CHAPTER-I

INTRODUCTION

Bangladesh is one of the most densely populated countries in the world (BBS, 2009) with an economy based on the development of agriculture: about two-thirds of the labour force depends on agriculture. As a result of increases in population (1.8% annually), rapid urbanization (15% annually) and rises in absolute income, the demand for animal products (mostly milk and milk products) has been increasing rapidly in Bangladesh (Jabbar et al, 2005; Hafez, 2004).

Cattle production is the process of raising cattle from birth until the point at which they provide milk for consumption. A typical cattle farmer raises cattle to to provide milk for family consumption and top earn money. Currently there are 23.7 million cattle, 1.47 million buffalo, 25.7 million goats, 3.35 million sheep, 268.39 million chickens and 52.2 million ducks (DLS 2016). Statistics show that about 1.66% of national GDP is covered by the livestock sector and its annual growth rate of is 3.21% (DLS 2016). The livestock sector generates 20% of full-time employment in Bangladesh (DLS 2016). Generation of self-employment and the total income shares of dairy cows and goat raising tend to increase with a decrease in farmer's resources, especially land area, suggesting that animals are of particular importance for landless and small-scale farmers (Alam 1994). The driving force for the intensification of dairying in the country is the rapidly decreasing availability of agricultural land. Other factors that lead to the development of intensive and specialized production systems are the expansion of smallholder dairy production, increasing experience and open market opportunities (Devendra, 2001).

The small holder dairy sector offers a potential option for rejuvenating rural economic growth in Bangladesh. In areas with a limited land resource, smallholder dairy production offers continuous self-employment. Smallholder dairy production is a labour-intensive production method that integrates well livestock farming and cropping activities (Muraguri, 2000). Milk is the main product from a smallholder cattle production system and the sale of milk from smallholder production systems contributes significantly to the household economics. Milk is alsdo a major source of protein for many rural families. The production cost of milk (per litre) from local and crossbred cows was much higher than the selling price (Alam, 1995). In hilly areas of Bangladesh small holder farming contributes a lot in improving peoples livelihood by selling milk.

The yearly total cattle manure/dung production in Bangladesh is estimated to be 80 million tonnes of which 68% and 52% are used as manure in rural and urban areas, respectively. The use of dung as a household fuel is mostly on small farms and represents 25% of total production (DLS 2000). The use of dung as fuel is also practiced in rural areas. There is no major difference in small holder cattle farming in plain and hilly areas. In hilly areas most of the cattles are of indigenous breeds and farmers fed their cattle through teathering in unused fields and feeding of some unconventional feed and small amounts of concentrate feed. They rear their cattle in loose housing system and some farmers rear cattle without any housing (except in rainy season). In plain lands most of the smallholder farmers rear crossbred cows and because of having plenty of lands they fed their cattle by grazing mostly. They also give water hyacinth and concentrate feed as well. So far our knowledge there is no report on comparative study on production parameters of cattle on smallholdings in hilly and plain lands in Bangladesh. Therefore this study carried out to find out differences in cattle production of both hill and plain areas. The objectives of this study were:

1. Compare production performance of cattle (both indigenous and cross) in hilly area and plain area.
2. Understand effect on production of cattle due to difference in geographical location.

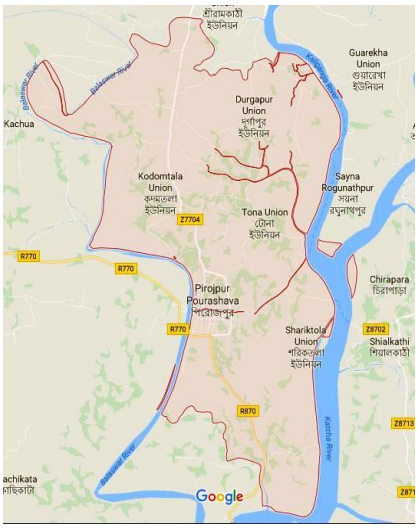
CHAPTER-II

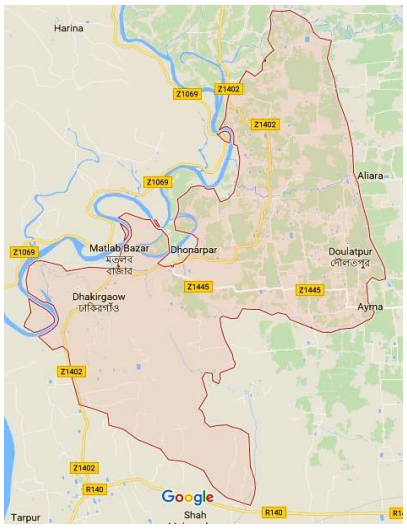
MATERIALS AND METHODS

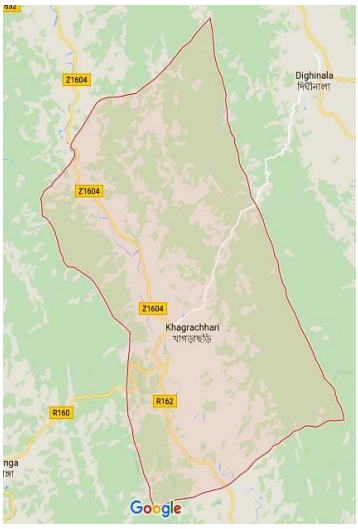
To compare the production status of smallholder cattle farmer we need information of cattle from both hill and plain lands. The materials and methods used to convey this study are mentioned below:

2.1 Area of study:

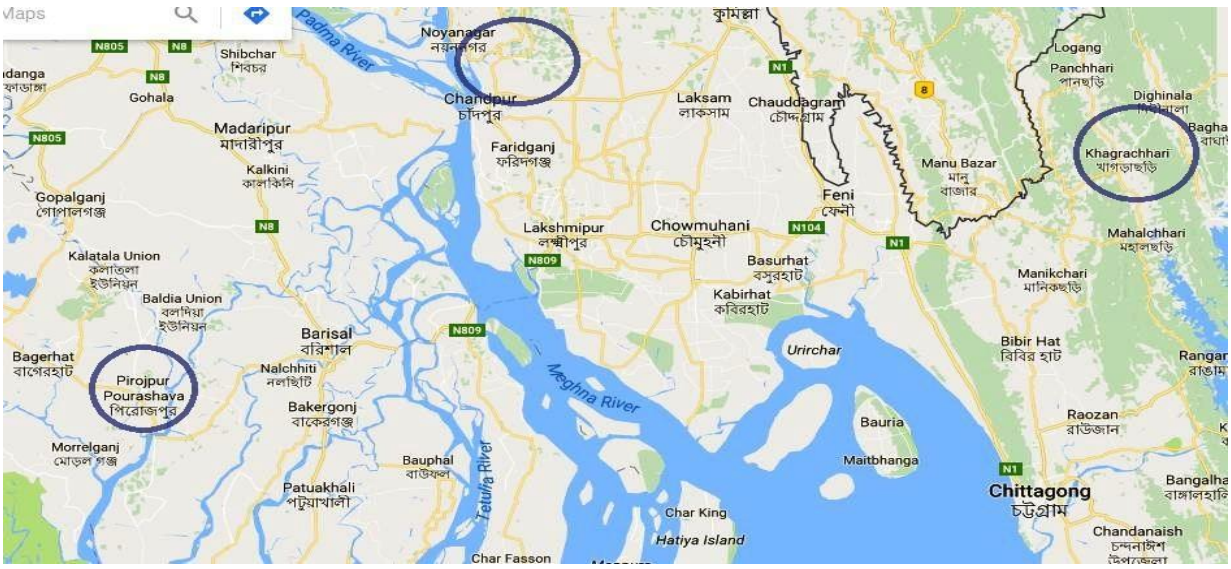
For this study some selective areas were chosen from hilly area and plain area. From hilly area Khagrachari sadar upazilla and from plain area Pirojpur sadar upazilla and Matlob upazilla from Chandpur district were selected.







Pirojpur Matlob Khagrachari



Geographical location of study areas

2.2 Study population:

As the study was based on comparison of cattle production the study population was cattle population of Khagrachari, Pirojpur and Matlob upazilla, respectively. Information of 68 cattle from smallholding farmers was taken from Khagrachari which represents hill tract. From Pirojpur and Matlob upazilla information were taken from 79 and 86 cattle owners respectively which are representative of plain area (Table 1).

Table 1: Study population statistics

Upazilla	Khagrachari	Pirojpur	Matlob
Indigenous	60	44	22
Cross	8	32	46
Non descriptive	0	3	18
Total cattle	68	79	86

2.3 Data collection:

A questionnaire was developed comprising of both open ended and close ended questions (annex-1). Then production data of cattle was collected from owner with the help of questionnaire. Data was collected following the direct interviews and frequent personal visits. Interviews were normally conducted in respondent's house. All the information was collected at the time of UVH placement.

2.4 Data analysis:

All the data collected through questionnaire were inserted in Microsoft office excel 2007 and analyzed by using data analysis tool from excel and graph pad software (https://www.graphpad.com/scientific-software/prism/)

CHAPTER-III

RESULTS AND DISCUSSION

3.1 Cattle management practices in small holdings

Cattle are predominantly managed on cutting and carry system during the day and are tethered near the homestead at night without any shelter in hill tract. However in plain lands cattle are managed by grazing system during the day and are reared in loose housing system during night. Feeding method practiced in hill tract are tethering cattle in unused land, cutting and feeding, vegetable leaves, rice water and some local made feed like byproducts of alcohol. In plain land, mostly practiced feeding method is grazing in unused crop lands and also some unconventional feeds such as water hyacinth is also given. Concentrate feeding is also practiced in both hill tracts and plain lands.

3.2 Cattle population demography in hill tract and plain lands

The mean herd size was 4 in both hill tract and plain land. Ratio between cross bred and indigenous cattle in hill tract was 1:7.5 and in plain land it was 1:0.68. Ratio between male and female in hill tract and plain land was 1:1.93 and 1:3.4, respectively. (Table 2)

Table 2: Differences in population structure in smallholding cattle farms in hill tract and plain land of Bangladesh.

Parameters	Hill tracts	Plain land
Mean herd size (number)	4	4
Crossbred:Indigenous	1:7.5	1:0.68
Male:Female	1:1.93	1:3.4

In both hill tract and plain lands frequently found cattle breeds are indigenous cattle and cross bred cattle. In hill tract indigenous cattle are frequently reared rather than its lower milk production because of its hardiness and ability to survive in challenging environment. Some cross bred cattle also reared in hill tract but the number is very low as cross bred cattle are not suitable with the environment of hill tract. In plain lands cross bred cattle are preferred compared to indigenous cattle because of suitable management condition and high production.

3.3 Comparison on body condition of cattle between hill tract and plain land

Table 3 shows body weights of cattle of both hill tract and plain land were found quite similar with mean body weight of 133.89 kg in hill tract and 133.58 kg in plain lands. The difference in body weight between hill and plain land was not significant (P=0.9683). Body condition score (BCS) was significantly (P=0.0236) higher in hill tract compared to plain lands.

Table 3: Mean±SEM in body condition parameters for smallholding cattle in hilltract and plain land of Bangladesh

Parameters	Hill tracts	Plain land	P value
Mean Birth weight of calf(kg)	10.20±0.40	11.40±0.35	**0.0469**
Mean body weight of adult animal(kg)	133.89±3.53	133.58±4.80	0.9683
Mean BCS	3.2±0.02	3.09±0.03	**0.0236**

The reason behind it may be feeding of unconventional feed like byproducts of alcohol and certain green fodder from hill. In addition to the mean birth weight of calf was slightly lower in hill tract than plain land with (10.20kg in hill tract vs. 11.40kg in plain land. This result was also significant with a P value of 0.0469.

3.4 Comparison of production parameters in hill tract and plain land

Average daily milk yield in hill tract was 2.39 liters whereas in plain land it was 4.97 liters. The difference in milk production was highly significant (P=0.0001). The main reason of this difference may be because of rearing of more cross bred cattle in plain lands than hill tract.

Table 4: Comparative production parameters of small holding cattle in hill tract and plain land of Bangladesh.

Parameters	Hill tracts	Plain land	P value
Mean daily milk yield(liter)	2.39±0.26	4.97±0.29	**0.0001**
Mean Lactation length(month)	6.9±0.24	7.6±0.23	0.0730
Mean lactation yield(liter)	298.08±13.23	795.93±77.66	**0.0003**

Mean lactation length was also high in plain than that of hill tract (7.6±0.23 in plain vs. 6.9±0.24 in hill). Mean lactation yield in hill tract was 298.08 liters and plain land 795.93 liters. The difference in mean lactation yield between hill and plain land was highly significant (P=0.0003).

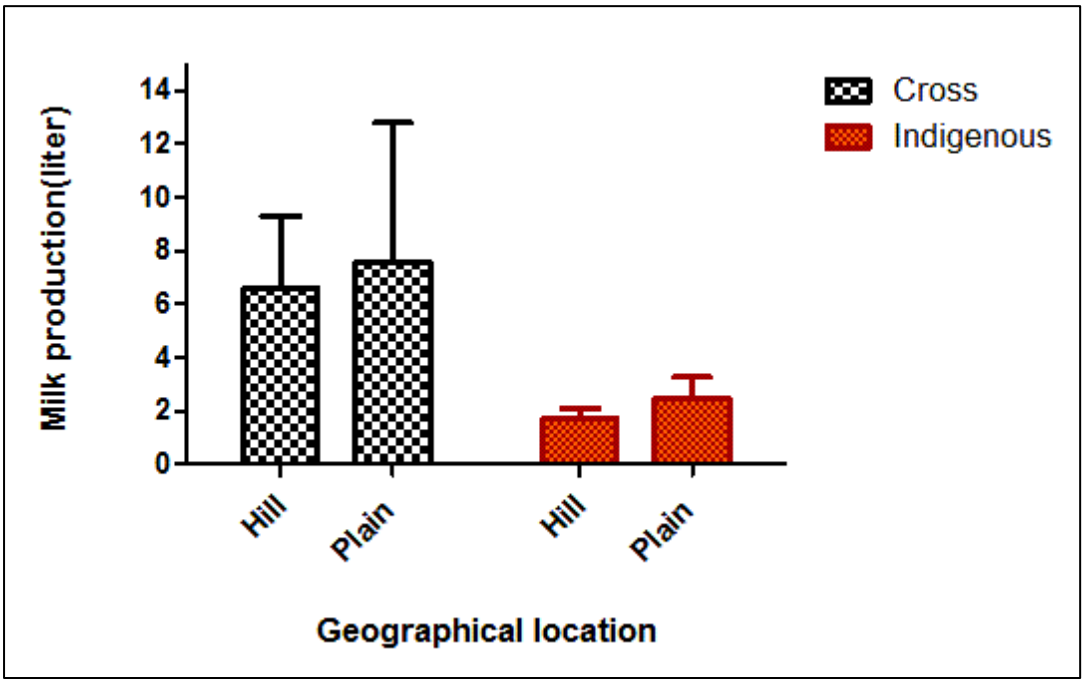


Figure 1: Difference of milk production on the basis of geographical location

Milk production was low in indigenous cattle than cross bred cattle in hill tract as well as in plain land. The milk production of indigenous cattle in hill tract was lower than indigenous cattle in plain land. For cross bred similar trend also found (Figure 1). The reason for this difference may be unfavorable condition for rearing of cross bred cattle, lack of grazing land, less practice of concentrate feeding in hill area. On the other hand, in plain land availability of green grass and easy access of concentrate feed and more favorable condition for cross bred cattle leads to higher production of milk.

From above results it is clear that there was difference in cattle management between hill tract and plain lands. Only similar population parameter was herd size whereas other parameters such as milk yield, lactation length, lactation yield and mean birth weight of calf substantially different between plain area and hill tract. In 2008, milk production of indigenous cattle & cross bred in Comilla was reported 4.85 liters (M. K. uddin et al., 2008) which is lower than our results in plain lands (4.97 liters). This slight difference is may be due to difference in geographical location and feeding. But overall milk production found in plain area is higher than that of hill tract (2.39 liters).

CHAPTER-IV

CONCLUSIONS

Cattle rearing methods and feeding practice was found different between hill tract and plain lands. Unfavorable geographical condition in hill tract put pressure to rear hardy indigenous cattle which leads to lower production of milk there. However in plain area, availability of fodder for cattle and lower cost of concentrate feed leads to more production. In hill tract availability of certain unconventional feed results in better weight gain but lack of green grass and concentrate feeding causes lower production. The production parameters for cattle on smallholdings were better in plain land compared to hill tract. If green grass and concentrate feed can be made available in hill tract the difference in production can be minimized successfully.

CHAPTER-V

REFERENCES

Alam J. 1994. Economics of mini dairy farm in selected areas of Bangladesh. Bangladesh Livestock Research Institute, Savar and Dhaka, Bangladesh.

Alam J. 1995. Livestock resources in Bangladesh—Present status and future potential. University Press Ltd, Motijheel CA, Dhaka, Bangladesh.

Bangladesh Bureau of Statistics (2009), Statistical Year Book of Bangladesh, Division of Planning, Ministry of Planning, Bangladesh Secretariat, Dhaka.

DLS (Department of Livestock Services). 2000. Department of Livestock Services—An overview. DLS, Dhaka, Bangladesh.

DLS (Department of Livestock Services). 2016. Department of Livestock Services—An overview. DLS, Dhaka, Bangladesh.

Devendra, C. (2001), 'Smallholder dairy production systems in East and South-East Asia: expanding importance, environmental impacts and opportunities for improvements', in Smallholder Dairy Production and Marketing – Opportunities and Constraints: Proceedings of a South–South Workshop held at National Dairy Development Board, 13–16 March, Anand, India.

Muraguri, G.R., 2000. Epidemiological and financial impact of vector-borne diseases on productivity of smallholder cattle in the coastal lowlands of Kenya, (PhD thesis, Department of Agriculture. University of Reading, UK).

Hafez, M. R. (2004), 'Small-scale dairying in Bangladesh', Report of the Twenty-Eighth Session of the Animal Production and Health Commission for Asia and the Pacific, 27 September–1 October, Chiangmai, Thailand.

M. K. Uddin, A. Wadud, D. Begum, M. S. R. Siddiki and M. H. Rashid (2008), 'Productive and reproductive performance of indigenous and crossbred cattle in comilla district'

Graph pad software, graph pad prism. Available from https://www.graphpad.com/scientific-software/prism/

ANNEX

A Questionnaire on production and reproduction status of cattle population in ……

Serial no: …… Date: ……/……/……/

Name of the owner: …… Address: ……

Number of Total animal: ……

Should fill the blanks with particular information asked below.

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 (in liter/lactation): ……
- Feed supplied: Roughage…… or Concentrate……, others……
- Amount of feed given every day (in Kg): ……

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

Thank you

ACKNOWLEDGEMENT

The author wishes to acknowledge the immeasurable grace and profound kindness of almighty "GOD" The supreme authority and supreme ruler of universe, who empowers the author to complete this task successfully.

The author feel proud in expressing her deep sense of gratitude and indebtedness to internship supervisor Dr. Ashutosh Das, Associate Professor, Department of Genetics & Animal breeding, Chittagong Veterinary and Animal Sciences University for his trustworthy and scholastic supervision to make this report.

The author also wishes to thank the ULO of Khagrachari UVH, Pirojpur UVH and Matlob UVH for their help in collection of data to make this study possible and for their guardian like supervision during UVH placement.

The author expresses thanks and warmest sense of gratitude to his parents and all well-wishers.

The author
November 2017

BIOGRAPHY

I am Progayan Chakma, son of Mr. Amar Sneha Chakma and Mrs. Bina Chakma. I passed my Secondary School Certificate (SSC) examination from Chittagong Residential School & College (CRSC), Chittagong in 2009 and Higher Secondary Certificate (HSC) examination from Bandarban Cantonmenmt Public School and College (BCPSC), Bandarban in 2011. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chittagong Veterinary and Animal Sciences University (CVASU), Chittagong, Bangladesh in 2011-12 sessions. At present I am doing my Internship programme which is compulsory for awarding my degree of Doctor of Veterinary Medicine (DVM) from Chittagong Veterinary and Animal Sciences University. In the near future I would like to work and have massive interest in wildlife medicine, conservation of nature and wildlife.