# Effects of small-scale free range domestic pigeon farming on income generation of the subsistence rural livelihood in Bangladesh

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# Effects of small-scale free range domestic pigeon farming on income generation of the subsistence rural livelihood in Bangladesh



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# Abstract

Present survey was conducted in Chattogram Metropolitan area to assess the effects of small-scale free range domestic pigeon farming on economy of the farmers. Data from 10 pigeon farms mainly on production, reproduction, breed, housing, feeding, management of pigeons were collected through the direct interview of the farmers. Data of a total 100 pigeons were collected and analyzed here. Results showed that most of the pigeon growers (90%) were young (25-40 years) and all of them were from middle class family. Only 60% of them were found literate. Results also revealed that, only three types of pigeon breeds (gola, giribaz and local) were available in the farms of the study area. Comparative analysis of the production indices of these three breeds showed that local non descriptive varieties of pigeon produce more eggs and thus squabs per year than the gola and giribaz, though these were not statistically significant. On the other hand, average pause size, feed supply per day and average market age were a bit lower in the local pigeons than other breeds that ultimately help in increasing productivity of the local birds. Hatchability percentage of the local pigeon was found non significantly higher than the other breeds. Average mortality was found slightly higher in giribaz. Overall, the average annual egg and squab production of the pigeons of the study area were found 20.6 and 10.7 no/pair respectively. The mean quantity of the supplied feed to the pigeon was 37.8 g/bird/day. The average clutch and pause size were 2 and 17 days respectively. The usual market age, hatchability and mortality were seen 30.6 days, 51.4% and 7.6% respectively. Mean feed and housing cost were found BDT 1008 and 443/pair/year respectively where market price per pair adult and per squab were found BDT 36 and 130 respectively. A strong positive correlation was seen in between flock size and annual squab production of pigeon farms of the present study. On the other hand, pause size had a strong negative correlation with the annual squab production at pigeon farms in CMA. Farms rearing local pigeons make highest profit (BDT 823/pair) than the farms rearing giribaz (BDT 478/pair) and gola (BDT 319.70/pair). Pigeon farming in the study area had a great potentiality and can make more profitable through government and NGO by arranging training and loans for the small-scale farmers.

**Key word**: Pigeon farming, free range, income generation, CMA

# Chapter 1: Introduction

Pigeon, common title for individuals of the expensive family Columbidae, arrive fowls, catholic in calm and tropical locals, characterized by strong bodies, long necks, little head and thick overwhelming plumage (Gifford, 1941). Pigeons are related to human since ancient time. They coexist with humans as a source of food (Levi, 2020), hobby, income  (Goodwin, 1977) and for research purpose (Sari et al., 2008). Pigeons are mainly monogamous birds (Essam, 1997), extremely intelligent and complicated creatures. Pigeons (Order Columbiformes) are common birds that can be found in almost any town or city on the planet (Marques et al., 2007). Despite the fact that pigeons are among the most intelligent of all bird species, man has found few uses for them other than the sports, food and as a messenger.

There are several popular breeds of pigeons depending on their purpose. King, Runt, Red Carneau, French Mondaine, Giant Homers etc. are used for the squab production while Fantail, Crowned Pigeon, Jacobin, Pouter, Swallow, Bokhara trumpeter, and Frill back, are raised as ornamental birds in all over the world including Bangladesh. Flying or homer breeds are possibly the most famous that includes racing pigeons used for endurance flying (distance or height) and for their homing instinct. Breeds include Racing Homers, Rollers and Tumblers (Kabir, 2014). Giribaz is one of the Indo-Bangladesh subcontinent's oldest pigeons. There are several other local breeds of pigeon that are commonly raised in Bangladesh are Gola, Siraji, Serting, Mayouri etc. (Islam, 2010).

Bangladesh has a long history of raising different poultry species in backyard systems (Bhowmik et al., 2014). It's weather and extensive tracts of cropland, as well as housing facilities are ideal for pigeon farming  (Asaduzzaman et al., 2009). More than 60% of rural households that raise poultry are found raising pigeons either commercially or as a hobby (Huque, 1987). Pigeon farming has a minimal initial investment, low feed and housing costs, simple and cost-effective husbandry procedures, a short reproduction cycle and low disease occurrences. The pigeon can eat simple grains and a bit decent grit, but it also needs clean water (Anggorodi, 1995). Pigeons could also be fed on crumble ration or a mix of miles, minerals, grits, and water, according to the availability of the items. Pigeons preferred cereals such as corn, soya bean, peanut, and wheat grain among the diets. One of the most important criteria for successful pigeon farming is a balanced ration. Nutritional balance promotes healthy growth, production, reproduction and immunity (Levi, 2020) . Squab the young pigeon is a

great source of appetizing, delectable, easily digestible and elegant animal protein. It is popular among people of all faiths. Squab meat is low in fat and high in protein, minerals, and vitamins (Aliza, 2005). Pigeon meat is thought to have therapeutic properties in China, and squab is served at festive banquets such as the Chinese New Year (Simonds et al., 2005). Rearing pigeons as pets is a great source of recreation. Their droppings act as a good source of bio-fertilizer, particularly for family gardening. Moreover, pigeons have been used as research animal in genetics and hormonal investigations for a long time (Asaduzzaman et al., 2009). Recently commercial pigeon rearing is seen as one of the popular businesses specially among the young generation. These farms are dedicated to mostly squab production for meat as well as for the production of squab of ornamental breeds to be reared as pet.

Although pigeons provide an alternative source of animal protein and income through commercial farming, their contribution has yet been compared to that of the livestock sub-sector and total poultry production in BD. Moreover, there is no statistics available on the contribution and common drawbacks of this potential farming sector in Bangladesh. So, the current study was conducted to record the present status, common problems and prospects of pigeon farming in Chattogram Metropolitan Area (CMA), Bangladesh.

# Chapter 2: Materials and Methods

## 2.1 Study design, area and duration

A cross-sectional study was conducted from July, 2021 to September, 2021 at Chattogram Metropolitan (CMA) which is one of the epicenters of pigeon farming in Bangladesh.

## 2.2 Farm Selection

This area was also convenient for the researcher to communicate. Ten (10) different pigeon farms were selected where the main selection criteria were having at least 02 pairs of pigeon reared in backyard system, free family labor and no objection of the family members for keeping pigeons.

## 2.3 Farmer's interview

Farmers were interviewed in their own premises by the researcher directly. In order to get detailed information, interviewer interviewed only two farmers a day. It took around two hours to interview a respondent. A break of 30 minutes was taken between two subsequent interviews. An observation list was also completed during the farm visit. Institutional approval for conducting interviews with the pigeon farmers was obtained from CVASU.

## 2.4 Data collection

Before, the field survey, a structured questionnaire (Appendix I) and a survey protocol were developed to achieve targeted objectives of the study. After briefing the objectives of the interview, verbal and written consents of the respondents were taken. At least one week before starting the interview, the interviewer was given printed materials as guidelines for the survey. The questionnaire included farmer's personal information (age, educational level, farming experience), farm production and reproduction like breed, housing, feeding, management, egg and squab production, disease control, marketing, mortality etc.

## 2.5 Statistical analysis

Raw data were compiled into Microsoft excel professional 2020 (Microsoft corporation, USA). Outliers and multicollinearity in the data set were tested by inter quartile range test and variance inflation factors. Normality of the response variable was checked by Shapiro Wilk test. Profile plots were used to measure the interactions of the covariates. The data were analyzed by one

way ANOVA. Heatmap of multiple orthogonal contrasts were produced to check the latent trends, dimensionality and strengths of the co-variates. When statistical effects were deemed significant ($p < 0.05$), the Duncan's New Multiple Range Test (DMRT) was used to compare the means. All statistical tests were performed by using Stata 14.1 SE (Stata Corp LP, College Station, Texas, USA).

# Chapter 3: Results

## 3.1 Socio-economy

Age of the pigeon farmers ranged from 27 to 50 years in this study. The farmers were graded into 2 age categories like young (25-40 years) and middle aged (41-55 years). It is evident that 90% farmers were belonged to young group and only 10% were middle aged. The pigeon farmers of study area were classified into 3 categories on the basis of their educational level. Results presented that 30% of the farmers were of year 10 graduate and above, whereas, another 30% had received only primary education. But unfortunately remaining 40% of the farmers were found illiterate. All the farmers were of middle-class family and their annual income was within 12,000-15,000 per year.

## 3.2 Comparative indices

Results of the present study showed that local non descriptive varieties of pigeon produce more eggs and thus squabs per year than the gola and giribaz, though these were not statistically significant. On the other hand, average pause size, feed supply per day and average market age were a bit lower in the local pigeons than other breeds that ultimately help in increasing productivity of the local birds (Table 1). Hatchability percentage of the local pigeon was found non significantly higher than the other breeds. Average mortality% was found slightly higher in giribaz (Table 1).

**Table 1.** Differences between the production parameters of three different breeds at CMA

| Variables | Breeds | | | SEM | P-value |
|---|---|---|---|---|---|
| | Local | Gola | Giribaz | | |
| Flock size (pair) | 3.0 | 5.6 | 5.0 | 0.67 | 0.388 |
| Annual egg production (no/pair/year) | 22.0 | 20.6 | 19.7 | 1.13 | 0.814 |
| Annual squab production (no/pair/year) | 12.3 | 10.6 | 10.0 | 1.02 | 0.779 |
| Average clutch size (day) | 2.0 | 2.0 | 2.0 | 0.00 | - |
| Average pause size (day) | 16.0 | 17.2 | 18.3 | 0.79 | 0.644 |
| Feed supply (g/bird/d) | 35.5 | 38.2 | 38.7 | 1.50 | 0.785 |
| Average market age (day) | 29.0 | 30.8 | 31.3 | 0.88 | 0.696 |
| Hatchability (%) | 55.7 | 50.3 | 50.5 | 2.24 | 0.687 |
| Average mortality (%) | 8.0 | 6.0 | 10.0 | 1.60 | 0.609 |

## 3.3 Overall indices

Results of the present study revealed that most of the backyard pigeon farmers at CMA had more than one year of farming experience and the mean experience was 2.6 years with an average flock size of 4.9 pairs of pigeon (Table 3). The average annual egg and squab production were found 20.6 and 10.7 no/pair respectively. The mean quantity of the supplied feed to the pigeon was 37.8 g/bird/day. The average clutch and pause size were 2 and 17 days respectively. The usual market age, hatchability and mortality were seen 30.6 days, 51.4% and 7.6% respectively (Table 3). Mean feed and housing cost were found BDT 1008 and 443/pair/year respectively where market price per pair adult and per squab were found BDT 36 and 130 respectively (Table 3).

Figure 1, the heat map showed the correlation between different descriptive parameters of the pigeon farms. A strong positive correlation was seen in between flock size and annual squab production of pigeon farms of the present study (Figure 2). On the other hand, pause size had a strong negative correlation with the annual squab production (Figure 3) at pigeon farms in CMA.

**Table 2.** Overall status of the backyard pigeon farming in Chattogram metropolitan area

| Descriptive parameters | Min. | Max. | Mean | SE | 95% CI | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | | | Min. | Max. |
| Farming experience (year) | 1.0 | 5.0 | 2.6 | 0.6 | 1.3 | 3.9 |
| Flock size (pair) | 2.0 | 9.0 | 4.9 | 0.7 | 3.4 | 6.4 |
| Annual egg production (no/pair) | 15.0 | 28.0 | 20.6 | 1.1 | 18.0 | 23.2 |
| Annual squab production (no/pair) | 8.0 | 18.5 | 10.7 | 1.0 | 8.4 | 13.0 |
| Feed supply (g/bird/d) | 32.0 | 47.0 | 37.8 | 1.5 | 34.4 | 41.2 |
| Average clutch size (day) | 2.0 | 2.0 | 2.0 | - | - | - |
| Average pause size (day) | 14.0 | 22.0 | 17.3 | 0.8 | 15.5 | 19.1 |
| Average market age (day) | 28.0 | 36.0 | 30.6 | 0.9 | 28.6 | 32.6 |
| Hatchability (%) | 42.0 | 66.1 | 51.4 | 2.2 | 46.3 | 56.5 |
| Feed cost/pair/year | 864.0 | 1152.0 | 1008.0 | 24.7 | 948.5 | 1067.5 |
| Market price per squab (BDT) | 110.0 | 150.0 | 130.0 | 4.9 | 118.8 | 141.2 |
| Market price per adult couple (BDT) | 280.0 | 450.0 | 365.0 | 18.6 | 322.8 | 407.2 |
| Average mortality (%) | 2.0 | 18.0 | 7.6 | 1.6 | 4.0 | 11.2 |
| Housing cost/pair/year | 305.0 | 700.0 | 443.0 | 42.8 | 346.3 | 539.7 |
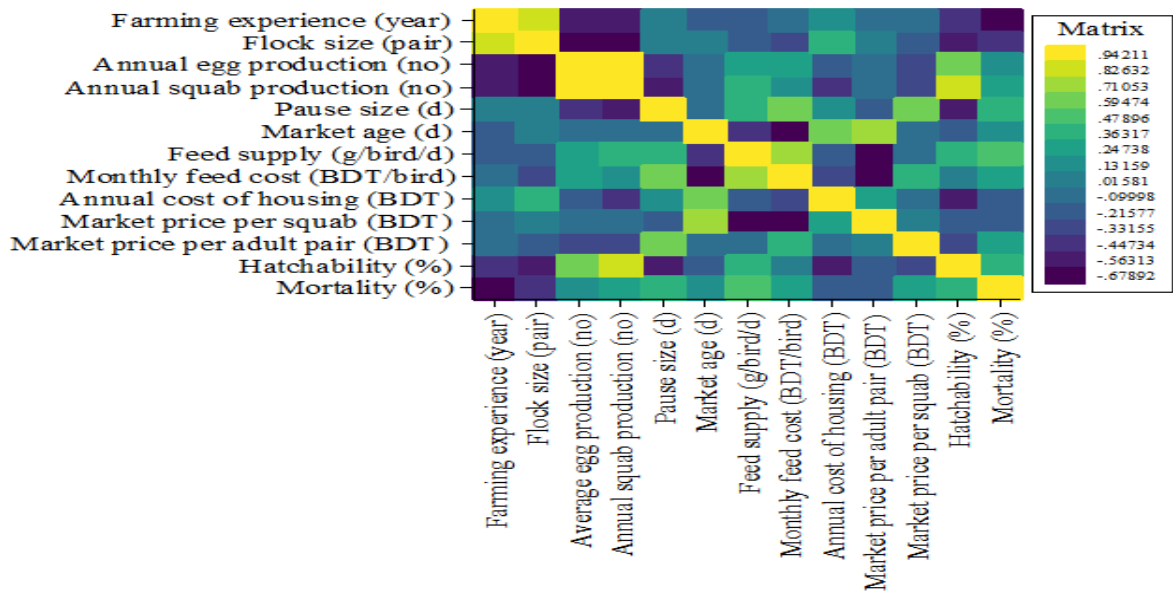
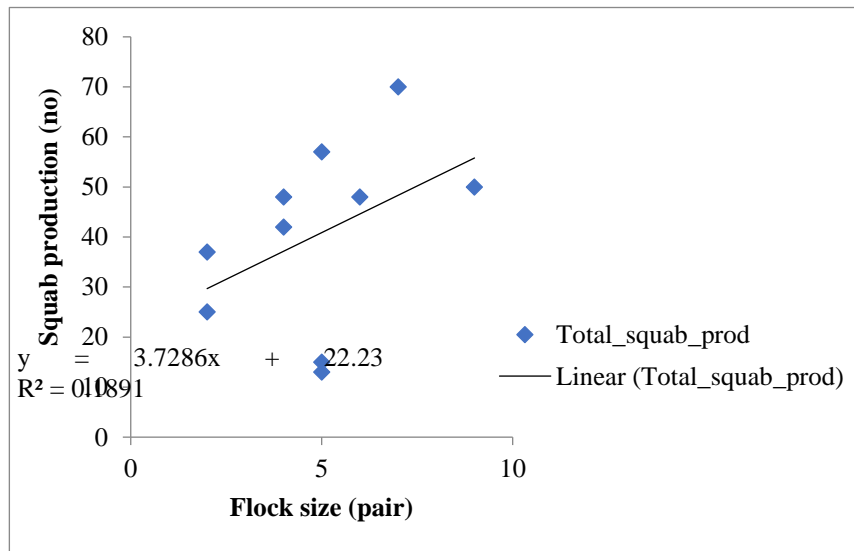**Figure 1.** Heat map showing orthogonal contrasts of the production indices of pigeon farming at CMA



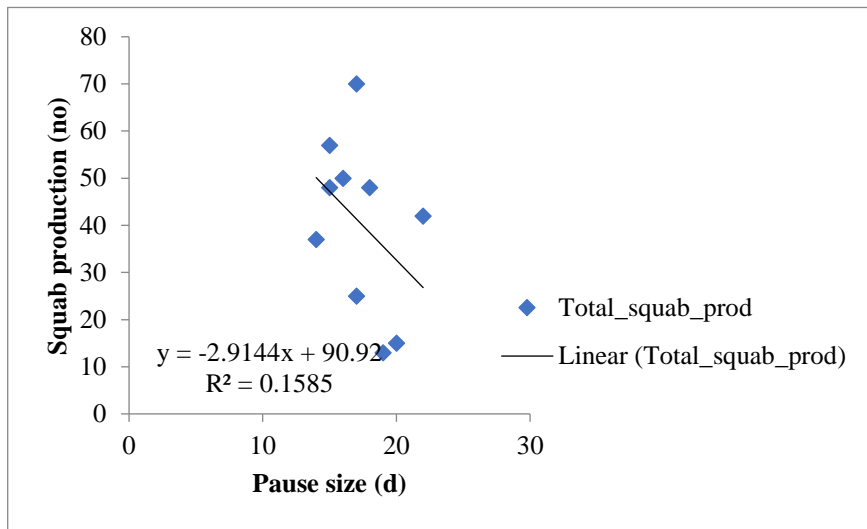**Figure 2.** Positive correlation between flock size and squab production

**Figure 3.** Negative correlation between pause size and squab production

### 3.4 Cost-benefit analysis

Results of table 2 showed the detailed cost-benefit status of the selected pigeon farms of CMA. There were significant differences between the net profit of the farms rearing different breeds of pigeon. Farms rearing local pigeons make highest profit (BDT 823/pair) than the farms rearing giribaz (BDT 478/pair) and gola (BDT 319.70/pair).

**Table 3.** Cost-benefit analysis of different pigeon farms at study area

| Variables | Breeds | | | SEM | P-value |
|---|---|---|---|---|---|
| | Local | Gola | Giribaz | | |
| Feed cost/pair/year | 996.0 | 1017.6 | 1000.0 | 1.10 | 0.948 |
| Housing cost/pair/year | 348.5 | 515.2 | 385.7 | 42.75 | 0.250 |
| Market price per breeding pair (BDT) | 395.0 | 356.0 | 360.0 | 18.63 | 0.767 |
| Other costs/pair/year | 500 | 500 | 500 | - | - |
| Total costs | 2239.5 | 2388.8 | 2245.7 | 51.6 | 0.675 |
| Market price/pair squab (BDT) | 250.0 | 256.0 | 273.3 | 4.94 | 0.712 |
| Total income from squab sale (BDT) | 3062.5 | 2708.5 | 2724.2 | 65.3 | 0.374 |
| Net profit/adult couple (BDT) | 823.0 | 319.7 | 478.6 | 46.3 | 0.001 |

# Chapter 4: Discussion

## *4.1 Socio-economy*

In this study most of the pigeon farmers were literate, young to mid aged and socially belong to middle class. Age of the pigeon farmers observed in the study coincide with Rahman (2002) but contradict with the observation of Asaduzzaman et al. (2009). The majority of pigeon farmers were literate which contradict with previous report (Asaduzzaman et al., 2009), where 53.3% of the pigeon farmers were illiterate. The differences could possibly be explained by the year and area of study.

## *4.2 Comparative indices*

In this study, local non descriptive varieties of pigeon produced more eggs and squabs per year than the gola and giribaz, though these were not statistically significant. On the other hand, average pause size, feed supply per day and average market age were a bit lower in the local pigeons than other breeds that ultimately help in increasing productivity of the local birds Hatchability percentage of the local pigeon was found non significantly higher than the other breeds. Average mortality was found slightly higher in giribaz. The differences have possibly been arisen because in the present study pigeon were reared in scavenging system whereas, in other studies the pigeons were reared in confinement. Environmental condition is one of the most effective cause of this differences.

## *4.3 Overall indices*

In this study most of the backyard pigeon farmers have an average flock size of 4.9 pairs of pigeon. The average annual egg and squab production were found in this study are 20.6 and 10.7 no/pair respectively. Squab output peaked at 18 numbers per year per pair and peaked at 12 numbers per year per pair. According to (Levi, 2020), a successful commercial pigeon couple should produce 18 to 20 squabs each year, but (Platt & Dare, 1937) found 11.4 squabs/pair/year.  This discrepancy in squab output could be attributable to breed and geographical variables. The mean quantity of the supplied feed to the pigeon was 37.8 g/bird/day. Strand Magazine (1901)  reported that feed intake per pigeon per day was 47.35 g which was slightly higher than the present observation. The differences have possibly been arisen because in the present study, pigeons were reared in scavenging system and farmers supplied only supplementary feeding. Whereas, in other studies the pigeons were reared in

confinement. The usual market age, hatchability and mortality were seen 30.6 days, 51.4% and 7.6% respectively which is similar with the report of (Levi, 2020) where marketing age was reported at ranged from 25 to 35 days, with an average of 30 days Mean feed and housing cost were found BDT 1008 and 443/pair/year respectively where market price per pair adult and per squab were found BDT 36 and 130 respectively. In previous report maximum construction cost of pigeon house was Tk.150, while minimum cost was Tk. 70 and the average cost was Tk. 113 (Asaduzzaman et al., 2009). As the price of construction materials used for pigeon in this study is high as well as increasing day by day, a variation is found.

### 4.4 Cost-benefit analysis

We discovered that farms rearing local pigeons make highest profit (BDT 823/pair) than the farms rearing giribaz (BDT 478/pair) and gola (BDT 319.70/pair). It might be occurred due to lower feed and housing cost/pair/year of local breed than other commercial breeds. This study shows that, it can be huge source of income for small scale farms as well as large scale farmers. The production can be increased if the vaccination, medication, good feed formulation is introduced.

# Chapter 5: Conclusion

Overall, free range pigeon farming in rural areas of Bangladesh had a great potential in income generation for the unemployed young generation. In the present study, local pigeon breeds showed better production and reproduction performances over the gola and giribaz. Cost benefit analysis revealed a positive balance in case of rearing of all three types of pigeon breeds. So, commercial pigeon farming using these breeds can contribute in subsistence income generation for the rural people of Bangladesh and this can be boosted up through supports from the government and NGOs in terms of training facility and loans.

# Limitations of the study

- Small sample size and short study duration
- Non cooperative farmers
- Data collection- Most of the farmers did not keep any written document of their farm activities.

# References

Aliza, G. (2005). Field guide to meat: How to identify, select and prepare virtually every meat, poultry and game cut. Quirk books.

Anggorodi, R. (1995). Nutrisi aneka ternak unggas. Gramedia Pustaka Utama. Jakarta.

Asaduzzaman, M., Mahiuddin, M., Howlider, M. A. R., Hossain, M. M., & Yeasmin, T. (2009). Pigeon farming in Gouripur upazilla of Mymensingh district. Bangladesh Journal of Animal Science, 38(1–2), 142–150.

Bhowmik, N., Mia, M. M., & Rahman, M. A. (2014). Morphometric measurements, productive and reproductive performance of Jalali pigeon. Int. J. Dev. Res, 4(4), 908–911.

Essam, A. M. (1997). Behaviour and management of pigeons. PhD, Faculty of Veterinary Medicine, Moshtohr, Zagazig University.

Gifford, E. W. (1941). Taxonomy and habits of pigeons. The Auk, 58(2), 239–245.

Goodwin, D. H. (1977). Pigeons and doves of the world. Comstock Pub. Associates.

Huque, Q. M. E. (1987). Characteristics of two villages for farming system research. Farming System Research Programs, Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh.

Islam, M. R. (2010). Pigeon farming and meat yield of some genetic groups in Mymensingh district. MSc, Dept. of Poult. Sci., Bang. Agril. Univ., Mymensingh, Bangladesh.

Kabir, M. A. (2014). Grading system of ten common fancy pigeons of Bangladesh. Integrated Journal of British, 1(1), 19–26.

Levi, W. M. (2020). Making Pigeons Pay-A Manual of Practical Information on the Management, Selection, Breeding, Feeding, and Marketing of Pigeons. Read Books Ltd.

Platt, C. S., & Dare, R. S. (1937). Squab production. New jersey agric. Exper. Station Bull, 634.

Rahman, M. W. (2002). Consumption of poultry and poultry products by the rural families in selected villages of sadar upazila under Mymensingh. MS thesis, Department of Poultry Science, Bangladesh Agricultural University.

Simonds, N., Simonds, N., & Lowe, J. (2005). The Food of China. Murdoch.

Marques, T. S., Cuadros, M. D. R., Silva, J. C., & Baldo, M. (2007). Parasites of pigeons (Columba livia) in urban areas of lages, Southern Brazil. Parasitología Latinoamericana, 62(3–4), 183–187.

# Acknowledgements

# Biography

I am Partha Samanta. I passed my Secondary School Certificate (SSC) examination in 2012 and Higher Secondary Certificate (HSC) examination in 2014. Then I have enrolled myself at for Chattogram Veterinary and Animal Sciences University (CVASU) in the Faulty of Veterinary Medicine (FVM) in 2015. I have immense interest to work in the field of Pet Animal Medicine.