Original Research Article

Broiler Farming in Hathazari, Bangladesh: A Study of Management and Outcomes.

Abstract

Broiler farming has greatly contributed to improving the socio-economic status of people in underdeveloped countries like Bangladesh. The productivity and profitability of broiler farming largely depend on good management practices. The present study was conducted on selected broiler farms to know about the socio-economic status of the farmers, managemental practices adapted by them and overall production performance of the broiler chicken in Hathazari region, Chittagong. The data for this study was collected by direct interview to farmers, visual inspection of farms and farm records through a pre-formed questionnaire. Through the study, it was found that most of the farmers are of young age (60%), started farm with own money (60%), received no training (90%), has experience of 6-10 years (50%) and has taken farming as main occupation (70%). Considering management practices, 50% of the farmers collected day old chick (DOC) from Kazi Farms Limited through local dealers. The housing system was intensive, open sided with kacha (60%) and paka (40%) floors and tin shed roof. In all farms sawdust was used as litter material in study region due to unavailability of rice husk. Electric brooding was done in all farms with duration of 5-7 days in summer and 10-15 days in winter and 50% of farmers did not measured temperature during brooding. Most of the farmers used feed of Kazi brand (30%) followed by Paragon (20%), ACI (20%), Aman (10%) and Nourish (10%). Broilers were reared for 28-35 days. The most common disease in this area is Infectious Bursal disease (66%). Most farmers maintained vaccination schedules but hygiene condition were minimal, with no foot bath and unrestricted public access. All the farmers used different growth promoters, antibiotics, liver tonics, vitamins in broilers. The average mortality rate of the studied farm was 3.36%, average final body weight was 1.7 kg and average feed conversion ratio (FCR) was 1.26. It is concluded that the information gathered through this study would be beneficial in developing enhanced poultry management strategies in the study area.

Keywords: Broiler, production performance, mortality rate, day old chick, feed conversion ratio.

1. Introduction

The poultry sector is developing as one of the most promising commercial sectors in Bangladesh in recent years. It contributes 14% to the overall economic value of livestock [30] and 37% of the total animal protein in Bangladesh [27] . The total poultry population is 3857.04 lakh in 2022-23 which is highest among the previous years [23]. It is estimated that per year per capita consumption of broiler meat was 6.3 kg in 2018 which was assumed to reach 7 kg in 2020 [15]. So the demand for broiler chicken which is mainly produce for meat purpose is increasing day by day due to its shorter production cycle, tenderness, high palatability and digestibility and low price [21].

In recent years poultry industry has experienced a positive transformation evolving from backyard rearing to fast growing commercial sector. A study done on the effect of Smallholder Livestock Department Project showed that socio-economic condition of the people of rural area specially meat and egg consumption rate , employment rate improved due to the measures taken by SLDP (smallholder livestock department project) [3]. About more than 6 million job

opportunities are created by the poultry industry [7]. Thus facilitating in reducing unemployment problems, improving socio- economic condition also expanding the women empowerment in the rural areas [28]. A great number of rural women are under the non-government organization and department of livestock service conducting poverty alleviation program which include poultry production and rearing [23]. The poultry sector also created great investment opportunity in Bangladesh [14]. So the poultry sector has become one of the great source for earning, reducing poverty [10]. It has also a greater contribution on the GDP of the country, thus contributing 1% of the total GDP of Bangladesh [12]

Broilers are young chicken of either male or female reared for meat production. They are characterized by rapid growth gaining a weight of 1.5-2 kg from around 40 gm within 5 weeks. So for achieving profits from poultry industry one should have good knowledge and more concern on its technical aspects like housing, breeding, feeding and overall management. Like layer birds, broiler also need similar housing with one square feet floor space per bird after they are brought from hatcheries as day old chick. As they grow quickly, they require high protein, vitamin, minerals and other trace element in their diet. According to [6] probiotics in the diet of broiler has great effect on their body weight gain, mortality rate and feed conversion ratio. Again feed conversion ratio was greater of those birds kept under bio-secured condition than those without bio-security [5]. However the percentages of farmers using lime water to disinfect their farms in Jessore and Bhola were 43.08% and 63.46% respectively [20]. Bangladesh has a suitable weather for rearing broiler. But most of the broiler farm owner suffer from different problems like lack of capital, over price and low quality of the chicks, high feed cost which is also low in quality, improper transportation system, Inadequate veterinary services [22] . Study found that high price of the broiler feed is one of important factors affecting broiler farms [11,13]. Environmental factors like weather, temperature also affect the growth of the broilers. Beside this broiler faces a lot of diseases like infectious Bursal disease (Gumboro), Newcastle disease (Ranikhet Disease), Avian Influenza, salmonellosis and many more which lead to high mortality [31]. Most of the diseases occurs due to managemental problems in the farm as most of the farmers are illiterate and having no training or experience on broiler farming. But according to a study in Jessore and Bhola 40.38% farmers had vaccinated against three disease Ranikhet, Gumboro and infectious bronchitis whether 36.64% farmers vaccinated against Gumboro and Ranikhet only [20]. Moreover, worldwide the broiler industry including Bangladesh adapting new strategies and technologies in order to improve managemental system and production performance.

A good number of research have been occurred in different region in Bangladesh on broiler production and management. However, no research was found on management and production aspect of broiler farms in Hathazari region of Chittagong which has great geographical significance due to it's rich agricultural land and abundant water resources from Halda river. Therefore, the current study was undertaken in the Hathazari upazila of Chittagong to minimize this research gap by achieving following objectives:

1) To know the socio-economic status of the farmers of Hathazari region.

2) To assess the different managemental system adapted by farmers in Hathazari region.

3) To assess production performance of broilers in Hathazari region

2. Materials and Methods

2.1 Study area

This study was conducted at selected broiler farms of Hathazari upazila of Chattogram district, Bangladesh.

Figure 1: Location of study area

2.2 Study period

The information related to broiler farming was collected from February, 2024 to March, 2024.

2.3 Study design

The study design is retrospective descriptive study.

2.4 Study population

The study was conducted on broiler farms with a flock size ranging from 500 to 3000 birds in hathazari upazila. By maintaining this criteria data were collected from 10 randomly selected broiler farms.

2.5 Data collection

The data were collected through the direct interview of the broiler farmers and also by direct visit to the farm. A Questionnaire was designed for data collection which contained both open and close form of question. The data were collected from the owner, their family members and the workers by asking different question in simplest way. In addition, farm record book was used, when available, for validation of this information. All the data were collected according to the management system of the farms. The data were collected on different parameter like owner's information (Name, age, occupation, experience and received any training or not), management system (No. of birds, type of housing, floor and litter management, brooding, feeder and drinker, biosecurity and hygiene practices, common disease and drug used and vaccination schedule) and finally on production performance like feed conversion ratio (FCR), mortality rate and final body weight.

$$\text{FCR} = \frac{Total\ feed(kg) consumed\ up\ to\ the\ age\ of\ marketing}{Live\ weight\ (kg) of\ bird\ at\ the\ age\ of\ marketing}$$

$$\text{Mortality rate} = \frac{Total\ death\ till\ marketing}{Total\ DOC\ introduced\ in\ farm} \times 100$$

$$\text{Final body weight gain} = live\ weight\ of\ bird\ at\ marketing\ day - day\ old\ chick\ weight$$

2.6 Statistical analysis

The collected data was entered into Microsoft excel 2016 and sorted accordingly for analysis. Descriptive statistics including mean value, frequencies and percentages were calculated using excel formula. For various qualitative variables Fisher's Exact test was performed using STATA-11 software.

3: Results

3.1 Owner's information

The owners' information like name, age, sex, experience in this field, received any training or not are presented in Table 1. Most of the farmers (60%) invested from their own fund. Majority of them did not receive any training (90%; p = 0.001). No female broiler farm owner was observed in the area. A great number of them are young (60%) individuals aged between 24-30 years. 50% of the owner has experience of 6-10 years and a considerable number of them have taken farming as their primary occupation.

Table 1: Information about the status of broiler farm owners (N=10).

Parameter	**Categories**	**No. of farmers**	**Percentage (%)**	**p-value (Fisher's Exact)**
Investment source	Own	6	60	0.656
	Bank loan	4	40	
Received any training	Yes	1	10	0.001
	No	9	90	
Age (year)	24-30	6	60	0.090
	31-35	2	20	

	36-40	2	20	
Sex	Male	10	100	-
	Female	0	0	
Experience (year)	1-5	3	30	0.118
	6-10	5	50	
	11-15	1	10	
	16-20	1	10	
Farming main occupation	Yes	7	70	0.178
	No	3	30	

3.2 Managemental practices in broiler farms

3.2.1 Collection of day old chick and no. of birds:

The farmers collected the day old chicks (DOC) from different companies like Kazi farms, Paragon, CP, Nahar etc. in Hathazari region. They collected the DOCs through the local dealers of particular hatcheries. Size of the observed farms and the source of DOCs are presented in Table 2. Among the ten farms three small scale (30%), five medium scale (50%) and two large scale (20%) farms were seen & most of the DOCs (50%) are brought from Kazi farm in that area.

Table 2: Size of farms and source of DOC.

Parameter		**No. of farmers**	**Percentage (%)**	**p-value**
Farm size	Small (500-1000 birds)	3	30	0.349
	Medium (1000-2000 birds)	5	50	
	Large (2000-3000 birds)	2	20	
Source of DOC	Kazi Farm	5	50	0.111
	Paragon	2	20	
	Aman	1	10	
	Nourish	1	10	
	Dhaka group	1	10	

3.2.2 Housing system

All ten broiler farms are of intensive type with tin shed roof. Large and medium scale farms had separate brooder and grower shed. But in small scale farms there was a single shed used for both brooding and growing purpose. Housing system of our selected farms are shown in Table 3 which reveals that most farms had kacha floor (60%) & majority of farmers used tarpaulin as curtain to protect their birds from adverse weather.

Table 3: Housing system of farms.

Parameter		**No. of farms**	**Percentage (%)**	**p-value**
Floor type	Kacha	6	60%	0.656
	Paka	4	40%	
Curtain type	Sack	4	40%	0.656
	Tarpaulin	6	60%	
Floor space/bird at grower stage	1-1.5 Sq. ft	5	50%	_
	1.5-2 Sq. ft	5	50%	

3.2.3 Feeder and drinker

In most of the farms tray feeder are used during brooding (some farmers avoid it as it causes more wastages of feed) and round feeder after brooding. Feeder are wiped daily with clean cloth and washed per batch. Drinker washed three times per day. Water was supplied directly from deep well in most farms. No. of feeder and drinker are presented in Table 4 shown that during brooding 6 farms used 1 feeder and drinker per 100 bird. At growing stage 6 farms ($p = 0.057$) kept 3-4 feeder for every 100 birds which indicating a significant difference in feeder distribution.

Table 4: No of feeder and drinker in farms.

Period of flock	**No. of feeder/100 bird**	**No. of farm**	**p-value**	**No. of drinker /100 bird**	**No. of farm**	**p-value**
Brooder	1	6	0.656	1	6	0.656
	2	4		2	4	
Grower	1-2	3	0.057	1-2	4	0.142
	3-4	6		3-4	5	
	5-6	1		5-6	1	

3.2.4 Brooding management

The brooder house was prepared before the arrival of the chicks at the farm using rice husk as litter material and plastic board as chick guard. In most farms 500 chicks were brooded together except some in which 300/400/750/1000 were brooded together. The duration of brooding was 5-7 days in summer and 15-18 days in winter.

Table 5: Temperature measurement and No. of bulb used during brooding.

Parameter		**No. of farms**	**p-value**
Brooding temperature	Measured	5	-
	Not measured	5	
No. of bulb used/ brooding	3-5 of 100 watt/500 bird	5	-
	6 of 100 watt/ 500 or 750 bird	5	

No significant differences can be figure out on brooding temperature measurement and no. of bulb used for brooding from the Table 5. Half of the farms were maintaining brooder temperature schedule by keeping temperature scale in brooding area whereas half of the farms did not maintain that.

3.2.5 Litter management

Sawdust was used as litter material in all farms due to scarcity of the rice husk in Hathazari region. A study in Bangladesh investigating the impact of various liter materials on broiler performance concluded that sawdust was most effective for promoting broiler growth (Monira et al., 2003). The depth of the liter was thicker in cold season than summer. The depth was 1-1.5 inch in most farms in summer season; in some farms it was 2-2.5-inch depth. In cold season the depth was 3 inch in most farms.

3.2.6 Feeding management

Effective feed and feeding management is a primary concern for successful commercial poultry farming. Feed should contain all of the nutrients like protein, fat, carbohydrate vitamin, minerals for proper growth of broilers. All the farmers of the study area used feed from different companies like Kazi, ACI, Paragon etc.

Table 6: Feed, feed type and feeding schedule adapted by different farmers.

Feed company	**Farm no. (%)**	**Feed type**	**Feed size**	**Time**
Kazi	3 (30%)	Broiler starter	Crumble	0-15 days
		Broiler grower	pellet	15-till marketing
ACI	2 (20%)	Broiler starter	Crumble	0-14 days
		Broiler grower	Pellet	14- till marketing
Paragon	2 (20%)	Broiler starter	Crumble	0-15 days
		Broiler grower	Pellet	15-till marketing
Suguna	1 (10%)	Broiler starter	Crumble	0-20 days
		Broiler finisher	Pellet	20-till marketing

Aman	1 (10%)	Broiler starter	Crumble	0-17 days
		Broiler grower	Pellet	17-till marketing
Nourish	1 (10%)	Broiler pre-starter	Crumble	0-8 days
		Broiler starter	Crumble	9-20 days
		Broiler finisher	Pellet	21- till marketing

3.2.7 Common disease and medication

Prevalence of different kind of disease were seen in all broiler farms. Outbreak of Infectious Bursal disease (Gumboro) and Newcastle disease (Ranikhet) were seen in some of the farms which caused high mortality and great loss to the farmers. Beside these, Brooder pneumonia, Chronic Respiratory Disease, Ascites, Infectious coryza were also seen in different farms.

Table 7: Disease prevalence in different farm.

Name of Disease	**No of Farms**	**Prevalence (%)**
Infectious bursal disease (IBD)	6	66%
Newcastle Disease (ND)	4	44%
Chronic Respiratory disease	4	44%
Infectious Coryza	3	33%
Brooder Pneumonia	1	11%
Ascites	1	11%

From Table 7 we can see that infectious bursal disease (66%) is the most prevalent disease in that region followed by Newcastle disease (44%). Various kind of medicine are used by farmers in brooding and grower stage of broilers. In brooding stage Cefa-1 Vet (Cephalexin), Lisovit (anti-stress drug), different vitamin and minerals like Zinc, Calcium, selenium etc. Glucose and Amino acid preparations are used. In growing stage different antibiotics like Sulpha drug, amoxicillin, Colistin, Enrofloxacin, Amprolium etc. are used. Toxin binder, liver tonic, different vitamin mineral preparations were also used to enhance the growth of broilers.

3.2.8 Vaccination schedule

Most of the farmers maintained the proper vaccination schedule whereas some of them had vaccinated their chicks for 2-3 time.

Table 8: Proper vaccination Schedule maintained by farmers in study area.

Day	**Disease**	**Vaccine**	**Dose and Route**

3-4	ND	BCRDV	1 drop in 1 eye
7-12	IBD	Gumboro	1 drop in 1 eye
18-20	ND	BCRDV	1 drop in 1 eye
22-25	IBD	Gumboro	1 drop in 1 eye

3.2.9 Biosecurity and hygiene management

Most of the farmers maintained minimal biosecurity in their farms. Farmers and workers used separate shoes and dress to enter into the farms. There was no footbath in any farms. No strict restriction was available to the entry of common people in most of the farms. Vehicle carrying feed had their wheels sprayed before enter into the farms. Proper ventilation were maintained in most of the farms. Most of the farms had proper drainage system to wash out the wastages. Dead birds were either buried in the soil or given in the pond as feed for fish or thrown away in land. In some farms there were no access to rodents as net were used to prevent their entry whether in some of them had access of rodents like rat. After the marketing of flock at first the litter materials were cleaned properly. Then some farmers washed the shed with bleaching powder and lime while some of them washed with potash and lime water. At last the sheds were sprayed with copper sulphate.

3.2 Production performance of the farms

Table 9: Production performance of the 10 studied farms with mortality rate

Sl no.	**Initial Population**	**Final Population**	**Mortality Rate (%)**	**Total feed consumption/Bird (Kg)**	**Final body weight/Bird (Kg)**	**FCR**
1	3000	2830	5.6	1.6	1.5	1.06
2	2000	1960	2	2.5	1.5	1.6
3	1500	1470	2	2	1.8	1.1
4	1500	1430	4.6	3	1.6	1.8
5	1500	1470	2	2	1.8	1.1
6	1000	995	0.5	2	2	1
7	1000	970	3	2.5	1.7	1.5
8	600	570	5	2	1.6	1.25
9	500	480	4	1.8	2	0.9
10	500	485	3	2	1.5	1.3
Total	**13100**	**12660**	**3.36**	**21.4**	**1.7**	**1.26**

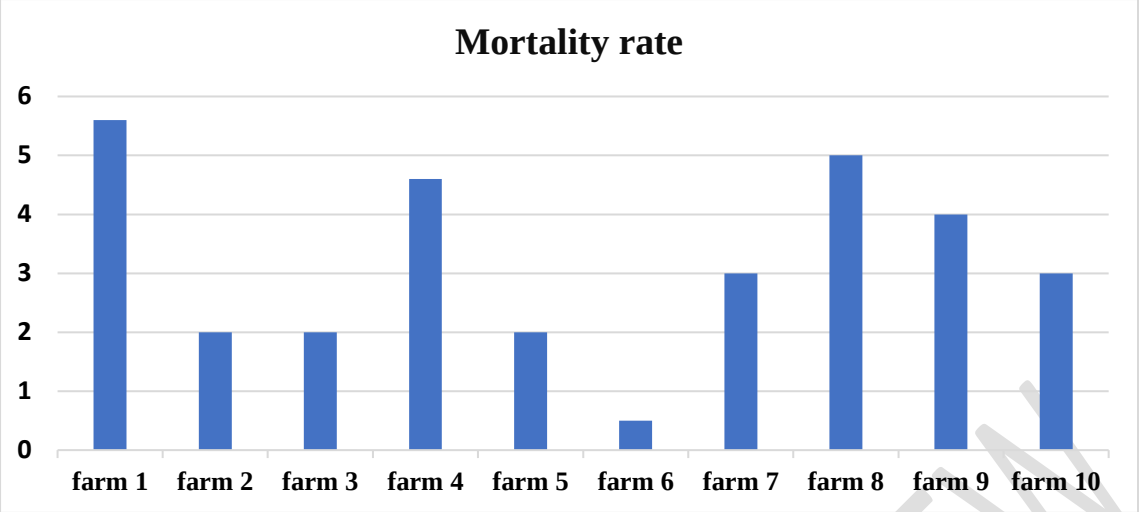

Figure *2*: Mortality rate of 10 farms

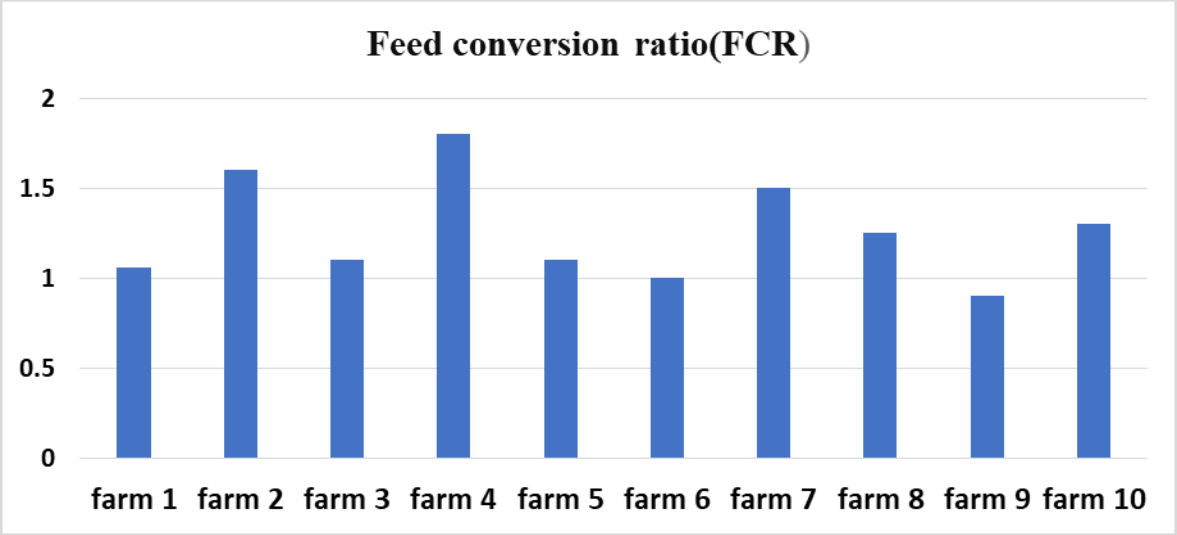

Figure 3: Feed conversion ratio (FCR) of 10 farms

Discussion

The present study revealed that investment source of 60% of the farmers were their own money while [17] found that farmers started their farm by taking loan from Bangladesh Krishi Bank. In the study area 60% farmers are of young age (24-30 years) which is contraindicated to the study of [32] that 60% of the farmers are of middle age(31-50years).[2] also observed that 54.84% of the farmers were of middle age (31-50 years) in Mymensingh. Most of the farmers (50%) had experience of 6-10 years while 30% of them had experience of 1-5 years. (Islam et al., 2015) found that 75% of Mymensingh and 33.3% farmer of Barguna had experience of more than 3 years. Only 10% farmer received training in the study area and 90% got no training. [4] reported that only 27.5 % farmer got training while majority of them (72.5%) got no training. Farming was the main Occupation of 70% farmers while 30% of them taken it as a secondary occupation or hobby. [26] showed that 35% of broiler farmer had taken farming as main occupation.

In the study area 50% farms were of medium scale while 30% were of small scale & only 20% farm were of large scale. These findings contradicts the findings of [8] who reported that most of the farms (80%) were of small scale; only 8.3% farmers had medium & 11.7% farmers had large farms in Botswana. Maximum farmers purchased day old chick from Kazi Farms Ltd. Which is similar to study of [14]. The flooring system of most of the farms were Kacha whereas some of them had Paka floor. [33] reported that most broiler flooring system are Kacha and brick in Bangladesh. They suggested using Kacha flooring because it resulted in higher growth rates and better feed conversion ratio (FCR) compared to other types of flooring [1]. All of the broiler shed in study region were intensive open-sided type which has similarity with the study of [19]. Maximum farmers of Hathazari upazila used the feed of Kazi farms LTD. (30%) which has similarity with [33] in Santhia upazila under Pabna district. Beside this, feed of Paragon, ACI, Aman, Nourish were also used in the study region. All farmers of the study region used sawdust as litter material due to lacking of rice husk in that region. However, [1] reported that rice husk were mainly used by the farmers (60%) in Sylhet region other than sawdust (28%). Brooding was done with electric brooder in all of the farms for 5-7 days in study area. [19] also reported electric brooding for 7 days in Mymensingh and Barguna district. In the study area the prevalence of Infectious Bursal disease (66%) & Newcastle disease (44%) were highest which has similarity with [1]. But [16] reported that salmonellosis was most prevalent (28.57%) disease while infectious bursal disease & Newcastle disease were next most prevalent disease affecting 14.87% & 12.56% poultry in Gazipur district. In the study area vaccine against IBD and Newcastle disease were used and maximum farmers maintained proper vaccination schedule. [29] reported that 70% farmers maintained regular vaccination schedule whether 30% of them didn't maintain. [9] reported that 16% of the farmers had done regular vaccination to control disease in Mansa district of Punjab. In hathazari region most farmers didn't imposed strict restriction on entry of common people and did not kept any footbath at the entrance of farms which has similarity with the findings of [18] that the biosecurity practices in Bangladesh by poultry farmers are quite insufficient like common people can easily enter the farms without properly disinfecting their hand, shoes and cloths.

The average feed conversion ratio (FCR) of the study area was 1.26 whether [35] found the FCR 1.93 to 1.94. The average mortality rate was 3.36% in Hathazari region but [24] reported 6.2 % mortality in the Hariana region. The final body weight per bird was 1.7 kg which is similar to [1]. But [34] reported 1.5 kg average market weight per bird in Sherpur Sadar upazila.

Conclusion

Broiler sector has a great role in improvement of socio-economic condition of people of Bangladesh. It has created employment opportunities for educated young generation and rural women. In Hathazari region all of the broiler farm owners (100%) are male and most of them are youth of 24-30 years. Only 10% farmers got training on farming and large number of them (70%) has taken it as their main profession. Intensive rearing was practiced in all farms, with most of farms (60%) having kacha floor. Majority of DOCs (60%) and feed (30%) were supplied by Kazi farms. Electric brooding was done in all farms for 5-7 days in summer. Sawdust was used as litter material in that area. Birds were mostly affected by infectious bursal disease (66%) despite most farmers maintaining a proper vaccination schedule in that area. The result of the present study will be helpful for the broiler farmers and researchers to find out the lacking on management system of broilers as well as how to overcome these lacking so that production performance of the broiler increases. Beside this government should take lead in advancing this sector.

The information collected in this study were collected at a time from the farmers. The flock were not observed for full rearing time. Some farmers were not cooperative and showed unwillingness to give information

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