**CHAPTER-I**

**INTRODUCTION**

Bangladesh is one of the most densely populated countries in the world with a high population growth rate. This huge population requires more meat and milk to meet up the need for protein requirement. In the national policy of the country, special importance has been launched for the development of dairy and meat production to fulfill the protein shortage of the country. Livestock production is a major component of Bangladesh and goes well beyond direct food production. Sales of livestock and their products provide direct cash income to farmers. It is considered the living bank of farmers and has a critical role in the agricultural intensification process through provision of draught power, manure for fertilizer and fuel..Livestock plays an important role in the national economy with a direct contribution of around 3% of the agricultural GDP & providing 15 percent of total employment in the economy. According to Bangladesh Bureau of statistics,(2011), the growth rate in GDP in 2009-2010 for livestock was the highest of any subsector at 7.23% compared to 0.15% for crops & 3.65% for fisheries sub sector. However disease control is the main constraint for the development of livestock sector. Among the diseases, foot and mouth disease (FMD) is one of the most threatening diseases to animal health seriously affecting economic and nutritional status of the rural population in Bangladesh. FMD is one of the highly contagious viral diseases of cloven footed animals like cattle, buffalo, sheep, goat, pig & one of the most economic diseases of livestock (Bronsvoort *et al*.2004). The out break of FMD was first recorded in 1544.since then it has caused tremendous economic loss throughout the world. Foot and mouth disease is different from other viral diseases in several ways. The virus affects the susceptible animals within the range of 40 miles. Multiplicity of viral serotypes and infections to wide host ranges such as cattle, buffaloes, sheep, goats, deer, pigs and numerous wild animals. Therefore, immunity against one type cannot protect the other type of the agent. The virus has 7 distinct serotypes(A,O,C,Asia 1,SAT 1,SAT 2,SAT 3) & about 61 sub types. Out of 7 serotypes of FMDV, 3 are currently prevalent in Bangladesh: O, A and Asia 1 where serotype-O accounts for about 85% of the outbreaks followed by types A and Asia1. Types A and Asia 1 accounted for nearly 8% and 7% of the outbreaks, respectively (recent results).studies conducted by BLRI(Bangladesh livestock research institute) revealed the morbidity in cattle to be around 36%,in buffalos 23% & in goats/sheep 5%.mortality rate especially in calves has been found to be about 51% in outbreak areas.

The disease severely impacts the productivity of small scale dairy farming, recently emerging as a promising economic sector. The diseases is characterized by fever & vesicular eruption in the mouth nares, muzzle, foot, teats & other hairless soft areas of the body(chowdhury *et al*.2004). Although FMD does not cause high mortality in adult animals, the diseases has debilitating effect, including weight loss, decrease in milk & meat production, reproductive failures, mortality of newnates & loss of draught power resulting in reduced productivity. Mortality however can be high in young animals where in the viral causes myocardial degeneration known as tiger heart disease(Gleeson *et al.*2003).the FMD disease is causing considerable economic loss to the farmers, even though it is not fatal but the symptoms of the disease i.e. salivation due to vesicles in the mouth & lameness due to vesicle in feet are causing the tension of the farmer. The affected animals become off fed due to the vesicle in the mouth & the milk production drops considerably high effect the rural economy. A study of the economic impact of the livestock disease in rural areas of Bangladesh estimated that FMD could account for 26% of the overall economic losses in livestock production. Annual loss has been estimated at about US $ 125 million per year in Bangladesh(BLRI). The disease also drastically reduces milk production and impoverishes poor farmers’ diet. FMD also significantly reduces the value of cattle, one of the few sources of cash income available to cope with the emergency.

The epidemiological factors contributing to occurrence of FMD in Bangladesh are largely unknown. Movement of livestock, which is required to meet the demand for animal draft power and for meat and milk within the country, as well as from India has been proposed as a factor promoting reemergence of FMD in Bangladesh. FMD prevalence in Bangladesh has been thought to be higher in areas with a high density of animals and where the human population density also is high. Animal markets and small ruminant presence also are believed to contribute to FMD spread and transmission.

The control of FMD in Bangladesh has been difficult because of the limited government resources, lack of trained manpower, poor infrastructure, unstable government, and government policies, such as prohibition of cattle slaughter and lack of access to quality vaccines, as noted elsewhere. An understanding of factors associated with FMD risk would help in developing detection, surveillance, and/or control strategies, as well as to inform studies to gain insight into how some factors might be influencing FMD transmission. The disease not only adversely affects the international trade in animals and animal products, but also has a potential major negative impact in ensuring global food security and alleviation of poverty. FMD is considered as a political disease in countries where the disease has not been controlled since international relationship in terms of trades with animal products and by-products is difficult to maintain. Effective prevention, control and eradication program of FMD can only help in saving our livestock population from the malady and would provide positive impact on international trade of its products.

**Objectives:**

1. To calculate the mortality and morbidity rate due to FMD (Foot & Mouth diseases) outbreak.
2. To calculate decrease milk production due to FMD.
3. To determine the economical loss occurs due to FMD outbreak.
4. To identify the problem faced by the farmer during FMD outbreak, and
5. To suggest the possible support need of farmer for cattle rearing efficiently.

 **CHAPTER-II**

**REVIEW OF LITERATURE**

**Bangladesh Livestock Research Institute. 2005.** revealed the morbidity in cattle to be around 36%, buffaloes 23% and goats/sheep 5%.Mortality rates especially in calves, has been found to be about 51% in outbreak areas. Annual loss due to FMD has been estimated at about US $ 125 million per year.

 **Carpenter T.E. *et al*.2001.** stated that the median economic impact of FMD outbreak was estimated $ 2.3to 69 billion as detection delay increases from 7 to 22 days. The losses were estimated to be as high as $10.7 to $130 billion.

**Chowdhury S.M.Z.H. *et al*.2004.**  reported that FMD outbreak was higest in Rajshahi division(304) followed by Dhaka(272) Khulna(203) Ctg (151).Morbidity rate was significantly higher (p<0.01) in cattle(35.5%) than buffoles(23.3%) and sheep/goat(4.8%). Mortality specially in calves was found at the rate of 50.9. Loss in milk yield was found to be 66.6%.loss of working days per working cattle 14 to 24 days(average 21.2 days) and the loss in draft energy per cattle was found to be12.7 to 18.9 kw per hour.

**Kim Jensen *et al*.2007.** reported that with 10% outbreak of the FMD the projected direct impact are estimated at $ 136 million and 50% outbreak, the direct losses expand to $357.5million.

**Litty M. and Deepa G. M.2006.** stated that in Chazhoor Panchayat, 62 animals were affected with FMD, out of which 28 were vaccinated. total economic loss was calculated as Rs 313900/ out of which loss in milk production accounted for 80.68%. Cost of milk was calculated at the rate of Rs 12/littre to assess the economic loss. Treatment cost includes vechicle charges and cost of medicine. An average loss of 8 hours/day/animal was calculated. Vaccination cost of Rs 5/animal was also considered.

**Lohani and Rasali *et al*.1992.** stated that 26% of the overall economic losses in livestock production and economic losses due to FMD infection Nepal, which was about an annual per capita income of $270.

**Perry B.D *et al*.2010.** demonstrated that in small holder dairy systems can benefits of US $9 to US$ 29 per cow throw FMD control, resulting in an increase of 7% to 24% in the gross margin per cow.

**Thompson D*. et al*.2002.** reported that, economic losses from FMD in the UK at £5.8 to 6.3 bilion($10.7 to $11.7 bilion US). This FMD out break in the united kingdom demonstrates the need to understand probable economic impacts of a highly contagious diseases to develop effective public policy.

**CHAPTER-III**

 **METHODOLOGY OF THE STUDY**

**3. Introduction**

For any type of investigation, the investigator or researcher has to follow appropriate guideline i.e. the method, which somehow differs, from one investigation to another. This method is set in such a way that it must satisfy the objective of the investigation/research project. However, in any type of investigation, emphasis is given on the survey method to collecting primary data. Direct observation and informal discussions with the concerned persons and the farmers supplement this primary data.The steps followed in the present study are discussed below:

**3.1 Selection of the study Area**

Selection of the study area is an important step in a study. Keeping objectives of the study in mind, the present study was conducted in Shahrasti Upazilla of Chandpur district. The main considerations in selecting the study area were as following:

1. Good communication facilities. Since the researcher resides in the Shahrasti, the conduct of study was less expensive as well as less time consuming.
2. The author expected high co-operation from the owners.
3. No study of this type was done previously in this area.

**3.2 Selection of Sample Size and period of survey**

About 32 FMD infected cattle were selected from the Shahrasti Upazilla in Chandpur district of Bangladesh for collecting primary data through survey method. Limited time, costs and resources compelled the researcher collected only the 30 sample. The data were collected during the period of October to December,2011.

**3.3 Preparation of questionnaire/interview Schedule**

The requisite primary data for this study were collected through survey method. For collecting the necessary data, questionnaire/interview schedule was prepared in the light to the objectives of the proposed project. The questionnaire was pre-tested and then finalized. The information to each of the items of the questionnaire/ interview schedule was assured for correct recording. If any item overlooked and misunderstood or found contradictory, these was corrected through re-interviewing on the spot. Any further recommendation/comments were also recorded at the end part of the questionnaire/ interview schedule. The schedules contained both the open and close ended questions.

 **3.4 Collection of Data**

Collection of reasonable and reliable data and other necessary information from the field survey is not an easy task. The success of survey depends on the reliability of data and therefore, data all possible care to establish rapport with the respondents so that the respondents did furnish correct data. They were convinced that the study was purely an academic one and was not likely to have an adverse effect on their business. Thus the primary data were collected. The secondary data were collected from different published documents such as Survey reports, Five Year Plans and Statistical Yearbooks. Random sampling technique was followed to collect the data.

**3.5 Problems Faced in Collecting Data**

In conducting the field survey a number of problems were faced by the author. Some of them are mentioned below:

1. Most of the owner thought that the investigator was an agent of the government authority and therefore, they initially did not want to co-operate with the researcher. In fact they hesitated to answer some questions relating to income and asset, because they were afraid of tax imposition or tax increase.
2. Another important limitation of survey was the researcher had to depend solely on the memory of the owners for collecting necessary information because they do not keep written records.
3. The owners were not available for interview and therefore several visits were needed to collect relevant information which was often very time-consuming for the researcher.
4. Literacy of the respondents was great hindrance of data collection. They could not sometimes answer to question accurately and to the point.

**3.6 Analytical technique**

For analysis of collected data various statistical tools like percentages, tables, graphs and diagrams were applied in order to make the study worthy, informative and useful for the purposes. Benefit-Cost Analysis also estimated to find out the economic impact of the owner.

** **

 **Fig-1: FMD affected cattle**

 **CHAPTER-IV**

**RESULT AND DISCUSSION**

Foot and mouth diseases (FMD) are highly contagious diseases. The diseases are rapidly transmitted from animal to animal and from herd to herd. The diseases causes’ substantial economic loss in many ways such as milk production, losses body weight and losses caused by calf mortality. In this study morbidity rate was found 74.8%, and the mortality rate was 9.1% for FMD outbreak (Table 4.1).

**Table 4.1: Descriptive results of morbidity and mortality of FMD**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number of farmers** | **Total cattle** | **Cattle per farm** | **FMD morbidity %** | **FMD mortality %** |
| 30 | 112 | 3.8 | 74.8 | 9.1 |

Source:field survey

**Cost of farming**

The cost and return is a very important component for dairy farm owner. Cost may be classified as variable cost and fixed cost. The variable cost are hired labour, feed cost , fuel and electricity cost ,medicine and vaccination cost and the fixed cost are capital cost, permanent labour cost, housing and equipment cost. Fixed cost was estimated as a depreciation cost. The cost and return were estimated from the collected data from the shahrasti upzilla under chandpur district. The estimated costs of cattle rearing before and after FMD infection were discussed as follows:

**Table 4.2: Per year Cost of farming before and after FMD on the basis of full**

|  |  |  |
| --- | --- | --- |
|  |  Before FMD |  After FMD |
| Cost items | Amount in  | Percentages% | Amount in Tk. |  Percentages % |
|  A. Variable cost | 110060.3 | 78.48536 | 120974 | 80.03623 |
| Hired Labour  | 5460 | 3.893595 | 11540 | 7.634848 |
| feed | 101200 | 72.167 | 98426 | 65.1185 |
| Fuel/Electricity | 1234.5 | 0.880338 | 1543 | 1.020847 |
| Medicine & vaccine | 2165.75 | 1.544424 | 9465 | 6.262031 |
|  B. Fixed cost | 30170.05 | 21.51464 | 30175.05 | 19.96377 |
| Capital |  |
| Interest(7.5%) | 4480.25 | 3.194923 | 4480.25 | 2.964127 |
|  Permanent labour | 24500 | 17.47126 | 24500 | 16.20917 |
| Housing |  |
|  Depreciation cost | 757.8 | 0.540397 | 757.8 | 0.501359 |
| Equipment |  |
|  Depreciation cost | 432 | 0.308065 | 437 | 0.289119 |
| Gross cost | 140230.3 | 100 | 151149.1 | 100 |
| Farm Size |  3.8 |

Source:field survey

Table 4.2 shows that the major cost of cattle rearing is the feed cost and it was about 72.16% of the total cost. After FMD infection the feed cost was 65.11% which is comparatively lower before FMD infection, because the formation of vesicle in the mouth cavity, as a result the feed intake of the infected cow reduces than the healthy cow. Labour cost, vaccination and medicine cost and fuel & electricity cost were 3.89%, 1.54%, & .88%, respectively before FMD infection. The labour cost and the treatment charges after FMD were higher before the FMD infection and these were 7.63% and 6.26% in the total cost.

**Returns**

It was shown from the table 4.3, the return of dairy farmer was derived from three sources; selling of milk, selling calves and cow dung. The highest return was achieved by the selling of milk and it was estimated Tk. 179560.

 **Table4.3: Return of farming before and after FMD**

|  |  |  |
| --- | --- | --- |
| **Particulars** | **Before FMD** | **After FMD** |
| Milk | 179560 | 94434 |
| Selling of calves | 16450 | 10240 |
| Cow dung | 2850.35 | 1720 |
| Total | 198860.4 | 106394.3 |

Source:field survey

The return from selling of calves and cow dung were Tk. 16450 and Tk. 2850.5, respectively before FMD infection in farm. After FMD infection average return is drastically reduced due to the reduced milk production and calves mortality (Fig:2).

 **Figure2: Comparative return of farming for before and After FMD**

**Net return**

The average net return was computed simply by deducting gross return from gross cost. The net return before FMD was Tk. 58630 per year where the herd size was 3.8. But after FMD infection the net return was negative which accounted Tk. -44754.8 per year that means the farmer losses Tk. 44754per year due to FMD out break (Table 4.4).

**Table 4.4: Profitability of farming for before and after FMD**

|  |  |  |
| --- | --- | --- |
| **Particular** | **Before FMD** | **After FMD** |
| Gross cost | 140230.3 | 151149.1 |
| Gross return | 198860.4 | 106394.3 |
| Net return | 58630.1 | -44754.8 |
| BCR | 1.41 | 0.70 |

Source:field survey

**Benefit Cost Ratio (BCR)**

Benefit cost ratio (BCR) was the highest found than.(Fig: 3). While it was 1.41.and 0.70 in before FMD and after FMD infection, respectively. It means that if a farmer invests Tk.1 before FMD infection he/she would get return Tk. 1.41 from dairy farm, but after FMD infection farmer losses Tk. 0.30 (Table: 4.4).

 **Figure 3: Comparison of BCR Before and After FMD**

**Economical loss**

Foot and mouth disease is probably the most important livestock disease in the world in terms of economic impact. The reasons for this are not only due to the losses of production but also to the restrictions on the trade of animals both locally and internationally. The economic loss of farmers due to FMD in Shahrasti can be summarized as follows;

**Table 4.5: Per farm Economical loss for FMD outbreak**

|  |  |  |
| --- | --- | --- |
| **Particular** | **Amount Tk** | **Percentages** |
| Reduction in milk yield | 85126 | 84.29 |
| Death of Animal | 8560 | 8.47 |
| Treatment charges | 7299.25 | 7.2 |
| **TOTAL** | 100985.25 | 100 |

Source:field survey

In this study the most important loss was reduction in milk yield. Milk yield is reduced about 84.29%, followed by 8.47% death of the animal and 7.2% of the treatment charges (Fig: 3).

 **Figure-4: Economical loss for FMD outbreak**

The infected animals remained severely debilitated for a considerable period of time, and loss weight considerably, which may be due to, reduced feed intake resulting from foot and mouth lesions.Consumption of milk and meat was reduced on account of consumer fear of contracting FMD. Although there is no scientific basis for this concern, the effect would be reduced consumption and further decrease in prices. FMD is a major constraint in international livestock and animal products. The presence of FMD can affect the export of other products, such as fresh fruit and vegetables to FMD free countries. FMD has also socioeconomic impact. Moreover it creates a negative feeling among farmers, especially in the context of increasing production costs.

**CHAPTER- V**

**PROBLEMS OF FARMING**

The purposes of this section of the study is to identify the problems of raising dairy cows in the selected area of Chandpur district and to make suggestion with a view to solving these problems for expanding rearing of dairy cow owners as a tools of poverty alleviation at rural areas in Bangladesh. The problems are as follows-

**Table-5: Problems faced by the FMD infected cattle of the farmers of Shahrasti**

 **Upazilla under Chandpur District.**

|  |  |  |  |
| --- | --- | --- | --- |
| **SL. No.** |  **Problems** | **Percentage****(%)** | **Ranks** |
| **1.** | High Feed cost |  100 | 1 |
| 2 | Lower price of milk |  100 | 1 |
| 3 | Lack of high yielding varities |  80 | 2 |
| 4 | Lack of financial credit |  70 | 3 |
| 5 | Inadequate veterinary care and services |  60 | 4 |
| 6 | Poor vaccination programme |  50 | 5 |
| 7 | Lack of A.I center |  40 | 6 |
| 8 | Absence of Govt. help and guidance |  40 | 6 |
| 9 | Lack of technology |  40 | 6 |

Source:field survey

* **High prices of feed**: This is the most important problem of rearing dairy cows. About 100 percent farm owners complained about this problem. Scarcity of quality feeds and fodder is also an important constraint of rearing dairy cows.

* **Low prices of milk:** The prices of milk in the study area were low. The average price of milk per liter in the study area was estimated at taka 35, which was lower than the prices prevailed in many other areas of Bangladesh. The problem of low prices milk was reported by the 100 percent of the farmers.
* **Lack of high yielding varaities:** Unavailable high yielding varaities is also major problem for developing dairy farm in the country.About 80 percent people complained this problem.
* **Lack of credit**: It is one of the important constraints for improvement of dairy enterprises. About 70 percent farm owners could not developed their dairy farm due to the lack of credit.

* **Inadequate veterinary care and service** Most of the dairy farm owners reported that the availability of the veterinary services was inadequate in the study area. About 60 percent of the farm owners mention this problem.
* **Lack of AI centre**: Artificial insemination is one of the most important methods used for the improvement of breeds. It was found that 40 percent of dairy farm owners faced the problems of lack of AI centre.
* **Lack of technology**: If proper technological knowledge spread among farmer the farming system will developed rapidly. But about 40 percent farmer faced lack of technology in the study area.

 **CHAPTER- VI**

**CONCLUSION AND RECOMMENDATIONS**

This chapter presents the conclusions of the present study and also provides some important recommendations for future planning of the development of dairy industry at village level. The study was conducted for economic impact of FMD of dairying at rural areas in Chandpur district. In this study the morbidity rate was74% and mortality rate was 9.1%, mortality rate was higher in the calves. The major economic loss of farmer due to FMD outbreak was higher loss of milk production and it was about84.29% of the total loss. The study revealed that BCR on the basis of full cost before FMD were found in 1.41, and after FMD outbreak the BCR was 0.70, which shows that the farming is more profitable when the herd is free from FMD outbreak.

In the study area farm owners faced various types of problems for dairy farming. Based on this problems, the following suggestions are made to develop the farming practices of dairying and make it to sustainable for future:

* The Directorate of Livestock Services should expand their veterinary services and other facilities. Veterinary treatment facilities should be extended up to union level and more veterinarians should be placed in this Upazilla.
* The shortage of feeds and fodder may partially overcome by introducing high yielding variety fodder cultivation. The government and non-government organizations should play a vital role in disseminating HYV fodder cultivation.
* Provide high yielding varieties.
* Facilities of the Institutional loan to the owners of farmers should be made so that they can get the credit on easily terms.
* For proper housing, nutrition, disease control, marketing and management should provide short term training for the owners of the dairy farms.
* Government support should be provided to medicine and vaccine producing Institutions to ensure the availability of the medicine and vaccine in the area.
* provided all technical & managemental support.

**Limitation of the study:**

**Interviewer bias**:

Proper data collection by interviewer sometimes was not possible.

**Recall bias:**

Farmers were reported not to have seen equally co-operative and friendly. They sometimes tried to be escaped in the middle of the interviews. Moreover, even, interviewees were not done always with right person who involved with farming directly. Variables measurements were depended on reporting of the farmers in most of the cases that recall or incorrect information could gather on the way.

**Misclassification.**

Most of the owners thought that the investigator was an agent of Government authority and therefore, they initially did not want to co-operate with the researcher. Illiteracy of the respondents was a great hindrance of data collection. They could not sometimes answer to questions accurately and to the point.

**Data recording**:

Farmer were not higher educated & they did not keep any written document of their farm activities. As a result for the accuracy & reliability of data, researcher had to depend carefully upon the memory and sincerity of the farmers. So the possibility of errors could not be ruled out

Period of study: study period was very short just for 2 months.

 **CHAPTER-VII**

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