

## **Chapter: I**

### **Introduction**

In Bangladesh the livestock sector is highly important in rural area because it works as big economic source for the poor people. The economy of Bangladesh is agro based. About 1.66% of GDP comes from livestock, DLS (2016). Livestock is an important component of the mixed farming system practiced in Bangladesh for centuries. Ruminant, especially cattle constitute the major portion of the livestock. The number of livestock is increasing worldwide as well as our country and they are becoming increasingly important around the world for a variety of reasons. According to DLS, (2016) the population size of cattle in Bangladesh is 23.85 million. Most of these animals are reared under smallholder traditional management system in rural areas. As Bangladesh is a developing country, it has various importance of cattle and its products and by products. Cattle are important as they play an important role as a source of food, supply of raw materials like milk, meat and skin. Cattle share 14.21% of livestock GDP in Bangladesh , DLS (2016).

A smallholding is a small farm in third world countries. Smallholdings farms are usually supporting a single family with a mixture of cash crops and subsistence farming. Cattle are an inseparable part of small holder subsistence farming system. Most of the people of rural areas are small holders. However because of their illiteracy, most of the farmers lacking scientific management in cattle rearing particularly a substantial number of farmers are unaware of actual amount of feed ingredient for better production of animal for farmers. The common scenario of smallholding cattle farm in our country is One-fourth farmers used artificial insemination for breeding purpose and two-fifth belonged to medium or high level of technology adoption. Only 35% farmers adopted crossbred cows and some others upgraded indigenous with exotic breeds. About 17.5% rural farmers and 70% semi-urban farmers reared crossbred cows and rural farmers are reluctant to utilize all kinds of improved technologies. Secondary and higher educated farmers were 9.7 times more likely to be adopting improved

technologies compared to illiterate farmers. Top ranked constraints were ill equipped and negligible services at AI center, no provision for testing of animals, poor knowledge of farmers about health care of animals and inadequate knowledge about proper feeding and balanced ration. Farmers Need more knowledge on improved technologies through training, availability of reliable and continuous technical assistance, availability and low price of concentrate feeds, increased and timely provision of medicine, increasing AI facilities, providing pure breed and strengthening extension services. But there are some drawbacks in contrast of livestock rearing. Diminishing grazing land for animal, lack of livestock farm, lack of proper care of cattle in rural areas.

Generally, conformation traits are important in dairy cattle development. These traits are used for selection of animals through creating the predict equation based on the independent variable and assuring selection of the superior animal with its important trait. The functional conformation traits that influence or facilitate the production status of dairy cows are the appearance of udder conformation (udder size and shape), thoracic and abdominal body conformation (body size) etc. almost all the farmers considered a cow as best for milk production if it has a straight back, triangular shape of the frame of a cow and straightness of the back of the cow and large udder of the cow. The different conformation traits are assessed in relation to milk yield of the different local cattle breeds. The result shows that some cows that have non prominent naval flaps but proportionate and medium sized teats are average milk yielders. On the other hand cows that have voluminous dewlap and large naval flap, well developed udder and teats with prominent milk vein are docile and good milk yielders. Cows that have short and tacked up naval flap, long and well round barrel, small compact udders and small hard teats are also poor milkers .

Farmers keep livestock to meet the needs of power for crop and food production. In the cereal crop-based agriculture system, all the cultivable lands are used for crop production. Grazing land and fodder cultivation are almost nonexistence and consequently, animals are sustained on low quality forages. Straw is the major roughage for feeding to ruminant livestock. Farmers offer green grass by 'cut and carry' system and offer some rice and wheat brans, oil cakes, tree leaves and kitchen scraps (Alam *et. al* 2000). Depending on the farm size, about 22.5 to 59.6 kg of fresh feed or 11.6 to 27.1 kg DM/day are offered to the cattle. Based on the theoretical estimation of feed energy and feed requirements (Lawarance, 1985), working cattle require 37 MJ ME or 4.7

kg DM per day. Likewise, a cow producing 2 litres of milk/day requires 34.7 MJ ME or 4.4 kg DM. Medium quality feed may meet both these requirements and is an amount equivalent to 3% DM of live weight. As rural people are poor and economically not strong they can't maintain between the high prices of animal feed and low prices of animal products. Actually the feeding system practiced in Bangladesh is not enough to fulfill the nutritious requirement of cattle. It's practiced very much haphazard farming system in here my study area as well as Bangladesh.

So far our knowledge, till today, there is no report on functional traits and their association with milk production in Bangladesh. In addition there are limited works have been done on feeding system in hill tract compared to plain land. Therefore, this study was carried out with the following objectives:

- To associate functional traits with milk production in smallholding farming system.
- To assess current feeding practices in hill and plain land.
- To correlate feeding strategy with milk production in cattle on smallholdings.

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## Chapter: II

### Materials and method

#### Description of study area:

In my study there were three study area in Bangladesh. The area were Matlab, Chandpur; PirojpurSadar and khagrachariSadar. Chandpur, considered as the gate way of eastern Bengal located between 23° 29' to 24° 04' North latitudes and between 90° 06' to 91° 0' east longitude . The tropical monsoon climatic condition characterizes by annual average temperature of 17c to 32c, humidity of 79%. Around 1468 people/ sq km live in this district. Livestock rearing is common practice in Chandpur as major or subsidiary income source.

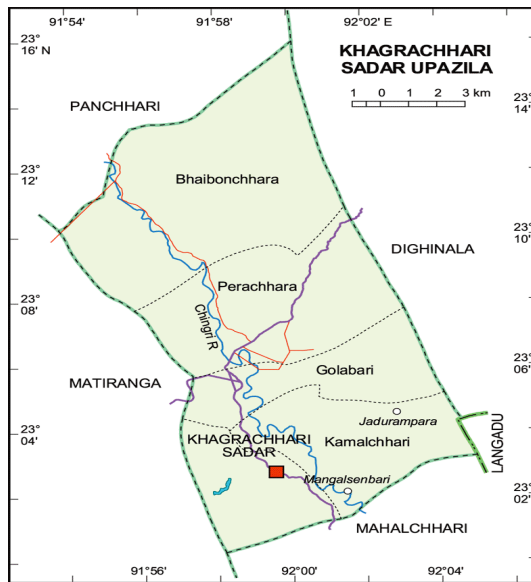


**Fig: Matlab south upazila**

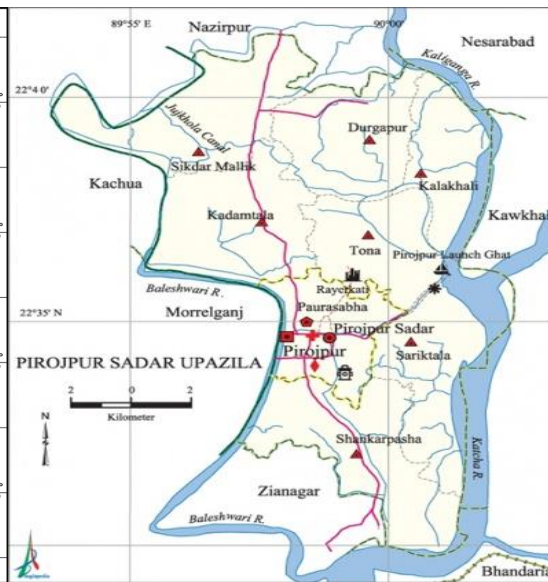
In chandpur district the total population of cattle is 115615 (DLS, 2011). Goat and cattle are reared in intensive, semi intensive, free range and tethering system in chandpur. Farmers use to keep their animal in their own houses as well as separate houses with low biosecurity and hygienic standard. The backyard and smallholding farmers rear the animals as meat purpose.

Pirojpur district area is about 164.64 sq.km located in between 22° 29' and 22° 41' north latitudes and in between 89° 53' and 90° 02' east longitudes. In between this area pirojpur sadar is located.

And the khagrachari district is a area of 2699.55 sq.km located in between 22° 38' and 23° 44' north latitudes and in between 91° 44' and 92° 11' east longitudes.



**Fig: Khagrachari Sadar**



**Fig:Pirojpur Sadar**

**Sample-population:**

Total 233 cattle population data (feeding and production) was collected from the three study area (Matlab,Pirojpur and Khagrachari).From Matlab, Chandpur there collected 86 cattle data and from Pirojpur and Khagrachari there collected 79 and 68 cattle feeding data respectively.

**Feeding strategy:**

Feeding system in Matlab and Pirojpur Sadar is more or less same type. Farmers used to give them roughage (straw,grass mainly),concentrate (rice polish, wheat bran etc. ) and grazing in low pasture land. But in Khagrachori it has been seen that maximum time most of the cattle are reared in house and sometimes grazed in hilly land area. But it is common scenario in the study area to rear the cattle in backyard system.

**Sample-collection:**

A common questionnaire was developed previously to collect the data of cattle feeding system from all 3 study area. It was a mixed type questionnaire with combination of both open and close type question. Actually in this study most of the required data was collected by questioning the farmers.

**Statistical analysis:**

All the data from the animals were entered into MS excel (Microsoft office excel-2010, USA). Data management and data analysis. The association between functional traits and milk production were estimated using Graphpad software, La Jolla california USA ([www.graphpad.com](http://www.graphpad.com)). Mean difference among feeding strategy and their association with milk production were calculated using t-test and group analysis from graphpad.

## Chapter: III

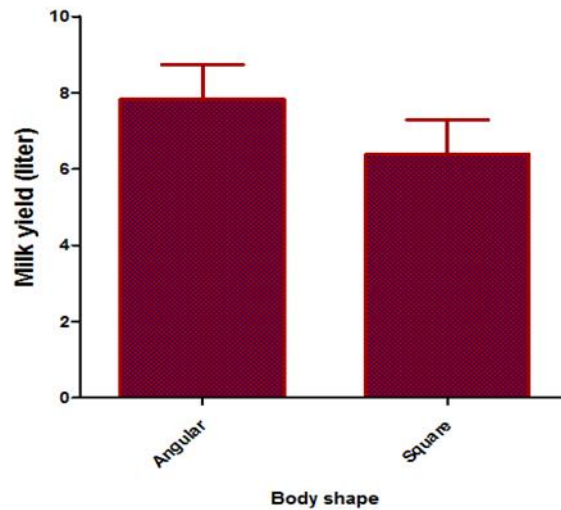
### Results and discussion

During the study period of one month data on total 233 cattle was recorded from the three different area of Bangladesh (Chandpur, Pirojpur and Khagrachari). The sample population comprised of 86 cattle from Chandpur, 79 from Pirojpur and 68 from Khagrachari district. the data included supplied feed ingredients, milk production, body shape, udder shape, udder size.

#### 3.1: Functional traits and milk production:

##### 3.1.1:Body-shape:

Figure 1 shows, cows with angular body produce more milk compared to square shape. This finding was in line with the description that a good type dairy cow should have triangular body shape (FAO, [www. Fao. Org/againfo](http://www.Fao.Org/againfo))



**Figure 1:** Milk production in relation to body shape

##### 3.1.2:Udder size and shape:

In present study there an evaluation of relationship between milk production and udder size-shape. Cow with large udder produce on an average >10 liter milk per medium and small udder produce around 5 and 2.4 liter milk per day.

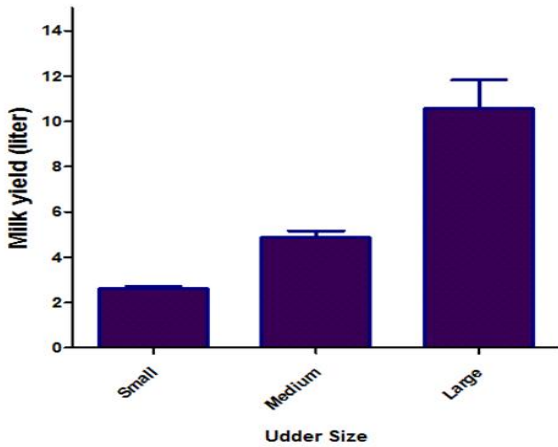


Figure 2: Milk production in relation to udder size

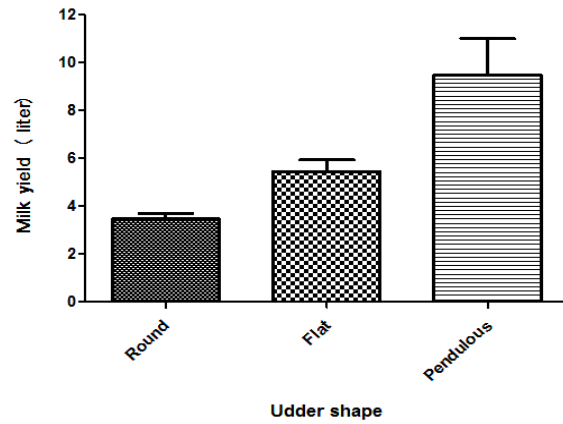


Figure 3: Milk production relation to udder shape

It was reported that jersey and Friesian cross breed had produced more milk and shorter calving intervals than pabna and deshi cattle breed. (Hossain and Routledge, 1982). As the cross breed of jersey and Friesian have more large and pendulous udder than deshi cattle breed , it agrees with present study.

### 3.2: Feeding strategy and milk production:

#### 3.2.1: Roughage-versus-concentrate:

Our analysis revealed in hill tract farmer provide on an average  $10.17 \pm 0.14$  kg, whereas in plain the roughage supply was  $13.02 \pm 0.58$  kg. This findings clearly indicate the availability of fodder in plain land compared to hill area. In contrast, concentrate supply is slightly higher in hill area then that of plain land. This is indicative that farmers in hill region misgate deficit of roughage by supplementary more concentrate to their animal.

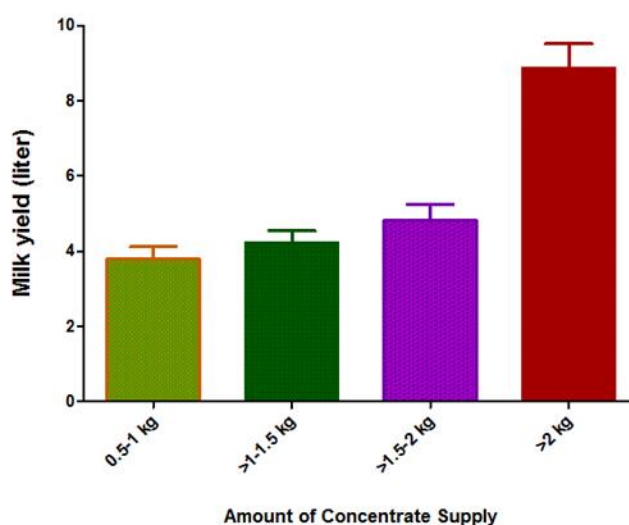


**Table 1:** Mean±SEM (kg) of roughage and concentrate supplement for smallholding cattle in hill and plain land

Feed supplement	Hill	Plain land
Roughage	10.17±0.14	13.02±0.58
Concentrate	2.576687±0.14	2.45±0.21

### 3.2.2: Concentrate supply and milk production:

In the relationship between milk production and concentrate supply to cow, we found that cows with a supply of 0.5-1 kg concentrate per day produce < 4 liter milk in a day. However, a concentrate supply of > 2 kg increases the daily milk production up to 10 liter . Results shows, milk production increases with the amount of concentrate supply to the animal.



**Figure 4:** Milk production with the amount of concentrate supply.

In a previous study it was recorded that when cows supplied with 1 kg concentrate then the milk production was 2.15 liter and when supplied with 2.3 kg concentrate then milk production was 6.5 kg (Khan *et al.*, 2009). That means there is positive relationship between concentrate supply and milk production and it completely agree with the present study.

## **Chapter: IV**

### **Conclusion**

The present study revealed that, angular body shape cows on smallholdings produce more milk than the square shape cows. Our results consistent with the literature that cows with large and pendulous udder can produce more milk than cows with small and flat udder. A deficit of roughage in hill was observed in our study. For concentrate, both hill and plain land show the similar trend. Milk production increases with amount of concentrate increases. This study provides a significant scenario that small holder farmers are aware of using roughage and concentrate. Future research with large number population and diverse geographical location is recommended to address similar issues in small holder dairy farming in Bangladesh.

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## A Questionnaire on Production and Reproduction status of Cattle Population in .....

Serial no: .....

Date: ...../...../...../

Name of the owner: ..... Address: .....

Number of Total animal: .....

Number: Male....., female.....calf.....

### Production info:

❖ Number of cow (conceived at least one time): .....

❖ Body weight (in Kg):.....

❖ Body shape: Angular..... or Square .....

❖ Udder size: .....

❖ Udder shape: .....

❖ Age of the animal: .....

❖ Parity: .....

❖ Breed: Indigenous..... or Cross..... or others.....

❖ Milk yield (kg/day): .....

Lactation length:.....

(lactation yield): .....

Dry yield:.....

### Feeding

❖ Feed supplied: Roughage.....amount/day .....

or concentrate.....amount/day.....

Others..... amount/day.....

**Reproductive info:**

- ❖ Service used: A.I ..... or Natural insemination.....
- ❖ Service per conception: .....
- ❖ Semen used: From same bull/semen ....., From different bull/semen
- ❖ Batch of semen: .....
- ❖ Breed of sire: .....
- ❖ Body condition score: .....
- ❖ Birth weight of calf: ..... Calf weight: .....
- ❖ Calf feeding/milk feeding (yes or no): ..... if yes, amount: .....
- ❖ History of abortion/still birth:  
.....
- ❖ Duration of calving to first heat (in days): .....
- ❖ Non return rate: .....
- ❖ Calving interval: .....

**Other managements**

- ❖ History of: Deworming (yes or no) ..... Time: .....
- ❖ History of vaccination (yes or no):.....  
if yes, name of the vaccine given:.....
- ❖ History of antibiotic use (yes or no): .....If yes, name of the drugs.....  
used.....

Thank you

## **Acknowledgement**

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The author expresses thanks and warmest sense of gratitude to her parents and well wishers.

The author

December 2017

## **Biography**

I am **Biethee Rani Sarker** Daughter of Arun Chandra Sarker and Swapna Rani Sarker .I am from Chandpur district, Bangladesh. My SSC passing year is 2008 and HSC passing year is 2010. Now, I am an intern student of the faculty of Veterinary Medicine of Chittagong Veterinary and Animal Sciences University obtaining session (2011-2012). I hope to become a good veterinarian in the future. I would like to serve the innocent animal by treating them and I feel lucky myself that almighty gave me such type of opportunity to remain in close touch with the animal and serve the society as well as nation.