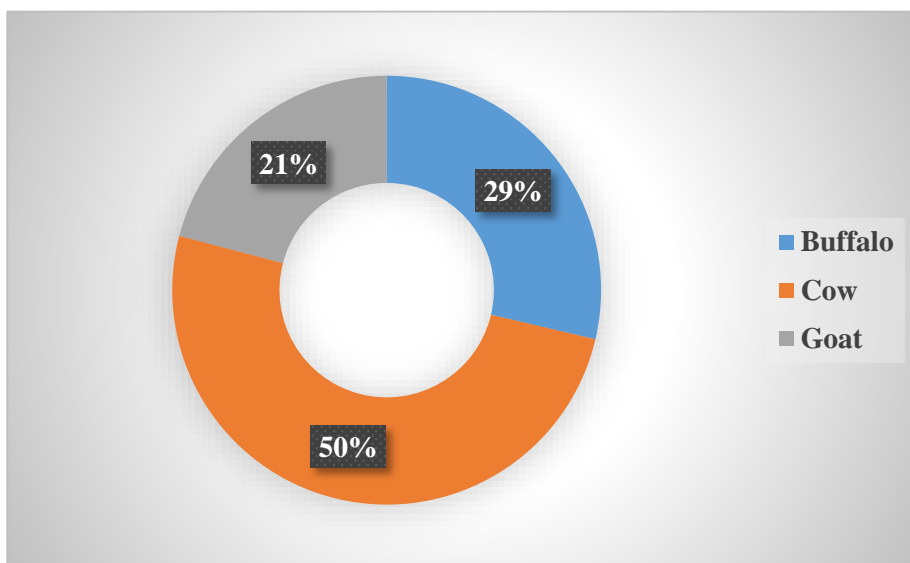


Figure 90: Percentage of sick animal

From the result, average calving interval days of buffalo, cow and goat is about 568, 522 and 165 respectively (Figure 92). In the survey area, average milk production of buffalo is 135 days, cow 166 days and goat 138 days (Figure 93). Average age of puberty of buffalo, cow and goat is 3, 2.2 and 1 year (Figure 94). Figure 95 is presented the weight of buffalo, cow and goat at different ages. In the study area, birth weight of buffalo, cow and goat is about 21, 19 and 1.8 kg. Weight of buffalo, cow and goat at the age of 2 years is about 204, 197 and 26 kg respectively. At the age of six-month buffalo, cow and goat weight is about 73, 62 and 8 kg respectively.

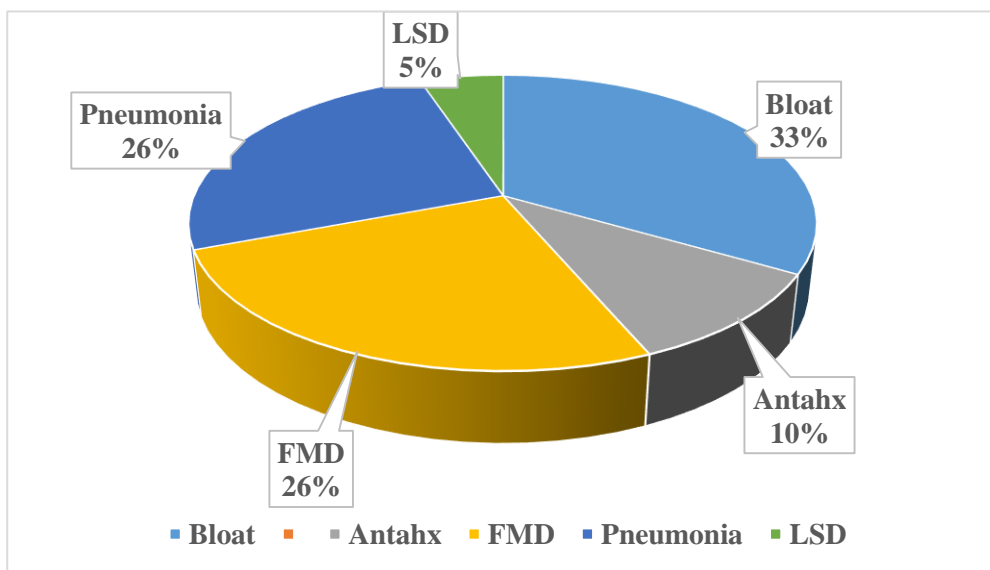


Figure 91: Animal affected by disease

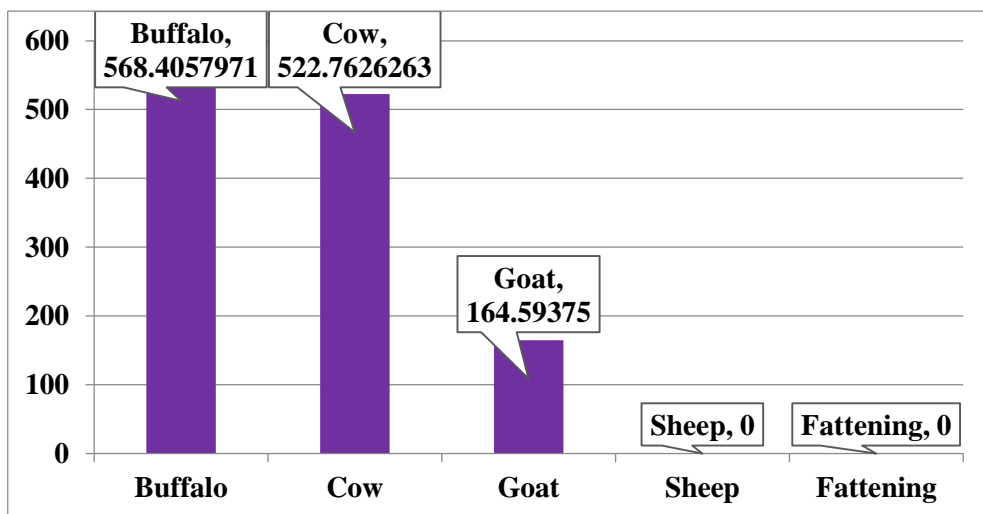


Figure 92: Calving interval

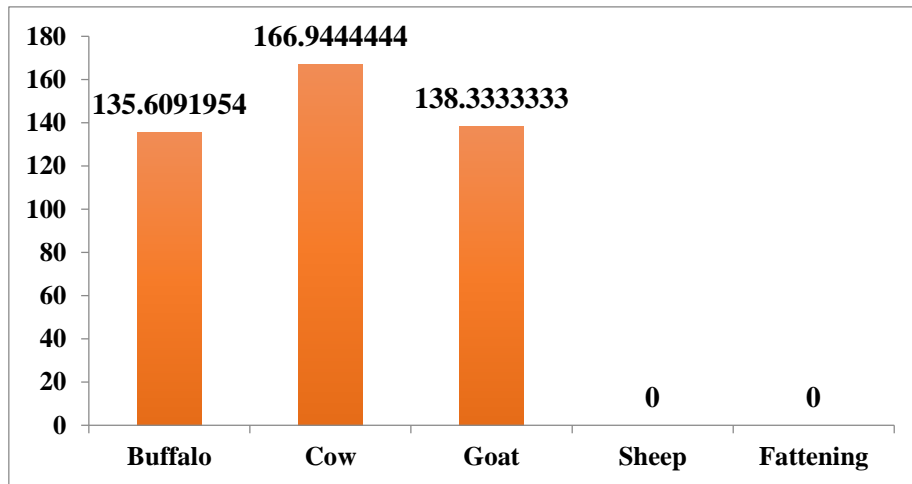


Figure 93: Milk production in days

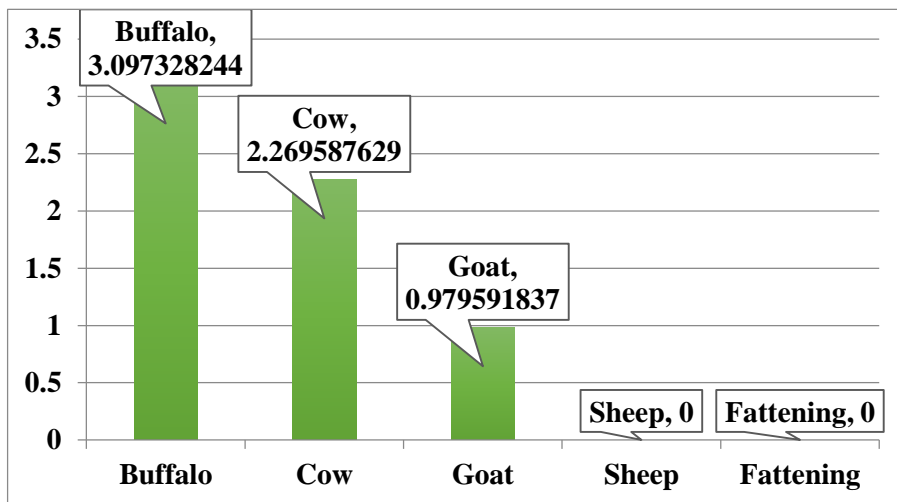


Figure 94: Age of puberty

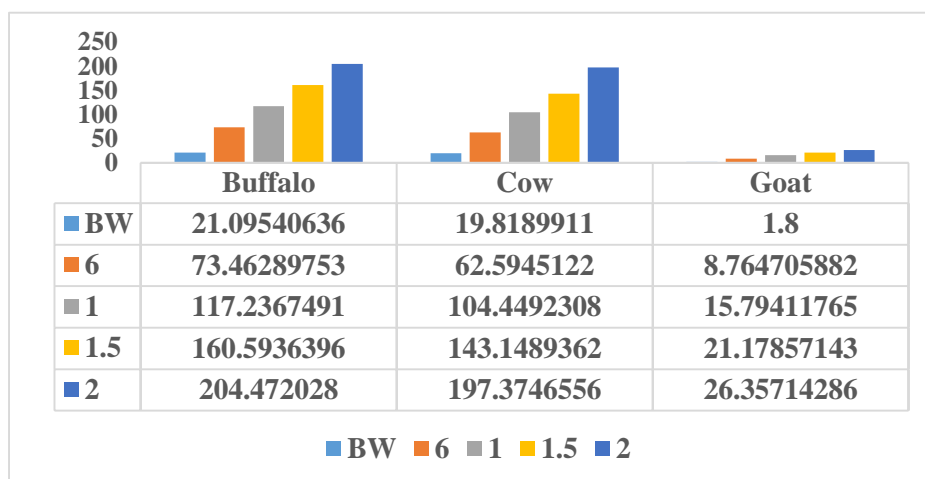


Figure 95: Weight of buffalo, cow and goat at different ages

7. Service Provider in Supply Chain

In this region, the numbers of Goat, Cow & Buffalo are around 110, 190 & 220 respectively who didn't take any vaccination and AI from any service provider (Figure 96). This pie (Figure 97) data shows that 98% of farmers didn't take any training on raising cows and 100% of farmers didn't take any training on the management of buffalo. In our study area, about 100% farmers did not practice GGAP and HACCAP rules and lack of knowledge about GGAP and HACCAP (Figure 98).

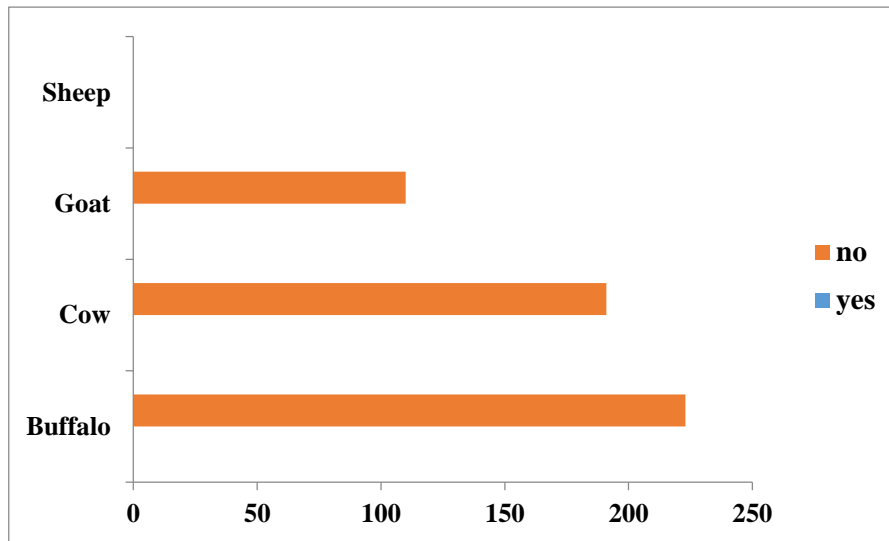


Figure 96: Vaccination and artificial insemination provider

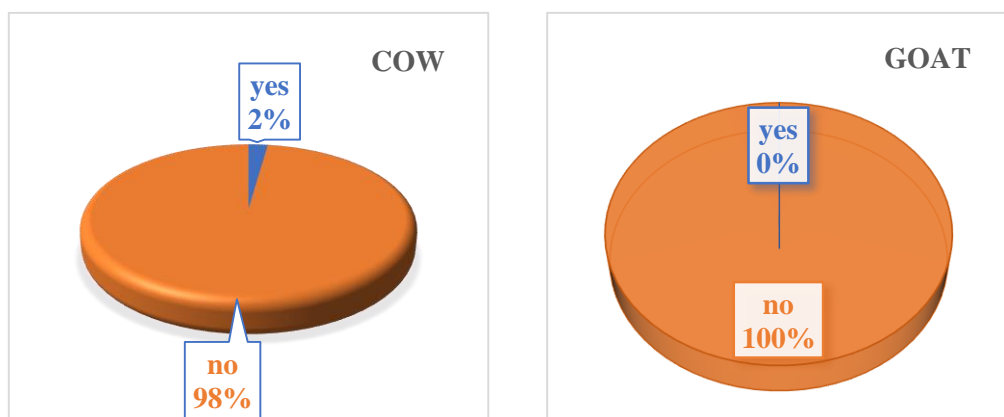


Figure 97: Training on animal husbandry practices

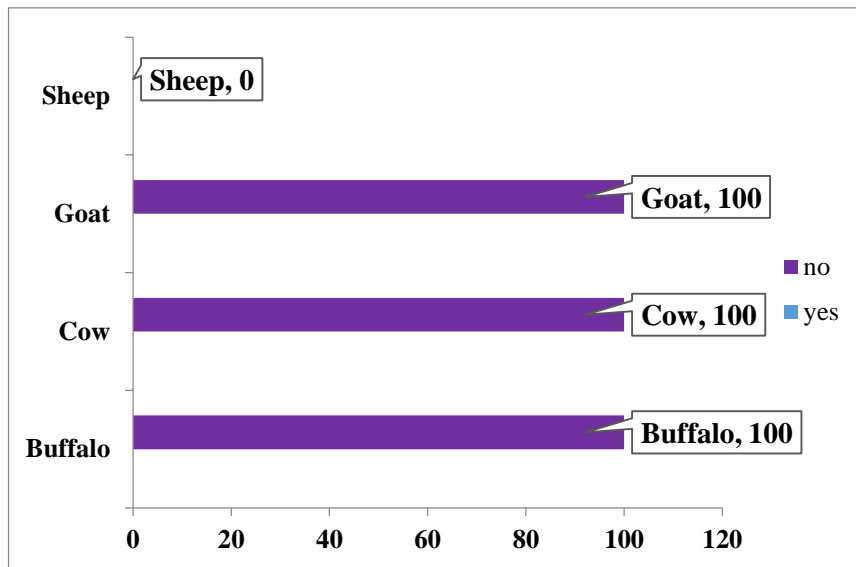


Figure 98: Training on GGAP and HCCAP

8. Feeds and Fodder Supply Chain

Here the graph presents that out of 500 Sheep, Goat, Cow and Buffalo 0, 110, 400, 350 didn't feed UMB/UTS regularly (Figure 99). About 100% farmers did not take UMB/UTS from any service provider (Figure 100). Here in this region Raw green grass provided to 99% of cow, 97% of Buffalo and 100% of goat respectively by the farmers (Figure 101).

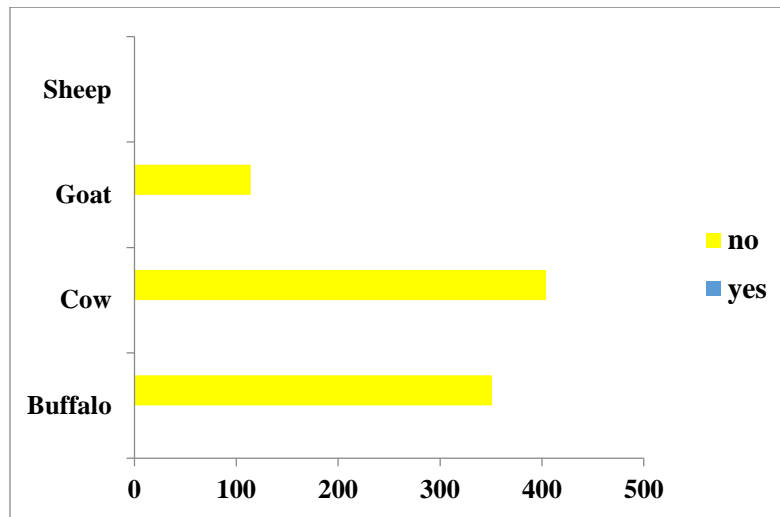


Figure 99: Regular feeding of UMB/UTS

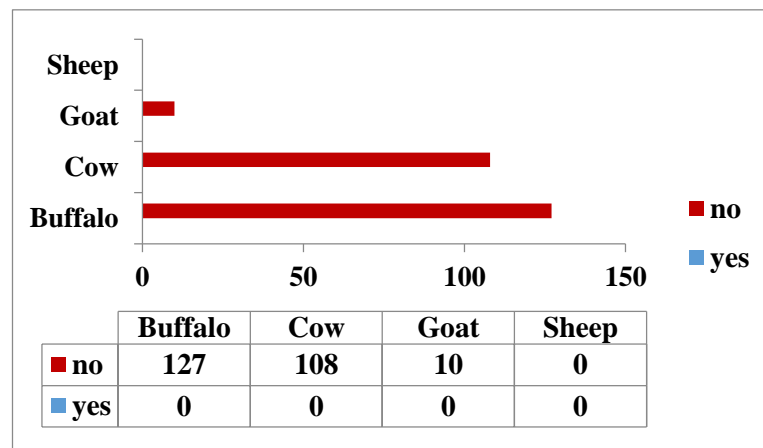


Figure 100: UMB/UTS provider

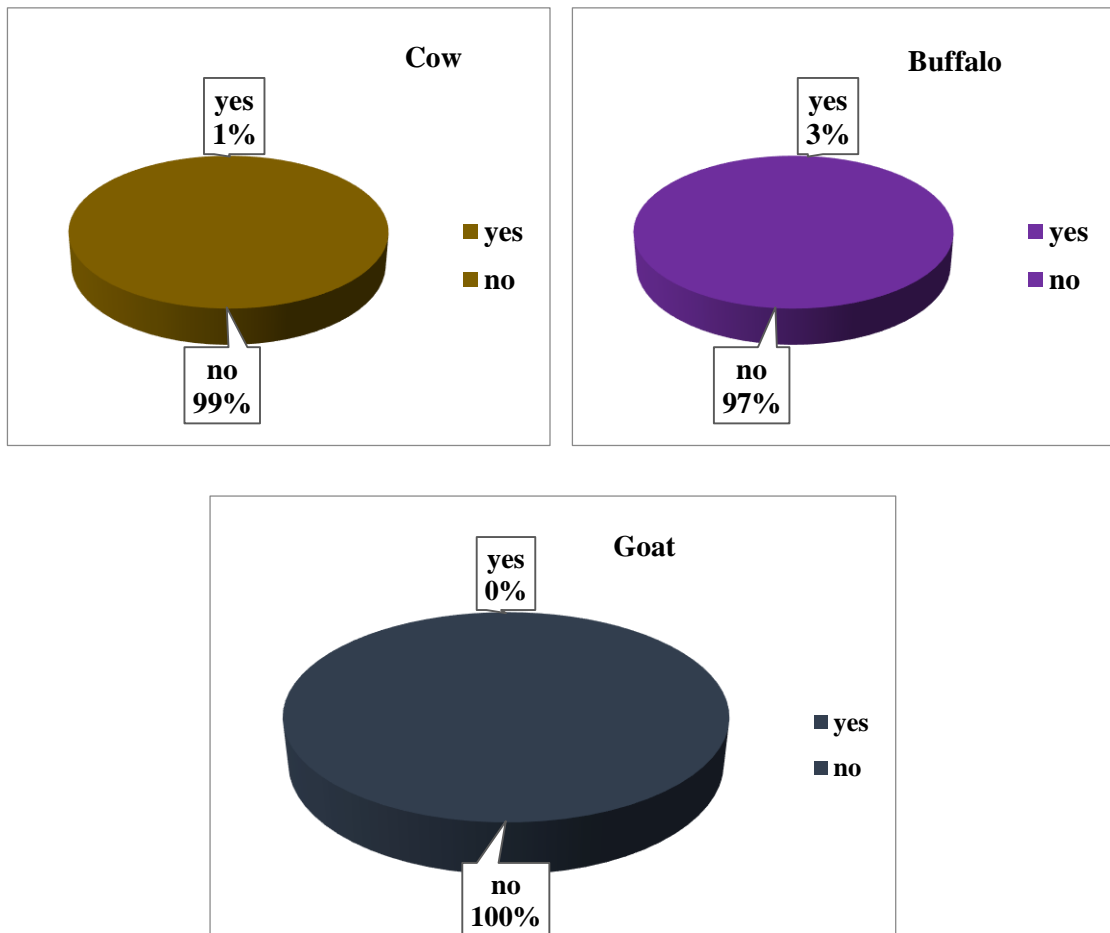


Figure 101: Percentage of providing green grass

9. Use of Light and Heavy machine Technology in Farm Management

In our study area, most (about 100%) of the buffalo and goat farmers said that they did not use any light and heavy machine technology in the farm management (Figure 102). Only 1% cow rearing farmers used green grass chopping machine in that region.

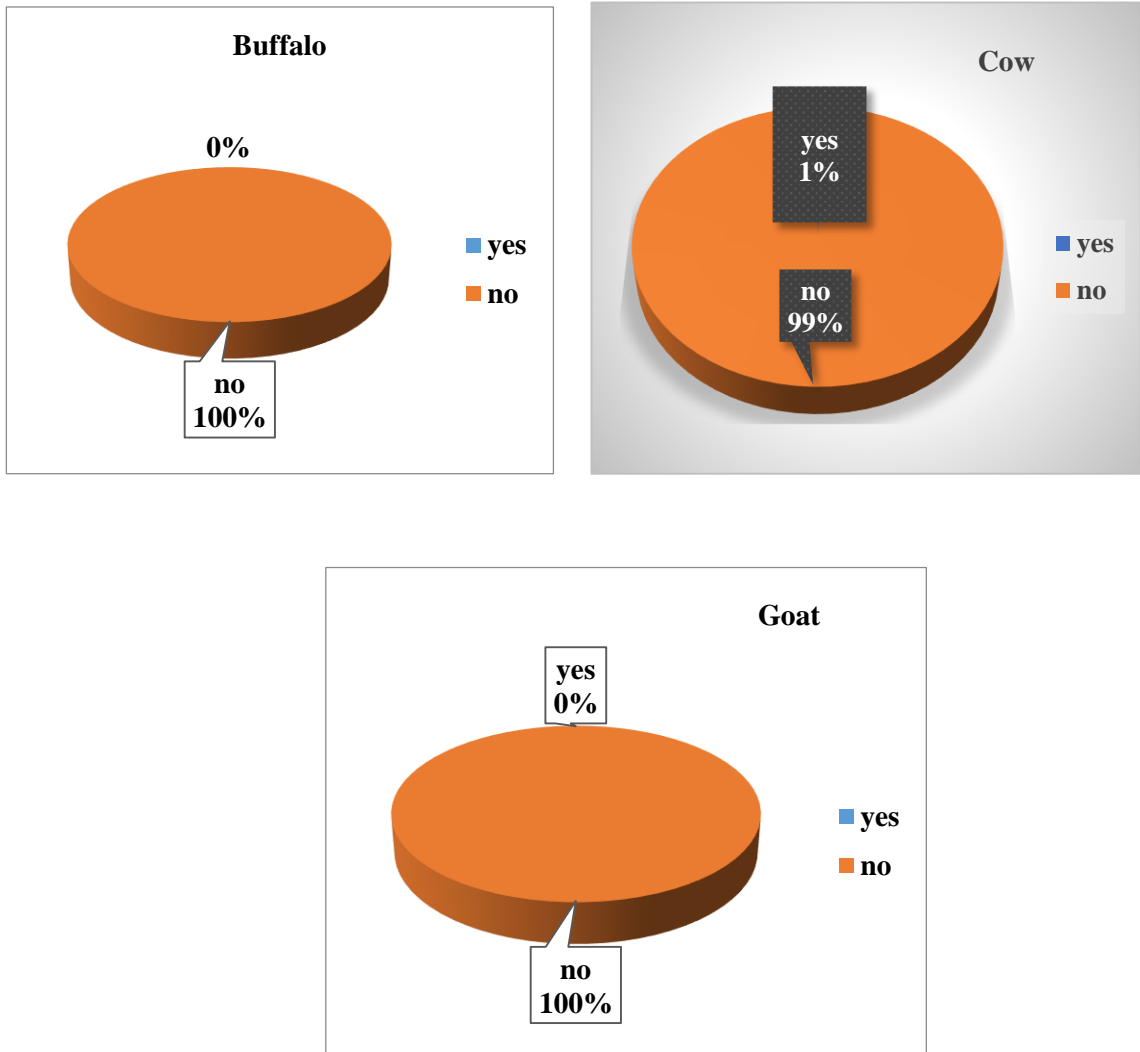


Figure 102: Use of light and heavy machine technology in farm management by the buffalo, cow and goat farmers

10. Training, Climate Smart Management and Use of IoT

On average farmers taken 1 day's training on animal husbandry practice. Data showed that 98% farmers taken training on buffalo husbandry practice (Figure 103). Only 2% farmers taken training on animal husbandry practice in our study area. On average most of the farmers taken training 2 times. About 100% farmers in our survey area did not take Training on GAP, Fattening and Smart Technology (Figure 104). This pie chart (Figure 105) reveals that no farmers out of 600 had any training on nutrition, environment, social issue, Animal management and Business management. In the survey area, about 55% farmers did not practice proper waste management in the farm. About 45% farmers practice proper waste management in the farm (Figure 106). Among 600 farmers, about 195 farmers collect the dung of animals. Among all the farmers, 10 farmers said that they have biogas plant (Figure 107). From the collected information, farmers learn about waste management from others is about 47% (Figure 108).

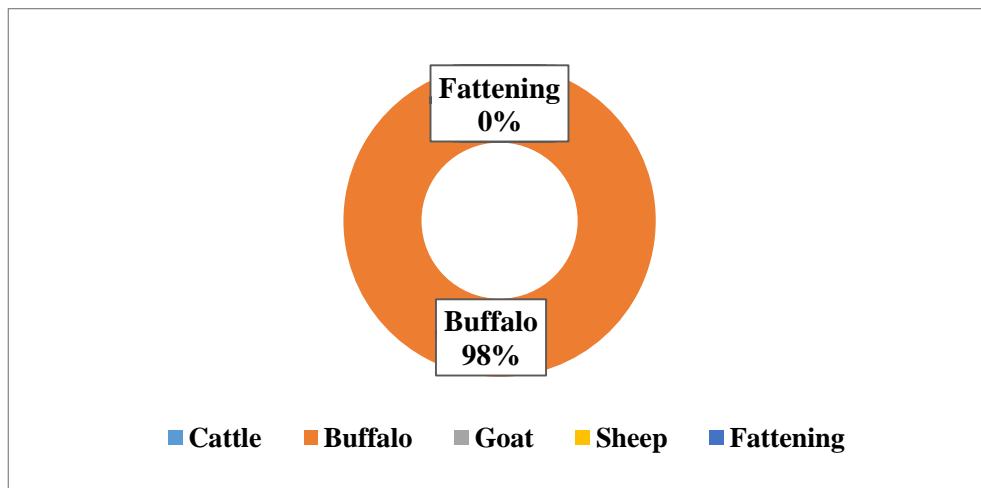


Figure 103: Training on animal husbandry practice

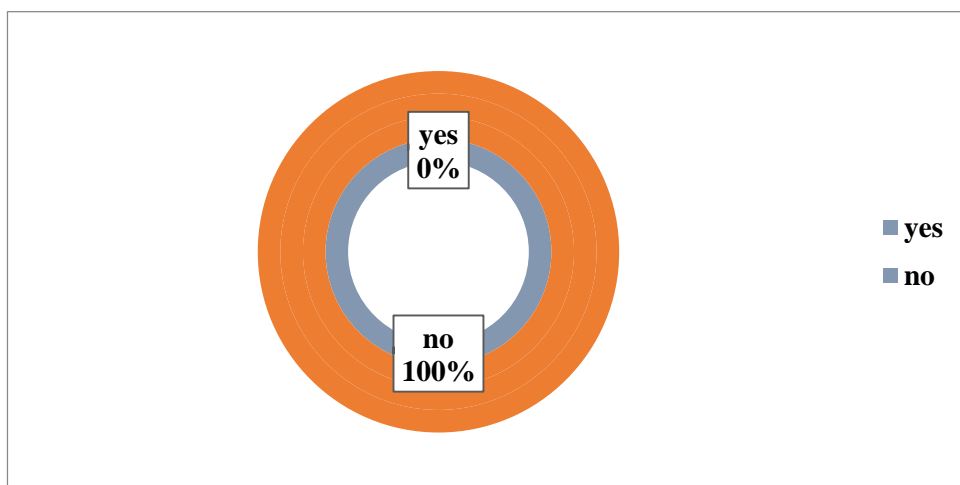


Figure 104: Training on GAP, fattening and smart technology

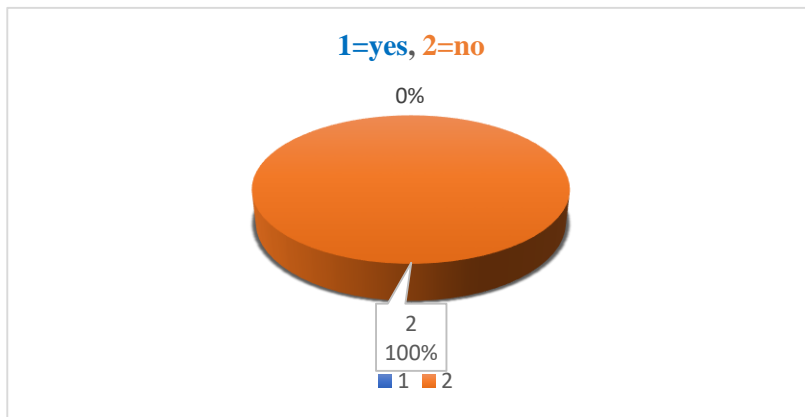


Figure 105: Training on nutrition, environment, social issue, animal management and business management

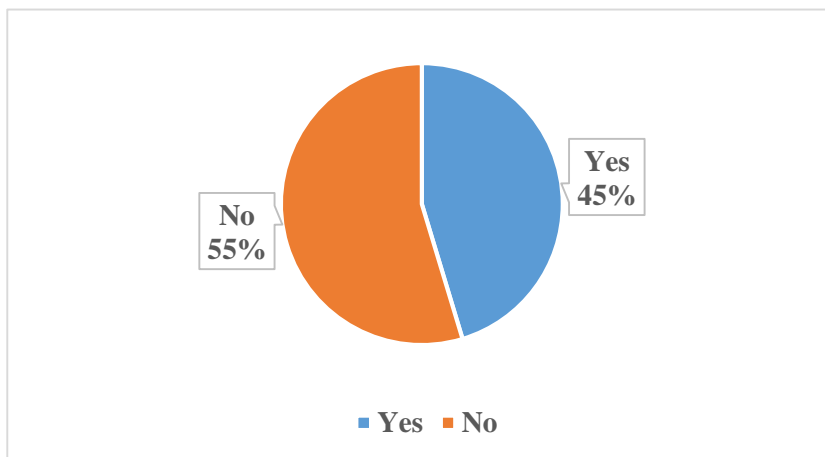


Figure 106: Present status of waste management in the farm

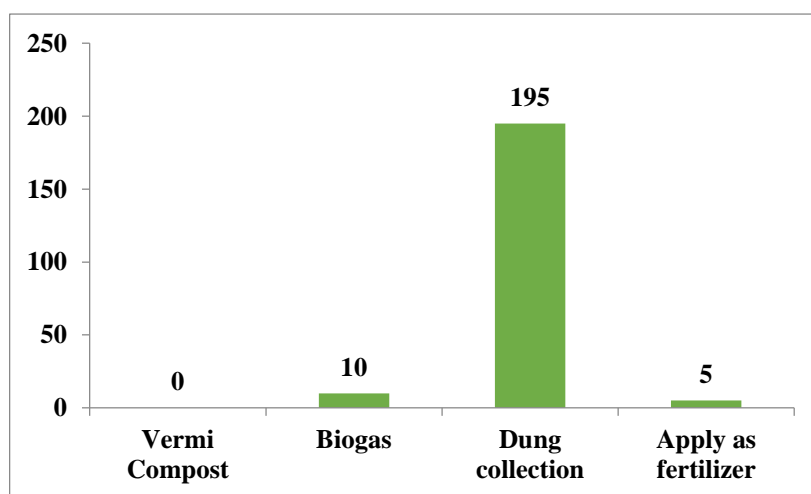


Figure 107: Decrease of environment pollution due to proper waste management

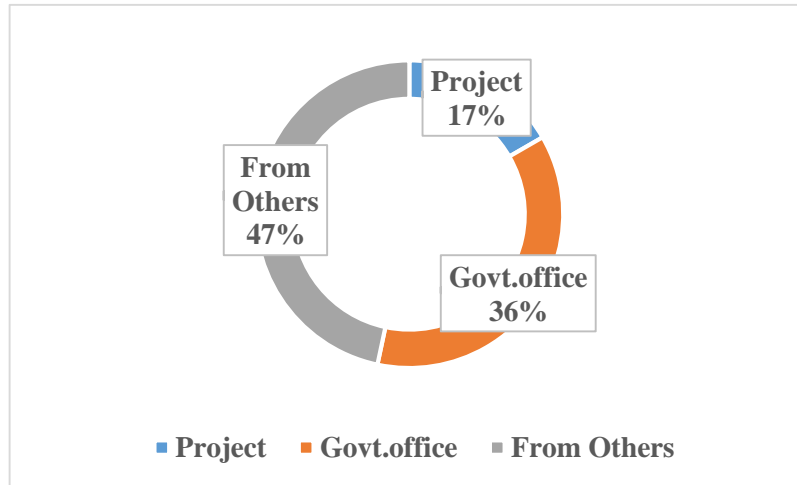


Figure 108: Source of learning waste management

Pie chart reveals that no farmers out of 600 had got any Veterinary telemedicine service from local service provider (Figure 109). This pie chart shows that no farmers out of 600 had got Mobile apps service from local service provider (Figure 110). This pie (Figure 111) chart reveals that no farmers out of 600 had got any Animal health insurance service from the local service provider in our study area. According to this pie (Figure 112) chart no farmers out of 600 used mobile apps on the purpose of animal husbandry business management. Pie chart (Figure 113) reveals that farmers out of 600 didn't purchase any animal from online in this year.

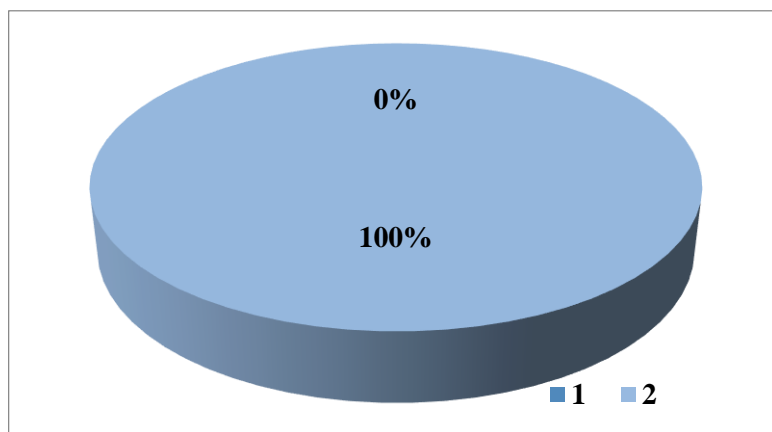


Figure 109: Veterinary telemedicine service from local service provider

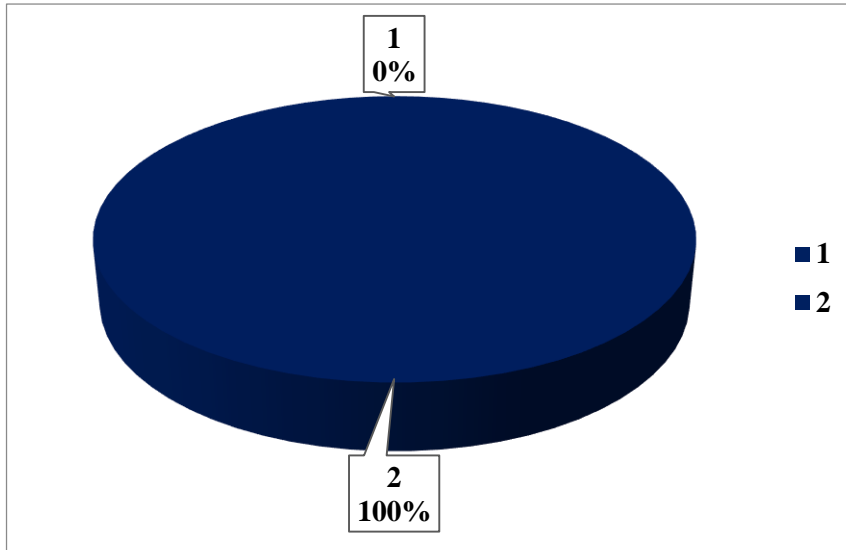


Figure 110: Mobile apps service from local service provider

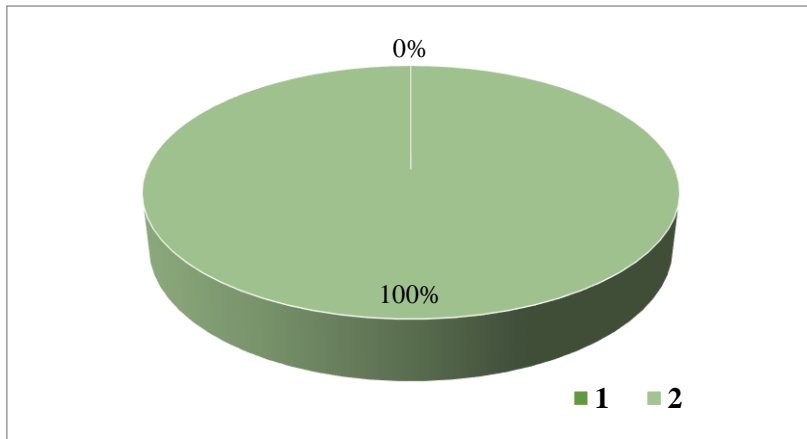


Figure 111: Animal health insurance service

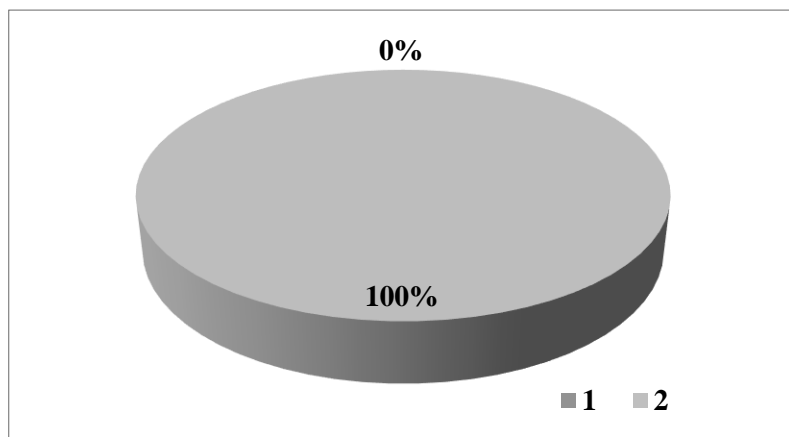


Figure 112: Using mobile apps on the purpose of animal husbandry business management

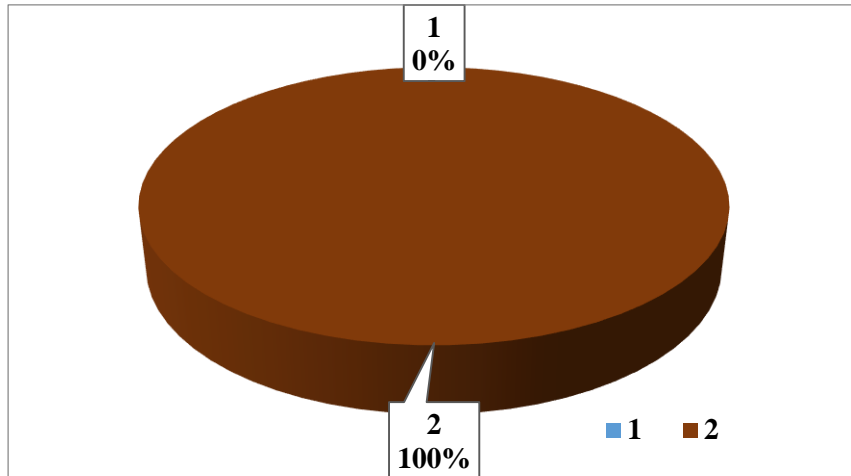


Figure 113: Purchase animal from online based platform

11. Context Summary from Key Informant

Livestock Service Provider (LSP)

Most of the LSP are educated. They have completed S.S.C. and H.S.C. About 54.16% and 20.83% completed SSC and HSC. About 100% of the livestock service providers are male. Most of the LSP working in that area are middle aged. They earn on an average 22958.33 (BDT) per month. They provide farmers both treatment and AI services. They specialized in providing cattle AI services. The majority of LSP had instruction on how to treat cattle, goats, and buffalo. They received training from government agencies 10-12 times in a year. They give the service in about 2-3 union by using motorcycle. They generally give treatments to all kinds of animal. They can visit about 300-350 houses per month. Most of the LSP collect vaccine from Upazilla Livestock Office and private company. They generally disinfect the medical appliances before using. They return the expired medicines to the company. They took help from Upazilla doctor when they fail to diagnosis any disease case.

Milk Trader

Among all the milk trader about 10%, 60%, 25%, 0% and 5% are Illiterate, Primary, SSC, HSC and above HSC respectively. Most of the milk traders have primary education knowledge (about 60%). About 100% milk trades age above 20 years. Most of the milk trades (about 100%) have 20 years' experience. About 15%, 45% and 35% milk traders have Sweetmeat, Curd/yoghurt and Chana business. On an average 370250 tk (BDT) comes from particular milk trading business. On an average 628.33 L cow and 1183.33 L buffalo milk purchased per day. Most of the farmers (about 100%) collect milk from the farmers directly. Daily collection 1223.75 L of milk from the farmers. They sold 25% and 60% sweetmeat and curd/yoghurt daily. In future about 55% trades wants to produce butter and about 35% traders want to produced different types of cheese. About 20%, 30%, 20% and 25% trades said that sweetmeat, curd/yoghurt, Chana, Cheese and butter product will be the most potential milk product in future. In this region, about 15% and 30% traders want to incorporate cheese and butter business during the project time. On an average the sold 3687.5 kg curd, 894.4 kg sweetmeat and 10050 kg Channa per month. About 70% traders fullfill the demands according to consumer's demand.

Meat Traders

Most the meat traders have completed the training. They have license for meat selling. About 70% meat traders age 25-40 years. On an average they have six family members. Monthly of meat the meat seller is 60631.57 tk (on average). They buy on an average 15 cows, 3 buffalo and 9 goats from the farmers. On an average they buy 24 cows from the market per month. In this area average price of cow, buffalo and goat meat is 682.63, 579.16 and 911.53 tk/kg respectively. In the urban side this number is almost half. They are not involved in contract with farmer for buying animal. The slaughter house waste is generally kept in a hole inside the soil.

Medicine Seller

In our study area, we found that about 91.66% medicine seller have govt. registration. Most of the (about 75%) farmers age between 25-40 years old. On an average they have six family members. They earn 26750 tk (BDT) per month by selling medicine. About 41.66% farmers kept both human and animal medicine. They earn more money in the winter seasons when most of animal and people affected by disease. About 95% medicine seller have completed training on medicine selling and primary treatment. Most of time they sell medicine by seeing the prescription except emergency case. Most of the farmers dispose the waste of medicine by burial method. They know medicine pollute environment. So, they use the disposal methods.

Feed Seller

About 70.33% fed seller have govt registration. 75% feed seller completed the SSC examination. On an average they have 7 family members The feed sellers earn around 34916.66 tk per month. The feed seller usually keeps all kinds of feed. The feed seller in the town area generally don't keep loose feed in their shop. In the urban area both loose feed and commercial feed are kept. Most of the feed seller said the sale of commercial cattle feed befor Eid-UI-Azha. They said the demand of commercial feed is increasing day by day. The seller generally sells 495 kg loose feed per month (on an average). In the developed area where commercial farm is available, demand for commercial feed is high. Some feed seller sells 1638.26 kg commercial feed per month. Contract farming system with feed seller is not developed yet. About 62.5% did not sell their feed in contract basis. They return the expired feed to the company. But for other kinds of damage, they are responsible. They generally keep the bag on plastic. They try to control rodents. Some farmers used wooden platform for kept the bags.

Upazilla Livestock Officer/District Livestock Officer (ULO/DLO)

In the Dashmina district of Barishal division there are 66% of people have livestock of their own approximately. They have 66.33% of cattle, 36.66% of Buffalo, 19% of goat and 11.33% of sheep respectively in their house. In our survey area, we can see from data that approximately there are 1005.33 numbers of commercial farms. Specifically on an average there are 337 cattle farms, 2000 buffalo farms, 143.5 goat farms and 151 sheep farms gradually. In addition, there are 200 and 1725 numbers of cattle & Buffalo farms used for fattening of both animals. According to the data analysis, there is no stall grazing in this area. But we can see the numbers of grazing and semi-intensive animals in this area are 80 and 15 for cattle rearing, 83.33 and 15 for buffalo, 76 and 25 for goat rearing and 83.33 and 40 for sheep accordingly. Gradually, for cattle, 25 used for natural breeding & 70 for artificial breeding and 22.5 used both kind of breeding. This number varies according to the animal, facilities of breeding in any particular area. For this area, for buffalo the numbers of animals follow natural and artificial breeding are 91.66 and 6.66 and 7.5 use both type of breeding. For sheep and goat 97.33 and 98.33 used natural breeding then 4 and 5 for artificial breeding and 20 and 25 use both.

If we see the data of Bakerganj, the quality of breed and the quality of semen are fair but in sadar the quality of breed is good. For Sadar availability of breed, concentrate is good but feeding technology is not available but the vaccine and medicine quality is good for both area whereas the treatment quality is good for Bakerganj and fair for sadar. In addition to, we can see that availability of breed, land for grazing, straw, green grass, feeding technology, vaccine, anthelmintic, medicine, treatment, credit/loan facilities, insurance facilities are less available in both areas. The average percentage of milk is marketed through local consumer, goala, market, product manufacturer & others are 35%, 43.33%, 13.33%, 12.5 % 7 12.5% and prices are 85, 61.66, 80, 75, 75 in BDT (TK/Kg) for both areas. On an average for both area, there are 30% of entrepreneurs who runs different farms of businesses. Among all of them, 20 are milk product manufacturer, 1 for branding milk manufacture, 1.5 for milk collection center. The numbers of farmers getting training for both area on cattle, buffalo, goat, sheep rearing and fattening of cattle & buffalo are 5000, 7000, 2000, 1500, 500 and 1000 respectively. Though a large number of farmers have gotten the GAP training but the number of farmers who practiced the training is about 0%. On an average, the numbers of farmers who use modern farming technology are 2 for silage making, 50 for fodder cultivation, 39.33 use

grass chopping machine,7 use concentrate mixing machine, 22.33 use weighing balance, 2 use heat detector, 6.5 use milking machine.

GENERAL LIMITATIONS, TACTICAL POSSIBILITIES AND INTERFERENCES

The 2050 goal of sustainable farming is to increase agricultural yield to meet the food demand of 10 billion people and calls for smart farming. In Bangladesh context it is more challenging and need rapid implementation of smart farming. The term "smart farming" refers to the integration of cutting-edge technology into agricultural operations in order to increase agricultural productivity and sustainability. These technologies include artificial intelligence (AI), the internet of things (IoT), and high-speed wireless networks. Livestock sector needs integrated inputs entailing technologies and services as it deals with a larger range of concerns at farm level, for example, environmental, animal welfare and product quality issues. However, to go for the sustainable improvement in livestock farming, understanding the current situation is crucial. From our survey, the limitations and possibilities were identified.

Numerous systematic issues exist in the study regions that hamper the potential for product production, processing, and commercialization. Farmers are unaware of the current, efficient technologies that may improve their production system, and hence, the productivity, product quality, and ease of market access. Concerning service providers are not available always. At the field level, there is a lack of livestock service providers, and DLS's staffing levels are also insufficient. Additionally, the service provider is not up to speed on modern tools and technologies. Similarly, the role of private companies is not beyond questions. Although it indirectly affects their company, private enterprises are mostly focused on growing their own businesses rather than closing the knowledge gap among farmers. However, it is possible to spread technologies like better feeding practices (Silage, UMS, UMMB, TMR, etc.), improved breeding program, and efficient disease management among cattle producers. Service provider could be a bridge between farmers and technologies in this regard. In order for every livestock farmer to have access to at least one service provider, the number of service providers needs to be optimized. Also, the service provider needs to be equipped with the time demanded technology and skills. This might be accomplished by exposure visits, training, method demonstration, workshop, etc. To encourage farmers to embrace the modern technology on their farms and boost productivity and product quality, result demonstrations of the recent technology can be performed.

Considering the local conditions, the supply and value chains must be revised in order to increase productivity. A sustainable production system requires the constant provision of all inputs and services. Profitable cattle husbandry is severely hampered by the lack of necessary supplies including feed components, preventative products, and services like artificial insemination. Additionally, the volatility in the price of goods and services is crucial in this context. The development of farmers' entrepreneurship in relation to various input items like green grass, UMMB, etc., linkage/contract through matchmaking workshops, commercial cultivation of high yielding green grass by service providers, training of farmers for artificial insemination, and organizing training for local input sellers on the impact and quality of various products could all be possible ways to ameliorate the dire condition.

On the farmers side, they are not well organized therefore fail to attract the large buyers/processors. Farmers that are poor and extremely impoverished do not uphold standards of their products and they do not always produce commercially. The capacity of the producers can be increased through the proper training program. In this regard, arranging learning visit can also help to minimize the knowledge gap and motivate farmers for group marketing. Again, finance is important in this perspective, therefore, microfinance/bank/other financing organizations representation is important while selecting the stakeholders in match making, meeting, training, workshop or similar events. The elements that must be addressed to provide a fair price of the products to the producing farmers include knowledge of product handling and processing, quality considerations, and improved transportation. The regulatory authority will assist the manufacturer while also monitoring for the customers' access to high-quality products in the market. However, it is impossible for the regulating authority, such as DLS, NFSA, or BSTI, to do all of the necessary tasks. Therefore, the establishment of the Dairy Development Board, Poultry Development Board, and Meat Development Boards is urgent, and it will provide both producers and regulatory authorities with policy support to increase production, enterprise sustainability, and high-quality goods for customers.

The producers and other actors are unaware of the rules & regulations on livestock rearing, farm registration, grants etc. For instance, they do not maintain the slaughter system, which is equally dangerous for humans, or they are unaware of the withdrawal period for many veterinary drugs, both of which pose health risks. Even they don't know how the water and soil contamination, and application of pesticide and herbicide to the neighboring crop field can make the milk or meat harmful

to the consumers. So, the producer's knowledge and awareness need to be geared up. The condition may be improved by enhancing the dialogue and advocating for policies that would make various stakeholders responsive. The entire stuffers engaged from farm to fork should be included in events like meetings, workshops, and other awareness-raising initiatives. This might also be accomplished by introducing Good Husbandry Practices (GHP), promoting certification procedures, and encouraging contract farming and subcontracting business models to follow GHP in order to produce healthy meat and dairy products.

The profitable production and availability of high-quality products are further hampered by a lack of farm automation, particularly in the production and processing of dairy products, lack of slaughter house, and the limited use of ICT tools. Therefore, it is important to prioritize increasing farm mechanization and farmers' access to ICT technologies. It is also necessary to include the appropriate private enterprise in strengthening the machinery and equipment supply chain for farm mechanization. It is crucial as well to provide dairy products of the highest quality for the industry by modernizing local processing facilities, improving the supply chain through marketing initiatives, and connecting to national and premium markets. The development of advanced financial and ICT services can be helpful to turn livestock enterprises into successful businesses and it is the time demand nowadays.

Revolution in domestic livestock production is the key to improve the condition of the marginal and poor farmers. It is highly possible that expanding demand growth will be met by local livestock industry with significant improvement in production efficiency through adoption of better and cost reducing technologies and management practices.

CONCLUSION

The baseline survey was done by collecting data from 600 farmers in Bakerganj, Dashmina, Bauphal, Borhanuddin upazilla and Bhola sadar. The data were collected from the farmers by pre-structured questionnaire and live random interviewing consists of many type questions that fulfill the objectives of the survey task. The data related to socio-economic condition, micro enterprises, current livestock status, livestock market status with its SWOT, feeds and feeding practices, milk and meat production status, status of using machineries, status of using technology and financial services related to livestock farming were observed in that area. From the collected data it was found that very few farmers were involved in contract farming and micro-enterprise. Farmers just rear livestock and sell the livestock and livestock products in traditional way. At present, in the survey area, most of the farmers rear cattle and goat in their own land site. Majority of farmers rear buffalo in their household area sometimes with minimum grazing in the char land. However, very small number of farmers rear buffalo only in bathan at different char land site.

Livestock market in that is increasing day by day. Strength of livestock market in that area is that the farmers can rear their buffalo in bathan area with minimum cost. At present, the transportation problem and involvement of middleman are the main weakness of marketing the livestock product in that area. As the people in that area are getting educated and more health conscious, the demand for livestock product is increasing day by day. In this region the grazing land is reducing gradually which affects the production of livestock. It is a threat for future livestock market in that area. At present most of the farmers who rear small number of animals don't supply balanced diet and quality feed to their animals. Cattle farmers usually graze their animals and supply rice straw to cattle. Few farmers produce fodder like Napier, German and para for the animals. Buffalo farmers graze their buffalo in the chor area and don't give any extra feed. Some feed seller sells ready feed to some commercial cattle farmers but green grass isn't found in the local market.

Farmers are not conscious about producing safe milk production. They do not maintain hygiene during milking, storage and marketing of milk. A small number of farmers are involved in the marketing of milk to the commercial dairy enterprises. They usually sell milk to middleman and get a little profit that discourages them toward dairy farming. Farmers in that area don't rear fattening or meat animal with proper management practices. They generally rear animal for selling during "Eid-UI-AJha" for

meat purpose. Specific market system for meat animal marketing have not established yet. There is no standard pricing system for selling the meat animal. As most of the farmers in that area rear small number of animals and they aren't well introduced with modern machineries such as chopping machine, milking machine, weighing balance, heat detector and tractor etc for livestock production.

Farmers don't get modern services related to livestock production by using information technologies (IT). They don't use the IT related to livestock rearing like online marketing, weather forecast, mobile apps for husbandry management etc. Currently farmers are not well introduced to the process of getting loan for livestock and insurance services. In this area, farmers don't keep any labour in their farm as a permanent or daily basis.

Finally, it can be suggested that specialized training program on livestock rearing or project related to livestock production especially feeding management, disease prevention, Artificial Insemination, product processing (quality control), marketing, and modern technology should be introduced in that area.