

Baseline Study Report
On
Market System Development of Safe Poultry and Poultry Products



Implemented by: Dushtha Shasthya Kendra (DSK)

Supported by: Palli Karma-Sahayak Foundation (PKSF)



June 2023

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Supported by: Palli Karma-Sahayak Foundation (PKSF)

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Acronyms

AI	Artificial Insemination
AISP	Artificial Insemination Service Provider
BDT	Bangladeshi Taka
BHHs	Beneficiary Households
BQ	Black Quarter
DLS	Department of Livestock Services
FAO	Food and Agricultural Organization
FGD	Focus Group Discussion
Fig	Figure
FMD	Foot and Mouth Disease
g/d	Gram per Day
GAP	Good Agricultural Practices
GDP	Gross Domestic Products
GLMP	Good Livestock Management Practices
GO	Government Organization
HACCP	Hazard Analysis on Critical Control Points
HHS	Household Survey
HHs	Households
HSC	Higher Secondary Certificate
IDF	International Development Fund
IFAD	International Fund for Agricultural Development
Kg	Kilogram
KII	Key Informant Interview
LEO	Livestock Extension Officer
LS	Litter Size
LSP	Livestock Service Provider
MA	Master of Arts
MBA	Master of Business Administration
NGO	Non-Government Organization
NHHs	Non-Beneficiary Households
Para-vet	Para-Veterinary Workers
PKSF	Palli Karma-Sahayak Foundation
PPHP	Postpartum heat period
RMTP	Rural Microenterprise Transformation Project
SDGs	Sustainable Development Goals
SMART	Specific, measurable, achievable, relevant, and targeted
SPSS	Statistical Package for Social Science
SSC	Secondary School Certificate
ULO	Upazila Livestock Officer
UNDP	United Nations Development Program
VS	Veterinary Surgeon
Yrs	Years

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Executive Summary

Dushtha Shasthya Kendra (DSK) is implementing the sub-project entitled '**Market System Development of Safe Poultry and Poultry Products**' at five Upazilas of Netrakona Sadar, Barhatta, Mohonganj & Kalmakanda of Netrakona district and Dhormapasa of Sunamganj district under Rural Microenterprise Transformation Project (RMTP) of Palli Karma-Sahayak Foundation (PKSF). The project is working to increase income, ensure food security and improve family nutrition of marginal and small farmers and poultry related backward and forward market entrepreneurs. The sub-project will also work 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. A total of 10000 beneficiaries will get different technical and logistic supports through this sub-project. Under this sub-project, a baseline survey was conducted to assess the production, management & technological interventions which are required to improve value chain, market linkage, easy access to the market and overall business environment condition of the poultry sub-sector

Small-scale duck production has a significant contribution to household economies, food security, and improving the nutritional status of the rural poor. Ducks in Bangladesh are traditionally reared as family and commercial farming following a free-range scavenging system. The main advantage of the duck-rearing system is the low input requirement. The education level of the duck-rearing farmers was found poor irrespective of the study areas. The highest 44.04% of duck-rearing farmers completed the primary level of education and only 9.17% and 3.67% of farmers completed class vi-JSC and SSC levels respectively. However, most of the duck-rearing farmers were middle-aged and young as 51.38% belong to the age group 36-50 years followed by 37.61% to the age group 18-35 years. The average family size was 5.28 and most of the duck-rearing households (78.90%) had up to 3 family members. The dependency ratio was 1.49 and in most of the cases (89.91%) income earning members were male members of the households. The duck-rearing farmers belong in the small farm size category as the landholding was found 48.85 decimal. The highest 26.79% of households consume 4 items of food in a day and 100% of household's intake crops, roots, tuber (potato), etc. followed by meat (red or white) and fish (89.86%) irrespective of the study areas. It was investigated that besides duck-rearing (92.66%) chicken (90.83%) and cattle (72.48%) farming was also a very popular livestock in the surveyed areas. The average monthly income of duck-rearing households and commercial duck-rearing farms was BDT 16167.43 and BDT 22247.71 which shared 5.54% and 43.30% of the total monthly income respectively. Most of the household farmers (82.56%) and commercial farmers (87.16%) reared desi ducks and khaki Campbell. The semi-scavenging (86.24%) and scavenging (50.45%) rearing systems were mostly practiced in household and commercial duck-rearing. Most household and commercial duck-rearing farmers mainly used agricultural fields (74.31%) and (100.0%) and hoar land and water body (70.64%) and (77.98%) as the scavenging venue for ducks. The duck farmers were found unaware of the Good

Agricultural Practice (GAP) in duck farming and had no linkage to contract duck farming. However, 32.10% and 41.28% of households and commercial farmers practice natural scavenging and 67.90% and 93.57% provided additional feed to ducks. Most of the household farmers provide whole rice and snail (59.64%) and commercial farmers provided whole rice and snail (100.0%). The annual egg production performance of commercial farmers (255.35) was better than household farmers (208.34) per duck in the study areas. The average clutch length of household and commercial duck farming was 1.27 months and 1.53 months respectively. The average price of day-old ducklings was BDT 32.75 and BDT 29.50 for household and commercial farming respectively. Egg fertility and egg hatchability were found 76.50% and 68.50% in households and 82.56% and 74.31% in commercial duck-rearing respectively. The average number of live ducks and eggs sold in the last year was found 9.75 and 368.85 421.55 and 104240.05 in household farming and commercial farming respectively. The average price of live ducks and eggs was BDT 395.75 and BDT 12.20 for household rearing and BDT 373.25 and BDT 10.08 for commercial farming. The highest 72.48% of household duck-rearing farmers reported they sold the egg and duck to their neighbor and in the case of commercial farming 77.98% of farmers directly sold to bazar (weekly). There was no farmer found who uses modern technology and equipment, mobile apps, or online media to process information, and connected online for the sale of duck, duck meat, and eggs in the study areas. Only 10.09% and 29.35% of household and commercial farmers use the vaccine and most of them use duck plague and cholera vaccines and 12.84% and 59.63% of farmers regularly de-wormed ducks respectively. About 81.65% and 100.00% of household and commercial farmers reported there was the existence of the disease and duck plague and cholera were common diseases. The environmental condition of the farmhouse and farm waste management was poor and most of the households (80.73%) and commercial farmers (94.49%) faced climatic effects mainly extreme heat and flood after duck farming. The highest 50.46% of household farmers had a linkage with local traders/wholesalers 79.82% of commercial farmers had a linkage with feed dealers. However, only 12.84% and 21.10% of household and commercial farmers received training from government organizations. The main source of loans was NGOs followed by moneylenders. Duck farming created employment opportunities in rural areas as there 77.98% of respondent farmers found who had wage-based employees at their duck farms. The ducks are reared mainly by female members of the family who usually take care of them which empowered rural women. From FGD it was investigated that the day-old ducklings, fertile eggs, feed (concentrate) and veterinary services were available and vaccines, vaccinators, veterinary medicine, insurance facility, loan facility, and farm mechanization equipment were less available and the qualities of duckling, duck feed, vaccine, anthelmintic, veterinary medicine and veterinary treatment service were good but need to be improved more in the study areas. From the KIIs, it was revealed that most LSP (90%) received training on livestock treatment and 55.55% of veterinary medicine sellers received training and 44.44% has a drug license. The feed traders reported the demand for duck feeds was increasing. The fertility and hatchability of eggs were 82.56% and 74.31% for hatchery owners. The price of day-old male and female ducklings was BDT 28.75 and BDT

31.25 for ducklings' traders. The demand for the duck was high in winter and autumn. The average selling price of growing, adult and laying ducks was BDT 255.50, BDT 398.75 and BDT 475.65 for duck traders found irrespective of the study areas. Nowadays duck meat has the strongest consumer perception and is popular in the country. Hence, there is a huge scope and prospects of duck rearing in the socioeconomic context of rural Bangladesh.

Introduction

The contribution of the livestock sector to national GDP at the constant price was 1.44 percent and the share of the livestock sector in agricultural GDP was 10.69 percent in FY 2020-21. Though the share of the livestock sub-sector in national GDP is, but it has an immense contribution in meeting the daily animal protein requirements for human consumption. The livestock sector has been playing an important role in our economy. It can solve the problems of malnutrition, unemployment, empowerment of women, growth of fertility of agricultural land, making a talented nation and earning foreign exchange. Meat, egg and milk play a vital role in meeting the demands of food of animal origin in our everyday life. Since the contribution of the livestock sector is increasing day by day, the opportunity for employment, the number of commercial farms and the production of livestock increased surprisingly. Production of meat, milk and egg in 1971-72 were five lakh metric tons, ten lakh metric tons and 150 crores respectively, which has increased to 76.74 metric tons, 106.80 metric tons and 1736 crore in 2019-20 (reference). Demands of animal origin food are increasing due to rapid economic development, reduction of hardcore poor and health consciousness among the people in the country. Now we need to increase the supply of meat, milk and egg to mitigate the supply of food of animal origin at a rapid pace. Therefore, we need to follow science-based modern technology to upgrade breed development and give adequate coverage to animal health. Supply of feed at affordable prices round the year is essential for the smooth growth of this sector.

The population of livestock and poultry rose to 560.62 lakhs and 3,585.46 lakhs respectively by February 2021 in the FY 2020-21 (Bangladesh Economic Review, 2021; DLS, 2021). Poultry farms are growing at a rate of 15% a year. The annual per capita poultry consumption is projected to be around 8.5 kg in 2023 and the country is predicted to require 17 billion eggs, and 2 million tons of poultry meat (MoFL, 2020). A report by the Food and Agricultural Organization (FAO) shows that the position of Bangladesh for duck meat and egg creation is eleventh and fourth separately among Asian nations. The duck population in Bangladesh has been reported to be 45.12 million (BER, 2022) mostly of indigenous type although genetic dilution in some regions has occurred due to indiscriminate crossbreeding with high-yielding breeds. Small-scale duck production has a significant contribution to household economies, food security, and improving the nutritional status of the rural poor. Ducks in Bangladesh are traditionally reared as family poultry following a free-range scavenging system. The contribution of duck meat and eggs is about 30% of the total poultry meat and eggs produced

in the country (Islam et al., 2003). Besides, Khaki Campbell, Indian Runner, Xinding, Pekin and their crosses are getting popular due to better production and are being reared by limited farmers in some selected areas. Farmers prefer indigenous ducks in the scavenging rearing system due to their high adaptability to their farming conditions, unique foraging and disease resistance characteristics. Ducks have long productive and profitable life, i.e., they used to lay in the second and third year also. Marshy, swampy riversides, wetlands and barren lands are not suitable for chicken rearing but are suitable for duck rearing (Valavan et al., 2009). Ducks are larger in size and the meat ducks are sold at a higher price than that of local free-range live chicken. Therefore, indigenous ducks both generate income and ensure protein for the people. Small farmers have less preference for specific breeds; they mainly keep indigenous (deshi) ducks. The price of duck eggs varies from season to season. Ducks lay eggs between their two molting (feather-changing) periods, February to March and September to October. During the two peak laying seasons, the production is high but farmers get a lower price for eggs during the hot season from March to July. About seventy percent of the total production of eggs is sold to Dhaka and other urban regions and the rest are consumed locally.

Duck genetic resources of the country are composed of indigenous or native, improved native, exotic and their crosses. Most of the duck populations in the country are native ducks like Pati (Deshi), Nageswari, Sylhet Mete which have been well adapted to the local climate and are considered to be dual purpose. The rest are exotic breeds like Indian Runner, Khaki Campbell, Jending, Pekin and Muscovy (Sing and Moore, 1978; Huque and Hossain, 1991). Netrokona, Sunamgonj, Sylhet, Moulvibazar and Kishorgonj are water-based areas consists lots of haors, bills & low land. So that areas are most duck-rearing areas because of the availability of plenty of water and feed sources. Duck farming in haor areas is characterized by traditional, extensive, nomadic, and seasonal. There are several small sedentary groups of growers, breeders, and nomadic duck raisers who keep moving their flocks in a cyclic fashion from one region to another, depending on the amount of feed available in the marshy land, canal, river and haor areas. There are mainly two types of duck farmers: backyard farmers and commercial farmers. The backyard farmers keep 2-19 ducks, with the marginal farmers among them keeping only 2-7 ducks and the small farmers keep 8-19 ducks during the rainy and autumn season when water surrounds the localities and natural feeds like different kinds of snails, fish, pests and water hyacinth become available. These ducks are reared in a scavenging system and additional feed like rice polish, boiled potatoes, rice grains etc. is only supplied for a short period of the year. The commercial duck farms also operate with a scavenging system. Usually, they keep

between 50 and 5000 ducks and move routinely from one place to another, the frequency of moving and distance from home depends on the availability of natural feeds for the ducks. The main obstacles in developing commercial duck farming are lack of improved duck varieties, shortage of vaccines, traditional feeding practices, inadequate duck healthcare supports, unavailability of capital for farming and improper marketing facilities for the egg & duck and overall lack of effective value chain from production to marketing.

Dushtha Shasthya Kendra (DSK) is implementing the sub-project entitled '**Market System Development of Safe Poultry and Poultry Products**' at five Upazilas of Netrakona Sadar, Barhatta, Mohonganj & Kalmakanda under Netrakona district and Dhormapasa under Sunamganj district. This sub-project is jointly funded by the Palli Karma-Sahayak Foundation (PKSF) and International Fund for Agricultural Development (IFAD) under Rural Microenterprise Transformation Project (RMTP) of PKSF. The project will be working to increase income, ensure food security and improve family nutrition of marginal and small farmers and poultry related backward and forward market entrepreneurs. The sub-project will also work 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 will be made to scale up and expansion of enterprises through efficient production methods and strong market linkages of marginal and small farmers. The baseline survey will be conducted with the following objectives:

- a. To assessment the production, management & technological interventions which are required to improve overall business environment condition of the poultry sub-sector.
- b. To identify the common services which will increase the productivity and help to develop value chain, market linkage and environment conditions of the MEs under the mentioned sub-sector.
- c. To find out activities which will help to develop the infrastructure of that business cluster and will assist the MEs & the buyers for getting easy access to the market.

STUDY METHODOLOGY

Document review

Before going to baseline survey for this study, the necessary documents were reviewed for pre-assessment information of the program, which helped us for the development of details methodology, work planning, and questionnaire formation.

Methods of data collection

There were two approaches followed in collecting data for this baseline study; quantitative and qualitative approaches. Household survey (HHS) was the quantitative approach of data collection conducted by trained enumerators. FGD, KII and SWOT analysis were the methods for qualitative approach of data collection conducted by the consultant. The details of those methods are described here below.

Development of questionnaires

In the HHS, questionnaire was prepared in accordance with the set indicators of the project log-frame as per the objective of the project. The questions were mostly formed by close ended (answer either 'yes' or 'no') and multiple answers or multiple-choice questions which can be described in statistical way. However, open ended questions are effective for acquiring qualitative information and are particularly good for determining people's estimation and feelings. In KII and FGD, both close and open-ended questions were included. Besides, as per the project intervention, all questions were made relevant to the duck farming issues.

Sample size for baseline survey

The standard statistical procedure to determine sample size was followed by the following formula as mentioned by (Robb, 1963).

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

Where, N = Total number of beneficiaries households under RMTP sub-project (10,000); 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. 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 for HHS had been estimated as **263**. Moreover, all the respondents were randomly chosen from the enlisted beneficiaries of duck farmers in the project areas under DSK. The sample size for different survey tools is given below:

Type of respondent	Sample distribution and no of sample						Data collection method
	Mohongonj	Kalmakanda	Netrokona sadar	Barhatta	Dharmapasha	Total	
Duck producer (Small scale)	42	42	41	41	42	263	FGD/ HHs
Duck producer (Commercial)	11	11	11	11	11		
LSP (Treatment & vaccinator)	2	2	1	1	1	7	KII
Feed Seller (ready feed)	3	2	2	2	2	11	
Medicine & vaccine Seller	3	2	2	2	2	11	
Adult duck traders	1	1	1	1	1	5	
Duckling supplier	2	2	2	2	2	10	
Hatchery for duckling (Company/Govt)	-	-	-	-	-	3	
Equipment Seller	-	-	-	-	-	3	
ULO/VS/LEO	1	1	1	1	1	5	
SWOT						1	

Approach to collect information from the respondent

During survey, the purpose of the study was clearly explained to all respondents prior to taking interview from them. The respondents were abstained from interview from any person who denied or showed any reluctance in providing information. Verbal consent of each of the respondents was taken before interview. The study 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.

Household survey (HHS)

In this technique, enumerators randomly visited respondents' house from door to door for direct interviewing with the structured questionnaires.

Focus group discussion (FGD)

In this technique information was collected from a group of around 12 beneficiaries of duck farmers, mixed with different age and sex.

Key Informant Interview (KII)

In this technique information was collected by direct interviewing with loosely structured questions from different stakeholders related to livestock farming. The interviewers included in the KII were ULO/VS/LEO, LSP/Paravet, Feed Seller, Medicine Seller, Fertile egg supplier, Duckling & adult duck supplier and traders Hatchery for duckling (Company/Govt) supplier, Equipment Seller

SWOT Analysis

A SWOT analysis is a way of optimizing sustainability and viability of any business operation, research or social interventions by identifying strengths, weaknesses, opportunities and threats using an objective approach. The consultant performed this tool by taking interviews with potential stakeholders, visual and insight observations on the study areas.

Training to the enumerators

Before going to the HHS, the consultant deliberated a debriefing session to the enumerators to make them clear understanding about the questions to be asked to the interviewers and the techniques how to collect information authentically.

Data checking and quality control

All the questionnaires filled by the enumerators was checked and crosschecked by the consultant prior to go for data punching.

Data analyses

After checking and cross examination, all data were imputed in MS excel worksheet and analyzed by pivot table for frequency analysis. Further statistical analysis was performed by SPSS software. Results were tabulated and presented precisely in accordance with the objectives of the project.

Reporting

After analysing field data, a comprehensive report was formulated which reflects the present scenario of dairy, beef fattening, goat and sheep farming and safe meat and milk product marketing in the survey areas, identifies shortfalls, made recommendations thereof, that would be the guidelines for implementing the project activities and interventions fruitfully.

Results and discussion

Socio-demographic profile of the duck-rearing farmers

The level of education is an important indicator for duck-rearing farmers. The education level of duck-rearing farmers is shown in Table 1. The study revealed that the highest 44.04% of duck-rearing farmers completed the primary level of education followed by 31.19% able to sign.

Table 1: Education level of the duck-rearing farmers

Sl. No.	Education level	Measurement unit	Value
1.	Illiterate	%	11.01
2.	Able to sign	%	31.19
3.	Primary	%	44.04
4.	Class-viii (JSC)	%	9.17
5.	SSC	%	3.67
6.	HSC	%	0.92
7.	Graduate	%	0.0
8.	Post-graduate	%	0.0

However, the higher education status of the farmers was found poor, only 9.17% and 3.67% of farmers completed Class vi-JSC and SSC levels respectively irrespective of the study area. Moreover, the result showed that 11.01% of farmers were illiterate. Hence, the education level of the duck-rearing farmers was found poor irrespective of the study areas.

Table 2: Respondent age, family size, sex ratio, family headed and earning member

Indicator	Measurement unit	Value
Age of the farmer		
18-35 years	%	37.61
36-50 years	%	51.38
51-60 years	%	9.17
Above 60 years	%	1.83
Family size		
Up to 3 person	%	78.90
4 to 5 person	%	17.89
6 to 10 person	%	3.21
More than 10 person	%	0.0
Average family size	Number	5.28
Average male-female family members		
Male	Number	2.88
Female	Number	2.40
Headed by the family		

Indicator	Measurement unit	Value
Age of the farmer		
18-35 years	%	37.61
36-50 years	%	51.38
51-60 years	%	9.17
Above 60 years	%	1.83
Male	%	92.66
Female	%	7.34
Earning member of the family		
Male	%	89.91
Female	%	10.09
Dependency ratio	Number	1.49

The distributions of respondents' age, family size, sex ratio, family head and earning member are presented in Table 2. The age distribution of the duck farmers ranged from 18 to above 60 years. The farmers were stratified into 4 age categories; 18-35 years, 36-50 years, 51-60 years and above 60 years. Most of the duck farmers (51.38%) belong to the age group 36-50 years followed by 18-35 years (37.61%). Hence, most of the duck-rearing farmers were middle-aged and young irrespective of the study area. However, the average family size was 5.28 and most of the duck-rearing households (78.90%) had up to 3 family members. The average male and female family members were 2.88 and 2.40. Moreover, 92.66% of households were male-headed found in the study. The dependency ratio was 1.49 and in most of the cases (89.91%) income earning members were male members of the households.

Table 3: Land size owned by the farmer

Land category	Measurement unit	Value
Homestead	Decimal	13.43
Cultivated	Decimal	35.42
Total land	Decimal	48.85

Table 3 shows the average landholding of duck-rearing farmers. The living status of the household largely depends on the size of the land ownership. The average landholding was found 48.85 decimals indicating that the duck-rearing farmers belong in the small farm size category. However, among landholdings 35.42 decimal was cultivated and 13.43 decimal was homestead land.

Table 4: Different kinds of food items consumed in a day by the household family

SI No.	Food items	Measurement unit	Value
1.	Crop, root, tuber (potato), etc.	% intake by the people	100.0
2.	Cowpeas, peas, lentils, etc.	% intake by the people	56.52
3.	Peanut, seed, etc.	% intake by the people	10.14
4.	Milk and milk products	% intake by the people	37.68
5.	Meat (red or white) and fish	% intake by the people	89.86
6.	Egg	% intake by the people	37.68
7.	Deep green vegetables	% intake by the people	69.57
8.	Vitamin A-enriched vegetables	% intake by the people	55.07
9.	Other vegetables	% intake by the people	50.72
10.	Fruits	% intake by the people	39.13

Table 4 and Table 5 represent the food habits of duck-rearing households. Different kinds of food items are consumed in a day by the household family members. In the study, data was collected on 10 food items. The result shows that 100% of households' family members intake crops, roots, tuber (potato), etc. irrespective of the study areas followed by meat (red or white) and fish (89.86%). Most of the households consume green vegetables (69.57%), cowpeas, peas, lentils, etc. (56.52%), and vitamin A-enriched vegetables (55.07%). However, egg and milk and milk product intake were found 37.68% in both cases.

Table 5: Number of food items consumed in a day by the household family

SI No.	Number of food items	Measurement unit	Value
1.	2-items	% intake by the people	10.70
2.	3-items	% intake by the people	20.49
3.	4-items	% intake by the people	26.79
4.	5-items	% intake by the people	25.64
5.	6-items	% intake by the people	5.90
6.	7-items	% intake by the people	5.70
7.	8-items	% intake by the people	4.80
8.	9-items	% intake by the people	0.0
9.	All of the 10 items	% intake by the people	0.0

From Table 5 it was revealed that the highest 26.79% of households consume 4 items of food in a day followed by 5 items (25.64%). The highest 8 items were found consumed by a household in a day and the percentage was only 4.80%.

Livestock population distribution of duck-rearing households

In the study areas among duck-rearing households, it was investigated that besides duck-rearing (92.66%) most of the households rearing chicken (90.83%), cattle (72.48%), goat (44.95%) and sheep (37.61%) (Table 6).

Table 6. Livestock population available in the respondent household

Sl. No.	Livestock species	% of response	Herd size/flock size
1.	Family duck rearing	92.66	15.94
2.	Commercial duck rearing for		
	Egg production	75.0	790.89
	Meat purpose duck production	10.0	658.45
	Growing duck production	15.0	801.75
3.	Goose	17.43	2.84
4.	Muscovy	28.44	3.21
5.	Chicken	90.83	13.95
6.	Pigeon	34.86	8.16
7.	Cattle	72.48	2.49
8.	Goat	44.95	1.60
9.	Sheep	37.61	1.20
10.	Buffalo	0.0	0.0

However, in commercial duck-rearing, 75% of farmers reared for egg production. The flock size of family duck rearing was 15.94. In the case of commercial duck farming the flock size of egg production, meat-purpose duck production and growing duck production farm were 790.89, 658.45, and 801.75 respectively. Moreover, the flock size of family chicken rearing was 13.95 irrespective of the study areas.

Table 7: Monthly income from different sources

Income source	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Duck rearing	BDT	896.79	9633.03
Others sources	BDT	15270.64	12614.68
Total	BDT	16167.43	22247.71

Table 7 shows the monthly income of duck-rearing households and commercial duck-rearing. In the study areas, the average monthly income of family duck-rearing households and commercial duck-rearing farms were BDT 16167.43 and 22247.71 respectively. Among the total monthly income BDT 896.79 and 9633.03 were earned from duck rearing which shared 5.54% and 43.30% of the total monthly income in the case of family and commercial duck rearing respectively.

Duck management system in the study areas

Table 8 represents the duck-rearing system in the study areas. In the case of household duck rearing, most of the farmers (82.56%) were involved in rearing Desi ducks followed by cross-type (51.38%). However, commercial duck-rearing farmers have mostly reared Khaki Campbell (87.16%) followed by cross-type (70.64%). Moreover, the semi-scavenging (86.24%) rearing system was mostly practiced in household duck rearing followed by the scavenging (13.76%) rearing system. In commercial duck-rearing, farmers practiced scavenging (50.45%) and semi-scavenging (49.55%) rearing systems irrespective of the study areas.

Table 8: Duck farming system

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Type of duck reared by the farmers			
Deshi	% of response	82.56	22.94
Khaki Campbell	% of response	32.11	87.16
Xinding	% of response	35.77	47.71
Cross-type	% of response	51.38	70.64
System of duck rearing			
Intensive	% of response	0.0	0.0
Scavenging	% of response	13.76	50.45
Semi-scavenging	% of response	86.24	49.55
Places for scavenging			
Pond	% of response	32.11	13.76
Canal	% of response	59.63	35.78
Hoar land and water body	% of response	70.64	77.98
Agricultural field	% of response	74.31	100.0
Awareness of GAP for duck farming	% said "Yes"	0.0	0.0
Whether farmers practiced GAP	% said "Yes"	0.0	0.0
Linkage for contract duck farming	% said "Yes"	0.0	0.0

Furthermore, household duck-rearing farmers mainly used agricultural fields (74.31%) and hoar land and water body (70.64%) as the scavenging venue for ducks followed by canals (59.63%) and ponds (32.11%). In the case of commercial farming farmers mainly used agricultural fields (100.0%) and hoar land and water body (77.98%) as the scavenging venue for ducks followed by canals (35.78%) and ponds (13.76%). The duck farmers were found unaware of the Good Agricultural Practice (GAP) in duck farming. There were no farmers found who practiced GAP in the study areas. There was no linkage for contract duck farming irrespective of the study areas.

In duck-rearing, proper housing is an important factor. Proper housing facilities protect ducks from bad weather and predator animals and reduce disease incidence. In the study area, mainly four types of duck houses were found which are shown in Table 9. Most of the houses were made with tin and wood (63.30%) followed by joint tin, wood/bamboo and net (32.11%) and brick and tin (4.59%) in household duck-rearing. In commercial duck-rearing, most of the houses were made with joint tin, wood/bamboo and net (87.16%) followed by joint polythene, bamboo and net (12.84%).

Table 9: Housing and feed supply for duck

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Housing materials used for native duck			
Tin and wood	%	63.30	0.0
Joint Tin, wood/bamboo and net	%	32.11	87.16
Joint Polythin, bamboo and net	%	0.0	12.84
Brick and tin	%	4.59	0.0
Daily feed supply for duck			
Natural (scavenging)	% of response	32.10	41.28
Ducks provide extra feed	% of response	67.90	93.57
Total length of feed supplementation	months	7.16	7.55
Type of feed provided			
Ready feed	% of response	46.78	71.55
Whole Rice	% of response	41.28	100.0
Rice/khud and Rice Polish	% of response	50.45	0.0
Whole Rice and Rice Polish	% of response	44.95	0.0
Whole Rice and wheat bran	% of response	37.61	0.0
Whole Rice and snail	% of response	59.64	100.0
Provide vitamin-mineral mixture for duck	% of response	0.0	66.97
Season of feed supplementation			
Winter	% of response	16.51	100.0
Summer	% of response	19.27	0.0
Rainy	% of response	13.76	100.0
Round the year	% of response	50.46	93.57

Feeding management is a vital factor in duck rearing and feed cost is the highest cost among all other production costs. Efficient feeding management is the most important factor for profitable duck farming. Table 9 shows that 32.10% and 41.28% of respondents practice natural scavenging in household and commercial duck farming respectively. However, among duck-rearing farmers, 67.90% and 93.57% provided additional feed and the length of supplementation was 7.16 and 7.55 months in household and commercial duck farming respectively. Most of the farmers provide whole rice and snail (59.64%) followed by rice/khud and rice polish (50.45%) in household duck-rearing. On the other hand, most of the farmers

provide whole rice and snail (100.0%) followed by ready feed (71.55%) and vitamin-mineral mixture (66.97%) in commercial duck-rearing. Moreover, about 50.46% and 93.57% of farmers supplemented their ducks around the year in household and commercial duck rearing respectively.

Egg production performance, source, fertility and hatchability of duck

Table 10 represents the egg production performance of ducks in the study areas. The average clutch length, egg per clutch, clutch per year and annual egg production of household duck farming was 1.27 months, 21.68, 9.61 and 208.34. On the other hand, the average clutch length, egg per clutch, clutch per year, and annual egg production of commercial duck farming was 1.53 months, 32.20, 7.93, and 255.35. However, the main source of the fertile egg of household duck-rearing was neighbor (64.22%) followed by their own source (56.88%).

The average price of day-old ducklings was BDT 32.75 and BDT 29.50 for household and commercial farming respectively.

Table 10: Egg production performance, source, fertility and hatchability of duck

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Egg production performance of duck			
Clutch length	Months	1.27	1.53
Egg per clutch	Number	21.68	32.20
Clutch per year	Number	9.61	7.93
Annual egg production	Number	208.34	255.35
Source of fertile egg			
Own	%	56.88	0.0
Neighbor	%	64.22	0.0
Local market	%	41.28	0.0
Commercial farm	%	53.21	0.0
Price of fertile egg	BDT	14.50	0.0
Source of ducklings			
Own brewing	%	100.0	0.0
Bought	%	75.0	100.0
Price of duckling (day old)	BDT	32.75	29.50

Moreover, egg fertility and egg hatchability were found 76.50% and 68.50% respectively in households and 82.56% and 74.31% in commercial duck-rearing.

Marketing system of egg and ducks

Table 11 revealed the marketing system of eggs and ducks in the study areas. The average number of live ducks and eggs sold in the last one year was found 9.75 and 368.85 in household farming, on the other hand, in commercial farming it was 421.55 and 104240.05 respectively. The average price of live ducks and eggs was BDT 395.75 and BDT 12.20 for household rearing and BDT 373.25 and BDT 10.08 for commercial farming.

The highest 72.48% of household duck-rearing farmers reported they sold the egg and duck to their neighbor followed by 59.63% to the middleman. On the other hand, in the case of commercial farming 77.98% of farmers directly sold to bazar (weekly) and followed by wholesalers/retailers (50.46%).

Table 11: Marketing system of egg and duck

Type	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Number of duck and eggs sold in the last one year			
Live duck	Number	9.75	421.55
Egg	Number	368.85	104240.05
Average price			
duck	BDT	395.75	373.25
Egg	BDT	12.20	10.08
Place where sold duck and egg			
Neighbor consumers	%	72.48	0.0
Middleman	%	59.63	22.93
Wholesaler/retailer	%	50.46	50.46
Directly to the Hatchery	%	22.94	13.76
Directly to the Hotel	%	29.36	18.35
Directly to the Bazar (weekly)	%	37.61	77.98
Reason for sale of duck and egg			
For family expenditure	%	77.98	96.33
For bought new duck/chicken	%	51.38	77.98
For bought feed	%	68.80	92.66
For bought medicine and vaccine	%	48.62	64.22
Employees payment	%	0.0	81.65
Seasons of selling duck			
Winter	%	82.57	83.48
Summer	%	47.70	36.68
Rainy	%	75.22	80.74

Moreover, in the case of household farming, the highest 77.98% of farmers reported that they sold ducks and eggs for meeting family expenditure followed by 68.80% for bought feed for ducks. On the other hand, in commercial farming, the highest 96.33% of respondents reported that they sold their ducks and eggs for meeting family expenditures followed by bought feed for ducks (92.66%) and payment of employees (81.65%). Furthermore, the highest 82.57% of

household farmers sold ducks and eggs in the winter season followed by 75.22% in the rainy season. Similarly, the highest 83.48% of commercial farmers sold ducks and eggs in the winter season followed by 80.74% in the rainy season.

Mechanization and technology use in duck farming

Table 12 represents the scenario of mechanization and technology use in duck farming. There was no use of mechanization and technology in duck farming in the study areas in both cases of household and commercial farming. There was no farmer found who uses modern technology and equipment, mobile apps or online media to process information, and connected online for the sale of duck, duck meat and eggs in the study areas.

Table 12. Use of mechanization and information technology in duck farming

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Use modern technology and equipment for duck farming	% of response	0.0	0.0
Use of mobile apps or online media to process information about duck farming?	% of response	0.0	0.0
Connected with online for sale of duck, duck meat and eggs	% of response	0.0	0.0

Healthcare management of duck

Vaccination, de-worming, disease, mortality and other health risks of ducks were investigated in the present study and represented in Table 13. Only 10.09% and 29.35% of household and commercial farmers use the vaccine and most of them use duck plague and cholera vaccines. However, 12.84% and 59.63% of household and commercial farmers reported that they regularly de-wormed ducks respectively.

Table 13: Duck health care management

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Type of vaccine used for duck			
Duck cholera	% practiced	13.76	33.03
Duck plague	% practiced	22.94	46.79
Farmers vaccinate regularly	% said "Yes"	10.09	29.35
Farmers de-wormed duck regularly	% said "Yes"	12.84	59.63

Table 14 shows that 81.65% and 100.00% of household and commercial farmers reported there was the existence of the disease and duck plague and cholera were common diseases for both household and commercial farming. The mortality was high for both duck plague and cholera.

However, most of the households (69.72%) and commercial (81.65%) farmers reported that their duck died in the summer season.

Table 14: Disease outbreak and mortality in duck

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Disease cases found in duck	% response	81.65	100.0
Prevalence/load of different duck diseases			
Duck cholera	% response	68.81	76.15
Duck plague	% response	50.46	67.88
Limber neck poisoning	% response	22.93	50.46
Avian influenza	% response	0.0	0.0
Death cases found in duck	% response	93.58	100.0
Causes of death in duck			
Duck cholera	% response	68.81	76.15
Duck plague	% response	50.46	67.88
Limber neck poisoning	% response	22.93	50.46
Other diseases	% response	42.20	0.0
Mortality of duck			
Duck cholera	%	49.54	44.95
Duck plague	%	41.28	35.77
Limber neck poisoning	%	35.78	22.02
Other diseases	%	25.68	25.69
Season when duck died more			
Winter	% response	11.93	7.34
Rainy	% response	18.35	11.01
Summer	% response	69.72	81.65

Table 15 shows the health risk of duck rearing. However, 100.00 % of commercial farmers use antibiotics regularly which was a matter of concern. On the other hand, only 40.37% of household farmers use antibiotics only when disease outbreaks. However, commercial farmers (51.38%) use growth promoters irregularly but in household farming, there was no use of growth promoters used by the farmers. Moreover, 60.55% of commercial farmers use special medicine (except vitamin minerals) to increase duck egg production when egg production low found irrespective of the study areas.

Table 15. Health risks in duck farming

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Antibiotics use regularly to prevent duck disease			
Not at all	% response	59.63	0.0
Use regularly	% response	0.0	100.0
Irregular	% response	0.0	0.0
Use when disease attack	% response	40.37	0.0
Growth promoters use regularly (medicines) for the physical growth of ducks			

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Not at all	% response	0.0	0.0
Use regularly	% response	0.0	0.0
Irregular	% response	0.0	51.38
Use when lower growth	% response	0.0	48.62
Use any special medicine (except vitamin minerals) to increase duck egg production			
Not at all	% response	0.0	0.0
Use regularly	% response	0.0	0.0
Irregular	% response	0.0	39.45
Use when egg production low	% response	0.0	60.55

Farmhouse environment, farm waste management and climate consequences in duck rearing

Table 16 shows the environmental condition of the farmhouse and farm waste management of the respondent farmers in the study areas. The ventilation condition in the poultry house was poor as 63.30% and 74.32% of households and commercial farmers reported poor conditions. The highest 60.55% of household's farmers reported they clean duck houses daily, on the other hand, 54.13% of commercial farmers clean on the alternative day. Moreover, disinfectant use for foot-bath at the entrance to the house was absent and only 5.50% of commercial farmers sprayed with disinfectants irregularly. However, most of the farmers disposed of farm waste very nearer to the farm. Most of the respondent farmers (77.06% and 100.0%) damaged farm waste. For properly disposing of the farm waste 35.06 % of respondent farmers used it to cropland as fertilizer.

Table 16: Farmhouse environment and farm waste management

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Ventilation condition in the duck house			
Good	%	11.93	10.09
Moderate	%	24.77	15.59
Poor	%	63.30	74.32
Duck house cleaning			
Daily	%	60.55	45.87
Alternative day	%	39.44	54.13
Weekly	%	0.0	0.0
Disinfectant use for foot-bath at the entrance to the house	%	0.0	0.0
House regularly sprayed with disinfectants?			
Regularly	%	0.0	0.0
Irregular	%	0.0	5.50
Not at all	%	0.0	94.50
Place where farm wastes are disposed			
Inside the farm	%	0.0	0.0
Very nearer to the farm	%	89.91	100.0
Far away from farm/pit	%	10.09	0.0

Utilization of farm wastes			
Self-utilization as fertilizer	%	22.93	0.0
Neighbors take free of cost	%	0.0	0.0
Damage	%	77.06	100.0
Are there any bad odors, fly and mosquito disturbances for farm waste?	% said 'yes'	77.98	87.16
Which technology is used by the farmers for properly disposing of farm wastes			
Vermicomposting	%	0.0	0.0
Biogas	%	0.0	0.0
Fertilizing cropland	%	22.93	0.0
Nothing	%	77.06	0.0

Table 17 represents the climate consequences of duck rearing. Most of the households (80.73%) and commercial farmers (94.49%) faced climatic effects after duck farming. Extreme heat, floods and extreme rain were the main climatic factors that affect duck farming. Most of the household (80.73%) and commercial (89.90%) farmers' economic loss occurred by climatic effects and in most of the cases, mortality was increased.

Table 17: Climate consequences in duck rearing

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Farmers faced climatic effects after duck farming	% said 'yes'	80.73	94.49
Climatic effects faced by farmers farming period			
Flood	% said 'yes'	87.16	96.33
Extreme heat	% said 'yes'	92.66	91.74
Extreme rain	% said 'yes'	74.31	77.98
Storm and thunder	% said 'yes'	27.52	59.63
Farmers losses by climatic effect after duck farming	% said 'yes'	80.73	89.90
Type of losses faced by the farmer during natural disaster			
Production decreased	% said 'yes'	74.31	85.32
Disease incidents increased	% said 'yes'	68.81	72.47
Sell decreased	% said 'yes'	47.71	80.74
Mortality increased	% said 'yes'	80.73	94.49
Amount of losses by the climatic effect	BDT	7765.45	23552.75

Profitability of duck production

Table 17 represents the profitability of duck production for both household and commercial farmers. Household duck farming was found highly profitable as the BCR (undiscounted) was 5.81. The total cost was BDT 2235.50 whereas the total return was BDT 12996.98 and the net return was BDT 10761.48 in the case of family duck farming. In household duck farming feed and labor cost was lower. On the other hand, BCR (undiscounted) of commercial egg, meat, and growing duck production was 1.10, 1.22, and 1.51 respectively which was lower compared to household duck farming. The total cost of commercial egg, meat, and growing duck

production was BDT 1198489.89 BDT 243405.32 and BDT 121224.20 where the total return was BDT 1314086.25 BDT 295750.0 and BDT 183300.0 and the net return was BDT 115596.36 BDT 52344.68 and BDT 62075.80 respectively.

Table 18: Profitability of duck production

Line items	Measurement unit	Family farming	Commercial farming		
			Duck rearing for egg production	Meat purpose duck rearing	Growing duck production
Duckling/Egg	BDT	450.0	29500.0	28350.0	28028.0
Feed	BDT	890.50	746717.79	136566.67	63125.25
Treatment, medicine, vaccine, and fee	BDT	175.0	82500.0	11416.60	5250.0
Salary of the employee	BDT	0.0	280389.60	52228.25	11225.0
Small farm equipment	BDT	210.0	10502.0	1500.0	1250.0
Miscellaneous	BDT	65.0	6750.0	890.75	880.75
Interest in operating capital	BDT	0.0	13150.0	5987.80	4915.20
A. Total variable cost	BDT	1790.5	1169509.39	236940.07	114674.20
Housing	BDT	445.0	28980.50	6465.25	6550.0
B. Total fixed cost	BDT	445.0	28980.50	6465.25	6550.0
C. Total cost (A+B)	BDT	2235.50	1198489.89	243405.32	121224.20
D. Total return	BDT	12996.98	1314086.25	295750.0	183300.0
E. Net return (C-D)	BDT	10761.48	115596.36	52344.68	62075.80
Benefit-Cost Ratio (BCR undiscounted)		5.81	1.10	1.22	1.51

From the result, it was revealed that commercial duck-egg farming was less profitable than meat and growing duck production. In the case of egg production feed, labor and housing cost was comparatively higher. This is because the duck flock was moved from one place to another frequently and every time housing needed to be made and labor was provided salary with other necessary expenses such as food, clothing, medicine, treatment and mobile bill.

Availability/quality of the inputs and services required for keeping duck

The quality breeding ducks required by both the household (41.28%) and commercial (59.63%) farmers were found in the study (Table 19). Most of the farmers agreed about the availability of day-old ducklings. The availability of vaccines and medicine was lower in the case of household farming (19.27%). However, the quality of concentrate feeds, treatment service, credit/loan, training, consultation and marketing linkage facilities were found poor in both cases. These facilities were required by farmers irrespective of the study areas.

Table 19: Availability/quality of the inputs and services required for keeping duck

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Quality breeding duck	% said 'yes'	41.28	59.63
Availability of day-old ducklings	% said 'yes'	72.47	82.56
Availability of vaccines and medicine	% said 'yes'	19.27	50.45
Quality of concentrate feeds	% said 'yes'	38.53	42.20
Availability of treatment service	% said 'yes'	41.28	35.77
Availability of credit/loan facility	% said 'yes'	30.28	47.71
Training facilities	% said 'yes'	9.17	38.53
Consultation facilities	% said 'yes'	10.09	13.76
Marketing linkage facilities	% said 'yes'	15.59	32.11

Farmer's behavior towards duck rearing

The farmers' behavior towards duck farming was investigated and presented in Table 20. It was observed that 45.87% and 29.35% of household and commercial farmers were willing to improve the farm environment. However, 28.44% and 26.61% of household and commercial farmers were ready to take the risk for farm expansion. About 18.34% and 22.94% of household and commercial farmers were willing to spend more money to improve the farm environment. Farmers' knowledge of record keeping and practice was found poor. Most of the farmers have no idea about govt. rules for farming for farming.

Table 20: Farmer's behavior towards duck rearing

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Have an interest to			
Improve farm environment	% said 'yes'	45.87	29.35
Take a risk for farm expansion	% said 'yes'	28.44	26.61
Spend more money to improve the farm environment	% said 'yes'	18.34	22.94
Record keeping	% said 'yes'	4.59	0.0
Have an idea about govt. rules for farming	% said 'yes'	2.75	4.59

Development of linkage with different livestock stakeholders

The linkage of duck farmers with different livestock stakeholders was investigated in the current study (Table 21). The highest 50.46% of household farmers had a linkage with local traders/wholesalers followed by experienced LSP (44.95%) and veterinary pharmacy (40.37%). On the other hand, the highest 79.82% of commercial farmers had a linkage with feed dealers followed by the veterinary pharmacy (77.98%) irrespective of the study areas.

Table 21: Development of linkage with different livestock stakeholders

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Whether there has any linkage with			
Livestock office	% said 'yes'	14.67	37.61
Experienced LSP	% said 'yes'	44.95	47.70
Feed Company	% said 'yes'	0.0	0.0
Feed dealer	% said 'yes'	0.0	79.82
Veterinary pharmacy	% said 'yes'	40.37	77.98
Local traders/wholesalers	% said 'yes'	50.46	68.80
National traders/wholesalers	% said 'yes'	0.0	59.63
Hotel and restaurant	% said 'yes'	29.36	32.11
Credit service providers	% said 'yes'	30.28	36.69

Training received for duck rearing rearing

Training is important to improve the competitiveness of farmers to strengthen and improve the capacity of farming activity. The result indicated that only 12.84% of household duck farmers received training and in the case of commercial farmers it was 21.10% and most of the farmers got the training once. Most of the duck farmers got 1-day training and all training were given by the government organization. About 41.28% of households and 50.46% of commercial farmers opined that their knowledge was increased and 21.11% and 25.68% implemented the knowledge on duck rearing respectively.

Table 22: Training received for duck rearing rearing

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Whether farmers received training	%	12.84	21.10
Frequency of training attended by the farmers			
Once	%	77.06	80.73
Twice	%	22.94	28.44
Thrice	%	0.0	0.0
The average frequency of training	Number	1.15	1.36
Duration of training			
one day	%	82.57	77.98
two days	%	17.43	29.35
three days and more	%	0.0	6.42
Sources of training received			
Government organization	%	100.0	100.0
Non-government organization	%	0.0	0.0
Both	%	0.0	0.0
Knowledge increased after getting training	% response	41.28	50.46
Knowledge is implemented on duck rearing	% response	21.11	

Loan and animal insurance status of farmers

Table 23 describes the loan and animal insurance status of duck farmers. The loan is helpful to promote different income-generating activities. It was observed that a few (12.84%) households and 47.71% of commercial farmers were taken loans for farm operations from different sources. More loan was taken by commercial farmers than household farmers and the average amount of loan was BDT 71235.50 and the average number of loan sources was found 1.67 and 1.88 respectively. However, the main source of loans was NGOs followed by money lenders. A few farmers were taken loans from banks found irrespective of the study areas.

Table 23: Loan and animal insurance status of farmers

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Loan taken for farm operation	% of response	12.84	47.71
Amount of loan taken	BDT	45612.75	71235.50
Number of sources	Number	1.67	1.88
Source of loan (%)			
Bank	% of response	4.58	8.25
NGOs	% of response	87.16	82.56
Money lender	% of response	32.11	35.78

Employment generation in duck farming

From the study, it was found that female members of the family spend more time (3.50 hours/day) in household farming on the other hand male members (11.50 hours/day) spend more time in commercial duck farming (Table 24). There 77.98% of respondent farmers found who had wage-based employees at their duck farms. In commercial farming, 74.31% of farmers had a single employee working on the farm and the average salary with food was BDT 16345.65 per month.

Table 24: Employment generation in duck farming

Indicator	Measurement unit	Value	
		Family duck rearing	Commercial duck rearing
Time spends in a day for duck rearing			
Male	Hours	1.40	11.50
Female	Hours	3.50	0.0
Wage-based employee at duck farm	%	0.0	77.98
Number of wage-based employees for duck rearing			
Single	%	0.0	74.31
Double	%	0.0	25.68
Salary of the employee with food	BDT/month	0.0	16345.65

Focus Group Discussion (FGD)

In the focus group discussion, all participants were livestock/farmers represented from different locations, age groups, and sex. A structured questionnaire was used to get the overall scenario of duck production under the study areas. The availability and quality of necessary inputs and services required for duck farming were investigated during conducting FGD. The degree of availability and quality of necessary inputs and services were analyzed based on the information taken from the duck farmers which are summarized in Table 1, Table 2, and Table 3.

Table 1: Availability of input supply and services

SL No	Name of input and service	Degree of Availability (% response)		
		Available	Less available	Not available
1.	Day old duckling	75.0	25.0	0.0
2.	Fertile egg	73.33	26.67	0.0
3.	Feed (Concentrate)	81.66	18.33	0.0
4.	Ready feed	46.67	38.33	15.0
5.	Vaccine	25.0	58.33	16.67
6.	Vaccinator	26.67	55.0	18.33
7.	Veterinary Medicine	25.0	75.0	0.0
8.	Veterinary Treatment Service	65.0	35.0	0.0
9.	Insurance Facility	0.0	0.0	0.0
10.	Loan Facility	21.67	65.0	13.33
11.	Farm Mechanization Equipment	16.67	70.0	13.33

However, the farmers' perceptions on the availability and quality of inputs and services may be varied from man to man or place to place. Moreover, it is not usual that the availability of inputs and services will be equal everywhere. Thus, the estimated values as given in Table 1 and Table 2 are though apparent, but as a whole, it may be considered as the overall reflection of the total scenario prevailing in the study areas. Table 1 shows the degree of quality of necessary inputs and services required for duck farming. However, day-old ducklings, fertile eggs, feed (concentrate) and veterinary services were available and vaccines, vaccinators, veterinary medicine, insurance facility, loan facility, and farm mechanization equipment were less available in the study areas.

Table 2: Quality of input supply and services

SL No	Name of input and service	Degree of Quality (%response)			
		Very good	Good	Roughly	Poor
1.	Day old duckling	0.0	55.0	45.0	0.0
2.	Feed	0.0	50.0	50.0	0.0
3.	Vaccine	0.0	45.0	55.0	0.0
4.	Vaccinator	0.0	50.0	50.0	0.0
5.	Veterinary Medicine	0.0	35.0	65.0	0.0
6.	Veterinary Treatment Service	0.0	35.0	55.0	0.0

Further, the qualities of duckling, duck feed, vaccine, anthelmintic, veterinary medicine and veterinary treatment service were good but need to be improved more.

Table 3 describes the availability of different production, market enhancement and environment mitigation actors irrespective of the study areas. Sub-dealer of poultry feed seller (in each union) for getting ready balanced feed, high-capacity electric hatchery, and meat processing plant was absent in the study areas. However, a contract basis egg and meat production system were unavailable and DLS and the poultry association were not playing a role in improving egg and duck marketing.

Table 3: Availability of different production, market enhancement and environment mitigation actors

SL No	Performance Indicator	Measurement unit	Results
1.	Sub-dealer of poultry feed seller (in each union) for getting ready balanced feed	Yes/No	No
2.	About 10000 ducklings per week producing hatchery in the surveyed area (electric)	Yes/No	No
3.	Meat processing plant	Yes/No	No
4.	Production of egg and meat with contract basis	Yes/No	No
5.	DLS and Poultry Association are playing roles in improving egg and duck market	Yes/No	No
6.	In each Union wholesale egg market are available	Yes/No	No
7.	In each Union hygienic and Halal poultry meat chain shop are available	Yes/No	No
8.	In each Union at least 5 e-agents for marketing egg, duck and meat are available	Yes/No	No
9.	Advance loan taken	number	0.0
10.	The online portals are publishing updates on daily market price of egg and ducks	Yes/No	No
11.	Vermin-Trico compost processing plant by using poultry and livestock wastes through waste management process	Yes/No	No

In each Union wholesale egg market, hygienic and halal poultry meat chain shops and at least 5 e-agents for marketing egg, duck and meat were not available irrespective of the study areas. Moreover, there was a lacking of online portals publishing updates on daily market prices of egg and ducks in the irrespective areas. Vermin-Trico compost processing plant by using poultry and livestock wastes through waste management process was unavailable. No advance loan facility for the duck rearing farmers was found in the areas. Hence, these facilities and

structural capabilities need to address for the extension and improvement of duck farming irrespective of the study areas.

a. The problems identified during conducting FGD are enlisted below:

- Very difficult for farmers to identify the quality of duck breeds
- Have to collect duck feed from far away
- Scarcity, lack of quality and high cost of feeds, which incurred higher production cost
- Outbreak of duck cholera and duck plague disease
- Lack of quality veterinarian & efficient quack, cannot diagnose the disease properly
- Veterinary treatment service not available on time
- Costs of medicine and treatment fees are very high, even more than human treatment
- The duck and egg market is far away, and cannot be sold without an animal trader/broker at a low price.
- Difficulty in providing good housing and management due to shortage of capital
- Farmers were lack of knowledge and training
- Farmers were lack of technology, necessary inputs and technological knowledge

b. Suggestions from participants (during conducting FGD) regarding increasing the productivity of duck farming are enlisted below:

- The price of necessary inputs needs to be reasonable
- Need to develop quality duck breeds
- Need to increase production of animal feeds
- Need to develop a good marketing channel
- Need to train farmers and stakeholders
- Need to work together with all stakeholders
- Need collaborative initiative of GO and NGOs to ensure the availability of input supports

Key Informant Interviews (KIIs)

In-depth interviews of concerned stakeholders and conduct in-depth discussions for their first-hand knowledge about the topic of our study. The interviews were structured, relying on a list of issues to be discussed. Key informant interviews resembled a conversation among acquaintances, allowing a free flow of ideas and information. KIIs were used to get additional insights from those who were not involved in the focus group discussion but could potentially add insights to the questions used in the evaluation. The survey team developed a study checklist based on specific concerns of the study. The interviews were not used any rigid questionnaires that can inhibit free discussion. However, interviewers had a clear idea of what questions to ask. The guide listed major topics and issues to cover under each study question. Because the purpose is to explore the objects in depth, guides were limited to a few items. Different guides were necessary for interviewing different groups of informants.

Table 1 describes detailed information on the livestock service provider (LSP). Most LSP (90%) received training on livestock treatment and the average duration of training was 123.75 days. About 434 livestock farmers get veterinary services and only 58 duck farmers get services from LSP per month. The main source of vaccine (70%) of LSP was both government and private. About 50% of LSP had their own pharmacy and their average monthly income was BDT. 18675.50.

Table 1: Details about LSP

Indicator	Measurement unit	Value
Whether LSP has training on livestock treatment	% response	90.0
Average duration of training received by the LSPs	Day	123.75
Average no. of Unions LSP provide their services	Number	3.75
How many farmers get services from LSP per month	Number	434.50
How many duck farmers get services from LSP per month?	Number	58.25
Source of vaccines collected by LSP (%)		
Govt.	% response	70.0
Private	% response	60.0
Both	% response	70.0
Whether LSP has their own pharmacy	% response	50.0
Monthly income	BDT	18675.50

Table 2 describes the veterinary medicine seller. About 55.55% of veterinary medicine seller received training in the profession and 44.44% has a drug license. Demand for duck medicines was high in the summer (55.55%). The average sell value of duck medicine per day was BDT 5623.50 and their average monthly profit was BDT. 19125.75.

Table 2: Details about veterinary medicine seller

Indicator	Measurement unit	Value
Whether Vet Pharmacist has training on his profession	% response	55.55
Whether Vet Pharmacist has drug license	% response	44.44
Season when demand of duck medicines are high		
Year-round	% response	33.33
Summer	% response	55.55
Winter	% response	11.11
Sell value of veterinary medicine per day	BDT	16125.25
Sell value of duck medicine per day	BDT	5623.50
Number of wage-based employees	Number	0.67
Monthly profit from veterinary medicine	BDT	19125.75

Table 3 reveals the animal feed seller. The highest 90.91% sell poultry feed followed by all types of feed (81.81%). About 63.64% of animal feed seller opined in the summer season demand for duck feeds were high. However, 100.0% reported the demand for duck feeds was increasing. The average quantity of concentrate and ready feed sold per month was 7.75 and 23.25 MT respectively and their average monthly profit was BDT. 23450.50.

Table 3: Details about animal feed seller

Indicator	Measurement unit	Value
Type of feeds sold		
Concentrate ingredients	% response	63.64
Ready cattle feed	% response	72.72
Fish feed	% response	72.72
Poultry feed	% response	90.91
All types	% response	81.81
Season when demand of duck feeds are high		
Summer	% response	63.64
Rainy	% response	18.18
Winter	% response	27.27
Whether demand of duck feeds are increasing		
Yes, increasing	% response	100.0
No, constant	% response	0.0
No, decreasing	% response	0.0
Amount of concentrate feeds sold per month	MT	7.75
Amount of ready feeds sold per month	MT	23.25
Number of wage-based employees	Number	0.81
Monthly profit earned from feed trading	BDT	23450.50

Table 4 reveals the information on hatchery owners. The highest 85.71% of hatcheries hatch khaki Campbell and cross-type of ducklings. The source of the fertile egg was own source (100.0%). The average price of a fertile egg was BDT 11.75. The fertility and hatchability of egg were 82.56% and 74.31%. The average capacity of duckling hatch per week and ducklings sold per month was 7775 and 15550. The average price of day-old male and female ducklings was BDT 25.75 and BDT 27.50. All the hatchery owners said the demand for ducklings was increasing and their average monthly profit was BDT. 23325.0.

Table 4: Details about the hatchery owner

Indicator	Measurement unit	Value
Types of ducklings are hatch		
Deshi	% response	28.57
Khaki Campbell	% response	85.71
Xinding	% response	57.14
Cross-type	% response	85.71
Sources of fertile egg		
Own duck farm	% response	100.0
Contract duck farm	% response	57.14
Others duck farm	% response	85.71
Avarage price of fertile egg	BDT	11.75
Fertility of egg	%	82.56
Hatchability of egg	%	74.31
Capacity of duckling hatch per week	Number	7775
Ducklings are sold per month	Number	15550
Price of day-old duckling		
Male duckling	BDT	25.75
Female duckling	BDT	27.50
Marketing system of duckling		
Direct to duck farmers	% response	85.71
Through local duckling traders	% response	100.0
Through abroad duckling traders	% response	57.14
Local hat-bazar	% response	0.0
Season of demand for ducklings high		
Late winter	% response	85.71
Summer	% response	71.42
Autumn	% response	85.71
Year-round	% response	42.86
Demand for ducklings increasing		
Yes, increasing	% response	100.0
No, constant	% response	0.0
No, decreasing	% response	0.0
Number of wage-based employees	Number	1.29
Monthly profit earned from ducklings sold	BDT	23325.0

Table 5 reveals information on egg traders. The main source of egg collection was direct from farmers and haat/bazaars. On average 14125 eggs were collected by an egg trader. The price of eggs is determined as per the market rate when collecting eggs. On average 2.25% of eggs are wasted every day. All the egg traders reported the demand for eggs was increasing and their average monthly profit was BDT. 25645.0.

Table 5: Details about egg traders

Indicator	Measurement unit	Value
Eggs collect from		
Direct farmers	% response	100.0
Haat-bazaars	% response	100.0
Other traders	% response	55.56
Type of eggs buy		
Duck	% response	100.0
Layer Chicken	% response	66.67
Desi Chicken	% response	22.22
Per week egg collect	Number	14125
Collect eggs according to needs	% response	55.55
Price of eggs determined when collecting eggs		
As per the market rate	% response	100.0
Through buyer-seller negotiation	% response	44.44
Bad egg in buying and selling		
Never	% response	0.0
Always	% response	100.0
Sometimes	% response	0.0
Eggs sell system		
Wholesale	% response	100.0
Retail	% response	66.67
Both	% response	55.56
Percentage of eggs are wasted every day	%	2.25
Changed in the demand for eggs		
Decreased	% response	0.0
Increased	% response	100.0
Remained the same	% response	0.0
Number of wage-based employees	Number	1.0
Monthly profit earned from egg sold	BDT	25645.0

Table 6 reveals information about duckling traders. The main type of ducklings sold by traders was Khaki Campbell (100.0%), cross-type (100.0%) and Xindinand (72.73%). On average 13875 ducklings were sold by a trader. The price of day-old male and female ducklings was BDT 28.75 and BDT 31.25. All traders directly sold ducklings to the farmers. The demand for ducklings was high late winter and autumn. Most traders (90.91%) reported the demand for ducklings was increasing and their average monthly profit was BDT. 21365.0.

Table 6: Details about duckling traders

Indicator	Measurement unit	Value
Types of duckling sell		
Deshi	% response	36.36
Khaki Campbell	% response	100.0
Xinding	% response	72.73
Cross-type	% response	100.0
Per month duckling sell	Number	13875
Price of day-old duckling		
Male duckling	BDT	28.75
Female duckling	BDT	31.25
Marketing system of duckling		
Direct to duck farmers	% response	100.0
Through abroad duckling traders	% response	36.36
Local hat-bazar	% response	72.72
Season of demand for ducklings high		
Late winter	% response	81.81
Summer	% response	63.64
Autumn	% response	81.81
Year-round	% response	45.45
Demand for ducklings increasing		
Yes, increasing	% response	90.91
No, constant	% response	9.09
No, decreasing	% response	0.0
Number of wage-based employees	Number	0.0
Monthly profit earned from ducklings sold	BDT	21365.0

Table 7 reveals information about duck traders. The main type of duck sold by traders was adult duck and the average duck sold per month was 765.75. The selling price of growing, adult and laying duck was BDT 255.50, BDT 398.75 and BDT 475.65. All traders directly sold duck to the abroad duck traders. The demand for duck was high in winter and autumn. Most traders (81.82%) reported the demand for the duck was increasing and their average monthly profit was BDT. 25550.75.

Table 7: Details about duck traders

Indicator	Measurement unit	Value
Types and amount of duck sold per month		
Growing duck	Number	652.25
Adult duck	Number	765.75
Laying duck	Number	369.50
Selling price of duck		
Growing duck	BDT/duck	255.50
Adult duck	BDT/duck	398.75
Laying duck	BDT/duck	475.65
Marketing system of duckling		
Direct to duck consumers	% response	18.18
Through abroad duck traders	% response	100.0
Local hat-bazaar	% response	18.18
Season of demand for duck high		
Winter	% response	100.0
Summer	% response	45.54
Autumn	% response	81.82
Year-round	% response	54.55
Demand for duck increasing		
Yes, increasing	% response	81.82
No, constant	% response	18.18
No, decreasing	% response	0.0
Number of wage-based employees	Number	1.0
Monthly profit earned from duck sold	BDT	25550.75

Current Status of Project Performance Indicator and Target of Achievement

Sl. No	Performance Indicator	Measurement unit	Baseline status	Target for achievement
1.	The income of 70% entrepreneurs will be increased to at least 50% i. Family duck farming a. from duck rearing b. others sources ii. Commercial duck farming a. from duck rearing b. others sources	BDT/month BDT/month BDT/month BDT/month BDT/month BDT/month	16167.43 896.79 15270.64 22247.71 9633.03 12614.68	24251.15 (50%) 1345.19 (50%) 22905.96 (50%) 33371.57 (50%) 14449.55 (50%) 18922.02 (50%)
2.	30% project participant farmers will add nutritious foods in their daily diet	% intake of 10 food items	0.0	30%
3.	The sell volume of safe duck/meat and egg of 80% entrepreneurs under the project will be increased to 30% i. Family farming Duck Egg ii. Commercial duck farming Duck Egg	number/annum number/annum number/annum number/annum	9.75 368.85 705.55 104240.05	12.68 (30%) 479.51 (30%) 917.22 (30%) 135512.06 (30%)
4.	The profit margin of 80% entrepreneurs under the project will be increased to 20% Feed dealer/sub-dealer Duckling dealer/supplier Poultry medicine seller LSP Duck Trader (Bepari) Egg Trader (Bepari) Hatchery owner Poultry Equipment Seller	BDT/month BDT/month BDT/month BDT/month BDT/ month BDT/ month BDT/ month BDT/ month	23450.50 21365.0 19125.75 18675.50 25550.75 25645.0 23325.0 20654.25	28140.60 (20%) 25638.0 (20%) 22950.90 (20%) 22410.60 (20%) 30660.90 (20%) 30774.0 (20%) 27990.0 (20%) 24785.10 (20%)
5.	All entrepreneurs under the project will be engaged in the activities of production of safe poultry products (meat & egg) by using quality/new inputs, innovative technology or GAP	%	0.0	100%
6.	13% producer group (PG) will be linked with formal and informal buyers as contract farmers	%	0.0	13%

Sl. No	Performance Indicator	Measurement unit	Baseline status	Target for achievement
7.	60% members under the project will gain knowledge as well as doing practice on GAP	%	0.0	60
8.	58% members under the project will adopt environment friendly smart technology	%	0.0	58
9.	As a result of increasing the usage of IT and GAP, the mortality of duck will be decreased to 10% i. Family farming ii. Commercial duck farming	% mortality % mortality	38.07 32.11	Mortality will be decreased to 73.73% 68.85%
10.	Expected growth of duck is obtaining i. Family duck farming ii. Commercial duck farming	% response % response	55% 45%	100% 100%
11.	Expected egg production is obtaining i. Family duck farming ii. Commercial duck farming	% response % response	58% 65%	100% 100%
12.	Production cost will be decreased to 10% i. Family farming ii. Commercial duck farming	BDT/annum BDT/annum	2235.50 1198489.89	2011.95 1078640.90
13.	As a result of developing linkage with formal and informal big buyers sell volume of products will be increased to 25% i. Family farming Duck Egg ii. Commercial duck farming Duck Egg	Number/annum Number/annum Number/annum Number/annum	0.0 0.0 0.0 0.0	25% 25% 25% 25%
14.	As a result of developing linkage with formal and informal big buyers selling price of products will be increased to 10% i. Family farming Duck Egg ii. Commercial duck farming Duck Egg	BDT/duck BDT/egg BDT/duck BDT/egg	395.75 12.20 373.25 10.08	435.33 (10%) 13.42 (10%) 410.58 (10%) 11.09 (10%)
15.	As a result of increasing access in backward and forward market service			

Sl. No	Performance Indicator	Measurement unit	Baseline status	Target for achievement
	in the cluster, the employment generation will be increased to 15% At farm level At enterprise level	Number/farm Number/entp.	1.26 0.95	1.45 (15%) 1.08 15%)
16.	In each union, a poultry vaccinator and a vaccine hub will be established Vaccinator Vaccine hub	Yes/No Yes/No	No No	25 25
17.	In the vaccine hub vaccine, anthelmintic, necessary medicine and related services or selling is ensuring and under the working areas about 80% farmers are getting this services Vaccine Anthelmintic Medicine	Yes/No Yes/No Yes/No	No No No	7600 (80%) 7600 (80%) 7600 (80%)
18.	In each union sub-dealer of poultry feed has been established (sell volume at least 10 MT per month), as a result about 80% farmers under the working areas are getting ready balanced feed in their hand	Yes/No	No	25
19.	In the local areas, poultry hatchery has been established and about 10000 ducklings are supplied from that hatchery	Yes/No	No	2
20.	Among family farming, about 10% family farm has been converted to commercial farm	Yes/No	No	950 (10%)
21.	About 10% farmers under the sub-project are producing egg and meat with contractual basis. Meat processing plant has been established (with capacity 4 MT per month) and at least 50 buyers are purchasing frozen meat on sub-contract basis from that plant. i. Production of egg and meat with contract basis ii. Establishment of meat processing plant iii. Buyers are purchasing frozen meat on sub-contract basis	10% Yes/No Yes/No	0.0% No No	950 (10%) 01 01
22.	DLS and Poultry Association are playing roles for improving egg and duck market	Yes/No	No	02

Sl. No	Performance Indicator	Measurement unit	Baseline status	Target for achievement
23.	a. In each Union whole-sale egg market has been established b. Small-scale egg washing hub has been established c. At least one egg brand has been established in the project working areas	Yes/No Yes/No Yes/No	No No No	25 01 01
24.	In each Union hygienic and Halal poultry meat chain shop has been established	Yes/No	No	12
25.	In each Union at least 5 e-agents have been developed for marketing egg, duck and meat	Yes/No	No	125
26.	a. At least 15% farmers/entrepreneurs are using mobile apps for their farm and business management b. The number of advance loan takers will be improved to 1000	% number	0.0 0.0	1425 1000
27.	The online portals are publishing updates on daily market price of egg and ducks	Yes/No	No	01
28.	In each Union Vermin-Trico compost processing plant has been established by using poultry and livestock wastes through waste management process	Yes/No	No	25

E. SWOT Analysis

Market System Development of Safe Poultry and Poultry Products

Strengths

- Project intervention
- Skilled manpower
- Financial and logistic supports
- Linkage and collaboration of different stakeholders
- Presence of a significant number of duck rearing MEs

Weaknesses

- Lack of knowledge, training and motivation related to duck farming and business
- Lack of financial ability to develop infra-structure
- Lack of strong linkage and collaboration among stakeholders
- Reluctant of the farmers and stakeholders to follow GAP and HACCP
- Dis-continuation and short-term project intervention
- No value chain and cluster approach in place
- Disorganized marketing system

Opportunities

- Awareness of the peoples for food safety and public health concern
- Increasing demand of safe and quality meat
- Attainment of more excellent production and marketing efficiencies through the value chain and cluster

Threats

- High input prices
- Market syndicate
- Dis-honesty of the market traders (tendency to deprive farmers for profit sharing)
- Huge gaps of market price from producers to consumers levels
- Indiscriminate use of unethical veterinary drugs to enhance meat yields
- Lack of biosecurity and preventive measures
- Favourable environment and climate to outbreak and spread diseases

Recommendations

Based on the findings from the HH survey, FGD and KIIs, the following recommendations are made:

- Selecting egg and meat-type ducks that are suited to the local environment will greatly reduce the risks to productivity, ability to adapt to climatic extremes, feed quality and resistance to endemic disease. Good quality ducklings should be supplied to the farmers.
- Vaccination is a useful event to limit the impact of disease by increasing the immunity of the animal population to specific pathogens. Ducks farmers are required to vaccinate their flocks against serious contagious diseases like duck cholera, and duck plague. Besides, the shuttle de-worming program should be followed at regular intervals (thrice a year).
- Waste storage areas should be sited appropriately with regard to sight and smell, and the risk to the environment from pollution and vermin. The biogas plant, disposal pit, vermin-compost, tri-compost, well drainage system, etc. technologies should be established to keep the environment free from pollution. The dead duck must be buried in a deep ground pit or incinerated properly.
- Need to protect ducks from adverse weather and the consequences thereof. This includes stress factors such as weather extremes, unseasonal change and others causing cold or heat stress. Need to consider the structure of shade or alternative means of cooling system.
- Veterinary medicines pose risks to humans, animals and food safety and are subject to special handling on their supply and use. Use only approved veterinary medicines, at the recommended dose according to the label directions, or as prescribed or advised by a veterinarian. Relevant withholding periods must be followed. Store chemicals and veterinary medicines securely to ensure they are not used inappropriately or do not unintentionally contaminate milk and feed. Check and observe product expiry dates. Now-a-days, many farmers administer unethical drugs to stimulate growth and egg production which have residual effects on human health when meat and eggs are consumed. This must be avoided.

- Expansion of duck farming among smallholders and commercial producers, as well as input suppliers (feed mills, drug producers, etc.) and processors of duck meat, is thus expected to increase the demand for finance throughout the sub-sector and will be needed to help facilitate continued horizontal and vertical integration. Duck rearing is always at risk of various diseases, sudden accidents and death and if happens may create very miserable conditions for the farmers, especially poorer farmers to maintain their livelihoods. Livestock insurance can protect against the loss of livestock from accident or disease.
- Farmers/beneficiaries, medicine and feed seller, LSP, duck and egg transporter, and duck traders/brokers should be trained-up.
- Routine campaigns for de-worming and vaccination will help to reduce disease incidents. Demonstration of modern farms and different technologies will encourage farmers to adopt those technologies. Visit to model farms will be helpful for knowledge sharing.
- Duck farmers have to sell their animals for earning profit. If they want to access premium markets, they must have taken product certification from the legal entity (veterinarian/livestock specialist). The legal entity will give product certification subject to pre-inspection of the animal in physical condition as well as the following issues producers must have kept in their records:
 - ❖ Ducks are physically sound and fit
 - ❖ No unethical drugs or medicines were administered for the purposes of any kind of diseases or increasing meat and egg production
 - ❖ Ducks were vaccinated and de-wormed regularly
 - ❖ Ducks are anyhow not injured or stressed

Conclusions

Duck farming is profitable because less investment is required and create employment opportunities among rural people. Better utilization of feed resources under water and wastage rice in crop field by duck farming. Most of the land of surveyed area is low land which is very much suitable for duck rearing. In the surveyed areas most of the farmers have limited knowledge about the production performance of improved breeds/varieties of duck. Farmers do not know scientific feeding and management system of duck rearing. Most of the farmers do not know about vaccination and its advantages in preventing duck disease. They have unavailability of improved variety of duckling. Most of the farmers have no training on duck production. Decreasing scavenging area and complains of neighbour regarding decrease duck rearing because they damage seedlings and crop during scavenging. Almost all duck farmers under the project areas are not aware duck farming in accordance with environment friendly “Good Livestock Management Practices (GLMP)” following global “Good Agricultural Practices (GAP)”. Therefore, a need-based extension program should be introduced among the farmers giving more focus on building awareness and ability about duck production. Through RMTP project, DSK has opportunity and potentiality to reach many duck farmers and entrepreneurs, input and service providers for developing their professional skills, increasing income level, developing women empowerment and building awareness for duck production, meat and egg market development.

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