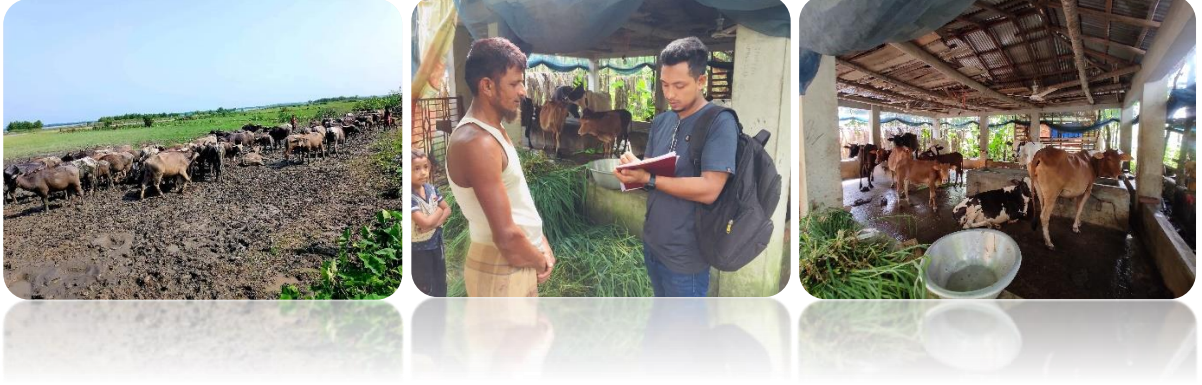


**"Safe Meat & Dairy Product Market Development"**  
*Implemented by Family Development Association (FDA) under*  
**Rural Microenterprise Transformation Project (RMTP)**



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# CONTENTS

<b>SL no.</b>	<b>Title</b>	<b>Page</b>
1	ACKNOWLEDGEMENT	i
2	LIST OF CONTENTS	ii
3	LIST OF FIGURES	iii-viii
4	LIST OF TABLES	ix
5	LIST OF SUPPLEMENTARY TABLES	x
6	EXECUTIVE SUMMARY	xi-xvi
5	INTRODUCTION	1-3
6	METHODOLOGY	4-6
7	RESULT AND DISCUSSION	7-88
8	SYSTEMIC CONSTRAINTS, STRATEGIC OPTIONS AND INTERVENTIONS	89-90
9	CONCLUSION	91-92
10	ANNEXURE	93-97

## LIST OF FIGURES

Figure no.	Name	Page
1	Educational qualifications of the farmers	7
2	Types of members based on the land area	8
3	Sex of the participants	8
4	Age classification of the farmers	8
5	Types of family in the surveyed farmers	9
6	The area of land (decimal) owned by each of the participants	10
7	The diversity of the meal taken by the females in last 24 hrs.	11
8	Diversity of livestock rearing in the survey areas	12
9	Frequency of number of cattle reared by the farmers	12
10	Frequency of number of goat reared by the farmers	13
11	Frequency of number of buffalo reared by the farmers	13
12	Buffalo rearing system followed by the farmer	14
13	Different breeds of goat reared by the participants	15
14	No. of Farmer Practise Fattening	15
15	Proportion of farmers in relation to loan	16
16	Purpose of using the loan money	16
17	Total Number of Farmer keep Labour	17
18	Average Monthly Salary Spent by the Farmers	18
19	Other Expenditure Spent by the Farmers	18
20	Number of Farmer keeps Temporary Labour	19
21	Daily Allowance Given by the Farmer to Temporary Labour	19
22	Average Investment of Each Farmer	20
23	No. of Farmer Deposited Livestock Selling Money	21
24	Average Amount Deposited by Farmers	21
25	Average Feed Cost Per Year Per Farmer	22
26	Average yearly Labour Cost spent by different farmer	23
27	Average yearly treatment Cost spent by different farmer	23
28	Average yearly other cost spent by different farmer	24
29	Average yearly Total Cost by Each Farmer	24

30	Average Net Yearly Income Per Farmer by Rearing Different Livestock	25
31	Contract for Selling Live Animal	26
32	Contract for Selling Milk	26
33	Following of biosecurity for rearing of cattle	27
34	Following of biosecurity for rearing of Buffalo	27
35	Following of biosecurity for rearing of Goat	28
36	Following of Husbandry Practices for rearing Cattle, Buffalo and Goat	28
37	Supplying of good quality feed to cattle	28
38	Supplying of good quality feed to buffalo	29
39	Supplying of good quality feed to Goat	29
40	Average No. of Milking Animal kept by farmer	29
41	Average No. of days in milk of different milking animal	30
42	Average Milk Production Per Household/Farm	30
43	Average Milk price in the locality	31
44	Washing of hand, pot and udder before milking of cattle	31
45	Involvement of farmer with contract farming	31
46	Receiving of Certificate after milk quality test	32
47	Involvement of farmer with milk product manufacturing	32
48	Buffalo Milk Selling Place	33
49	Cow Milk Selling Place	33
50	Buffalo farmer face problem to sell milk	33
51	Cow farmer face problem to sell milk	34
52	Price of Buffalo Milk throughout the year	34
53	Price of cow milk throughout the year	34
54	Ability to sell more buffalo milk if the production increases	35
55	Ability to sell more cow milk if the production increases	35
56	Use of oxytocin for increasing Milk production	35
57	Use of oxytocin for increasing Milk production	36
58	Milk Selling Place for cattle Farmer	36

59	System Used for Selling Buffalo Milk	37
60	System Used for Selling cow Milk	37
61	Using of GGAP indicator during milk production	38
62	Biosecurity Practices for Cattle Rearing	40
63	Biosecurity Practices for Buffalo and Goat Rearing	40
64	Practicing GGAP for fattening by farmer	40
65	Using of Quality of Feed for Buffalo Fattening	41
66	Using of Quality of Feed for Beef Fattening	41
67	Using of Quality of Feed for Goat Fattening	41
68	Figure 68: Percentage of Farmer Practice Fattening	42
69	No. of Fattening program practiced each year by the farmer	42
70	Fattening farmer's Contract with Bepari or Meat Processing Company	43
71	Usage of steroid for Fattening purpose	43
72	Usage of Antibiotics for Fattening purpose	44
73	Place for selling of Buffalo after fattening	44
74	Place for selling of Cattle after fattening	45
75	Place for selling of Goat after fattening	45
76	Place for selling of meat animal after fattening	46
77	Selling Procedure of Meat Animal by farmer	46
78	Regular Supply of Concentrate to Buffalo by farmer	48
79	Regular Supply of Concentrate to cattle by farmer	48
80	Regular Supply of Concentrate to goat by farmer	49
81	Use of ready feed for rearing of cattle	49
82	Use of ready feed for rearing of Buffalo and Goat	49
83	Use of ready feed from different company by farmers	50
84	Use of UMS by farmers for rearing livestock	50
85	Production of Napier or other high quality grass for Buffalo rearing	50
86	Production of Napier or other high quality grass for Cattle rearing	51
87	Production of Napier or other high quality grass for Goat	51

	rearing	
88	Making of silage by the farmer	51
89	Practicing of TMR technology by the farmer	52
90	Using of Calf starter by the farmer	52
91	Calving Interval of different animal	53
92	Breeding procedure of Buffalo	53
93	Breeding procedure of Cattle	54
94	Breeding procedure of Cattle	54
95	Semen from different company used by the farmer	55
96	Semen from different breed used by the farmer	55
97	Percentage of Semen Used by the farmer	55
98	Insemination of animal in correct time	56
99	Types of Buffalo used for breeding	56
100	Availability of Breeding Male Buffalo in the herd	57
101	Deworming of Buffalo Practiced by farmer	57
102	Deworming of Cattle Practiced by farmer	58
103	Deworming of Goat practiced by farmer	58
104	No. of Deworming practiced per year for Buffalo	58
105	No. of Deworming practiced per year for Cattle	59
106	No. of Deworming practiced per year for Goat	59
107	Regular vaccination of Buffalo practiced by farmer	60
108	Regular vaccination of Cattle practiced by farmer	60
109	Regular vaccination of Goat practiced by farmer	60
110	No. of vaccination practiced per year for Buffalo	61
111	No. of vaccination practiced per year for Cattle	61
112	No. of vaccination practiced per year for goat	61
113	No. of Farmer faced animal death last year	62
114	No. of total animal died of different age	62
115	Causes of Death of Mature Buffalo	63
116	Causes of Death of Mature Cattle	63
117	Causes of Death of Young Buffalo	63

118	Causes of Death of Young Cattle	64
119	Causes of Death of Young Goat	64
120	Average Loss for Each Farmer for Death of Animal	64
121	Death occurred of animal in different season	65
122	Percentage of buffalo farmer had sick animal last year	65
123	Percentage of Cattle farmer had sick animal last year	66
124	Percentage of Goat farmer had sick animal last year	66
125	Percentage of Fattening farmer had sick animal last year	66
126	Percentage of Different animal got sick	67
127	Different disease occurred in buffalo	67
128	Different disease occurred in cattle	67
129	Different disease occurred in goat	68
130	Average Weight of Animal at Different Age	69
131	Percentage of Buffalo farmer practice vaccination	70
132	Percentage of Cattle farmer practice vaccination	70
133	Percentage of Goat farmer practice vaccination	70
134	Vaccination Practiced by each Farmer	71
135	Percentage of Buffalo farmer practice deworming	71
136	Percentage of Cattle farmer practice deworming	72
137	Percentage of Goat farmer practice deworming	72
138	Deworming Practiced by each Farmer	72
139	Percentage of Buffalo farmer use AI	73
140	Percentage of Cattle farmer use AI	73
141	Percentage of Goat farmer use AI	73
142	Total Number of AI Performed	74
143	Source of service taken by buffalo farmer	74
144	Source of service taken by cattle farmer	74
145	Use of Ready Feed by Cattle Farmer	75
146	Use of Ready Feed by Buffalo Farmer	75
147	Use of Ready Feed by Goat Farmer	76
148	Source of ready feed used by the farmer	76



149	Usage of calf starter by the farmer	77
150	Usage of silage by the farmer	77
151	Usage of UMB/UTS by the farmer	77
152	Use of High Breed Grass by the Cattle Farmer	78
153	Use of High Breed Grass by the Buffalo Farmer	78
154	Use of High Breed Grass by the Goat Farmer	79
155	sources of high quality grass	79
156	Use of Nutrition Technology Based Feed	80
157	Practicing of Mechanized Farming by farmer	80
158	different technology used by the farmer	81
159	Training Related to Modern Farming received by farmers	81
160	Training Related to GAP received by farmers	82
161	Training Related to meat animal rearing received by farmers	82
162	Proper management of washed followed by farmer	82
163	System for collection ad preservation of waste used by farmer	83
164	Decrease of environmental pollution due to waste management	83
165	Source of learning of waste management	83
166	Training related to nutrition, climate, social issue, business management	84
167	Veterinary Telemedicine Service from LSP received by farmer	84
168	Animal Husbandry Services by Mobile App	85
169	Availability of insurance service for animal	85
170	Usage of Mobile Apps for Animal Business Management	86
171	Selling of Animal through Online by farmer	86

## LIST OF TABLE

<b>Table no.</b>	<b>Name</b>	<b>Page</b>
1	The amount of land (decimal) owned by the participants	9
2	Income of the farmers from Buffalo, Cattle and Goat farming (Monthly, in BDT)	10
3	Number of buffalo, cattle and goat reared by the participants	12
4	No. of buffalo reared by the Participants	14
5	No. of cattle reared by the participants	14
6	Number of Animal Reared for Fattening	16
7	Statistical parameters on the loan taken by the farmers	16
8	Number of cattle and buffalo farmers loan statistics	17
9	Diversity of investment by different types of farmer	20
10	Statistical analysis of feed cost by farmers	22
11	Statistical analysis of total yearly cost by different farmer	24
12	Total yearly income by farmer	25
13	Statistical analysis of net yearly income by different farmer	25
14	Statistical analysis of no. day in milk of cattle, buffalo and goat	30
15	Price Of the Milk /litre for Selling	37
16	Fattening Animal Reared by Each Farmer	43
17	Statistical analysis of calving interval of Cattle, Buffalo and Goat	52

## LIST OF SUPPLEMENTARY TABLES

<b>Table no.</b>	<b>Name</b>	<b>Page</b>
S1	No. of farmers keep different livestock	93
S2	Income, Food security and nutritional status of the small farmer under the project	93
S3	Sustainable development of the value chain in the area	94
S4	Effective production system, application of internationally recognized standard, traceability and marketing system of milk production	94
S5	Effective production system, application of internationally recognized standard, traceability and marketing system of meat production	95
S6	Improvement of livestock rearing system with proper prevention of disease and improvement of production	95
S7	Sustainable development of livestock production by improvement of livestock service provider	96
S8	Feeds and Fodder Supply Chain	96
S9	Use of Light and Heavy machine Technology in Farm Management	96
S10	Training, Climate Smart Management and Use of IoT	97

## **Executive Summary**

The baseline survey was conducted at selected Upazillas under Bhola district of Bangladesh for identifying the scopes for the overall business development of small entrepreneurs who are part of the Safe Meat & Dairy Product Market Development Sub-project of Rural Microenterprise Transformation Project (RMTP). The objective of the sub-project is to increase the income, food security and nutrition situation of marginal, small farmers and micro enterprises in the project area through value chain integration activities. With six major interventions, the sub-project ensures to deliver good livestock production practices, sales and overall profitability. The baseline study is implied with collecting data and information from a representative sample of 600 project participants to gain a clear picture of their pre programme socio-economic status considering income, gender, nutrition and other criteria to satisfy project log frame's indicators. Project targets of providing financial and value chain promotion support to the stakeholders (e.g., producers, input suppliers, processors, wholesalers' retailers etc.) is measured under different parameters to evaluate the performance of the project.

The assessment was completed in three phases. Firstly, in inception part primary desk research identified the stakeholders and socio-economic status. Then field research, sampling and focus group discussions (FGDs) through questionnaires were carried on in the investigation phase. Lastly, in the dissemination phase, the acquired data was duly analyzed with necessary tools to present it in a form of report. The study tools also included skills for the input suppliers, GO and NGO service providers of the value chain. Through monitoring and quality control data was interpreted and validated afterwards through a briefing meeting which kept relevant stakeholders involved.

Beneficiaries were categorized as extreme poor, poor and microenterprise based on their socio-economic status. Ownership of livestock namely cow, beef and goat were studied belonging to the 600 beneficiaries participating in the survey. Moreover, the basic personal information, land ownership, household situation, nutritious food intake and experience in livestock of the beneficiaries were taken into consideration. Household income of the beneficiaries and contribution to the income from livestock farming in between the three categories was compared. Farming practices and comparison each livestock-wise between the categories were studied to highlight the calving interval, lactation length, prevailing livestock diseases and health care practices. The survey also evaluated the participation of Local Service Providers (LSPs) and Paravet in assisting the target groups. It identified the problems faced by the beneficiaries in livestock farming and their ways of remediation through farm mechanization. Knowledge of the beneficiaries related to natural and artificial insemination, use of ICT in livestock farming and, practice of BGAP and GGAP were also observed in the survey.

The later part of the report assessed situation of Safe Meat and Dairy Products in both national and regional context with regards to the project area for intervening the systemic constraints strategically. For the fiscal year of 2021-2022, the three Upazilla under the survey shares potential percentage contribution in meat and milk production in the promotion of livestock farming. Both the value chains for milk and meat production considered the three main components core functions, supporting functions and enabling environment. The roles of input suppliers, producers, traders, processors, marketers along with regulating bodies are highlighted in the value chain. Lastly, the system constraints of the beneficiaries are addressed with suggested options and interventions. Starting from poor organization of farmers to inadequate knowledge of ICT are addressed with strategic options of gaining relevant access and trainings.

#### At A Glance Baseline Status against the Target in Log frame

Indicators	Target in Local Framework	Baseline Status	
<b>Outcomes</b>			
<b>Reduction of disease infestation</b>	<20%	<b>Livestock</b>	<b>Percentage</b>
		Buffalo	39%
		Cow	50%
		Goat	37%
<b>Reduce mortality rate</b>	Adult cattle 1% Calf & adult sheep & goat 3%, sheep & goat kid 5%	<b>Livestock</b>	<b>Percentage</b>
		Buffalo	9%
		Cow	42%
		Goat	10%
<b>Reduce calving interval</b>	Reduce on an average 3 months	<b>Livestock</b>	<b>Months</b>
		Buffalo	16.7
		Cow	15
		Goat	6
<b>Increase lactation length</b>	Average 210 days	<b>Livestock</b>	<b>Days</b>
		Buffalo	120
		Cow	188
		Goat	73
<b>Increase population of livestock in project areas</b>	15%	<b>Livestock</b>	<b>Population (per farmer)</b>
		Buffalo	15
		Cow	4
		Goat	4
		Sheep	0
		Chicken	15
		Duck	14
		Pigeon	21
<b>Increase production</b>	30%	Milk: 4.5 L ( average L/day)	

<b>Decrease production costs</b>	10%	Buffalo : TK-522 (per buffalo/month) Cow : TK-576 (per cow/month) Goat : TK-653 (per goat/month)	
<b>Indicators</b>	<b>Target in Local Framework</b>	<b>Baseline Status</b>	
<b>Price of Dairy and Products Increase</b>	10%	Products	Taka per Kg
		Sweetmeat (avg.)	270
		Curd	160
		Cheese	-
		Channa	300
<b>Increase number of enterprise</b>	10%	26.66%	
<b>Increase employment opportunity</b>	15%	Nil	
<b>Outputs</b>			
<b>Increase Local Service Providers (LSP)</b>	200	2 Per working union	
<b>Training by LSP</b>		Nil	
<b>Deworming and vaccination by LSP</b>	19,200	Nil	
<b>Master trainers on GGAP &amp; HACCP</b>	10	Nil	
<b>Trained by GAP and HACCP trainers</b>	5000	Nil	
<b>Policy dialogue at local &amp; national level</b>	2	Nil	
<b>(Ready feed &amp; Grass) increased sale of ready feed and grass due to strong network of sub dealers</b>	50 dealers & 50 suppliers	Dealers and supplier 3 per upazila	
<b>Supply physical Promotion points and for virtual</b>		No points and exist	
<b>Buy ready feed, calf starter, green grass, UTS</b>	19,200 enterprises	9% buy	
<b>(Safe Dairy products) Increase access to light and heavy machines/technologies contributed to farm mechanization</b>	<ul style="list-style-type: none"> <li>Developed at least one sub-dealer/dealer or service provider in a union.</li> <li>At least one service is receive packaging by at least 6000 cattle farmers</li> </ul>	<ul style="list-style-type: none"> <li>No sub-dealer exists</li> <li>No Services are available</li> </ul>	

Indicators	Target in Logical Framework	Baseline status
<p><b>Increase sale of safe dairy products due to safe milk production, diversification, and good supply network</b></p>	<ul style="list-style-type: none"> <li>• 100 milk collectors/service</li> </ul> <p>Providers promoted and selling milk in formal and in- formal institutions in one production cluster.</p> <ul style="list-style-type: none"> <li>• Promoted 120 processors in one cluster for at least one postharvest technology.</li> <li>• Established linkages between 100 formal and 200 informal buyers for buying milk.</li> <li>• At least 2000 enterprise works under contract farming</li> </ul>	<ul style="list-style-type: none"> <li>• 6 processors cum milk collectors exists in per union, but no Certification by BSTI/HACCP/ HALAL</li> <li>• No linkages exist between formal buyers and enterprises of project</li> <li>• Enterprises under the project are not involve in contract farming</li> </ul>
<p><b>(Safe Meat) Increase sale of safe meat products due to safe meat production, diversification, and good supply network</b></p>	<ul style="list-style-type: none"> <li>• 3000 farmer follows GAP</li> <li>• At least one meat processing center established in project areas</li> <li>• At least one slaughter house cum- butcher shop established where at 40 butchers use new technology.</li> <li>• At least 3000 farmers sale their animal to butcher shops and premium market</li> </ul>	<ul style="list-style-type: none"> <li>• Project beneficiaries do not follow GAP;</li> <li>• Butcher houses exist but not a single butcher use modern technology;</li> <li>• Project beneficiaries do not sales their animal to formal butcher shops or meat processors</li> </ul>
<p><b>Access to ICT and Financial Services in livestock business</b></p>	<ul style="list-style-type: none"> <li>• 25000 cattle farmers trained on nutrition, climate,</li> </ul>	<ul style="list-style-type: none"> <li>• No formal training received;</li> <li>• No Veterinary tele-</li> </ul>

	<p>environment, social issues, livestock management and business development.</p> <ul style="list-style-type: none"> <li>• Established Veterinary tele medicine service center 5000 farmers benefited and 200 benefited by insurance.</li> <li>• 600 entrepreneurs are trained and 500 farmers (entrepreneurs) trained on entrepreneurship and use entrepreneurship apps.</li> <li>• At least 3000 farmers sales their animal using on-line app</li> </ul>	<p>medicine center at union level is exists;</p> <ul style="list-style-type: none"> <li>• No livestock insurance beneficiary exists;</li> <li>• No trained entrepreneurs exists and are not aware on entrepreneurship management apps;</li> <li>• 10% beneficiaries aware about online selling methods and sold animal online through upazilla livestock office.</li> <li>• 15 microfinance branches of RMTP in project area.</li> </ul>
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## **Recommendations:**

- Develop knowledge and skills of LSPs and farmers on good husbandry practices, on farm preventive and biosecurity measures, application of vaccines and drugs, preparation and feeding of urea molasses straw (UMS), urea molasses block (UMB) silage, hay, TMR, heat stress management etc.
- Need to train the farmers on farm record keeping and simple way of preparing annual financial statement to reveal the farm profit and use of it for management decision making.
- Input supplies must be available throughout the year either by government agencies or by private sectors with minimum volatility in the whole supply chain.
- Need improvement of the value chains, especially with regards to the market linkage so that the producer can avoid the middlemen.
- Enhance access to financial services of producers and traders (Bank, market actor, private company etc.)
- Need to strengthen knowledge and create awareness on safe handling and production practices to ensure safe food products to the consumers.
- Need training on the government rules and regulations with regards to the farm to fork including the whole supply and value chain.
- Engage relevant private sectors for strengthening the supply chain of machine and equipment for farm mechanization.
- Develop industry-grade dairy products through modernization of small processing units and strengthening its supply chain through promotional activities and linkage with national/premium markets.
- Training and awareness campaign on BGAP and Creation and dissemination of BGAHP
- Promote certification process BSTI/HACCP/GGAP and need to ensure the traceability of the products
- Promote contract farming and sub-contracting business models to adopt good husbandry practices for producing safe meat and dairy products
- Create access and usage of advanced financial & ICT services for better transformation of livestock enterprises into profitable business
- Need campaigning on the nutrients and nutritional profile of locally available food items and importance of diversity of food items in a single meal.

# *INTRODUCTION*

## **1. Background of the Sub-Project**

Family Development Association (FDA) is implementing the sub-project titled "Market Development of Safe Meat and Dairy Product" at Bhola District (Charfassion, Lalmohon, Monpura) in 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. The sub-project shall enable rural producers to expand sustainable micro-enterprises through efficient production methods and strong market connectivity, implemented for the overall business development of small entrepreneurs. The project is providing support to produce and distribute safe dairy and meat products following the Global GAP and HACCP protocols. Traceability and certification of those products will be introduced for the branding of dairy/meat products and help equip the participants with a valuable business tool for compliance of product quality. The objective of the sub-project is to increase the income, food security and nutrition situation of marginal, small farmers and small entrepreneurs in the project area through value chain activities. Now, FDA has taken the initiative to hire a consultant for baseline survey of safe meat and dairy products project beneficiaries in the project area.

## **2. Sub-project Goal and Outcome**

The chain activities will gradually increase the income, food security and nutrition situation of marginal, small farmers and small entrepreneurs under the project. In other words, the implementation of the sub-project will increase the production of 80% targeted entrepreneurs in regards to safe livestock production and increase 20% profitability of the targeted entrepreneurs, increase income of 60 percent of the entrepreneurs by at least 50 percent and 30 percent of the project members will be able to add nutritious food to their regular food list. The specific outcomes include -

- ✓ Eighty percent of the targeted entrepreneurs will produce safe meat, milk and milk products through using quality inputs, improved technologies and Good Husbandry Practices and Good Manufacturing Practices.
- ✓ Ten percent entrepreneurs' groups will achieve the capacity of running their business through establishment of formal contract with public and private market actors
- ✓ Forty percent of the targeted entrepreneurs will adopt climate smart/friendly technologies

For achieving these, the sub-project will implement the following six major interventions in the project areas:

- ❖ Livestock Service Market Development
- ❖ Feed Market Development
- ❖ Farm Mechanization
- ❖ Safe Milk and Milk products Market Development
- ❖ Safe Meat Market Development and
- ❖ Information Technology and Financial Service Market Development

### **3. Scope of work**

The sub-project aims to benefit 25,000 households including marginal, small farmers and microentrepreneurs consisting of ultra-poor, transitional poor and enterprising poor. In line with project targets, the baseline survey will collect information against all socio-economic indicators to measure project performance. 55% targeted project participants will be women. The youth (18-35) target will be 11.24% among the project participants. The baseline study will assess the present condition of gender and youth coverage. The sub-project has specific indicators to measure its performance in improving the nutritional status of its participants. By creating self and wage employment and expanding microenterprises, sub-project will contribute to the national target of poverty reduction. It is estimated that with project support a total of 25,000 entrepreneurs will adopt environmentally sustainable and climate-resilient technologies. The study will assess the present situation of the microenterprises regarding this issue. To cover indicators like the increase of income and production of the project households, profit increase in the enterprises, the study should investigate the present situation of project households and microenterprises. The study should look into the initial status on financial and technical supports, adopting of Global GAP and HACCP at the enterprise level, skill on production practices and technologies, adoption of technologies and/or management practices, rural enterprises accessing to business development services, persons in rural areas accessing financial services etc. The study should provide gender segregated data against all log frame indicators for the sake of future outcome and impact assessments.

### **4. Geographic Scope of the Survey**

The sub-projects will be implemented in different sub-districts of Bhola district among 25,000 participants considering the potentiality of the business cluster of dairy and meat sub-sector. Considering the above, this study will select the area and propose an appropriate sample size. The survey shall be conducted in the areas are mentioned in the following table:

District	Sub-District	Union	Total	
			Male	Female
Bhola	Charfashion	Aslampur	316	1228
		Osmanganj	267	928
		Aminabad and Omarpur	329	1343
		Zinnagar	60	1493
		Charfashion Pourosova	745	23
		Char Falmi	130	601
		Nil Komol	129	1115
		Nurabad	590	705
		Rasulpur	292	1197
		Ahammadpur	194	668
		Mujibnagar	251	668
		Char Manika	305	892
		HajariGanj	264	632
		Char Kukri-Mukri	185	603
	Monpura	1 no Monpura	91	661
		N. S. Sakuchia	222	792
	Lalmohon	Char Umed	220	1709
		Lalmohon Pourosova	118	1622
		Lord Hardinj	187	1794
		Char Vuta	98	1333
Total			4993	20007

## 5. Objectives of the Study

- To measure current perception, attitude, knowledge and behavior
- Study will further explore existing support system and linkage of the beneficiaries with local government institute and service providing agencies
- The study will serve the purpose of ensuring that the project indicators are SMART (specific, measurable, achievable, relevant, and targeted) and can be used for the study as well as future project monitoring and learning
- The baseline data will consider various socio-economic indicators including income, gender, nutrition etc. as per project log-frame.

## *METHODOLOGY*

FDA has taken initiative to conduct a baseline survey through an individual consultant to understand the current business, economic, environment and climatic conditions of the MEs who are likely to participate in the project activities. Moreover, the survey will establish the baseline situation on a significant number of variables relevant to sales, profit, employment, asset creation, environment and health and safety situation etc. by the project participants. The study will look into the initial status on financial and technical supports, adopting of Global GAP and HACCP at the enterprise level, skill on production practices and technologies, adoption of technologies and/or management practices, rural enterprises accessing to business development services, persons in rural areas accessing financial services etc.

### **i) Document review**

Before going to baseline assessment for this study, the necessary documents were reviewed for pre-assessment material of the program, which helped us for the improvement of details methodology, work planning, and questionnaire formation.

### **ii) Methods of data collection**

There were two approaches followed for data collection in the baseline survey; quantitative and qualitative approach. Household survey (HHS) was the quantitative approach of data collection conducted by a group of trained enumerators. FGD and KII were the methods for qualitative approach of data collection conducted by the consultant. The details of those methods are described here below.

### **iii) Development of questionnaires**

In the HHS, questionnaires were mostly formed by close ended questions (answer either 'yes' or 'no' or from multiple answers or multiple-choice questions) which may be described statistically. However open-ended questions are effective for acquiring qualitative information and are particularly good for determining people's estimation and feelings. During developing questionnaires, the objectives of that project was considered. Besides, as this was a purposive survey, all questions were made relevant to the dairy farming issues.

### **iv) Sample size for household survey**

Although, standard sample size was estimated statistically by the formula adopted by Cochran (1963), but considering the budget and duration of time to accomplish this study, the sample size of the respondent households (HHs), FGD and KII for conducting the baseline survey was finalized with the consultation of the client (FDA). Moreover, all the respondents were randomly chosen from the MEs in the survey areas. 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**

<b>District</b>	<b>Upazila</b>	<b>Union</b>	<b>MEs</b>	<b>HH sample</b>	<b>FGD</b>
Bhola	Charfashion	14	16153	392	8
	Monpura	2	1766	43	1
	Lalmohan	4	7081	154	2
<b>Total</b>			<b>25000</b>	<b>589</b>	<b>11</b>

<b>Sl.</b>	<b>Type of actors</b>	<b>Sample</b>	<b>Method</b>
1.	LSP and AI Technician	30	KII
2.	Feed Supplier (Dealer/retailer)	30	KII
3.	Medicine Seller	30	KII
4.	Govt. Official (ULO, DLO)	2	KII
5.	Milk Collector and Dairy Processor	28	KII
6.	Meat Seller	30	KII

#### **v) Approach to collect information from the respondent**

During survey, the research objective was clearly explained to all respondents prior to taking interview from them. The respondents were abstained from interview from any person who denied or showed any reluctance in providing information. 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 technique, enumerators randomly visited respondents' house from door to door for direct interviewing with the structured questionnaires.

#### ***Focus group discussion (FGD)***

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

### ***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***

Before going to the HHS, the consultant deliberated a debriefing session to the enumerators to make them clear understanding about the questions to be asked to the interviewers and the techniques how to collect information authentically.

### **vi) Data checking and quality control**

All the questionnaires filled by the enumerators was checked and crosschecked by the consultant prior to go for data punching.

### **vii) Data analyses**

After checking and cross examination, all data were imputed in MS excel worksheet and analysed by pivot table for frequency analysis. Further statistical analysis was performed by SPSS software conducted by the consultant himself. Results were tabulated and presented precisely in accordance with the objectives of the project to be implemented.

### **viii) Report writing**

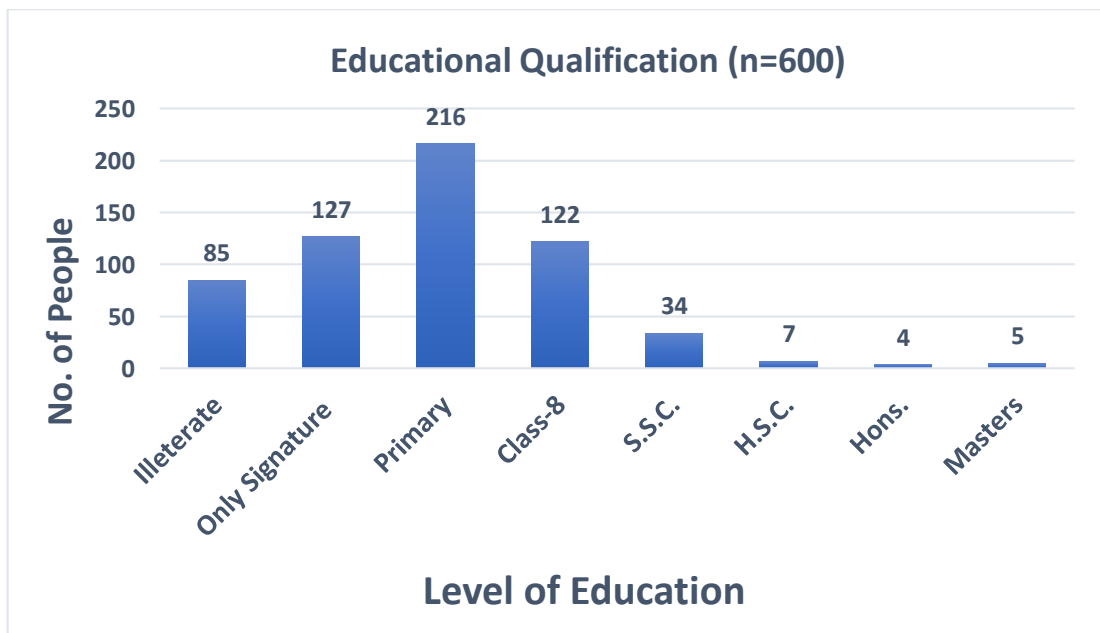
After analysing field data, a comprehensive report was formulated by the consultant which reflects the present scenario of dairy farming in the survey areas, identifies shortfalls, made recommendations thereof that would be the guidelines for implementing the project activities and interventions fruitfully.

# RESULT AND DISCUSSION

## 1. Special Information of the farmer

### ***Educational Qualification:***

The educational status of the participants are presented in Figure 1. In the survey area about 14% of the people were illiterate. Among the rest about 24% of the people can only write their name. Among the literate people about 42%, 23.5% & 10% people has completed their primary , Class-8 and higher than class-8 education, respectively.



**Figure 1: Educational qualifications of the farmers**

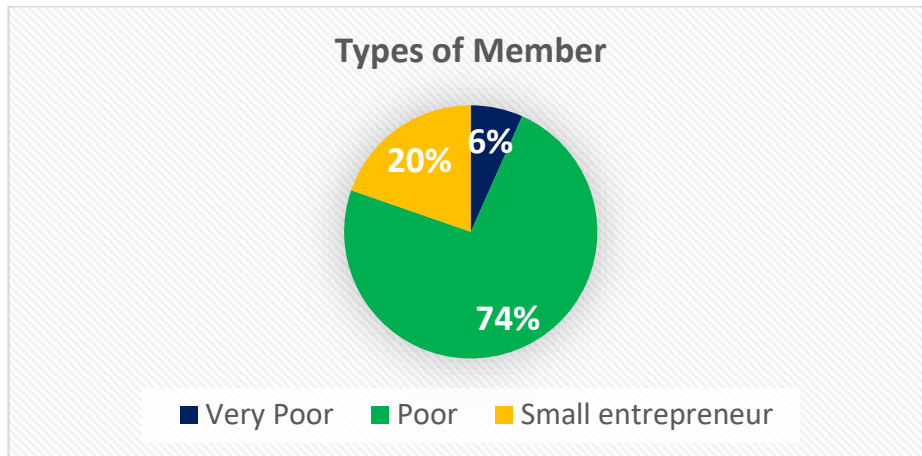
### ***Types of Members:***

Distribution of the landless/very poor, poor and small entrepreneurs are illustrated in the Figure 2. In the survey area most of the farmer (about 74%) are poor who has 5-149 decimal land. About 6% participants have less than 4 decimal lands. One fifth of the farmers in the survey area have more than 149 decimal lands.

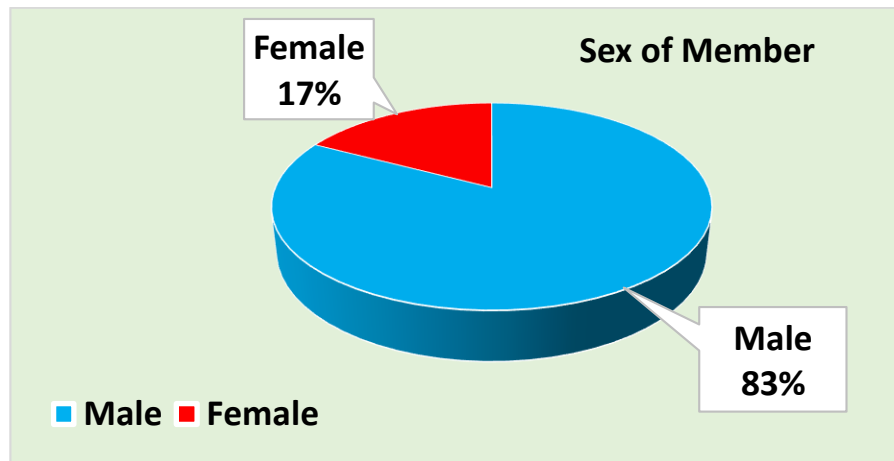
### ***Sex and Age of the Farmers:***

The results in sex and age of the members are shown in Figure 3 and Figure 4, respectively. Most of the member in the collected data are male (about 83%). In the survey area about 76% of the members were above 35 years of age. Most of the young people below 35 years of age are involved with other activities like business, job etc. Only about 24% of the member are below 35 years of age.

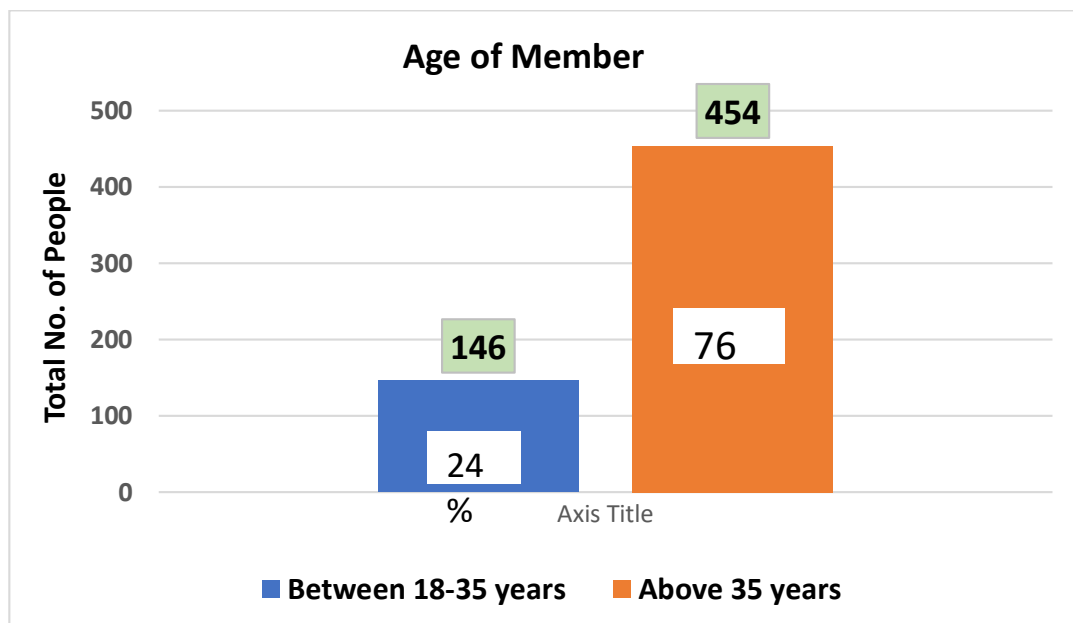




**Figure 2: Types of members based on the land area**



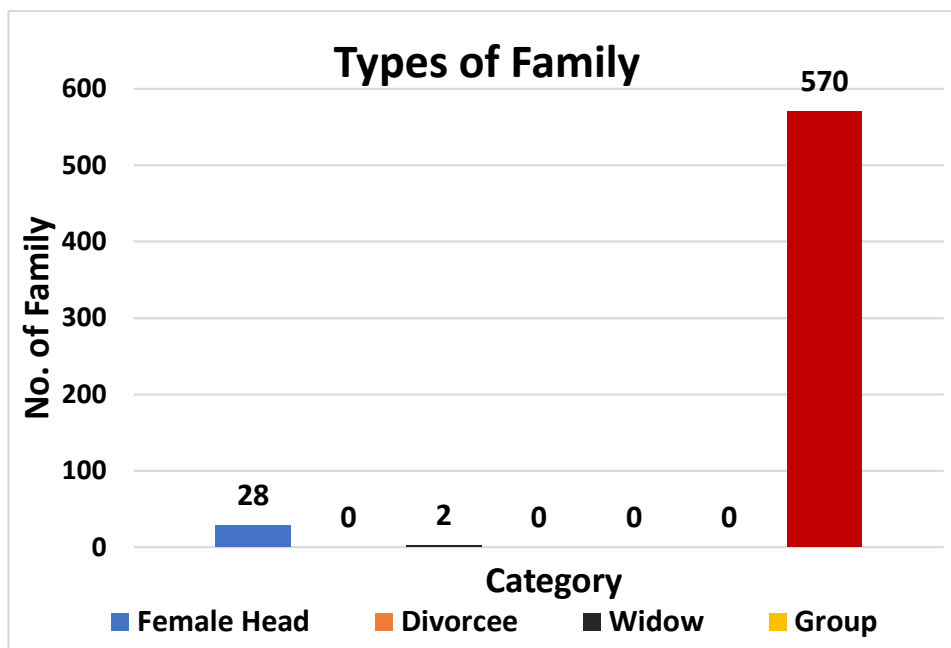
**Figure 3: Sex of the participants**



**Figure 4: Age classification of the farmers**

### **Types of Family:**

In the survey area 95% of the family is male headed type. Only in 4.6% of family female is headed. In these families where female is head their husbands are in abroad or in other cities for work. We didn't find any divorce, lower cast, tribal and lame headed family and found only 2 widowed family (Figure 5).



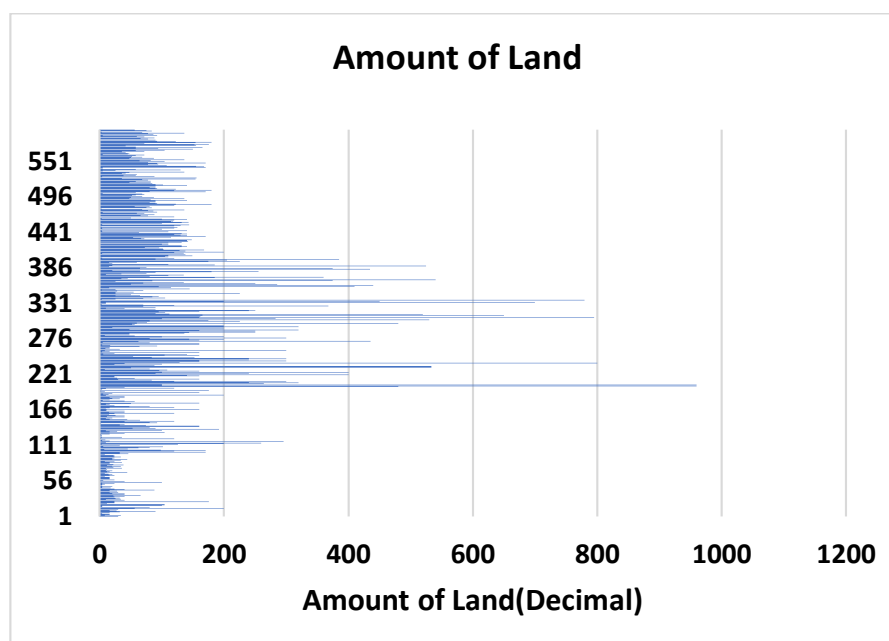
**Figure 5: Types of family in the surveyed farmers**

### **Amount of land:**

The data found on the area of land owned by each of the respondents are presented in Figure 6 and the summary statistics are presented in Table 1. In the survey area the farmer has 101.25 decimal land on an average. The higher standard deviation indicating the diversity of the data collected which is also reflected in the minimum and maximum land area owned by the participants (Table 1) and frequency (number of farmers) of each area owned (Figure 6).

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

Statistical Parameter	Decimal
Mean	101.25
Standard deviation	123.45
Minimum	0
Maximum	960



**Figure 6: The area of land (decimal) owned by each of the participants**

***Monthly Income by Rearing Livestock:***

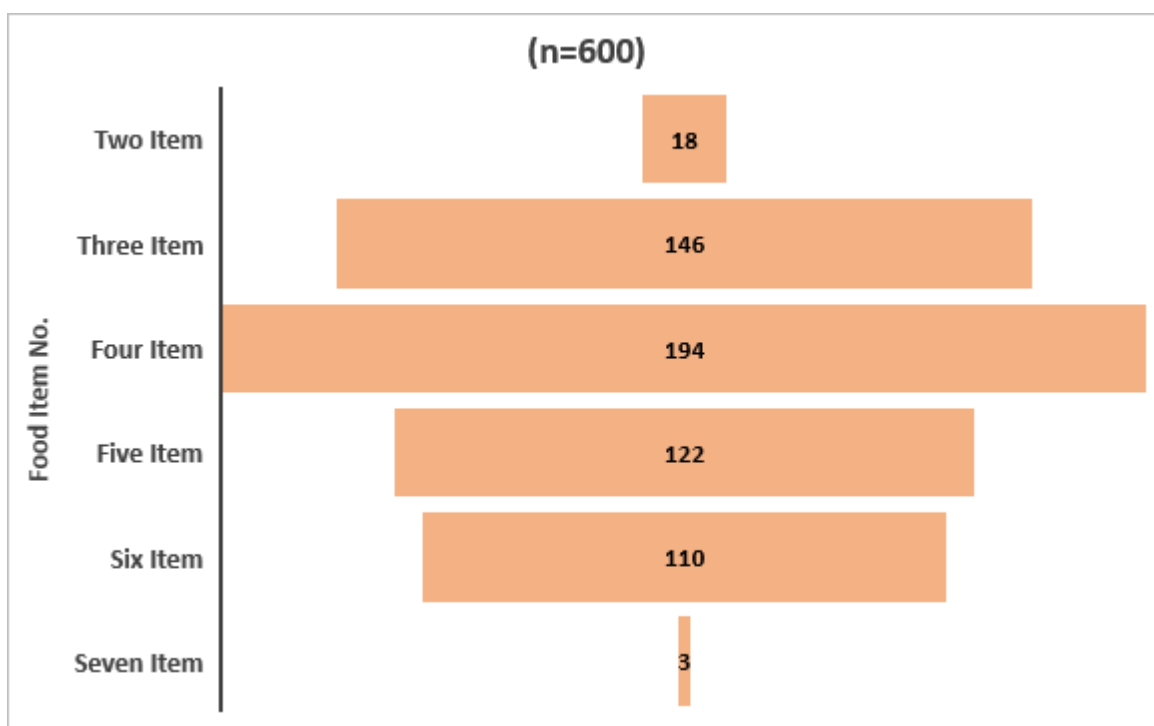
The participant’s income from livestock rearing is summarized in Table 2. In the survey area average monthly income of buffalo farmer is 20007 taka. A Farmer made 180000 tk income (highest income) by rearing buffalo. Average monthly income by rearing cattle and goat is approximately one-third and one-tenth of the income from the buffalo. Again, a larger standard deviation indicating the diversity of the data collected.

**Table 2: Income of the farmers from Buffalo, Cattle and Goat farming (Monthly, in BDT)**

Animal	Mean	Standard Deviation	Minimum	Maximum
Buffalo	20007.09	22815.45	600	180000
Cattle	6740.551	11191.47	0	100000
Goat	2177.404	2329.901	0	22000

***No. of Food Item Taken by Female Member of the Family:***

In last 24 hrs during the survey, the diversity of the food items taken by the females of the family are illustrated in Figure 7. During the survey the female person of about 32% family took 4 food ingredients in last 24 hours. The female person of 24%, 20% and 18% family took three, four and five food ingredients, respectively in last 24 hours.



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

## **2. Livestock, Finance, Employment, Capital and Income**

In the survey area 459 households keep cattle for rearing. 208 and 148 family keep goat and buffalo, respectively. About equal number of family (about 235) keep Chicken and duck along with the ruminant animal (Figure 8). In the collected data from 600 farmer, they have 2118 cattle, 784 goat and 2294 buffalo in total. The farmer who rears cattle keeps 4.6 cattle per head. In the collected data a farmer has 26 cattle (highest). The buffalo farmer keeps 15.5 buffalo per head. The farmer belonging highest number of buffalo has 70 buffalo in total (Table 3).

In the survey area most of the farmer (about 54%) keep 1-5 cattle on an average. 23.5% of the people don't keep any cattle. 18.5% of the people keep 6-10 cattle. Very few farmers keep above 11 cattle per head (Figure 9). The data on goat and buffalo are presented in (Figure 10 and Figure 11), respectively. In the survey area about 34.6% of the farmer keep goat for rearing. Most of the farmer about 30% of the farmer keep 1-5 goat per head. In the survey area about 24.5% of the people rear buffalo (That means 148 farmers rear buffalo among the 600 collected data). It is to be noted that in the main land area about 1% farmer keep buffalo in the collected data and the percentage of buffalo farmer is higher in the Char or Bathan area. Among the buffalo farmer about 48% of the farmer keep 1-10 buffalo and about 26% of Farmer keep 11-20 buffalo per head.

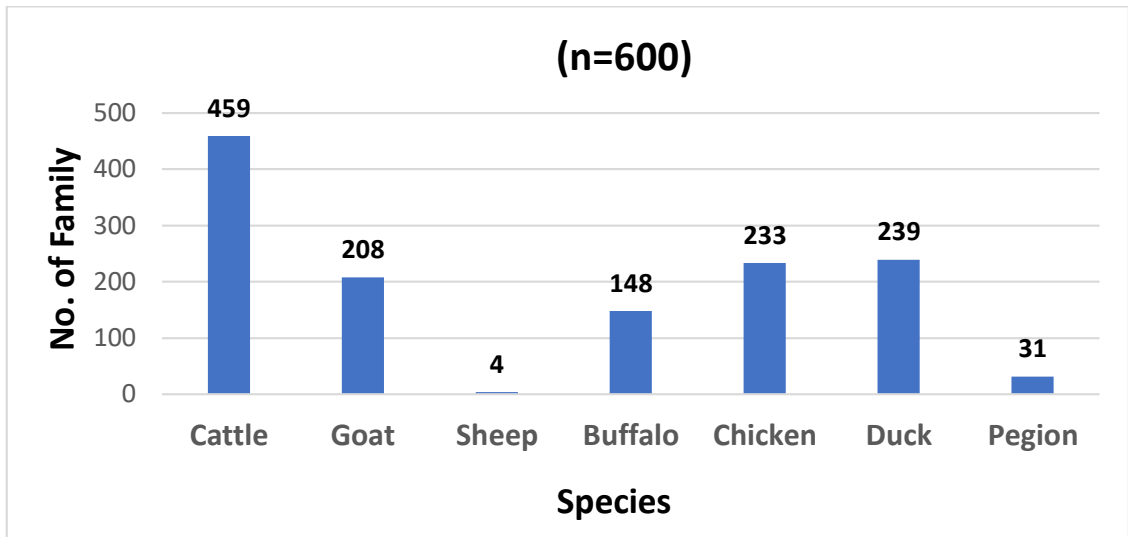


Figure 8: Diversity of livestock rearing in the survey areas

Table 3: Number of buffalo, cattle and goat reared by the participants

Animal	Total	Mean	Standard Deviation	Minimum (Among who Rear the Animal)	Maximum
Cattle	2118	4.614379	3.464336	1	26
Goat	784	3.769231	2.452371	1	16
Buffalo	2294	15.5	12.67302	2	70

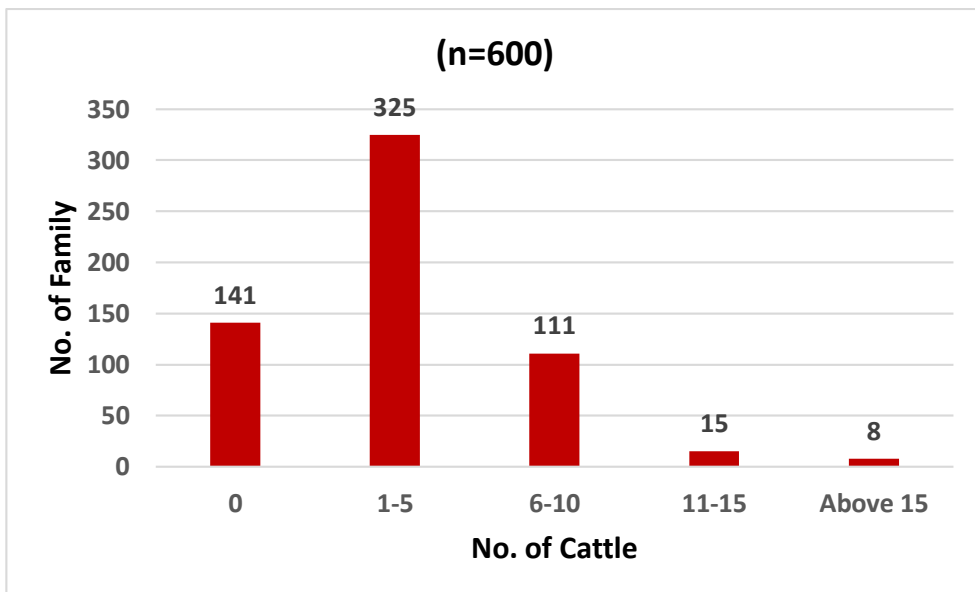


Figure 9: Frequency of number of cattle reared by the farmers

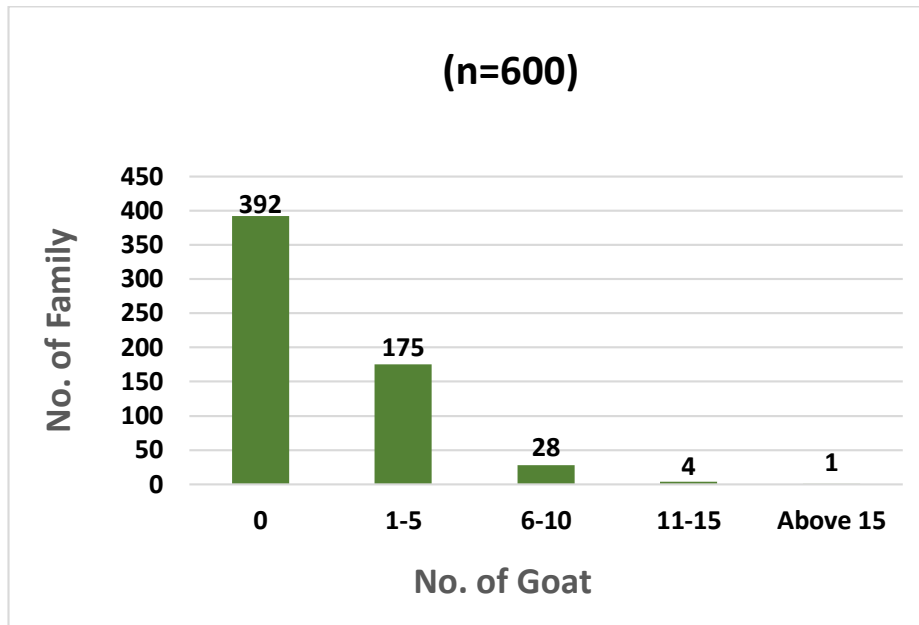


Figure 10: Frequency of number of goats reared by the farmers

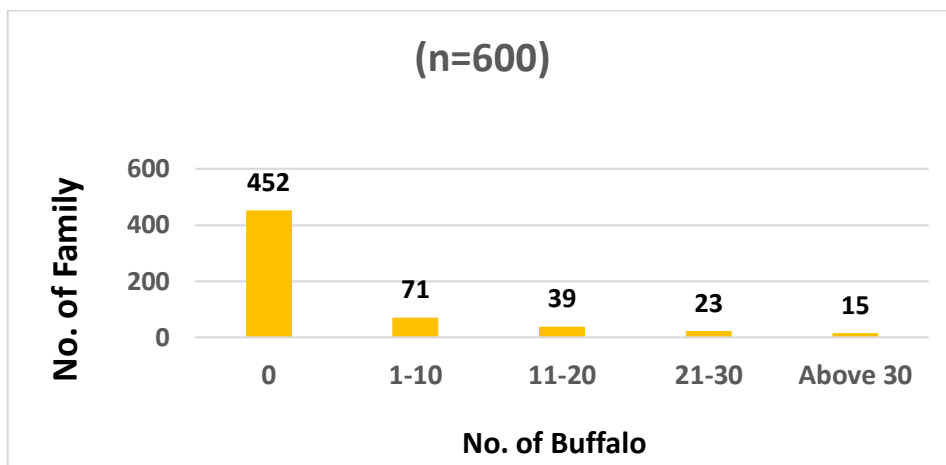
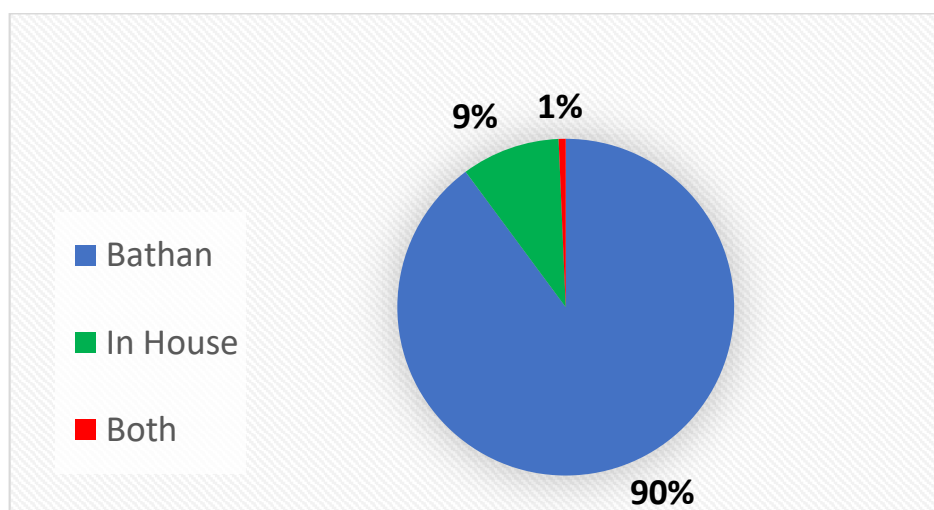


Figure 11: Frequency of number of buffalo reared by the farmers

About 90% of the farmer rear their buffalo in the bathan area. 9% of the farmer who can't go to bathan rear their buffalo in house but graze their buffalo in the fallow land around their house (Figure 12). The buffalo farmer has average 4-5 milch buffalo per head. They have 2 breeding male buffalo and 5-6 female buffalo on an average. Number of Murrah buffalo is very few (Table 4)

In the survey area the mean value of cattle per farmer is 4.63. One farmer rear 36 (highest) cattle. Most farmer rear indigenous cow. The data in the table shows that the mean value of indigenous and crossbred cow is 1.73 and 0.73 respectively (Table 5)



**Figure 12: Buffalo rearing system followed by the farmer**

**Table 4: No. of buffalo reared by the Participants**

Types	Total	Mean	Standard Deviation	Maximum
Milch Buffalo	638	4.87	3.829	17
Buffalo Bull	428	3.24	2.641	15
Breeding Male Buffalo	235	2.07	1.918	10
Breeding Female Buffalo	821	5.82	4.565	25
Murrah Male Buffalo	16	0.61	2.450	12
Murrah Adult Buffalo with calves	0	0	0	0

**Table 5: Number of cattle reared by the participants**

Types	Total	Mean	Standard Deviation	Maximum
Cattle	2114	4.63	3.482	36
Indigenous Cattle	1435	3.43	3.216	31
Crossbreed Cattle	679	2.42	2.985	24
Milch cow	694	1.84	1.288	9
Indigenous Cow	637	1.73	1.482	13
Crossbreed cow	287	0.73	1.910	10
Crossbreed Calf	332	1.03	1.100	5

Figure 13 shows about 94% farmer who rear goat, keeps Black Bengal goat in their household. 5% of the farmer rear crossbreed goat. About 34.5% of farmer are running fattening program of cattle, buffalo and goat. 23% of the farmer are rearing cattle for fattening (Figure 14).

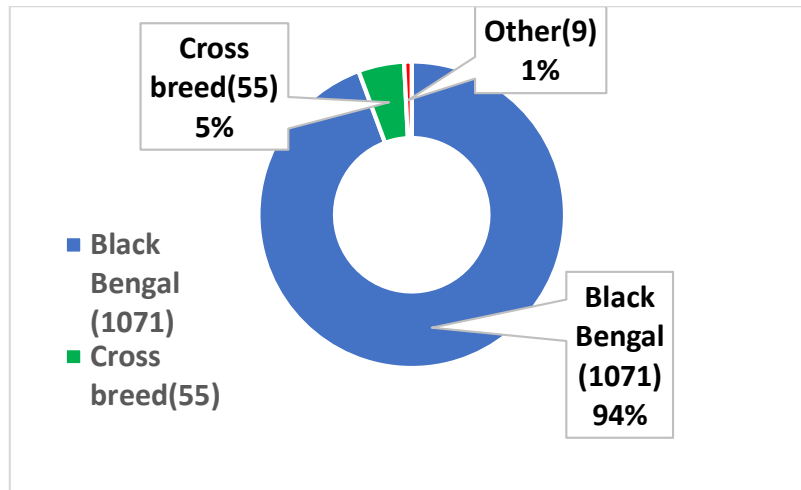


Figure 13: Different breeds of goat reared by the participants

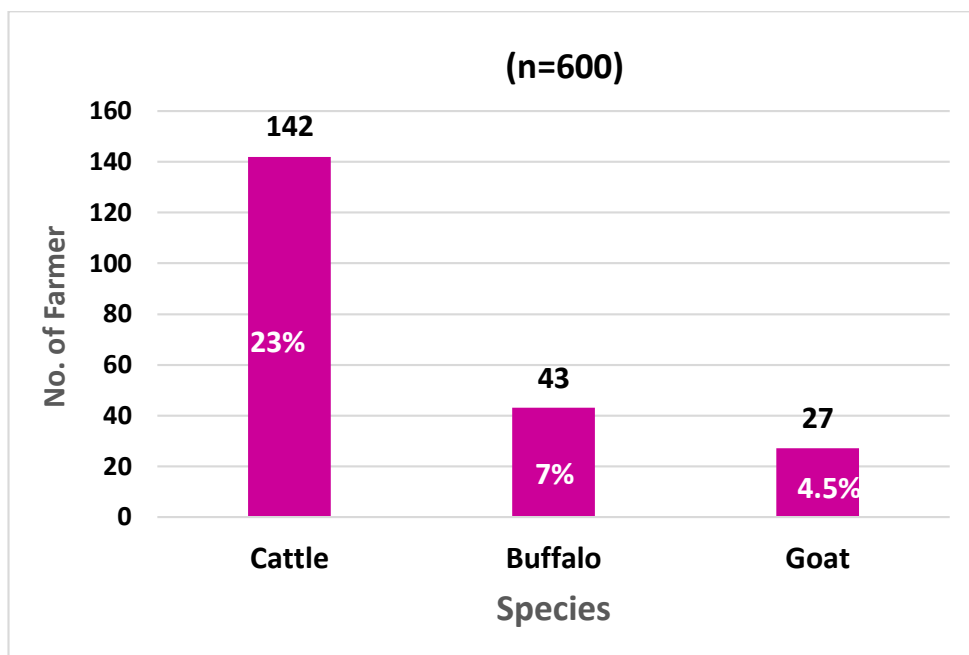
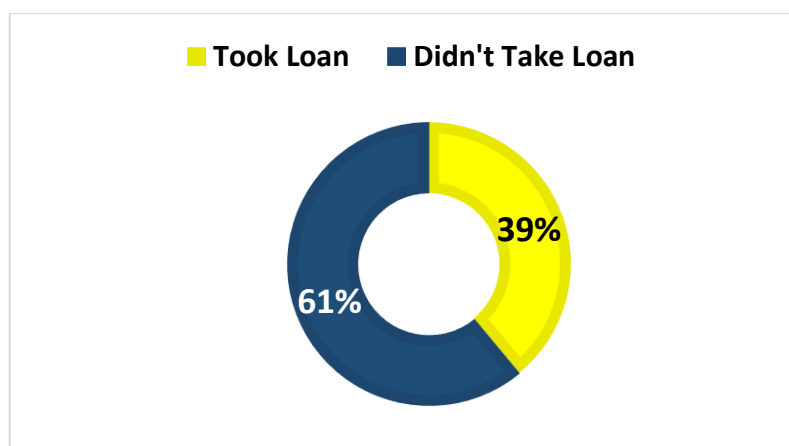


Figure 14: No. of Farmer Practise Fattening



**Table 6: Number of Animal Reared for Fattening**

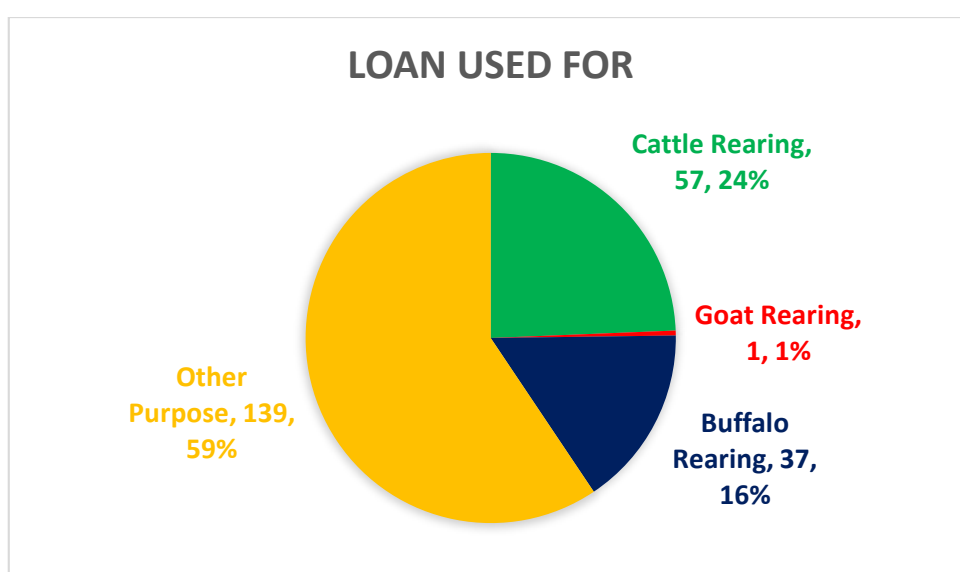
Species	Total	Minimum	Maximum
Cattle	397	1	15
Buffalo	180	1	18
Goat	61	1	6



**Figure 15: Proportion of farmers in relation to loan**

**Table 7: Statistical parameters on the loan taken by the farmers**

Total Number	Mean	Standard Deviation	Minimum	Maximum
234	81000	64424.09	10000	600000



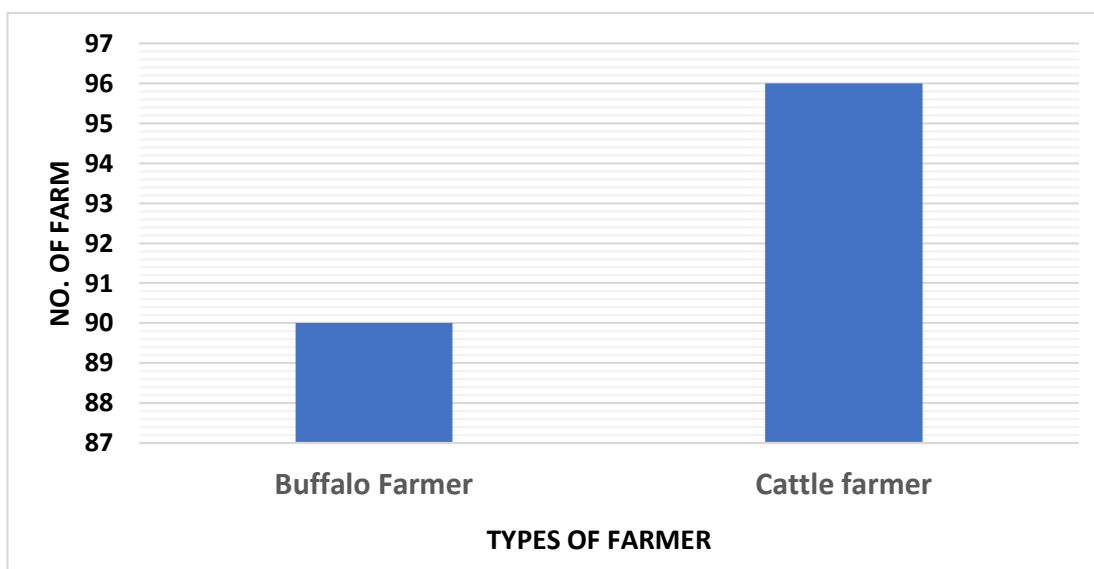
**Figure 16: Purpose of using the loan money**

About 39% of the farmer took loan from organization or other sources (Figure 15). They took it mainly for making house or buying land. The farmer took 81000-taka loan on an average (Table 7). Among the loan taker about 59% of the farmers use their loan in other purposes. They mainly use this loan for building houses or buying land. About 24% & 16% of farmer use their loan for rearing cattle and buffalo, respectively (Figure 16). Table 5 reveals that, cattle farmer took 86929.2-taka loan in an average whereas buffalo farmer took 124594 takas on an average.

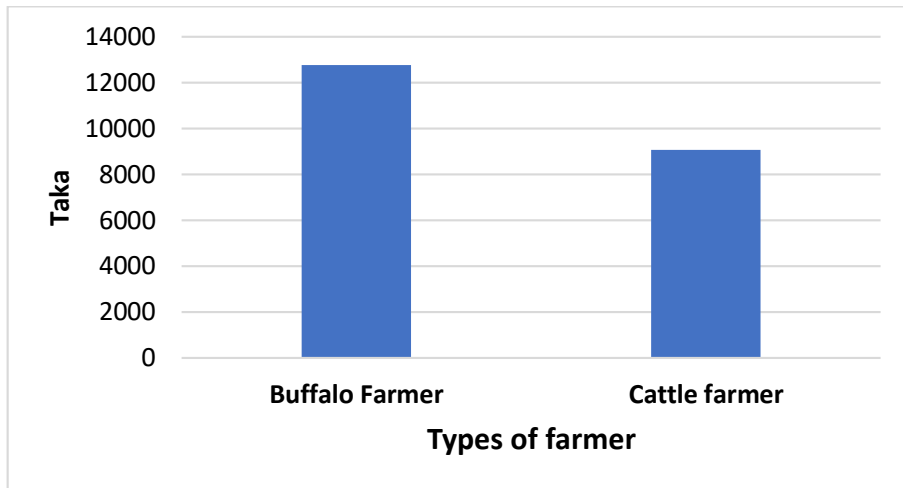
**Table 8: Number of cattle and buffalo farmers loan statistics**

Used for	Total Number	Mean	Standard Deviation	Minimum	Maximum
Cattle Rearing	57	86929.82	89281.63	10000	400000
Buffalo Rearing	37	124594.6	70998.61	20000	400000

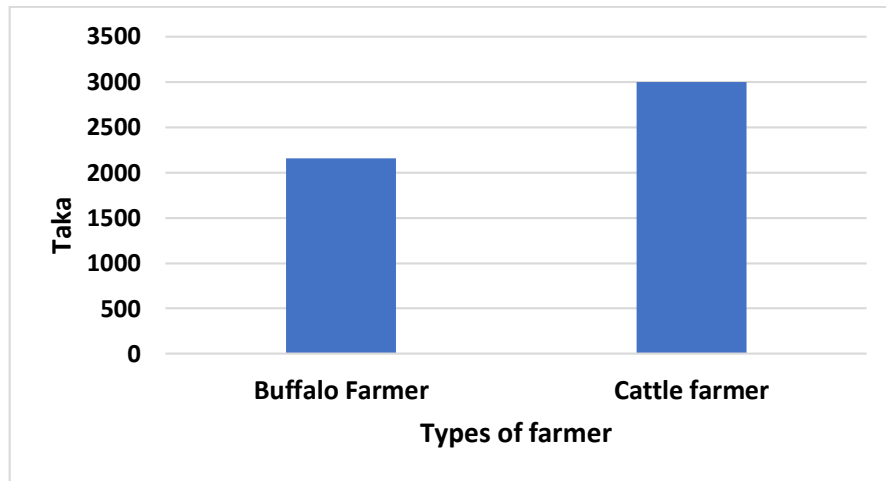
Figure 17 shows that 90 buffalo farmers out of 148 keep full time labor whereas 96 cattle farmers out of 459 cattle farmers do the same. In Figure 18, monthly salary for the labors is presented. The buffalo farmer pays about 13000 taka per month on an average for labor. But most of the cattle farmer rear small number of cattle so most of the farmer don't keep labor. So, the average value that the cattle farmer pay for labor is also less. The cattle farmer gives around 9000 taka per month on an average for labor cost. Buffalo farmers have to pay extra about 2200 taka other than the monthly salary to their labor. This cost is about 3000 per head in case of cattle farmer (Figure 19).



**Figure 17: Total Number of Farmer keep Labour**

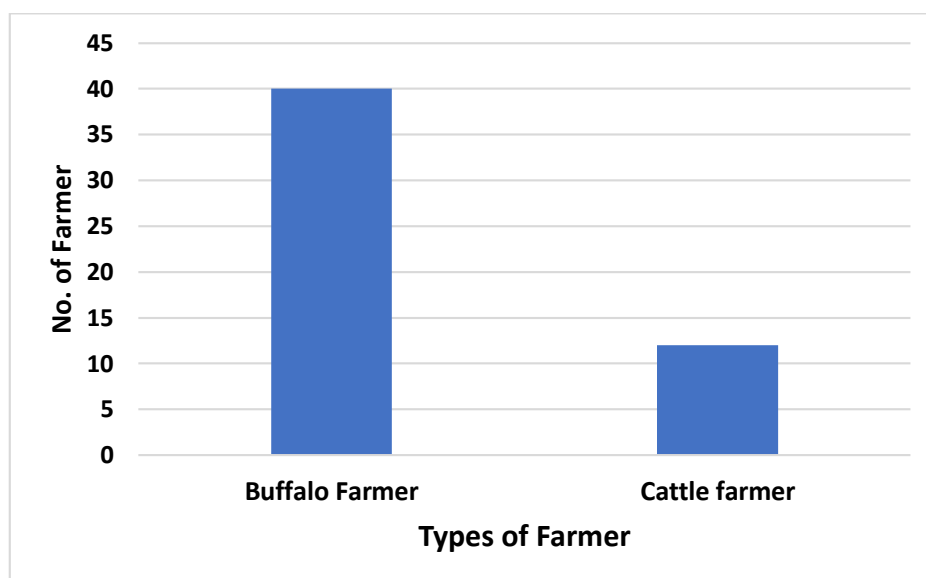


**Figure 18: Average Monthly Salary Spent by the Farmers**

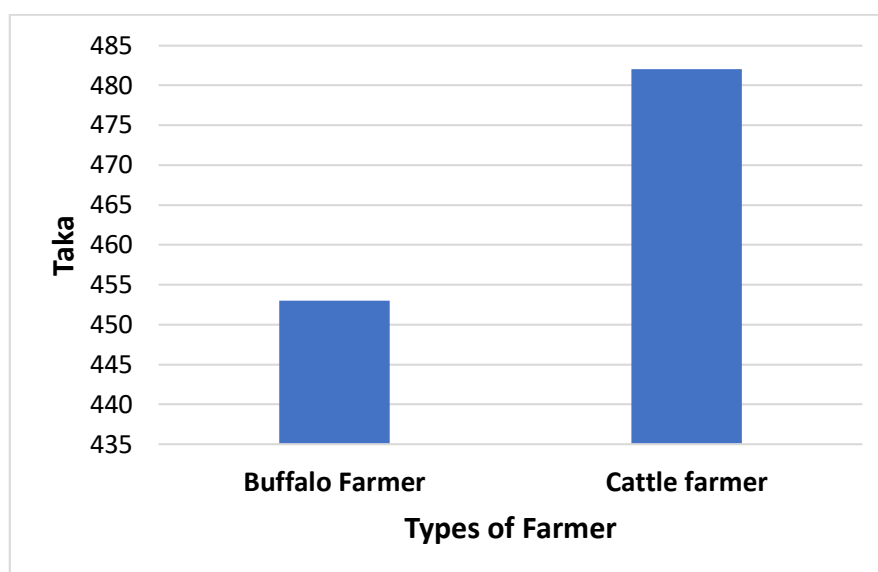


**Figure 19: Other Expenditure Spent by the Farmers**

Figure 20 shows that total 40 buffalo farmer keep temporary labour and only 12 cattle farmer keep temporary labour on an average. The buffalo farmers give about 455 taka daily allowance to their temporary labour and the cattle farmer pay about 480 taka per labour as daily allowance (Figure 21).



**Figure 20: Number of Farmer keeps Temporary Labour**



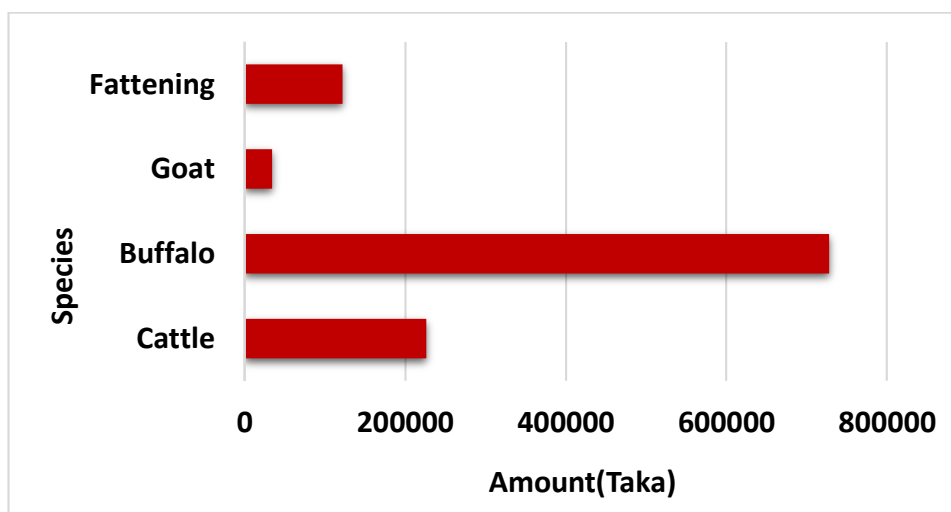
**Figure 21: Daily Allowance Given by the Farmer to Temporary Labour**

Buffalo farmer has the highest investment for livestock farming. The average investment of buffalo and cattle farmer is 728266 taka and 225607 takas respectively (Table 9). In the survey area among the investment for livestock most percentage of investment is from own. Average own investment of cattle and buffalo farmer is 203988 taka and 656241 takas respectively (Table 9)

Figure 23 stated very few farmers deposit the selling money of their animal. 40 cattle farmers deposited money in bank or other place from selling price of their animal. Number of Buffalo farmer who has deposited the selling money of buffalo is very low but average amount of deposited money is quite high about 153571 taka (Figure 24).

**Table 9: Diversity of investment by different types of farmers**

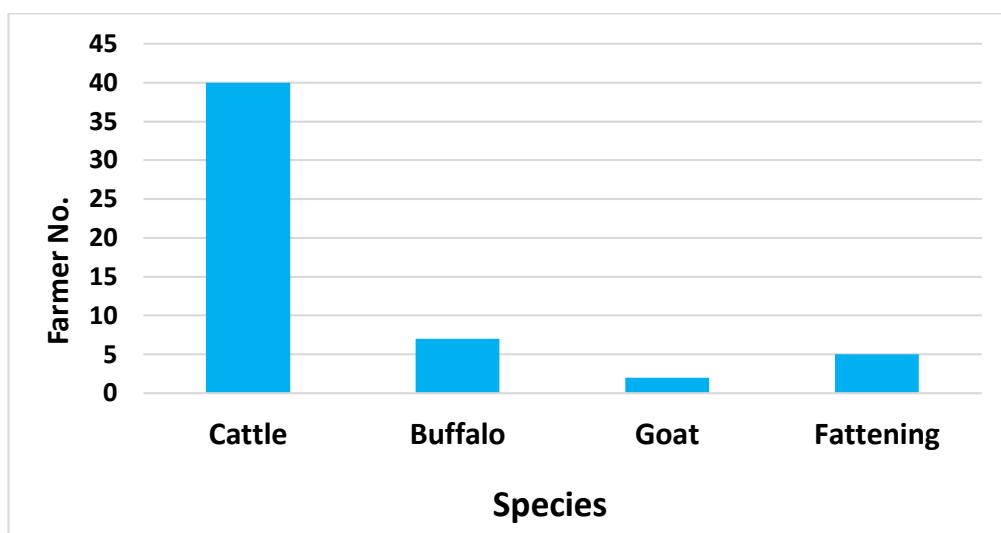
Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	225607.2	258770.9	10200	2500000
Buffalo farmer	728266.7	699628.4	90000	6000000
Goat farmer	33903.23	24953.14	5000	150000
Fattening farmer	120080	133521.8	20000	700000



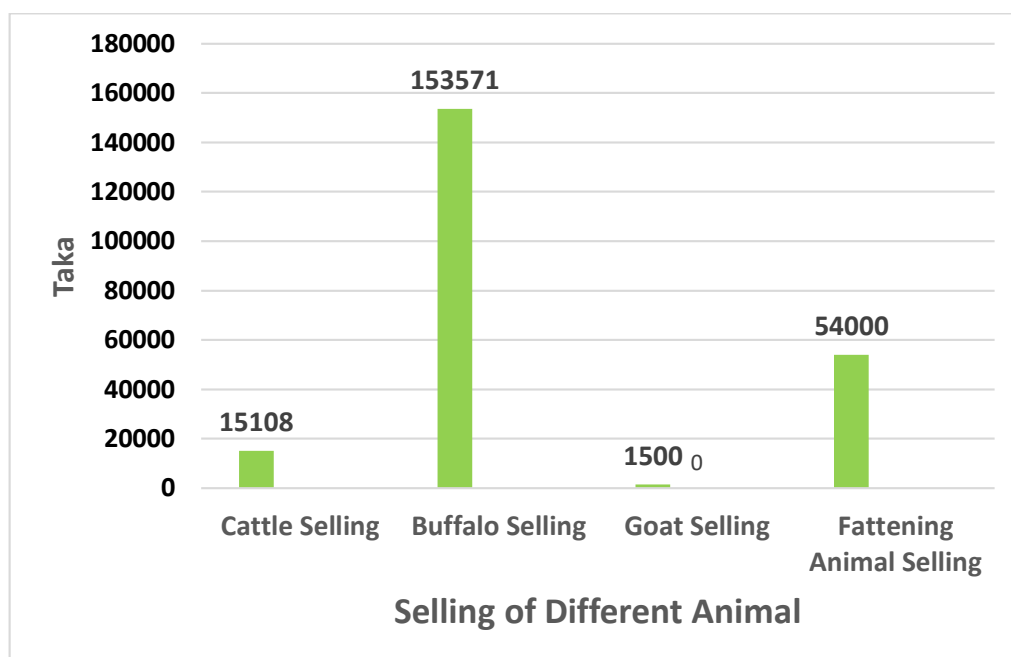
**Figure 22: Average Investment of Each Farmer**

**Table 9: Diversity of own investment by different types of farmers**

Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	203988.9	242862.9	3058	1900000
Buffalo farmer	656241.6	523989.3	50000	2500000
Goat farmer	34503.27	27152.14	3000	200000
Fattening farmer	89250	53964.76	12000	220000



**Figure 23: No. of Farmer Deposited Livestock Selling Money**



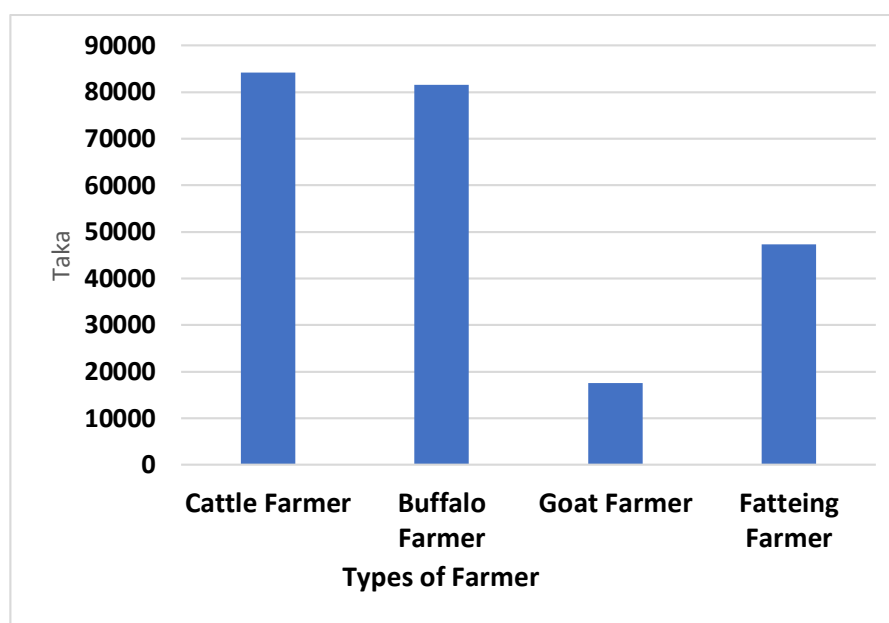
**Figure 24: Average Amount Deposited by Farmers**

Average feed cost per year for cattle farmer is 84129.22 taka and for buffalo farmer it is about 81578 taka per year. This cost is not for single animal. Rather this value defines the cost of each cattle or buffalo farmer for feed on an average (Table 10). Figure 26 shows average labor cost of buffalo farmer for rearing buffalo is higher than the other farmer. This is because buffalo farmers usually maintain large herd for that many labor is required. Treatment cost is also high for the buffalo farmer for maintaining large herd. Buffalo farmer need about 11000 taka per year for treatment cost of buffalo. Cattle farmer need about 9000 taka per year for the treatment purpose of their cattle (Figure 27). Figure 28 illustrates Buffalo farmer spend approximately 3000 takas for other purpose and the cost for cattle for other purpose is

approximately 1800 taka. Average total yearly cost of cattle farmer for raising cattle is about 120500 takas. Average total yearly cost of buffalo farmer is higher than the cattle farmer. For rearing buffalo, the yearly average cost is 132880 taka (Table 11).

**Table 10: Feed cost statistics incurred by the farmers**

Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	84129.22	101338.8	10000	810000
Buffalo farmer	81578.57	72375.46	10000	400000
Goat farmer	17583.12	9953.827	1200	60000
Fattening farmer	47296.3	58033.02	7000	300000



**Figure 25: Average Feed Cost per Year Per Farmer**

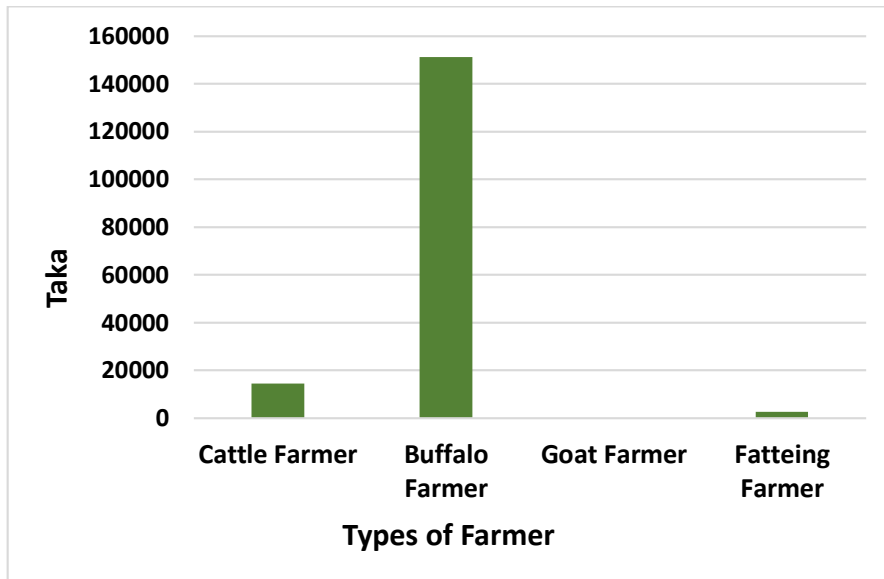


Figure 26: Average yearly Labour Cost spent by different farmer

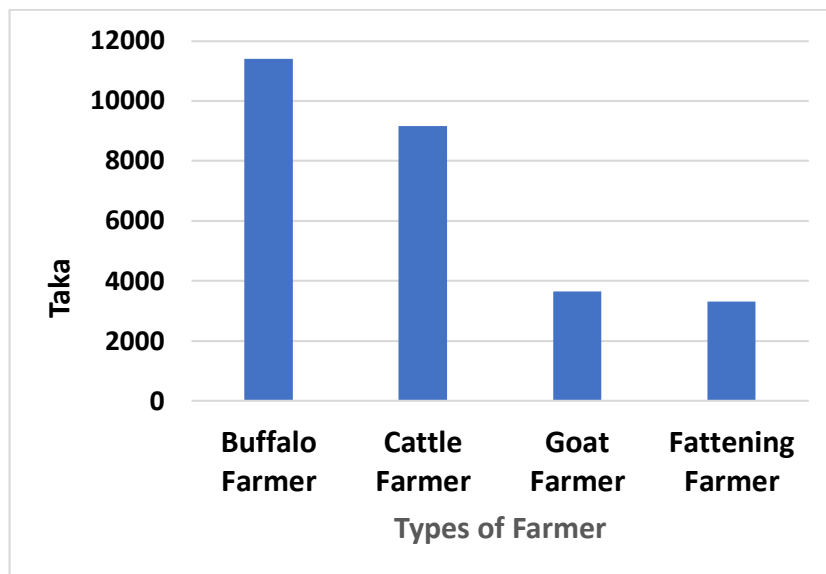


Figure 27: Average yearly treatment Cost spent by different farmer



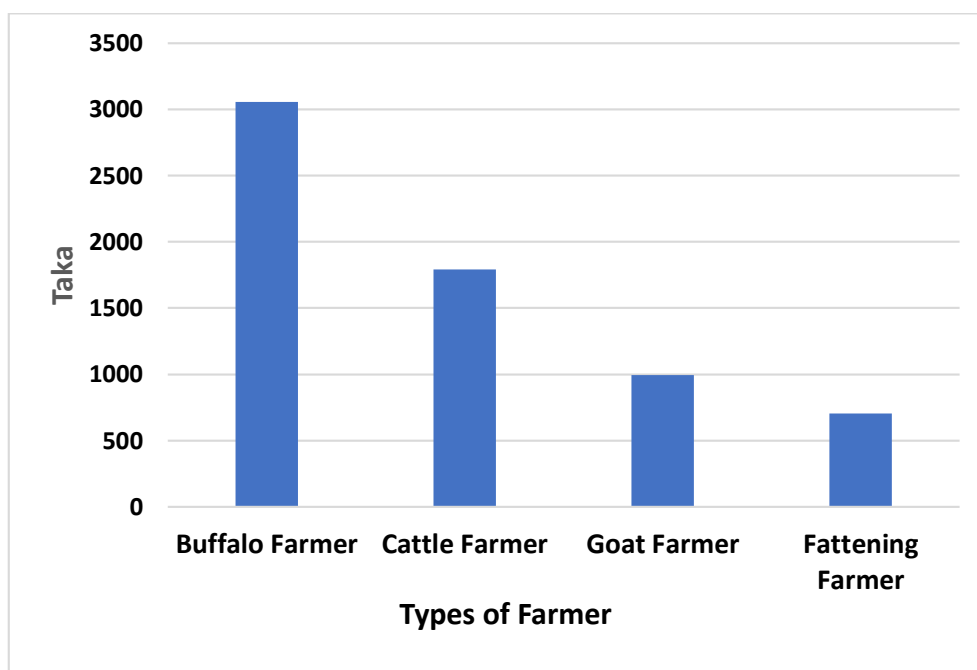


Figure 28: Average yearly other cost spent by different farmer

Table 11: Statistical analysis of total yearly cost by different farmer

Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	120557.7	159725.6	20000	1330143
Buffalo farmer	132880	125878	20000	525000
Goat farmer	22576.6	13284.94	2500	95000
Fattening farmer	43492.59	31859.68	12000	147000

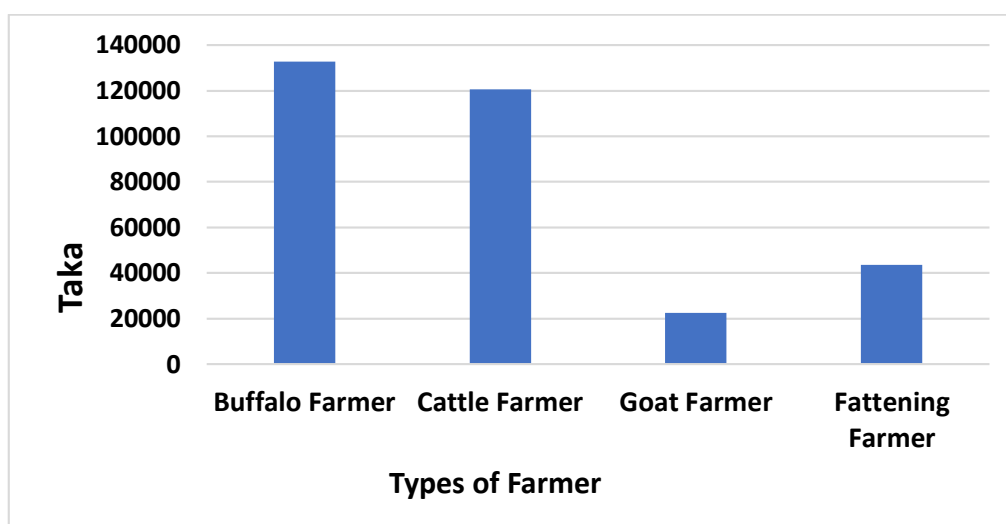


Figure 29: Average yearly Total Cost by Each Farmer

Total yearly income is calculated by adding the selling money of animal, selling price milk, selling price of waste product etc. Average income of cattle farmer is about 180405 taka per year and buffalo farmer is 320561 takas. (Table 12)

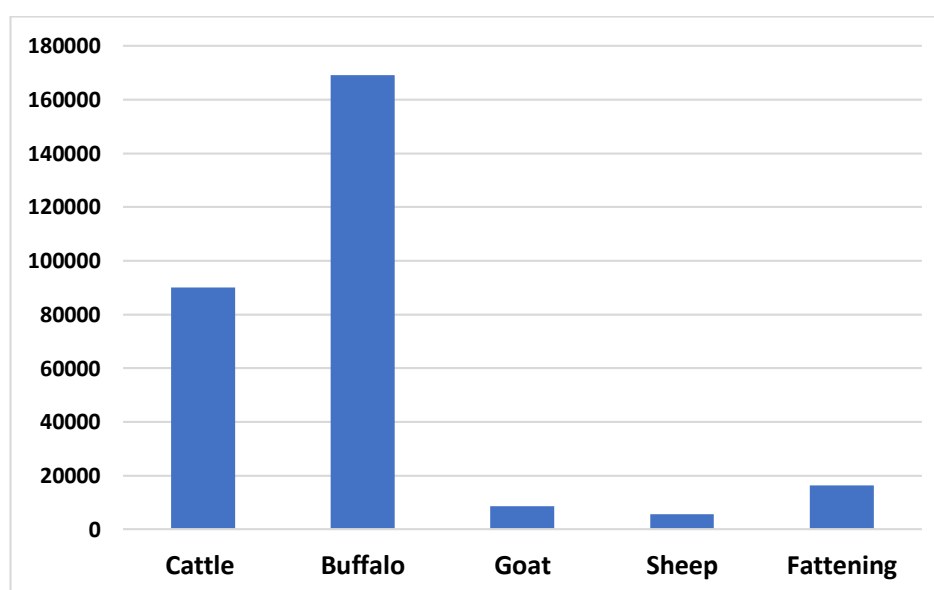
After calculating the net income, it was found that many farmers couldn't made profit. Though some farmers made good amount of profit mainly by selling animal. Cattle farmer made 90063-taka yearly profit on an average whereas buffalo farmer made profit of 169027 taka per year on an average (Table 13).

**Table 12: Total yearly income by farmer**

Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	180405.2	223820.5	0	1840000
Buffalo farmer	320561.6	255537.1	27000	1200000
Goat farmer	29980.58	58348.51	0	60000
Fattening farmer	65500	51798.83	0	200000

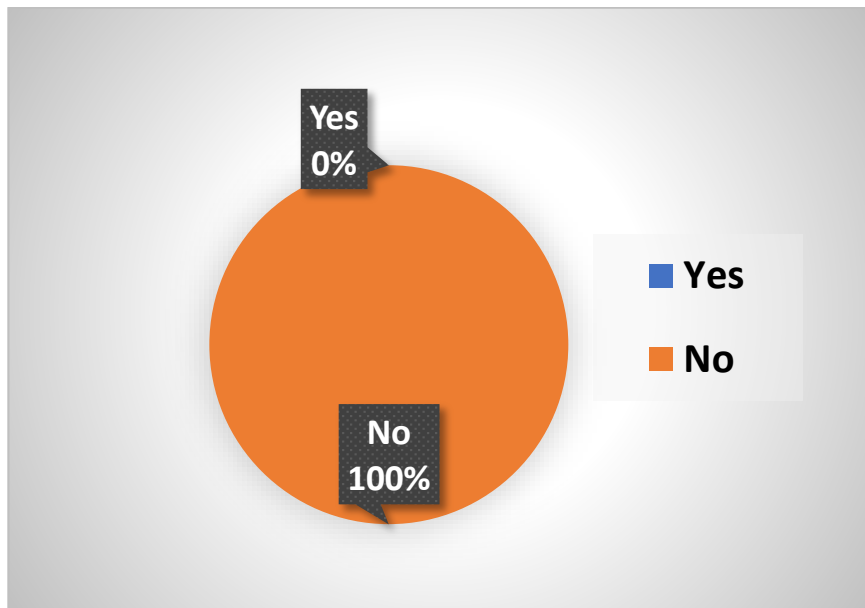
**Table 13: Statistical analysis of net yearly income by different farmer**

Types of farmers	Mean	SD	Minimum	Maximum
Cattle farmer	90063.58	154492.1	-187000	1276000
Buffalo farmer	169027.3	212792	-485000	924000
Goat farmer	8648.877	105802.1	-50500	72000
Fattening farmer	16453.85	25777.48	-36000	120000

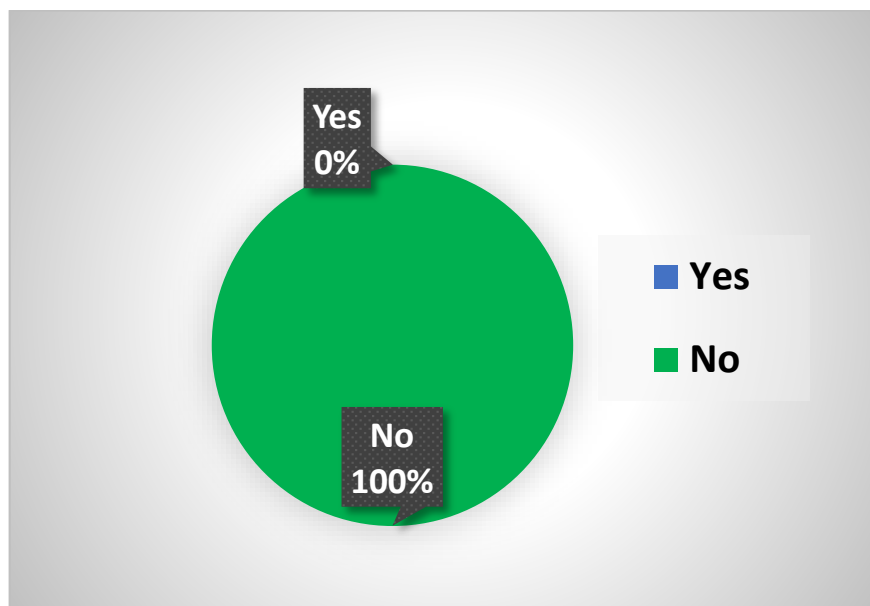


**Figure 30: Average Net Yearly Income per Farmer by Rearing Different Livestock**

No farmer has any official or unofficial contract with any govt. or private market, businessman or buyer for selling live animal and milk (Figure 31 and Figure 32), respectively.



**Figure 31: Contract for Selling Live Animal**



**Figure 32: Contract for Selling Milk**

### 3. Dairy Animal Production, Milk and Milk Products – Supply and Value Chain:

About 3% of the cattle farmer follows the biosecurity management. They mainly rear their cattle intensively (Figure 33). None of the buffalo and goat farmer follow biosecurity practices for rearing buffalo and goat (Figure 34 and Figure 35), respectively. Figure 36 shows none of the farmer follow proper husbandry practices for rearing cattle, buffalo, goat and sheep.

Figure 37 and Figure 38 shows that only 10 % of cattle farmer and 2% of buffalo farmer try to ensure good quality feed for their cattle and buffalo. Rest of the farmer are not concern about the quality of feed (Figure 39).

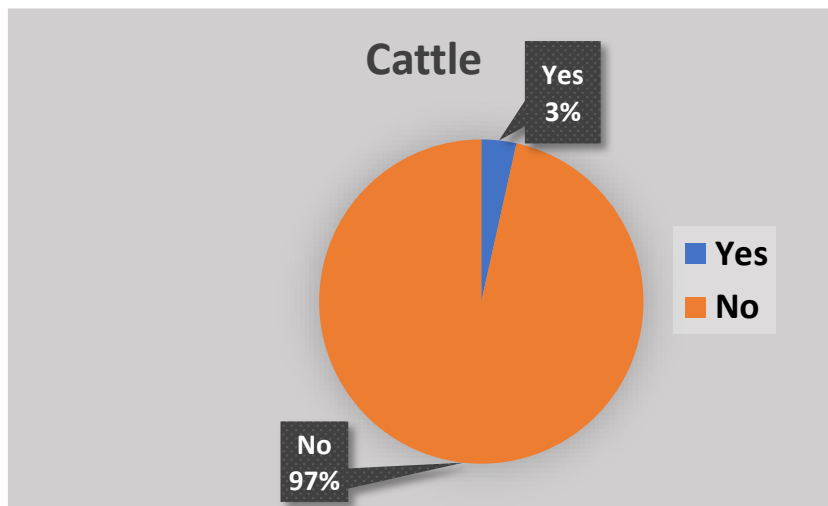


Figure 33: Following biosecurity for rearing cattle

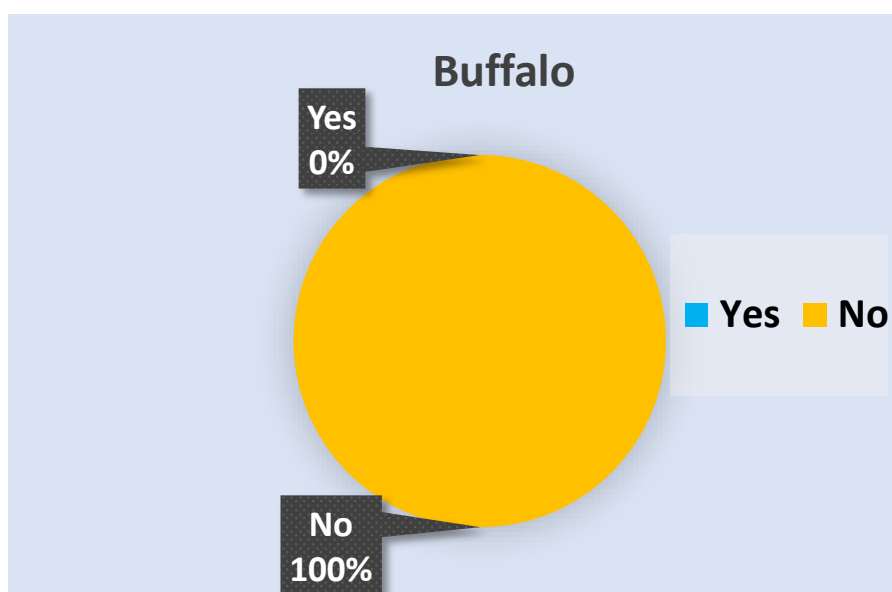


Figure 34: Following biosecurity for rearing Buffalo

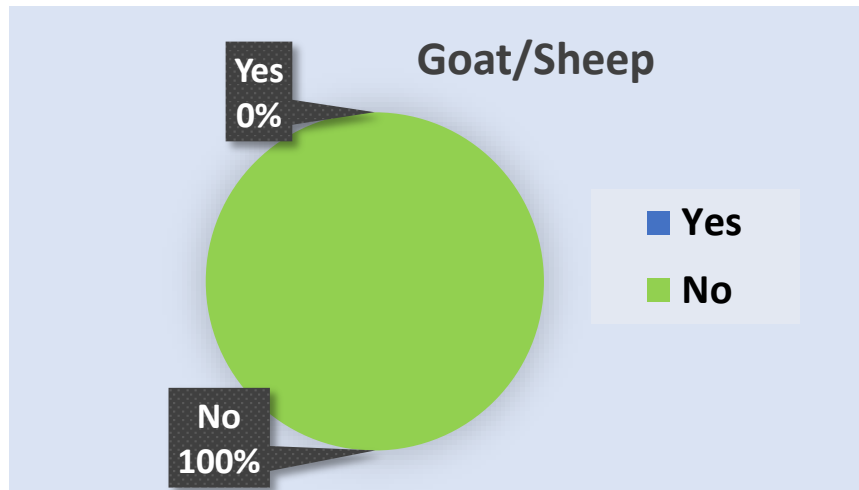


Figure 35: Following biosecurity for rearing Goat

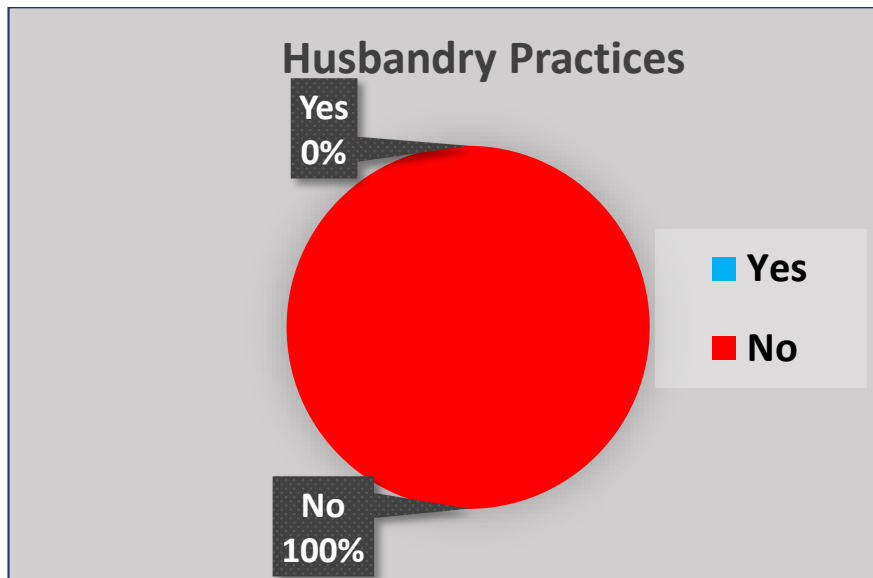


Figure 36: Following Good Husbandry Practices for rearing Cattle, Buffalo and Goat

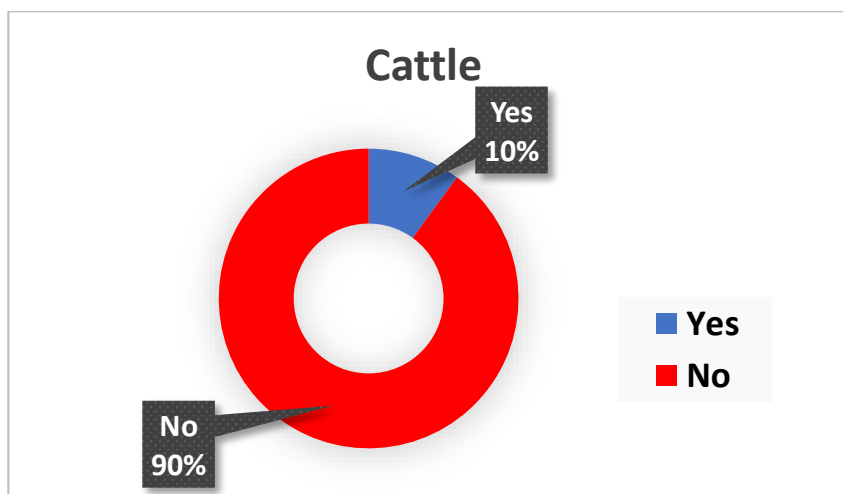


Figure 37: Supplying good quality feed to cattle

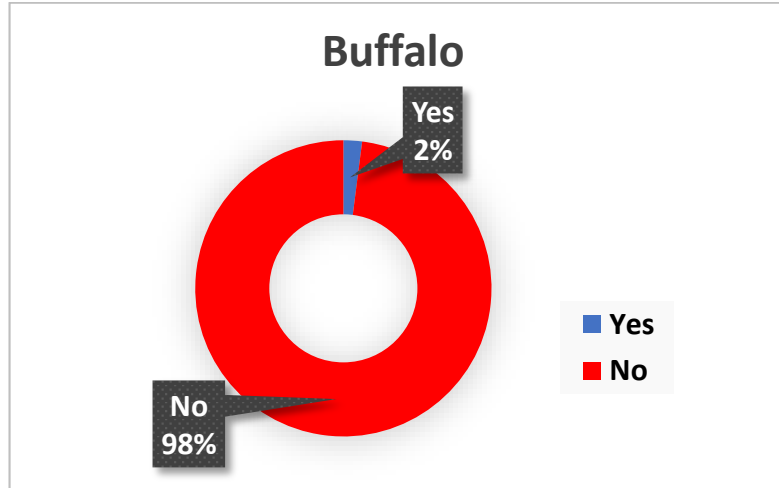


Figure 38: Supplying good quality feed to buffalo

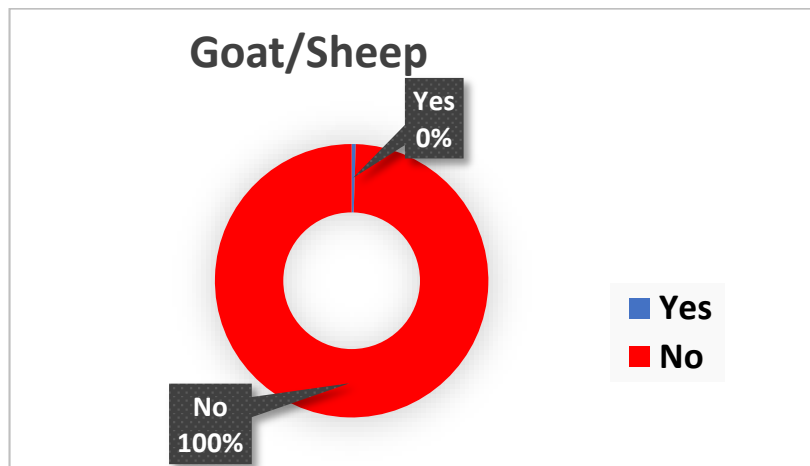


Figure 39: Supplying good quality feed to Goat

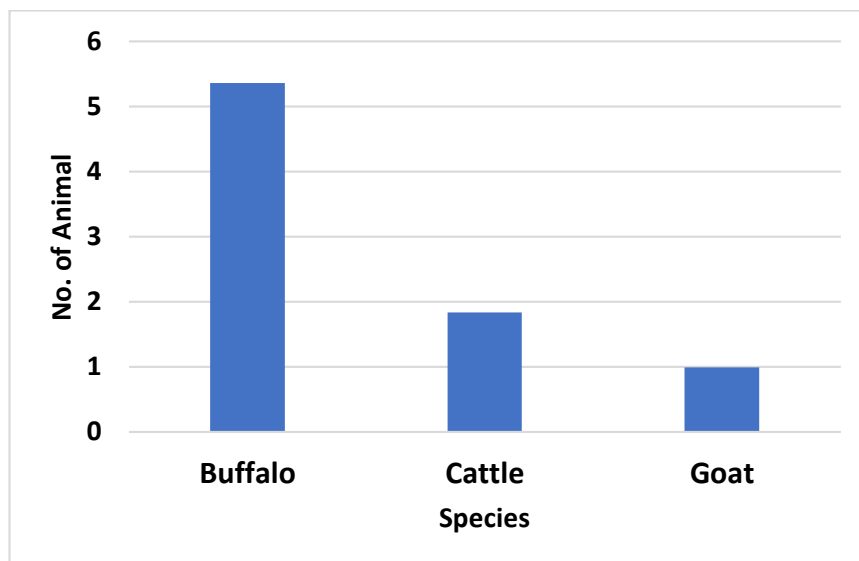
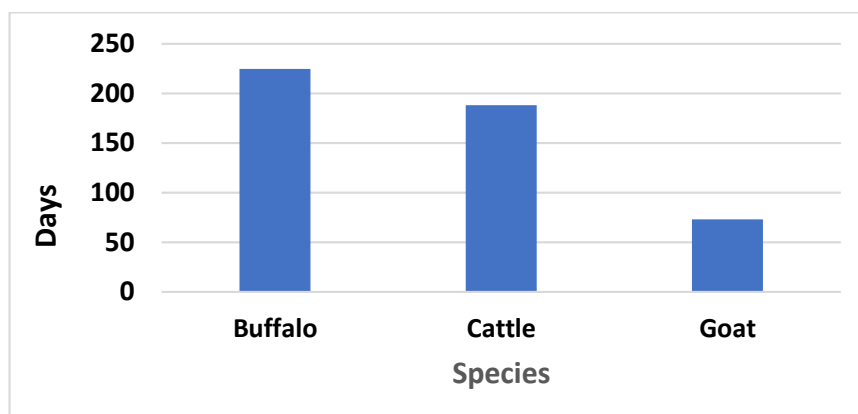


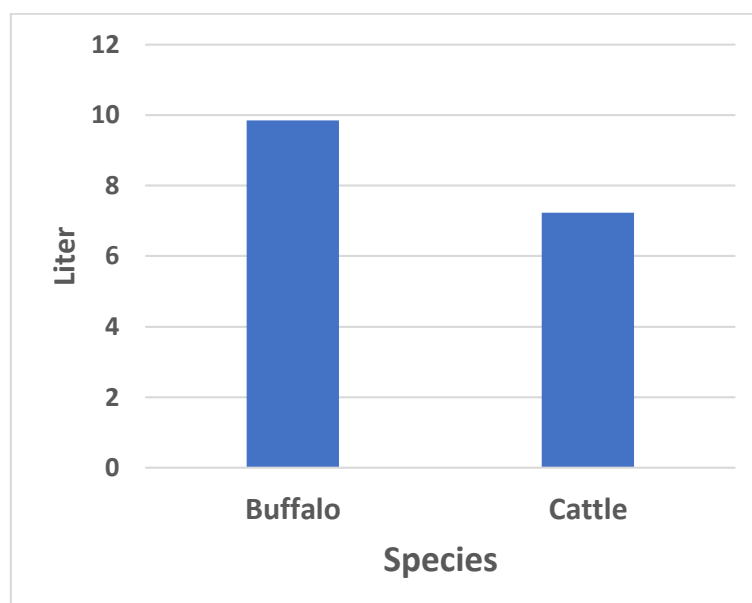
Figure 40: Average No. of Milking Animal kept by farmer

**Table 14: Statistical analysis of no. day in milk of cattle, buffalo and goat**

Species	Mean	SD	Minimum	Maximum
Cattle	188.1125	44.63581	130	280
Buffalo	224.5865	37.3206	145	300
Goat	73.29545	4.693288	70	80



**Figure 41: Average No. of days in milk of different milking animal**



**Figure 42: Average Milk Production per Household/Farm**

Buffalo farmer has 5 milking animals on an average and the cattle farmer has 2 milking animals on an average (Figure 40). Average lactation length of cow of the survey area is 188 days. The average lactation length of buffalo is 224 days (Table 14). Average Milk production per household of buffalo is about 10 liter and of cattle is about 7 liter per day (Figure 42). Average price of buffalo milk is 100 tk/ liter and cattle milk are 64 tk/Liter (Figure 43)

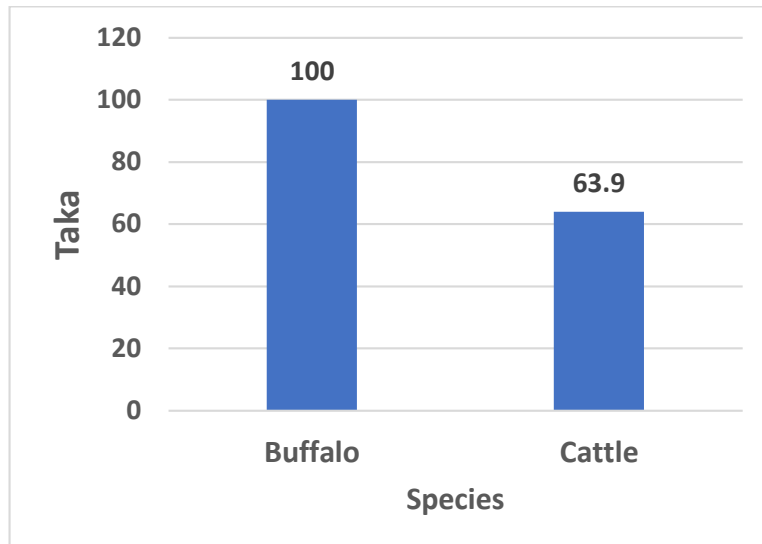


Figure 43: Average Milk price in the locality

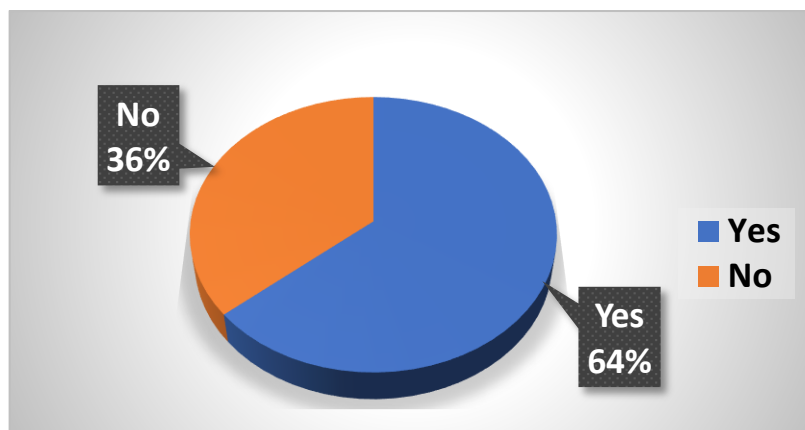


Figure 44: Washing of hand, pot and udder before milking of cattle

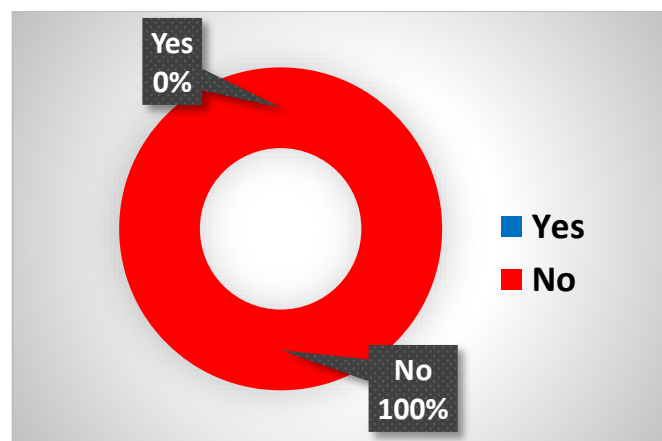
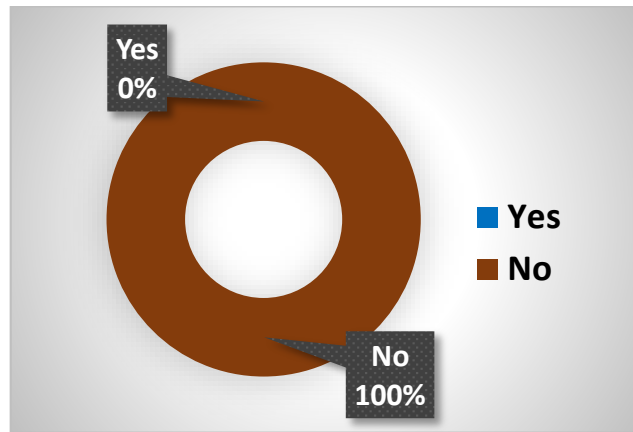
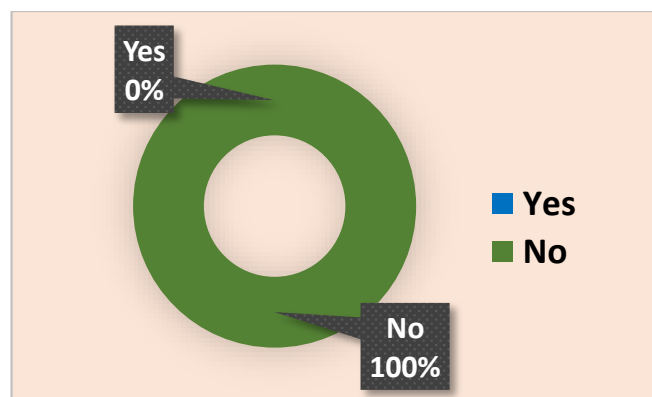


Figure 45: Involvement of farmer with contract farming





**Figure 46: Receiving of Certificate after milk quality test**



**Figure 47: Involvement of farmer with milk product manufacturing**

Before milking about 64% of the cattle farmer wash their hand, pot and udder of the animal (Figure 44). None of the farmer is involved with contract farming for selling the milk of buffalo and cow (Figure 45). Figure 46 shows none of the farmer take certificate after testing the milk of buffalo and cow. None of the farmer produce milk product from the milk of buffalo and cow (Figure 47).

Figure 48 shows about 27% of buffalo farmer sell milk to milkman and 58% of the buffalo milk to local market. About 35% cattle farmer sell cow milk to local customer, 31% to local market and equal 17% to milkman and product producer (Figure 49). Figure 50 and Figure 51 shows about 64% of the buffalo farmer face problem to sell milk in the existing channel and about 53% cattle farmer face problem during selling milk.

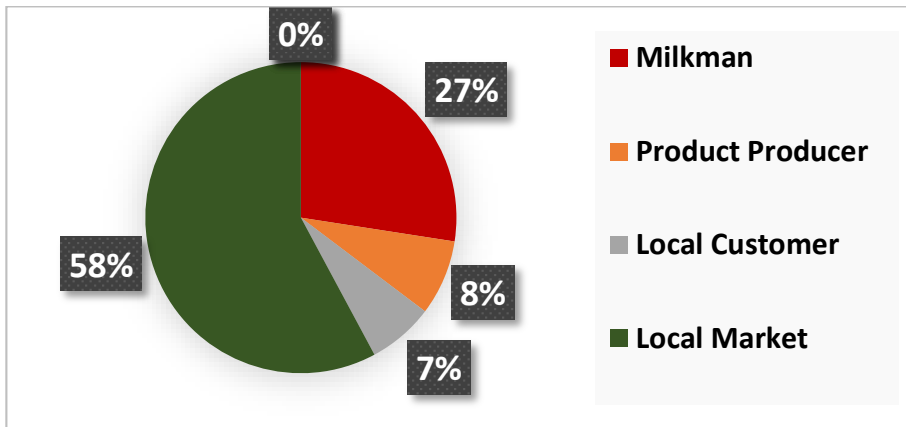


Figure 48: Buffalo Milk Selling Place

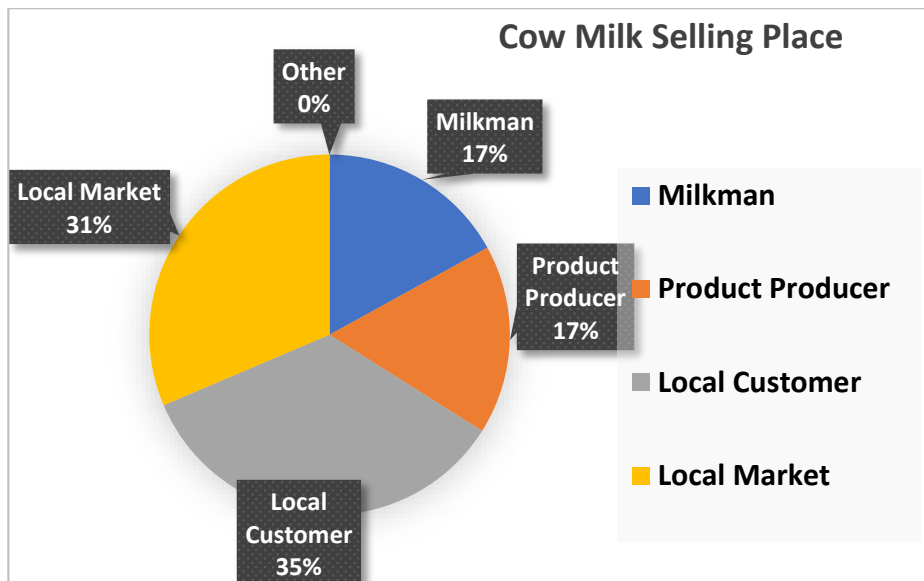


Figure 49: Cow Milk Selling Place

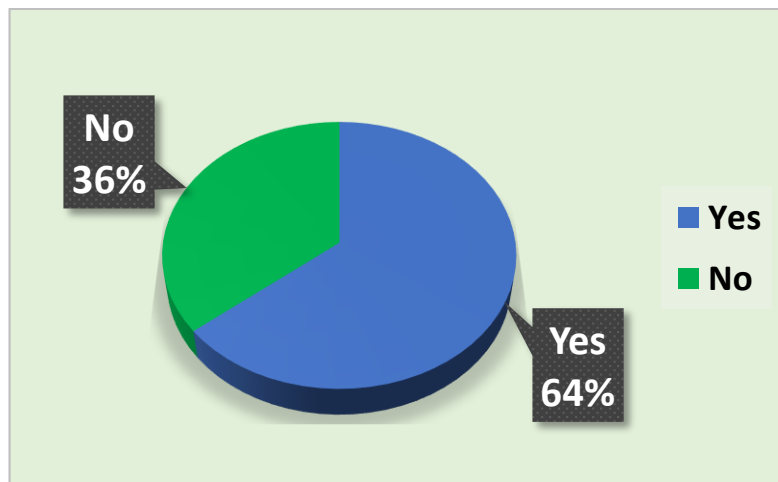


Figure 50: Buffalo farmer face problem to sell milk

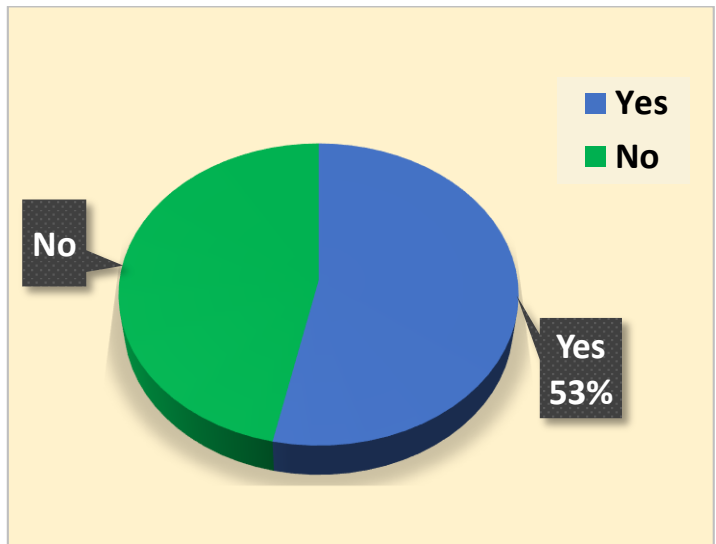


Figure 51: Cow farmer face problem to sell milk

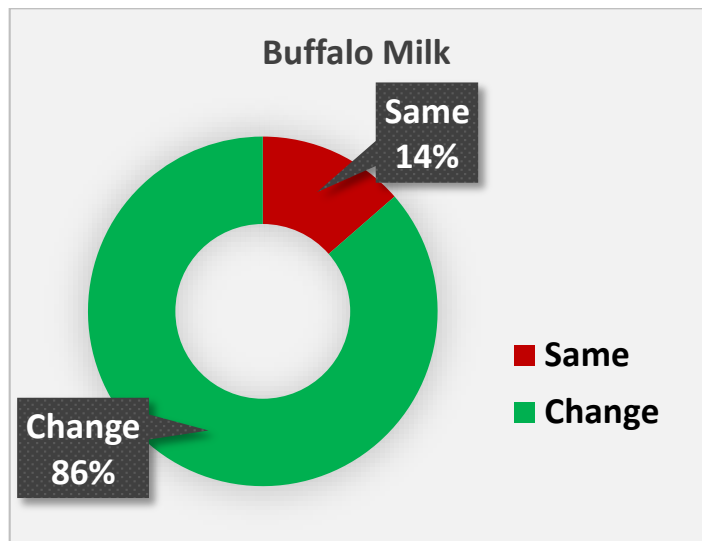


Figure 52: Price of Buffalo Milk throughout the year

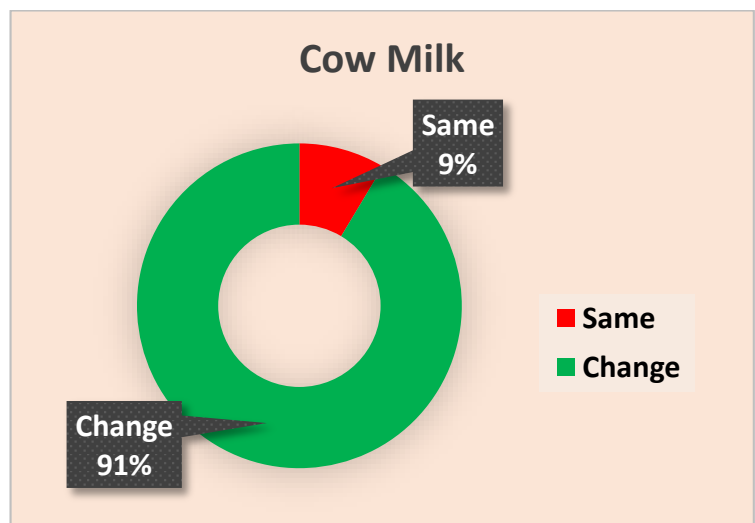
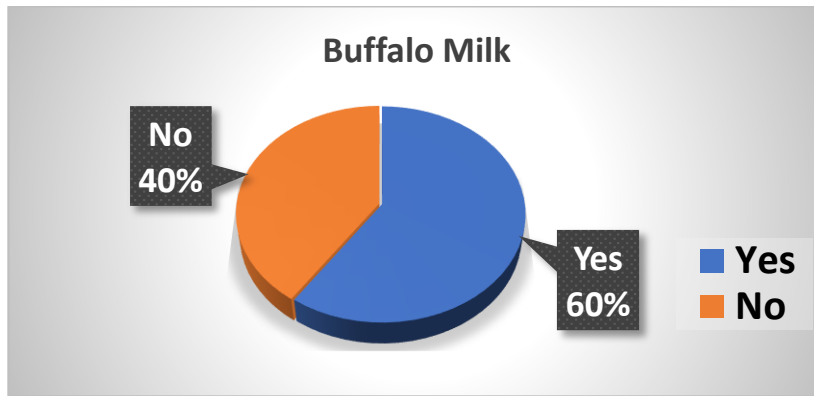
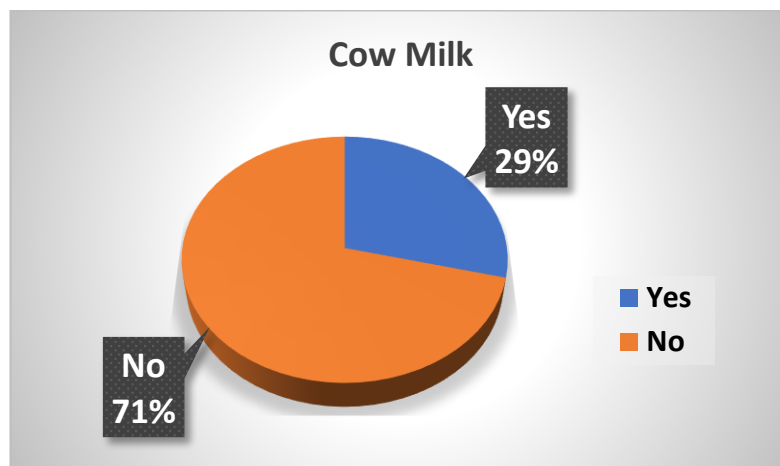


Figure 53: Price of cow milk throughout the year

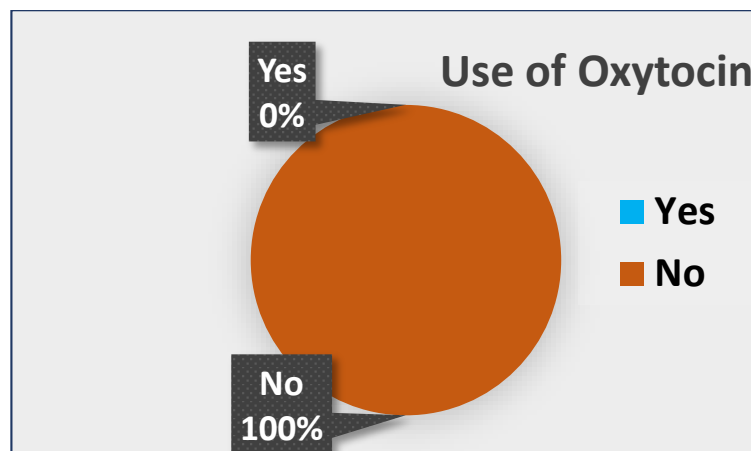


**Figure 54: Ability to sell more buffalo milk if the production increases**

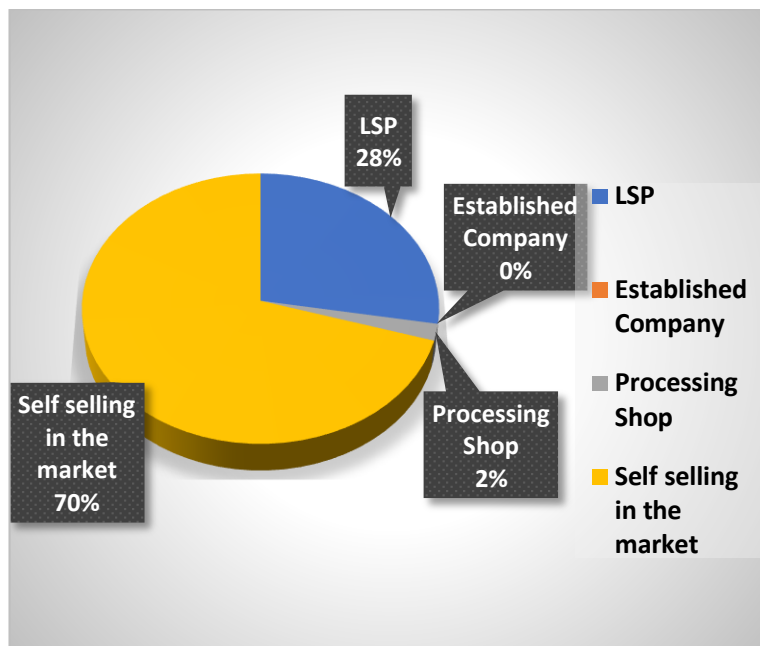
86% of buffalo farmer and 91% of cattle farmer said price of milk fluctuates from time to time (Figure 52 and Figure 53), respectively. About 40% of buffalo farmer and 71% of cattle farmer won't be able to sell the milk if the milk production increases from now (Figure 54 and figure 55). Figure 56 none of the buffalo farmer and cattle farmer use medicine or oxytocin to increase the milk production.



**Figure 55: Ability to sell more cow milk if the production increases**

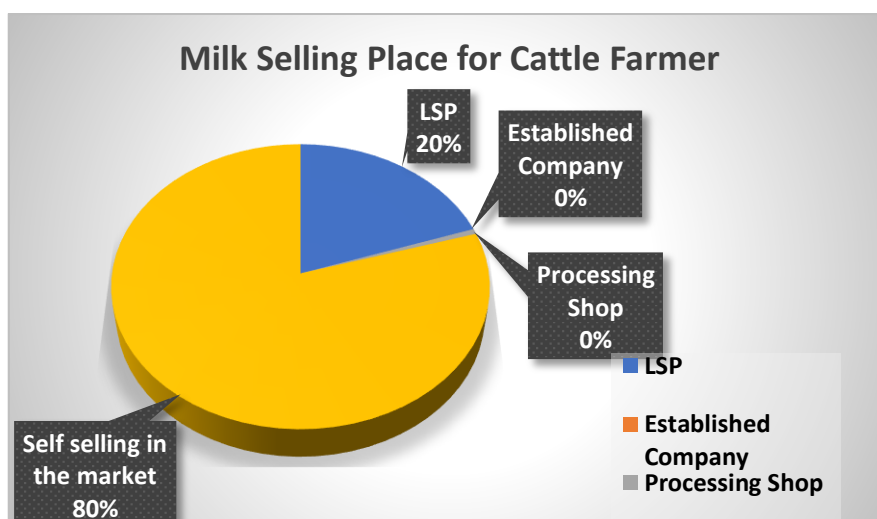


**Figure 56: Use of oxytocin for increasing Milk production**



**Figure 57: Milk Selling Place for Buffalo Farmer**

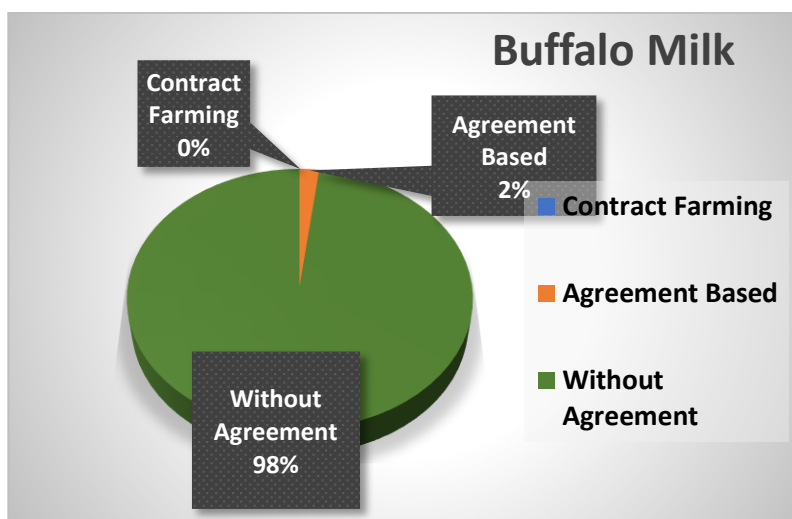
Figure 57 shows 70% of the buffalo farmer sell their milk in the market by their own. 28% of the buffalo farmer sell their milk by milk man or LSP. On the other hand 80% of the cattle farmer sell their milk in the local market and the rest 20% sell their milk to milkman or LSP (Figure 58). In the survey area 98% of the buffalo farmer and 95% of cattle farmer sell their milk without any agreement. Where as 2% of buffalo farmer and 5% of the cattle farmer sell milk with unofficial agreement with the milkman. They can also cancel the agreement at any time by informing the milkman (Figure 59 and Figure 60). In the survey area none of the farmer follow the indicator of Global Good Agricultural Practices before milk production from buffalo or cattle (figure 61).



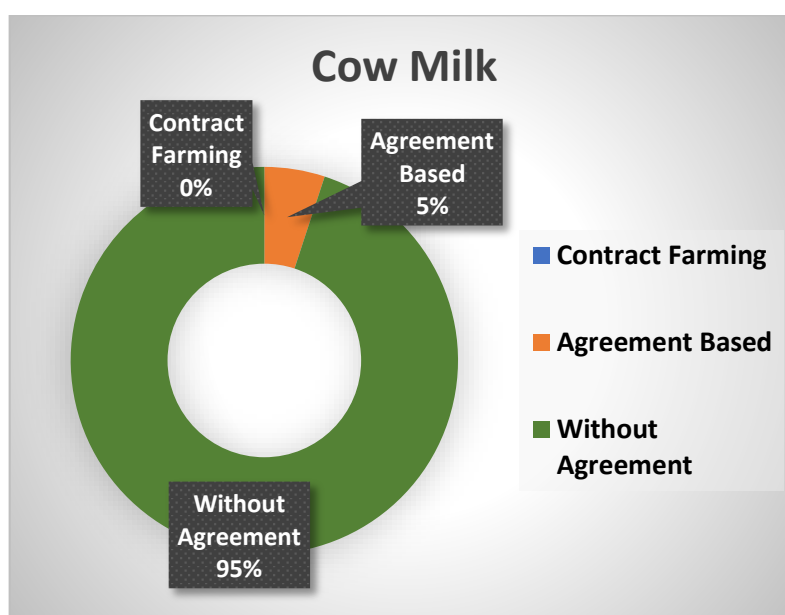
**Figure 58: Milk Selling Place for cattle Farmer**

**Table 15: Price of the Milk /litre for Selling**

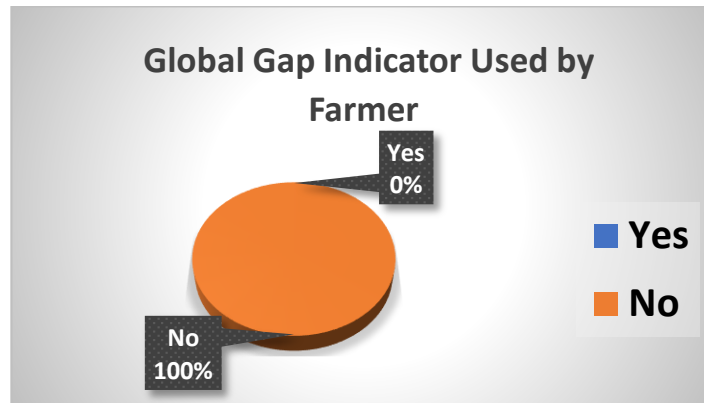
Species	Tk/Litre
Buffalo	100
Cattle	63.273



**Figure 59: System Used for Selling Buffalo Milk**



**Figure 60: System Used for Selling cow Milk**



**Figure 61: Using of GGAP indicator during milk production**

The milk value chain is comprised of core functions, supporting functions and enabling environment. The core functions are the sum of input supply, milk production, milk collection or buying at local milk processing level (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 the consumers. The supporting services come from financing organizations (micro/macro), department of livestock services, service providers from the development organizations, input sellers, service providers from the input manufacturing companies etc. The enabling environment are the results of different rules and regulations as implemented by the department of livestock services, Union council/pouroshova, Department of public health and engineering, food safety authority etc. They also covers the infrastructural aspects of the value chain.

At the production level there is a clear indication of preference to the buffalo milk production. Whatever, cow or buffalo, most of the animals are of indigenous type with low milk production. The average number of animal, milk production per house hold was found higher in the buffalo farmer than the cattle farmer. The farmers are far behind than the standard practice for maintaining hygienic environment and biosecurity of the farm and sanitary practices related with milking.

Feed sellers, veterinary medicine seller, AI workers are the main part of the input supply to the dairy farmers. Input suppliers have capacities to facilitate training to the producers on milking cow/buffalo rearing, supplementary feeding, and preliminary disease management to increase the milk production. They have linkages with mainly upazila and district level inputs market and the medicine suppliers have connection with the representative of different veterinary pharmaceutical companies. With regards to selling fo milk, most of the milk are sold to local market, milk man, local customers. No producers were found involved in milk processing. The existing system of milk marketing was found unsatisfactory to major protion of the farmers. The buffalo milk receives higher price than the cow milk though they are no aware of quality certification or traceability of the prodcut. During selling, three-fourth of the farmers sell their own milk and rest by the milk man or LSP. A small portion of the farmers sell their milk to the

local milk processors who manufacture sweetmeats, *doi*, ghee, chhana etc, however, no formal milk collection from the established dairy processors like Milk vita, Aarong, Pran dairy etc.

A majority of the respondents received loan from MFI for running their livestock farm and milk production business. However, FDA, GJUS, BRAC, ASA and other local NGOs have credit program for milking cow programme. Interest rate, repayment system, instalment schedule are less favourable to the producers in this regard. Despite the limited number of field level worker of the DLS, some producers were able to receive service from the DLS, especially vaccination through the LSP. In some cases producers collect vaccine from the DLS through the LSP. The DLS also provides treatment, training on husbandry techniques, farm management and vaccination and farm supervision and loan distribution from cattle rearing support projects. Union parishad has supporting roles to improve law and order and maintain rural level security through community police, improve infrastructure of marketing place and rural communication like road and culvert. It is also necessary to get the registration of the farm recommendation from the Union Parishad (UP), and UP also provides trade license. The DLS is the authority to certify the farm registration. The DLS also certifies financial support/ credit from Bank or government project. Union parishod/Pouroshova is the authority for trade license and the The department of public health and engineering are mainly concerned with regulations that has public health significance, e.g. slaughter hou management.

#### **4. Meat animal production, supply and value chain**

In the survey most of the farmers (about 90%) did not use any biosecurity practices for cattle rearing. Only 10% practised biosecurity for rearing (Figure 62). In the collected data, none of the farmers practice any biosecurity in their farm for rearing buffalo and goat (Figure 63). Figure 64 shows in the survey area, no one practice Global GAP for Fattening. Most of the farmers have no knowledge about Global GAP. They use traditional system for fattening.

Figure 65 states that in the survey area,98% buffalo farmer used poor quality feed for fattening. Only 2% buffalo farmer used good quality feed for fattening. They have poor knowledge about feeds and feeding. In the collected area, about 97% cattle farmer use poor quality feed for beef fattening and 3% farmer used good quality feed (Figure 66). Figure 67 shows for goat fattening, all of the farmers used poor quality feed.



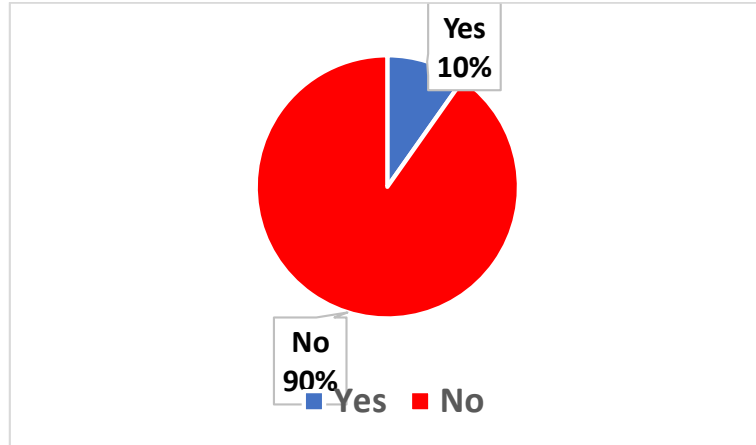


Figure 62: Biosecurity Practices for Cattle Rearing



Figure 63: Biosecurity Practices for Buffalo and Goat Rearing

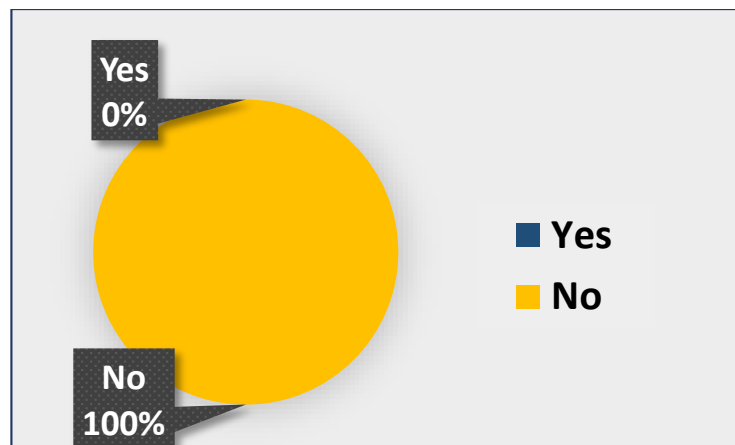
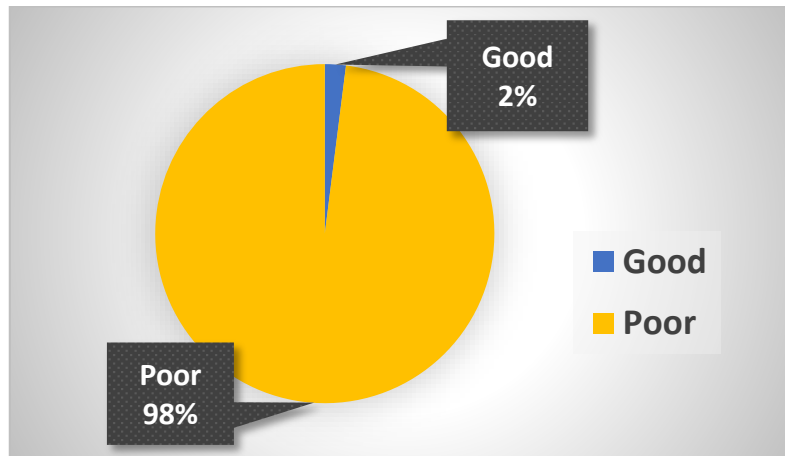
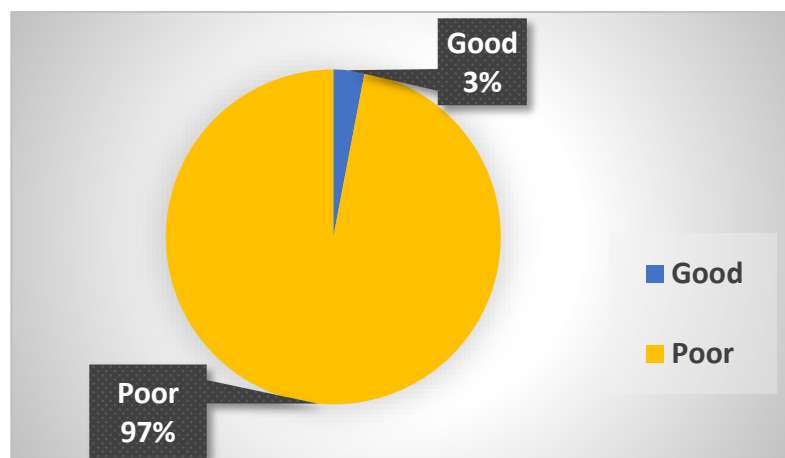


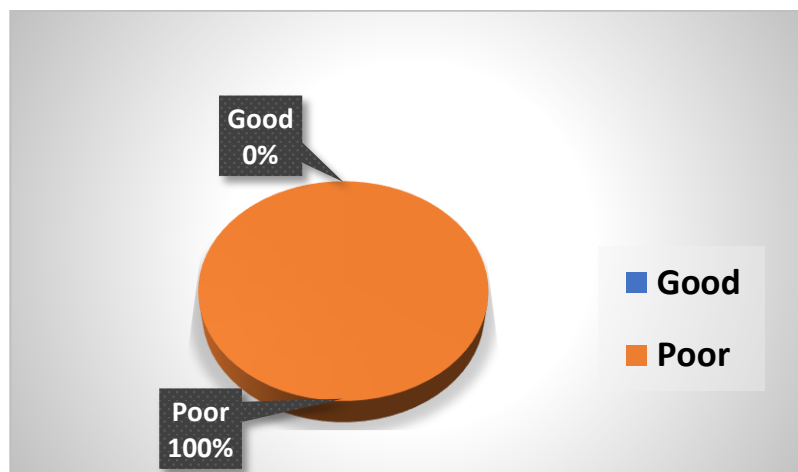
Figure 64: Practising GGAP for fattening by farmer



**Figure 65: Using of Quality of Feed for Buffalo Fattening**



**Figure 66: Using of Quality of Feed for Beef Fattening**



**Figure 67: Using of Quality of Feed for Goat Fattening**

In the collected data, about 29% of the Buffalo farmer practice fattening, about 31% of the Cattle farmer practice fattening and only 12% of goat farmer practice fattening (Figure 68). Figure 69 shows in the survey area fattening program for buffalo, cattle and goat is done one time per year, which is not enough for them. After fattening of animal, processing of meat or selling of animal by contracting with Bepari is very important step. In the survey area all of the farmers are lagging behind to contract with those people and company (Figure 70).

Figure 71 shows in the survey area, none of the farmers uses any types of steroids for fattening of animal. In the collected data, no farmers use any types of antibiotics for fattening (Figure 72).

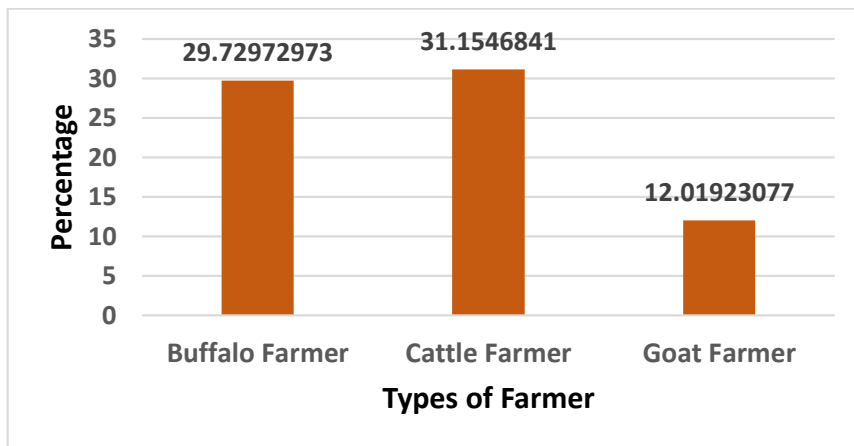


Figure 68: Percentage of Farmer Practice Fattening

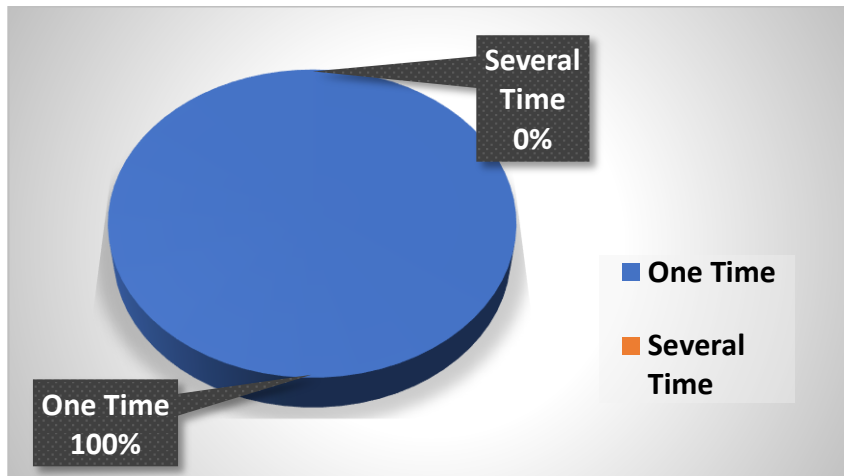
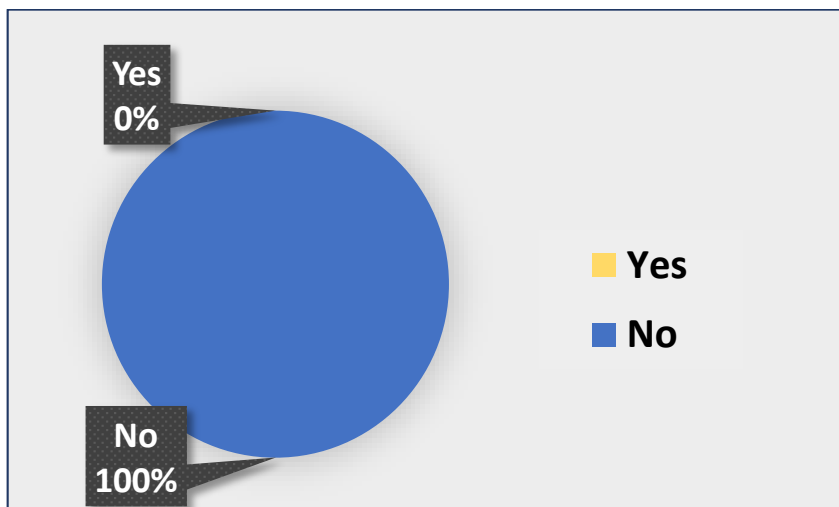


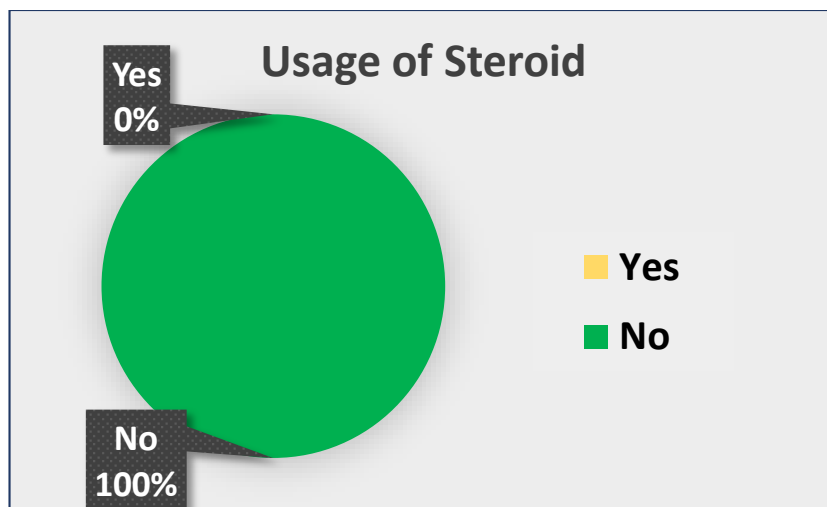
Figure 69: No. of Fattening program practised each year by the farmer

**Table 16: Fattening Animal Reared by Each Farmer:**

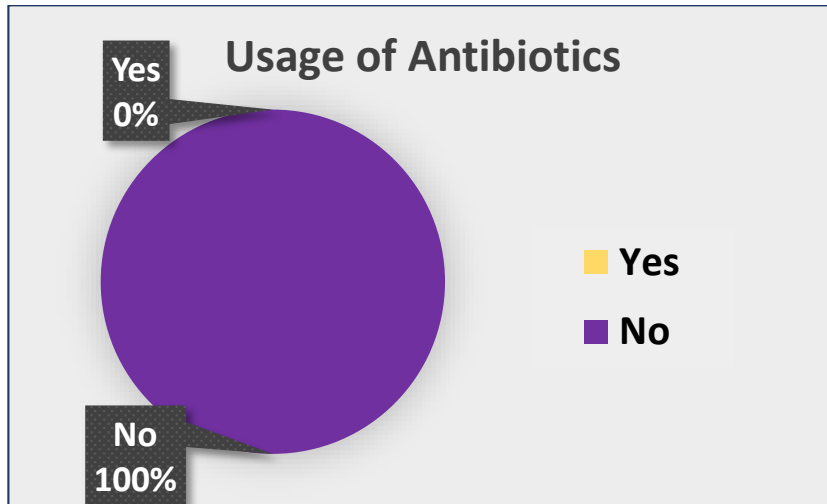
Species	Mean	SD	Minimum	Maximum
Cattle Farmer	2.169014	1.780284	1	18
Buffalo Farmer	4.880952	3.927405	1	10
Goat Farmer	2.038462	1.182566	1	6



**Figure 70: Fattening farmer's Contract with Bepari or Meat Processing Company**

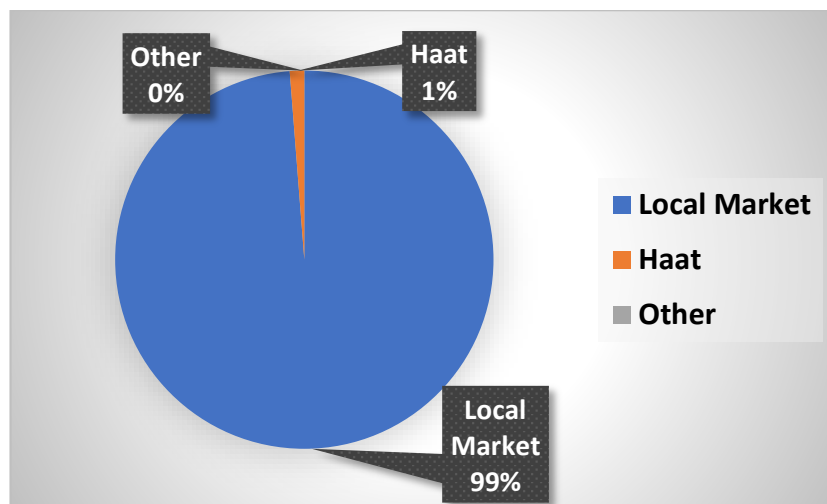


**Figure 71: Usage of steroid for Fattening purpose**

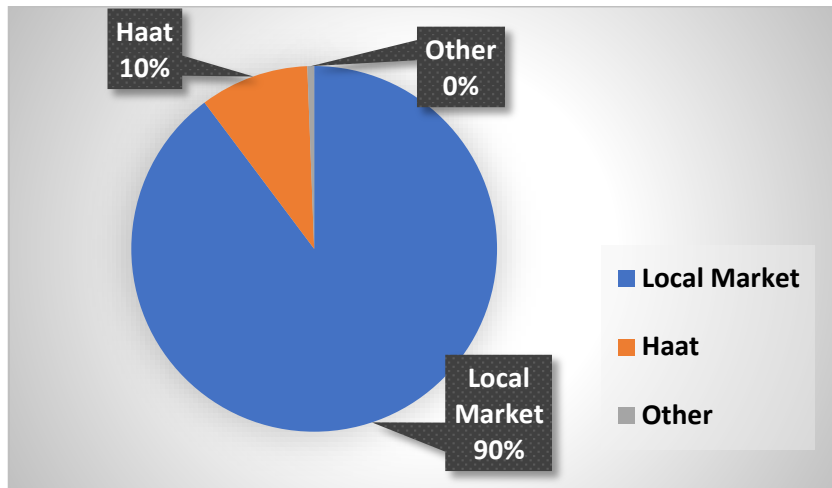


**Figure 72: Usage of Antibiotics for Fattening purpose**

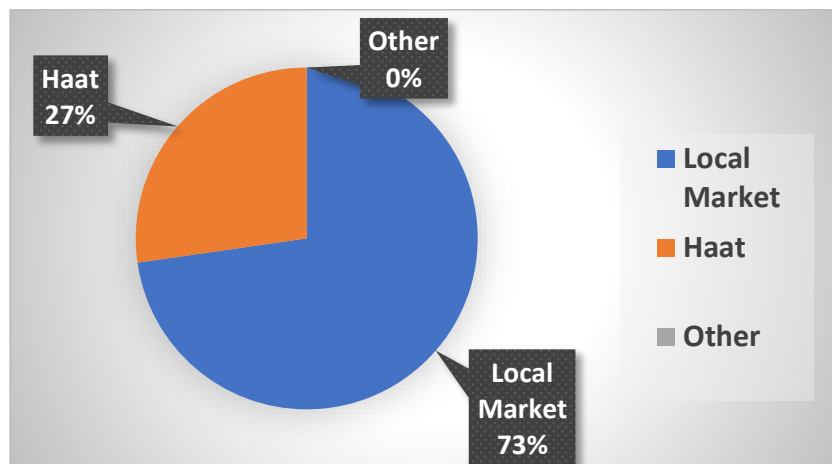
Figure 73 shows after fattening of Buffalo 99% of the farmer sell their animal into the local market, 1% of the farmer sold their animal in the haat. After fattening of Cattle, 90% of the farmer sell their animal into the local market, 10% of the farmer sell their animal in the haat (Figure 74). After goat fattening, 73% of the farmer sell their animal into the local market, 27% of the farmer sold their animal into haat (Figure 75).



**Figure 73: Place for selling of Buffalo after fattening**

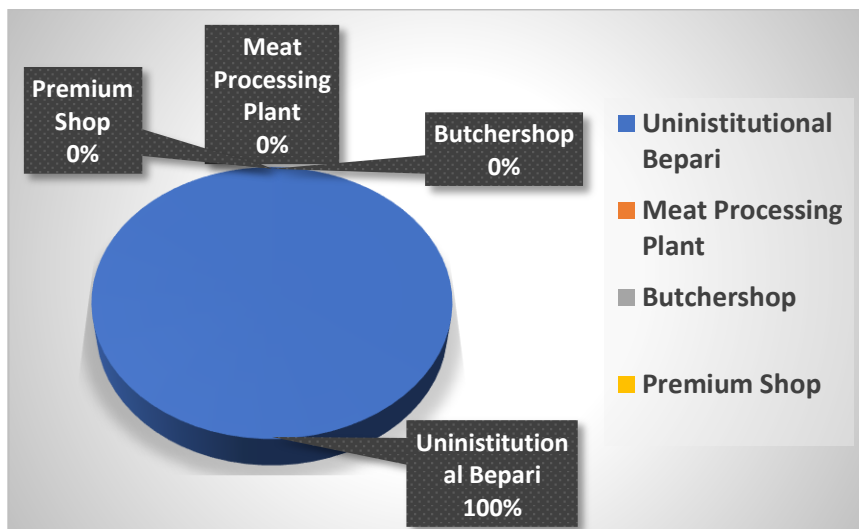


**Figure 74: Place for selling of Cattle after fattening**

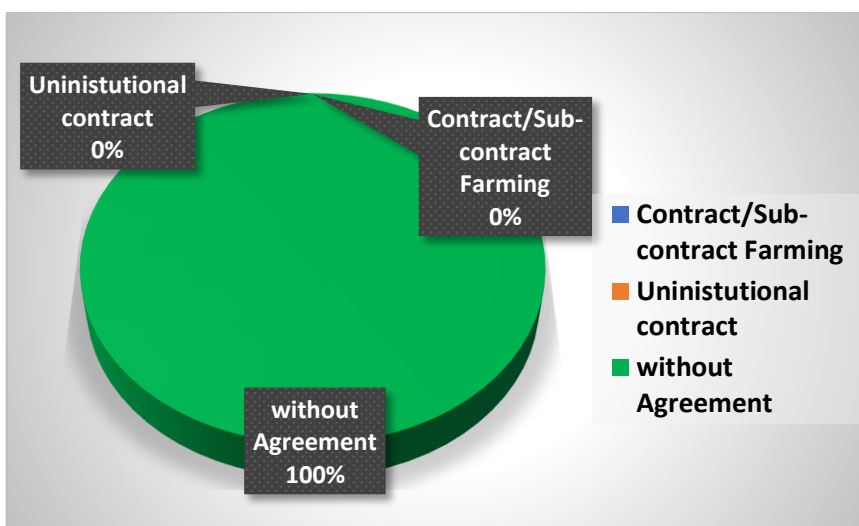


**Figure 75: Place for selling of Goat after fattening**

Figure 76 shows that 100% farmer sell their all types of meat animal to unofficial bepari at present. Figure 77 shows that 100% of the farmer sell their meat animal without any agreement. They don't have any contract with any businessman or company.



**Figure 76: Place for selling of meat animal after fattening**



**Figure 77: Selling Procedure of Meat Animal by farmer**

The meat value chain is comprised of core functions, supporting functions and enabling environment. The core functions are the sum of input supply, meat production, meat whole selling, meat processing and meat retailing. The supporting services come from financing organizations (micro/macro), department of livestock services, service providers from the development organizations, transport agent , trader association etc. The enabling environment are the results of different rules and regulations as implemented by the department of livestock services, Union council/pouroshova, Department of public health and engineering, food safety authority etc. They also covers the infrastructural aspects of the value chain.

At the production level there is a clear indication of preference to beef fattening for meat. Whatever, cow or buffalo, most of the animals are of indigenous type with sound body shape.

The farmers are far behind than the standard practice for maintaining hygienic environment and biosecurity of the farm and fattening strategy for meat animal production.

Feed sellers, veterinary medicine & vaccine seller, calf seller and equipments seller are the main part of the input supply to the meat animal rearing farmers. Input suppliers have capacities to facilitate training to the producers on fattening animal rearing, supplementary feeding, and preliminary disease management to increase the growth. They have linkages with mainly upazila and district level inputs market and the medicine suppliers have connection with the representative of different veterinary pharmaceutical companies. With regards to selling meat animal, most of the meat animal are sold to haat during Eid Ul Adha and in local haat. No meat animal farmer were found involved in meat processing and selling in retail. The existing system of meat marketing was found unsatisfactory to major portion of the farmers. During selling, almost all farmers sell their meat animal in haat by themselves and some sell the animal in house when they get satisfactory price from bepari.

A majority of the respondents received loan from MFI for running their livestock farm. However, FDA, GJUS, BRAC, ASA and other local NGOs have credit program for fattening programme. Interest rate, repayment system, instalment schedule are less favourable to the producers in this regard. Despite the limited number of field level worker of the DLS, some producers were able to receive service from the DLS, especially vaccination through the LSP. In some cases producers collect vaccine from the DLS through the LSP. The DLS also provides treatment, training on husbandry techniques, farm management and vaccination and farm supervision and loan distribution from cattle rearing support projects. Union parishad has supporting roles to improve law and order and maintain rural level security through community police, improve infrastructure of marketing place and rural communication like road and culvert. It is also necessary to get the registration of the farm recommendation from the Union Parishad (UP), and UP also provides trade license. The DLS is the authority to certify the farm registration. The DLS also certifies financial support/ credit from Bank or government project. Union parishod/Pouroshova is the authority for trade license and the The department of public health and engineering are mainly concerned with regulations that has public health significance, e.g. slaughter house management.



## 5. Feed, Fodder and Insemination

91% of the buffalo farmer cannot supply concentrate regularly to the animal, only 9% can supply regularly (Figure 78). For cattle the percentage is 89, those are not able to supply concentrate, only 11% can supply. For goat only 2% of the farmer can supply concentrate to the animal.

Figure 81 shows only 6% of the cattle farmer use ready feed, 94% of the farmer don't use ready feed. For Buffalo and Goat, no farmer has used ready feed (Figure 82). Farmer use different company feed for animal .36% Farmer use Kazi feed, 27% farmer use Aftab company feed, 1% farmer use Nourish feed, only 3% farmer use ACI company feed and 31% other feed (Figure 83). Figure 84 shows in the survey area, none of the farmers have used UMS for animals. Figure 85 shows for Buffalo, only 3% of the farmer produce napier or other grasses. On the other hand, for Cattle, only 25% farmer produce grasses (Figure 86). For Goat, only 1% farmer produce grasses for animal (Figure 87).

Figure 88 no one make silage for animal. TMR technology is not practised by any farmer for animal (Figure 89). In that area calf starter for calf feeding is not practised by any farmer (Figure 90).

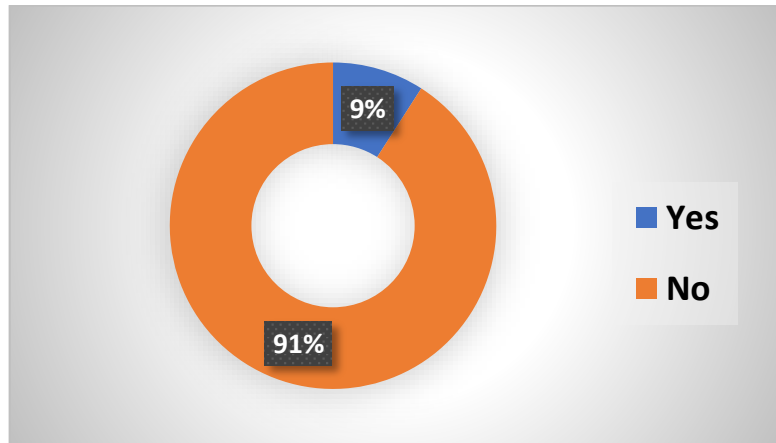


Figure 78: Regular Supply of Concentrate to Buffalo by farmer

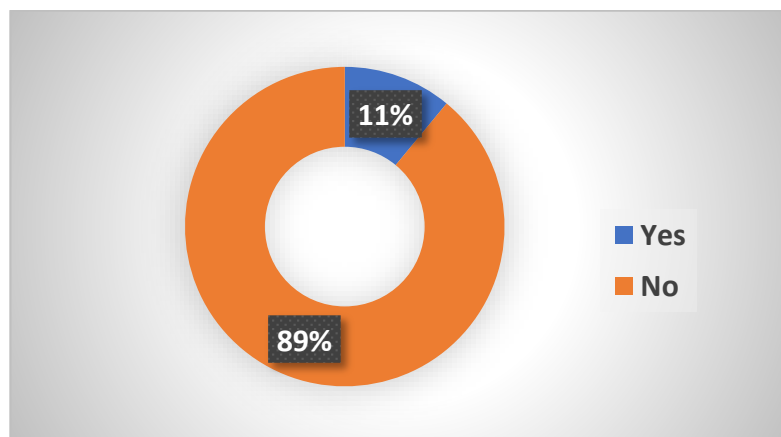
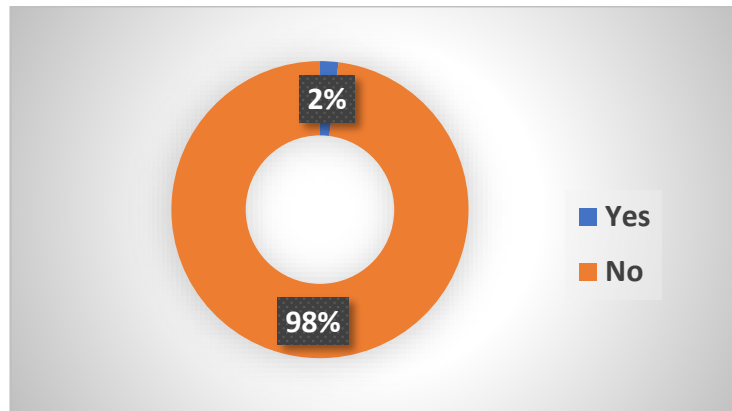
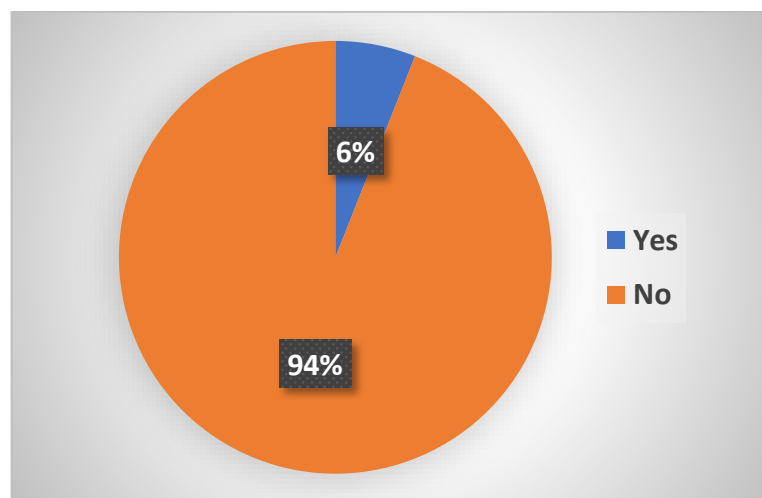


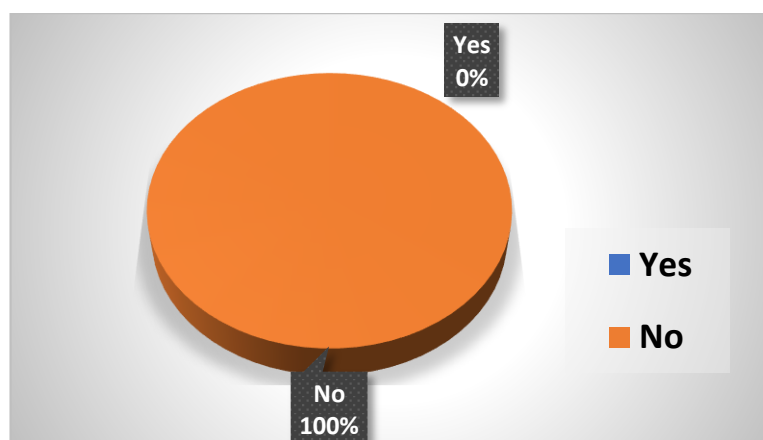
Figure 79: Regular Supply of Concentrate to cattle by farmer



**Figure 80: Regular Supply of Concentrate to goat by farmer**



**Figure 81: Use of ready feed for rearing of cattle**



**Figure 82: Use of ready feed for rearing of Buffalo and Goat**

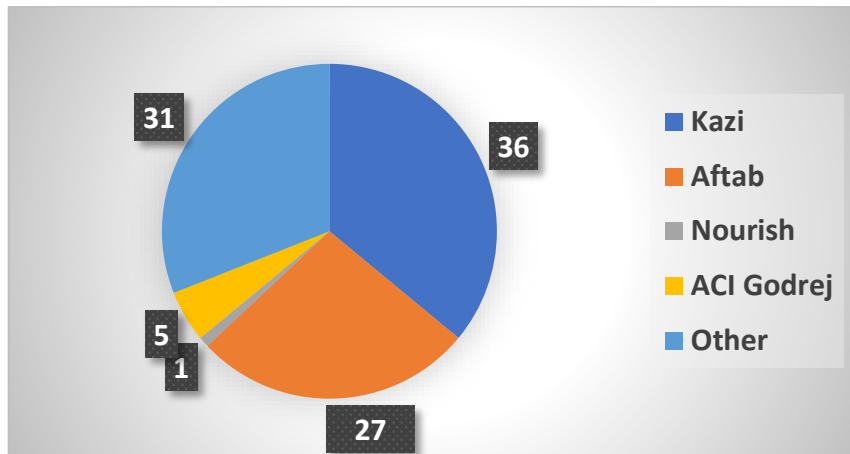


Figure 83: Use of ready feed from different company by farmers

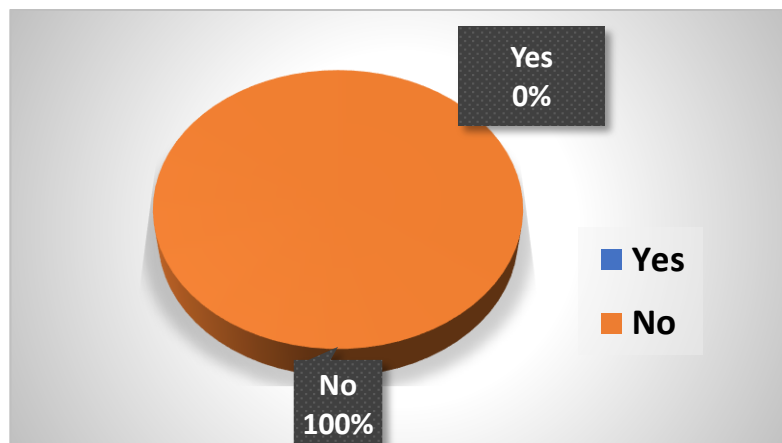


Figure 84: Use of UMS by farmers for rearing livestock

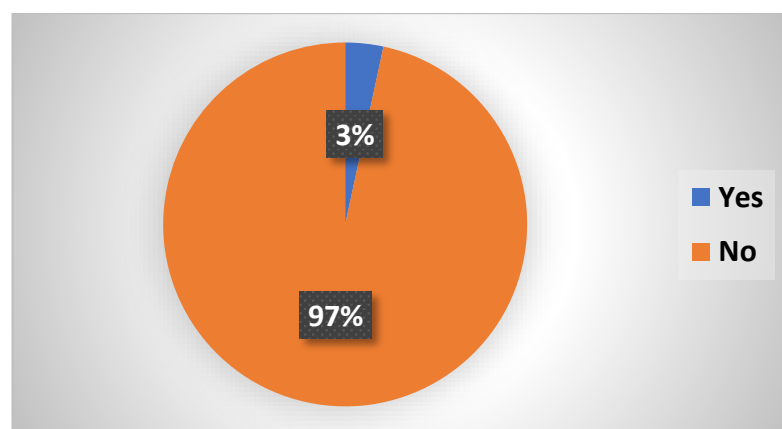
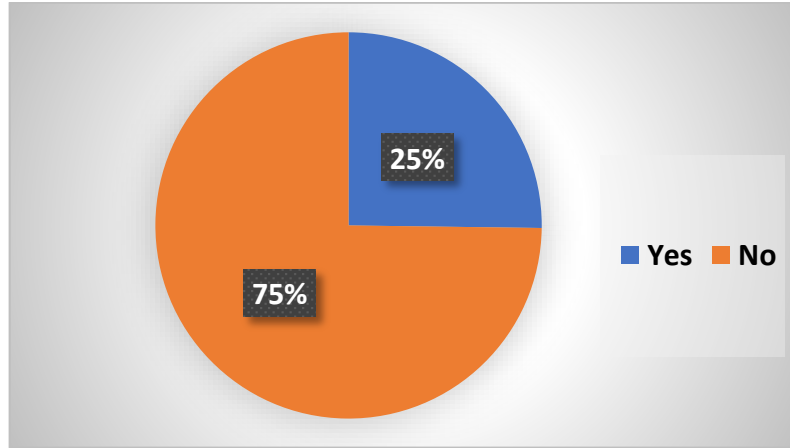
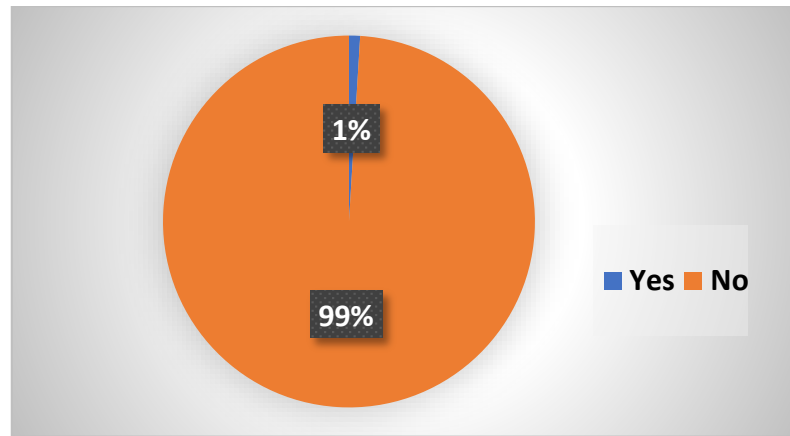


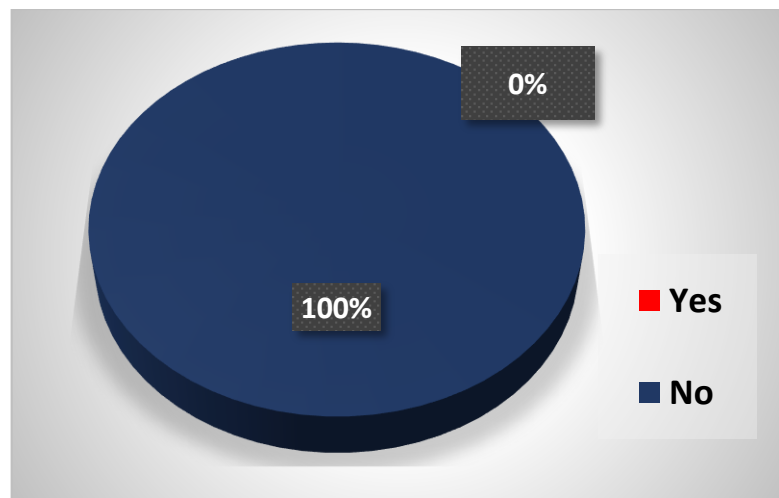
Figure 85: Production of Napier or other high-quality grass for Buffalo rearing



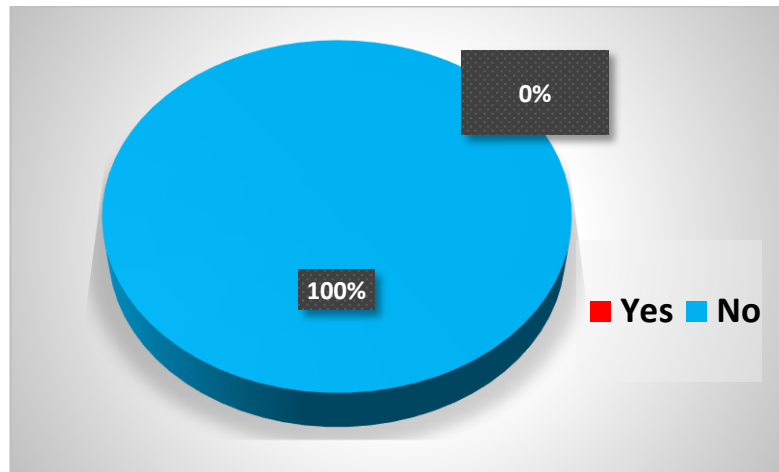
**Figure 86: Production of Napier or other high-quality grass for Cattle rearing**



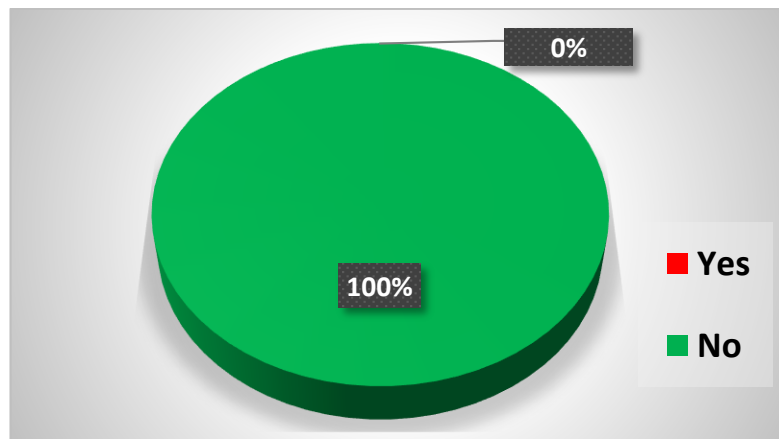
**Figure 87: Production of Napier or other high-quality grass for Goat rearing**



**Figure 88: Making of silage by the farmer**



**Figure 89: Practicing of TMR technology by the farmer**

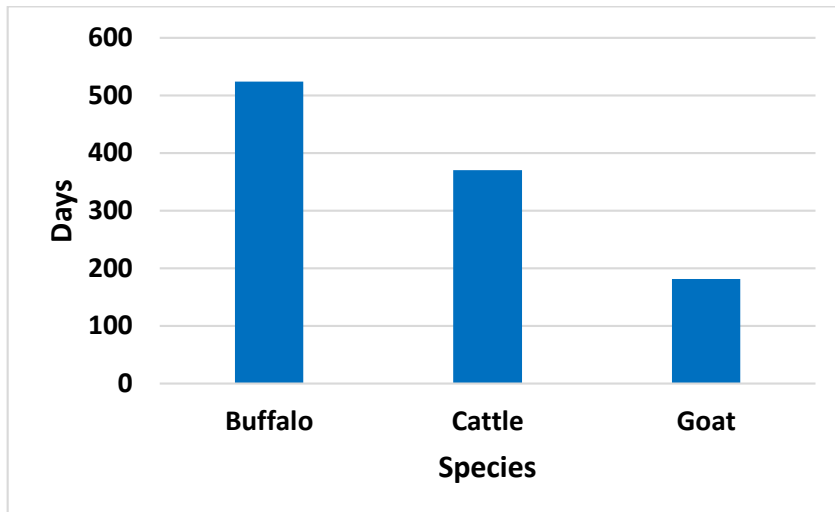


**Figure 90: Using of Calf starter by the farmer**

Table 17 and Figure 91 shows that the average calving interval of cattle is 370 days and for buffalo and goat it is 523 days and 181 days respectively.

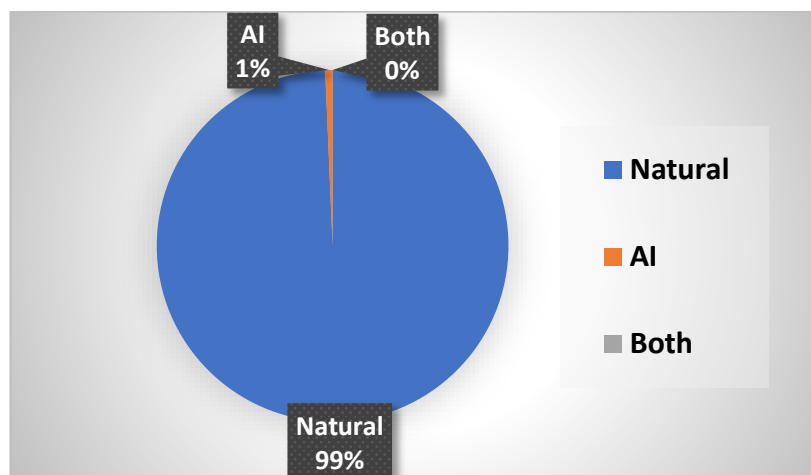
**Table 17: Statistical analysis of calving interval of Cattle, Buffalo and Goat**

Species	Mean	SD	Minimum	Maximum
Cattle	370.2937	19.55217	300	450
Buffalo	523.7245	168.3582	350	700
Goat	181.7978	9.395491	180	270

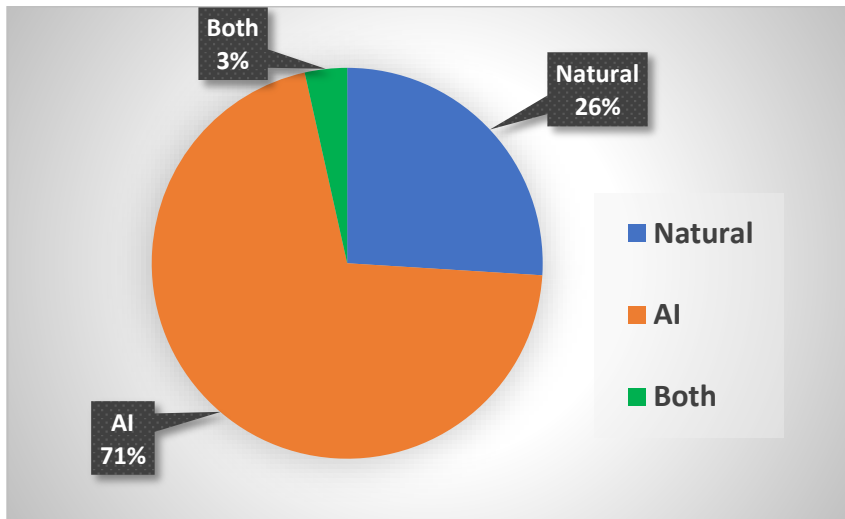


**Figure 91: Calving Interval of different animal**

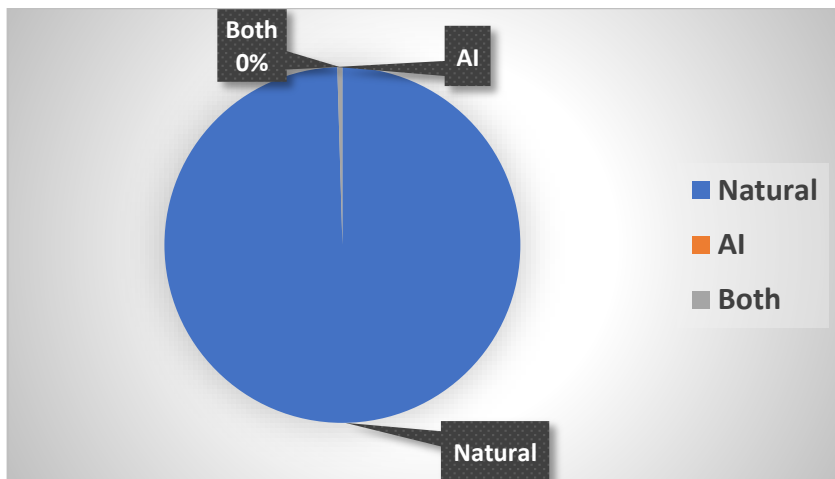
In the survey area, 99% farmer practised natural breeding for Buffalo and only 1% practised artificial insemination (Figure 92). For Cattle, 71% of the farmer used AI for breeding of cattle, 26% of the farmer have practised natural breeding for cattle and only 3% farmer practised both (figure 93). For goat, 100% farmer have practised natural breeding (Figure 94).



**Figure 92: Breeding procedure of Buffalo**



**Figure 93: Breeding procedure of Cattle**



**Figure 94: Breeding procedure of Cattle**

Mainly cattle farmer practice artificial insemination for their cattle. About 57% of the farmer use ACI company semen for AI, 24% of the farmer have use BRAC company semen, 14% of the farmer use Govt semen, 4% of the farmer use Lalteer company semen and 1% belongs to others (Figure 95). Figure 96 shows 52% of the farmer have use HF breed's semen, 23% of the farmer have use Sahiwal/ Sindhi breed's semen, 1% of the farmers use Jersey breed's semen, others included 24% for Artificial Insemination. Figure 97 shows 78% of the farmer use 75% semen, 14% of the farmer use 100% semen, 8% of the farmer use 50% semen for AI.

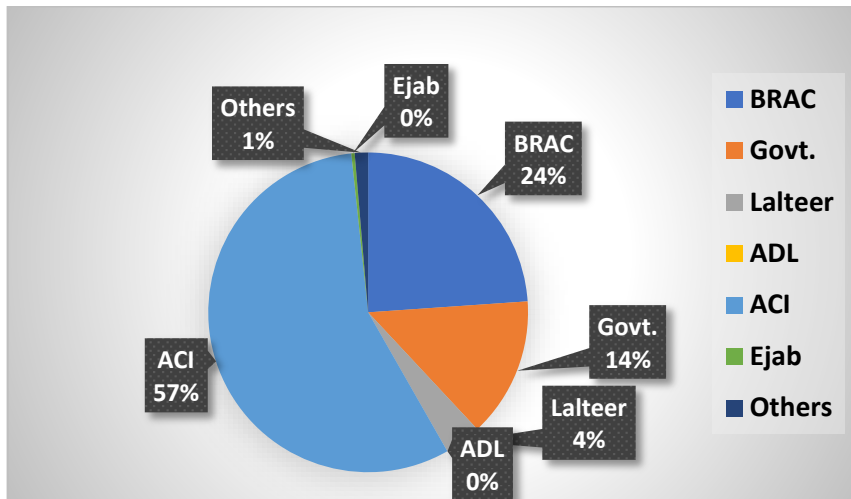


Figure 95: Semen from different company used by the farmer

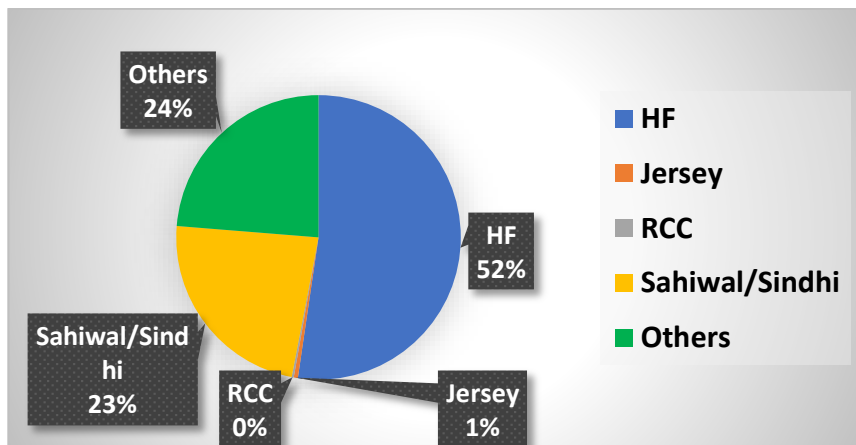


Figure 96: Semen from different breed used by the farmer

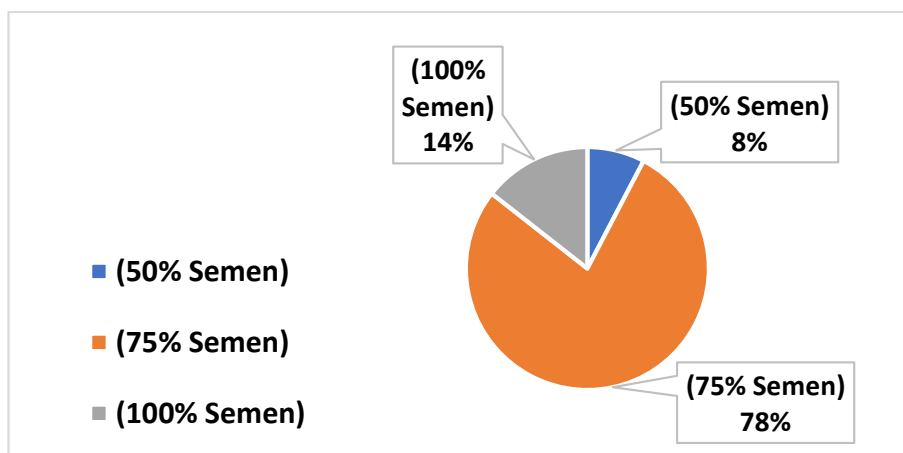
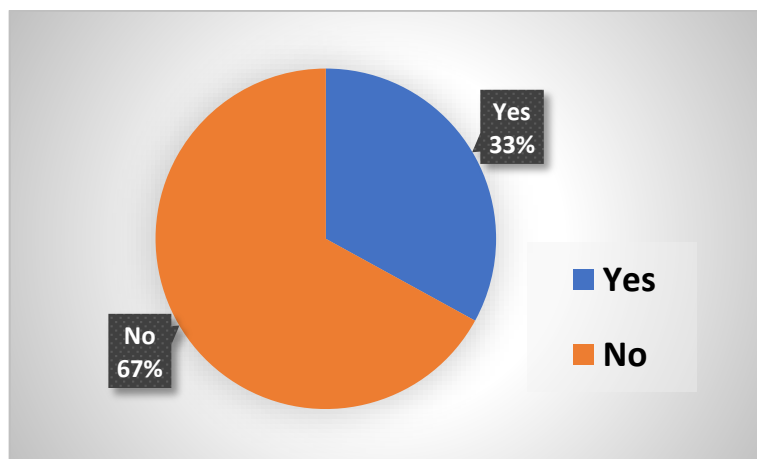


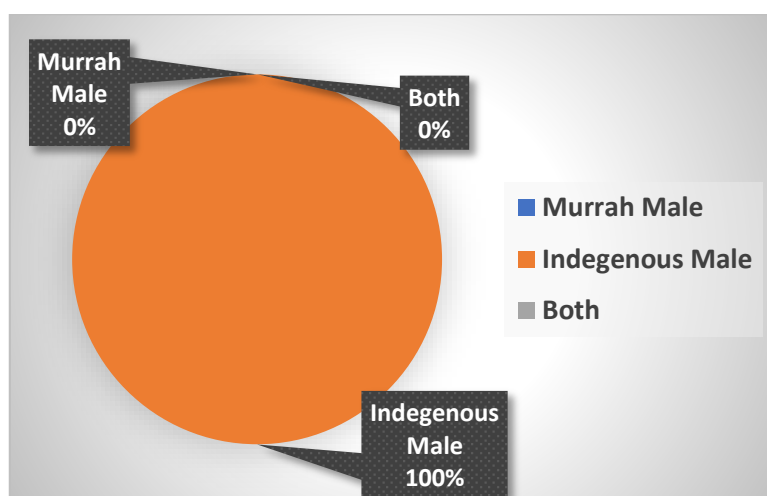
Figure 97: Percentage of Semen Used by the farmer



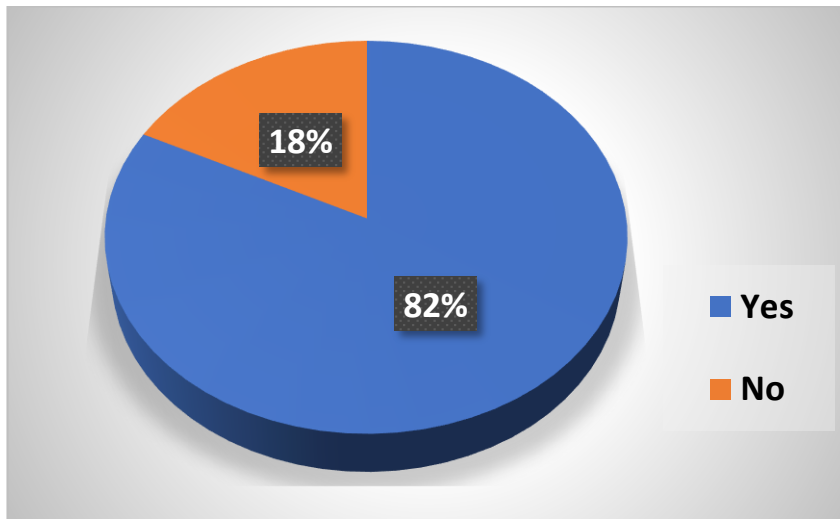
33% of the farmers animal inseminate in the correct time, and 67% of the farmers animal do not inseminate in the correct time (Figure 98). In the survey area,100% indigenous male Buffalo is used for breeding (Figure 99). For breeding of Buffalo, 82% of the farmer said number of breeding male Buffalo is not available in the survey area for breeding. The rest 18% said available (Figure 100).



**Figure 98: Insemination of animal in correct time**



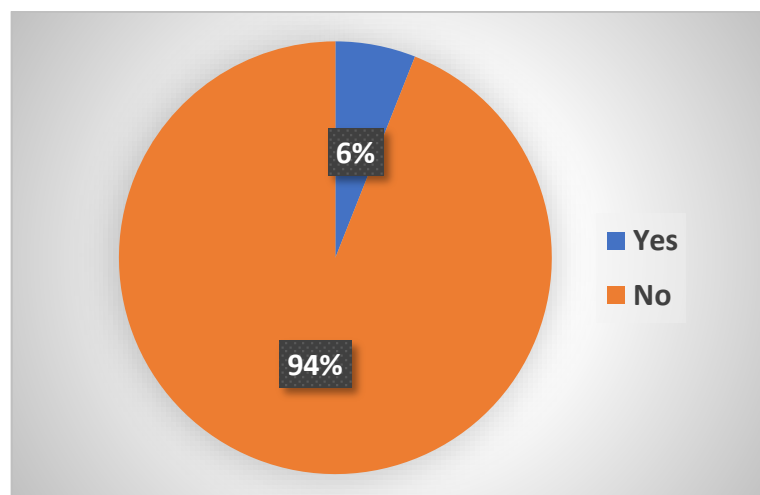
**Figure 99: Types of Buffalo used for breeding**



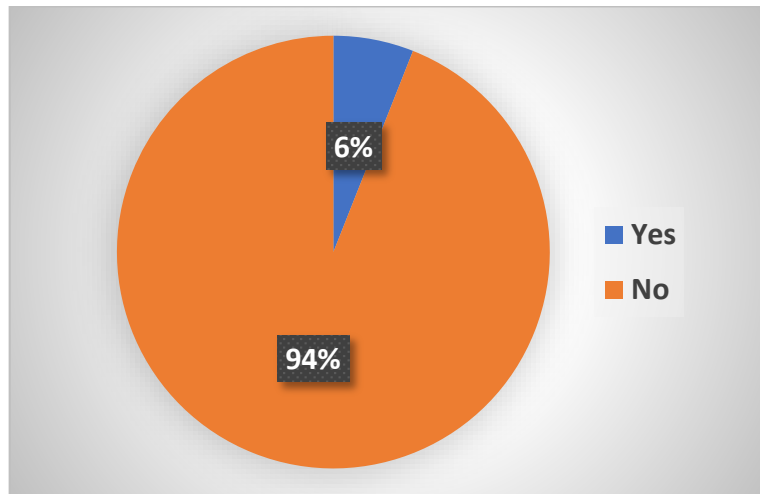
**Figure 100: Availability of Breeding Male Buffalo in the herd**

## **6. Deworming, Vaccination, Reproduction, Disease and Mortality**

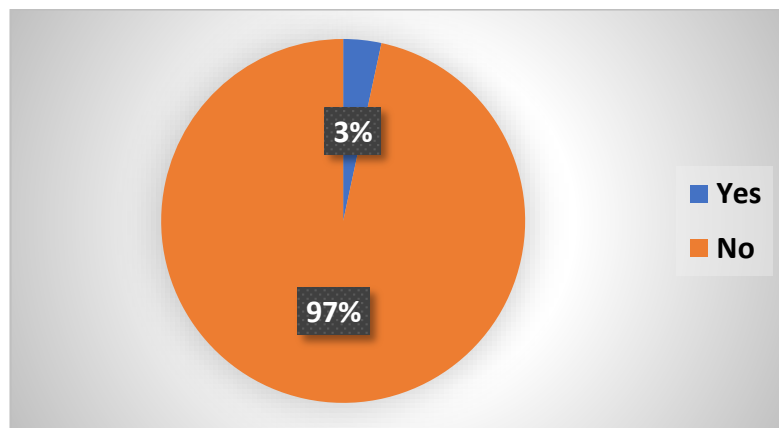
For Buffalo, only 6% of the farmer practised deworming (Figure 101). Figure 102 shows for Cattle, only 6% of the farmer practised deworming. For Goat, 3% of the farmer practised deworming (Figure 103). For Buffalo, most of them practised one and two times per year (figure 104). Figure 105 shows for Cattle, most the farmer have practise three and four times deworming per year. For Goat, 56% of the farmer practise one time deworming per year (Figure 106).



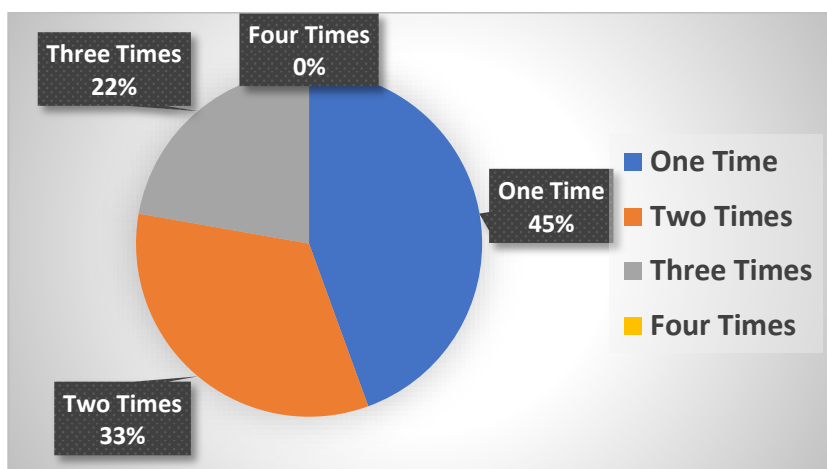
**Figure 101: Deworming of Buffalo Practiced by farmer**



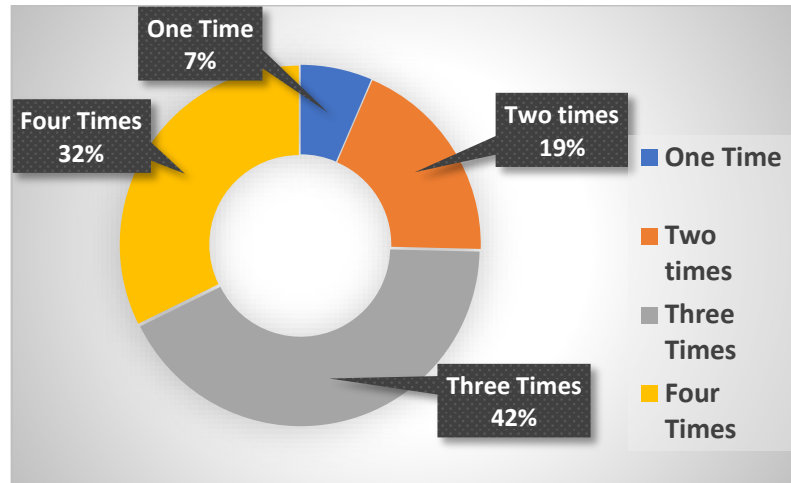
**Figure 102: Deworming of Cattle Practiced by farmer**



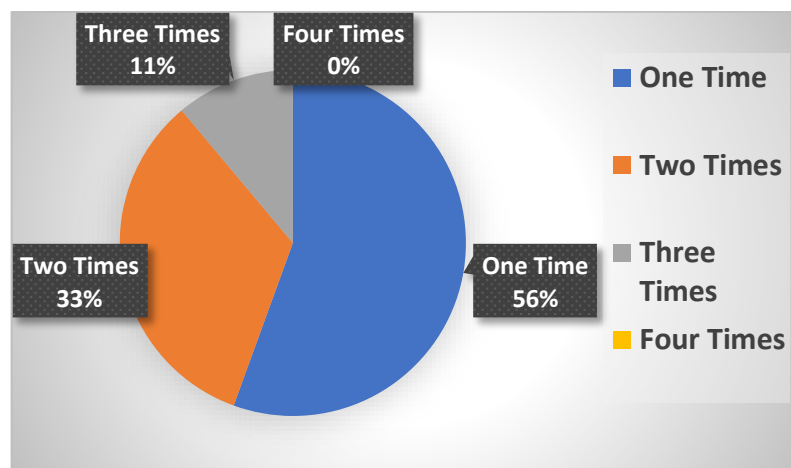
**Figure 103: Deworming of Goat practiced by farmer**



**Figure 104: No. of Deworming practiced per year for Buffalo**



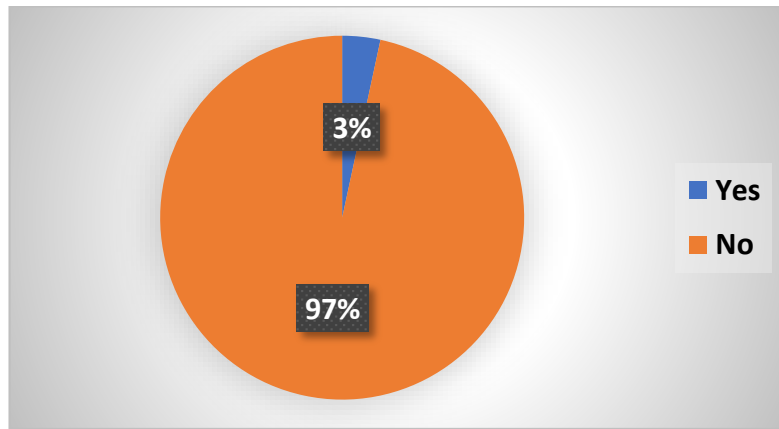
**Figure 105: No. of Deworming practiced per year for Cattle**



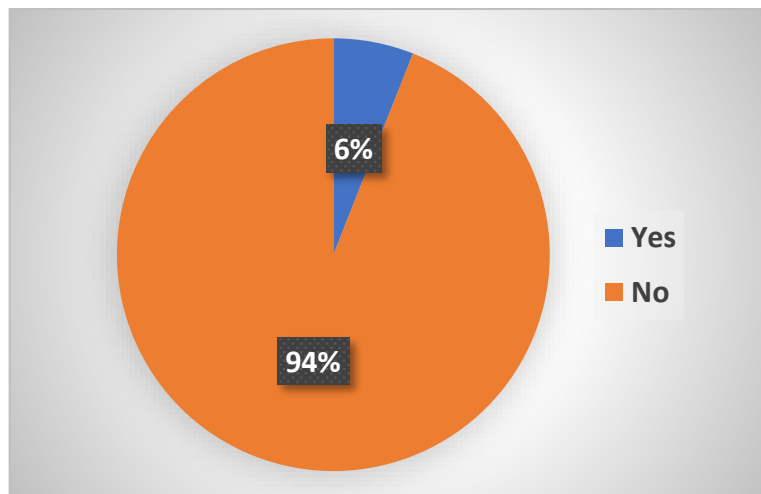
**Figure 106: No. of Deworming practiced per year for Goat**

Figure 107 shows vaccination practised for Buffalo; 3 % farmer practised vaccination For Cattle, 6% farmers practised vaccination (Figure 108). And for Goat, the percentage is 3 those who practised vaccination (Figure 109).

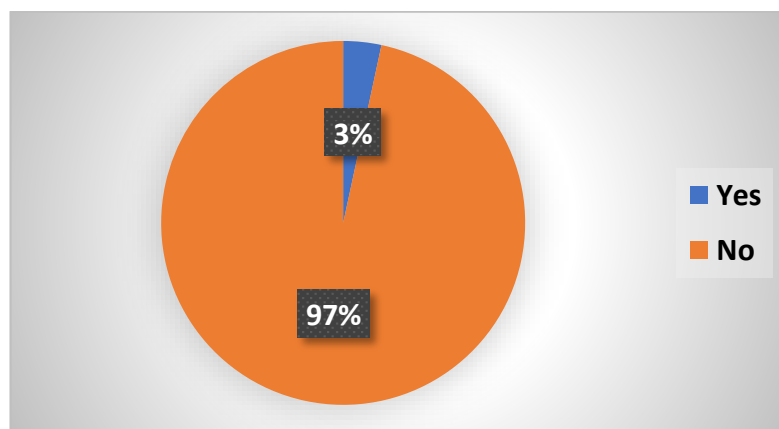
In the survey area, among the buffalo farmer who vaccinate their buffalo, about 53% vaccinate 3 times in year (Figure 110). In case of cattle, 43% farmer vaccinate fro 2 times in a year (Figure 111). For goat 94% farmer vaccinate once in a year (Figure 112).



**Figure 107: Regular vaccination of Buffalo practiced by farmer**



**Figure 108: Regular vaccination of Cattle practiced by farmer**



**Figure 109: Regular vaccination of Goat practiced by farmer**

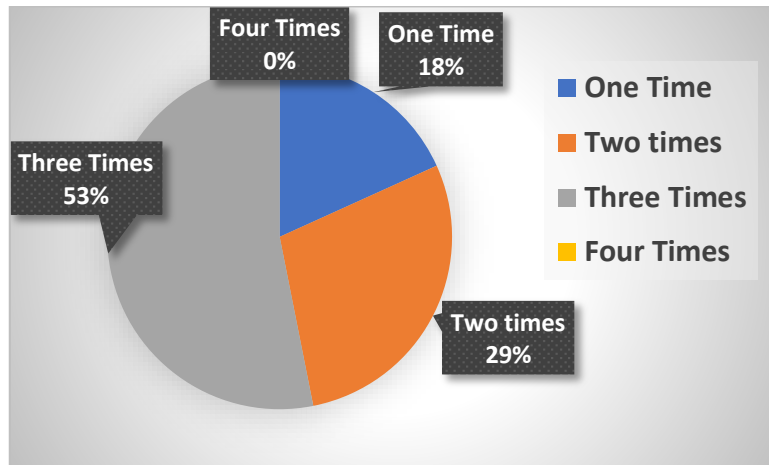


Figure 110: No. of vaccination practiced per year for Buffalo

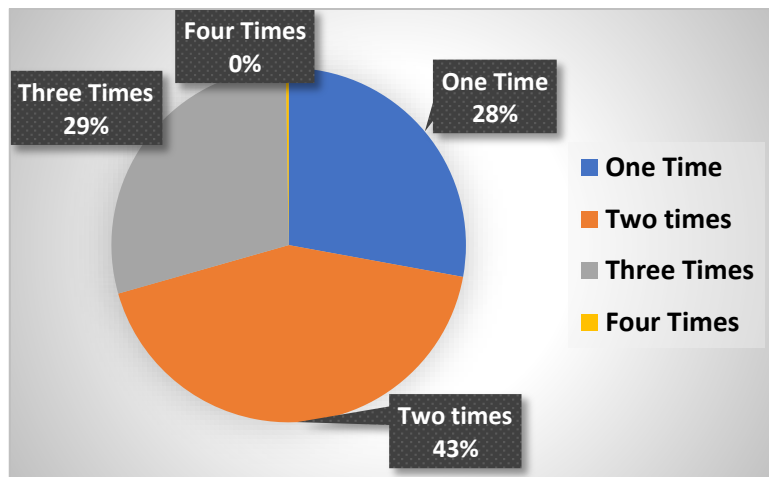


Figure 111: No. of vaccination practiced per year for Cattle

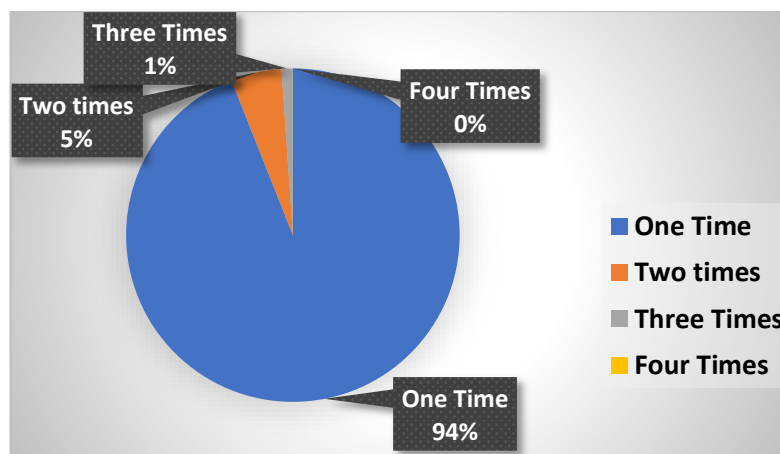


Figure 112: No. of vaccination practiced per year for goat

In the survey area buffalo of 5 farmer died in last year, the no. for cattle is 43 (Figure 113). Maximum number of death occurrence for Buffalo and Cattle is above 6 months of age. And for Goat it is before 6 month of age (Figure 114). Figure 115 shows maximum number of death of buffalo occurred due to Pneumonia (43%). Others diseases are HS, Bloat, Toxicity. For Cattle; Maximum number of deaths occurred in Bloat. Others diseases are LSD, Anthrax, BQ, Diarrhoea (Figure 116). Maximum number death of young Buffalo is Pneumonia (Figure 117). For Young Cattle: In the survey area, maximum death occurred in pneumonia (Figure 118). For causes of death of young goat, death occurred in pneumonia is higher in number (figure 119). Loss for Buffalo farmer is above 550000tk. For Cattle farmer it is below 100000Tk, and for goat farmer it is below 100000 Tk (Figure 120). Figure 121 shows in winter season most of the death of buffalo occurred.

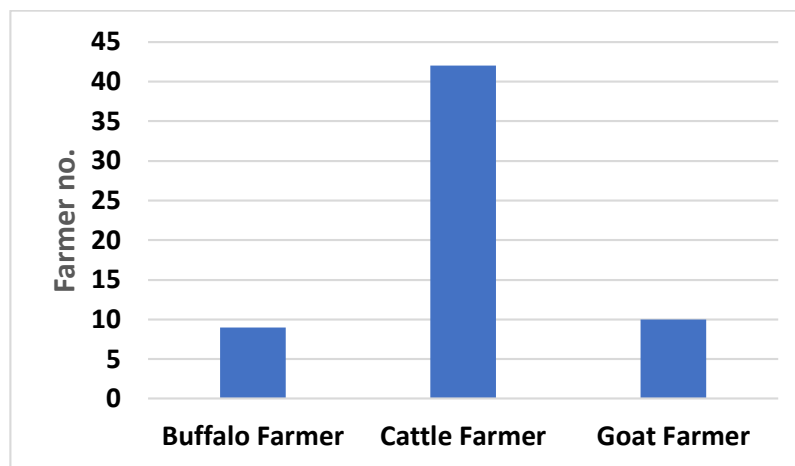


Figure 113: No. of Farmer faced animal death last year

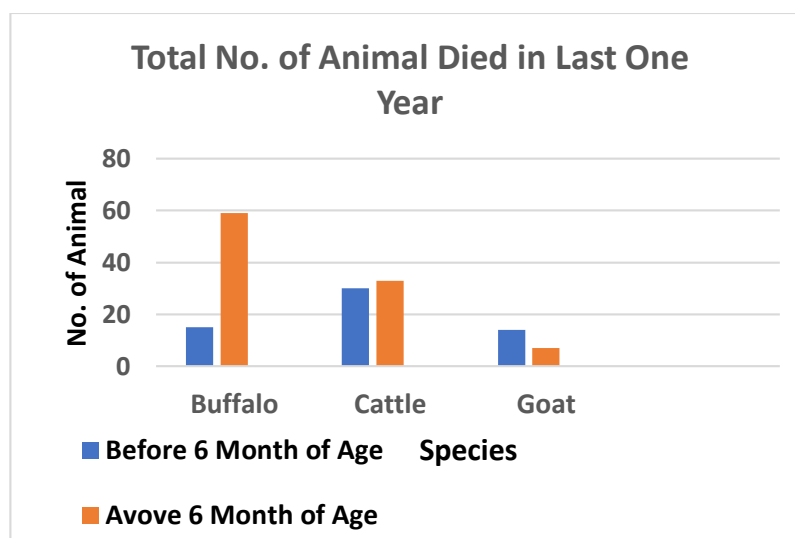


Figure 114: No. of total animal died of different age

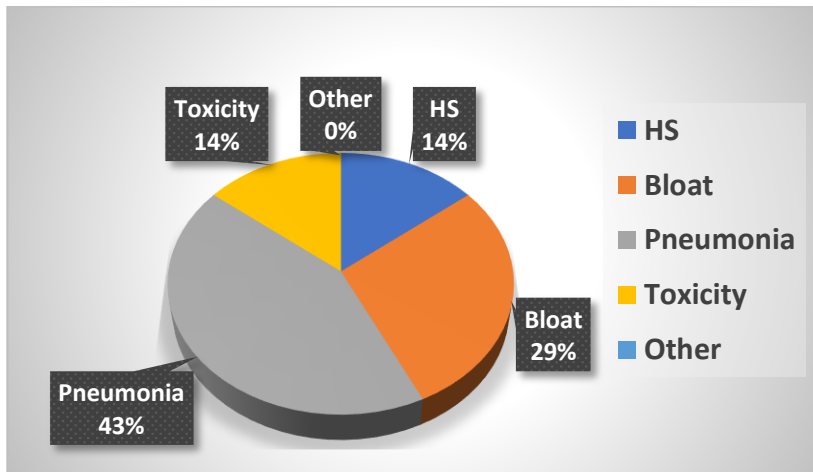


Figure 115: Causes of Death of Mature Buffalo

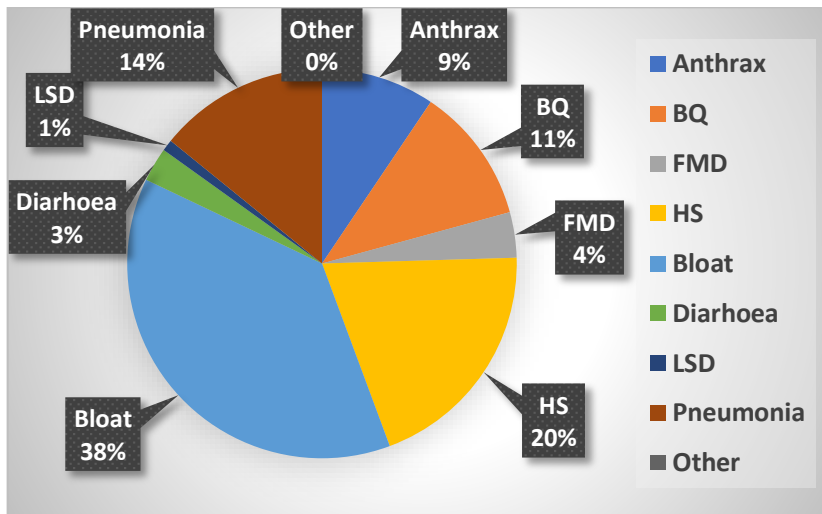


Figure 116: Causes of Death of Mature Cattle

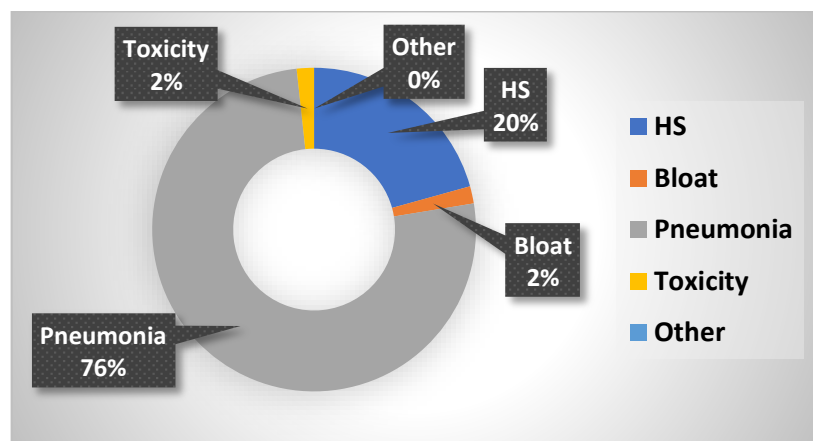


Figure 117: Causes of Death of Young Buffalo



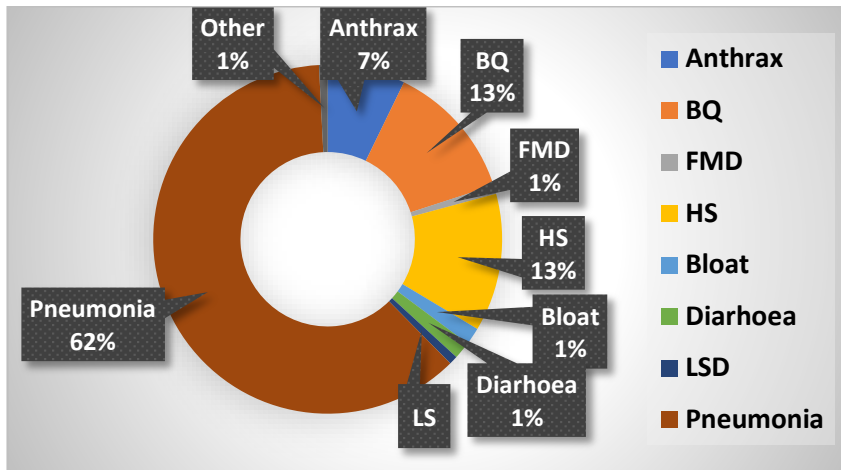


Figure 118: Causes of Death of Young Cattle

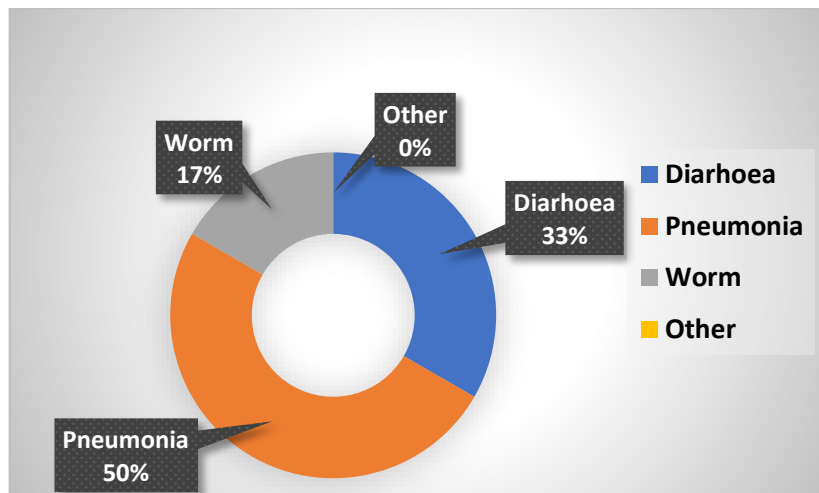


Figure 119: Causes of Death of Young Goat

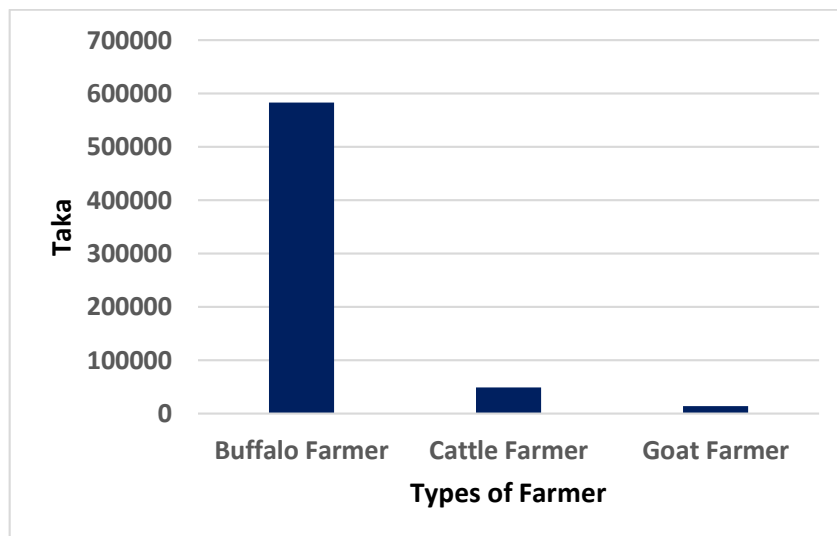
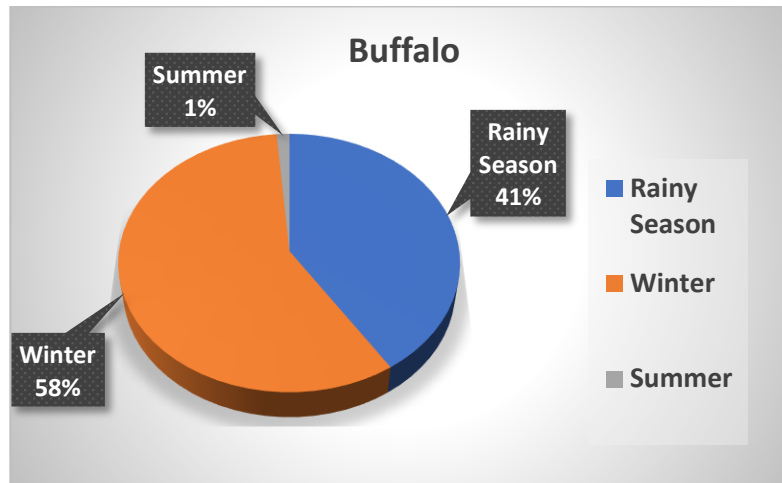


Figure 120: Average Loss for Each Farmer for Death of Animal



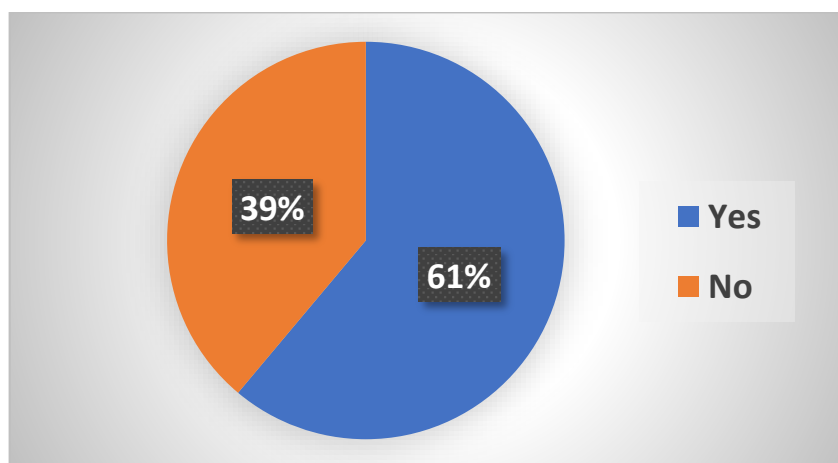
**Figure 121: Death occurred of animal in different season**

Figure 122 shows 61% Buffalo farmer had sick animal. For cattle it is 50 % and for goat, it is 63% (Figure 123 and Figure 124), respectively.

Whereas 50% farmer who are involved with fattening program had sick animal last year (Figure 125).

In the survey area, avg. percentage of animal got sick: above 40% (Buffalo), almost 50%(Cattle), 69%(Goat), 48% (Fattening animal) (Figure 126).

Figure 127 shows maximum Buffalo affected in HS (62%). Other diseases are FMD, Bloat, BQ etc. In the survey area, maximum cattle affected in LSD. Other diseases are Anthrax, BQ, FMD, Bloat, Milk fever, Toxicity etc (Figure 128). Figure 129 shows maximum goat affected in Pneumonia (78%). Other Diseases are Bloat, Diarrhoea, Worm etc.



**Figure 122: Percentage of buffalo farmer had sick animal last year**

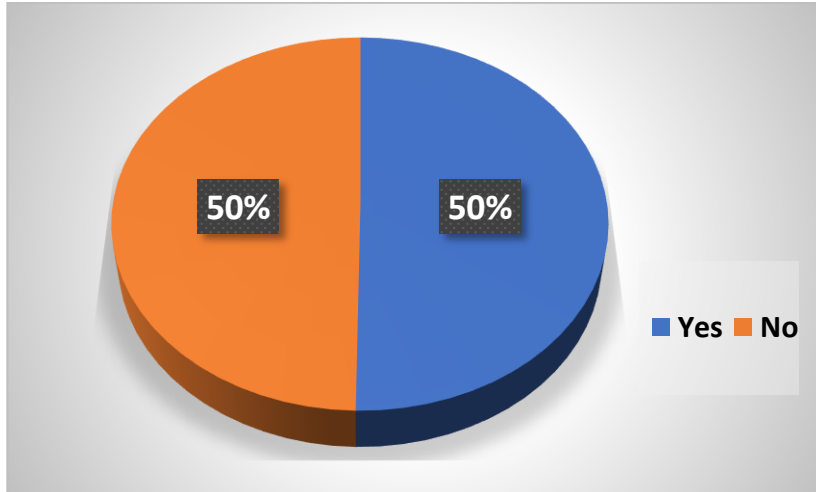


Figure 123: Percentage of Cattle farmer had sick animal last year

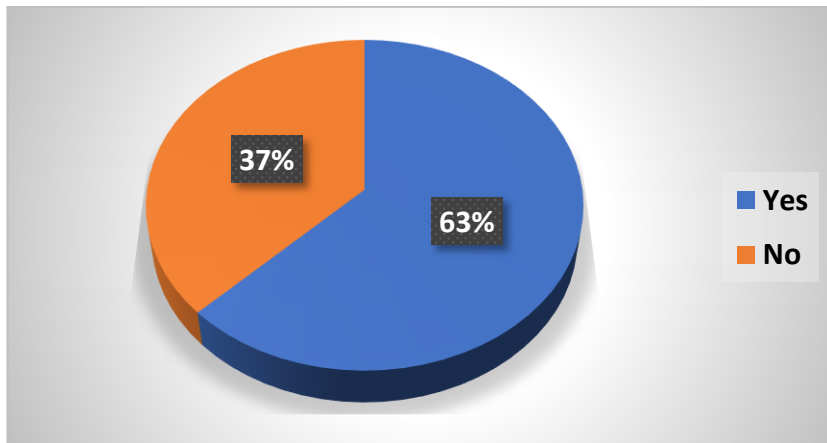


Figure 124: Percentage of Goat farmer had sick animal last year

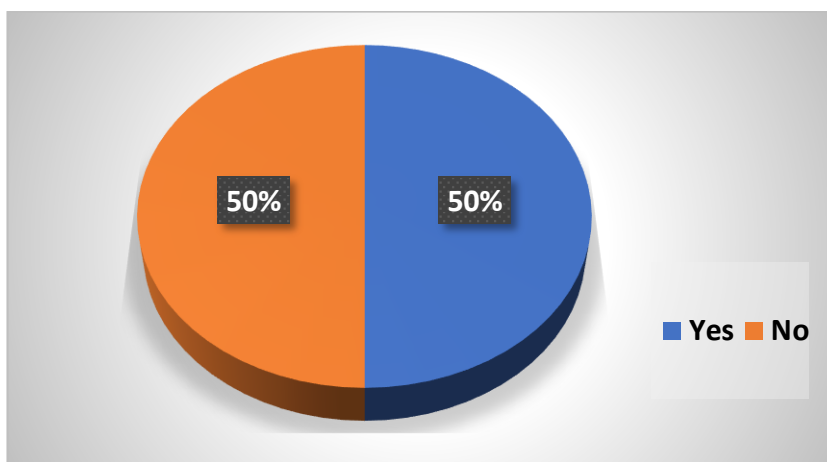


Figure 125: Percentage of Fattening farmer had sick animal last year

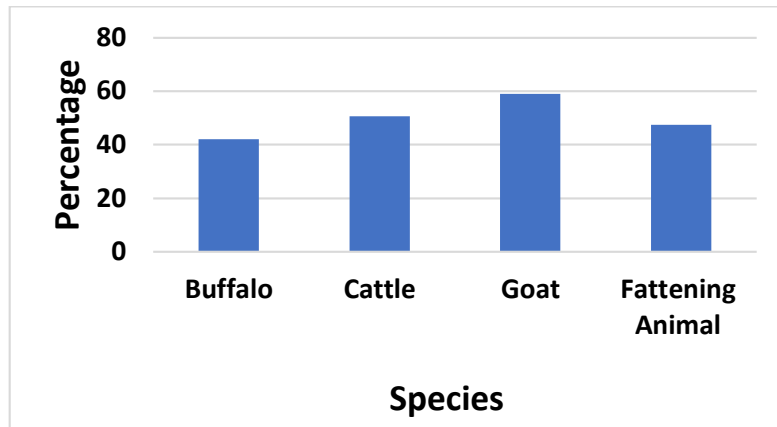


Figure 126: Percentage of Different animal got sick

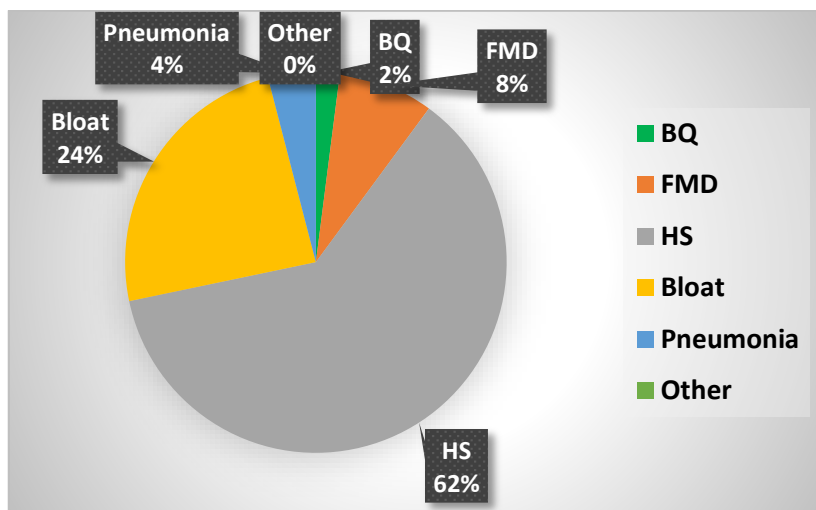


Figure 127: Different disease occurred in buffalo

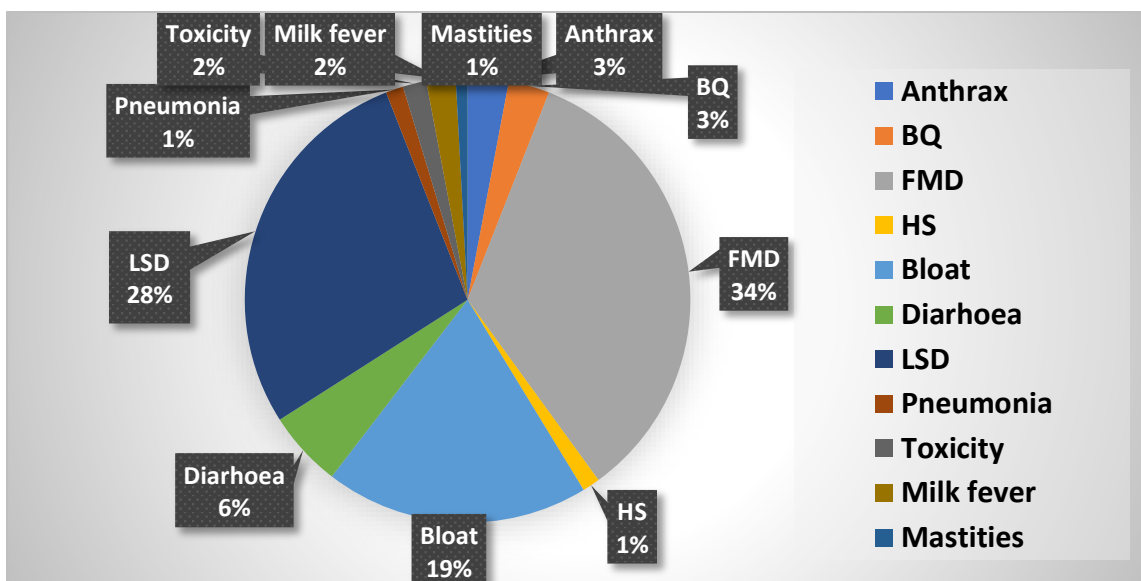
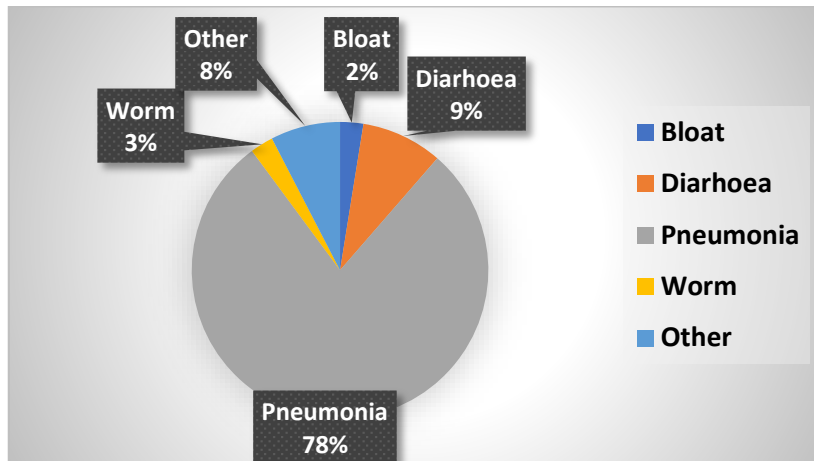
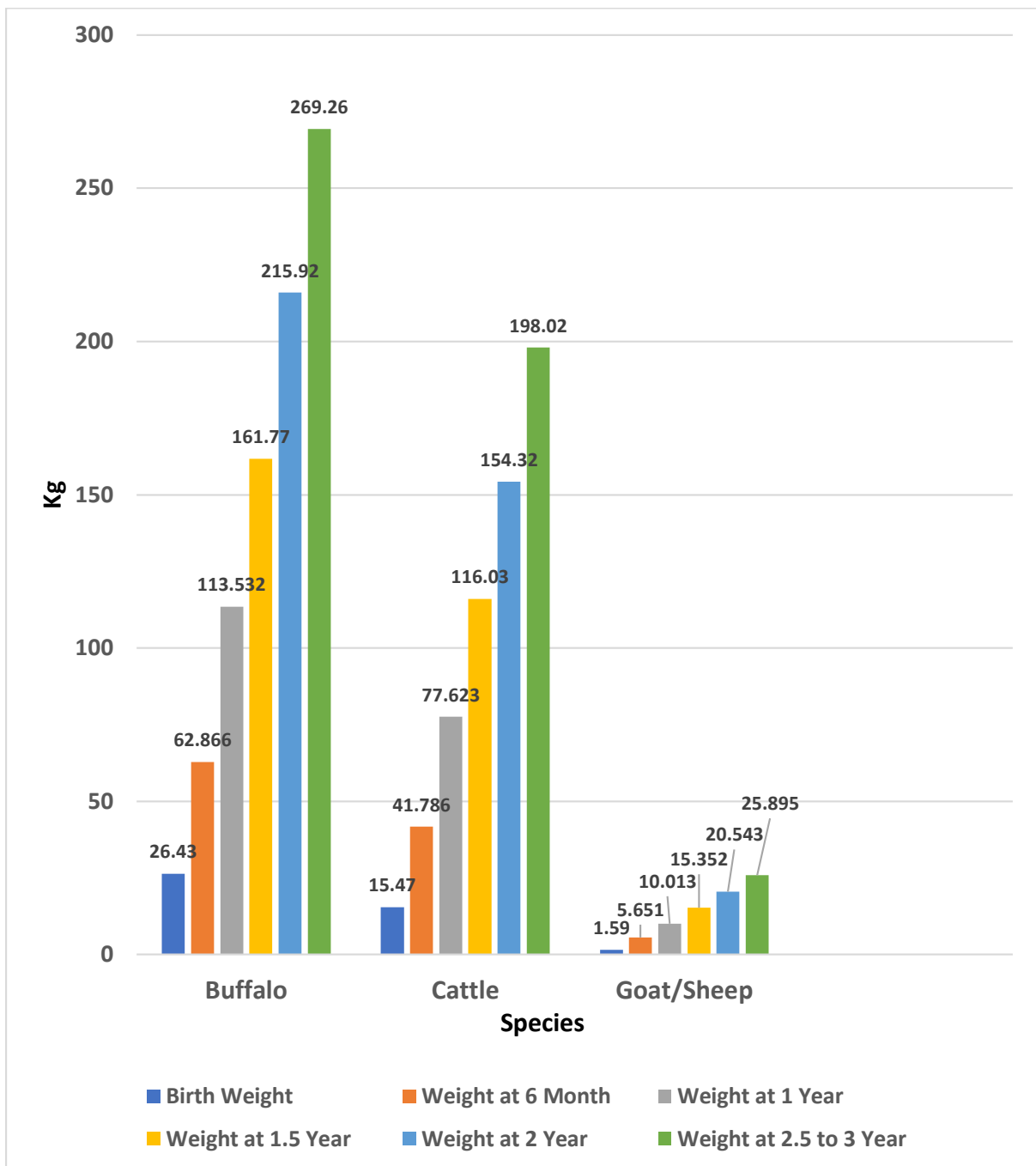


Figure 128: Different disease occurred in cattle



**Figure 129: Different disease occurred in goat**

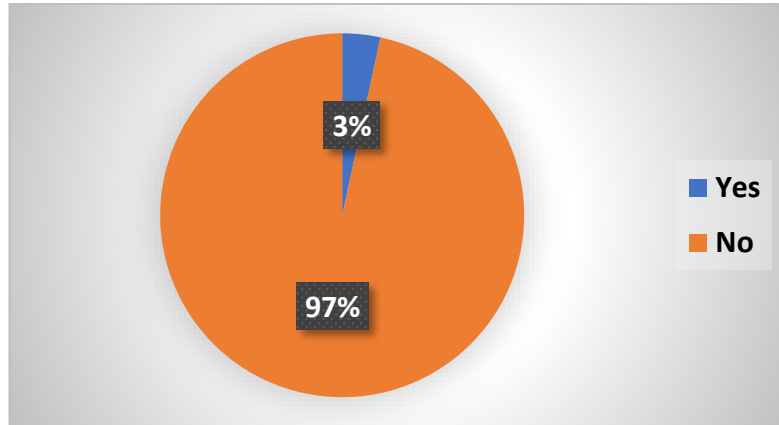
In the survey area, the average birth weight of buffalo is 26.43 kg, weight at 6 month is 62.86 kg and weight at 2 years is 215.92 kg. The birth weight of cattle is 15.47 kg, weight at 6 month is 41.78kg, weight at 2 years is 154.32 kg. The birth weight of Goat is 1. 59 kg, weight at 6 month is 5.651 kg, weight at 2 years is 20.543 kg (Figure 131).



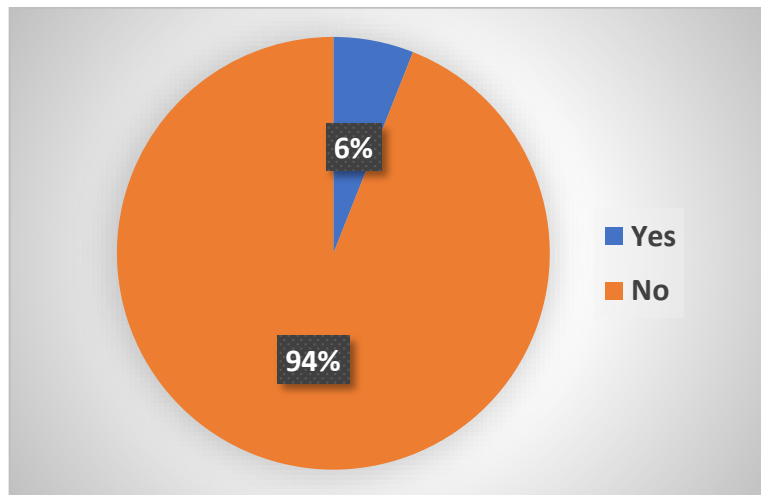
**Figure 130: Average Weight of Animal at Different Age**

## 7. Service Provider in Supply Chain

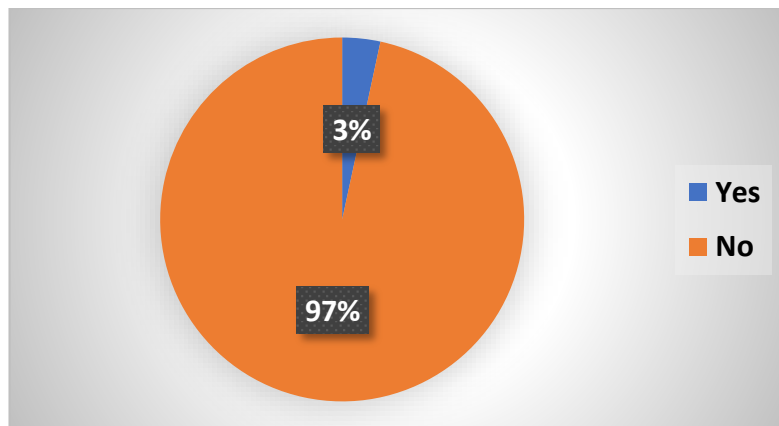
In the survey area, 3% of the Buffalo farmer practice vaccination, 6% of the cattle farmer practice vaccination, and for goat the percentage is 3% (Figure 131, Figure 132 and Figure 133), respectively. Figure 134 shows that among the farmer who vaccinate animal maximum number of vaccinations have practiced by Buffalo farmer (about 13 animal each).



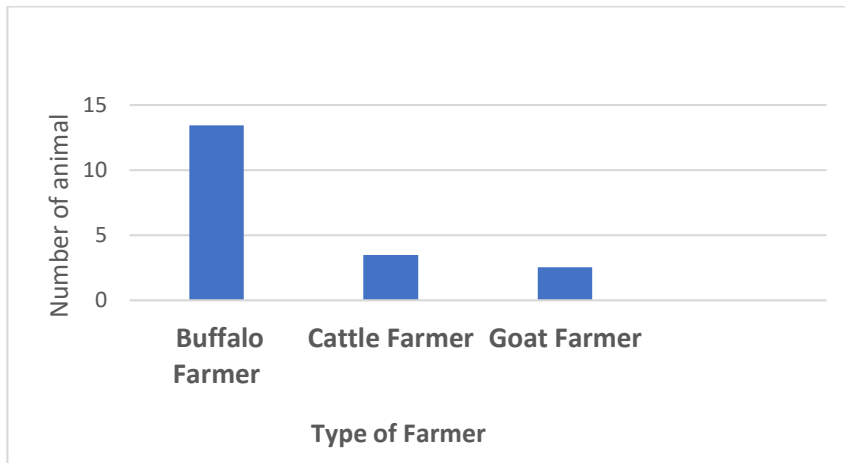
**Figure 131: Percentage of Buffalo farmer practice vaccination**



**Figure 132: Percentage of Cattle farmer practice vaccination**



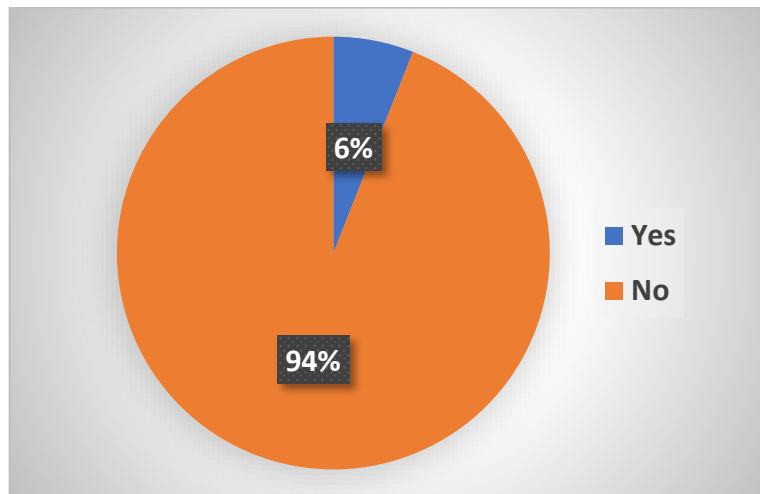
**Figure 133: Percentage of Goat farmer practice vaccination**



**Figure 134: Vaccination Practiced by each Farmer**

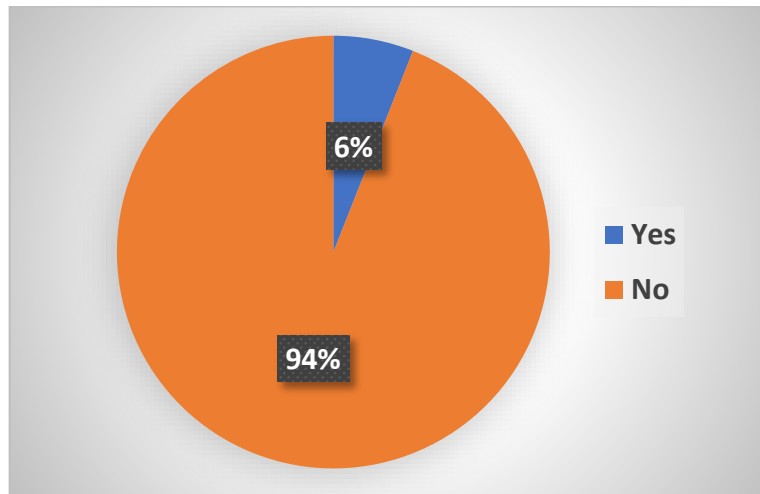
Deworming is very important issue for animal rearing farmer. In that area, only 6% of the Buffalo farmer dewormed their animal, for cattle 6% of the cattle rearing farmer have practiced. For goat the it is 3% (Figure 135, Figure 136 and Figure 137), respectively.

In the survey area goat rearing farmer have practiced deworming high in number (Figure 138).

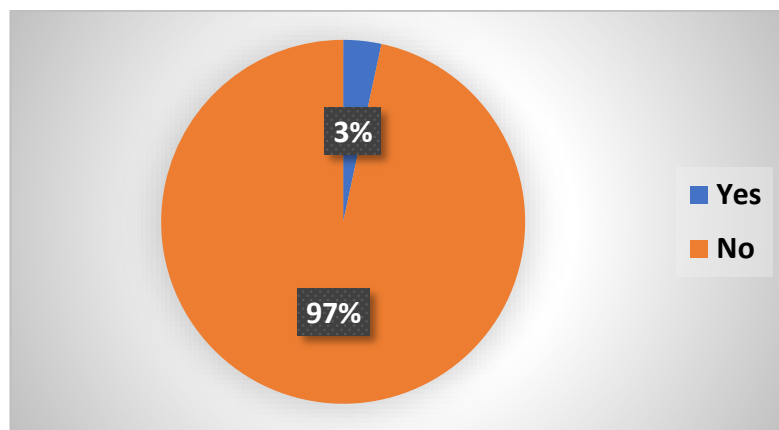


**Figure 135: Percentage of Buffalo farmer practice deworming**

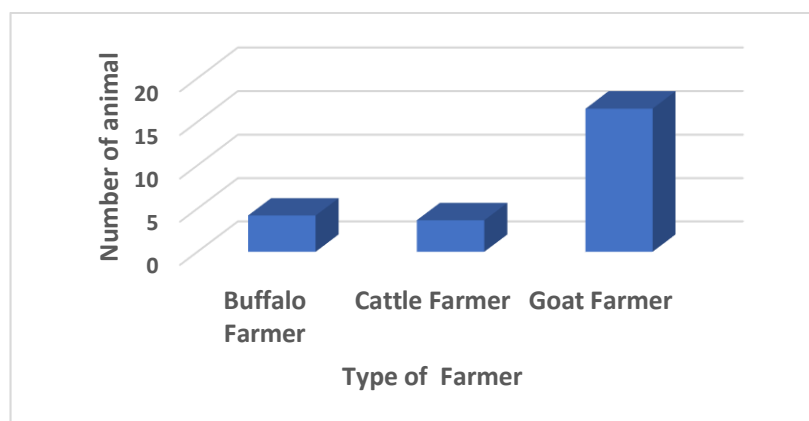




**Figure 136: Percentage of Cattle farmer practice deworming**



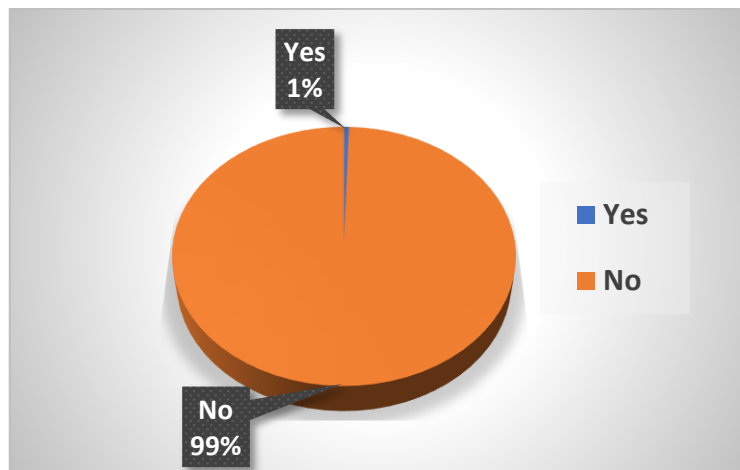
**Figure 137: Percentage of Goat farmer practice deworming**



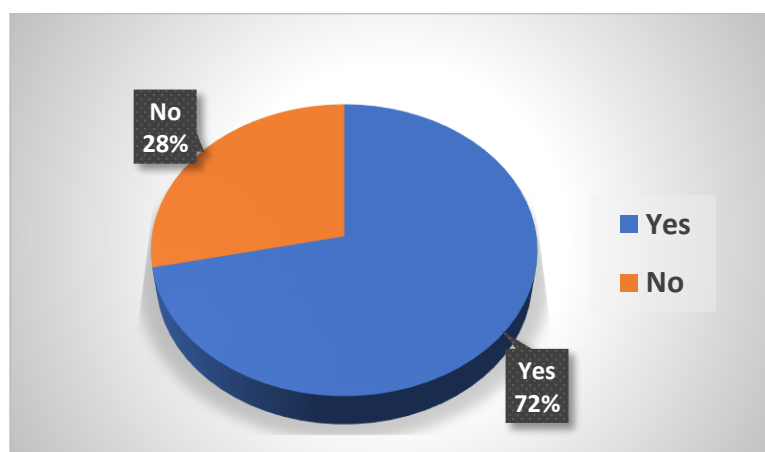
**Figure 138: Deworming Practiced by each Farmer**

In the collected data, only 1% of the buffalo farmer use Artificial insemination (AI) for breeding. But the percentage is higher in cattle rearing who have practiced AI, and it is 72%. For goat, no AI has been practiced (Figure 139, Figure 140 and Figure 141), respectively.

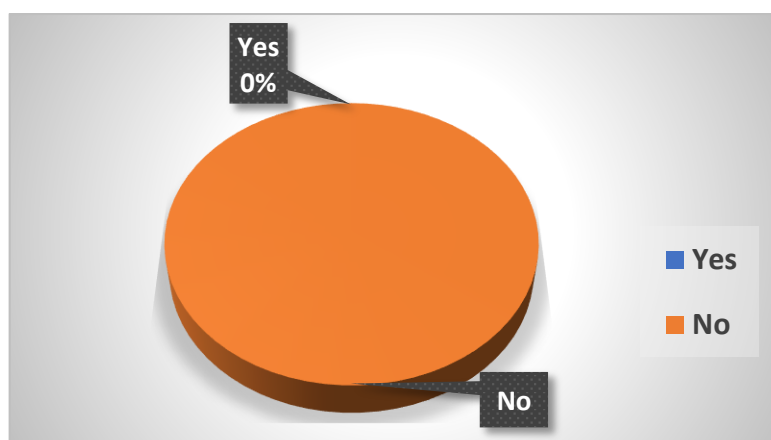
In the survey area, only cattle rearing farmer practiced AI in last 1 year (Figure 142).



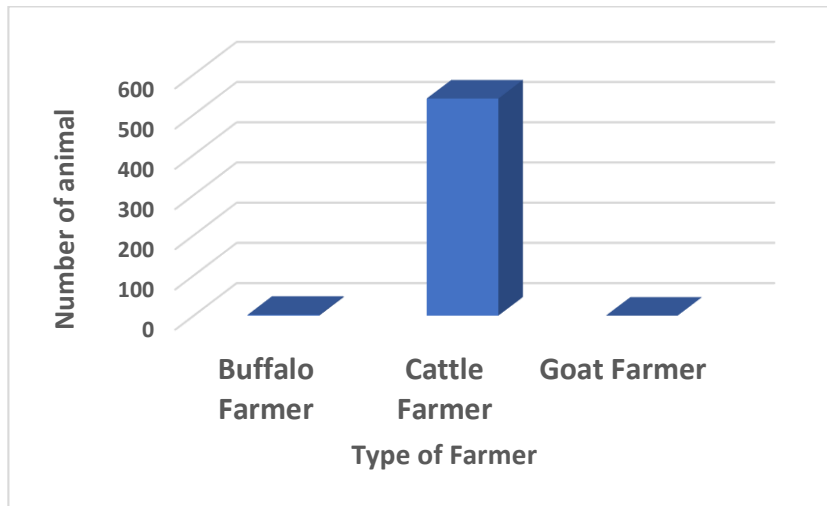
**Figure 139: Percentage of Buffalo farmer use AI**



**Figure 140: Percentage of Cattle farmer use AI**

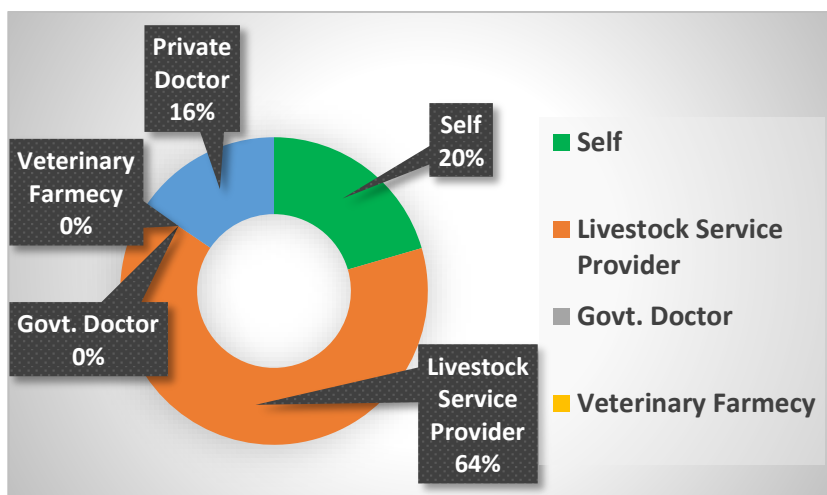


**Figure 141: Percentage of Goat farmer use AI**

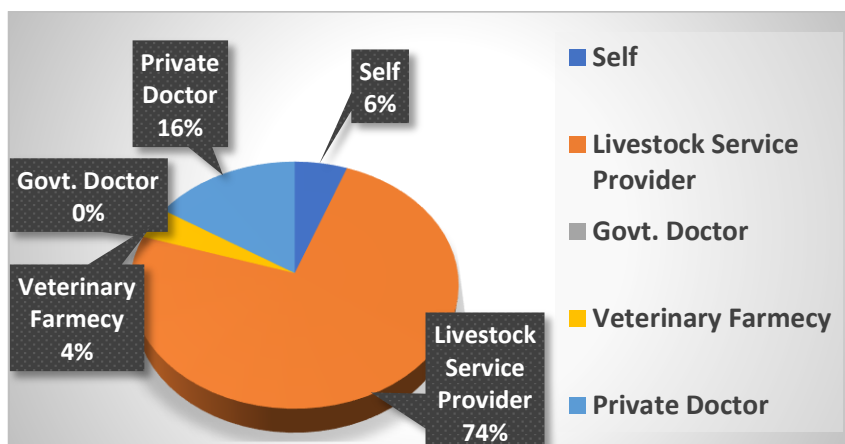


**Figure 142: Total Number of AI Performed**

Figure 143 shows 64% of the farmer received vaccination, deworming, AI and other services from Livestock Service provider. 74% of the cattle farmer received those services from LSP (Figure 144).



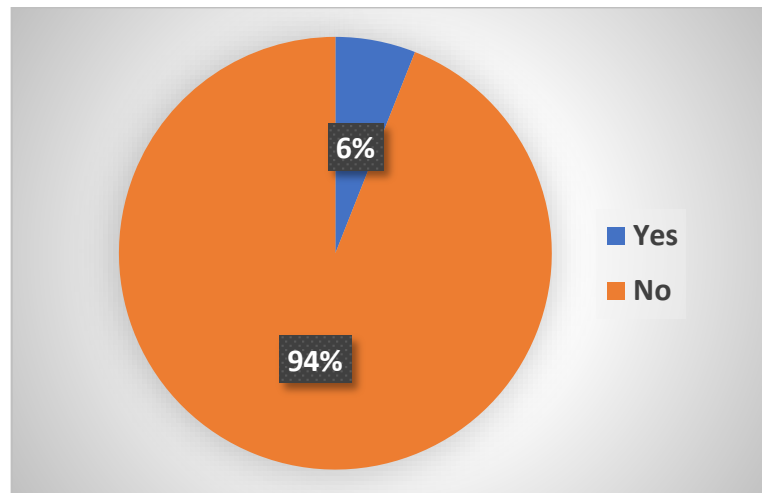
**Figure 143: Source of service taken by buffalo farmer**



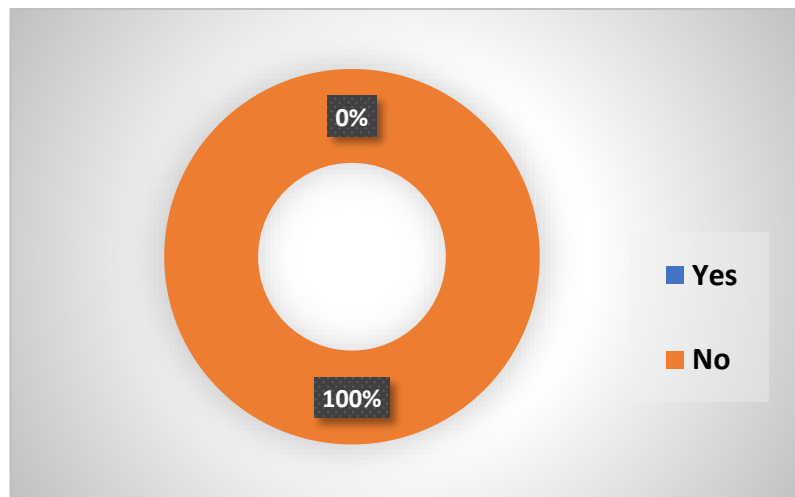
**Figure 144: Source of service taken by cattle farmer**

## 8. Feeds and Fodder Supply Chain

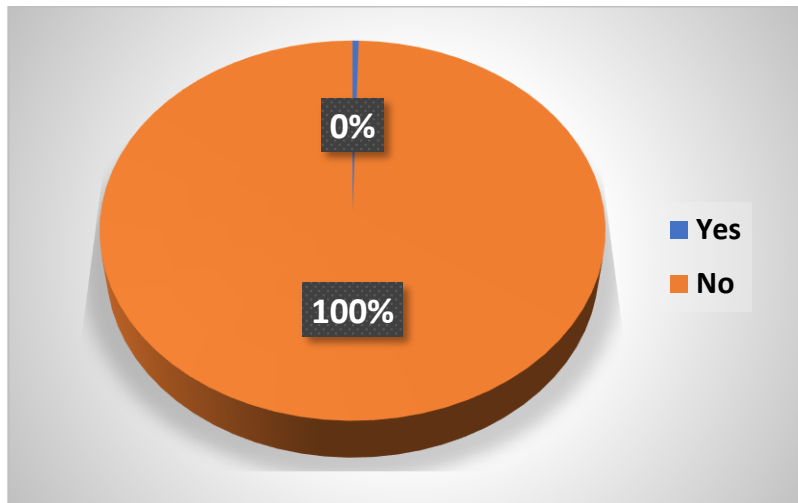
Figure 145 shows about 6% of the cattle farmer use ready feed for rearing cattle. Whereas none of the buffalo farmer and only 1 goat farmer use ready feed for rearing buffalo and goat (Figure 146 and Figure 147), respectively. Figure 148 shows that all the cattle farmers who use ready feed buy ready feed from the local market.



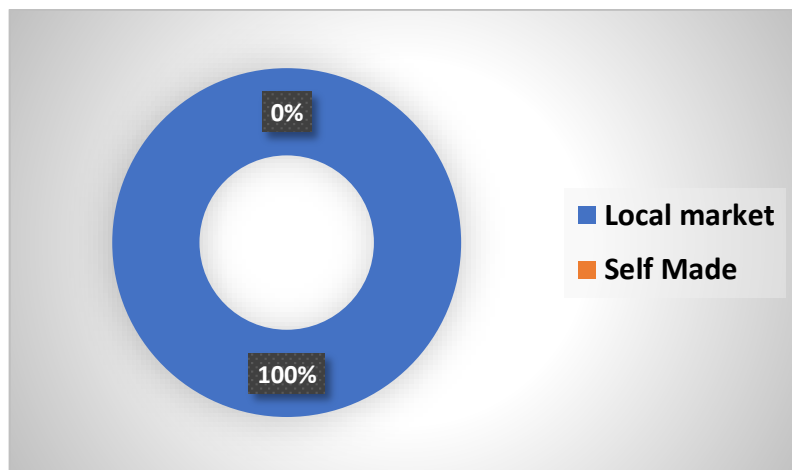
**Figure 145: Use of Ready Feed by Cattle Farmer**



**Figure 146: Use of Ready Feed by Buffalo Farmer**

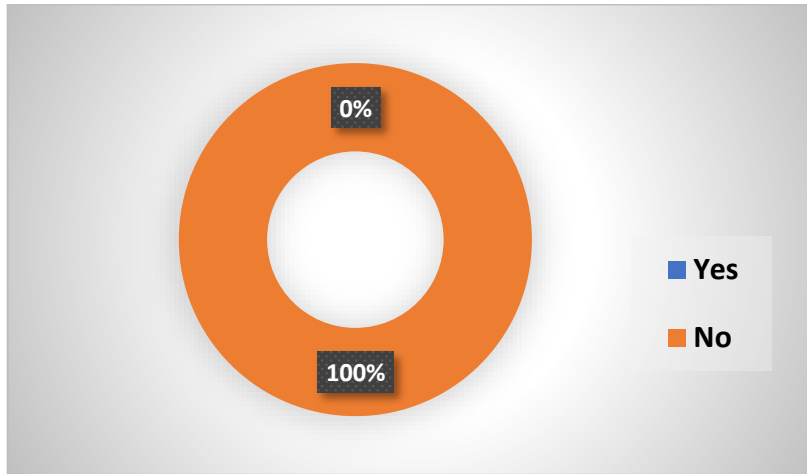


**Figure 147: Use of Ready Feed by Goat Farmer**

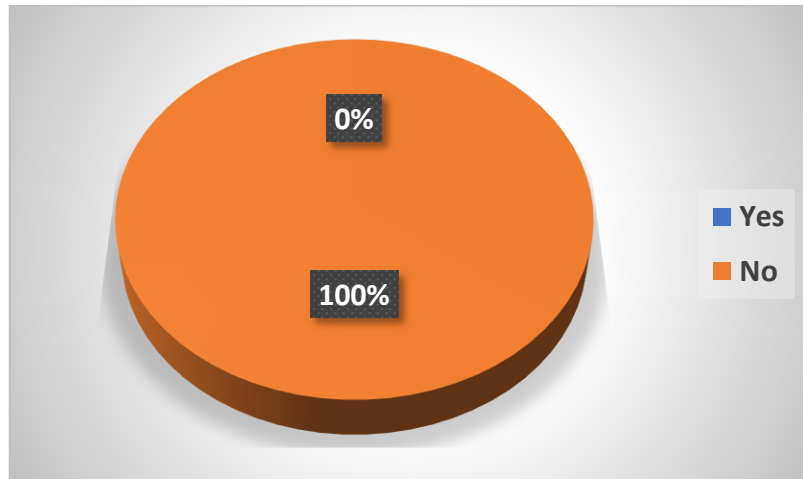


**Figure 148: Source of ready feed used by the farmer**

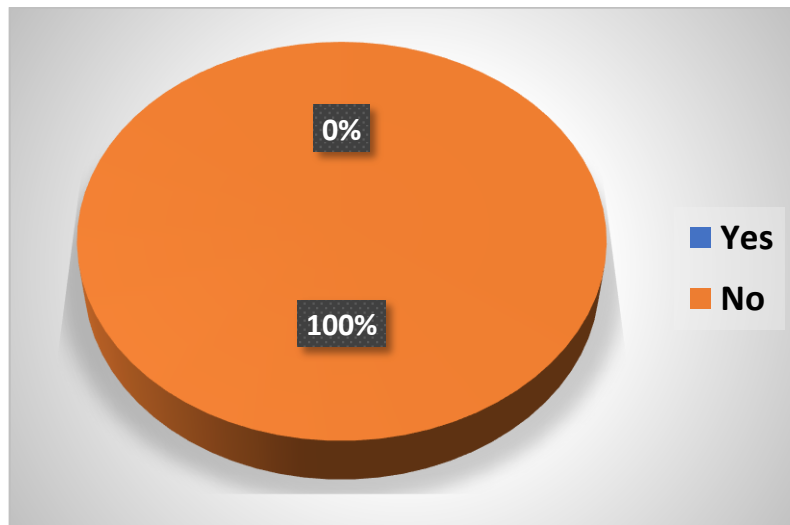
In the survey area none of the farmer use calf starter for raising buffalo or cattle calf (Figure 149). As most of the farmer don't produce high quality grass for raising buffalo, cattle or goat, so none of the farmer make silage for feeding of their animal (Figure 150). During survey it was found that none of the farmer in the survey area treat straw with Urea or molass for ensuring comparatively better nutrition to their buffalo, cattle or goat ( Figure 151)



**Figure 149: Usage of calf starter by the farmer**

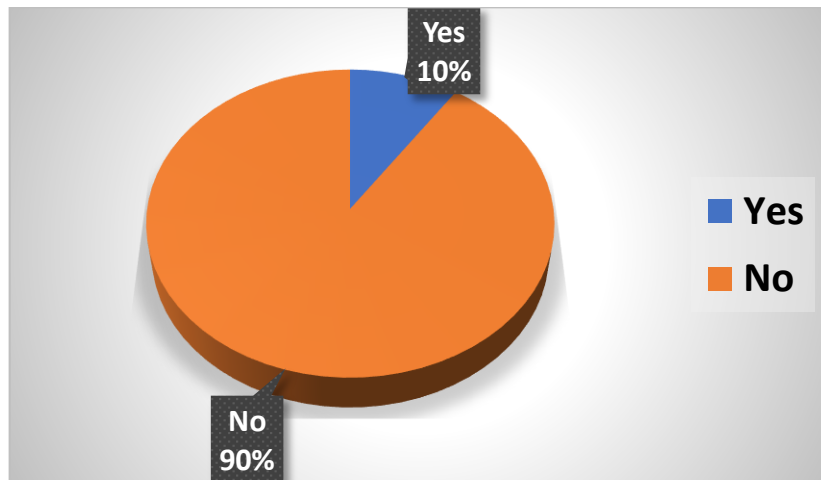


**Figure 150: Usage of silage by the farmer**

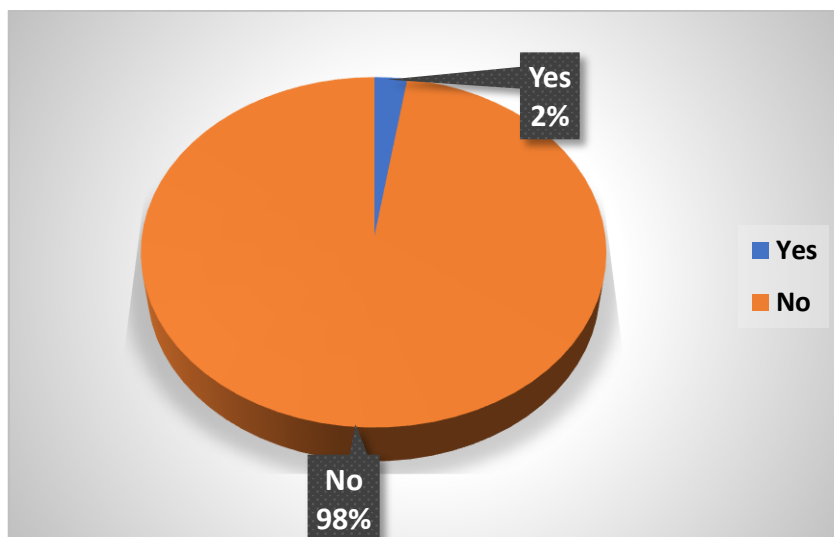


**Figure 151: Usage of UMB/UTS by the farmer**

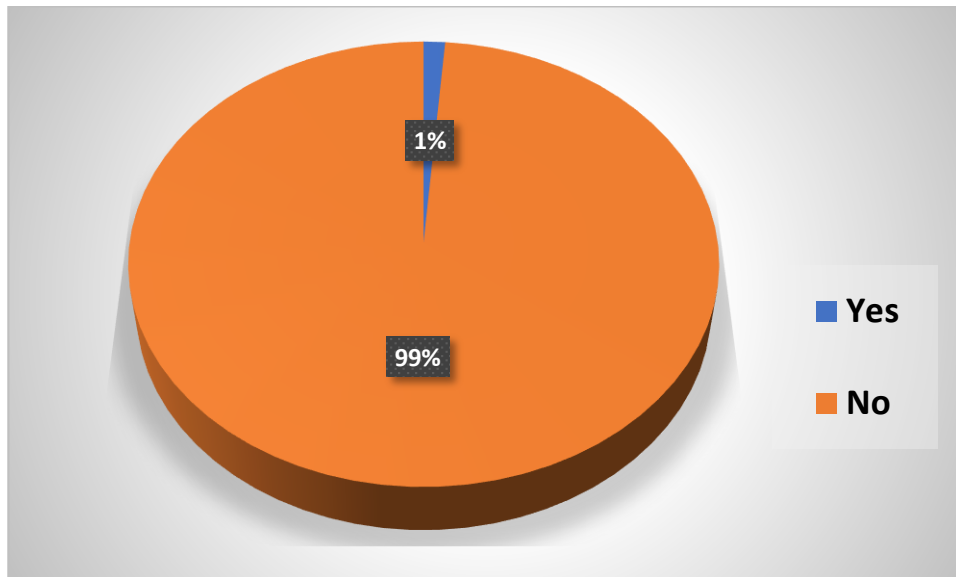
Figure 152 shows about 10% of the cattle farmer produce high breed grass like Napier, pakchong etc for rearing cattle. On the other hand only 2% buffalo farmer and 1% goat farmer use high breed grass (Figure 153 and Figure 154), respectively. The following three chart shows that about all the farmer who feed their animal high quality grass produce this grass by their own ( Figure 155).



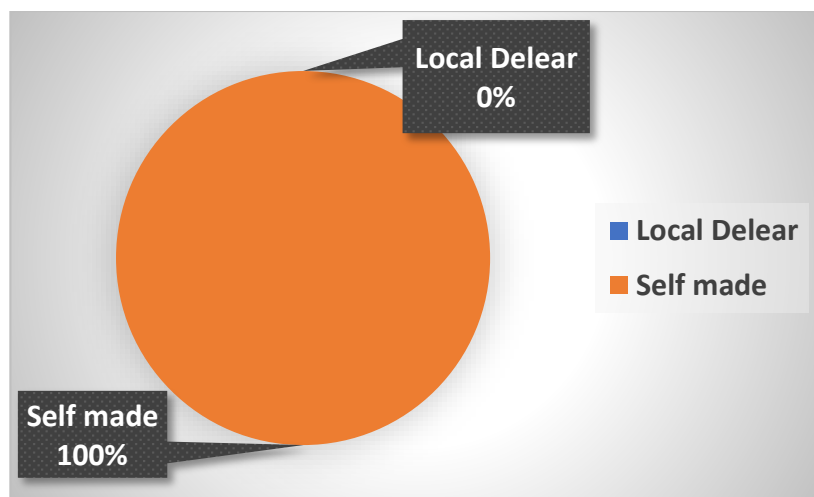
**Figure 152: Use of High Breed Grass by the Cattle Farmer**



**Figure 153: Use of High Breed Grass by the Buffalo Farmer**



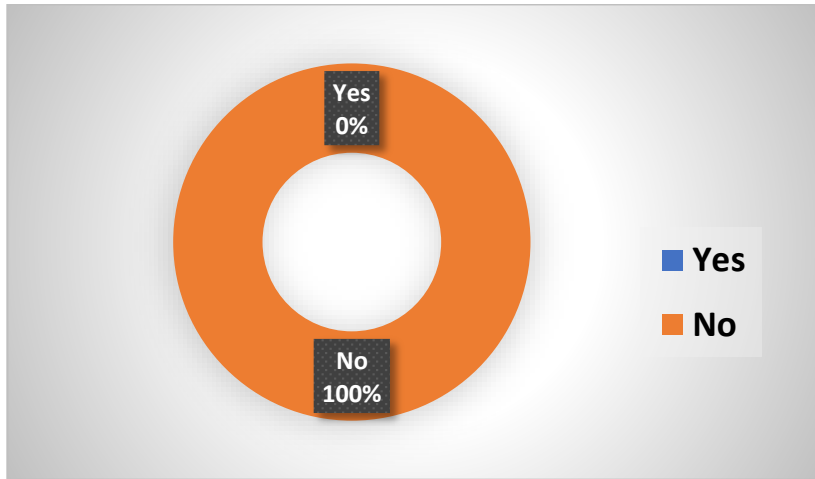
**Figure 154: Use of High Breed Grass by the Goat Farmer**



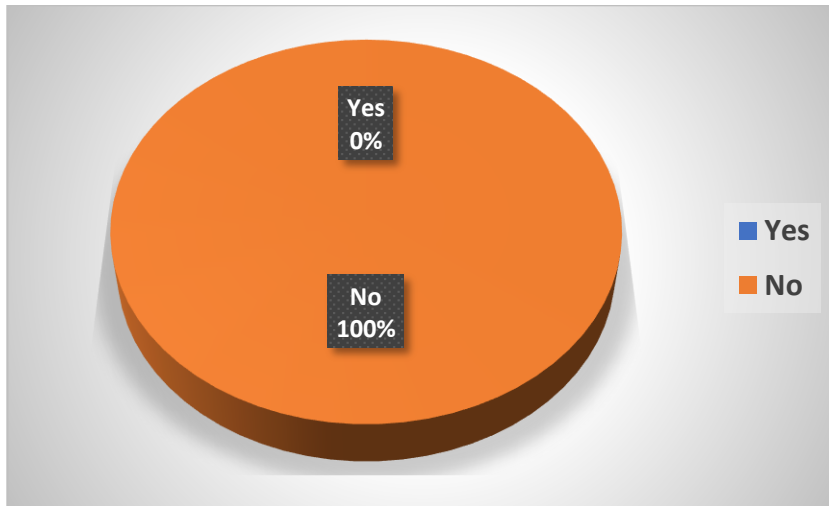
**Figure 155: sources of high-quality grass**

In the survey area none of the farmer use nutritional technology-based feed like vitamin-mineral premix for rearing buffalo, cattle or goat (Figure 156). Figure 157 shows that none of the buffalo, cattle or goat farmer practice like use of mechanized farming like straw cutting machine, milking machine, feed trolley, weight machine.





**Figure 156: Use of Nutrition Technology Based Feed**



**Figure 157: Practicing of Mechanized Farming by farmer**

## 9. Light and Heavy Machine Technology in Farm Management

Figure 158 shows none of the farmer use new technology or machine like straw or grass cutting machine, concentrate feed mixing machine, weight machine, milking machine, feed trolley, heat detection machine used by the farmer for mechanization of the farm.

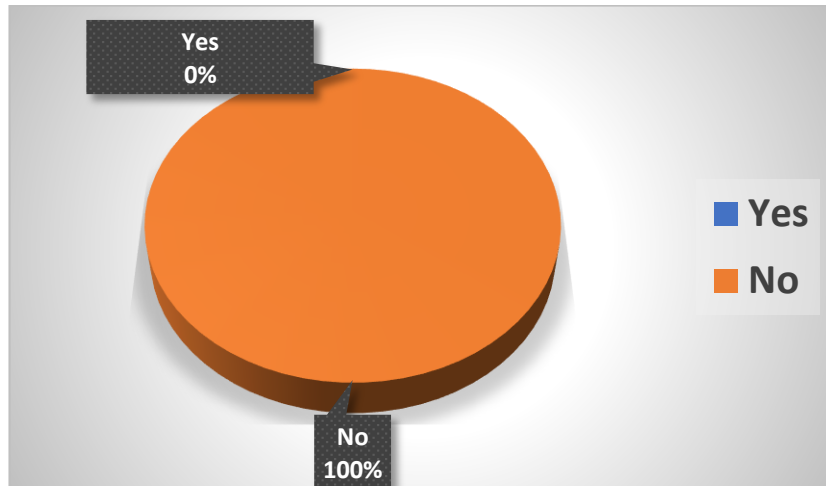


Figure 158: different technology used by the farmer

## 10. Training, Climate Smart Management and Use of IoT

Most of the farmer (about 93%) didn't get any training related to modern livestock farming yet. The rest 7% got training from different organization (Figure 159). Figure 160 shows none of the farmer got training related to Good Agricultural Practices. They don't know how to rear livestock by following climate friendly livestock rearing system. Figure 161 presents none of the farmer got training related to Global Good Agricultural Practices for rearing meat animal.

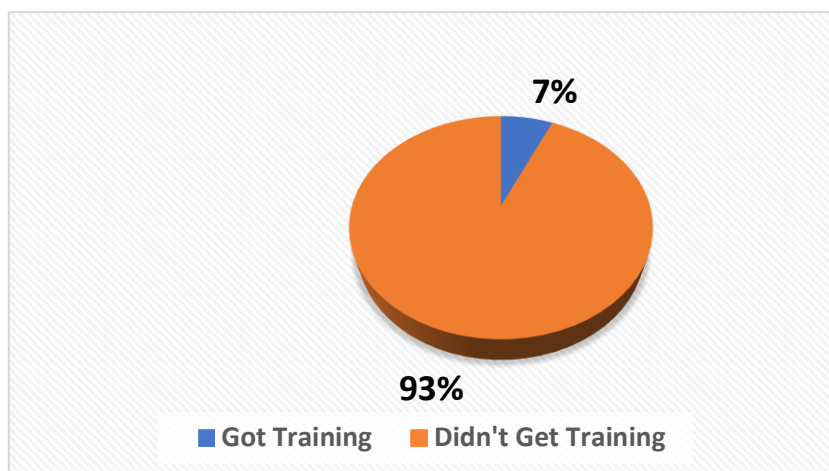


Figure 159: Training Related to Modern Farming received by farmers

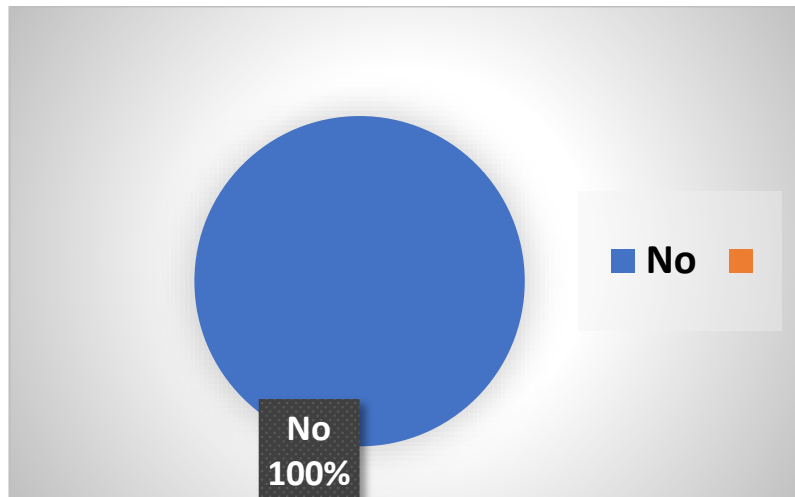


Figure 160: Training Related to GAP received by farmers

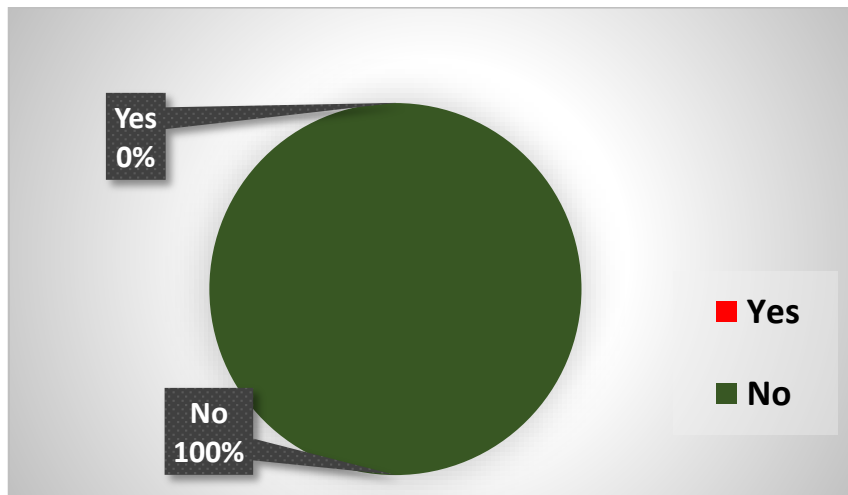


Figure 161: Training Related to meat animal rearing received by farmers

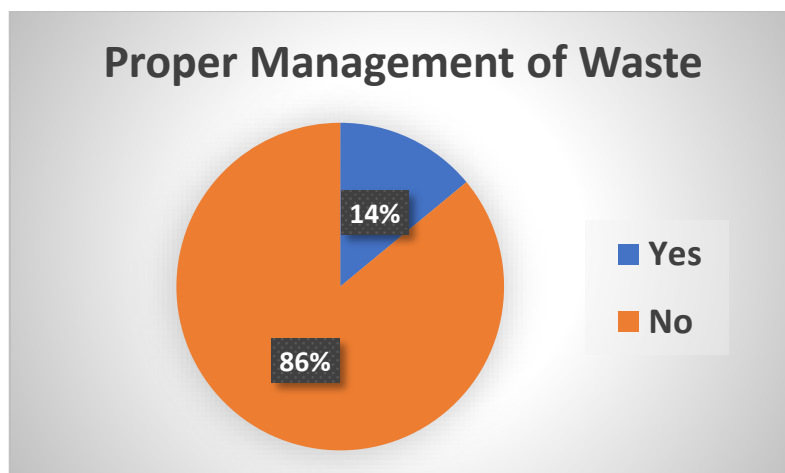


Figure 162: Proper management of washed followed by farmer

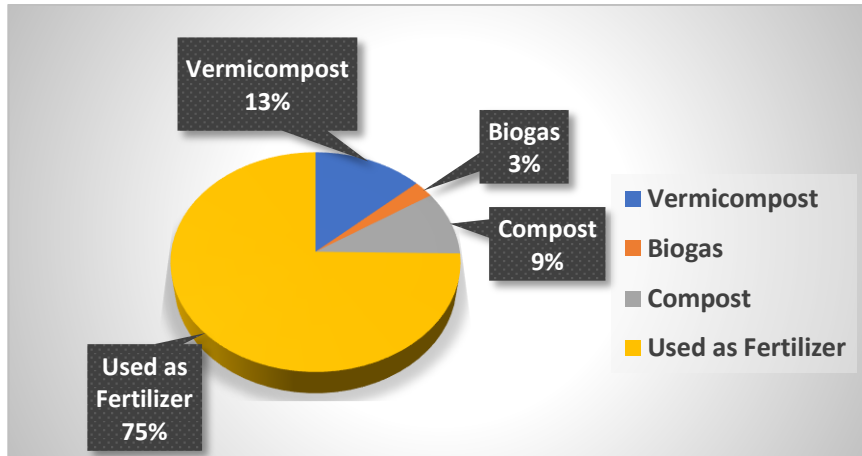


Figure 163: System for collection and preservation of waste used by farmer

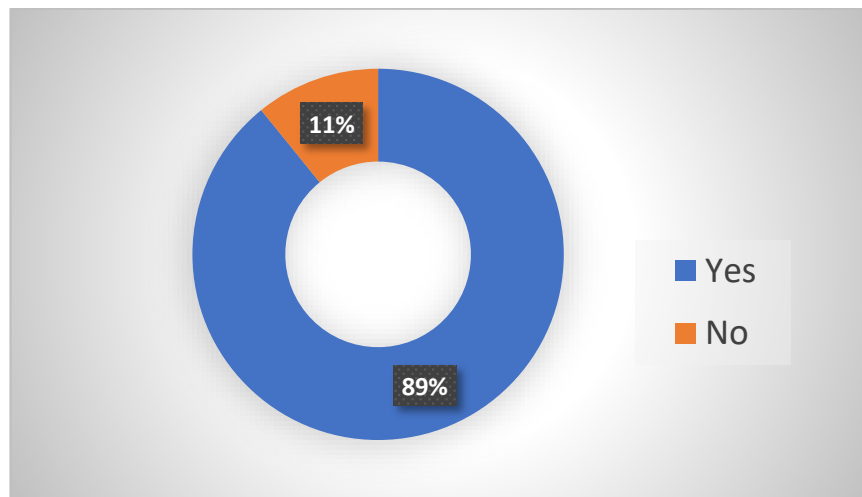


Figure 164: Decrease of environmental pollution due to waste management

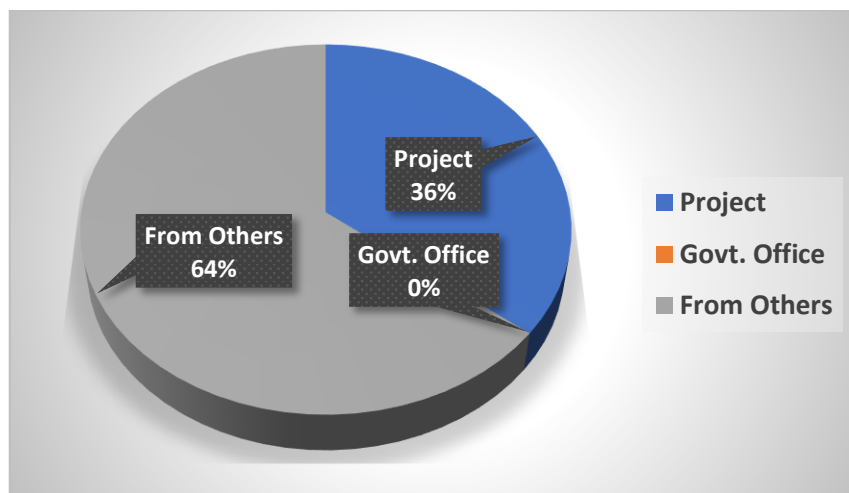
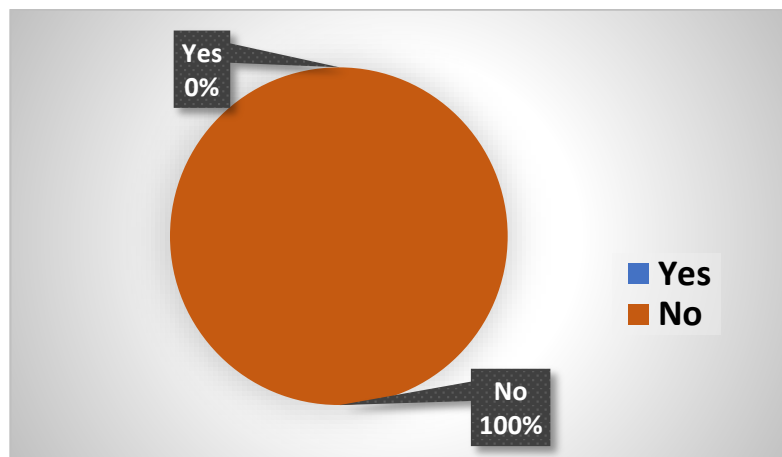


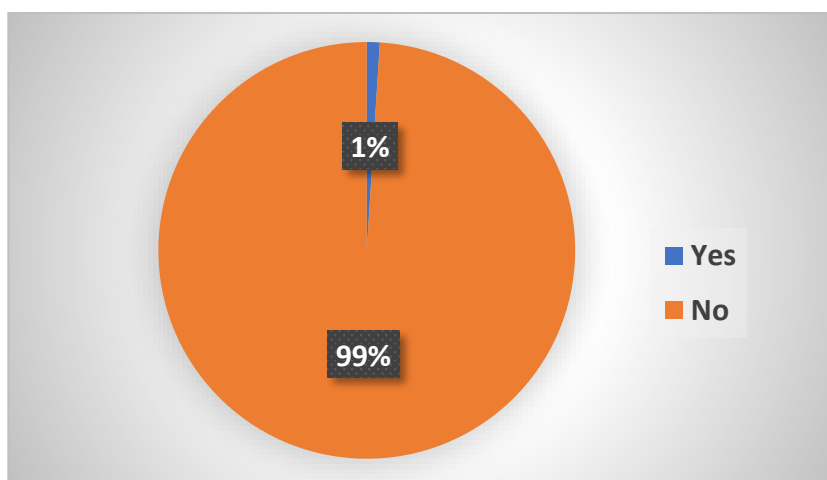
Figure 165: Source of learning of waste management

14% of the farmer practice proper waste management, whereas 86% of the farmer don't (Figure 162). In the survey area 75% of the farmer use their waste as fertilizer. Others use as vermicompost, Biogas, Compost etc. (Figure 163). Figure 164 shows 89% farmer said environment pollution has been reduced due to proper waste management. Farmers learned about waste management from project (36%) and 64% from others (Figure 165).

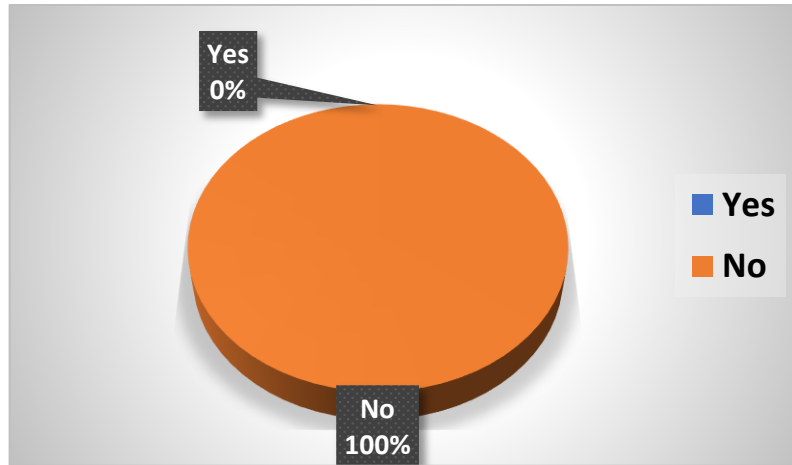
Figure 166 shows none of the farmer got training Related to nutrition, climate, environment, social issue, animal husbandry and business management for rearing cattle, goat, buffalo and sheep. Figure 167 presents that only about 1% of the farmer receive veterinary telemedicine service from Local Service provider. None of the farmer get animal husbandry services through mobile apps (Figure 168). In the survey area none of the farmer get insurance services for their animal (Figure 169). In the survey area none of the farmer use mobile apps for animal business management (Figure 170). In the survey area none of the farmer sold a single animal through online platform (Figure 171).



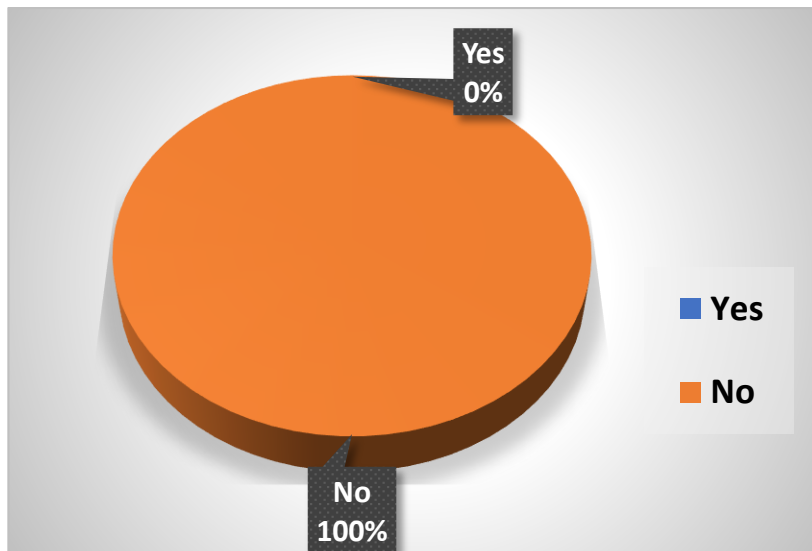
**Figure 166: Training related to nutrition, climate, social issue, business management**



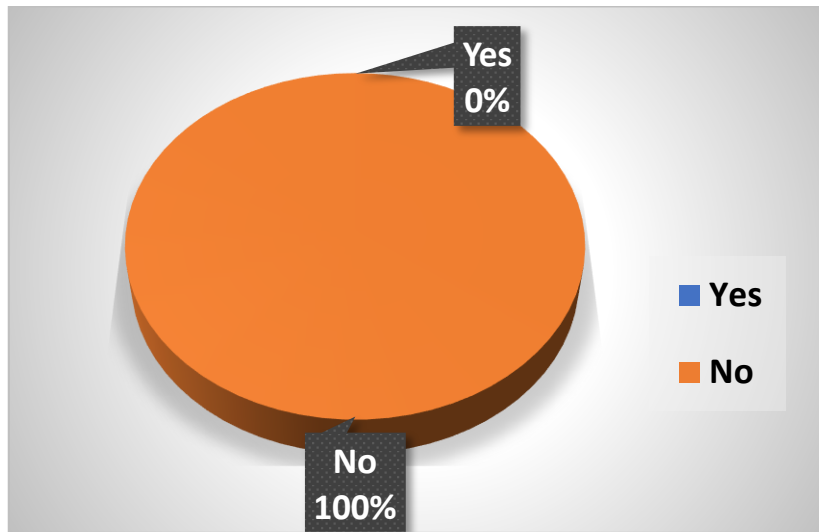
**Figure 167: Veterinary Telemedicine Service from LSP received by farmer**



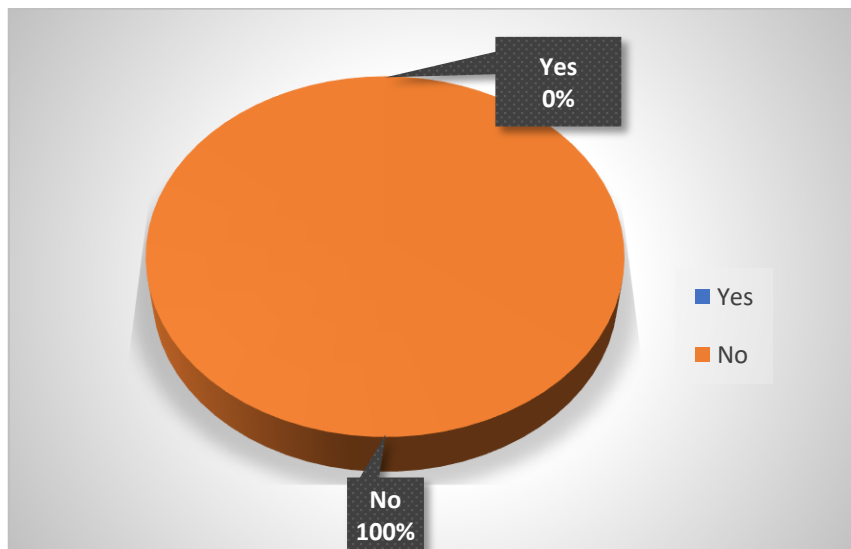
**Figure 168: Animal Husbandry Services by Mobile App**



**Figure 169: Availability of insurance service for animal**



**Figure 170: Usage of Mobile Apps for Animal Business Management**



**Figure 171: Selling of Animal through Online by farmer**

## **11. Context Summary from the key informant**

### ***LSP:***

Most of the LSP are educated. They have completed S.S.C./H.S.C. Most of the LSP working in that area are middle aged. They earn about 30000-40000 (BDT) per month. They provide both treatment and AI services to farmer. They mainly practised AI service of cattle. Most of the LSP got training about treatment of Cattle, goat, buffalo. They got training for about 3-6 months from government organizations. 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 house3s per month. Most of the LSP collect vaccine from Upazilla Livestock Office. 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:***

Milk trader in that area is experienced in that field, they have experience above 10 years. Most of the trader either work as milkman or sweetmeat producer. They earn about 30000-40000 BDT. Monthly. In the area near to bathan trader deals with buffalo milk other in the town area deal with cow milk. They generally trade with 100-120 kg milk on an average. Milkman collect milk from farmers and the sweetmeat producer collect milk from milkman. Sweetmeat is the best-selling product of the sweetmeat producer. They generally make 40-50 taka per kg sweet or from yoghurt. Milkmen make 15–20-taka profit from per kg of milk. They think the demand for milk is rising day by day and the amount of milk currently available is not enough for current situation.

### ***Meat Seller:***

Meat seller in this area generally slaughter their cattle in a specific place. They are not well trained for slaughtering. They are middle aged people. They earn on an average 50000-60000 BDT. They generally buy animal from bepari or from market. The meat seller of town area generally slaughters 30-40 cattle, 4-5 buffalo, 40-50 goat per month per person. In the urban side this number is almost half. Average selling price of beef is 680-700 tk/kg, chevon 800 tk/kg and buffen is 650 tk/ kg. They are not involved in contract with farmer for buying animal. The slaughter house waste is generally kept in a hole inside the soil.

### ***Feed Seller:***

The feed sellers earn around 60000-70000 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 before kurbanid eid. They said the demand of commercial feed is increasing day by day. The seller who keeps loose feed generally sell 2000 kg loose feed on an average. In the developed area where commercial farm is available, demand for commercial feed is high. Some feed seller sells 4000-5000 kg commercial feed per month. Contract farming



system with feed seller is not developed yet. They return the expired feed to the company. But for other kinds of damage, they are responsible. They generally keep the bag on plastic.

### **Medicine Seller:**

In our study area, we found that about 90% medicine seller have govt. registration. Most of the (about 90%) farmers age between 25-40 years old. They earn about 30000 tk (BDT) per month by selling medicine. They don't keep human medicine along with animal medicine. They earn more money in the winter seasons when most of animal and people affected by disease. About 75% 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 and return the medicine to company that has been expired. They don't have any contract with the farmer. They know medicine pollute environment. So, they use the disposal methods.

### **ULO**

#### **Livestock locality**

In the two upazilla (Charfassion and Lalmohon) district of Bhola on an average 67% of people have livestock of their own approximately. They have 62.5% of cattle, 17.5% of Buffalo, 13.5% of goat and 1% of sheep respectively in their house.

#### **Rearing system of livestock**

In this area 6% cattle used stall feeding, 82.5% grazing and 11.5% semi-intensive. For buffalo, 92.5 % grazing and for rest semi-intensive system is used.

#### **Breeding system**

For cattle 65% farmer use artificial insemination, 20% use both and 15% dependent in natural breeding. For buffalo and goat natural breeding (above 90%) is used.

#### **Availability of some inputs**

There is good amount of breed available in this area but the good quality bull semen is less available. Amount of grazing land is not up to the requirement. Good quality concentrate feed is less available. Amount of good quality grass is less available. Good quality vaccine, anthelmintics, medicine and treatment are less available here. All farmer doesn't get loan facility for dairy easily.

#### **Milk Market channel**

About 45% milk is marketed through goala and 40% directly to consumer from farmer. Average selling price of cow milk is 70 taka per kg.

#### **Entrepreneur, Training & modern farming technology**

There are about 80 milk product manufacturers. Very small amount of farmer received GAP training. About 10 farmers are using different modern technology like HYV grass production, using chopping machine, using weighing balance.

## *SYSTEMIC CONSTRAINTS, STRATEGIC OPTIONS AND INTERVENTIONS*

In the survey area, there are a number of systematic challenges that hinders the potentialities of the production, processing and marketing of the products. Farmers do not know the recent effective technology that could bring positive changes in his/her production system and consequently the production, product quality and easy access to the markets. Concerning service providers are not available always. There is a shortage of livestock service provider at the field level and the manpower of DLS seems inadequate. Furthermore, the service provider themselves are also not updated with recent technology/tools. The private companies are mainly focused on their own business rather improving the farmer's knowledge gap though it has indirect effect on their business as well. Technologies like improved feeding practices (Silage, UMS, UMMB, TMR etc) can be disseminated among the livestock farmers. The number of service provider need to be optimized so that every livestock farmer got the access to at least one service provider. The service provider needs to be equipped with the time demanded technology and skills. This could be achieved by training, exposure visit etc. Result demonstration of the technology can be used to motivate the farmers to adopt it in their farm to increase the productivity and to improve the products quality.

The supply and value chain need to be tuned in a way considering the local factors, will enhance the productivity as well. The uninterrupted supply of all inputs and services are important for a sustainable production system. Unavailability of required products like feed ingredients, preventive products and services like artificial insemination pose a great barrier to profitable livestock farming. In addition, volatility of the price of both product and services are also very important in this connection. Capacity building of input seller, linkage/contract through match making workshop, commercial cultivation of improved green by service provider or entrepreneurship development among the farmers on different input items like green grass, UMMB etc, collaboration with different organizations like DLS, BLRI, BAU, BARC, trained the farmers for AI, organize training for local input seller on quality and impact of different products, and party coordination meeting could improve this situation. On the farmers side, they are not well organized therefore fail to attract the large buyers/processors. The poor and extreme poor farmers are not producing commercially and not always maintain the standards. The capacity of the producers can be increased through the training needed in this regard and arranging learning visit will helps to minimize the knowledge gap and will motivate for group marketing. Finance is important in this regard therefore microfinance/bank/other financing organizations representation is important while selecting the stakeholders in match making, meeting, training, workshop or similar events. Knowledge on product handling and processing, quality factors, improved transportation are the elements that has to be addressed to ensure a fair price of the produce to the producing farmers. The regulatory body will act to help the producer and at the same time will take care of the quality products in the market for the consumers. However, all the relevant functions by the regulatory body like DLS, NFSA, BSTI are not possible. Therefore, the formation Dairy Development Board, Poultry Development Board,

Meat Development Board is time demanding and will support both the producers and regulatory authorities with the policy support to enhance the production, sustainability of the enterprise and quality products to the consumers.

The producers as well as other actors do not know the rules & regulations on livestock rearing/farm registration/grants etc. For example, they are not aware of the withdrawal period for different veterinary drugs causing a health hazards, do not maintain the slaughter system which is also hazardous for human being. Even they don't know how the water and soil contamination, and application of pesticide and herbicide to the neighbouring 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 situation can be improved by strengthening the dialogue and policy advocacy to make different stakeholders responsive. Event like meeting, workshop and other awareness activities should be taken including the all actors involved from farm to fork. Introduction of Good Husbandry Practices (GHP), promoting certification process and promoting contract farming and sub- contracting business models to adopt good husbandry practices for producing safe meat and dairy products could help in this regard as well.

Lack of farm mechanization especially in the dairy production and processing, slaughter house, and the use of ICT tools are also hindering the profitable production and availability of the quality products. Therefore, emphasis should be given to improve the farm mechanization and farmers access to the ICT tools. Need to engage relevant private sectors for strengthening the supply chain of machine and equipment for farm mechanization. Developing industry-grade dairy products through modernization of small processing units and strengthening its supply chain through promotional activities and linkage with national/premium markets is also important. Creating the access and usage of advanced financial & ICT services for better transformation of livestock enterprises into profitable business is the time demand nowadays.

## CONCLUSION

The baseline survey was done by collecting data from 600 farmers in Charfassion upazilla and Lalmohon upazilla. We collected data from the farmers by questionnaire consisting many sets type questions that fulfil the objectives of the survey task. We observed the socio-economic condition, micro enterprises, current livestock status, livestock market status with it's 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 in that area.

From our collected data it was found that very few farmers are involved with contract farming and micro-enterprise. Farmers just rear livestock and sell the livestock and livestock products in traditional way. They don't try to practice enterprise for making sustainable profit.

At present in the survey area most of the farmer rear cattle and goat in the mainland area. And, in the bathan area most of the farmer rear buffalo. Livestock market is increasing here day by day. Strength of livestock market in that area is that the buffalo farmer can rear their animal in bathan area with minimum cost. At present the transportation problem and involvement of middleman is the weakness of livestock product marketing 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. As the grazing land is reducing gradually the production cost is increasing and 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 to their animals. Cattle farmers usually graze their animals and supply straw to cattle in the house. Very farmers produce high quality grass for the animals. Buffalo farmers graze their buffalo in the bathan and don't give any extra feed. In the mainland area some feed seller sell ready feed to some commercial cattle farmers but marketing of green grass is not yet established.

Farmers are not conscious about producing safe milk by maintaining hygiene during milking, storage and marketing of milk. Very few farmers are involved with the marketing of milk. They usually sell milk to middleman.

Farmers in that area don't rear fattening or meat animal with proper management practices. They usually rear meat animal for selling during "Eid-UI-Adha". Specific market system for meat animal marketing is 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, they don't use machineries like chopping machine, milking machine, weighing balance, heat detector, tractor etc for livestock production.

Farmers don't get modern services related to livestock production by using information technologies. They don't use the information technology related to livestock rearing like online marketing, weather forecast, mobile apps for husbandry management etc. Currently farmers are not well introduced with the process of getting loan for livestock and insurance services.

Finally, I think some extension program or project related to livestock production and management tools especially feeding, breeding, housing and disease prevention, product processing with quality assurance, networking with other relevant stakeholders, use of modern machineries, equipment and technology, livestock and product marketing should be introduced in that area.

## Annexure

**Table - S1: No. of farmers keep different livestock**

Animal No.	Dairy Farmer	Beef Farmer	Buffalo Farmer	Goat Farmer
0	0	0	0	0
1-2	290	358	4	80
3-5	312	114	12	114
Above 5	62	6	42	42

**Table – S2: Income, Food security and nutritional status of the small farmer under the project.**

Income per Month from Livestock Rearing	Species	Income (Mean)
	Buffalo	20007.09
	Cattle	6740.551
	Goat	2177.404
	Sheep	0
	Fattening	-
Food Intake of Women in 24 Hours  For measuring food security and nutritional status	No. of food items	Percentage
	Two	3
	Three	24.3
	Four	32.3
	Five	20.3
	Six	18.3
	Seven	0.5

*N.B.: This table is related with the project goal in the LOG frame*

**Table – S3: Sustainable development of the value chain in the area.**

	Meat	Milk
Contract selling of meat and milk by the farmer under the project	0 farmers out of 600 Percentage =0%	0 farmer out of 600 Percentage= 0%
Total yearly net income by the farmer	Species	Income (Mean)
	Buffalo	90063.58
	Cattle	169027.3
	Goat	8648.877
	Sheep	0
	Fattening	16453.85

*N.B.: This is related with the development objectives in the project LOG frame*

**Table – S4: Effective production system, application of internationally recognized standard, traceability and marketing system of milk production.**

Indicators	Value
Maintenance of biosecurity in the farm	0 farmer out of 600 (0%)
Following of good husbandry in the farm	0 farmer out of 600 (0%)
Following of BGAP/GGAP in the farm	0 farmer out of 600 (0%)
Use of quality feed for milk production	Buffalo= (2%) Cattle= (10%) Sheep and goat= (0%)
Involvement of contract farming for milk selling	0 farmers out of 600 (0%)
Milk testing of Certification	0 farmer out of 600 (0%)
Traceability	0%

*N.B.: This is related with the outcome in the project LOG frame*

**Table – S5: Effective production system, application of internationally recognized standard, traceability and marketing system of meat production.**

Indicators	Value
Maintenance of biosecurity in the farm	cattle = 10%, Buffalo= 0%, Sheep/Goat=0%
Practicing of GGAP for fattening of animal	0 farmer out of 600 (0%)
Use of quality feed for meat production	Buffalo= (2%) Cattle= (3%) Sheep and goat= (0%)
Contract with bepari or meat processing organization	0 farmers out of 600 (0%)
Production of meat according to the indicator of global (GAP)	0 farmers out of 600 (0%)

*N.B.: This is related with the outcome in the project LOG frame*

**Table – S6: Improvement of livestock rearing system with proper prevention of disease and improvement of production.**

Parameter	Buffalo	Cow	Goat/Sheep
Deworming practices	6%	6%	3%
Regular vaccination practices	3%	6%	3%
Disease occurrence	39%	50%	37%
Farmer faces animal death	9%	42%	10%
Calving interval(days)	523.72	370.29	181.79
Milk in days	224.58	188.11	73.29
Age of puberty (year)	3.09	2.26	0.979

*N.B.: This is related with the sub-project outcome in the project LOG frame*



**Table – S7: Sustainable development of livestock production by improvement of livestockservice provider.**

Parameter	Buffalo	Cattle	Goat
Vaccination and AI service provider	0%	0%	0%
Training on animal husbandry practices	0%	0%	0%
Training on GGAP and HCCAP	0%	0%	0%

*N.B.: This is related with the short-term or instant result outcome of the sub-project in the project LOG frame*

**Table – S8: Feeds and Fodder Supply Chain**

Parameter	Buffalo	Cattle	Goat
Supply of UMB/UTS	0%	0%	0%
Supply of Ready Feed	0%	6%	0%
Supply of calf starter	0%	0%	0%
Supply of greengrass	3%	1%	0%
Supply of nutrition technology-based feed	0%	0%	0%

*N.B.: This is related with the short-term or instant result outcome of the sub-project in the project LOG frame*

**Table – S9: Use of Light and Heavy machine Technology in Farm Management**

Use of Light and Heavy machine Technology in Farm Management	Buffalo	0%
	Cow	1%
	Goat	0%

*N.B.: This is related with the short-term or instant result outcome of the sub-project in the project LOG frame*

**Table – S10: Training, Climate Smart Management and Use of IoT**

Indicators	Value
Training on animal husbandry practice	0%
Training on modern farming	7%
Training on GAP, fattening and smart technology	0%
Training on nutrition, environment, social issue, animal management	0%
Present status of proper waste management in the farm	14%
Veterinary telemedicine service from local service provider	1%
Mobile apps service from local service provider	0%
Animal health insurance service	0%
Using mobile apps on the purpose of animal husbandry business	0%
Purchase animal from online based platform	0%

*N.B.: This is related with the short-term or instant result outcome of the sub-project in the project LOG frame*