

**Study on the Profitable Implementation of Selected Broiler
Strains Providing Selected Company Feeds in Cox's Bazar
under Intense Management**



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Table of Contents

Contents	Page No
List of Tables	IV
List of Figures	IV
List of Abbreviation	IV
Abstract	V
Chapter 1: Introduction	1-3
Chapter 2: Materials and Methods	4-6
Chapter 3: Results	7-9
Chapter 4: Discussion	10-12
Limitations	13
Conclusion	14
References	15-17
Acknowledgements	18
Biography	19

LIST OF TABLE

Table No	Content	Page No
Table No 1	Nutritional makeup of Nourish feed	5
Table No 2	Nutritional makeup of Nahar feed	6
Table No 3	Nutritional makeup of Aman feed	6
Table No 4	Production performance of Arbor Acres broiler strain	7
Table No 5	Production performance of Indian River (Lohmann Meat) broiler strain	8
Table No 6	Production performance of Ross-308 broiler strain	8
Table No 7	Average feed conversion ratio of different strain	9
Table No 8	Average feed conversion ratio of different feed company	9

List of Figures

Fig No	Content	Page No
1	Mortality (%) of different Strain and Company Feed	10
2	Average Feed intake/bird (gm)	11
3	Average Body Weight/Bird (gm)	11
4	Feed Conversion Ratio (FCR)	12

List of Abbreviation

Abbreviation and Symbol	Elaboration
ME	Metabolic Energy
CP	Crude Protein
CF	Crude Fiber
EE	Ether Extract
DM	Dry Matter
<i>et al.</i>	And his associates
%	Percent

Abstract

This study investigated the performance of 15,000 commercial broiler chicks comprising Arbor Acres, Lohmann Meat and Ross-308 strains over 30 days in Cox's Bazar district. These strains were subjected to comparable housing, feeding, and environmental management conditions. Each strain was assigned to three feed groups formulated by distinct recognized companies. Mortality percentages for Arbor Acres, Lohmann Meat, and Ross-308 were 4.17%, 4.23%, and 4.73% respectively. Ross-308 exhibited higher average feed consumption (2417.4 gm) than Arbor Acres (2415.64 gm) and Lohmann Meat (2398.9 gm). Lohmann Meat had the highest average live weight (1710.43 gm), followed by Arbor Acres (1699.55 gm) and Ross-308 (1679.32 gm). Notably, Lohmann Meat demonstrated the best FCR (1.40) followed by Arbor Acres (1.42) and Ross-308 (1.44). Mortality rates for Nourish feed, Aman feed, and Nahar feed were 3.63%, 4.73%, and 4.77% respectively, with consistent feed intake and body weight. While feed did not significantly impact performance, broiler strain exhibited a noteworthy relationship with performance. In conclusion, Lohmann Meat strain emerged as the most cost-effective choice based on its performance in this study.

Key words: Productive performance, Broiler strain, Feed, FCR, Mortality

Chapter 1

Introduction

The poultry industry plays a significant role in promoting agricultural development and lowering malnutrition among Bangladeshi citizens. In the shortest amount of time, it offers the most affordable animal protein (nutritious meat and eggs) for human consumption. Meat is a fantastic source of high-quality, easily digestible protein and can significantly improve people's nutritional status. They provide excellent sources of micronutrients as well (Bender, 1992). Livestock contributes 1.85% of Bangladesh's GDP and employs directly 20% and partly 50% of the country's workforce, accounting for 16.52% of the country's agricultural GDP (BBS, 2022-23). 37% of Bangladesh's entire meat production is solely comprised of poultry meat. Of the nation's entire supply of animal protein, poultry accounts for roughly 22-27% (Islam, et al., 2019). Over the last two decades, poultry farming in Bangladesh has become more popular. This is an extremely delicate and risky venture. Bangladesh has a long history of small-scale farming and backyard poultry production, which are the main characteristics of the industry. A significant portion of Bangladesh's GDP comes from the poultry sector, which also generates a lot of employment possibilities. Modern times have seen the establishment of both small- and large-scale poultry industries that offer employment opportunities as well as meat and eggs. Our country's total poultry population is roughly 385.7 million which is around 87% of the overall livestock population (DLS, 2022-23). Today, it is estimated that 10.22 billion Eggs and 1.46 billion tons of poultry meat are produced every year by 1 million entrepreneurs and 8 million people. There are 16 grandparent farms, 206 breeder farms, and around 70000 commercial poultry farms (OHPH, Prof. Md. Ahasanul Hoque, CVASU, Personl Communication).

Broiler can help to alleviate the country's animal protein crisis. In comparison to other meat-producing animals, modern broilers are fast-growing, highly productive, and able to quickly fill protein gaps due to their ability to produce in the shortest time possible. According to WHO-FAO joint survey, meat consumption per head in Bangladesh is 15.23 kg per year while the requirement is 43.8 kg per person. So

there is a deficit of 65.23 % to meet our domestic requirement. It may be noted that poultry contributes 35.25% of total meat supply (Akbar et.al 2013,p.27). However, according to DLS data, the demand for meat in Bangladesh is 120 g/day/head, whereas the availability of meat produced is 137.38 g/day/head. The amount of meat produced in FY 2013–14 was 45.21 MT, and in FY 2022–23 it climbed to 87.10 MT, or nearly twice as much, after a decade (DLS, 2022-23). After all, it is quite evident that poultry has been fulfilling this need for meat for the previous ten years in an exceptional manner.

The poultry sector has had a significant uptick in scientific and technological advancement in recent years. This increase has generated a detailed evaluation of different commercial broiler strains and management approaches, all with the goal of improving production efficiency and aiding well-informed decision-making in farming plans for these particular strains. The consequences of this development are substantial. The consistent drive of breeding companies to create superior broiler strains with heightened production attributes necessitates an ongoing process of evaluating selected broiler lines. Notable broiler breeder strains utilized widely in the Bangladeshi include Arbor Acres, Hub chicks, Ross, Starbro, Hubbard classic, Cobb-500, MPK, Lohman meat, and Hybro G (Latif 1999).

Around 60 to 70 percent of the total expenses in broiler production are attributed to the cost of feed (Banerjee, 1998). Therefore, any increase in broiler and layer bird performance brought on by inevitable dietary changes can have a significant impact on profitability (McNab, 1999).

Broiler feed composition is a crucial factor in ensuring the proper growth, development, and health of broiler chickens. The feed composition directly impacts the nutrition status of the birds. The goal of formulating broiler feed is to provide the necessary nutrients in the right proportions to support optimal growth, meat production, and overall well-being. The amount of feed needed and the nutritional requirements of chickens depend on a number of variables including the birds' weight, age, and the current season (Damerow,2012). Along with the necessary

vitamins, minerals, and water, healthy poultry needs a proper supply of protein and carbo-hydrate.

The primary aim of poultry feeding is to transform feed ingredients into consumable human food. Presently, diverse commercial feed mills are manufacturing various types of broiler feed designed for different age groups of birds. The physical structure of the feed (mash, pellet, and crumble) significantly impacts the meat production outcome in broilers, yet their nutritional composition varies significantly. The precise nutritional content of the feed can be accurately determined through direct laboratory analysis of the ready-feed product.

The proliferation of feed mills is rapidly expanding nationwide in tandem with the growth of the poultry industry, aiming to satisfy the ongoing feed requirements of farmers. While the precise count of operational feed mills remains uncertain, a report indicates the presence of approximately 40 feed mills partnered with 900 dealers within the private sector. These entities are engaged in the production and distribution of poultry feeds across the entire country (Latif, 1999). Hence, the current study was carried out to assess the productive performance and economic viability of three distinct broiler strains namely Arbor Acres, Lohmann Meat, and Ross-308, each being provided with feeds from three different companies.

Specific Objectives:

1. Evaluate the productive performance of broilers through intensive farm management practices.
2. Compare how different commercial feeds affect the performance of different broiler strains in terms of production.

Chapter 2

Materials and Methods

The study was based solely on survey research and no laboratory analysis was done. The survey was conducted at the three upazila namely Chakaria, Pekua and Eidgah located at Cox's Bazar district in Bangladesh. These Upazila were selected based on my internship location. Prior to site selection, good relationships were established with various relevant agencies and other stakeholders in the target area.

2.1. Data collection:

In order to evaluate the production efficiency and commercial viability of three broiler strains data were gathered from fifteen(1000 DOC/farm) rural poultry farms. The broiler strains chosen for this investigation were Arbor Acres, Indian River (Lohmann Meat), Ross-308, and they were obtained from Nourish Poultry and Hatchery Ltd., Aman Poultry and Hatchery Ltd., and Nahar Agro respectively. Each strain was supplied with feed from three well-known feed companies. The names of the feed companies were Nourish poultry feeds, Aman poultry feeds, and Nahar poultry feeds. The birds were raised in an open-sided farm house under the same conditions from day one to 30 days. Farmers received a brief explanation of the study's objectives prior to their interview. Since the validity of the data needed for the survey depends on its accuracy, the collection of correct and trustworthy data was done with caution. A structured questionnaire was developed containing the basic question with a view to extract information regarding the objective of the study such as strain of the bird, type of rearing, type of feed, name of feed company, amount of feed intake, live weight etc.

Live weight gain, FCR and Mortality % were calculated by the following ways:

LWG= Achieved body weight of the birds (g) - Initial body weight (g) of the birds

FCR= Feed intake (gm) / Body weight gain (gm)

Mortality % = (No. of birds died / No. of birds starting) ×100

2.2. Management procedure:

During the rearing periods the broiler were exposed to continuous light and provided 1350 cm² floor space per bird. The temperature and humidity were kept at a reasonable level. Each farm had enough feeders and drinkers for the birds to eat and drink properly. Litter of saw dust to a depth of 1.5 cm was spread on the floor of each farm to maintain a comfortable environment for the birds. The feeders were cleaned every day before giving food to the birds, and the drinkers were washed once a week to keep them clean and healthy for the birds. Day old chicks were brooded up to 12 days providing adequate light and temperature. Feeds were provided according to age of birds. Birds had free access to water and feed which were provided ad libitum throughout the trial period. All the birds received the necessary vaccines against Newcastle disease, Infectious Bursal diseases and Infectious Bronchitis disease and medication for disease protection.

The nutrient compositions of the experimental feeds are shown in table 1, 2 and 3.

Table 1: Nutritional makeup of Nourish feed

Nutrients	Pre-Starter (1-11 days)	Starter (12- 21 days)	Grower (22-28 days)	Finisher (29 day - selling day)
ME (Min.) kcal/kg	2950	3000	3050	3100
CP% (Min.)	21	20	19	18
Ca% (Min.)	1	0.95	0.95	0.9
P% (Min.)	0.45	0.45	0.45	0.42
CF% (Max.)	5	5	5	5
Humidity% (Max.)	12	12	12	12
Lysine% (Min.)	1.15	1.05	1.05	1
Methionine% (Min.)	0.48	0.45	0.45	0.42

Source: www.nourish-poultry.com

Table 2: Nutritional makeup of Nahar feed

Nutrients	Starter (1-12 days)	Grower (13-23days)	Finisher (24 day - selling day)
ME (Min.) kcal/kg	3000	3050	3100
CP% (Min.)	22	21	20
Ca% (Min.)	0.9	0.9	0.9
P% (Min.)	0.45	0.45	0.42
CF% (Max.)	4	4	4
Humidity% (Max.)	12	12	12
Lysine% (Min.)	1.32	1.05	1
Methionine% (Min.)	0.5	0.45	o.42

Source: www.naharagro.com/ www.facebook.com/naharagro

Table 3: Nutritional makeup of Aman feed

Nutrients	Starter (1-10days)	Grower (11-24 days)	Finisher (25 day - selling day)
ME (Min.) kcal/kg	3000	3050	3100
CP% (Min.)	22	21	20
Ca% (Min.)	0.9	0.9	0.9
P% (Min.)	0.45	0.45	0.42
CF% (Max.)	4	4	4
Humidity% (Max.)	12	12	12
Lysine% (Min.)	1.32	1.05	1
Methionine% (Min.)	0.5	0.45	o.42

Source: www.amanfeed.com

Chapter 3

Result

The study involved a comparative analysis of the performance of Arbor Acres, Lohmann Meat, and Ross-308 broiler strains. These strains were evaluated while being fed different formulated feeds provided by three reputable feed companies in Bangladesh namely Nahar Poultry Feeds, Nourish Poultry Feeds, and Aman Poultry Feeds. Each rearing period lasted for 30 days on each farm.

To determine the relative performance and economic suitability of the broiler strains in Cox's Bazar district, data were collected from a total of fifteen distinct poultry farms situated within the district. The summarized data can be found in Tables 4, 5, 6, 7, and 8, respectively.

Table 4: Production performance of Arbor Acres broiler strain

Variable	Farm 1 (Nourish Feed)	Farm 2 (Aman Feed)	Farm 3 (Nahar Feed)
Mortality%	3.2	4.5	4.8
Rearing period (day)	30	30	30
Total feed intake per bird (gm)	2396.36	2419.56	2431
Avg. daily feed intake per bird (gm)	79.93	80.6	81.03
Live weight gain per bird (gm)	1724	1692	1682.64
Feed Conversion Ratio	1.39	1.43	1.44

Table 5: Production performance of Indian River (Lohmann Meat) broiler strain

Variable	Farm 1 (Nourish Feed)	Farm 2 (Aman Feed)	Farm 3 (Nahar Feed)
Mortality%	3.6	4.1	5
Rearing period (days)	30	30	30
Total feed intake per bird (gm)	2397.34	2382.05	2417.3
Avg. daily feed intake per bird (gm)	80.3	79.75	80.58
Live weight gain per bird (gm)	1737.2	1689.4	1704.7
Feed Conversion Ratio	1.38	1.41	1.42

Table 6: Production performance of Ross-308 broiler strain

Variable	Farm 1 (Nourish Feed)	Farm 2 (Aman Feed)	Farm 3 (Nahar Feed)
Mortality%	4.1	5.6	4.5
Rearing period (day)	30	30	30
Total feed intake per bird (gm)	2431.43	2413	2407.87
Avg. daily feed intake per bird (gm)	81.04	80.43	80.26
Live weight gain per bird (gm)	1724.35	1641.49	1672.13
Feed Conversion Ratio	1.41	1.47	1.44

Table 7: Average feed conversion ratio of different strain

Strain	Mortality%	Avg. feed intake per bird (gm)	Avg. body weight per bird (gm)	FCR
Arbor Acres	4.16 ± 0.85	2415.64 ± 17.64	1699.54 ± 21.68	1.42 ± 0.02
Indian River (Lohmann Meat)	4.23 ± 0.7	2398.89 ± 17.67	1710.43 ± 24.41	1.4 ± 0.02
Ross-308	4.73 ± 0.77	2417.43 ± 12.38	1679.32 ± 41.89	1.44 ± 0.03

Table 8: Average feed conversion ratio of different feed company

Feed	Mortality%	Avg. feed intake per bird (gm)	Avg. body weight per bird (gm)	FCR
Nourish Feed	3.63 ± 0.45	2408.37 ± 19.97	1728.51 ± 7.52	1.393 ± 0.01
Aman Feed	4.73 ± 0.77	2404.87 ± 20.03	1674.29 ± 28.44	1.436 ± 0.03
Nahar Feed	4.76 ± 0.25	2418.43 ± 12.04	1686.49 ± 16.62	1.433 ± 0.01

Chapter 4

Discussion

- Mortality%:** Throughout the study (from day-old chicks to 30 days), mortality rates remained consistent across different broiler strains and feed companies. The factors tested didn't cause significant mortality differences. Among strains, Arbor Acres had the lowest mortality (4.16%), followed by Lohmann Meat (4.23%) and Ross-308 (4.73%). Mortality for Nourish, Aman, Nahar feeds were 3.63%, 4.73%, and 4.77% respectively. No substantial variations were seen in these groups over the entire rearing period.

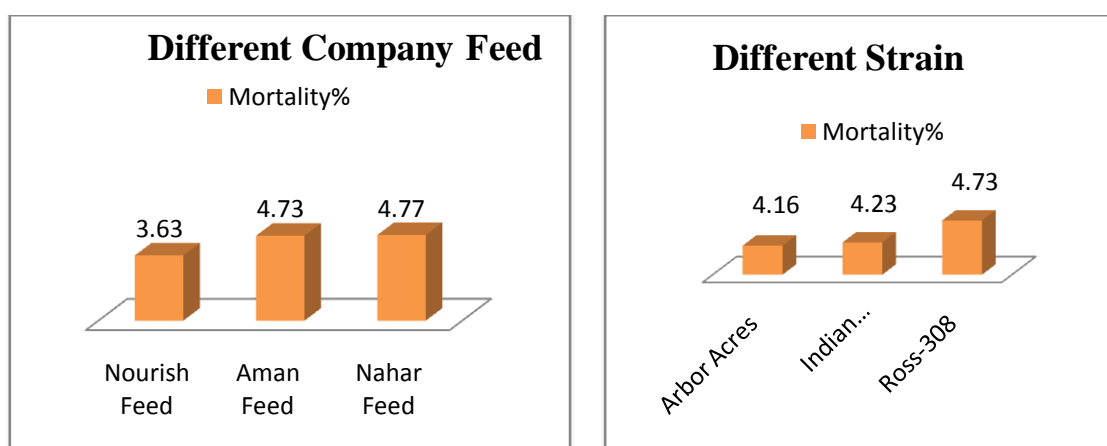


Fig 1: Mortality (%) of different Strain and Company Feed

Different broiler strains didn't adversely affect bird survival. Strain impact on bird livability was minor. This agrees with (Sarker, et al., 2001). and (Rokonuzzaman, et al., 2015), who found similar results. Hossain et al. (2011) also noted insignificant mortality differences among strains.

- Feed intake:**

Feed consumption per bird was similar among Ross-308 (2417.43 gm), Arbor Acres (2415.64 gm), and Indian River (2398.89 gm) strains (Table 7). Feed intake also remained consistent across three feed types (Table 8). Strain weight and nutritional requirements influenced feed consumption. Multiple factors like

breed, feed quality, age, gender, climate, and environment impacted higher intake.

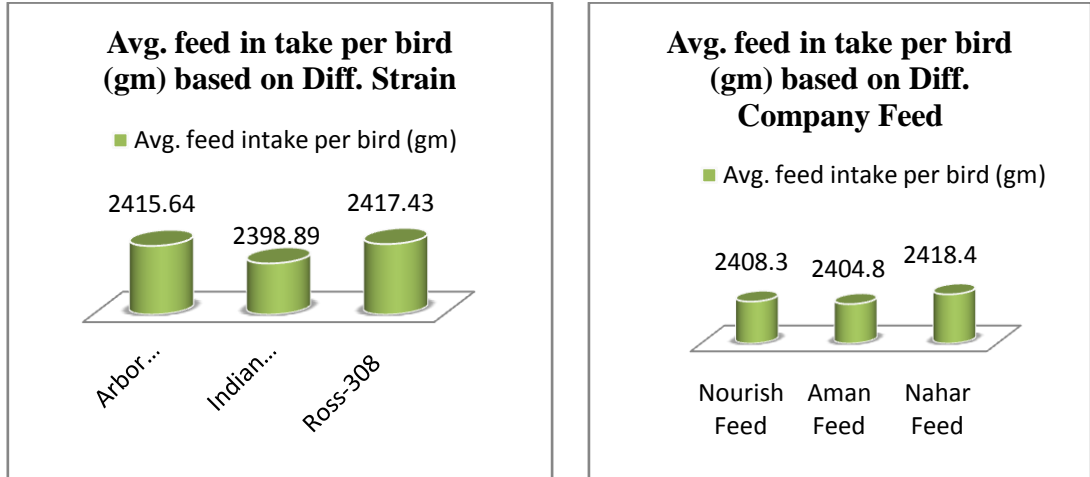


Fig 2: Average Feed intake/bird (gm)

Smith et al. (1998) highlighted strain and sex influence on feed intake and conversion. Adverse environmental conditions might reduce performance and feed intake. Baghel and Pradhan (1989) and Islam (2000) reported poor performance in hot, dry climates compared to colder ones.

3. *Live weight:*

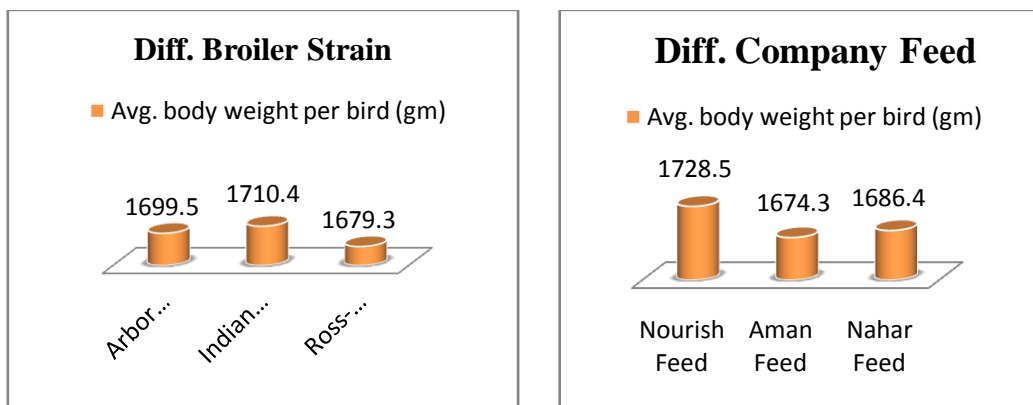


Fig 3: Average Body Weight/Bird (gm)

The study found significant differences in live weight and weight gain among broilers fed by three companies in Bangladesh. Nourish feed led to higher weight (1728.51 gm) at day 30. Lohmann Meat strain had slightly higher weight (1710.43 gm) than Arbor Acres (1699.54 gm) and Ross-308 (1679.32 gm) strains. Factors like genetics and feed quality influenced weight gain. Past research (Gonzales et al., 1998; Sarker et al., 2001-2002; Abdullah et al., 2010; Hossain et al., 2011) supported similar findings. Genetics might influence Lohmann Meat's growth potential, influenced by other factors.

4. Feed conversion ratio (FCR):

Arbor Acres had best FCR (1.42), while Lohmann Meat (1.40) and Ross-308 (1.44) were less efficient at 30 days (Table 7). FCR was consistent for feed companies except Nourish (Table 8).

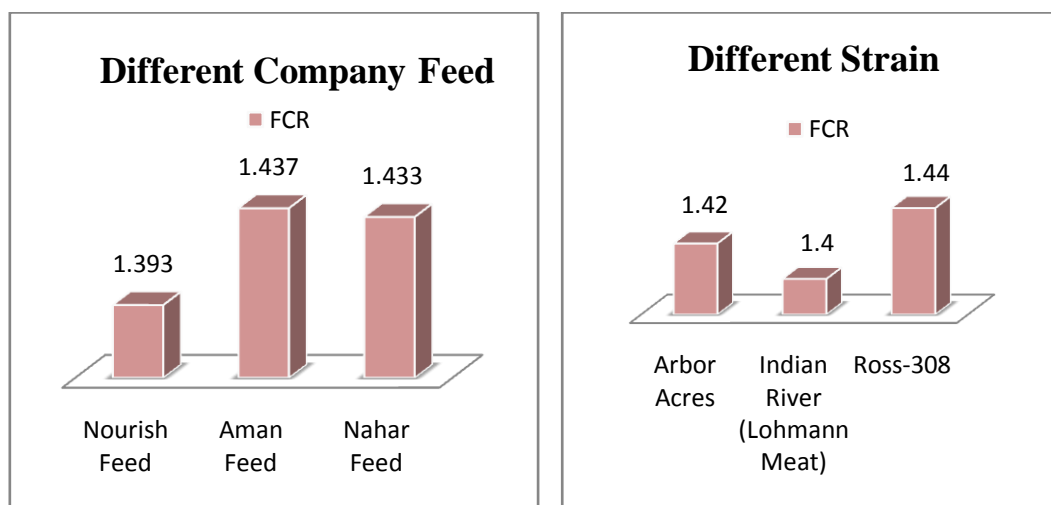


Fig 4: Feed Conversion Ratio (FCR)

Feed conversion is complex, influenced by many traits. Mortality and disease affect FCR. High mortality, especially late, increases FCR due to feed consumed by dead birds. Arbor Acres bulletin (2011) links extreme temperatures to FCR changes. Cold increases intake, raising FCR; heat reduces intake, increasing FCR. Hatching conditions impact gut development and nutrient absorption. Chick transportation affects early development, FCR. Long-term research shows heat hurts growth and intake (Wilson 1948; Suk and Washburn, 1995).

Limitations

The study's limitations include its localized scope within Cox's Bazar, small sample size of 15 farms, lack of environmental consideration, potential genetic variations, and external factors like disease outbreaks. Additionally, feed quality, statistical analysis, data reliability and economic viability were not fully explored. Addressing these limitations would enhance the study's credibility and applicability.

Conclusion

This study highlights a modest impact of feed on broiler production performance. Local farms show increased mortality due to insufficient management and bio-security measures. The findings enhance our understanding of how broiler strain and commercial feed influence production in the Cox's Bazar area. Lohmann Meat strain is recommended as economic and more suitable for rearing under the farming management in Cox's Bazar district. Further research, including cost analysis, is needed to identify viable broiler strains in Bangladesh.

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The Author

BIOGRAPHY

I am **Shiful Islam**, born to Md. Osman Goni and Hasina Begum. My educational journey began at Chakaria Grammar School, Cox's Bazar, with my Secondary School Certificate (SSC) achieved in 2015. I obtained my Higher Secondary Certificate (HSC) from Govt. Haji Mohammad Mohsin College, Chittagong, in 2017.

Presently, i'm an intern veterinarian under the faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University. I am fueled by a passion for veterinary excellence and a drive to contribute to public health research.

My journey reflects determination, academic achievements, and a commitment to advancing veterinary science for societal well-being.