Baseline study on Market System development of safe poultry and poultry products

পল্লী কর্ম-সহায়ক ফাউন্ডেশন

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গাক
Gram Unnayan Karma (GUK)

Report on

"Baseline study on Market System development of safe poultry and poultry products"

Implemented by: Gram Unnayan Karma (GUK)

Supported by: Palli Karma-Sahayak Foundation (PKSF), International Fund for Agricultural Development (IFAD) & Embassy of Denmark (DANIDA).

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ACKNOWLEDGEMENT

The “Baseline study on Market System development of safe poultry and poultry products” was conducted by BAU consulting group headed by Prof. Dr. Md. Shawkat Ali and the report has been prepared in accordance with the ToR. This work has been done with the financial support of PKSF and patronization of Gram Unnayan Karma (GUK), Bangladesh. GUK is a renowned NGO working in the rural areas of Bangladesh, whose motivation is to alleviate poverty and increase food security and rural development. The mission of GUK is to empower communities by ensuring access to finance, education, healthcare, food and nutrition and various socio-economic development activities towards employment creation and resilience building. This baseline survey has been done on commercial and family poultry from the different Upazilas of Bogura district for food and nutrition security. This task has been assigned by GUK to the research team. We categorically thankful to GUK for allow us to conduct this baseline survey and writing a report on it. We also thankful to the respondent farmers and the other peoples who have help us to carry out the survey in different ways.

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ABBREVIATIONS

ASA	Association for Social Advancement
BAU	Bangladesh Agricultural University
CSR	Corporate Social Responsibility
BCR	Benefit Cost Ratio
BRAC	Bangladesh Rural Advancement Committee
DLS	Department of Livestock Services
DOC	Day Old Chick
FGD	Focus Group Discussion
GPP	Good Poultry Practices
GUK	Gram Unnayan Karma
Hh	Household
ICT	Information and communications technology
IFAD	International Fund for Agricultural Development
KIIs	Key Informant's Interviews
MRA	Microcredit Regulatory Authority
NGO	Non-governmental organization
PKSF	Palli Karma-Sahayak Foundation
Proshika, Bangladesh	A Centre for Human Development, Bangladesh
SIT Foundation	Science and Information Technology Foundation, Bogura
ToR	Terms of Reference
VGD	Vulnerable Group Development

Executive Summary

This study entitled “Baseline study on market system development of safe poultry and poultry products”. This study has been assigned to the research team by Gram Unnayan Karma (GUK) a renowned NGO working all over the country. Encompassing all sophisticated methodological approach comprising sample size determination, sample selection, sample survey, FGD and KII, descriptive statistics and functional statistics, the study estimated all relevant parameters and characteristics of family and commercial poultry farming. The study addressed the following objectives:

- Prepare an existing poultry value chain map and profile in the Bogura district;
- Assess volume of safe poultry and poultry products;
- Gender wise analysis of return and profit from poultry and poultry products;
- Assess poverty alleviation from poultry and poultry products;
- Assess level of smart technology use in the poultry sub-sector;
- Assess inputs and service delivery in the sub-sector;
- Identify stakeholders like suppliers, producers, processors, transporters, traders and buyers and their engagement in the market system; and
- Identify existing interventions and intended intervention to enlarge the poultry and product market to solve the striking problem in it;
- Describe skills training needs related to potential role in the value chain;

Average age of the respondent farmers was 37.29 years indicating that middle aged farmers were engaged in poultry farming. Educational qualifications were significantly lower in Shahjahanpur upazila and higher in Bogura sadar. Average year of schooling was 6.54 years for all respondent farmers. Highly significant differences were found in experience of farming among 4 upazilas.The highest experience of farming was found 11.71 years in Shahjahanpur upazila and the lowest was found in Nondigram upazila. The number of female respondents was found higher in Shahjahanpur and Kahaloo upazila compared to male farmers, while number of male farmer was higher in Nondigram and Bogura sadar upazila. The aggregate number of literate and illiterate male was 2.53 and 0.28 and female was 1.66 and 0.25 respectively. Again, aggregate

number of employed male and female was respectively 1.04 and 0.94. In all cases the value was higher in male compared to female.

Total income and expenditure was respectively Tk. 199984.94 and 255280.68 at the aggregate level. The higher expenditure of the farmer's family indicated that they might have loan from other sources. Among the poultry farming, duck and native chicken showed the highest percentage with 52.57%, followed by native chicken farm (15.98%) and broiler farm (10.31%).The day old chicks collected from other sources exhibited the highest percentage (70.62%) followed by chicks from industry hatchery (12.37%) and local dealer (11.34%) respectively. Mortality rate of chick was 13.01% for family farming and 9.86% for commercial farming. It indicated that mortality rate was significantly ($F=5.92^{**}$) higher for family farming compared to that of commercial farming. That means commercial farms maintained better bio-security measures and regular vaccination program compared to family poultry. Only 22.8% respondent farmer stated that they used branded feed, while 77.2% farmer said they did use unbranded feed. Therefore, unbranded feed might be risk for safe poultry production.

The average feed cost in 4 upazilas of Bogura districts showed significant differences. It was the highest in Bogura sadar upazila with Tk.55.00 per kg feed, while the lowest in Shahjahanpur upazila with Tk. 42.29 per kg. The higher price of feed in Bogura sadar upazila indicated that respondents from Bogura sadar were basically broiler farmers, as price of broiler feed is higher compared to other feed. Vaccination and medication cost did not differ significantly among 4upazilas of Bogura district. Although the value was very high in Bogura sadar upazila, but the sample size was very small in that upazila. Forty-five percent respondents said that they did not vaccinate to their birds while only 15.8% vaccinated to their birds against New castle and Gumboro diseases. Nearly 73.97% respondent did not answer or they had no idea about cool chain during vaccine transportation. This answer might be related with vaccination failure in the poultry farm which is a concern of disease outbreak.

Only 21.39% farmers maintained withdrawal period prior to marketing of their products which indicated that the majority of respondents had no idea about safe poultry production. About 77% farmers provided their services themselves while only 12.63% services were provided by veterinary surgeon. This means proper diagnosis and treatment is questionable for safe production.

Most of farmers had tin shed housing (53.61%) while 27.58% had half building and 15.98% had other housing systems. Most of the rearing method was floor rearing (90.21%). Eighty-three percent litter materials were rice husk. About 44% farmers used laying box.

Most of the farmers (83.3%) carried out their businesses with own finance. Majority of the farmers sold their bird and egg in local markets and ultimate destinations of the products were Bogura city and Dhaka. There were many problems and challenges of running poultry businesses like lower prices of poultry products, higher prices of feed, medicine etc. Most of the farmers did not have knowledge of safe poultry and egg production, bio-security, hygiene, etc. About 26% farmers buried dead birds and 65.78% farmers threw them outsides. About 56% farmers used poultry litter in their fields for crop production and 18.30% farmers sold it to other people.

From FGDs it appeared that women were mostly involved in backyard poultry rearing. However, women have little knowledge for feeding and vaccination. Family income through selling of birds and eggs was increased and women were found to support their family financially during crisis period. Family nutrition through consumption of egg and meat increased is not significant. In case of commercial poultry farming most of the activities were carried out by male. It was observed that they established their farming with their own finances. Most of the farmers had no idea about biosecurity, only 2.84% of farmers had informed about biosecurity. Only 17.78% of farmers got training for poultry production indicated that skills training are necessary for safe poultry production. The respondents preferred to sale their product outside the local market for better profit.

From KIIs it was observed that dealers were the most important actors in commercial farming. They maintained communication with industry people and farmers. They used to supply medicine, chicks, feed and vaccine to farmers. They had gained some technical knowledge of poultry rearing through transaction of different inputs to farmers. Sometimes they were found to work as middlemen through connecting farmers to wholesalers or traders or even large scale consumers for selling of poultry. Next to dealer veterinary surgeon and livestock officer are important actors of poultry industry. They provided technical supports, treatments and maintained biosecurity management to the farmers. A package of policy options has been suggested for the development of poultry sub-sector.

As feed, DOC, medicine prices are high, government direct subsidy is needed at farmer's level to maintain the supply chain of live birds and eggs commensurate with the increased demand. Regular training of farmer and local people should be given about the poultry technology by DLS so that farmers and local people can carry out vaccination regularly to their birds. Proper knowledge of diseases and medicine should be given to farmers for averting disease outbreaks. In addition, farmers should be given training to prepare least cost feed with their own ingredients. A proper marketing and value chain should be developed comprising farmers, traders, meat industries, hotels and restaurant people.

1. Introduction

Gram Unnayan Karma (GUK) was established in the year 1993 as a non-governmental development organization under the dynamic leadership of Dr. Khandaker Alamgir Hossain along with some dedicated social activists. The organization obtained registration from the Department of Social Services, NGO Affairs Bureau, Microcredit Regulatory Authority (MRA), Directorate of Health Services, Directorate of Family Planning and a partner of Bangladesh Bank and PKSF. As a pro-poor & Char friendly organization, GUK has been working in the field of primary health care, eye care service through GUK Eye Hospital, non-formal primary education, family planning, women empowerment, skill development through training, adolescent reproductive health care, climate resilient activities, disaster preparedness, emergency response, rescue & rehabilitation, sustainable agriculture development through diversified crop production practices, sub-sector development, VGD under social safety net, school feeding program, education, stipend, livelihood development of elderly people, beggar rehabilitation, activities under Corporate Social Responsibility (CSR) and create employment opportunities to alleviate poverty by implementing agriculture, livestock & fisheries activities, small trade & business and microenterprise through microfinance program. So far GUK has covered 7 divisions, 56 districts and 210 Upazilas enrolling 5,48,350 households by setting up 445 offices including Branches, Areas, Zones, Regions and Project Offices engaging 5,074 staffs. The organization is planning to expand the activities in un covered remote areas for inclusion of poor people in the mainstream of development leveraging financial and technical support from government and donor agencies.

The project titled ‘Market System development of safe poultry and poultry products’ financed by Palli Karma-Sahayak Foundation (PKSF) and the International Fund for Agricultural Development (IFAD), Embassy of Denmark (DANIDA) is being implemented in 4 Upazilas of Bogura district by the organization “Gram Unnayan Karma (GUK)”. This project is being implemented with a view to enhancing income, ensuring food security, improving family nutrition of marginal and small farmers, poultry related backward and forward market entrepreneurs. The sub-project is also working on value addition at various levels, expansion of financial services for enterprise development, and strengthening of the institutional framework for the development of safe eggs, meat and meat products of the value chain. Efforts have been made to scale up and expansion of enterprises through efficient production methods and strong

market linkages of marginal and small farmers. If the sub-project is implemented, 70 percent of the entrepreneurs' income will be increased by at least 50 percent and 30 percent of the project members will be able to add nutritious food to their regular diet.

The value chain analysis of the sub-sector has been undertaken while taking up the sub-project. The study found several constraints to the development of the livestock sub-sector, the problems in the project area are - inadequate supply of purebred chicks & quality feeds, conventional farming management, poor farm biosecurity, lack of quality livestock services, untrustworthy poultry & egg production, poor processing facilities, lack of ICT & financial services, improper use of farm waste and poor market linkages for safe egg and meat production and so on. Besides, it is not possible to sell locally produced animal products at competitive prices. There are 19000 farmers under the sub-project and 1 thousand service providers or market actors in strengthening backward and forward markets. Working to solve the problems mentioned in the project area will increase the sales of safe eggs, meat and meat products by at least 30 percent and increase net profit by at least 20 percent of 80 percent of the entrepreneurs.

Poultry stands as one of the most important sub-sectors of the livestock in Bangladesh. Many people in Bangladesh rely on the chicken sector because they can rear chickens at home. In addition, this sector plays a vital role in rural economic development and women's empowerment. According to the Bangladesh Poultry Industry Central Council Bangladesh's poultry sector currently produces 1.5 to 1.6 percent of the country's GDP (Karmoker, 2022). In addition, the sector employs approximately 6 million people directly and indirectly in the country (Ansarey, 2012). According to the Food and Agriculture Organization, an individual should consume at least 104 eggs each year. Nevertheless, Bangladesh reached its annual quota of eating eggs per capita in 2019. In addition, according to BPICC data, a total of 4.89 crore eggs are being produced commercially every day across the country. If computed every year, that comes to 1785 crore eggs. However, in 2010-11, this figure was just 608 crore. Egg production has grown nearly thrice (2.86) in the previous ten years, to phrase it differently (Karmoker, 2022). DLS's Livestock Economy Report 2020-21 argues that a person should consume at least 120 grams of meat per day, whereas 136.18 grams of meat is accessible to everyone in Bangladesh, with a per capita consumption of 6.7 kg of chicken per year. In addition, the country consumes 3,340 tons of poultry meat daily, for 1.26 million tons per year.

As the country has sufficiently fulfilled the requirement of meat and egg, the main question is now the safety issues related to poultry meat and egg production.

It must be ensured that the egg and meat produced by poultry are safe and suitable for their intended use, and also that the farm enterprise is viable into the future, from the economic, social and environmental perspectives. Therefore, Good husbandry practices are the main concern for safe egg and poultry production. Keeping production site clean by destroying infected flocks, sanitizing the products and limiting the introduction and spread of pathogens at the farm through Good Animal Husbandry practices (GAHPs) are the keys to main control strategy (Hafez, 1999). The major GAHPs include: effective hygiene measures in poultry houses having adherence to strict biosecurity, following hygienic measures for feeds, use of safe antimicrobial feed additives, careful vaccination of poultry flocks and finally the application of hygienic systems during harvesting and transporting birds.

Gram Unnayan Karma (GUK) has taken the initiative to hire a consultant for baseline survey of safe poultry and poultry products among project beneficiaries in the project areas.

The baseline study is intended to provide social, economic, and environmental data at the beginning of the project. The study acts as an accompaniment to the quantitative and qualitative data that is also recommended when implementing a project for the first time at the beginning of the project. This should help to identify any major issues and provide some insights into the opinions of the community concerning the poultry value chains. The baseline results will point to how best the project will be rolled out and set priorities for the project sometimes providing information that acts as a benchmark for measuring project success or failure. The study must produce information that will be used to direct and guide the implementation of the project and to measure the present condition of the project indicators, participants' knowledge attitude and practice. The task of the individual consultants is not limited to the following areas-

- Prepare a value chain existing map and make a profile of the Poultry value chain in the respective district.
- Conduct an end-to-end assessment of input, service, value chain products, and different buyers (formal and informal) and provide a detailed analysis of the value chain and provide recommendations on how the selected target group can be engaged in the value chain in different roles (Supplier of input, producer, processor, transporter, traders and so on).

- Assess the selected market system supporting environment (services, policies and rules regulations, infrastructure) & supporting functions and point out the market constraints.
- Assess the ongoing business of the different market actors, their present situation, role, and finally figure out the areas of intervention in the value chain for the actors including youth, persons with disability, older men & women.
- Describe skills training needs related to potential roles in the value chain.

1.1 Rationale and objectives

Baseline study is of absolute necessary to collect overall information with a view to implementing any development project successfully. Initial information collected through baseline study will help proper shaping of the project encompassing challenges and opportunities. Proper assessment on inputs, investment, trained manpower, business environment, GOES and NGO activities is needed to implement the final project. Impacts of the final project can be estimated only when baseline information is available.

The overall objective of the baseline study is to design a proper poultry value and market chain to elucidate the activities and responsibilities of all actors for increasing income of producers and other stakeholders. The specific objectives are outlined below:

- Prepare a poultry value chain market map in the Bogura district;
- Assess volume of safe poultry and poultry products;
- Gender wise analysis of return and profit from poultry and poultry products;
- Assess poverty alleviation from poultry and poultry products;
- Assess level of smart technology use in the poultry sub-sector;
- Assess inputs and service delivery in the sub-sector;
- Identify stakeholders like suppliers, producers, processors, transporters, traders and buyers and their engagement in the market system; and
- Identify existing interventions and intended intervention to enlarge the poultry and product market to solve the striking problem in it.

1.2 Scope of the baseline study

The scope of the study is enormous which includes input supplier feed industry, hatchery for DOC supplying, dealer and shopkeeper, service providers, traders or collectors, wholesalers, retailers, processors, consumers along with farmers. Farmers are the pivotal actor in the value chain analysis. Farmers are of various categories like broiler, layer, Sonali and indigenous poultry rearers, etc. There are several service providers like livestock officer, veterinary surgeon, local trained people and NGO personnel. There are some traders like collector, transporter, wholesaler and retailer. Meat processors like meat industry, fast food shops and Chinese food chops are important actors in the value chain. Consumers at local and national levels which constitute individual consumers and hotel consumers are also considered to be the final actors in the value chain. There are institutional consumers like officials working in government and semi organizations, communities, NGOs etc. In addition, consumers for processed meat products like meatball, sausages, nuggets, and drumstick are huge in numbers. These products are produced mostly by different meat industries. Fast food shops and Chinese food shops and restaurants have several processed products like crispy chicken, grilled chicken etc., are being served in their own shops. The study intends to know present status of income and food and nutrition security of farmers, input suppliers, service providers. It also assesses the forward and backward linkages to farmers, micro-entrepreneurs, institutional and non-institutional buyers. It examines also the involvement of younger people, elderly people and women in the poultry sub-sector. It also initiates to calculate mortality and growth of bird, possibility, sales of poultry and poultry products locally and amount of poultry processing at local level, frozen meat sold locally and nationally, increase of income and employment through adopting improved production methods and practices in the poultry sub-sector. It also assesses levels of vaccination and bio-security measures adopted at commercial and family poultry farming. Local level market demand and supply of poultry and poultry products is attempted to calculate.

2. Methodology

All activities have been accomplished as per ToR of the project. All objectives have been attained through rigorous analyses using sophisticated statistical techniques. All actors in the poultry sub-sector have been addressed while conducting baseline survey to estimate the requisite parameters.

2.1 Document review

Study on the document reviewed has given us about the pre-assessment information of the program. This information has been used for the development of details methodology, work planning, and questionnaire formation.

2.2 Methods of data collection

There were two ways of data collection; quantitative and qualitative approach. Household survey was the fundamental basis of massive data collection which required a group of trained enumerators. FGD, KII and SWOT analysis were methods for collecting qualitative data which were conducted by the consultants. The details of those methods are described here below.

2.3Development of questionnaires

In the HH survey, questionnaire was formed by usually close ended questions (supposed to ask yes or no or from multiple answers or multiple choice questions) and those might be described statistically. However open ended questions were effective for acquiring qualitative information and particularly good for determining people's estimation and feelings. During developing questionnaire, the objective of that project was considered.

2.4 Sample size for household survey

The sample size of the impact assessment survey was finalized with the consultations of the client which was estimated by statistical sampling technique with the following formula given by Cochran.

$$n = \frac{z^2 \text{ X } pq \text{ X } N}{e^2 (N-1) + z^2 pq}$$

Where, N = Total households; P (probability of success) = 0.50; q (probability of failure) = (1-p) = 0.50; z = 1.96: z is the area under standard normal curve under certain confidence limit (at

95% confidence interval); e = 0.05 within *95% Confidence level* i.e., desired level of precision (Ref: Sampling Technique by Cochran; page: 78, 79).After taking a value of 0.5 for either p or q (because such value of p and q maximize the sample size), and a confidence limit of 95% (of which value of z is 1.96) with a 5% error level, required sample size has been estimated. However, sample size was finalized according to budget for that task with the consultation of the project personnel.

2.5 Approach to collect information from the respondent

During survey, the research objectives were clearly explained to all respondents before collecting data from them. S/he would be abstained from data collection from any person who would deny or show any reluctance in providing information. Verbal consent with signature or thumb impression of the respondents, therefore, would be taken before collecting data. The research team was highly committed to the respondents to keep the privacy of their information and source of data as well as put heartiest attempt to be unbiased in collecting data.

2.6 Household Survey (HhS)

In this technique, enumerators were visit from door to door of the project beneficiaries for direct interviewing with the pretested structured questionnaires.

2.7 Focus group discussion (FGD)

In this technique information was collected from a group of 8-12 carefully participants with commercial and Family poultry farmers.

2.8 Key Informant's Interview (KII)

In this technique information was collected by direct interviewing with loosely structured questions from GoB officials, dealer and representative from Feed and Medicine Company.

2.9 SWOT Analysis

This approach helped to identify Strength, Weakness, Opportunity and Threats of a program.

2.10 Training to the enumerators

An expert panel of trainers in the respective areas gave training to the enumerators to make them clear understanding about the goal of this job as they would be capable of collecting information having more authenticity.

2.11 Data checking and quality control

All questionnaires filled by the respective enumerators were checked and crosschecked by the consultants prior to go for data entry into computer.

2.12 Data analyses

- Prepare a poultry map, market and value chain in the Bogura district;
- Assess volume of safe poultry and poultry products;
- Gender wise analysis of return and profit from poultry and poultry products;
- Assess poverty alleviation from poultry and poultry products;
- Assess level of smart technology use in the poultry sub-sector;
- Assess inputs and service delivery in the sub-sector;
- Identify stakeholders like suppliers, producers, processors, transporters, traders and buyers and their engagement in the market system;
- Identify existing intervention and intended intervention to enlarge the poultry and product market to solve the striking problem in it;
- Assess the intensity of involvement of different persons like women, youth, older men, disable people in poultry market and value chain.

After checking and cross examination, data were entered in broadly used reliable software, SPSS for further statistical analyses by the consultant himself. Results would be presented in accordance with the objectives of the study.

2.13 Report writing

After analyzing field data, a draft report has been written by the consultants who must have reflected the justification of the project and made of recommendations that would be the guideline for making future plan.

3. Demographic profile of respondent farmer

3.1 Age

Significant differences were found in ages of farmers at different upazila of Bogura district. Average age was found lower in Nondigram upazila, while it was higher in Shahjahanpur upazila. Average age of the respondent farmers was 37.29 years (Table 1). The sample distribution has been presented with Figure 1.

3.2 Educational qualification

Educational qualifications were significantly lower in Shahjahanpur upazila and higher in Bogura sadar. Average year of schooling was 6.54 years for all respondent farmers in this survey (Table 1).

3.3 Experience of farming

Highly significant differences were found in experiences of farming among four upazilas of Bogura district. The highest experience was found 11.71 years in Shahjahanpur upazila and the lowest was found in Nondigram upazila (Table 1& Figure 2).

Table 1: Age, education and experience of farming of respondent farmers

Upazila	Age (year)	Male	Female	Education (year of schooling)	Experience of Farming (year)	N
Shahjahanpur	37.60 (5.56)	107	189	6.11 (3.36)	11.71 (4.75)	296
Nondigram	34.84 (5.57)	32	5	8.49 (3.88)	6.07 (5.56)	37
Kahaloo	34.94 (5.60)	20	26	6.55 (3.67)	7.18 (5.61)	46
Bogura sadar	37.00 (5.63)	8	1	12.78 (3.42)	10.44 (3.00)	9
Aggregate	37.29 (5.61)	167 (43%)	221 (57%)	6.54 (3.64)	11.07 (5.10)	388
F-value	4.08*	-	-	23.28**	22.78**	

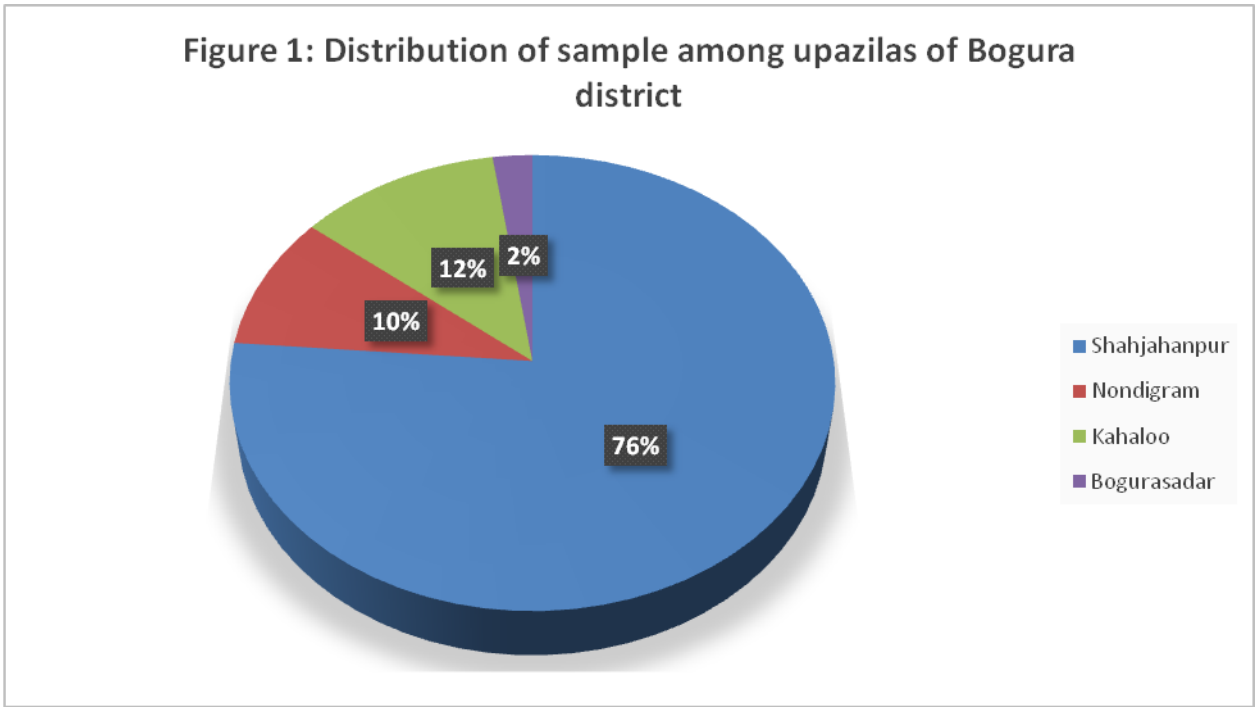


Figure 1: Distribution of sample among upazilas of Bogura district
12%
2%
10%
76%
Shahjahanpur
Nondigram
Kahaloo
Bogurasadar

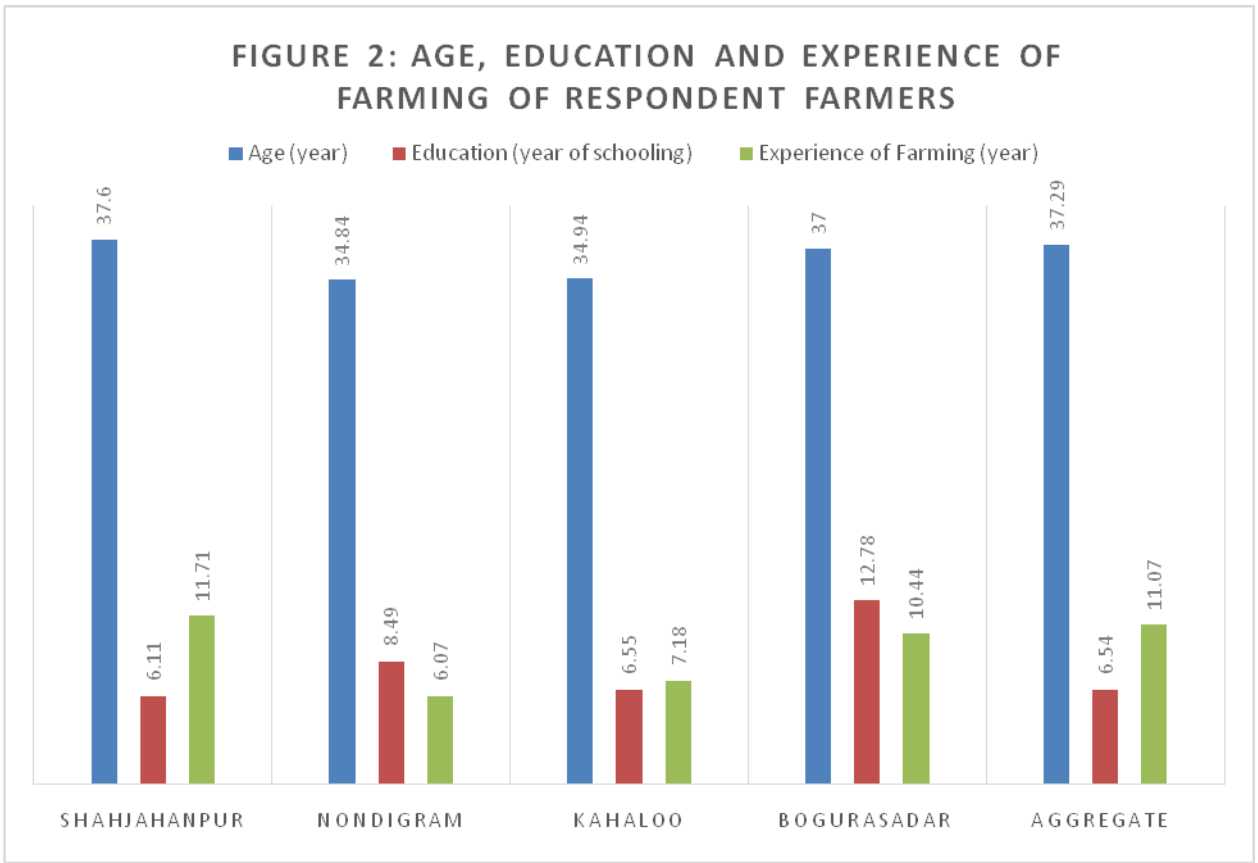


FIGURE 2: AGE, EDUCATION AND EXPERIENCE OF FARMING OF RESPONDENT FARMERS
Age (year)
Education (year of schooling)
Experience of Farming (year)
37.6
6.11
11.71
34.84
8.49
6.07
34.94
6.55
7.18
37
12.78
10.44
37.29
6.54
11.07
SHAHJAHANPUR
NONDIGRAM
KAHALOO
BOGURASADAR
AGGREGATE

3.4 Gender

The number of female respondents was found higher in Shahjahanpur upazila compared to male farmer or respondent, while male farmer or respondent was higher in Nondigram and Bogura sadar upazila. The average percentages of male and female respondent farmers were 43% and 57% respectively.

3.5 Family description

The number of literate male, illiterate male, literate female and illiterate female found highly significant among four upazilas of Bogura district. However, number of employed male and number of employed female did not show significant differences among four upazila of Bogura district. Family size showed significant differences among four upazilas of Bogura district and it was the highest in Bogura sadar upazila. The aggregate number of literate and illiterate male was 2.53 and 0.28and female was 1.66 and 0.25. Again, aggregate number of employed male and female was respectively 1.04 and 0.94. In all cases the value was higher in male compared to female (Table 2).

Table 2: Family description of respondent farmers

Upazila	No. of literate male	No. of illiterate male	No. of literate female	No. of illiterate female	No. of employed male	No. of employed female	Family size	N
Shahjahanpur	2.62 (0.98)	0.20 (0.60)	1.79 (0.73)	0.16 (0.54)	1.04 (0.39)	1.05* (1.40)	5.09 (1.14)	296
Nondigram	1.81 (0.96)	0.70 (0.94)	0.76 (0.76)	0.76 (0.83)	1.03 (0.50)	0.00 (0.00)	4.86 (0.98)	37
Kahaloo	1.80 (0.98)	0.72 (0.92)	0.78 (0.77)	0.79 (0.80)	1.01 (0.52)	0.50 (0.33)	4.90 (1.10)	46
Bogura Sadar	2.33 (1.41)	1.33 (1.00)	1.11 (0.93)	0.89 (0.33)	1.00 (1.11)	0.86 (0.38)	6.00 (2.35)	9
Aggregate	2.53 (1.02)	0.28 (0.70)	1.66 (0.81)	0.25 (0.61)	1.04 (0.43)	0.94 (1.28)	5.09 (1.17)	388
F-value	11.10**	21.36**	34.79**	23.40**	0.051	1.26	3.44*	

3.6 Family income and expenditure of the farm household (Taka/year)

The income from agriculture and poultry were significantly different, while income from service, others, total family income and expenditure (Taka/year) did not show significant different among four upazilas. The expenditure is higher compared to total family income which reveals that income sources are not quite capable of supporting expenditure. That is, they might have some credit from outside. Total income and expenditure was respectively Tk. 199984.94 and 255280.68 at the aggregate level (Table 3). However, yearly family income for commercial farmer was Tk.252242.42 whereas it was Tk. 189592.80 for family farming. Similarly, annual

expenditure of commercial farmer was Tk. 267454.56 and it was Tk. 254684.88 for family farming.

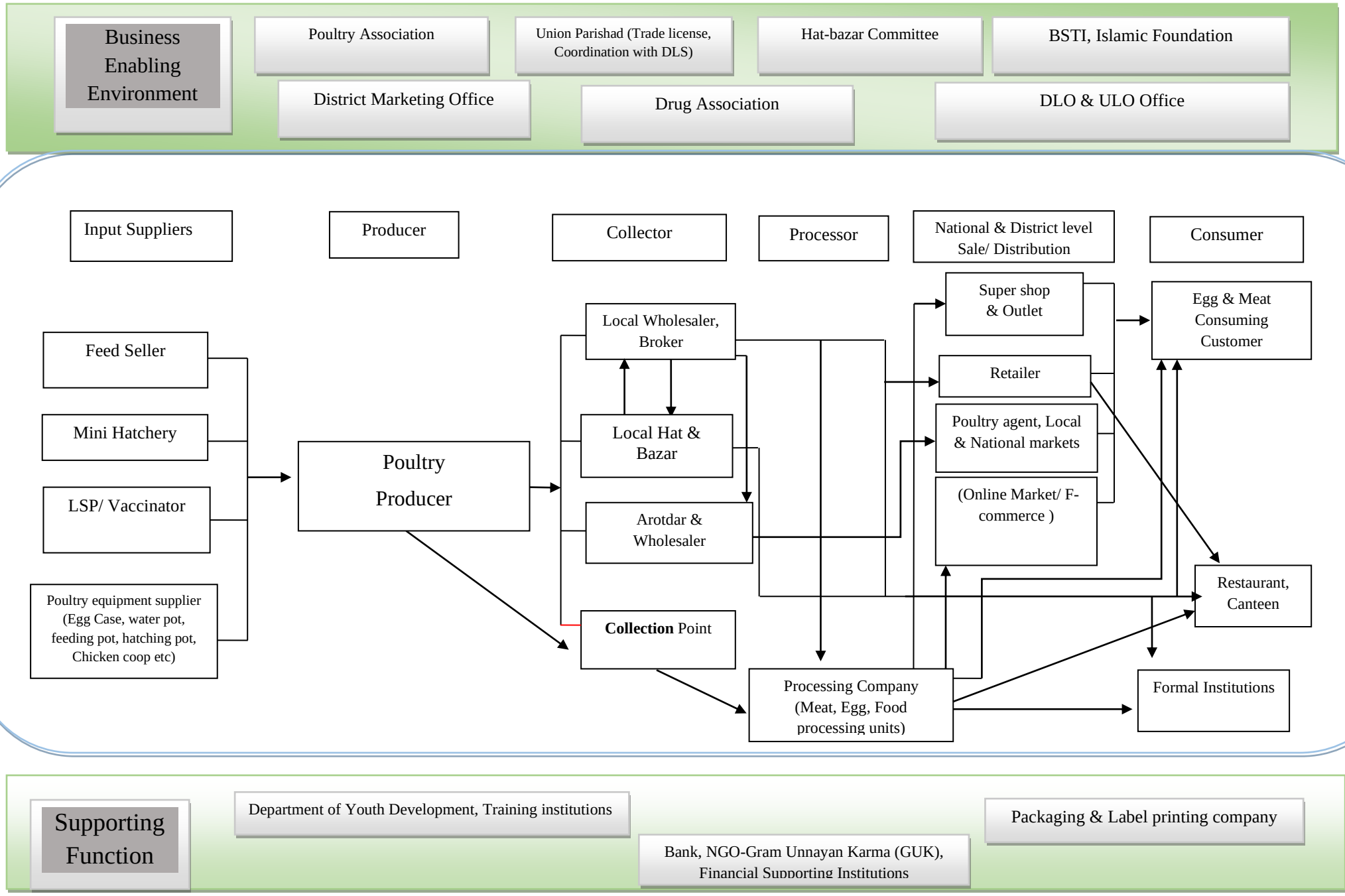
Table 3: Family income and expenditure of respondent farmers

Upazila	Income from Agriculture	Income from Poultry	Income from Service	Income from Others	Total family income	Expenditure
Shahjahanpur	142851.35 (230614.91)	43514.53 (113187.93)	12790.54 (120581.37)	6513.51 (23966.07)	205669.93 (258696.24)	260777.04 (472284.04)
Nondigram	53189.19 (71777.76)	35150.00 (59948.41)	37567.57 (98922.12)	10243.24 (17415.52)	136150.00 (275444.44)	179351.4 (86945.76)
Kahaloo	55189.19 (73777.76)	33222.00 (62118.41)	39477.75 (88821.34)	11113.32 (16315.48)	128962.12 (294563.76)	181312.8 (768485.95)
BoguraSadar	38888.89 (17638.34)	217444.44 (188447.68)	0.00 (0.00)	19111.11 (7606.65)	275444.44 (188309.00)	386666.64 (80000.04)
Aggregate	130415.20 (218088.57)	47186.70 (114404.15)	15134.50 (116948.62)	7248.54 (23139.25)	199984.94 (245776.24)	255280.68 (441609.96)
F-value	3.65*	10.93**	0.82	1.65	1.76	0.97

4. Value chain analysis and marketing of poultry and egg

This chapter deals with poultry and egg value chain and marketing which combines different actors like input supplier, feed industry, hatchery for DOC supplier, dealer and shopkeeper along with farmers. Farmers are the pivotal actor in the value chain analysis. Farmers are of various categories like broiler, layer, sonali, indigenous poultry rearers, etc. There are several service providers like livestock officer, veterinary surgeon, local trained people and NGO personnel. There are some traders like collector, transporter, wholesaler and retailer. Meat processors like meat industry, fast food shops and Chinese food chops are also important actors in the value chain. Consumers at local and national levels which constitute individual consumers and hotel consumers are also considered to be the final actors in the value chain. In addition, consumers for processed meat products like meatball, sausages, nuggets, and drumstick are huge in numbers. These products are produced mostly by different meat industries. Fast food shops and Chinese food shops have several own processed products like crispy chicken, grilled chicken etc., are being served in their own shops. All actors are discussed in every sub-section.

Poultry Value Chain Market Map



4.1 Types of farming

Results from Table 4 showed that different types of poultry farm existed in the four upazilas. There were 12 categories of farms. Among the poultry farming, duck and native chicken showed the highest percentage with 54.1%, followed by native chicken farm (18.1%) and broiler farm (10.2%) (Table 4).

Table 4: Number and percentage of different poultry farming

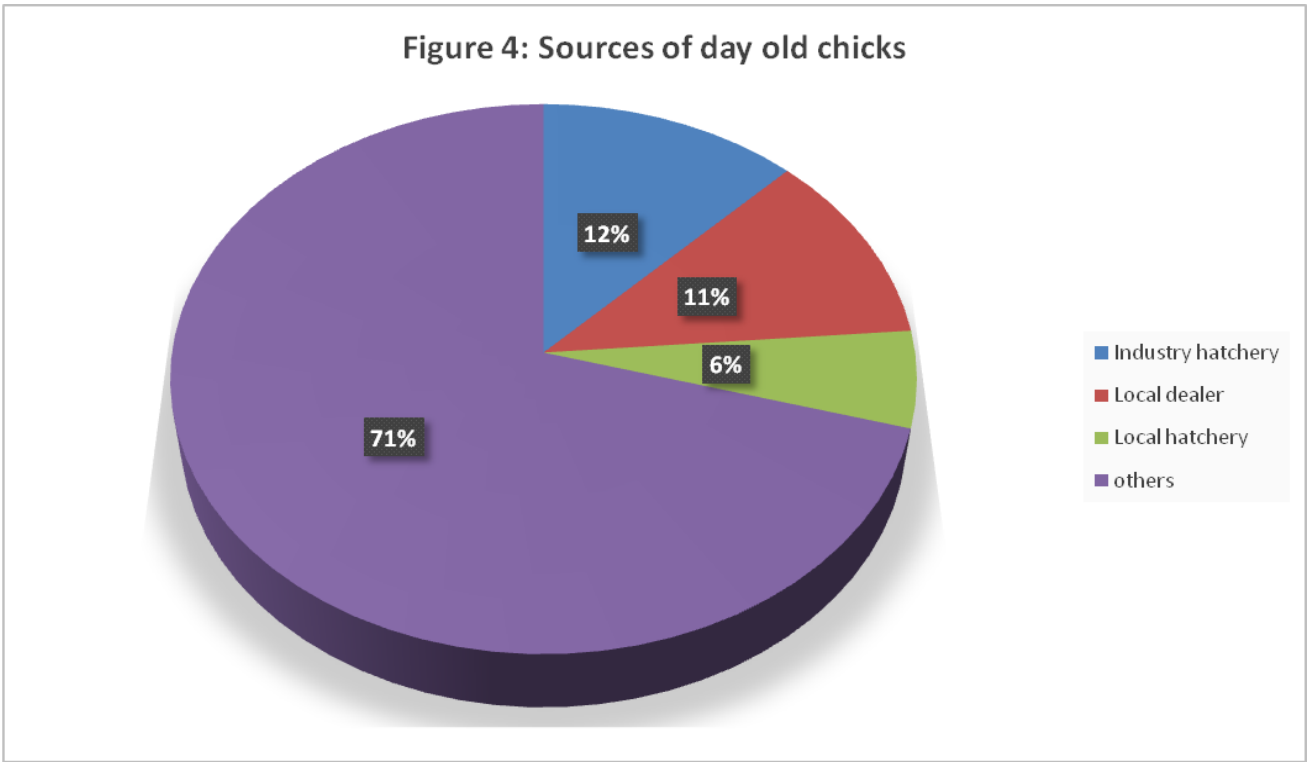
Type of Poultry rearing	Frequency	Percentage (%)
Broiler	40	10.31
Sonali	23	5.93
Layer	1	0.26
Duck	3	0.77
Native chicken	62	15.98
Sonali and native	6	1.55
Duck and Native chicken	204	52.57
Native chicken and Pigeon	8	2.06
Sonali, Duck and Native chicken	6	1.55
Duck, Pigeon and Native chicken	15	3.87
Broiler, Duck, Pigeon and Native chicken	11	2.83
Broiler, Duck, Pigeon, Native Chicken and Quail	9	2.32
Total	388	100.0

4.2 Sources of day old chick

Table 5 indicates that the source of day old chicks collected from other sources exhibited the highest percentage (70.8%) followed by industry hatchery (12.3%) and local dealer (11.4%) respectively.

Table 5: Sources of day old chick

Source	Frequency	Percentage (%)
Industry hatchery	48	12.37
Local dealer	44	11.34
Local hatchery	22	5.67
others	274	70.62
Total	388	100.0



4.3 Collection and number of chicks

While the question of collection of chicks, chick supplied by hatchery or chicks collected by the farmer non-response of respondent was 69.9% in case of chick supplied by hatchery and 55% chicks collected by the farmer. In the case of response of respondent, 10.5% said no and 19.6% said yes in case of chick supplied by hatchery, while 4.7% said no and 40.4% said yes in case of chicks collected by the farmer (Table 6).

Table 6: Collection and supply of day old chick

Response	Chick supplied by hatchery		Chick collected by the farmer	
	Frequency	Percentage	Frequency	Percentage
No	41	10.57	18	4.64
Yes	76	19.59	157	40.46
Total	117	30.15	175	45.10
Non response	271	69.85	213	54.90
Grand total	388	100.0	388	100.0

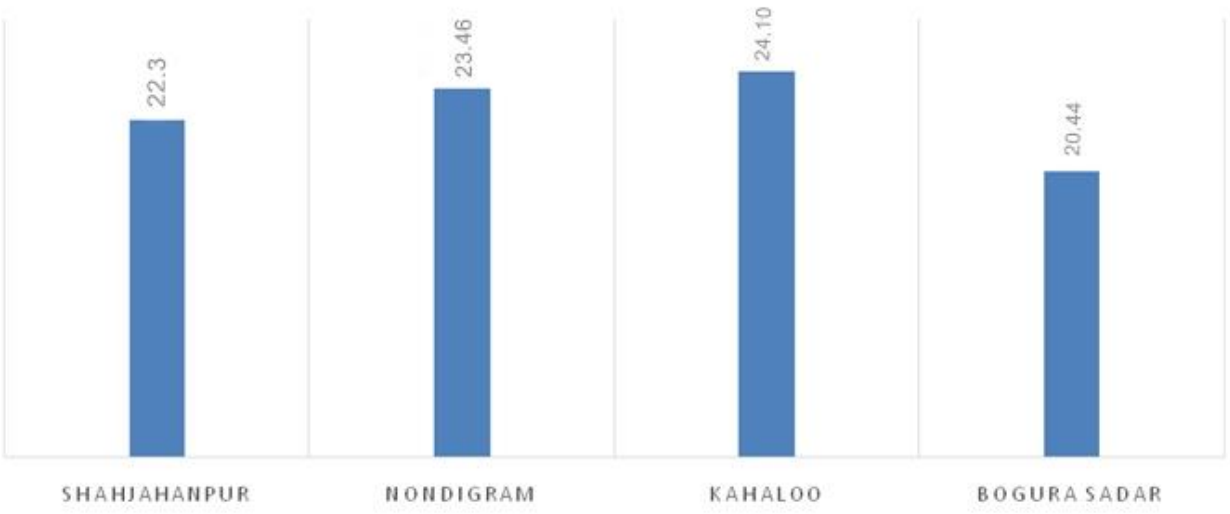
Expenditure of chick collection was significantly different, while number of chicks during first farming and mortality did not show significant differences. The average expenditure of chick

collection was Tk. 48241.02 at aggregate level (Table 7). However, expenditure of chick collection was Tk.232954.55 for commercial farming and it was Tk. 804.86 for family farming. The number of chick at first starting of farming was respectively 4643 and 26 for commercial farming and family farming although it was 969 at the aggregate level. Mortality rate of chick was 23.00 % for family farming and 19.86% for commercial farming. It indicated that mortality rate was significantly ($F=5.92^{**}$) higher for family farming compared to that of commercial farming. This might happen due to bio-security measures maintained by some of the commercial farming. Mortality percent of chicks in Kahaloo upazila was the highest (Table 7 & Figure 5).

Table 7: Expenditure, number and mortality of day old chick

Upazila		Expenditure of chick collection (Tk/year)	No of chick during first start of farming	Mortality percent of chick
Shahjahanpur	Mean	39385.56	744.02	22.30
	N	277	277	285
	Std. Deviation	112680.84	4522.98	9.85
Nondigram	Mean	54650.00	1938.92	23.46
	N	37	37	37
	Std. Deviation	137617.22	9822.51	5.63
Kahaloo	Mean	55110.10	2055.12	24.10
	N	46	46	46
	Std. Deviation	141512.23	8887.89	5.65
Bogura sadar	Mean	294444.44	3911.11	20.44
	N	9	9	9
	Std. Deviation	360420.28	4878.64	4.28
Total	Mean	48241.02	969.15	23
	N	369	369	377
	Std. Deviation	134142.78	5413.55	9.36
F-value		17.42**	2.18	0.45

FIGURE 5: MORTALITY OF DAY OLD CHICKS (%)

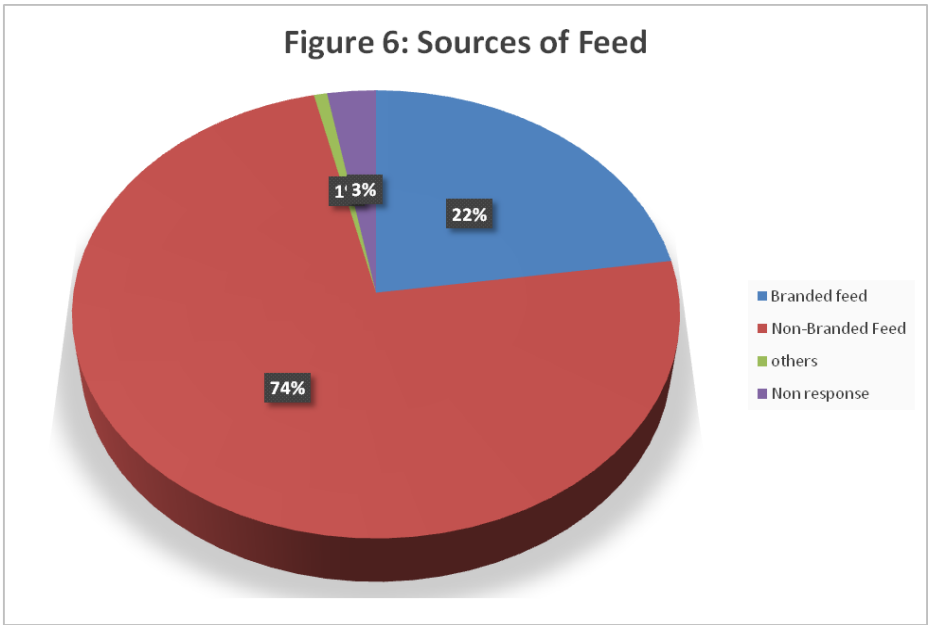


4.4 Uses of Poultry feed

Only 22.8% respondent farmer stated that they used branded feed, while 73.7% farmer said they did use unbranded feed. Among the total farmer, 2.9% farmer did not respond to this question (Table 8 & Figure 6).

Table 8: Sources of Feed

Type of feed	Frequency	Percentage
Branded feed	88	22.68
Non-Branded Feed	286	73.71
others	3	0.77
Total	377	97.16
Non response	11	2.84
Grand Total	388	100



The average feed cost in four upazilas of Bogura districts showed significant differences. It was the highest in Bogura sadar upazila with Tk.55.00 per kg feed, while the lowest in Shahjahanpur upazila with Tk. 42.29 per kg. The higher price of feed in Bogura sadar upazila indicated that respondents from Bogura sadar were basically broiler farmers, as price of broiler feed was higher compared to other feed (Table 9).

Table 9: Feed cost and total amount of feed required

Upazila		Feed cost (Tk./kg)	Total amount of feed used per year (kg)
Shahjahanpur	Mean	42.29	6583.34
	N	290	290
	Std. Deviation	14.74	14691.93
Nondigram	Mean	51.78	6247.78
	N	36	36
	Std. Deviation	12.21	10742.14
Kahaloo	Mean	50.98	6348.42
	N	34	34
	Std. Deviation	13.18	10817.23
Bogurasadar	Mean	55.00	126600.00f
	N	9	9
	Std. Deviation	12.63	255479.41
Total	Mean	43.65	9771.61
	N	335	335
	Std. Deviation	14.82	46261.84
F-value		9.77**	35.60**

4.5 Vaccination and medicine

Vaccination and medication cost did not differ significantly among four upazilas of Bogura district. Although the value was very high in Bogura sadar upazila, but the sample size was very small in that upazila (Table 10). Although there were various service providers as discussed below, vaccination was carried out by local trained people. They were trained by DLS or NGO.

Table 10: Vaccination and medication cost (Taka/year)

Upazila	Total cost (Taka/year)	N
Shahjahanpur	24068.80	200
Nondigram	21125.43	35
Kahaloo	22312.23	34
Bogura sadar	51125.00	8
Total mean	24535.60	277
F-value	0.786	

In case of vaccination of their birds, 45% respondents said that they did not vaccinate to their birds followed by 15.8% vaccinated to their birds for new castle and gumboro. A total of 31.3% farmer did not respond to this question (Table 11).

Table 11: Vaccine used for different diseases

Disease	Frequency	Percentage
New-castle	2	0.52
Gumboro	2	0.52
Bronchitis	12	3.09
New-castle and Gumboro	59	15.20
New castle, Gumboro and Bronchitis	6	1.55
New castle, Gumboro, Bronchitis and Avian influenza	5	1.29
Newcastle, Gumboro, & Marek's Diesease	10	2.58
No vaccination	168	43.30
Duck Plague	2	0.52
Chicken Pox, Gumboro and New-castle	14	3.61
Total	280	72.16
Non response	108	27.84
Grand total	388	100

Among the sources of vaccine, the highest 15.2% respondent said that they collected their vaccine from medicine shop. A total of 72.8% farmer did not respond to this question (Table 12). As mentioned earlier, various vaccine providers have been given in Table 12.

Table 12: Sources of vaccine

Source	Frequency	Percentage
Local dealer	25	6.44
Medicine shop	59	15.21
Nearest town	5	1.29
Veterinary hospital/ Livestock Dept.	18	4.64
Total	107	27.58
Non response	281	72.42
Grand Total	388	100

Nearly 75.4% respondent did not answer or they had no idea about cool chain during vaccine transportation. Among the response group 13.2% respondent said yes, while 11.4% respondent said no about cool chain maintaining during vaccine transportation (Table 13).

Table 13:Cool chain maintained during vaccine transportation

Response	Frequency	Percentage
No	46	11.86
Yes	55	14.18
Total	101	26.03
Non response	287	73.97
Total	388	100

Significant differences were found for the outbreak of diseases among the four upazilas. The highest incidence was found in Shahjahanpur upazila and the lowest was found in Bogura sadar upazila (Table 14).

Table 14: Outbreak of diseases last year

Upazila	Mean	N
Shahjahanpur	13.85 (5.02)	289
Nondigram	11.83 (6.50)	29
Kahaloo	12.30 (6.28)	30
Bogura sadar	4.56 (1.33)	9
Total mean	13.41 (5.34)	327
F-value	15.96**	

Figures in the parentheses indicate standard deviations.

In a question of medicine collection, 85.1% respondent said that they collected medicine from medicine shop, followed by 3.2% from local dealer and 3.2% from veterinary hospital. 7.6% did not respond to this question (Table 15).

Table 15: Collection of medicine

Source	Frequency	Percent
Local dealer	15	3.86
Medicine shop	319	82.23
Nearest town	4	1.03
Veterinary hospital	15	3.87
Total	353	90.98
Non response	35	9.02
Grand Total	388	100

In a question about the use of antibiotics in the poultry flock, 59.9% respondent said that they did not use it while 33.6% respondent said that they used it. Among the total respondent 6.4% did not respond to this question (Table 16).

Table 16: Uses of antibiotics last year in the farm

Response	Frequency	Percentage
No	231	59.54
Yes	130	33.51
Total	361	93.04
Non response	27	6.96
Total	388	100

Among the different antibiotics, the highest use of antibiotics was Gentamicin with a percentage of 8.8%, while Amoxicillin and Ciprocin jointly used in 8.2% case. 67.8% respondent did not answer to this question (Table 17).

Table 17: Different antibiotics used

Antibiotics Name	Frequency	Percentage
Levofloxacin	2	0.52
Gentamicin	35	9.02
Levofloxacin and Gentamicin	3	0.77
Ciprofloxacin	12	3.09
Oxytetracycline and Amoxicillin	3	0.72
Moxilin and Ciprocin-Vet	12	3.09

Antibiotics Name	Frequency	Percentage
Renamycin and Micsonic	11	2.83
Ciprocin-Vet	10	2.58
Renamycin	8	2.06
Amoxicillin and Ciprocin	31	7.99
Doxy-A Vet	3	0.72
Total	130	33.51
Non response	258	66.49
Grand total	388	100

In a question about the withdrawal period in case of antibiotics used, 74% respondent said that they did not maintain withdrawal period. Only 21.3% respondent said that they maintained withdrawal period while marketing their products (Table 18).

Table 18: Withdrawal period maintained prior to selling of egg and live chicken in case of antibiotics used

Response	Frequency	Percentage
No	287	73.97
Yes	83	21.39
Total	370	95.36
Non response	18	4.64
Grand total	388	100

Among the respondents who gave positive answer to the question about maintaining of withdrawal period, the period was higher in Shahjahanpur upazila with 19.73 days, while the lowest was in Bogura sadar with 6.33 days (Table 19).

Table 19: Number of days as withdrawal period maintained

Upazila	Day	N
Shahjahanpur	19.73 (18.77)	60
Nondigram	7.00 (3.42)	8
Kahaloo	7.02 (3.88)	7
Bogura sadar	6.33 (2.80)	6
Total mean	17.27 (15.17)	81
F-value	3.27*	

Figures in the parentheses indicate standard deviations.

Table 20 presents four categories of service providers like veterinary surgeon, veterinary field assistant, local trained people and farmers themselves. In a question about the service provider in the farm, 76.9% farmers responded that they themselves did the work, followed by veterinary surgeon in 12.6% case, 1.5% respondent did not respond to this question (Table 20).

Table 20: Service provider of the poultry farm

Service provider	Frequency	Percentage
Veterinary surgeon	49	12.63
Veterinary field assistant	5	1.29
Local trained people	31	7.99
Farmers themselves	298	76.80
Total	383	98.71
Non-response	5	1.29
Total	388	100.0

4.6 Housing and rearing of poultry

The type of housing was tin shed in 53.5% case, followed by 27.5% half building and 16.1% were others where non-response respondents were 0.6% (Table 20).

Table 21: Types of housing

Housing Types	Frequency	Percentage
Tin shed	208	53.61
Half building	107	27.58
Building	9	2.32
Others	62	15.98
Total	386	99.48
Non response	2	0.52
Grand Total	388	100.0

The cost of housing showed significant differences among four upazilas. The cost was higher in Bogura sadar and lower in Shahjahanpur. There were significant differences in the number of shed and area (sq. ft.) among four upazilas (Table 22).

Table 22: Cost of housing, number of shed and area of shed

Upazila		Cost of housing (Tk)	No of shed	Area of shed
Shahjahanpur	Mean	73361.23	1.09	1227.91
	N	294	294	294
	Std. Deviation	189070.06	0.33	892.74
Nondigram	Mean	101616.22	1.0000	903.78
	N	37	37	37
	Std. Deviation	184857.88	.00000	723.82
Kahaloo	Mean	99914.63	1.0000	890.58
	N	36	36	36
	Std. Deviation	166912.64	.00000	723.82
Bogura sadar	Mean	284444.44	1.6667	2066.6667
	N	9	9	9
	Std. Deviation	233511.84	0.50	331.66
Total	Mean	82023.53	1.09	1214.84
	N	340	340	340
	Std. Deviation	192372.82	0.33	881.50
F-Value		5.62**	16.44**	6.76**

Most of the rearing methods were floor rearing with a percentage of 90.1%, followed by others 5.8%, cage rearing was 0.6% and slat rearing 0.3%. The results indicated that the popular rearing method in 4upazilaswas floor rearing system (Table 23).

Table 23: Methods of rearing poultry

Rearing methods	Frequency	Percentage
Floor	350	90.21
Cage	3	0.77
Slat	1	0.26
Others	23	5.93
Total	377	97.16
Non response	11	2.84
Grand Total	388	100

In case of percentage of litter materials used in poultry farm, it was observed that in 83% case it was rice husk and only in 0.9% case it was saw dust. A total of 16.1% respondent did not response to this question (Table 24).

Table 24: Types of litter materials

Litter materials	Frequency	Percentage
Rice husk	322	82.99
Saw dust	3	0.77
Total	325	83.76
No response	63	16.24
Grand Total	388	100

About 43.6% farms used laying box, while 41.2% did not use laying box for laying hen. In 15.2% respondent did not answer to this question (Table 25).

Table 25: Laying box present in case of floor rearing layer

Response	Frequency	Percentage
No	160	41.24
Yes	169	43.56
Total	329	84.79
No response	59	15.21
Grand Total	388	100

Floor space per bird showed significant differences among 4 upazilas of Bogura district. The floor space per bird was higher in Bogura sadar and the lowest in Shahjahanpur upazila (Table 26).

Table 26: Floor space per bird {sq. ft)

Upazila	Floor space (sq. ft)	N
Shahjahanpur	0.75 (0.27)	274
Nondigram	1.0620 (1.36)	30
Kahaloo	1.0731 (1.38)	29
Bogura sadar	1.3111 (0.27)	9
Total	0.80 (0.50)	342
F-value	10.65**	

About 79.8% commercial farms used electric bulb as brooder in their farm, in 8.8% case it was others and 3.5% case it was electric heater. About 7.9% respondent did not response to this question (Table 27).

Table 27: Types of brooder

Type	Frequency	Percentage
Electric heater	14	3.61
Electric bulb	310	79.90
Others	34	8.76
Total	358	92.27
Non response	30	7.73
Grand Total	388	100

Most of the farms used round drinker as waterer and it was 97.1%. Nipple, bell and others cases it was 0.3% in each case. Non response case was 2% (Table 28).

Table 28: Types of waterer

Type	Frequency	Percentage
Round	377	97.16
Nipple drinker	1	0.26
Bell drinker	1	0.26
others	1	0.26
Total	380	97.94
Non response	8	2.06
Grand Total	388	100

In case of using feeder, in 98.5% case it was round feeder and only 0.6% case it was automatic feeder. About 0.9% case, the respondent did not give answer (Table 29).

Table 29: Types of feeder

Type	Frequency	Percent
Round	382	98.45
Automatic	2	0.52
Total	384	98.97
Non response	4	1.03
Grand Total	388	100

4.7 Bank loan and marketing

Bank loan is the most important and congenial source of financing. People can start poultry farming and business with the soft loan from scheduled banks. It is the cheapest source of financing compared to informal money lenders and NGOs.

4.8 Primary investment

Primary investment among 4 upazilas of Bogura district did not show significant differences. However, income from live poultry selling showed significant differences among 4upazilas of Bogura district. Income from live poultry selling is higher in Bogura sadar upazila and lower in Nandigram upazila (Table 30).

Table 30: Investment and income from poultry farming

Upazila		Primary investment for farming (Tk)	Income from live poultry selling (Tk/year)
Shahjahanpur	Mean	120679.08	55410.40
	N	282	277
	Std. Deviation	480799.05	193011.26
Nondigram	Mean	200571.43	51729.42
	N	28	34
	Std. Deviation	328669.53	90602.21
Kahaloo	Mean	211331.25	49566.86
	N	26	26
	Std. Deviation	331887.14	88876.42
Bogura sadar	Mean	297500.00	262500.00
	N	8	8
	Std. Deviation	316442.28	117321.29
Total	Mean	132161.95	60211.54
	N	318	319
	Std. Deviation	466420.13	185863.26
F-value		0.88	4.99**

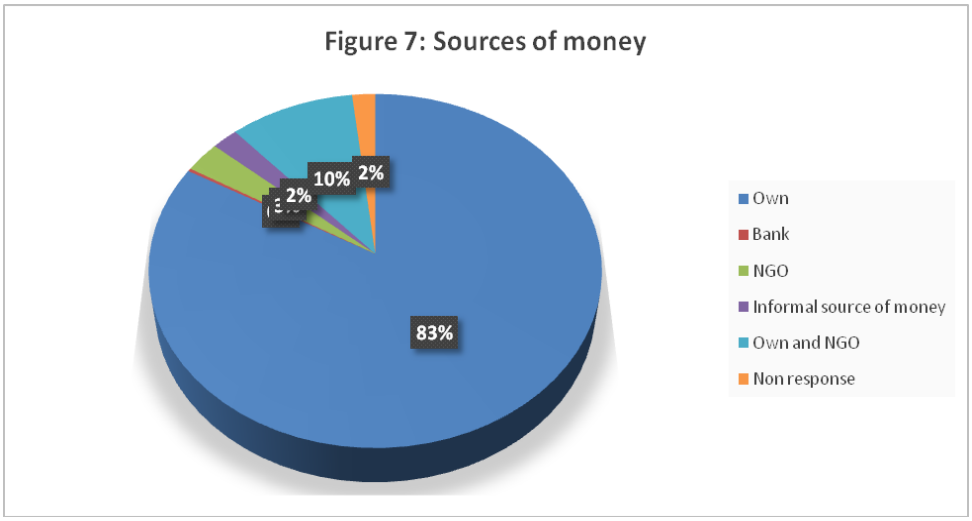
4.9 Sources of finance

During analysis of the data about sources of money for starting poultry farming, about 83.3% respondent answered that they established poultry farm with their own finance. Own and NGO jointly covered 9.9% and only NGO covered 2.9%. Non response respondent covered 1.5% (Table 31& Figure 7).

Table 31: Sources of money

Source	Frequency	Percentage
Own	323	83.3
Bank	1	0.26

Source	Frequency	Percentage
NGO	11	2.84
Informal source of money	8	2.06
Own and NGO	38	9.8
Total	381	98.20
Non response	7	1.80
Grand Total	388	100



4.10 Income from egg selling

Income from egg selling did not show significant differences among 4upazilas of Bogura district. The value was higher in Shahjahanpur upazila and lower in Nondigram upazila (Table 32).

Table 32: Income from egg selling (Taka/year)

Upazila	Mean	N
Shahjahanpur	2288.29 (3114.82)	168
Nondigram	1788.24 (746.35)	17
Kahaloo	1850.32 (870.42)	15
Bagura sadar	0.00	0.00
Total mean	2242.34 (2979.12)	200
F-value	0.43	

Figures in the parentheses indicate standard deviations.

4.11 Selling place of live bird or egg

Selling place of live bird and egg found the highest at local market with 93.9% case, while in case of broker it was 2.4% and at farm level it was 2.0%. The percentage of non-response was 1.2% to this question (Table 33).

Table 33: Selling place of live bird or egg

	Frequency	Percent
Farm	8	2.06
Market	364	93.81
Others	2	0.52
Broker	9	2.32
Total	383	98.71
Non response	5	1.29
Grand Total	388	100

4.12 Stakeholder in poultry and egg supply chain

The different stakeholders in poultry and egg supply chain showed higher percentage with consumer having 69.9%, followed by 12.9% businessman, 5.6% dealer and 2.3% producer. About 8.2% respondent did not response with this question (Table 34).

Table 34: Stakeholder in poultry and egg supply chain

Stakeholder	Frequency	Percentage
Producer	9	2.32
Dealer/supplier	22	5.67
Businessman	50	12.89
Consumer	271	69.85
All	5	1.29
Total	357	92.01
Non response	31	7.99
Grand Total	388	100

4.13 Main actors of live bird selling

While identifying the main actors of live bird selling about 76.6% respondent identified retailer as the main actor, followed by 15.5% whole seller, 3.2% dealer and 2.9% producer(Table 35).

Table 35: Main actor of live bird selling

Actor	Frequency	Percentage
Whole seller	60	15.46
Retailer	297	76.55
Producer	11	2.84
Dealer	12	3.09
Total	380	97.94
Non response	8	2.06
Grand Total	388	100

4.14 Actors of egg selling

While identifying the main actor of egg selling about 75.4% respondent identified retailer as main actor, followed by 3.2% producer, 1.5% dealer and 1.2% whole seller. About 18.7% respondent did not response with this question (Table 36).

Table 36: Actors of egg selling

Actor	Frequency	Percentage
Whole seller	5	1.29
Retailer	293	75.52
Producer	12	3.09
Dealer	6	1.55
Total	316	81.44
Non response	72	18.56
Grand Total	388	100

4.15 Final destination of live birds marketing

In response to a question about the final destination of live bird selling, about 81.6% case it was in Bogura city, while in 15.8% cases it was Dhaka and other cities. Non-response to this question was 2.6% (Table 37). Whole sellers supplied large quantity of live birds to the meat industries located at the outskirts of Dhaka city for processing. Meat industries have either own poultry farms or contract farmers or contract whole sellers for regular supply of live poultry birds.

Table 37: Final destination of live birds marketing

Destination	Frequency	Percentage
Bogura	317	81.70
Dhaka and Others	61	15.72
Total	378	97.42
Non response	10	2.58
Grand Total	388	100

4.16 Final destination of produced egg marketing

In response to a question about the final destination of egg selling, about 79.8% case it was in Bogura city, while in 1.2% cases it was in Dhaka city. Non-response to this question was 19% (Table 38).

Table 38: Final destination of produced egg marketing

Destination	Frequency	Percentage
Dhaka	5	1.29
Bogura	310	79.90
Total	315	81.19
Non response	73	18.81
Grand Total	388	100

4.17 Selling information of live bird

Number and amounts of live birds sold last year (kg), average selling price (Tk/kg) and return from poultry selling have been presented in Table 39. All these parameters had shown significant differences among different upazilas of Bogura district (Table 39).

Table 39: Selling information of live bird

Upazila		No of live birds were sold last year (Number)	Amount of live birds were sold last year (kg)	Average selling price (Tk/kg)	Return from poultry selling
Shahjahanpur	Mean	1572.93	1488.72	322.58	259618.12
	N	287	287	287	287
	Std. Dev.	4396.67	3997.49	110.32	763041.84
Nondigram	Mean	1810.91	2313.62	275.65	374500.00
	N	34	34	34	34
	Std. Dev.	3398.18	3853.40	105.43	705976.90
Kahaloo	Mean	1922.44	2412.12	286.44	384214.18
	N	30	30	30	30
	Std. Dev.	3398.18	3853.40	105.43	705976.90
Bogura sadar	Mean	8533.33	8666.67	138.89	1210000.00
	N	9	9	9	9
	Std. Dev.	1297.11	1322.87	12.69	242177.62
Total	Mean	1787.2818	1769.4712	312.7333	297373.9394
	N	360	360	360	360
	Std. Dev.	4391.86	4101.71	112.92	763017.62
F-value		11.67^{**}	14.85^{**}	14.72^{**}	7.23^{**}

4.18 Age and weight of live bird, and egg production and selling information

Age at selling (day) and average weight during marketing (g) was significantly different among the 4upazilas of Bogura District. However, eggs sold last year (Number), average selling price of egg (Price of each egg) and return from egg selling did not show significant differences among the 4 upazilas. Age at sale was lower in Bogura sadar upazila which indicated that the farmers were mainly broiler farmers (Table 40).

Table 40: Age and weight of live bird, and egg production and selling information

Upazila		Age at selling (day)	Average weight during marketing (g)	How many eggs were sold last year (Number)	Average selling price of egg (Price of each egg Tk)	Return from egg selling
Shahjahanpur	Mean	223.09	869.38	159.98	12.38	1971.15
	N	290	290	247	247	247
	Std. Dev.	159.97	478.73	100.53	2.47	1285.00
Nondigram	Mean	178.31	1150.00	132.08	12.96	1701.25
	N	36	36	24	24	24
	Std. Dev.	99.49	537.45	34.76	1.33	451.03
Kahaloo	Mean	182.22	1220.10	136.06	13.22	1802.23
	N	34	34	20	20	20
	Std. Dev.	99.49	537.45	34.76	1.33	451.03
Bogura sadar	Mean	39.44	1883.33	-	-	-
	N	9	9	-	-	-
	Std. Dev.	7.83	350.00	-	-	-
Total	Mean	213.34	926.78	157.51	12.44	1947.24
	N	369	369	291	291	291
	Std. Dev.	155.60	514.19	96.82	2.39	1236.00
F-value		7.37**	23.58**	1.82	1.26	1.04

4.19 Collection center of live bird and egg nearby firm

While asking a question whether any collection center of live bird and egg exist nearby your farm, 62.3% respondent answers were negative and 10.5% were positive. The percentage of non-response respondents were 27.2% (Table 41).

Table 41: Collection center of live bird and egg nearby farm

Response	Frequency	Percentage
No	242	62.37
Yes	41	10.57
Total	283	72.94
Non response	105	27.06
Grand total	388	100

4.20 Use of digital balance in the farm

Respondents were asked whether they use digital balance in their farm, in 76% cases it was negative and 21.1% cases it was positive. However, 2.9% respondent did not response to this question (Table 42).

Table 42: Use of digital balance in the farm

Response	Frequency	Percentage
No	295	76.03
Yes	82	21.13
Total	377	97.16
Non response	11	2.84
Grand Total	388	100

4.21 Poultry or egg processing unit

Respondents said that in 39.8% cases there was no poultry and egg processing unit in their area, while 0.9% respondent said that poultry and egg processing unit was present in their area. However, 59.4% respondents did not answer to this question (Table 43).

Table 43: Poultry or egg processing unit

Response	Frequency	Percentage
No	136	39.8
Yes	3	0.9
Total	139	40.6
Non response	203	59.4
Grand Total	342	100

4.22 Problems faced during marketing of birds

Some of the problems were identified while asking question to the poultry farmers. These were lower live weight, 300g more weight need to be given at 20 kg weight, lower price of birds, and higher price of feed, transportation problem. However, 74% cases the respondent did not found any problem in the poultry farming. However, 9.1% respondent did not response to this question (Table 44).

Table 44: Problems faced during marketing of birds

Problems	Frequency	Percentage
Lower live wt	8	2.06
300g more is given in 20 kg wt	5	1.29
Lower price	50	12.89
None	287	73.97
Higher price of feed	2	0.52
Transportation problem	1	0.26
Total	353	90.98
Non-response	35	9.02
Grand total	388	100.0

4.23 Problems faced during marketing of egg

The problems identified during marketing of eggs were low price of egg and small production of egg, hard to sell. However, 71.3% respondents said that they had no problem during marketing of eggs. However, 27.5% respondents did not answer to these questions (Table 45).

Table 45: Problems faced during marketing of egg

	Frequency	Percentage
None	277	71.39
Low Price	3	0.77
Little amount of egg, hard to sell	1	0.26
Total	280	72.16
Non response	108	27.84
Grand Total	388	100

4.24 Factors affecting the marketing of birds

The factors that affected market price of birds were fluctuating market prices, price of feed and local brokers. However, about 3.5% respondent said no idea about the factors that affected market price of birds while 86% respondent did not answer to this question (Table 46).

Table 46: Factors affecting the marketing of birds

Factors	Frequency	Percentage
Fluctuating market price	1	0.26
No idea	14	3.61
Price of feed	1	0.26
Local brokers	39	10.05
Total	55	14.18
Non-response	333	85.82
Grand Total	388	100

4.25 Factors affecting the marketing of egg

The factors that affected market price of birds were fluctuating market price (0.3%), however, about 3.2% had no idea. Non-response respondents were 96.5% (Table 47).

Table 47:Factors affecting the marketing of egg

Factors	Frequency	Percentage
None	12	3.09
Fluctuating market price	1	0.26
Total	13	3.35
Non-response	375	96.65
Grand Total	388	100

4.26 Training on poultry rearing

About 90.9% respondent gave answer with the question about training on poultry rearing. Among them, 73.1% did not get training from anywhere, while 17.8% got training(Table 48).

Table 48: Training on poultry rearing

Response	Frequency	Percentage
No	284	73.20
Yes	69	17.78
Total	353	90.98
Non-response	35	9.02
Grand Total	388	100

4.27 Places of training conducted

About 14.9% farmers got training from youth training centre, followed by nearest training center, SIT foundation, Bogura and others. However, 82.2% respondent did not response to this question (Table 49).

Table 49: Places of training conducted

Training centre	Frequency	Percentage
Youth training centre	58	14.95
SIT foundation, Bogura	1	0.26
Others	1	0.26
Nearest training centre	9	2.32
Total	69	17.78
Non-response	319	82.22
Grand-total	388	100

5. Labor and wages

5.1 Number of labor

Number of employees/labors involve in the farm, the most frequent number was 2 (6.4%), followed by 3 (3.2%), 1 (2.9%), 4 (2.0%), 5 (0.9%), 8 (0.3%) and 10 (0.3%). About 83.9% respondent did not response to this question (Table 50).

Table 50: Number of employee involved in the farm

Number of employee	Frequency	Percentage
1	11	2.84
2	25	6.44
3	12	3.09
4	8	2.06
5	3	0.77
8	1	0.26
10	1	0.26
Total	61	15.72
Non-response	327	84.28
Grand Total	388	100.0

5.2 Types of labor

The type of labor was mostly farmer himself (35.4%), followed by both (hired and own; 1.5%) and hired (0.9%). However, 62.3% did not answer to this question (Table 51).

Table 51: Types of labor used in the farm

Type	Frequency	Percentage
Hire	3	0.77
Own	138	35.57
Both	6	1.55
Total	147	37.89
Non-response	241	62.11
Grand Total	388	100

5.3 Wages of labor

The number of family labor, number of hired labor, wages of family labor (Taka/day) and wages of hired labor (Taka/day) did not show significant differences among four upazilas. Average number of family labor was 2.16 and number of hired labor was 0.48. However, wages of family labor per day was Tk711.11 and wages of hired labor per day was Tk 402 (Table 52).

Table 52: Labor and wages for poultry farming

Upazila		Number of family labour	Number of hired labour	Wages of family labour (Tk/day)	Wages of hired labour (Tk/day)
Shahjahanpur	Mean	2.10	0.48	711.11	436.00
	N	30	25	9	6
	Std. Dev.	1.79	1.05	344.40	106.68
Nondigram	Mean	2.28	0.00	696.11	430.60
	N	18	3	18	3
	Std. Dev.	0.67	0.00	345.16	96.45
Kahaloo	Mean	2.27	1.08	701.42	432.23
	N	16	3	16	3
	Std. Dev.	0.55	0.00	360.33	99.14
Bogura sadar	Mean	2.00	2.00	733.45	300.00
	N	1	1	1	1
	Std. Dev.	-.	-.	-	-
Total	Mean	2.1633	0.4828	711.1111	402.00
	N	67	32	9	8
	Std. Dev.	1.44837	1.02193	344.39964	122.27
F-value		0.09	1.49	2.77	2.17

6. Food security, safety and waste management

6.1 Number of poultry and egg consumed by the respondent farmer

Number of poultry and egg consumed by the farms family did not show significant differences among 4 upazilas of Bogura district. Average numbers of poultry consumed per month by farms family was 3.41 and average number of egg consumed by farms family per month was 22.68(Table 53).

Table 53: Number of poultry and egg consumed by the respondent

Upazila		Number of poultry consumed by your family (Number/Month)	Number of egg consumed by your family (Number/Month)
Shahjahanpur	Mean	3.37	23.60
	N	264	187
	Std. Dev.	2.95	25.18
Nondigram	Mean	3.45	12.47
	N	33	17
	Std. Dev.	1.80	10.60
Kahaloo	Mean	3.52	13.22
	N	30	16
	Std. Dev.	1.72	10.22
Bogura sadar	Mean	4.67	-
	N	9	-
	Std. Dev.	0.71	-
Total	Mean	3.41	22.68
	N	336	220
	Std. Dev.	2.82	24.48
F-value		0.93	3.26

6.2 Idea upon safe egg and poultry

About 79.2% respondents said that they have no idea about safe poultry and egg production. Only 16.4% respondents said that they have idea on safe poultry and egg production. Non-response respondents were 3.8% to this question (Table 54).

Table 54: Knowledge on safe poultry and egg production

Response	Frequency	Percentage
No	307	79.12
yes	64	16.49

Response	Frequency	Percentage
Antibiotic free safe meat & food production	2	0.52
Total	373	96.13
Non-response	15	3.87
Grand Total	388	100

6.3 Points to be considered to produce safe egg and poultry

While asking a question about the points to be considered for safe poultry and egg production 78.9% respondents did not have any idea, other answers were biosecurity, hygiene, healthy and quality chick production, intensive care, discriminate use of medicine etc. About 4.7% respondents did not answer to this question (Table 55).

Table 55: Factors for safe poultry and egg production

Points	Frequency	Percentage
Biosecurity	11	2.84
No idea	306	78.9
Biosecurity and hygiene	10	2.9
Healthy & quality chick production	4	1.2
Do not use medicine unnecessarily	31	9.1
Need intensive care	1	.3
Total	362	93.30
System	26	6.70
Grand Total	388	100

6.4 Disposal system of dead bird

In a question about dead bird disposal about 26% farmers buried the dead bird in the soil, while about 66% respondent said they threw it outside. Non-response respondents were 5.8% to this question (Table 56).

Table 56: Disposal system of dead bird

Disposal system	Frequency	Percentage
Buried in the soil	100	26.0
Burned	1	0.26
Throw outside	256	65.78
Others	8	2.03
Total	365	94.07
Non-response	23	5.93
Grand Total	388	100

6.5 Litter or feces management generated from poultry farming

In a question about litter or feces disposal, about 18% farmers said that they sold it, while 13.7% farmers said that they used it in the pond for fish culture. Only 0.3% farmers used it for manure preparation. Non-response respondents were 5.8% to this question (Table 57).

Table 57: Litter or feces management generated from poultry farming

Waste management	Frequency	Percentage
Selling	71	18.30
Manure preparation	1	0.26
Throw in the pond for fish culture	53	13.66
Others	19	4.90
Fire	2	0.52
Field	218	56.19
Total	364	93.81
Non-response	22	5.67
Grand Total	388	100

7. Contribution of poultry farm

7.1 Advantages of poultry farming

The respondents said that poultry farming is advantageous because it is a source of income, as well as safe production for home consumption. Poultry farming also fulfill the demand of egg and meat for the country. It is the main source of animal protein for the people of the country. The respondents also said that poultry farming give quick return compare to other sub sector of agriculture and livestock. About 7.3 % respondent did not answer to this question (Table 58).

Table 58: Advantages of poultry farming in the study area

Advantages	Frequency	Percentage
Income and safe poultry	61	15.72
income, fulfil the demand of egg and meat	133	34.28
Production & consumption of safe Poultry	2	0.52
None	5	1.29
Meat & egg production	6	1.55
Protein requirement fulfillment	21	5.41
Higher Profit in Short Time	21	5.41
Income in short period of time	112	28.87

Advantages	Frequency	Percentage
Total	361	93.04
Non-response	27	6.96
Grand Total	388	100

7.2 Challenges of poultry farming

While asking a question about disadvantages of poultry farming, highest response was bad smell (38.6%) (Table 59). The available answers were:

- Lower price of chicken and higher price of feed
- Air pollution
- Predator attack
- Biosecurity
- Lower production
- Higher chick mortality
- Crisis of quality chicks
- Disease outbreak
- Long broodiness
- Unstable market
- Low hatchability
- Low profit

Table 59: Challenges of poultry farming

Challenges	Frequency	Percentage
Lower price of chicken and higher price of feed	10	2.58
Bad Smell	150	38.66
Air pollution and smell	10	2.58
Predator animal	11	2.84
Bio Security	2	0.52
Higher Feed Price	9	2.32
No Idea	11	2.84
Lower Egg Production	9	2.32
Predator, High Chick mortality	29	7.47
Susceptible to disease	6	1.55
Crisis of quality Chicks	1	0.26
Long broodiness	1	0.26

Challenges	Frequency	Percentage
Market is not stable	41	10.57
Low hatchability	2	0.52
Low profit	2	0.52
Total	294	75.77
Non-response	94	24.23
Grand Total	388	100

7.3 Cost Benefit Analysis

Cost benefit analysis has been performed in this study. It was observed that rearing poultry was profitable in Nandigram and Kahaloo upazilas but it was not profitable in other two upazilas (Table 60).Return and cost varied widely and significantly among four upazilas, however, BCR did not varied significantly among upazilas.

Table 60: Yearly return, cost and benefit ratio (BCR) of poultry and layer farming

Upazila		Return from poultry and Egg	Total cost for poultry rearing in a year (Tk.)	Benefit cost ratio (BCR)
Shahjahanpur	Mean	253023.08	448445.95	0.79
	N	296	296	296
	Std. Deviation	752234.36	1028961.39	1.54
Nondigram	Mean	344956.75	331112.70	1.09
	N	37	37	37
	Std. Deviation	683409.16	790915.71	1.52
Kahaloo	Mean	345866.81	339992.65	1.09
	N	46	46	46
	Std. Deviation	677482.19	787814.26	1.45
Bogura sadar	Mean	1210000.00	5881377.78	0.95
	N	9	9	9
	Std. Deviation	242177.62	10090078.85	0.97
Total	Mean	288152.73	591706.34	0.82
	N	388	388	388
	Std. Deviation	751037.42	2031975.95	1.52
F-Value		7.48^{**}	38.14^{**}	0.66

8. Results generated from Focus Group Discussion (FGD)

8.1 FGD for family poultry farming

Family poultry farming is the most important enterprise in the rural households of Bangladesh for the supply of food, nutrition and income. Women in the rural area rear poultry for mostly their own consumption. Family poultry is the main source of animal protein for the household. Sometimes women earn money from selling of poultry and egg for meeting up their striking needs and sometimes for generating savings. However, women have little technical knowledge about scientific rearing of backyard poultry especially for feeding and vaccination.

They reported that they needed formal training for better management of poultry to raise production in terms of safe meat and egg.

They do not purchase day-old chicks from outside rather they produce chicks conventionally through hatching with broody hen. Conventionally they produce chicks of indigenous origin. The flock size is 10-20 birds which scavenge around the homestead. Normally they are given a shelter at night. They are given some supplementation from kitchen waste and grain to their birds besides their scavenging.

Women reported that they fed their poultry with homemade feed like broken rice, wheat, food residue etc. However, some of the women reported that they used to buy some feed ingredients/additives for their poultry along with their family supplied feed.

As disease prevention, they give vaccine of Ranikhet and Fowl Pox to their poultry with the help of Local Service Provider (LSP). If their poultry are affected by any diseases, they slaughter them for their own consumption. In that case they are unaware of health hazard owing to consumption of ill poultry.

They started to sell their poultry at the age of 6 to 10 months. An adult indigenous chicken can lay up to 60 eggs in a year, while an adult duck gives 180 to 200 eggs in a year. They reported that they rear only indigenous chicken, however, they could rear high yielding breed in case of duck preferably Khaki Campbell as they said their plumage color is khaki.

As a measure of sanitation, they use hot ashes and sand as bedding materials. They clean the basement every third day.

Figure 8: Focus group discussion for family poultry

In a response to a question, they reported they used to sell their poultry among neighbors and sometimes in nearby market. Rural women contribute to producing handsome amount of meat and egg but they were unaware of producing safe meat and egg. They mix poultry excreta with cow dung and use them in the field to produce different crops. They also use poultry excreta for home garden.

However, they have interest to rear poultry commercially in a large scale. But they are not in a position to establish commercial farming with their own resources or finance. Hence, they would be able to realize their objectives or intension with the financial support from the government, or NGOs or international organizations.

For family poultry farming only one woman is involved to carry out all activities of poultry rearing daily. They earn 10-12 percent of total income from this backyard farming. They reported that they did not get any support from the extension workers of government in the form of encouragement or medium or anything else.

8.2 FGD for commercial poultry farming

Commercial poultry farming in Bangladesh plays a vital role in supplying live birds, meat products and egg to the consumer. Large number of poultry and poultry meat and egg comes from commercial poultry farming. About 12 million people are engaged in poultry related

activities in farming, feed, meat and egg industries, restaurants, fast-food shops and Chinese restaurants.

Conducting FGD from commercial poultry farming found that every farmer has several poultry sheds. People reported that profitability of farming largely depends on feed price, medicine price, market size and price of poultry.

People of Bogura poultry farming used to sell their poultry in Dhaka, however, a little amount of them are sold in Bogura. They have been selling their birds in Dhaka for getting more prices. That is, profitability of farming depends on the distance of farming and selling. In other words, more is the distance selling place resulted more profit of farming. Normally they did not face any problem to sell their bird and egg. They did not have any association or business group to sell poultry and poultry products.

Figure 9: Focus group discussion for commercial poultry farming

Most of them were found to establish their poultry farming with their own finance, however, some of them were found to take loan from banks and NGOs.

Every entrepreneur employed one or two employees in their farms. They paid salary of Taka 11000 to 18000/- to every employee.

They vaccinated every bird and spent Tk. 5 for vaccination of each bird. They received that service from local service provider. Permanent labour carried out all daily activities of poultry farming. They followed sanitary measures in their shed as well as handling the birds. They used

commercial feed from the feed industry which was available with local dealer. They reported that they used antibiotics in their farm regularly.

Normally they used to sell primary product or unprocessed product to the consumer. There were huge demands for poultry meat and egg in the market. Even they sold the poultry litter or excreta to the crop farmer.

In commercial farming, most of the works were done by male. They used to keep records of farming. Most of the employees were illiterate and primarily they did not have any training for poultry farming. They earned Tk. 5 to 6 lakh every year from the poultry farming. They said that broiler farming was more profitable among all enterprises of poultry farming. They reported that they released 4-5 flocks in a year from each shed. They sold poultry immediately after giving antibiotics to the birds.

9. Result generated from conducting Key Informant Interviews (KIIs)

9.1 KIIs from Dealers

Dealers are integral part of family and commercial poultry farming. They supply feed, medicine, DOC to poultry farm. They have direct and even day to day relation to the poultry farmers. They are the important actors to the supply and value chain of poultry enterprises. They reported that they used to supply DOC, feed, medicine and technical instruction to the farmers. All dealers have license to carry out business relating inputs and medicine of livestock and poultry enterprises. They are quite experienced in this sector and the year of experience which ranged from 7 to 37 years. They also reported that farmers are directly benefited by their activities in the form of supplying medicine, chicks, feed and vaccine to farmers. As they supply essential inputs of poultry enterprises they have gained some technical knowledge of rearing poultry and that is why, they are delegating their responsibilities to the farmers. However, dealers categorically reported that they did not sell chicks according to grading.

Dealers were found to acting as middle men as they connected farmers to the wholesalers or traders or even large scale consumers for selling of poultry. In that case dealers received some money from both farmers and traders to facilitate the trading. However, they did not fix the price

of bird. Prices are fixed on the basis of demand and supply situation of the market. They reported that feed price influenced the price of poultry. There is no hidden cost beyond medicine, vaccine, feed and transportation costs. They used to sell their products on credit but did not provide farmers with credit. Some of the dealers were found to have training and some of them did not have training on poultry and livestock rearing. Most of the dealers reported that they were mostly benefited from poultry rearing although some of them asserted more benefit for farmers or industry.

Now-a-days, poultry industry has been facing challenge due to unusual price hike of feed, medicine and day old chick (DOC).

9.2 KIIs from Veterinary Surgeon and Livestock officer

Government officials especially Upazila Veterinary surgeon and Livestock officers are important stakeholders of poultry industry or enterprises. They assist farmers directly to carry out poultry farming in the rural areas. They provide farmers with technical supports in the form of treatment and maintaining biosecurity management. They reported that there are 63 to 300 commercial poultry farms in every upazila. They were very cautious to use antibiotics indiscriminately without prior suggestion of veterinary surgeon or livestock officer. There are specific rules of using antibiotics in diseased bird. Without knowing the mode of action of antibiotics they suggest the farmer not to sell their birds. That is, they are in favor of maintaining withdrawal period. They also give advice to the poultry farmers to maintain biosecurity in their poultry farm. They also reported that no medicine could be sold in the dispensary without prescription of the doctors. They also give advice to the farmer to maintain welfare of the birds. They reported that they did not test the quality of processed meat, egg and even poultry feed. Sometimes, they provide some sorts of incentives to the farmers. During the last CORONA pandemic they provided medicine to the farmer free of cost and also provided support to the farmer financially. In a response to a question, they provided with subsidized feed and medicine from the government can lessen the meat price as opined by the veterinary surgeon and livestock officer. As poultry meat is cheaper compared to other meat, it could be the main source of animal protein for the low and middle income people. They suggested consuming more poultry meat for the development of this sector. They categorically suggested to the farmers for maintaining hygiene

and biosecurity to the farms. The also opined that regular monitoring and training can ensure safe poultry meat and egg production.

9.3 KIIs from representative of feed and Medicine Company

Company is the most important stakeholder and actor in the poultry industry and enterprise. Some interviews with the representatives of company were organized by the researchers which revealed that company supplied feed, chicks, medicine and vaccines to the farmers. All the companies had license to carry out their business in the poultry sector. Incepta and Renata were such companies those have been carrying out their business and responsibilities for a couple of years in the poultry sector and have been contributing positively. Some of the companies were not found to sell chicks to the farmers. However, they used to supply other inputs as mentioned earlier. Company can influence selling of life bird or egg. But the company could not fix the price of the bird or egg. Representatives of the company asserted that there was no hidden cost beyond the feed, medicine, vaccine and transportation costs.

Company did not sanction loan or credit to the farmer and even did not supply inputs to the farmers on credit. That is, it supplied inputs to the farmer on cash. All company personnel have training on poultry business and they opined that increases of feed, medicine and transportation costs caused increase the price of poultry meat and egg. They also stated those dealers were largely benefitted from poultry enterprises. The companies have the direct contribution of safe meat and egg production through producing farmers with feed, medicine and vaccines.

10. Key findings, conclusion and recommendations

10.1 Key findings

Project Indicators/Immediate Result	Key findings
Increased use of information technology on farms and improved farm management practices will result in a 10 percent reduction in overall poultry mortality.	• 84% farmers are not adopting vaccine & biosecurity against different diseases. • About 79% farmers did not have any idea on bio-security and safe poultry/poultry products production. • About 43% respondents did not follow vaccination program in their farm. Majority of the farmer did not know about cool chain maintaining for vaccination. About 74% farmers did not follow withdrawal period of antibiotics. • About 76% farmers did not use digital balance in their farm. This is a major concern for both producer and consumer or others. • 23% of chicks mortality rate in family & commercial farm.
Gain in body weight as per the growth chart, and a 10 percent reduction in production costs.	• About 73% farmers did not get training for poultry farming. • Only 22% farmers are using branded feed for their poultry. • 67% farmers collect average or non-quality chicks from small chick producer farmer. • 90.9% farmers using unnecessary medicine. • Total cost for poultry rearing in a year Tk 591,706 per farmer.
The linkage of institutional and non-institutional buyers will increase sales of poultry and poultry products (including waste) by 25 percent and prices by 10 percent	• There was no organized market system in the project area. About 62% respondents have no idea about collection center. Therefore, they did not create institutional and non-institutional linkage for marketing.

Project Indicators/Immediate Result	Key findings
Local-level processing plants will be set up, 10 percent of the total poultry production will be processed in local plants, frozen meat will be sold locally and nationally through sub-contracting.	• There is only 1 poultry processing plant in such area and about only 0.5 % poultry are processed there and a small amount of frozen meat is sold local-national through subcontracting.
The establishment of commercial compost production plants using farm/kitchen market waste and make a linkage with big buyers to sell poultry products/by-products following the cross-cutting (gender, nutrition, climate change & environment) issues	• 18% farmers are selling their poultry litter and only 0.26% farmers are using it for manure preparation in compost plants. • 57% farmers are female entrepreneurs in this poultry sector. • Family nutrition through the consumption of egg and meat increased is not significant for mentionable. • About 26% farmers buried dead birds and 65.78% farmers threw these outside. • Proper disposals of litter, feces and dead birds were not considered by the respondent farmers.
The backward and forward market's linkage with the poultry farmers will gradually increase.	• 20 private companies are working in backward and forward market's linkage with the poultry farmers.
Wages increase by 10 percent and an additional 15 percent of employment opportunities will be created.	• Average wages per labor is Tk. 402 per day. • About 16% farms had created employment opportunities with 1-10 paid laborers. • Family income from poultry is average Tk.47,000 per year.

10.2 Conclusions and lessons learned

Only some commercial farms maintained biosecurity in their farms. Some of commercial farms vaccinated their birds regularly. Mortality of DOC is lower in commercial farming compared to family farming. Production cost can be reduced significantly through good poultry practices (GPP), combining vaccination, medication, supply of safe DOC and branded feed, maintaining

bio-security measures. The training of people was found lacking. Trained manpower is more productive compared to non-trained manpower. Reasonable price of DOC, egg, live bird should be ensured. Withdrawal period of each antibiotic should be strictly followed. Proper disposal system of dead bird, litter and feces need to be established in each farm. Accomplishments of above mention factors would increase farm income.

10.3 Recommendations

- Private sector has significant role in the development of livestock and poultry sector. There are about 20 big industries for processing of meat in terms of ready to cook and ready to eat meat. Similar number of industries are involved to supply of feed, DOC and medicine. Most of the NGOs like BRAC, TMSS, Proshika, SSS, ASA including GUK etc. are involved in the development of livestock and poultry sector.
- As feed, DOC, medicine prices are high, government direct subsidy is needed at farmer's level to maintain the supply chain of live birds and eggs commensurate with the increased demand.
- Regular training of farmer and local people should be given about the poultry technology by DLS so that farmers and local people can carry out vaccination regularly to their birds. Proper knowledge of diseases and medicine should be given to farmers for averting disease outbreaks. In addition, farmers should be given training to prepare least cost and safe feed with their own ingredients.
- A proper marketing and value chain should be developed comprising farmers, traders, meat industries, hotels and restaurant people.

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Annex

Questionnaire number: ----------

Name of the enumerator: ----------

Demographic profile of the respondent:

1. Name:	2. Mobile no.:
3. Village:	4. Upazila:
5. Age (year):	6. Education (year of schooling)
7. Experience of farming (year):	8. Sex: M/F

Family Information of the farmer:

9. Number of educated male:	10. Number of uneducated male:
11. Number of educated female:	12. Number of uneducated female:
13. Number of employed male:	14. Number of employed female:
15. Family size (9+10+11+12):	

Family Income and expenditure:

16. Main source of income:	17. Income from crop (Taka)
18. Income from poultry farming (Taka/ year):	19. Income from service (Taka/year)
20. Income from others (Taka/year):	21. Total family income (Taka/year):
22. Expenditure (Taka/Month);	23. Total asset (Taka):

Type of poultry farming (no. per year):

24. Broiler:	25. Color bird/sonali:
26. Cockerel:	27. Layer:
28. Duck:	29. Pigeon:
30. Indigenous:	31. Others:

Source of day old chick:

32. Industry (hatchery):	33. Local dealer:
34. Local hatchery:	35. Government hatchery:
36. NGO:	37. Others:

Chick collection and flock size:

38. Whether chick supply to the farm by the source:	39. Collection by the farmer himself:
40.Transportation cost of day old chick (Taka/year):	41. Initial flock size (Number):
42. Mortality (%):	

Type of feed used:

43. Branded commercial poultry feed (Brand name):	44. Unbranded poultry feed:
45.Crop by-products, bought in:	46. Crop by-products, self-produced:
47. Others:	48. Feed cost (Taka/kg)
49. Amount of feed used in a year):	

Vaccination and Medication:

50.Vaccination and medication cost (Taka/year):	51. What are the different vaccines you used against different diseases in your flock? i) ii) iii) iv) v) vi)
52. From where you purchase vaccine?	53. Do you maintain cool chain while transporting vaccines? Yes/No
54. Type of disease outbreak in your flock last year. i) ii) iii) iv) v) vi)	55. From where you purchase medicine for your flock?
56. Do you use antibiotics in your flock last year? Yes/No	57. What are the antibiotics you used last year in your flock i) ii) iii) iv) v) vi)
58. Do you maintain withdrawal period before selling your bird/egg? Yes/No .. If yes than how many days?	59. Who are the service provider in your farm i) Veterinarian ii) Veterinary assistant iii) Local trained person iv) By Own

Housing and Rearing:

60.Type of housing: i) Tin shed ii) Semi-building iii) Building iv) Others	61. Cost of housing (Taka):
62. No. of shed:	63. Size of shed: i) ii) iv) v)
64. Type of Rearing system: i) Floor ii) Cage iii) Slat iv) Others	65. In case of floor rearing, what type of litter material you use in your farm:
66. In floor rearing system, do you use laying box in layer house?	67. Floor space/bird (ft^2)
68. Different equipment used in the farm: i) ii) iii)	69. Brooder type: i) Electric heater ii) Gas brooder iii) Bulb iv) Others
70. Drinker type: i) Round drinker ii) Trough drinker iii) Nipple drinker iv) Bell drinker v) Others	71. Feeder type: i) Round feeder ii) Trough feeder iii) Automatic feeder iv) Others

Bank loan and marketing:

72. Initial investment (Taka):	73. Source of money: i) Own ii) Bank iii) NGO iv) Borrowed from informal source v) Others
74. Income from selling of live bird(Taka/year):	75. Income earn from selling of egg (Taka/year):
76. Place of selling of live birds or egg: i) Farm gate ii) Market	77. Who are the stockholders in the supply chain of poultry bird and egg:i) Producer ii) Supplier/dealer iii) Transporter iv) Trader v) Buyer vi) Processor ii) Others-
78. Marketing actors for live bird: i) Whole seller ii) Retailer iii) Producer iv) Dealer v) Others----------	79. Marketing actors for egg: i) Whole seller ii) Retailer iii) Producer iv) Dealer v) Others----------
80. Final destination of live birds: i) Dhaka iii) Bogura iii) Others------	81. Final destination of eggs: i) Dhaka iii) Bogura iii) Others------
82. Number of live bird sold last year (piece)---------	83. Amount of live bird sold last year (kg)----------
84. Average price/kg live bird (Taka):	85. Marketing age of meat type poultry:
86. Average weight of your bird (kg):	87. Amount of egg sold last year (piece)----------
88. Average price/piece of egg (Taka):	89. Age at first lay:
90. Average hen day egg production of your bird (%)	91. Age at culling of layer birds (Week):
92. At which % of egg production you cull your birds?	93. Is there any collection point of egg and live bird in your area? Yes/No
94. Do you use electric weighing machine during selling your bird? Yes/No	95. Is there any processing plant of egg and poultry meat in your area? Yes/No
96. What are the problems you faced during marketing of poultry? (i) .... (ii).... (iii)..... (iv).....	97. What are the problem you faced during marketing of egg? (i) .... (ii).... (iii)..... (iv).....
98. What factors influence price of poultry?	99. What factors influence price of egg?
100. Did you get any formal training on poultry rearing? Yes/No	101. If yes then from where you got the training?

Labour and wages:

102. Number of person engaged in this enterprises:	103. Nature of labour: i) Hired ii) Own iii) Both
104. Number of family labour:	105. Number for hired labour:
106. Wages for hired labour Taka/day------	107. Wages for family labour Taka/day----------

Food security:

108. How many eggs consumed by your family in a month?	109. How many numbers of poultry consumed by your family in a month?

Waste management:

110. What do you do with a dead poultry?	111. What do you do with your used litter materials or poultry faeces?

112. Please mention some points on advantages of poultry farming:

113. Please mention some problems of poultry farming:

এফজিডি চেক লিস্ট

পারিবারিক মুরগি পালনের ক্ষেত্রে ঃ

১. হাঁস-মুরগি পালনের ক্ষেত্রে আপনার কারিগরি জ্ঞানের প্রয়োজন আছে কি? হাঁ/না
উত্তর হাঁ হলে কোন ধরণের জ্ঞান দরকার ।

২. হাঁস-মুরগি বা ডিম বাজারজাতকরণে কোন সমস্যার সম্মুখিন হচ্ছেন কি? হাঁ/না
উত্তর হাঁ হলে কোন ধরণের সমস্যার সম্মুখিন হচ্ছেন ।

৩. হাঁস-মুরগি পালনের মাধ্যমে আপনার আর্থিক অবস্থার উন্নয়ণ হচ্ছে কি? হাঁ/না

৪. হাঁস-মুরগি পালনে বাচ্চা সংগ্রহের ক্ষেত্রে কোন ধরণের সমস্যা হচ্ছে কি? হাঁ/না
উত্তর হাঁ হলে কোন ধরণের সমস্যার সম্মুখিন হচ্ছেন ।

৫. কোন কোন উৎস হতে বাচ্চা সংগ্রহ করেন?

৬. হাঁস-মুরগিকে আলাদা খাদ্য দেন কি? হাঁ/না ; উত্তর হাঁ হলে কি ধরণের খাদ্য দেন?

৭. হাঁস-মুরগিকেভ্যাকসিন দেন কি? হাঁ/না; উত্তর হাঁ হলে কোন কোন ধরণের ভ্যাকসিন দেন?

৮. হাঁস-মুরগিকে ভ্যাকসিন কে দিয়ে থাকেন?

৯. হাঁস-মুরগি অসুস্থ্য হলে কার দ্বারা চিকিৎসা করান?

১০. হাঁস-মুরগি সাধারণত কোন বয়সে বিক্রি করেন?

১১. একটি ডিম পাড়া দেশী মুরগি হতে বছরে কয়টি ডিম পান?

১২. একটি ডিমপাড়া দেশী হাঁস হতে বছরে কয়টি ডিম পান?

১৩. উন্নতজাতের হাঁস-মুরগি পালন করেন কিনা? হাঁ/না; উত্তর হাঁ হলে কি ধরণের জাত উল্লেখ করুন ।

১৪. হাঁস-মুরগির জন্য আলাদা ঘরের ব্যবস্থা আছে কি? হাঁ/না

১৫. হাঁস-মুরগি পালনে কি কি স্বাস্থ্য সম্মত ব্যবস্থা নিয়েছেন উল্লেখ করুন?

১৬. হাঁস-মুরগি পালনে আপনার পরিবারের কতজন সদস্য জড়িত উল্লেখ করুন?

১৭. হাঁস-মুরগির রোগবালাই সর্ম্পকে ধারণা আছে কি? হাঁ/না

১৮. হাঁস-মুরগি পালন খাবার উদ্দেশ্যে না বিক্রির উদ্দেশ্যে করেন?

১৯. বিক্রির উদ্দেশ্যে করলে কোখায় কোখায় বিক্রি করেন?

২০. পারিবারিক খামার হতে বানিজ্যিক খামারে যাবার ইচ্ছা আছে কি? হাঁ/না

২১. নিরাপদ মাংস বা ডিম উৎপাদনের কোন ধারণা আছে কি? হাঁ/না

২২. মুরগির বিষ্ঠা কি কাজে ব্যবহার করেন?

২৩. আপনার পারিবারিক মোট আয়ের শতকরা কত ভাগ আয় হাঁস-মুরগি পালন থেকে আসে?

২৪. পারিবারিক মুরগি পালনে সরকারি অনুদান বা ঋণের দরকার আছে কি? হাঁ/না

২৫. সরকারি সম্প্রারণ কর্মী হাঁস-মুরগি পালনে অনুপ্রাণিত করে কি ? হাঁ/না

এফজিডি চেক লিস্ট

বানিজ্যিক মুরগি পালনের ক্ষেত্রে ঃ

১. আপনার খামারে কি পরিমান হাঁস-মুরগি পালন করা হয়?

২. লাভজনক খামারের ক্ষেত্রে কি কি বিষয় প্রভাবিত করে?

৩. হাঁস-মুরগি বা ডিম বাজারজাত করণে কোন সমস্যার সম্মুখিন হচ্ছেন কি? হাঁ/না; উত্তর হাঁ হলে কোন ধরণের সমস্যার সম্মুখিন হচ্ছেন ।

৪. আপনার খামাওে উৎপাদিত মুরগি ও ডিম কোখায় কোখায় বিক্রি করেন?

৫. মুরগি বা ডিম বিক্রয়ের ক্ষেত্রে আপনাদের কোন ব্যবসায়িক গ্রুপ আছে কি? হাঁ/না

৬. হাঁস-মুরগি পালনে আপনার মূলধণের উৎস কি?

৭. দূরবর্তী স্থানে মুরগি বা ডিম বিক্রয়ে বেশী লাভ হয় কি? হাঁ/না

৮. সরাসরি জীবন্ত বা প্রসেস মুরগি বিক্রি করেন কি? জীবন্ত/প্রসেস

৯. মুরগি প্রতি ভ্যাকসিন ও ঔষধ ক্রয়ে কত টাকা খরচ হয়?

১০. বায়োসিকিউরিটির জন্য কি কি ব্যবস্থা গ্রহন করেন?

১১. আপনি সম্প্রারণ সার্ভিস কোথা থেকে গ্রহন করেন?

১২. হাঁস-মুরগি খামারে চিকিৎসা সেবা কোথা হতে গ্রহন করেন?

১৩. আপনার খামারে কে ভ্যাকসিন দেয় ।

১৪. খামারে কতজন লোক কাজ করে?

১৫. বাইরের শ্রমিক দিয়ে কাজ করান কি? হাঁ/না

১৬. হাঁস-মুরগিকে কি ধরণের খাদ্য খাওয়ান?

১৭. কোন ধরণের অ্যান্টিবায়োটিক ব্যবহার করেন কি? হাঁ/না

১৮. হাঁস-মুরগি বা ডিম বিক্রির সময় প্রক্রিয়াজাত করেন কি? হাঁ/না

১৯. বাজারে হাঁস-মুরগি বা ডিমের চাহিদা কেমন?

২০. বর্জ্য ব্যবস্থাপনা কিভাবে করেন?

২১. আপনার হাঁস-মুরগি খামারে কে বেশী কাজ করে? পুরুষ/মহিলা

২২. পুঁজি কোথা থেকে পান?

২৩. আয় কি কাজে ব্যয় করেন?

২৪. রেকর্ড সংরক্ষণ করেন কি? হাঁ/না

২৫. হাঁস-মুরগি পালনে কোন প্রশিক্ষন আছে কিনা?

২৬. আপনার মোট আয়ের শতকরা কত ভাগ আয়হাঁস-মুরগি খামার থেকে আসে?

২৭. মুরগির খামারে মধ্যে কোন এন্টারপ্রাইজটি বেশী লাভজনক? ব্রয়লার/লেয়ার/সোনালী/ককরেল/অন্যান্য

২৮. নিরাপদ মাংস বা ডিম উৎপাদনের কোন ধারণা আছে কি? হাঁ/না

কে আই আই চেক লিস্ট

সরকারি কর্মকর্তা/ উপজেলা লাইভস্টক অফিসার/ ভেটেরিনারি অফিসার

নাম-

পদবি-

উপজেলা/জেলা-

মোবাইল নম্বর-

১) আপনার উপজেলা/জেলায় কি পরিমাণ পোল্ট্রি খামারি আছে---------
২) আপনি বা আপনার অফিস পোল্ট্রি খামারিকে কি ধরণের সেবা দিয়ে থাকেন?
৩) খাদ্যে অ্যান্টিবায়োটিক ব্যবহারে কোন বিধি নিষেধ আছে কি? হাঁ/না ।উত্তর হাঁ হলে কি ধরণের বিধি নিষেধ আছে?
৪) অসুস্থ্য পোল্ট্রি চিকিৎসায় অ্যান্টিবায়োটিক বা বিভিন্নঔষধ ব্যবহারে কোন নীতিমালা আছে কি? হাঁ/না । উত্তর হাঁ হলে কি কি নীতিমালা আছে বলুন ।
৫) অ্যান্টিবায়োটিক বা বিভিন্ন ঔষধ ব্যবহারের কতদিন পর পোল্ট্রি বা ডিম বিক্রয় করা যাবে এ ব্যপারে খামারিকে কোন পরামর্শ দেন কি? হাঁ/না ।
৬) খামারিকে বায়োসিকিউরিটি বিষয়ে কোন পরামর্শ দেন কিনা? হাঁ/না । উত্তর হাঁ হলে কি ধরণের পরামর্শ দেন?
৭) ভেটেরিনারি ডাক্তারের ব্যবস্থাপত্র ছাড়া ঔষধ বিক্রয়ে কোন বিধিনিষেধ আছে কি? হাঁ/না ।
৮) খামারে পাখিদের welfare বা কল্যান সম্পর্কে খামারিকে পরামর্শ দেন কি? হাঁ/না ।
উত্তর হাঁ হলে কি ধরণের পরামর্শ দেন?
৯) খামারে উৎপাদিত পোল্ট্রি, মাংস, ডিমঅথবা পোল্ট্রির জন্য ব্যবহৃত খাদ্য পরীক্ষা করেন কি? হাঁ/না ।উত্তর হাঁ হলে কি ধরণের পরীক্ষা করে থাকেন ?
১০)খামারীকে কোন ধরণের সরকারি প্রনোদনা দেয়া হয়কি? হাঁ/না ।উত্তর হাঁ হলে সর্বশেষ কবে দেয়া হয়েছিল?
১১)পোল্ট্রি শিল্প উন্নয়নে কি কি করা উচিত বলে আপনি মনে করেন?
১২)সাশ্রয়ি মূল্যে পোল্ট্রি প্রোডাক্ট পাবার ব্যপাওে আপনার পরামর্শ বলুন ।
১৩)অধিক পরিমানে পোল্ট্রি মাংস ও ডিম খাওয়ার জন্য ভোক্তাদের আকৃষ্ট করার ব্যপারে কোন পরামর্শ দেন কি? হাঁ/না ।উত্তর হাঁ হলে এ ব্যাপাওে আপনাদের কি কর্মসূচি আছে?
১৪)খামারি কে নিরাপদ পোল্ট্রি ও ডিম উৎপাদনে আপনি কি ধরণের পরামর্শ দিয়ে থাকেন?
১৫)নিরাপদ পোল্ট্রি মাংস ও ডিম উৎপাদনে কি কি ব্যবস্থা গ্রহণ করা উচিত বলে আপনি মনে করেন ।

কে আই আই চেক লিস্ট

ডিলার/ কোম্পানি প্রতিনিধি

নাম-

ঠিকানা-

মোবাইল নম্বর-

১) আপনি পোল্ট্রি খামারে কি কি ধরণের ইনপুট দিয়ে থাকেন?
২) আপনার কোন লাইসেন্স আছে কিনা?
৩) আপনি কত বছর যাবত এই কাজ করছেন?
৪) আপনার কাছ থেকে ঔষধ, বাচ্চা, খাদ্য, ভ্যাকসিন গ্রহনে খামারিরা উপকৃত হয় কি? হাঁ/না ।
৫) আপনি কি গ্রেড অনুযায়ি বাচ্চা বিক্রি করেন? হাঁ/না । উত্তর হাঁ হলে কি কি ধরণের গ্রেডের বাচ্চা বিক্রি করেন?
৬) কি কি ধরণের বাচ্চা বিক্রয় করেন?
৭) উৎপাদিত পণ্য বিক্রয়ে আপনার কোন ভূমিকা আছে কি? হাঁ/না ।
৮) আপনি কি উৎপাদিত পণ্যের মূল্য নির্ধারণ করেন? হাঁ/না । উত্তর হাঁ হলে কিভাবে মূল্য নির্ধারণ করেন?
৯) এই ব্যবসায় কোন লুকায়িত খরচ আছে কি? হাঁ/না । উত্তর হাঁ হলে লুকায়িত খরচ সম্পর্কে বলুন ।
১০)মুরগি ক্রয়ে কিভাবে ওজন করেন?
১১)খামারিকে লোন বা বাকিতে ইনপূট সরবরাহ করেন কি? হাঁ/না । উত্তর হাঁ হলে কোন ইনটারেস্ট নেন কিনা?
১২)খামারি লোকসান করলে কিভাবে টাকা আদায় করেন?
১৩)আপনার প্রশিক্ষন আছে কি না? হাঁ/না ।
১৪)কোন কোন ফ্যাক্টর পোল্ট্রি বা ডিমের বাজার মূল্য প্রভাবিত করে?
১৫)আপনার মতে পোল্ট্রি শিল্পে কে বেশী লভ্যাংশ পায় বলে আপনি মনে করেন?
খামারী/ডিলার/শিল্পমালিক/আরতদার/খুচরা বিক্রেতা
১৬)নিরাপদ পোল্ট্রি মাংস ও ডিমউৎপাদনে আপনার কোন ভূমিকা আছে কি? হাঁ/না । উত্তর হাঁ হলে কিভাবে ভূমিকা রাখছেন?