Abstract:

The study has been conducted to explore the experiences of small-scale dairy producers in *Rangunia upazla* of Chattogram in Bangladesh, with the particular focus on the small-scale dairy farming for livelihoods of rural farmers. The aim of the study was to determine the role of small-scale dairy cattle farming in improving their life styles, identifications of the problems of dairy cow rearing and to provide suggestions for their improvement. A total of 100farmers were selected where 40 and 60 for small scale-dairy farming/households (SCD/SCH) and non-farming households (NFH), respectively. The Data was collected through face to face interview on and personal visits. Results showed that farming system, breeding policy and veterinary services has significant (p<0.01) roles in production performances between the SCH and NFS and housing also has significant (p<0.05) contribution. There were no significant relation on other variables such as sex, age, marital status and education of the producer in production performances. Disease was the most important factor followed by unpredictable milk market and high prices of drugs for household income. This research is important in relation to farm-level policy and decision making, government program analysis, performance analysis, and resource allocation to small-scale dairy farming.

Key words: Small-scale dairy farming, non-farming households, livelihoods, Bangladesh.

Chapter: I

Introduction

Bangladesh is approaching a population inflection point as the numbers are projected to rise sharply by over 300 million between 2000 and 2030 which will be more than twice the population increment (World Bank, 2005). Urgent attention is required to provide food for this growing demand. Much of the demand for dairy products will be concentrated in the urban and peri-urban area (Azage and Wold, 1998). Given suitable government policy support and access to market and services, there is a great potential to develop small-scale dairy householder dairy schemes in peri-urban and urban areas of Bangladesh. Small-scale dairy farmers are at the centre of concerns about globalization, and rightly so because they are the largest employment and small business group among the world's poor (von Braun, 2004). Smallholder farmers predominates agricultural sector in Zambia, Tanzania and other Sub-Saharan Africa countries (Mumba, 2011). Like other developing countries, Bangladesh is the endeavor of smallholders (Raha, 2005).Bangladesh has 24 million cattle, out of which 6 million are dairy cattle of local and crossbreds (DLS, 2008). The majority of the dairy cattle are in the hands of smallholder dairy producers. Besides dairying is part of the mixed farming systems in Bangladesh (Saadullah, 2001) and a predominant source of income, nutrition and jobs (Miyan, 1996; Haque, 2009). Dairying is alsoconsidered a strong tool to develop a village micro economy of Bangladesh (Shamsuddin et al., 2007) in order to improve rural livelihoods and to alleviate rural poverty. Potentially, therefore, small-scale dairying is a viable tool to spur economic growth and alleviate poverty and malnutrition. Among other reasons, low agricultural productivity, and high population growths not matching with the available resources to support them are associated with high incidences of poverty in many countries (Mwankemwa, 2004; Mason and Lee, 2005). Smallholder farming has been characterized by low productivity. This situation is partly attributed to lack of capital and uses poor farming technologies by smallholder farmers, drought, and lack of market for the produce (Mwankemwa, 2004).

Dairy accounts for about 12% (FAO, 2010a) of agricultural GDP and contributes to the livelihoods of many small-scale farmers in our country through income, employment and food (Bangladesh economic survey, 2009).Smallholder dairy production has thrived since independence in 1972 owing to supportive subsidized services and guaranteed milk markets and prices for farmers. In order to take advantage of emerging market demands for reducing their poverty, smallholders have to face challenges to improve production costs and productivity

(Uddin et al., 2009). The recent historical rise in world food prices has further aggravated the situation of dairy input prices which has also increased farm costs and ultimately affects farm profitability. In addition, there is a lack of institutional support, research and training, which would be beneficial to the farming environment (Sriri et al., 2011). As in many other parts in Bangladesh, therefore, there is a growing need for information about detail householders and small-scale dairy production parameters to enhance household life styles in the study area. Previous studies in the area as whole country concentrated on evaluating operational productive and reproductive performance of the animals (Miah, 2012; Das et al., 2011; Hall et al., 2012). Similar apply to most other parts of the world (Chenyambuga and Mseleko, 2009; Jeyabalan, 2010). Based on the above background, present research was to determine the role of small scale dairy cattle farming in improving their life styles of producer and to identify the problems of dairy cow raising and suggestions for improvement.

Chapter: Ⅱ

Materials and method

Description of study area:

The present study has conducted at *Rangunia upazla* of Chattogram district in Bangladesh. The *upazila c*onsists of 1 municipality, 15 unions with 52851 units of household. The data was collected from the farmers of the villages of Rangunia during the placement of (Upazila Veterinary hospital) UVH in internship period from October to November 2019.Majority of households in the village depends on subsistence farming besides crop production. The villages have selected for the study based on the availability of dairy cattle farming.

Data collection:

A semi-structured questionnaire was used for collection of all information related to dairy farming in *Rangunia upazla.* Total 100 farmers were selected where 40 were for small scale dairy farming/households (SCD/SCH) and 60 for non-farming households (NFH) respectively. Data were collected through face to face interviewing of farmer and personal visits to the randomly selected dairy farming households involved in small scale dairy farming and others were considered as only households (non-farming). Before beginning of the interview, each respondent was given a brief description about the nature and purpose of the study. The questions were asked in a very simple manner with explanation of questions where necessary. A questionnaire was designed to capture information related to general characteristics of the household and the household head; farmland ownership and use housing pattern; production, inputs, costs and profits/income from dairy farming and other households activities; income from non-farm activities; expenditure of income from dairy farming; assets ownership; perceived benefits and constraints to dairy farming. On the other hand, a questionnaire for non-dairy farming households involved similar information with the exception to the information related to dairy farming.

Statistical Analysis:

The obtained data was stored in Excel sheet and imported to software STATA/IC-11.0 for analysis. Stored data was tabulated and descriptive statistics (i.e. means, frequencies etc) was produced for different variables. Independent t-test was used to determine the level of significance ($p<0.05$ and $p<0.01$) between categorical variables.

Chapter: Ⅲ

Results and Discussion

Characteristics of the small-scale dairy householders:

The general characteristics/variables associated with small-scale Dairy households (SCH) and Non-farming households (NFH)respondents are distributed by sex, age, marital status, education status, farming, housing, breeding and veterinary services received by SCH and NFH are presented in(table 1). The results showed that the highest percentage (50%) of the farmers were male in both groups of which majority of their age between 31-50 years and married. Highest percentage (65%) of the farm householders had higher primary level of education followed by secondary level education (17.5%). Hossain et al.(2005), stated that the average literacy rate of farm households in all farm categories was more than 60% which had above primary level of education. Similar observations also have reported by Mollel et al., (1999). There is interaction of farm management characteristics between particular management system variables such as farming, breeding and veterinary services which were highly significant ($p > 0.01$) and significant difference ($p < 0.05$) on the issue of the housing system. In this study, it becomes clear that several variables can be considered as potential factors which increase the risk of diseases. Among this are the farming, housing, breeding and veterinary services.These findings agree with the observations of a review by Salman and Meyer (1987).

Farming:

The small-scale dairying was followed as small-scale intensive, extensive and traditional farming systems (Uddin et al.,2010).In traditional farming systems were maintained mainly keeping local cows. The majorities of the farmers do not provide concentrates and depend on natural grass. Forages for dairy animals are usually natural pastures from communal lands, river banks and road-sides; and crop residues i.e. straws. Animals are also supplemented with concentrates such as maize crush, wheat bran, rice polish. The average milk production in traditional farming system is around 400 kg/cow/year. This result opposes the findings of Uddin et al.,(2010). The extensive farming system is more common in study areas where dairying is considered a part of the mixed farming agricultural systems. The average herd size is normally ranges 3 to 4 and milk production is around 650 kg/cow/year which follows the similar pattern of the study Hossain et al. (2005), who found 700kg/cow/annum of average milk production. The intensive farming system is very

high potential for milk production. Farms have 4 to 7 cows and the cows are provided with more concentrates both purchased and home grown (Napier grass) than any other systems and kept under a zero grazing system. Milk production is around 1450 kg/cow/year and this result lies between those obtained by Uddin et al.(2010), who found the range of milk production of 1400-1600 kg/cow/year.

Table 1: Proportion of different variables in small-scale dairy households (SCH) and non-farming households (NFH):

Variable	Category	SCH (N=40)	NFH (N=60)	Overall (N=100)
Sex	Male	(27)67.5%	(43)71.7%	69.6%
	Female	(13)32.5%	(17)28.3%	30.4%
Age	< 30	(5)12.5%	(8)13.3%	12.9%
	31-50	(22)55.0%	(37)61.7%	58.45
	50+	(13)32.5%	(15)25.0%	28.7%
Marital status	Married	(37)92.5%	(49)81.7%	87.1%
	Single	(3)7.5%	(11)18.3%	12.9%
Education	No formal education	(2)5.0%	(2)3.3%	4.2%
	Primary education	(26)65.0%	(48)80.0%	72.5%
	Secondary education	(7)17.5%	(6)10.0%	13.8%
	Higher secondary and above	(5)12.5%	(4)6.7%	9.5%
Farming	Free (traditional & extensive)	(30)75%	(58)96.7%	85.9%
	Intensive	(10)25%	(2)3.3%	14.1%
Housing	Open	(31)77.5%	(56)93.3%	85.4%
	Closed & semi-closed	(9)22.5%	(4)6.7%	14.6%
Breeding	Artificial	(35)87.5%	(39)65.0%	76.3%
	Natural	(5)12.5%	(21)35.0%	23.7%
Veterinary services	Yes	(37)92.5%	(35)58.3%	75.4%
	No	(3)7.5%	(25)41.7%	24.6%

Housing system:

From the surveyed data it is clear that only 10% of the farmers provide half building and rest 90% of the farmers used tin shed and straw shed to house their cattle. On the basis of floor type, 60% of farmhouse was found with semi-bricked (with bricks) and the rest had unpaved floor (Data were not shown).Highest percentage of farmers (77.5%) provided open house, 22.5% provided closed and semi-closed house (table 1). In the other regions of the country, Hossain et al. (2004), observed that 63% farmers provided closed house and 63% farmers used paved floor.

Constraints to SCD:

Under the world trade organization (WTO) regime, small scale dairy producers in developing countries are facing serious challenges. In the present study interviewer perceive the various shortfalls or constraints. The small scale dairy householders were asked to categorize the problems faced in small scale dairy farming in their area. The analysis of the results reported in(table 5) reveal that there are several problems hampering the small-scale dairy production in the study area. The major constraint facing small-scale dairy farmers in dairying was occurrence of different disease followed by unpredictable milk market and high prices of drugs. The result from the present study is in agreement with reports of Duguma et al.,(2011).Lacks of awareness, lack of proper nutrition due to high prices on feed resources are the main causes .The same findings were also revealed in a study by Urassa and Raphael (2002) in Tanzania.

Table 2: Different variables associated with small-scale dairy households (SCH) and non-farming households (NFH):

Variable	Households	Observation	Mean ± SE	95% CI	P - value
Sex	SCH	40	0.32 ± 0.07	(0.17-20.47)	0.66
	NFH	60	0.28 ± 0.05	(0.16-0.40)	
Age	SCH	40	1.20 ± 0.10	(0.99-1.40)	0.52
	NFH	60	1.11 ± 0.07	(0.95-1.27)	
Marital status	SCH	40	0.07 ± 0.04	(0.01-0.16)	0.10
	NFH	60	0.18 ± 0.05	(0.08-0.28)	
Educational status	SCH	40	1.37 ± 0.12	(1.12-1.62)	0.23
	NFH	60	1.20 ± 0.07	(1.04-1.35)	
Farming system	SCH	40	0.25 ± 0.06	(1.10-0.39)	0.00
	NFH	60	0.03 ± 0.02	(0.01-0.08)	
Housing	SCH	40	0.22 ± 0.06	(0.08-0.36)	0.03
	NFH	60	0.06 ± 0.03	(0.00-0.13)	
Breeding	SCH	40	0.12 ± 0.05	(0.01-0.23)	0.00
	NFH	60	0.35±0.06	(0.22-0.47)	
Veterinary services	SCH	40	0.07±0.04	(0.01-0.16)	0.00
	NFH	60	0.41±0.06	(0.28-0.54)	

Table 3: Small-scale farming system:

Farming system	Number	Breed	Milk production (kg/cow/yr)	Frequency (n=40)	Percentage (%)
Traditional	1-2	Local	400	10	25
Extensive	3-4	Local & cross	650	23	57.5
Intensive	4-7	Cross	1450	7	17.5

Table 4: Constraints faced by SCH:

Identifying problems	Category			Total Frequency	Total weighted score
	1	**2**	**3**		
Disease	20(60)	14(28)	2(2)	36	90
Unpredictable milk market	8(24)	7(14)	2(4)	17	42
Prices of drugs	5(15)	4(8)	7(7)	16	30
Prices of feeds (concentrates)	5(15)	5(10)	8(8)	18	33
Failure of AI	2(6)	1(3)	2(2)	5	11
Awareness	0(0)	1(3)	5(5)	6	8

(Figures in brackets are weighted scores and those out of brackets are frequencies.)

The second most important identifying constraint is unpredictable milk market. This is due to most of the milk is consumed by farming households or sold on the informal market, and less than 20 percent is delivered to formal milk processors (FAO, 2010b). However, this would require encouraging private individuals or farmers groups to establish small-scale milk processing plants for increasing shelf life of milk in which farmers could sell their milk there. High prices of drugs, feed concentrates and failure of AI (Artificial Insemination) in the area have mainly been attributed to the availability of raw materials and retail shops owners act as the middle-man. The same findings were also revealed in a study by Duguma et al.,(2011)

Chapter: IV

Conclusion

Finally, it can be concluded that smallholder dairy production was found to be an important and have the potential to poverty alleviation, food security, improved family nutrition and income and employment generation. However, disease, unpredictable milk market, high prices of drugs, feed concentrates and failure of AI were main constraints limiting small-scale dairy production in the study area.

Recommendation

Based on the findings of the study, it can be recommended that in order to improve small-scale householders overall life style by the way of improving dairy production in the study area, there is a need of technical and institutional intervention to alleviate the identified constraints. The constraints will be removed through dissemination of appropriate technologies for better disease prevention strategy, establishing the reliable milk market, availability of drugs with convenient price, feeding, artificial insemination service, improved dairy animals supply and awareness, which will significantly increase milk production and animal performances.

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My Goal

As a human being, I have a long-cherished dream to serve my nation through my knowledge, creativity, and profession. As a veterinarian, I think I have a great opportunity to fulfill my dream by developing my career in the field as a veterinary practitioner. By dealing as a veterinary surgeon, I would be able to expand and spread my knowledge. I have also a high interest in Medical Research, Wildlife Conservation and Eco health approach.