

# **Study on Biosecurity and Production Potentiality of Different Poultry farms at Lohagara Upazila, Chattogram**



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**Study on Biosecurity and Production Potentiality of Different  
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### List of Acronyms Symbols Used

<b>Abbreviation</b>	<b>Elaboration</b>
%	Percentage
No.	Number
e.g.	Example
etc.	Et cetera
et. al	And his associate
Fig.	Figure
NGO	Non-government organization
SSC	Secondary School Certificate
HSC	Higher Secondary School Certificate
CVASU	Chattogram Veterinary and Animal Sciences University

# **Study on Biosecurity and Production Potentiality of different Layer Farms at Lohagara Upazilla, Chattogram**

## **ABSTRACT**

Study on Biosecurity practices in commercial layer farms was conducted at Lohagara upazila of Chattogram district of Bangladesh. Data were collected from 20 layer farms of various size with a pre-formed questionnaire. After that, data were analyzed with Excel software. The farm size varied from 1,000 to 20,000 birds. Majority of the farms contained between 1000 and 3000 birds. A wide range of educational background of farmer from primary to higher secondary or above had found. Most of the farmers were SSC passed. About 60% of the farmers was not trained on layer farming. Most of the farmers had experience of five years of farming. About 60% of the farmers never heard about biosecurity before. From the study we have known that most of the farmers were unaware of conceptual biosecurity. Only 5% of the farm maintained distance from the locality. Even they did not maintain any buffer zone for the free range chickens. As a result, free range chicken move around the farm freely. Operational biosecurity also was poor as many farmer do not clean the floor, feeder, drinker daily. About 95% of the farm had no facility of protective clothes and shoes for their farm and about 60% of the farm had no foot bath facility. There was easy excess for rodents and birds. As a consequence, outbreak of infectious diseases were common there. So it can be said that for reducing disease occurrences as well as for the reduction of bird's mortality, biosecurity measures are important. Biosecurity also affects the egg production and the eggs are the perfect protein source for human being. So we should give importance to this issue for the prevention of diseases, protecting public health and upgrade of poultry sectors.

**Keywords:** Biosecurity, Layer farms, Lohagara, production potentiality

## CHAPTER 1: INTRODUCTION

Layer poultry farming indicates raising egg laying poultry birds for the purpose of egg production commercially with a definite management system. Proper care and farm management is the principle condition for egg production from a layer poultry farming. Hisex, Isa, Arbor acres, Shaver, Lohman, Babcock, B.V. 300 etc. the some of exotic layer chicken strains used commonly by commercial layer farmers (Saleque and Rozen, 2007). Recently, the poultry industry is becoming one of the most leading industry in Bangladesh. This rapidly growing farming system was started during the mid sixties in this country (Ali and Hossain, 2012). In Bangladesh, poultry industry is an essential avenue for not only promoting agricultural growth but also reducing malnutrition (Da Silva and Rankin, 2014). About 44 percent of human daily protein intake comes from livestock products. Moreover, it is important in the rural socio-economic system because many of the households are directly involved in livestock (Hamid et al., 2016).

Previously poultry farming was not regarded as a significant profession. Rural people of Bangladesh have kept the chicken primarily for only domestic consumption. As local breed has low productivity and high mortality, they were not reared commercially (Haque et al., 1999). In recent years, most flourishing and promising commercial sector is poultry sector as it is the most profitable businesses and is contributing significantly in the livestock. Layer farming is now a great potential for creating employment opportunities for both male and female members of rural and urban families. It has also helped in poverty reduction. In Bangladesh, most people, irrespective to caste and religion, shows high demand to chickens and eggs. For high demand, prices of these products also rising. High profitability and easy management system has attracted unemployed educated youth to initiate small-scale commercial layer poultry farming.

There is an estimation of 150,000 poultry farms in Bangladesh. About 570 million tons of chicken meat and 7.32 billion eggs are produced by these poultry farms. Total number of poultry found in the country, 1,18,18,825 were found in rural area and rest of 80,74,076 in the urban areas (Agriculture Census, 2019). The Food and Agriculture Organization recommended that per capita consumption of meat and egg are below the standard level. There are many smallholders, rearing around 2,000 layers, also have some bigger farm rearing more than around 10,000 layers. Generally, some hatcheries and breeder farm support the farmer to do farming.



Many infectious diseases including respiratory infections are very common in poultry industry. That is the main constraint to the upward growth of the poultry industry. Productivity is decreasing day by day for this reason. Avian Influenza, Infectious Bursal Disease, Newcastle Disease, Salmonellosis, Mycoplasmosis, Colibacillosis, Fowl Cholera are the recent emerging diseases that affecting the poultry industry (Islam et al., 1998, Talha et al., 2001, Giasuddin et al., 2002, Rashid et al., 2013). For controlling and prevention of these infectious diseases biosecurity is important. Many training has been organized at Upazila Veterinary Office and Veterinary Hospital for the development of the knowledge of biosecurity. But minority of the farm owner maintain it.

There are lots of people at Lohagara upazila of Chattogram district are involved in layer poultry farming, but no other research work came into attention to the author regarding biosecurity and production potentiality of layer farming system.

This study was undertaken with the following objectives:

- To give detailed information about layer farmer's socio-economic status at Lohagara upazila, Chattogram.
- To provide valuable information about biosecurity of layer farming system at Lohagara upazila, Chattogram.
- To compare the biosecurity compliance with egg production potentiality, mortality of bird and disease occurrence.

## CHAPTER 2: MATERIAL AND METHOD

### *2.1 Study area and population:*

The data were collected from 20 farms in Lohagara upazila under the Chattogram district. The covered area are Chunati, Adhunagar, West Kolauzan, Hajir Para, Amirabad, Charamba, Uzirvita, Darbeshhat, Shikdarpara, Majhirpara, Padua, Loskorpara etc. A pre-structured questionnaire was used to complete the survey. The questionnaire was based on farm level epidemiological data through face to face interview and by observation.

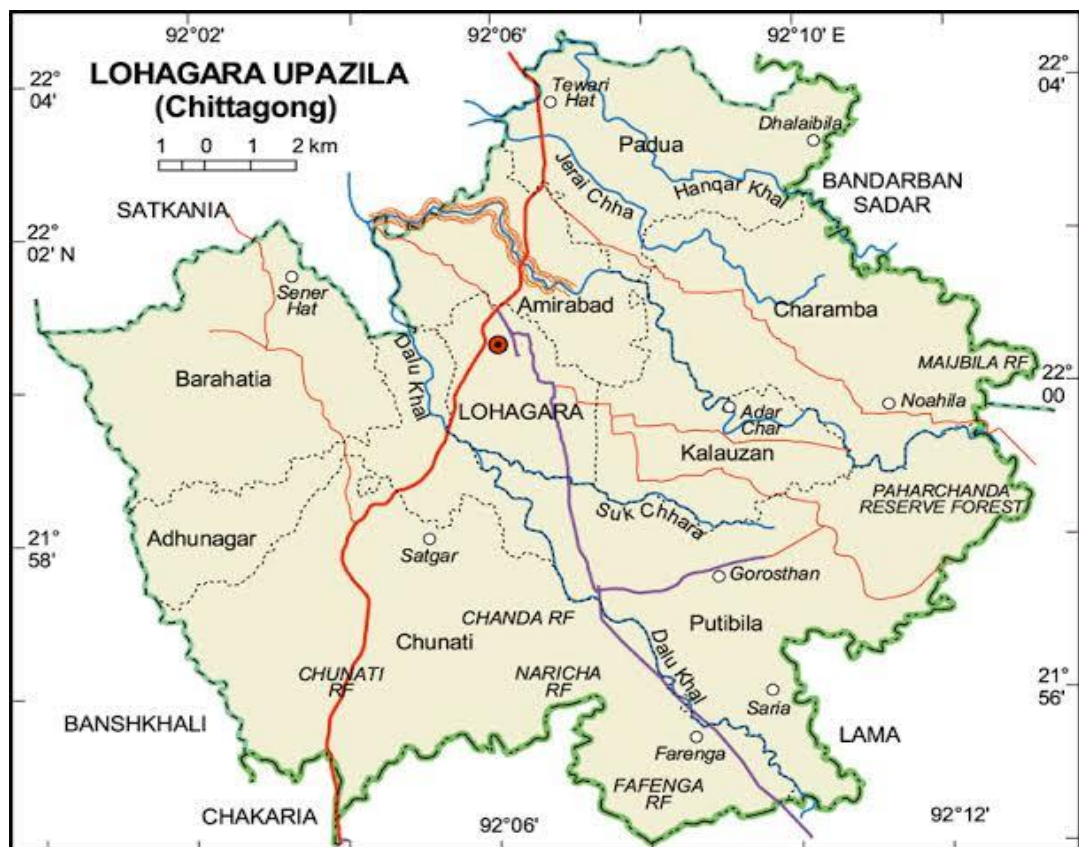


Fig.1: Geographical Location of Data collection site.

### *2.2 Duration of the study:*

The study was carried out for period of 1.5 months from 16<sup>th</sup> April 2023 to 1<sup>st</sup> June 2023.

### *2.3 Data collection process and tools:*

Two types of data were collected.

1. Qualitative and
2. Quantitative.

Data was collected based on some open and closed questions.

Following parameter were collected during the study period. Such as-

- Socio-economic status of the farmers of layer poultry farms.
- Management system of the farm
- Egg Production
- Occurred diseases in the farm
- Mortality
- About foot bath and public entrance
- Waste management
- Problems of layer poultry farming
- Prospects of layer poultry farming.



Photo 1: Data Collection from layer farm

#### ***2.4 Data analysis:***

Microsoft Excel 2019 was used for collected data sorting and import. Here mainly descriptive analysis was adopted to demonstrate the outcome of the study.

## CHAPTER: 3 RESULT AND DISCUSSION

### *3.1 Distribution of farm size:*

In this study, the layer farm size varied from 1,000 to 20,000 birds. There was 30% of farm with 1000 layer birds, about 20% of farm with 2000 layer birds, about 5% of the farm with 3000 layer birds, about 10% of farm with 4000 birds, other 10% and 25% of farm with subsequently 5000 and 6000 layer birds (Fig.2). So we can say, majority of the farm are between 1000 to 2000. Among them, some farm owner have started farming recently with small number of birds, again they have scarcity of land area also. As they new, they are not trained enough to maintain all the biosecurity measures. But they are keen to adopt these measures.

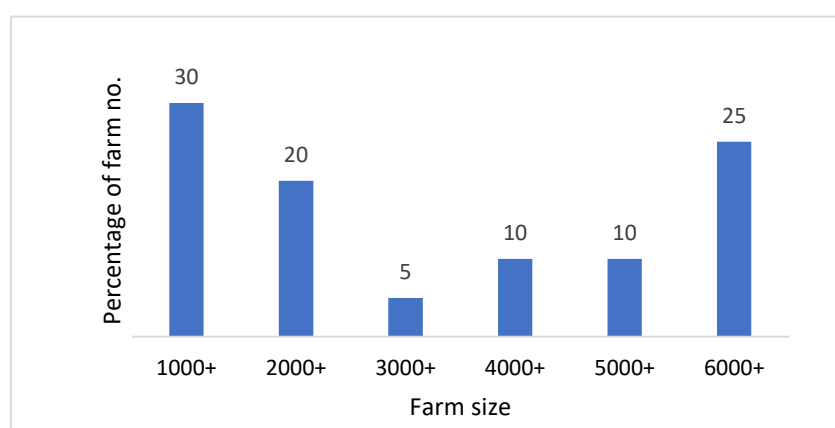


Fig.2: Distribution of farm size in Lohagara upazila

Same farm sizes are reported by Rahman et al. (2017), in Bhaluka and Sakhipur upazila, Bangladesh. It is due to layer farming is increasing day by day and most of the new farmers start with small scale farming with 1000 to 2000 or 3000 birds and they do not maintain biosecurity. Calduch et al. (2013), reported that small scale layer farmers are rarely maintain biosecurity.

### *3.2 Education of the farmers:*

In the study, only 15% of the farm owner was illiterate and 85% was literate. Among 85% literate farm owner, 15% was under SSC, 35% was SSC passed, and 15% of farm owner was HSC passed, and rest 10% are above HSC (Fig.3). Those who are educated, they are much careful about maintaining biosecurity measures.

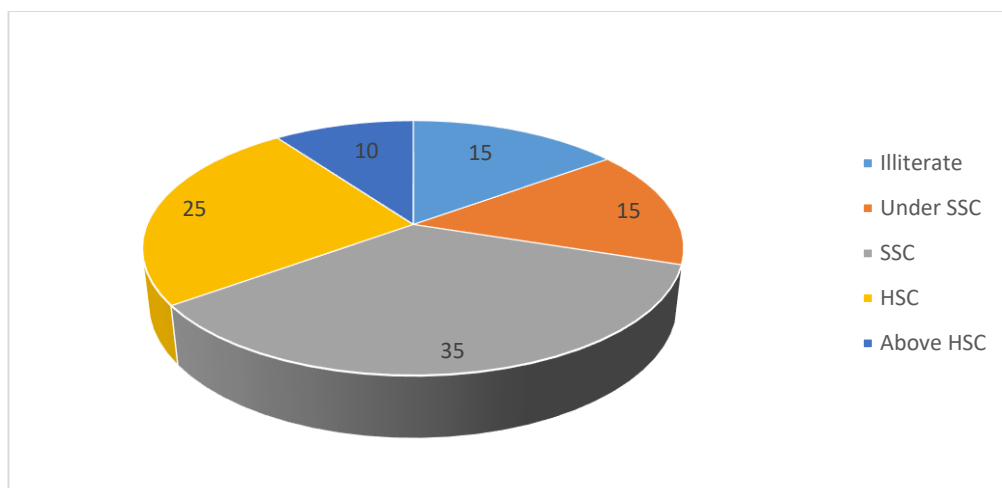


Fig.3: Education of the farm owners

According to Mukta et al. (2021), 40% to 50% of layer farm owner had secondary level of education which is more or less same with this study area. Educated people are showing much interest in layer farming.

### 3.3 Training received by farm owner:

A large of farm owner about 60% did not take any training from any kind of organization (Fig.4). So, they are not know about importance of biosecurity measures. Among 40% trained farm owner, majority have received training from NGO and remaining from DLS and rest 5% from other organization (Fig.4).

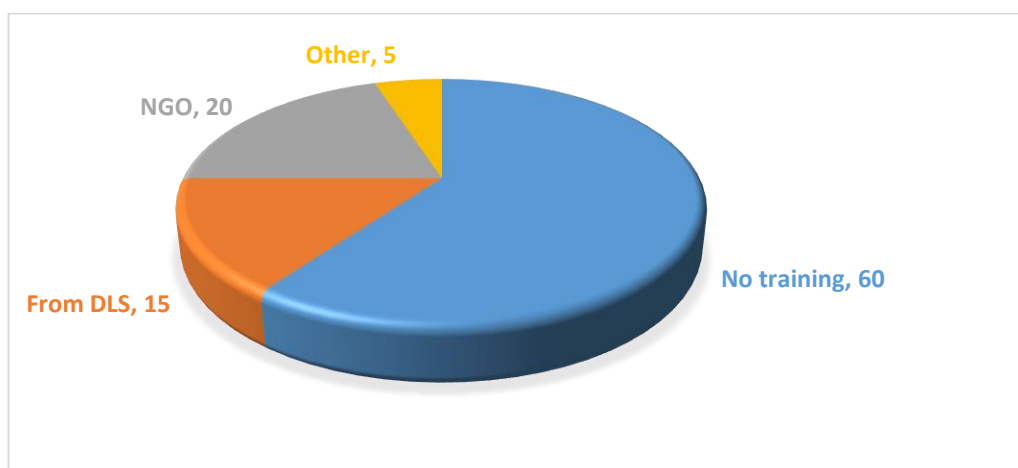


Fig.4: Training received by farm owner

Keutchatang et al. (2021), reported that training level is one of the major reason for not adopting biosecurity measures. In this study area we also found same scenario that trained farm owners were adopting different biosecurity measures like maintaining foot bath at entry of shed and farm entrance. If we can bring all the farm owners under training, biosecurity of layer farming will improve soon.

### **3.4 Duration of farming:**

Half the farm owner had experience of farming of five years. Among rest, 20% of farm owner have been starting farm management for last 3 years and 15% of farm owner for last 7 years (Fig.5). Experienced farm owners said that by maintaining biosecurity properly they have noticed that disease occurrence is decreasing and productivity is also increasing. Less experienced farm owners do not adopt biosecurity measures.

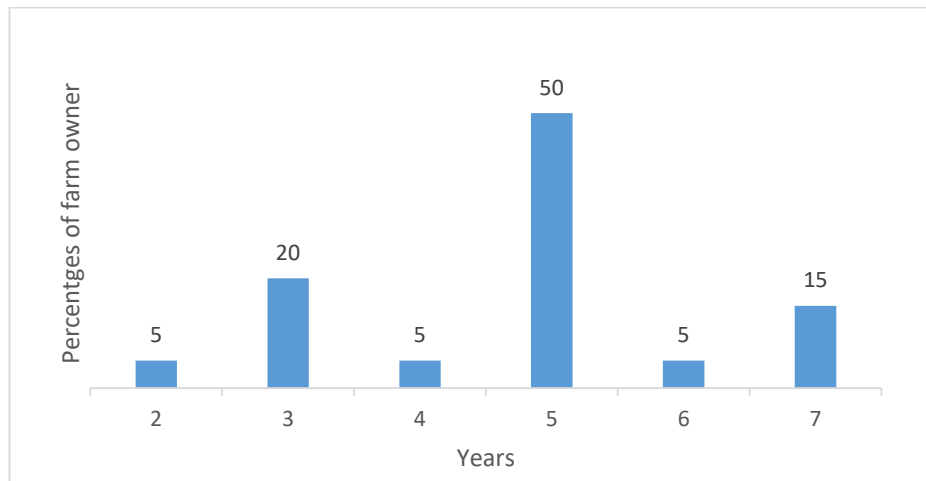


Fig.5: Length of farming experience of the farmers

According to Ngandeu and Ngatchou (2006), experienced farmers are more interested in maintaining biosecurity measures. So experience of farming affects indirectly in adopting biosecurity measures.

### **3.5 Farmers' familiarity with the term "biosecurity":**

About 69% of the farm owner never heard the term biosecurity. So they do not adopt any biosecurity measures by knowing. But the rest 31% know the term, among them, 13% have known from the company people, 9% from DLS, 5% from NGO, 2% from media (Fig.6).

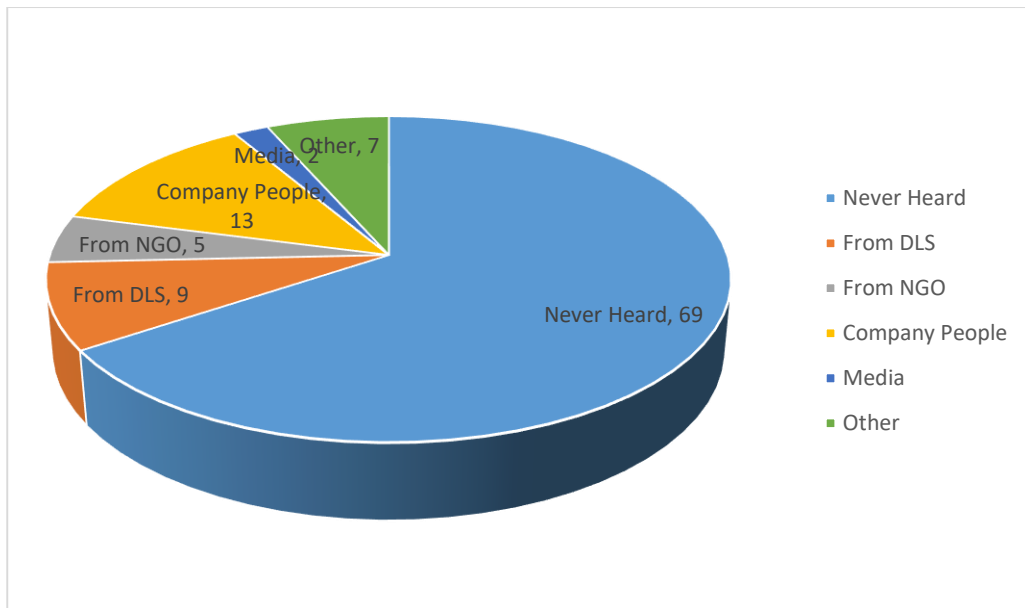


Fig.6: Farmers' familiarity with the term "biosecurity"

Rahman et al. (2017), reported that most of the farmer of Bhaluka and Sakhipur upazila, never heard the word biosecurity which is align with this study of Lohagara upazila. It is important to promoting biosecurity to the farmers.

**3.6 Farmers' perception about biosecurity:**

About 20% of farm owners thinks, biosecurity is the measure of disease prevention, about 16% adopt only operational biosecurity like foot bath, disinfection, waste management etc. but do not maintain other two type such as conceptual and structural biosecurity. Again about 56% of farm owner have no idea about the farm's biosecurity (Fig.7).

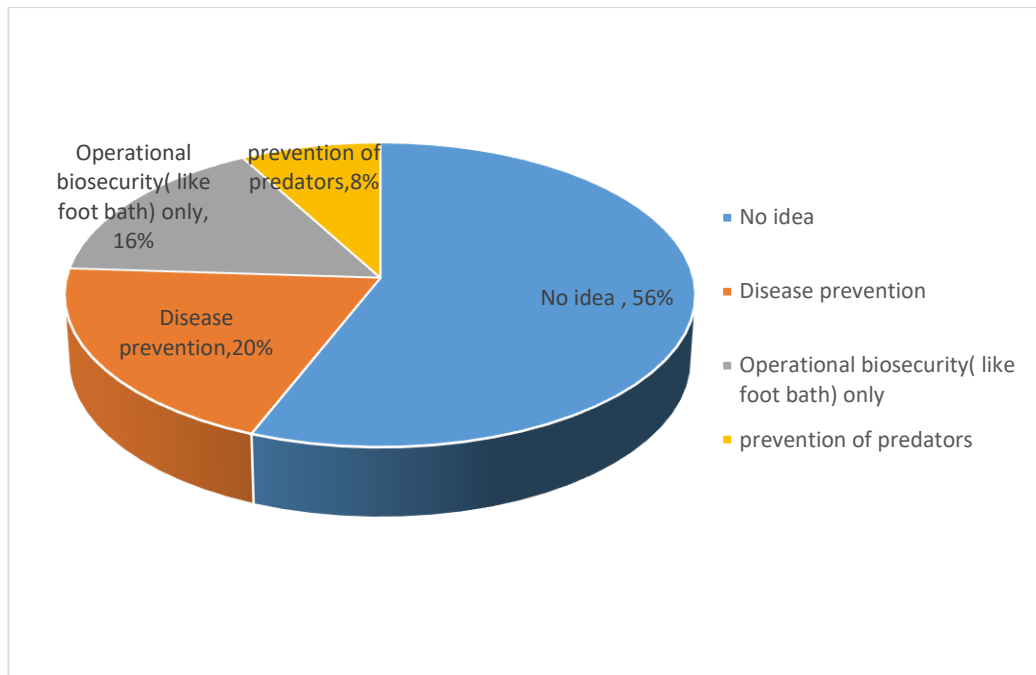


Fig.7: Farmers' perception about biosecurity

According to Rahman et al. (2017), farm owner thinks biosecurity is the preventive measure for the disease occurrence which is align with this study.

### 3.7 Biosecurity measures:

Level of biosecurity measures among the 20 layer farms is showed in Table 1. In this study, in most farms conceptual biosecurity is not satisfactory. Because, 95% of the farms were within 200 meter of locality and in 90% farms, there was free range local chicken in vicinity. These free roaming chicken carry causal agent of diseases.

In case of structural biosecurity, 40% of the farm did not give any fence surround the farm. 90% of the farm shed were not rodent proof shed. 80% of the farm shed were not wild bird proof shed. Distance between sheds were not maintained also.

In case of operational biosecurity, 60% of the farm were not restricted for visitors. In 95% of the farm, they had no protective clothing and shoes. In 60% of the farm, they had no foot bath.



**Table 1: Practices of Biosecurity in Layer Farm of Lohagara Upazila, Chattogram**

<b>SI No.</b>	<b>Biosecurity measures</b>	<b>% of farm compiled</b>	<b>% of farm not compiled</b>
<b>1.</b>	<b>Conceptual biosecurity:</b>		
1.1	Farms are away from locality (at least 200 m)	5	95
1.2	No free range chicken in the vicinity	10	90
<b>2.</b>	<b>Structural biosecurity:</b>		
2.1	Fencing around the farm	40	60
2.2	East-West direction of the shed	95	5
2.3	Rodent-proof sheds	10	90
2.4	Wild bird proof sheds	20	80
2.5	Separate room for storing	40	60
2.6	Distance between sheds	10	90
<b>3.</b>	<b>Operational Biosecurity:</b>		
3.1	No entrance of visitor	40	60
3.2	Use of protective clothing	5	95
3.3	Foot bath at farm gate	40	60
3.4	Foot bath at shed entry	40	60
3.5	Use of protective shoes	5	95
3.6	Disinfectant spray	80	20
3.7	Shed floor is cleaned daily	80	20
3.8	Disposal system is maintained	70	30
3.9	Feeder and drinker are cleaned daily	90	10



Photo 2: Unhygienic Surrounding of a layer farm

### ***3.8 Biosecurity and Production Potentiality:***

There are some relation between adopting biosecurity and egg production, mortality and disease occurrences in layer farms.

In the study, among the 20 layer farms, some farms had free range chicken in vicinity. Because they did not maintain the buffer zone for the layer farm. Again some farm maintain buffer zone so that free range chicken could not roam in vicinity. In comparison between two scenarios in a bar chart shows percentage of disease occurrence and mortality of birds are more and percentage egg production is less in the farm with free range chicken than the farms with no free range chicken in vicinity (Fig.8). The proximity of poultry shed near to people, roadsides, water bodies are at risk for the H5N1 outbreaks (Ahmed et al., 2012, Gilbert and Pfeiffer, 2012, Osmani et al., 2014). According to Dr. Margaret Mackenzie of Inghams Enterprises, Free range chickens are associated with the outbreak of avian influenza, Newcastle disease and any other number of diseases. Consequently, these diseases cause death of birds and decrease egg production.

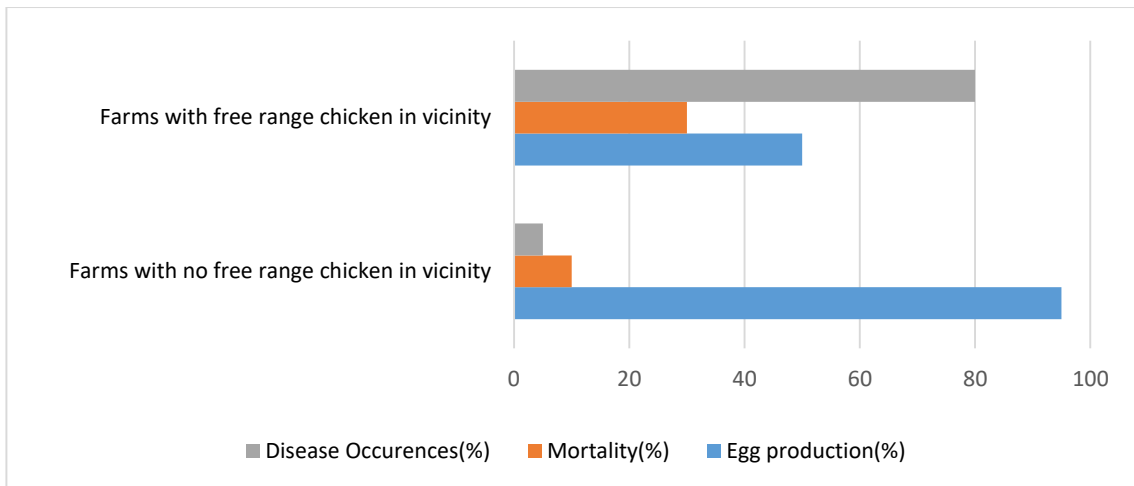


Fig.8: Effects of conceptual biosecurity on egg production, disease occurrence, mortality of layer chicken

In the study, among 20 layer farms, some farm maintain operational biosecurity such as, they have foot bath in the entry of the farms and sheds, they restrict visitors, they have protective clothes and shoes. On the contrary, rest farm do not maintain such measures. In comparison between two scenario in a bar chart shows percentage of disease occurrence and mortality are less, and percentage of egg production is more in the farms that maintaining operational biosecurity than the farms that do not maintain (Fig.9).

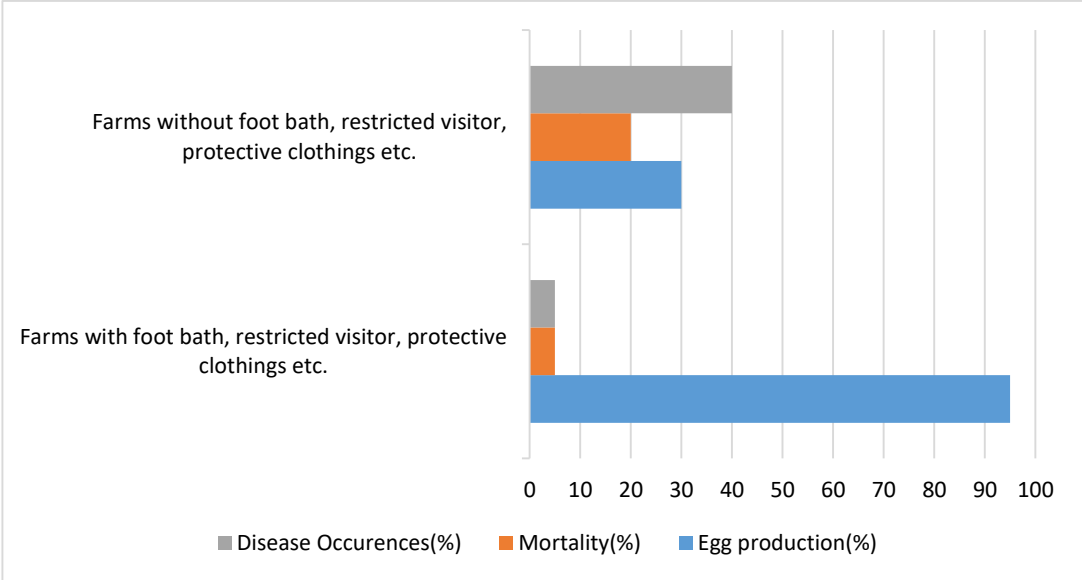


Fig.9: Effects of operational biosecurity on egg production, disease occurrence, mortality of layer chicken

In the study, among 20 layer farms, some farm maintain structural biosecurity such as, they have fencing, East-West direction of shed, rodent proof shed, wild bird proof shed etc. On the contrary, rest farm do not have those. In comparison between two scenario in a bar chart shows percentage of disease occurrence and mortality are less, and percentage of egg production is more in the farms that maintaining structural biosecurity than the farms that do not maintain (Fig.10).

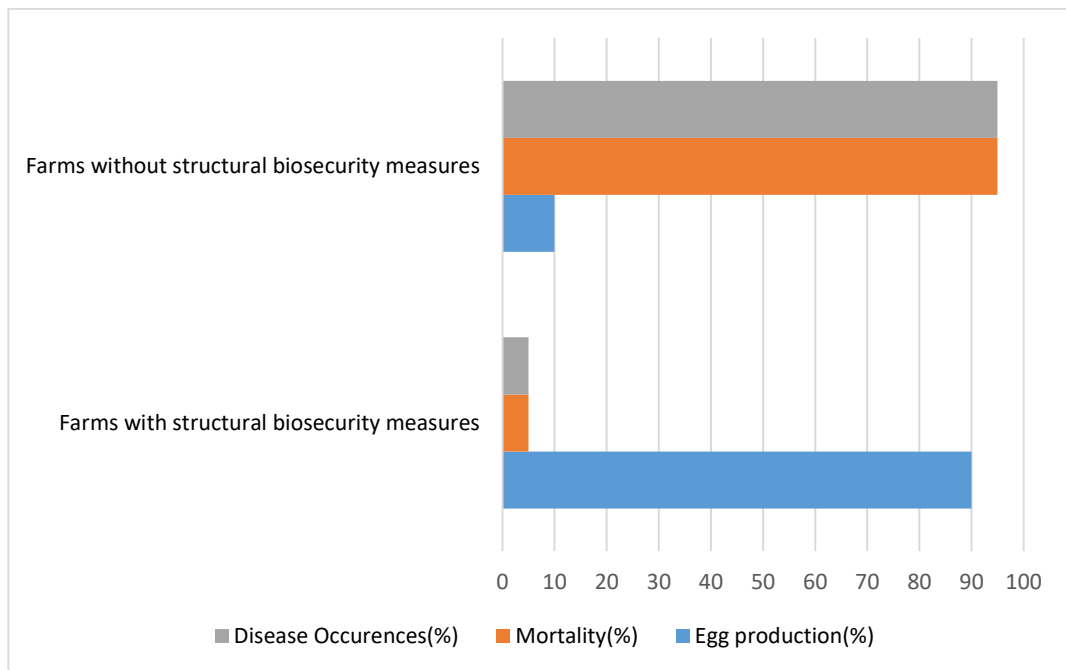


Fig.10: Effects of structural biosecurity on egg production, disease occurrence, mortality of layer chicken

Disease outbreak brought on by inadequate biosecurity protection could result in fatalities and significant economic losses (Conan et al., 2016). So it can be said that, inadequate biosecurity measures can cause different infectious diseases which further cause mortality of bird and also decrease egg production.

## **LIMITATIONS**

In this study, there were some limitations as the study of duration was limited and that study was restricted to a particular area. Some owner was not able to give information exactly. Flock size of the layer farms of this study were not uniform. Age of production of the birds of those layer farm were not same. So result of this study may not reflect the exact scenario of effects of biosecurity.

## **CONCLUSION**

This study provides a clear image of the level of biosecurity compliance among the layer farms of the country. Besides this we can also know the knowledge and attitude of farmers about biosecurity. The biosecurity of the layer farms is not satisfactory. Government, NGOs, and other sector should work collaboratively to improve biosecurity in this poultry farming system to upgrade this sector.

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## APPENDIX

<b>Questionnaire</b>		
<b>Socio-economic status of farmer:</b>		
Name:	Gender:	Income level:
Age:	Education level:	Duration of farming:
Experiences:                      Training: Y/N ; if yes, DLS/NGO/other		
<b>Farm based data:</b>		
Location of farm:	Farm size:	Diseases:
No. of shed:	Shed type:	Predation:
Wild bird proof shed (Y/N)      Rodent proof shed(Y/N)		
Distance between sheds:	Direction of sheds:	
<b>Production data:</b>		
Age of production:	Duration of production:	
Range of age of high production:	Egg production per day:	
Egg production per year:	Mortality of bird per day:	
Culling of bird per day:	Broken egg:	
<b>Biosecurity related data:</b>		
Distance from locality:( at least 200 meter)		
Free range chicken in vicinity:		
Fencing:		
Foot bath presence: at shed/at farm gate/both/absence		
Use of protective cloth:		
Use of protective clothes:		
Disinfectant spray:		
Cleaning of shed interval:		
Disposal system:		
Cleaning of feeder and drinker interval:		

## **BIOGRAPHY**

This is Umme Habiba, daughter of Md. Nurul Amin and Sakun Taj Begum from Lohagara upazila, Chattogram. Now I am doing my graduation on Doctor of Veterinary Medicine (DVM) at Chattogram Veterinary and Animal Sciences University under Faculty of Veterinary Medicine. I have completed my Secondary School Certificate Examination (S.S.C) in 2015 from Aparna Charan City Corporation Girls' High School, Chattogram and Higher Secondary School Certificate Examination (H.S.C) in 2017 from Government Hazi Mohammad Mohsin College, Chattogram. As an upcoming Veterinarian, I would like to dedicate my rest of the life for the welfare of animals. I am keen to be a pet practitioner.