**Chapter I**

**INTRODUCTION**

**1.1 Problem Statement**

Commercial broiler farming is one of the profitable agro-industries which can effectively tackle the problems of unemployment and underemployment in the rural areas, particularly of small and marginal farmers. It can be adopted under a wide range of climatic conditions and can generally be combined conveniently with other farm enterprises.

The land, capital and other requirements for this enterprise being not large, ensures a regular flow of income through the marketing of poultry products. In spite of a spectacular growth in the poultry sector during the past three decades, a huge gap exists between availability and requirement of poultry products. An increasing per capita consumption by single egg and 50 grams of poultry meat can create employment for about 26,000 persons per year (Kazi, 2003). The present per capita availability of poultry meat is 1.23 kg against the requirement of 11 kg as per the National Committee on Human Nutrition in Bangladesh (Bbs, 2017). Therefore, to meet the domestic requirement, need to increase about nine times poultry production in Bangladesh.

Increasing population growth, changing life-style, shifting of food habits, rapid urbanization, increased per capita income, increased unemployment, awareness about health care, etc. are contributing towards rising demand for poultry products. Thus, the growth potential of this sector is bright due to regular flow of income throughout the year in the rural as well as semi urban area economy. In Bangladesh, livestock contribution in total GDP was 1.47% (Bbs, 2018) where poultry production were estimated in 3563.18 lakh number in 2019-20 in which broiler production has a significant contribution in whole country.

Commercial broiler farming assumes special significance due to integration of Poultry sector, conducive weather conditions and available land area in Noakhali districts. The productivity and marketing of food grains have already reached a point of saturation with little scope to increase, resulting in looking for subsidiary occupations like broiler farming. At the same time, due to limited scope and opportunities of further addition to the net area sown and huge indebtedness, diversification of agriculture through allied activities like commercial broiler farming has acquired added significance for solving the agrarian crisis of the country. Adoption of broilers farming by farmers will not only liberate them from the debt trap but would also meet the growing demand of poultry meat.

#### Rationale of the study

Chittagong division is the leading poultry meat producing state in Bangladesh and it accounts for one fifth of the poultry meat as well as egg production in the country (Rajendran, 2008). One major aspect that can be observed in the poultry sector is that, it is highly appreciable to production and low market risk, which in turn affects the profitability of commercial broiler production particularly on the small farms.

But today the broiler industry is faced by so many problems such as ever increasing feed prices, non-availability of day-old chicks; unpredictable market prices for broiler meat are found to be the foremost restraints for rapid growth of broiler industry.

Noakhali district in Chittagong division is the biggest producer of broilers, having more broiler farms. In this area, there is notable immense potential of large scale commercial broilers farming which represents not only in Chattogram division but also in the country. Despite the importance of broiler production, no systematic studies were conducted yet in Noakhali district of Bangladesh to find out profitability on different farm sizes of broiler farming and cause to identify the factors that influence broiler production. To fulfill this gap, an attempt has been undertaken to assess the comparative production efficiency and profitability of commercial broiler farm owner at Noakhali district. The study also provides required information on the resource utilization and adjustments for optimal use of the inputs. Further, the information on the cost and return structure will be high utility to financing institutions to fix the scale of finance. As such the results of this study would be very much useful not only to the broiler farmers at Noakhali districts but also in whole country to identify lakh in production and to re-allocate their resources in an efficient manner.

Therefore, this situation raises the following questions,

1. What are the socio-economic characteristics of the selected broiler farm owners?
2. Is commercial broiler production profitable?
3. What are the resource productivity, resource use efficiency and returns to scale in commercial broiler production?
4. What are the problems faced in commercial broiler farming by farm owners in Noakhali districts.

#### The Specific objectives of the study are:

1. To assess the Socio-economic characteristics of the selected broiler farm owners.
2. To estimate the farm size wise profitability of commercial broiler production.
3. To assess the resource productivity, resource use efficiency and returns to scale in broiler production according to size of farms.
4. To study the problems involved in broiler farming and to suggest policy implications.

## Chapter II

**REVIEW OF LITERATURE**

The enigmatic feature of over dependence of the labour force on the agricultural sector (Such as Poultry sector) is a cause for concern for its pernicious consequences like unemployment, under employment and poverty. In the absence of any perceptible increase in labour absorption capacity by the industrial sector, the future remains bleak with regard to rural employment. Only recently there is awareness among academics as well as planners, that allied activities in the rural areas can be a potential source for providing productive employment. Apart from dairying which has attracted considerable attention, another relatively ignored activity is poultry (Specially Broiler) rearing. Poultry (Broiler) keeping, apart from providing subsidiary income and employment, can also contribute in mitigating the problem of malnutrition in the country. The previous research by the agricultural economists has almost ignored this allied activity i.e., poultry. Time and again, this lacuna in agricultural economics research has been pointed out by the academics and expert bodies. But, our understanding of the potentialities of poultry farming is very limited due to the paucity of research on economics of poultry (Broiler) farming. Despite this limitation, an attempt is made in this chapter to review certain aspects of research work done in the past ten years. These reviews are directional instruments to the present study. Keeping this in view, a few studies which have relevance to the present study have been abstracted and presented in subsequent paragraphs. For the purpose of clarity, this chapter is structured with the following headings and ideas.

**2.1 Investment pattern in Broiler farming:**

A study conducted by Karim *et al*. (2001) analyzed the performance of broiler farms in terms of profitability and marketing under constant rate of prices located at Kishoreganj district in Bangladesh. 75 famers (25 small, 25 medium and 25 large farms) were purposely selected from the area. The costs and returns were calculated to find out the profitability and marketing of broiler production. The total cost per bird estimated at Tk (78.43%), Tk (78.51%), Tk (78.32%) for small, medium, large and all broiler farms respectively. On the returns side, the average gross returns per bird per batch stood at TK (89.21%), TK (89.40%), TK (90.71%), TK (89.87%) for small, medium, large and all broiler farms respectively.

A study conducted by Saran *et al*. (2005) revealed that India's poultry industry has transformed from a mere backyard activity into a major commercial activity in just four decades. Bangladesh is now one of the world's largest egg and Broiler producers. Rising incomes, coupled with emergence of vertically integrated production systems, contract growing, and marketing activities bringing about much needed economies of scale and thereby sustained profit margins along with technological development have been the major planks for this transformation. The objectives of the paper are twofold: (a) to gain a better understanding of the prospects for the poultry industry, by assessing supply/demand structure; production and consumption trends; consumer demand and preferences; price scenario, income and price elasticities and factors affecting poultry demand; performance and costs; marketing and (b) to take advantage of the factors that led to the success of poultry in some regions for growth prospects in other less developed regions. Considering the wide gap between the recommended and actual levels of consumption/ availability of poultry (Broiler) meat and eggs, there exists an ample scope for furthering the poultry industry. Integrated production, a market transition from live birds to chilled and frozen products, and policies that ensure input supplies at competitive prices are keys to sustain the present production and for future growth and development of the poultry sector in India, have been advocated.

James M. MacDonald *et al.* (2008) concluded that Poultry (Broiler) production in the United States is coordinated almost entirely through systems of production contracts, in which a grower’s compensation is based, in part, on how the grower’s performance compares with that of other growers. The poultry industry is undergoing a gradual structural change as production shifts to larger broiler enterprises that provide larger shares of an operator’s household income. Larger enterprises require substantially larger investments in broiler housing, and new or retrofitted houses are also an important source of productivity growth in the industry. This report, based on a large and representative survey of broiler operations, describes the industry’s organization, housing features, contract design, fees and enterprise cost structures, and farm and household finances.

Rajendran *et al*. (2008) conducted a study on the cost of production of broilers at market age in the Noakhali area. They found that the fast growth rate of Bangladesh’s broiler production is mainly due to the availability of hybrid broiler chicks, balanced feed, higher demand for poultry meat and raising consumer income. The trend towards forward integration in poultry operations, farmers’ preference for birds with higher dressing yields, and price stabilization measures initiated by the industry are the additional factors supporting production growth. However, several factors are involved in the cost of production of broilers at market age. Hence a detailed study was made to find out the economic aspects of broiler farming in commercial broiler farms located in and around Palladam area of Coimbatore district in Tamil Nadu. The data were collected by personal interview method using a standard pre-tested questionnaire, specially designed for this purpose. A total of 4,83,900 broilers reared in 56 broiler farms representing three farm sizes, using own, company or both own and company feed, either all-in-all-out or batch system were covered in this study. The cost of production per broiler recorded in the present study was Tk.60.97, 58.69 and 55.97 in small, medium and large farms, respectively. It indicated that the production cost decreased with increase in farm size. This is in agreement with the earlier observation of Prabaharan *et al.* (1985). However, the production cost in this study was higher than the earlier observations of Shah and Ranawat *et al.* (1989) and Verma and Pillai *et al.* (1989) which might be due to the higher cost of inputs like feed, chicks etc., The reason for comparatively lower production cost of broilers in large sized farms than in small and medium sized farms in the present study could be attributed to the fact that most of the large sized farms used their own mixed feed and continuously rearing the broilers without break. The fixed cost on broiler production was 12.30, 10.43 and 10.36 per cent of total cost in small, medium and large farms, respectively. As the farm size increased the fixed cost decreased. This is in agreement with the earlier observation of Moorti *et al.* (1990) where the fixed cost share was 13.87 per cent in small and 12.43 per cent in large farms. Singh *et al.* (1994) observed 4.41, 3.68 and 3.66 per cent in small, medium and large farms, respectively as fixed cost share in broiler production. Singh and Singh *et al.* (1984) and Soni and Verma *et al.* (1990) observed 4.62 and 8.46 per cent respectively as fixed cost share in their study. The variable cost in the present study formed 87.70 per cent in small, 89.57 per cent in medium and 89.64 per cent in large farms. As the farm size increased, the variable cost also increased. This is in agreement with the observations of Devarajan *et al.* (1981) and Moorti *et al.* (1990).

Mozumdar et al. (2009) assessed the changes in socio-economic conditions of small scale broiler farmers in rural areas of Bangladesh. The population comprised the small scale broiler farmers who reared at least 300 to less than 2000 birds in the rural areas of Sadar Upazila of Mymensingh district, among which a total of 50 samples were randomly selected for the study. The necessary data on different socio-economic parameters were collected from the respondents through personal interviews with the pre-tested interview schedule. Findings showed that annual employment opportunities for unemployed family members of broiler farmers were 302.96 man- days. The overall income and expenditure of the farmers were increased by TK.6100 and TK.3064.66 after involving in broiler farming. Cash in hand and savings with the bank raised by 142.71% and 201.63% respectively. Drinking water from one's own tube well increased by 135.71% and katcha latrines decreased by 76.47%. Consumption of meat, egg, and fruits per month per household increased by 94.32%, 34.53% and 56.14% respectively in post farming situations. The number of school going children, household assets and health status also improved. So, small scale broiler farming has positive and significant impact for the development of socio- economic status of the farmers as well as the improvement of rural livelihood.

A survey conducted by Abdallah and Khraisat *et al.* (2013) on Analysis of Poultry (Broiler) Production in Amman and Irbid District in Jordan based on primary data collected from 98 poultry farms in Amman district, Irbid district in Jordan. Farms were categorized as: (A) farms having a population of less than 5000, (B) farms having a population of 5000 – 10000, (C) farms having a population of 10001 -15000, (D) farms having a population of 15001 -30000 and (E) farms having a population of 30001 and above. Results indicate that this business is adopted as major source of income; however, most of the commercial poultry farms have been closed due to lesser profits and even heavy losses during the last few years. Majority of poultry farms (39.80 %) are small farms and the farmers are forced to rely on non-institutional sources of credit. Seasonal and cyclical price fluctuations in input and output are found higher. Poultry (Specially Broiler) producers are major stakeholders having no role in price fixation. The estimated input output ratio of poultry production is 1:1.39 (in winter) and 1: 1.75 (in summer) without marketing costs as they are added to the live weight sold to the consumer per kilogram live weight , which is estimated 0.15 to 0.2 JD / kg . The per rupee return does not look promising for investors of this sector especially in case of small farmers who are unable to reap the benefit of economies of scale.

Kiran and Rao *et al.* (2014) reported that the Poultry industry is the fastest growing sector of India's agriculture. To get the full impact of its rapid escalation, it would be interesting to trace the evolution of poultry development in India. In the absence of any perceptible increase in labour absorption capacity by the industrial sector, the future remains bleak with regard to rural employment. Poultry keeping, apart from providing subsidiary income and employment, can also contribute in mitigating the problem of malnutrition in the country.

Acharya and Kaphle *et al.* (2015) found out that the poultry sector is an emerging industry in Nepal with two distinct patterns of poultry production-intensive and scavenging. The scavenging poultry is widely prevalent in the rural areas and nearly 45% of total poultry population comprises of native flock and 55% of poultry birds accounts of commercial poultry. In response to meet the urban demand for meat and egg, commercial poultry production is growing rapidly by more than three times in recent years (from 1985 to 2014). Poultry offers major advantages over other enterprises due to its low cost protein source, low generation interval, complementary role of poultry on other farming practices. In spite of its' potentiality, competition with human and other animal food sources, high cost of production, new disease challenges, low technical efficiency, lack of genetic improvement of economic traits of local breeds, adverse climatic conditions due to climate change and unstable market for egg and meat are creating the major problem for sustainability. These constraints should be addressed with on-farm research involving the middle class poultry producer along with other entrepreneurs with diversification of poultry industry, semi-intensive poultry farming, and effective quarantine, adoption of low cost technology, food safety and food security with equal participation of stakeholders. Special emphasis should be given on research of locally feasible production technology, suitable poultry breeds and management. It gives a new dimension towards poultry farming programs in different clusters of Nepal. Moreover participatory response of poultry entrepreneurs to programs with priority to disease investigation, eradication and escorting poultry industry would be valuable.

Vikash & Jheeba *et al.* (2015) opined that among the Indian livestock based vocations, poultry farming occupies a pivotal position due to its enormous potential to bring about rapid economic growth with low investment. The growth potential of this sector is bright due to regular flow of income throughout the year in the rural economy of the Rajasthan state. In spite of a spectacular growth in the poultry sector during the past two decades, a huge gap exists between availability and need of poultry products. Therefore, the present study has been undertaken to look into the cost and return structure, production efficiency, income and employment generation and economic viability of different sized poultry farms in poultry enterprises in the Jaipur district. The data were collected from twenty poultry farms pertaining to Jaipur district of Rajasthan state during year 2013-14.

#### Profitability of broiler farming:

A study conducted by Begum *et al.* (2005) on comparative profitability of poultry production in vertically integrated contract and independent farming systems in Bangladesh. Poultry meat is the most widely accepted meat in Bangladesh. The commercial poultry farming system started in 1980 but until now meat deficiency is 89.5%. Vertically integrated contract farming can be one possible solution in this deficiency situation. With effective management, vertically integrated contract farming system can be a means to develop markets and to bring about the transfer of technical skill in a way of increasing productivity that is profitable for both the integrator and farmers. The primary data were collected from 50 sample farms of ABFL, the pioneer vertically integrated farm, Kishoreganj and 25 independent sample farms from Gajipur, the poultry region of Bangladesh. It was revealed in the present study that although the independent farmer was able to take advantage of the increase in the price of broilers in the market, resulting in a higher price per bird as compared with the contract farmers, but the contract farmers were still better off in their net return or profit.

Amos T.T. *et al.* (2006) examined the profitability of Poultry production in Ondo State. A total of 92 Poultry farmers were selected from two LGAs in the State and used for the study. The study revealed that backyard poultry production (Layers and Broilers) is a profitable venture in the study area. Layers production was observed to be more profitable than broilers production. Factors affecting the production of layers in the area include cost of feeding and veterinary cost while for broilers they include cost of feed and production experience. The study concluded with suggestions for increasing the productivity of poultry production in the study area in particular and Nigeria in general.

Singh *et al.* (2010) worked out the cost and return analysis of different sizes of broiler farms in the Punjab state from the primary data collected from 140 broiler farmers for the period March 2008 to February 2009 in three districts, viz. Ludhiana, Hoshiarpur and Muktsar. The study has shown that the total fixed investments per bird have been highest on small farms, followed by medium and large farms. The total variable cost per bird has been reported highest on small farms, followed by medium and large farms. The total cost of meat production per bird has been found highest on small broiler farms, followed by medium and large farms. The net returns per bird over the variable costs have been recorded highest on large farms and economies of scale prevail on these farms. The meat-feed price ratio and benefit-cost ratio have been found to increase with increase in farm-size of broiler farms, which indicates better utilization of inputs on large farms. On the basis of net present value, benefit-cost ratio and internal rate of return, investment in broiler farming has been found profitable in all farm-sizes, it being most profitable on large farms, followed by medium and small farms. The small broiler farms have been observed to be highly sensitive to increase in costs and decrease in net returns. The study has observed that broiler farming is a profitable venture and has a bright future in Punjab agriculture for improving the economic status of the farming community.

A study was conducted by Rana *et al*. (2012) to determine the cost, return of broiler production in some selected areas of Mymensingh district, Bangladesh. It was mainly based on primary data which were collected through face to face interviews from the respondents of broiler production during the month of December, 2011. Selected samples consisted of 30 broiler farm owners selected by using purposive sampling technique. For the analysis of data, tabular and production function techniques were used. This study estimated the average cost of raising broilers to be Tk. 8,35,910.65 per farm per year. It was found that the variable cost per farm per year stood at Tk. 8,23,735.93 which accounted for 98.54 percent of total cost. The total fixed cost per farm per year accounted for Tk. 14,041.66. It is evident from the study that the gross return per farm per year stood at Tk. 10,78,022.39. The net return per farm per year was calculated at Tk. 2,42,111.47. The findings revealed that broiler production was a profitable enterprise. Cobb-Douglas production function was also applied to explore the specific effect of the factors on broiler production. It was observed that most of the included variables had a significant impact on broiler production. Out of six variables included in the regression, four variables (i.e., feed cost, cost of day-old chick, labour cost and litter cost) had significant positive impact on return. This study also identified some problems in the production of broilers in the study area. Finally, based on the findings of the study, some recommendations were made for the development of broiler production in Bangladesh.

Andah *et al*. (2013) examined the profitability of broiler production, using the break even concept. The break even quantities, net present values and internal rates of returns have been estimated for 20 selected poultry farms. Poultry farms located in the Kumasi area broke even in the production of broilers while about 38.5 percent of the farms in the Accra-Tema area produced below their breakeven levels. Only 30 percent of the farms registered positive net present value. Under an interest rate scenario of 25 percent about 70 percent of all farms would be profitable (break even). The results suggest that a lower interest rate is essential for more farms to break even (be competitive) and stay in the poultry business.

Balamurugan and Manoharan *et al.* (2014) carried out cost and return analysis of different sizes of integrated broiler farms in Theni District of Tamil Nadu State based on the primary data collected from 150 broiler farmers for the period Mar 2011 to Feb 2012. The study has shown that the total fixed investments per bird have been highest on small farms, followed by medium and large farms. The total cost of meat production per bird, returns per bird over the variable costs has been found highest on small broiler farms, followed by medium and large farms. On the basis of net present value, and internal rate of return, investment in broiler farming has been found profitable in all farm-sizes, it being most profitable on large farms, followed by medium and small farms. The small broiler farms have been observed to be highly sensitive to increase in costs and decrease in net returns. The study has observed that broiler farming is a profitable venture and has a bright future in the Tamil Nadu agro based industry for improving economic status of the farming community in general and in the study in particular.

#### Resource productivity and returns to scale:

Bora and Bora *et al.* (2000) carried out a study of 34 poultry farms in and around Guwahati city, Assam in 1998 to estimate costs and returns of broiler production and to investigate resource productivity and scale returns. Feed accounted for the highest expenditure item in the total cost of raising 100 birds. The total cost of production was Tk. 6097 and gross return was Tk.7699 for raising 100 birds.

Farooq *et al*. (2003) concluded in their study on poultry farming in Chakwal, Pakistan, that the total cost of production, gross return and net profit per layer was Tk.393.88±5.36, 432.14±8.01 and 38.26±6.66 respectively. Mean feed cost per layer was Tk.302.23±5.01 which include Tk.10.27±0.24, 29.19±0.42 and 262.77±5.08 for starter, grower and layer ration respectively. Feed cost was the major component contributing 76.73% to the total cost of production. The other important items of cost were cost of day old chick, building rent, vaccination and therapy accounting for 5.05, 5.01, 4.13 and 3.25 percent respectively. Gross return from the sale of marketable eggs, culled eggs, spent / culled birds, empty bags and manure was Tk.388.84±7.91, 3.85±0.01, 35.80±0.23, 2.20±0.04 and 1.45±10.01 respectively forming 89.98, 0.89, 8.28, 0.51 and 0.34 per cent of the total returns.

Ramana Reddy *et al.* (2004) employed Cobb-Douglas production function to assess resource productivity and resource use efficiency in broiler production. The results revealed that the flocked size, feed cost, medicines cost, electricity expenditure and litter material were the most important factors that have a significant and positive effect on gross returns. With regard to resource use efficiency, flock size, feed were overused and medicines, electricity and litter were used in the production of broilers. This trend was true in all sizes of broiler farms. This shows that there is scope for increasing broiler production through reorganization of resources.

Oladeebo and Ambe-lamidi *et al.* (2007) attempted to determine profitability and economic efficiency of poultry production among youth farmers in Osun state, Nigeria. Out of all the four functional forms estimated, Cobb-Douglas production function has a better fit for poultry production. The results of the functional analysis indicated that variables of total number of birds and cost of feed were significant and positively singed which implied that an increase in each of these variables would lead to an increase in the level of poultry products produced. The sum of elasticities of 0.76 indicated positive decreasing returns to scale and that poultry production was in stage II of the production region. The resource use efficiency analysis showed that the total number of birds (farm size) and feed were over utilized. Further, the youth poultry farmers were not only grossly inefficient but also over utilized resources such as hired labour, family labour, drugs and chemicals. Economic efficiency and productivity could be improved if the farmers use less of these resources.

An economic analysis by Ahmed *et al*. (2010) of broiler production in Allahabad district found that the net return per broiler was Tk.9.10, Rs.9.55 and Tk.14.48 for small, medium and large farms respectively. Benefit-Cost ratio was 1.19, 1.20 and 1.30 for the broiler farms in the above order. Net Present Value (NPV) calculated for small farms was Tk.23,324.95, medium size farms Rs.53,080.13 and large farms Tk.1,44,583.26. They concluded that large farms received higher profits as compared to medium and small farms.

Vincent *et al*. (2010) in their study ‘resource use efficiency in poultry production in Bureti district, Kenya’ employed Cobb-Douglas production function. The results of the Functional analysis showed that some resources used in poultry production were underutilized while others were over utilized. The Efficiency indicators for poultry feeds (0.0603) showed that poultry feeds were inefficiently used. Labour efficiency indicator (-0.091) showed that farmers were not only grossly inefficient in the use of the resource but also over utilized it. The efficiency indicator for poultry equipment (60.86) implied that the resource was underutilized. Therefore, it was recommended that farmers should reorganize the resources in order to increase the returns in poultry enterprises.

Anang *et al*. (2013) compared the profitability of broiler and layer production in the BrongAhafo region of Ghana. Six poultry farms, comprising three layer farms and three broiler farms, were purposely sampled for the study. Data were obtained from production records of the farms and by questionnaire administration. Profitability analysis was carried out using the cost, revenue and profit functions to derive total cost, total revenue and total profit respectively. Constraints were analyzed using the Kendall’s coefficient of concordance. The results showed that both broiler and layer production were profitable in spite of some constraints facing their production. The major constraints associated with layer production were inadequate finance and scarcity/high cost of maize. For broiler production, the major constraints were inadequate finance and competition with imported frozen chicken. Access to credit, extension education and training on production practices were recommended as measures to improve commercial poultry production in the country.

Eze *et al*. (2013) investigated the efficiency of resource use and returns to Scale among broiler farmers in Imo State. Data were collected through a multi-stage sampling from 50 broiler farmers in the State with the aid of structured questionnaires. Data collected were analyzed using descriptive statistics, efficiency index, elasticity of production technique and the ordinary Least Square Regression model. The results from this study showed that 68% of the respondents engaged in farming as their primary occupation with mean age of 47.1 years and mean farm size of 563 birds. The farmers made an average Net Revenue of N291, 192.10 with 66 Kobo Return on Investment. Medication (significant at 1%), farm size (significant at 5%), feed and other inputs (significant at 1%) were the major factors affecting broiler output. The farmers operated at increasing Returns to Scale with 1.1408 Elasticity of Production (EP). It was concluded that broiler enterprise among the Fadama II farmers in Imo State is profitable but there is inefficiency in resource allocation. It was therefore recommended that the farmers either keep labour constant and increase their farm size or keep the farm size constant and decrease their use of labour input for increased profitability of their enterprises.

Dwivedi *et al*. (2015) conducted a study to observe the management practices adopted by broiler growers in Jammu district of Jammu & Kashmir state in the year 2014. The growers were categorized into three groups on the basis of number of birds namely; growers with less than 500 birds, 501-1000 birds and more than 1000 birds. The data from 60 growers were collected by selecting randomly 20 growers from each category. The socio-economic and management characteristics of broiler farms have been studied for each category which include family composition, educational status, occupational status, investment pattern, distance from input and output markets, training and experience of growers, system of housing, feeding, water, power etc. and the marketing channels adopted for sale of broilers.

#### Marketing problems and prospects of broiler farmers:

A study was conducted by Mathialagan *et al.* (2000) on problems of poultry farmers as perceived by the farmers, extension personnel and technology developers in Tamil Nadu. Data were collected from 42 farmers, 30 extension personnel, and 30 technology developers over a period from 1995-96. The main problems identified were: a lack of awareness in decision making; housing; disinfection; medicine purchase; feed processing; chick medication; and culling technologies.

Naidu *et al.* (2002) studied the problems of broiler farmers of Chittoor district and indicated that the major problem faced by the farmers was the high cost of feed. Other problems were the high cost of chicks, medication costs and uneconomic prices. These problems were not faced by contract broiler farmers. Mane *et al*. (2007) in their study “constraint analysis of poultry farming in north konkan region of Maharashtra” revealed that poultry farming was taken up by small farmers as subsidiary occupation to agriculture. The main problems encountered by the poultry farmers were high cost of chicks, high cost of feed and difficulties in obtaining loans from Government institutions. The major suggestions made were that remunerative price should be given for poultry products, poultry feed should be available in time and at cheaper rates, organization of poultry units on co-operative basis and collection and transportation of eggs and broilers through co-operative societies.

Borthakur *et al.* (2009) examined the constraints faced by the farmers in poultry rearing and marketing in Dibrugarh district of Assam. They observed that lack of suitable marketing facility to receive remunerative price for poultry products was the major constraint reported by 100% farmers, followed by high cost of chick and feed (80%), incidence of diseases like CRD and Ranikhet (60%) and lack of veterinary service (40%).

Rani and Subhadra *et al.* (2009) opined that inadequate knowledge of low cost cage construction, problems of predators, losses due to bacterial and viral diseases, non availability of veterinary services nearby, financial difficulties, high interest rate of loans, inadequate marketing facilities and price fluctuations were the problems perceived as most serious by the farm women in poultry farming in Thrissur district of Kerala. Swain *et al*. (2009) conducted a study on constraint analysis of commercial poultry farming in Goa. The study revealed that main problems encountered by the farmers, in making their poultry a successful enterprise was high feed cost followed by competition with outside farmers, high labour cost, and trading, high cost of electricity, high cost of chicks and non-availability of health services. The major suggestions were provision of subsidized feed, electricity and water and establishment of feed mill with subsidized equipments, remunerative price for broiler and eggs through co-operative marketing.

Pal *et al.* (2013) conducted a study with a view to examine the marketing pattern, marketing costs, marketing margins and price spread of broiler marketing in Punjab state. The study revealed that the proportion of farmers who sold their broilers exclusively to wholesalers was the highest on large farms (82.93%) followed by medium and small farms with 73.33% and 48.15%, respectively. Only 14.81% small farmers and 4.45% medium farmers sold their broilers exclusively to retailers while 37.04% small farmers, 22.22% medium farmers and 17.07% large farmers sold their broilers to both wholesalers and retailers. Each category of broiler farmers adopted different channels to dispose off their produce in different proportions. The small farmers sold major part of their produce to wholesalers directly (74.02%) and the rest 25.98% sold to the retailers directly while medium farmers sold 87% of their broilers to the wholesalers and 13% to the retailers. The large broiler farmers sold 95.99% of their produce to wholesalers and the remaining 4.01% to the retailers. Further, the marketing channel Producer-Retailer- Consumer was the most efficient marketing channel followed by Producer-Wholesaler (local)- Retailer-Consumer involved in the marketing of broilers in Punjab state. The total marketing margins, costs and hence the price spread was lower in channel Producer-Retailer-Consumer. The producer's share in consumer's rupee as well as marketing efficiency was also higher in this channel.

A study was conducted by Islam *et al*. (2014) on Prospects and Challenges in Broiler Farming of Barguna District in Bangladesh. A total of 21 farms and 10542 broiler birds from 12 villages of 3 upazila under Barguna district in Bangladesh during June 2014 to July 2014 were studied. Among selected farms, 47.62% were small (200-450 birds) and 52.38% were medium (500-1000 birds) and most of the farmers (71.40%) were with secondary level education while majority (61.90%) had no training in broiler farming. However, 42.86% farmers reared Hubbard Classic and 38.09% reared Cobb-500 while the rest farmers reared Arber Aceres, Ross and Lohmanh commercial hybrid broilers. Several poultry hatcheries and feed companies were involved to supply day old chicks and feed through their respective dealers to the broiler farmers in the study area. All broiler houses were open sided and most of them (85.71%) were with gable roof of corrugated iron sheet. Most of the farmers (95.20%) were using sawdust as litter materials and all farmers were using the disposed litter as fertilizer. All farmers were using electric broilers and brooding their birds for 7 days while 85.70% farmers were using hurricane lanterns for standby power supply for the brooding period. All farmers were using Newcastle and Infectious Bursal Disease vaccine and 81% farmers were deworming their birds. About 85.7% farmers reported that Marek’s disease vaccines were administered in day old chicks at hatchery level while 81% farmers sell their live broiler at local markets and about 52.40% farmers use their disposed feed bags for their own farm and household purpose. Mean live broiler weight at marketing age, feed conversion ratio and bird mortality rate were 1502.38±35.27gm, 1.93±0.04 and 3.51±0.65 %, respectively. Maximum broiler farmers had secondary level education and had no training. Broiler farming in Barguna district has generated employment opportunity in this sector. Bank loans with easy access and lower rate of interest might be helpful for the broiler farmers to run their enterprise without dependency on dealers. Field survey primary data and farmers opinion regarding day old chicks price and live broiler marketing suggested that selling live broilers at high price and buying day old chick at low price make the farm operation profitable and vice versa. Again farmer’s opinion suggested that higher feed price is reducing the profitability of broiler farms. Hence, it might be concluded that higher feed price and day old chicks and live broiler market instability are the major challenges in broiler farming in Barguna district of Bangladesh.

**Chapter III**

**MATERIAL AND METHODS**

The following methodology was adopted to fulfill the data requirements and to capture the objectives of the study. The sample design, techniques and tools of analysis adopted, concepts used and estimation procedures undergone have been presented in this chapter.

 **3.1.1 Selection of the study area**

The study is conducted in Noakhali district in Bangladesh. The rational of selecting study area mainly based on density of commercial broiler farming.

**3.1.2 Sampling design and sample size**

Purposive sampling technique was used in selecting study areas of this research. In a total 60 broiler farms were randomly selected where 20 farms from each size (small, medium and large). The secondary information with reference to location and number of birds reared per year was obtained from various sources like hatcheries, Bangladesh Poultry and Breeders Association and Department of Livestock Service (DLS), Bangladesh.

**3.1.3** **Selection of farms**

The list of Broiler producers were categorized into three size groups on the basis of the number of birds raised per year viz.,

|  |  |  |
| --- | --- | --- |
| Small | – | up to 20000 broilers |
| Medium | - | 20000 to 40000 and |
| Large | - | 40000 and above. |

**3.1.3** **Collection of sample**

Both qualitative and quantitative data were collected using household survey method. A survey schedule was developed and pre-tested for the study. After that it was finalize to collect data. Specially structured schedule was prepared in order to obtain information on production of broiler farming. The size wise primary data on socio-economic characteristics, production, consumption and mortality were collected from the selected broiler farmers by direct personal interrogation in farmer compound.

#### Concepts and Estimation Procedures Adopted

#### Capital Investment

Capital investment included expenditure on land, poultry houses, with structures like water connections, electric fittings and equipment.

#### Fixed costs

Fixed costs included depreciation on building and equipment, interest on fixed capital and rent if the shed is taken on lease.



#### Figure 3.1: Study areas map

#### Variable costs

Variable costs are those which vary with the volume of production. This is also called operational costs which include cost of day old chicks, cost of human labour, feed, medicine, litter, electricity and fuel, repairs and maintenance charges and interest on working expenses.

* + 1. **Chick cost**

Chick cost is the cost, the actual purchased cost of chicks including the cost of transportation has been taken into consideration to estimate the chick value.

#### Feed cost

The actual cost paid on different mashes such as chick mash, grower mash, broiler mash and also other feed such as vegetables, mixed feeds etc.,

#### Labour cost

The actual expenditure incurred on both family and hired labour engaged on the farm. For hired labour the actual wages paid was considered and for the family labour was computed in opportunity cost method.

#### Medicinal costs

Medicinal costs included vaccines, debarking, deworming, feed additives and other medicines used during broiler production.

#### Electricity and fuel cost

Actual costs paid towards electricity bills and fuel for the purpose of lighting in the poultry shed for maintaining temperature during the brooding period was considered.

#### Litter cost

This included the actual cost incurred towards purchase of litter materials i.e., paddy husk etc.

#### Miscellaneous costs

Actual cost incurred on repairs and maintenance, water bills, removal of litter material, poultry manure and white washing of poultry sheds.

#### Quantity of meat production per broiler

This is the ratio of total quantity of meat produced in kilograms to the number of birds reared.

#### Total returns

Receipts obtained from the sale of birds, manure and gunny bags were considered.

#### Net returns

Net returns were obtained by deducting the gross costs from gross returns.

 Net Return=Total return- Total cost

#### Benefit-cost ratio (BCR)

This is the ratio of total output to total input. This was estimated by the following formula.

 BCR = $\frac{Total return}{Total cost}$

#### Depreciation on fixed capital

It was calculated at straight line method,

 Depreciation =$\frac{Purchase value-Salvage value}{Total lengh of life}$

#### Interest on fixed capital

It was calculated at the rate of 10 per cent per annum per farm.

#### Interest on working capital

It was computed at the rate of 12.5 per cent per annum or at the actual rate at which the amount was borrowed.

**3.3 Data coding, entry and cleaning**

After data collection, the questionnaires was checked for completeness, cleaned, organized coded then entered into MS-Excel and STATA (Stata 14, Stata Statistical Software, Stata Corporation, and College Station, Texas 77845 USA) for analysis. Both the descriptive as well as econometric methods were used to achieve the objectives. When data was found to be consistent, it was then prepared for further analysis

**3.4** **Analytical Tools and Techniques**

**3.4.1** **Costs and returns in broiler farming:**

Tabular analysis has been used to present costs and returns according to farm size in Broiler farm production.

**3.4.2**   **Break-Even output**

The break-even output of birds in kgs was calculated with the following formula has been shown in below:

Y=$\frac{F}{P}$

Where Y = Break-even output

F = Fixed costs in Taka

P = Contribution margin by sale of birds

**3.4.3** **Resource productivity and returns to scale in poultry farming:**

To estimate resource productivity and returns to scale in broiler) farming, Cobb-Douglas production function was fitted. From this function marginal value products were derived and by comparing with opportunity cost ratios, resource use efficiency was judged from each category of the farms.

In order to estimate resource productivity and scale of returns Cobb-Douglas production function model was used in the study. The model of the form is given below:

Y = aX1b1X2b2X3b3X4b4eui

This can be written in log form as

Log Y = log a + b1logX1+b2logX2+ b3logX3+b4logX4+ei

Where,

Y = Gross output from broiler per farm (kg)

X1 = Flock size per farm (number of birds)

X2 = Expenditure incurred on feed per farm (Taka)

X3 = Cost incurred on labour per farm (Taka)

X4 = Expenditure on medicine and miscellaneous charges per farm (Taka)

b1 to bn = The regression coefficients or elasticities of production of respective input

variables

a = The constant of the function

ui = Error term

**3.4.4** **Returns to scale**

Returns to scale was worked out from the Cobb-Douglas analysis of farm. This is the summation of the estimated regression coefficients that has been taken as an indicator of returns to scale. The sum of the regression coefficients was tested against unity and it is found to be statistically significant then one can infer that is

If Σbi> 1 it is increasing returns to scale

If Σbi = 1 it is constant returns to scale

If Σbi< 1 it is decreasing returns to scale

**3.4.5** **Marginal Value Products (MVP)**

The marginal value product is calculated by multiplying the marginal physical product (MPP) of the resource by the marginal revenue (MR) generated. To decide upon whether a particular input is used rationally or irrationally, its marginal value product (MVP) of an input just covers its acquisition cost which is said to be used more efficiently. Marginal value products can be calculated from the Cobb-Douglas type of production function as follows

1. =aX1b1X2b2X3b3…..Xnbn

$\frac{∂Y}{∂Xi }$ = $\frac{ab1X1+b2X2+b3X3……..+bnXn}{∂Xi}$

It can be generalized as,

bi=$\frac{Y}{Xi}$

Where bi = Partial regression coefficient of the respective input

Y = output when all the inputs are kept at their geometric mean levels

Xi = Respective independent variables at its geometric mean level

**3.4.6 Garrett’s ranking technique:**

Problems in production of broilers in the study area were analyzed using the Garrett’s ranking technique. The order of merit given by the broiler farmers for each statement under each head was converted into ranks by using the following formula.

Garrett’s formula for converting ranks into per cent was given as

Percent position = $\frac{100(Rij-0.50)}{Nj}$

Where,

Rij = Rank given for the ith statements by jth respondent

Nj = Number of statements ranked by jth respondent

The per cent position of each rank thus obtained was converted into scores by referring to the table given by Garrett. Scores of individual broiler farmers were added together and divided by the total number of broiler farmers for each statement. Mean scores for all the statements were arranged in ascending order, ranks were assigned and the important problems identified.

**Chapter IV**

**RESULTS AND DISCUSSION**

Having collected the data, tabulated and analyzed it is imperative to present the results and discuss the same as per the set objectives. In this chapter, an attempt has been made to discuss the results obtained from the study. The important findings of the study are presented and discussed under the following heads.

#### Socio-economic characteristics of the selected broiler farms

The study of socio-economic characteristics has important implications on the growth of the broiler industry. This section furnishes data on socio-economic characteristics of sample broiler farms such as size of the farms, average number of broiler birds, family composition, occupational distribution, educational status and asset structure which have a direct bearing on the success of broiler farming.

#### Size of the farm

Farm size was a crucial factor of broiler farming and it influences the efficiency of production. The number of total broiler birds as a measure of the farm size, has been adopted in this study.

The total and average number of broiler birds for the three size groups are presented in Table 4.1.

**Table 4.1 Farm size and number of birds per year**

|  |  |  |
| --- | --- | --- |
| **Sl.****No.** | **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| 1 | Sample size | 20 | 20 | 20 | 60 |
| 2 | Total number of broiler birds | 303079 | 620308 | 887678 | 2110913 |
| 3 | Average in each | 28865 | 59077 | 84541 | 172483 |

(Source: Compiled from the survey data)

It is observed from the table that the total number of broilers in the selected 60 broiler farms were 21, 10913. The number of broilers under small, medium and large farms was 303079, 620308 and 887678, respectively.

It is also observed that, the average number of broilers per farm was 172483 in pooled farm. It ranged from 28865 broiler birds in small farms birds followed by 56077 in medium and 84541 birds in large farms. It was clear that the highest being on large farms indicates direct relationship with the farm size.

* + 1. **Family composition and family labour availability on the selected Broiler farms:**

Efforts were made to help the study of the family composition of the broiler entrepreneurs in various size groups. The average sizes of the family members and family members engaged in broiler farming in various size groups are furnished in Table 4.2.

#### Table 4.2 Family composition of broiler entrepreneurs

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
|  Average Family members (Adults) |
| Male | 2 | 2 | 2 | 6 |
| Female | 2 | 1 | 1 | 4 |
| Sub total | 4 | 3 | 3 | 10 |
| Children |
| Male | 1 | 2 | 1 | 5 |
| Female | 2 | 1 | 2 | 5 |
| Sub total | 3 | 3 | 4 | 10 |
| Average size of the family | 7 | 6 | 7 | 20 |
| Family Members involved in broiler farming (Adults) |
| Male | 3 | 2 | 1 | 6 |
| Female | 1 | 0 | 0 | 1 |
| Total | 4 | 2 | 1 | 7 |
| Percentage of adults family members involved in broiler farming | 57.14 | 28.57 | 14.28 | 100 |

 Source: Survey data by author.

 It was observed from the Table. That the highest number of members was present in the small (7) and large (7) size group followed by medium (6) farms. The percentage of adult family members involved in broiler farming was the highest in small farms (57.14%) and lowest (14.28%) in large farms indicating an inverse relationship with the farm size. This was due to higher social status of large farmers and importance to the other occupations viz., cultivation, business etc. hence their participation in poultry (Broiler) was less.

#### Occupational distribution

The survey revealed that in the sample of farmers selected for the study, broiler farming was chosen by many farmers either as the main or subsidiary occupation. Irrespective of farm size, many farmers preferred broiler farming as the main occupation. The particulars of broiler farmers according to their occupation were presented in Table 4.3.

**Table 4.3 Occupational distribution of sampled broiler entrepreneurs**

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| Main occupation | 14 (70) | 16 (80) | 13 (65) | 43 (71.67) |
| Subsidiary occupation | 6 (30) | 4 (20 ) | 7 (35) | 17 (28.33) |
| Total | 20(100) | 20(100) | 20(100) | 60(100) |

Note: Figures in parenthesis indicate percentage to the totals

It was observed that 71.67 percent of the total respondents chose broiler farming as a main occupation while 28.33 per cent of the total respondents took broiler farming as a subsidiary occupation in the study area. Based on the size of the farm, about 30 percent of small, 20 percent of medium and 35 per cent of the large farmers took broiler farming as a subsidiary occupation and 70, 80 and 65 per cent farmers as main occupation for small, medium and large size groups, respectively. It was inferred that most of the large farmers took selected broiler farming as the main occupation and more medium farmers had broiler farming as a subsidiary occupation.

#### Educational status of selected broiler farmers

To run the commercial broiler farming on scientific and commercial lines requires a certain level of education for understanding the production as well as management techniques. The analysis of literacy level of sampled respondents was done to know its influence on broiler farm production. The education of the broiler farmers are presented in Table 4.4.

#### Table 4.4 Educational status of sampled broiler entrepreneurs

|  |  |
| --- | --- |
| Particulars | Farm size |
| Small | Medium | Large | Pooled |
| Illiterate | - | - | - | - |
| Primary | 7(36.67) | 5(23.33) | 3(13.33) | 15(24.44) |
| High school | 9(43.33) | 3(13.33) | 7(33.33) | 19(30) |
| Intermediate | 3(13.33) | 9(43.33) | 8(40) | 20(32.22) |
| Graduate | 1(6.67) | 3 (13.33) | 3(13.33) | 7(13.33) |
| Total | 20(100) | 20(100) | 20(100) | 60(100) |

Note: Figures in parenthesis indicate percentage to the totals

The results indicated that 13.33percent of total farmers were educated up to college level while 32.22 percent were educated up to intermediate level, 30 per cent up to high school and 24.44 per cent primary school level. Within the size groups, lowest percent of the farmers in small farms (6.77) have college education compared to medium and large ((13.33 percent) farmers. Other farmers in the three size groups were educated mostly up to intermediate and high school. It is interesting to note that there were no illiterates in the sample which may help them to run the broiler farm on sound lines and also to acquaint themselves with the modern management techniques to run their farms on scientific lines.

Figure 4.1: Educational status of different sizes of broiler farm owners

#### Distribution farm size according to land area

The distribution of the farms based on the ownership (land areas) is presented in Table 4.5.

#### Table 4.5 Frequency distribution of rented and owned farms

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| Owned | 15 | 14 | 9 | 38 |
| (76.67) | (70) | (46.67) | (64.44) |
| Rented | 5 | 6 | 11 | 22 |
| (23.33) | (30) | (53.33) | (35.55) |
| Total | 20 | 20 | 20 | 60 |
| (100) | (100) | (100) | (100) |

Note: Figures in parenthesis indicate percentage to the totals no.

It is noticed from the table that the pooled data of small, medium and large farms showed that 35.55 per cent of the total farms were rented and 64.44 per cent were owned. The percentage of owned farms in the case of small farms was 76.67 percent, while the same was 70 percent in medium and 46.67 percent in large farms. The analysis revealed that the maximum number of small farmers utilized owned farms followed by medium and large farmers for broiler rearing.

The percentage of rented farms in the case of small farms was 23.33 per cent, while the same was 30 per cent in medium and 50 per cent in large farms. The analysis revealed that the large farmers preferred to have rented farms followed by medium and small farmers.

#### Infrastructure of sample farms

The value of broiler farm assets would serve as a measure of the economic viability and liquidity of the farm business. This would influence farm financial activities like investment, borrowing and repayment of the loan as well as decision behavior of the farmers in terms of adoption of technology in broiler production. The composition of fixed assets in broiler farms is land and buildings, while the working assets include the equipment. The fixed and working assets of different size groups of farms are shown in Table 4.6.

#### Table 4.6 Asset structure of broiler entrepreneurs according to farm size (TK)

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small (Tk.)** | **Medium(Tk.)** | **Large(Tk.)** | **Pooled(Tk.)** |
| Land & buildingsPer farm Per bird | 14.81 | 11.95 | 10.14 | 12.39 |
| Equipment Per farm Per bird | 3.69 | 2.37 | 2.07 | 2.71 |
| Total AssetsPer farm Per bird | 18.50 | 14.33 | 12.48 | 15.10 |

The fixed assets per bird were TK 14.81, TK 11.95, TK 10.14 for small, medium and large farms, respectively and for pooled farms it was TK 12.39. Similarly the working assets per bird were in the order of TK 3.69, TK 2.37, TK 2.07 and TK 2.71 for small, medium and large farms, respectively. The analysis of the asset structure showed an inverse relationship of capital investment per bird with farm size indicating internal economies on large farms.

#### 4.2 Feed conversion in broiler farming

In broiler farming, feed is the major cost component of the total cost of production of broilers. The efficiency of converting feed to broiler meat is a major economic importance to the broiler producer for good income. The ratio of gain per unit weight of feed is called the feed efficiency. The feed per unit of weight gained is called feed conversion ratio that will help how much weight gain by intake feed. So, the lower the feed conversion ratio the higher is the profitability in broiler farming.

It is observed from the figure that the Feed Conversion Ratio for small farms was 1.56, while 1.49 and 1.48 for medium and large farms, respectively. It was 4.53 for pooled farms. Feed Conversion Ratio indicated that as the farm size increased the feed efficiency also increased due to better management and techniques, procedure adopted by larger farmers. Feed conversion ratio for different size groups of farms was calculated and the results are presented in figure 4.2.

**Figure 4.2: Feed conversion ratio according to farm size**

* 1. **Profitability in Broiler Production:**

#### 4.3.1 Production costs in broiler farming

The profitability of any enterprise depends upon income generating capacity and cost structure. Generally in an economic investigation total costs are discussed under two categories viz., variable costs and fixed costs. In general, variable costs alone are reckoned to be the cost of taking upon enterprise, ignoring the fixed costs. The profit and loss too are worked out accordingly. But in economic analysis of a business enterprise, the fixed costs are also taken into account to arrive at total costs and thereby to compute the income.

An attempt has been made to present the production costs according to different cost components and presented in Table 4.7 for different farm size groups. It is observed from the table that variable costs per bird were Tk.66.99, Tk. 64.44,Tk. 61.68 and Tk. 64.37 for small, medium, large and pooled farm, respectively.

#### Table 4.7 Per bird Production cost in broiler farming in different size groups (in Tk.)

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small (Tk.)** | **Medium(Tk.)** | **Large(Tk.)** | **Pooled(Tk.)** |
| Chick | 15.00(19.20) | 14.00(19.17) | 12.50(18.13) | 13.68(18.77) |
| Feed | 40.00(51.22) | 39.00(53.40) | 38.00(55.12) | 39(53.25) |
| Labour | 2.26(2.89) | 2.06(2.82) | 1.58(2.29) | 1.97(2.67) |
| Medicine & Misc. charges | 2.29(2.93) | 2.22(3.04) | 2.57(3.72) | 2.36(3.23) |
| Interest on working capital | 7.44(9.53) | 7.16(9.80) | 6.83(9.09) | 7.14(9.47) |
| **Total variable cost (TVC)** | 66.99(85.78) | 64.44(88.24) | 61.68(89.46) | 64.37(87.82) |
| Fixed cost |
| Depreciation on fixed capital  | 9.25(11.84) | 7.16(9.80) | 6.23(9.03) | 7.55(9.98) |
| Interest on fixed capital | 1.85(2.37) | 1.43(1.95) | 1.24(1.79) | 1.51(2.04) |
| Total fixed cost (TFC) | 11.10(14.21) | 8.59(11.76) | 7.74(11.22) | 9.14(12.40) |
| Total cost of production (TC) | 78.09(100) | 73.03(100) | 68.95(100) | 73.35(100) |

Source: Field survey-2019

Further, the total cost of production per bird was maximum (TK 78.09) in small farms and minimum (TK 68.95) in large farms, it was TK 73.03in medium farms with an overall average of TK 73.35for the pooled farms respectively. From the above results the production costs per bird indicated an inverse relationship with the farm size. However, in terms of percentage direct relationship was observed, which showed that the proportion of variable costs to the total production costs per bird was 85.78 per cent on small farms, 88.24 per cent on medium farms, 89.46 per cent on large farms while it was 87.82 per cent on pooled farms.

**Fig 4.3: Per bird Production cost in broiler farming in different size groups (in TK )**

From the above analysis, it was clear that the total costs indicated an inverse relationship with the farm size revealing superior management and size economies on large farms.

Among variable costs, feed cost was the major component which accounted for 58.65 per cent of the total cost for the sample as a whole. In between the size groups, it varied from 57.33 per cent on small, 58.64 per cent on medium and 59.98 per cent on large farms.

Among the variable costs, cost of the chicks constituted the second major item. It was 21.51 per cent on small farms, 21.03 per cent on medium farms, 19.76 per cent on large farms with an overall average of 20.74 per cent for the sample as a whole. The labour expenses accounted for 3.22 per cent, 3.11 per cent, 2.47 per cent and 2.94 per cent in small, medium, large and pooled farms respectively. The cost incurred on medicines and miscellaneous charges constituted 3.27, 3.32, 4.06 and 3.55 percent on small, medium, large and pooled farms in the same order. Among the fixed costs, depreciation of land and buildings, rent for leased shed was 1.32 percent, 1.06 per cent, 0.96 percent and 1.15 percent on small, medium, large and pooled farms respectively. Interest on the fixed capital accounted for 2.66 per cent, 2.16 per cent, 1.99 per cent and 2.27 per cent of the total cost on small, medium, large and pooled farms respectively (Table 4.8).

#### 4.3.2 Returns from Broiler Farming

The gross returns from poultry farming comprise receipts from sale of broilers, manure and empty gunny bags. The gross returns per farm and per bird were computed and furnished in Table 4.10. It is seen from the table that the major portion of the gross returns were obtained from the sale of birds followed by receipts from the sale of manure and sale of empty gunny bags.

Total returns per bird decreased with the farm size. In the case of small farms, the returns were Tk.171.37 whileTk.169.84 andTk.167.26in medium and large farms, respectively. It was Tk.169.49in pooled farms showing an inverse relationship with the farm size (Table 4.8).

**Table 4.8 Per bird gross return in broiler farming according to farm size (in Tk.)**

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| **Sale of broilers** | 168.92(98.57) | 167.43(98.58) | 164.95(98.62) | 167.12(98.59) |
| **Sale of manure** | 1.51(0.88) | 1.51(0.89) | 1.51(0.91) | 1.51(0.90) |
| **Sale of gunny bags** | 0.96(0.56) | 0.92(0.54) | 0.83(0.50) | 0.91(0.53) |
| **Total return** | 171.37(100) | 169.84(100) | 167.26(100) | 169.49(100) |

Source: Field survey, 2019.

Further it was observed that the gross returns from the sale of manure and sale of gunny bags per bird were Tk.1.51 and Tk.0.96 in small, Tk.1.51 and Tk.0.92 in medium, Tk.1.51 and Tk.0.83 in large and Tk.1.51 and Tk.0.91 in pooled farms, respectively. Thus, it was observed that the gross returns showed an inverse relationship with the farm size.

#### 4.3.3 Net Income:

The net returns per farm and per bird are presented in Table 4.9 and **Figure 4.4**. The net returns per farm and per bird indicated a positive relationship with the farm size.

**Table 4.9: Per bird profitability in broiler farming according to farm size (in Tk.)**

|  |  |
| --- | --- |
| **Cost and Return** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| (A)Total Return (Tk) | 171.37 | 169.84 | 167.26 | 169.49 |
| (B)Total cost (Tk) | 78.09 | 73.03 | 68.95 | 73.36 |
| (C) Cash Cost (Tk) | 66.99 | 64.44 | 61.68 | 64.37 |
| (D)Net Return (Tk)(A-B) | 93.28 | 96.81 | 98.31 | 96.13 |
| (E)Gross Margin (Tk) (A-C) | 104.38 | 105.4 | 105.58 | 105.12 |
| (F) BCR (Full Cost Basis) (A/B) | 2.19 | 2.33 | 2.43 | 2.32 |
| (G) BCR (Cash Cost Basis) (A/C) | 2.56 | 2.64 | 2.71 | 2.64 |

It was calculated by deducting the total costs from total returns. Further, it is observed that the net returns per farm per bird was Tk. 93.28in small farms followed by Tk. 96.81 and Tk. 98.31in medium and large farms, respectively.

**Figure 4.4: Per bird profitability in broiler farming according to farm size**

#### 4.3.4 BCR (Benefit Cost Ratio):

It is further seen in Table 4.10 that the Benefit-Cost Ratios also indicated a direct relationship with the farm size and the absolute ratios were 2.19 for small farms, 2.33 for medium farms, 2.43 for large farms, while it was 6.95 for the pooled farms. It indicates commercial broiler farming is profitable for all farm sizes in the study areas.

#### 4.3.5 Returns on investment in broiler farming

An attempt has been made for studying the returns on investment in broiler farming. To arrive at the total investment in broiler farming, capital investment and production costs per bird have been considered (Table 4.10).

**Table 4.10 Returns on investment in broiler farming according to the farm size (in Tk.)**

|  |  |
| --- | --- |
| **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| Capital investment (lakhs) | 172 | 289.5 | 421.5 | 291.33 |
| Production costs (lakhs) | 55 | 115.5 | 184.5 | 118.33 |
| Total investment (lakhs) | 72.5 | 144.5 | 226.5 | 148 |
| Net returns (lakhs) | 24 | 55.5 l | 97.5 | 59 |
| Per cent Net returns over investment | 33.49 | 38.65 | 43.18 | 38.44 |

From the Table 4.10, it is clear that capital investment need much in large size farm but comparatively need low in medium size farm and also low in small size farm. Production cost is high in large size farm due to flock size is high and it cost is 184.5 lakhs but on the other hand less production cost in medium size farm that is 115.5 lakhs and also lower in small size farm due to less amount of bird that cost is 55 lakhs. Total investment for large size farm is 226.5 but small size farm is 72.5lakhs. The net returns on investment for 12 months were 33.49, 38.65 and 43.18 per cent for small, medium and large farms, respectively. Thus, there is a direct relationship between the returns over investment and farm size.

***4.4 Break-Even Analysis***

The profitability of the selected broiler farms was studied with the help of break-even analysis. This analysis helps to assess whether the selected broiler farms are operating at profitable. level or not. In the earlier analysis, it could be seen that the selected broiler farmers were getting profits of different magnitude. An attempt is made in this section to find out the weight in kilograms required per 1000 birds to meet the cost of production of broiler farm. The results of the break even analysis on broiler farming size wise are presented in Table 4.11.

**Table 4.11 Break-even analysis on broiler farming according to farm size for 1000 birds.**

|  |  |  |
| --- | --- | --- |
| **Sl.****No.** | **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| 1 | Sale value of 1000 birds (TK) | 168920 | 167540 | 164970 | 167143.33 |
| 2 | Total variable costs (TK/1000 birds) | 119130 | 114560 | 109320 | 114336.67 |
| 3 | Net variable costs | 116640 | 112120 | 106000 | 111586.67 |
| 4 | Percentage of net variable cost to sale value of 1000 birds | 69.05 | 66.98 | 64.84 | 66.96 |
| 5 | Percentage contribution of sale of 1000 birds | 30.95 | 33.07 | 35.12 | 33.05 |
| 6 | Fixed costs (TK/1000 birds) | 37020 | 28680 | 24960 | 30220.00 |
| 7 | Break-even sale value of 1000 birds | 1196 | 867.25 | 710.70 | 924.65 |
| 8 | Break-even sale wt. of 1000 birds (kgs) | 1570 | 1140 | 930 | 1213.33 |
| 9 | Body weight in kgs of 1000 birds | 2240 | 2270 | 2180 | 2230.00 |

The study revealed that the break-even sale weight per 1000 birds according to prices was found to be more favorable, as the farm size increases. It is also observed that the break-even sale weight was also less than the average weight (kg) per 1000 birds for all broiler farm size groups and is inversely related to the farm size indicating higher profits for larger farms compared to that of small and medium farms. This clearly revealed positive returns in all the categories of broiler farms.

The break-even sale weight per 1000 birds was 1570, 1140, 930 kg for the small, medium, large farms respectively and 1213 kg for the sample as a whole. It is also observed that the average body weight per 1000 birds was 2240 kg in the case of small farms, 2270 kg in medium farms, while it was 2180kg and 2230 kg in case of large farms and pooled farms, respectively which was greater than the break-even sale weight per 1000 birds.

The above analysis clearly indicated that the investment on broiler farming would result in substantial profits, since the entire farm sizes were getting higher weight per bird than the break-even weight of the bird.

####  Resource productivity, returns to scale and resource use-efficiency in broiler production.

* + 1. **Resource Productivity**

The main objective of the broiler farmers is to make efficient utilization of resources available with them. In order to operate the broiler business at an economic optimum level, the broiler farmers make some adjustments in the allocation of their resources. The use of production function analysis could be help planning resource use at the farm level. Hence, an attempt has been made to discuss the resource productivity, returns to scale and resource use efficiency on all sizes of broiler farms with the help of production function analysis. The Cobb- Douglas type of production function can be chosen to estimate resource production and returns to scale.

The elasticity of production along with the standard error, coefficient of multiple determination and scale returns for different size groups are presented in Table 4.12.

* + - 1. **Flock size (**X1**)**:

It was observed from the Table 4.12 that the coefficients of flock size were statistically significant at one percent level in small and large farms. Thus, it indicated that there is a scope in this region for increasing the flock size to obtain large total output in broiler farming. It can be inferred that one per cent increase in flock size would increase the gross returns by 1.13, 1.04, and 1.46 per cent on small, medium and large farms, respectively.

**Table 4.12 Production elasticities and scale returns in broiler farming.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Particulars** |  |  |  |
| **Small** | **Medium** | **Large** |
| N | 20 | 20 | 20 |
| ‘a’ | 4.789731 | 4.477208 | 5.559573 |
|  | (6.306672) | (6.3277639) | (11.80909) |
| Flock size | 1.134255\* | 1.047623 | 1.469216\* |
| (x1) | (0.533175) | (0.621197) | (0.48596) |
| Feed cost | 0.040943 | 0.183225\* | 0.056697 |
| (x2) | (0.556331) | (0.097931) | (0.384374) |
| Labour cost | 0.082365 | -0.02447 | -0.05791 |
| (x3) | (0.281665) | (0.073011) | (0.508888) |
| Miscellaneous | -0.20453 | 0.32781 | -0.02677 |
| (x4) | (0.236988) | (0.459475) | (0.824847) |
| Ʃ bi | 1.153 | 1.424 | 1.321 |
| R2 | 0.648 | 0.457 | 0.418 |

Source: Computed from the data collected. Note : Figures in parentheses indicate standard error.\*Significant at 1 percent level of probability, \*\* Significant at 5 percent level of probability.

#### Feed cost (X2):

The coefficient of feed cost was found to be statistically significant for the medium farms only indicating that one per cent increase in feed cost influence the gross return positivity by 0.18 per cent. For the small and large farms the coefficient value was positive but not significant (Table 4.12).

#### Labour cost (X3):

In all the size groups, the production coefficients of labour cost were not statistically significant though the values were positive for small and negative for medium and large farms indicating excessive use of labour in medium and large farms (Table 4.14).

#### Miscellaneous cost (X4):

None of the partial regression coefficients of miscellaneous costs was significant. Production elasticity was found to be negative for small, large farms. The coefficient values for the medium farms were positive but not significant (Table 4.13).

**4.5.1.5 Coefficient of Determinations (R)**

The coefficients of multiple determinations (R) were 0.648, 0.457, 0.418 for small, medium, large farms, respectively. The (R) values indicated that 65, 46, and 42 percent variation in total income on small, medium and large farms, respectively has been explained by the four variables of inputs in the model. Low Rvalue in case of medium and large farms might be due to non-inclusion of some of the variables like investment.

#### Returns to scale

It is observed from the Table that the scale coefficients were 1.15, 1.42 and 1.32for the small, medium and large farms, respectively. The sum of elasticities of resources is an indicator of the returns to scale. This sum indicates the nature of the scale returns. From the analysis it was revealed that small, medium and large size farms are indicating increasing returns to scale with all the inputs included put together.

#### 4.5.3 Resource-use efficiency

This was worked out by computing the ratio of the marginal value product to opportunity cost. If the ratio is less than one, it indicates that excess of the particular resource is being used with the existing price condition and vice versa. If MVP to factor cost ratio is equal to one it indicates efficient resource use.

The marginal value products, factor costs and MVP to Factor cost ratios are presented in Table 4.13. It is revealed from the table that the MVP to factor ratios for all the inputs indicated a deviation from one. This indicated the inefficient use of resources in broiler farming with respect to all size groups.

#### Table 4.13 Marginal value products, factor costs and opportunity cost ratios in broiler farming according to farm size

|  |  |  |
| --- | --- | --- |
| **Sl.****No.** | **Particulars** | **Farm size** |
| **Small** | **Medium** | **Large** | **Pooled** |
| 1 | Marginal value products (TK) | 181.2017 | 173.7073 | 228.4774 | 167.6368 |
| Flock size |
| Feed | 0.110688 | 0.352338 | 0.092177 | 0.05068 |
| Labour | 2.71363 | -0.43098 | -3.14744 | 0.453801 |
| Miscellaneous cost | -3.83376 | 8.580204 | -0.9441 | -1.08621 |
| 2 | Factor costs | 20 | 18 | 16 | 18 |
| Flock size |
| Feed | 1.00 | 1.00 | 1.00 | 1.00 |
| Labour | 1.00 | 1.00 | 1.00 | 1.00 |
| Miscellaneous cost | 1.00 | 1.00 | 1.00 | 1.00 |
| 3 | MVP to factor cost ratios |  |  |  |  |
| Flock | 6.47 | 6.19 | 9.03 | 6.20 |
| Feed | 0.110 | 0.352 | 0.092 | 0.050 |
| Labour | 2.513 | 0.320 | 3.247 | 0.443 |
| Miscellaneous cost | 3.743 | 8.390 | 0.954 | 1.046 |

The marginal value product to factor cost ratios indicated inefficient use of resources in broiler farming on all farm size groups. Since these ratios showed a deviation from unity, profitability in broiler farming could be increased by increasing the flock size and reducing the costs on feed.

Chapter V

**PROBLEMS AND SUGGESTION**

#### Problems involved in Broiler farming

The perceptions of the broiler farmers regarding the problems on production and marketing were obtained and ranked with the help of Garrett’s ranking technique.

#### Problems in the production of broilers

Problems in the production of broilers in the study area were noted from the sample with the help of questionnaires. Seven production problems were identified in the survey. Main problems conceived were identified based on the frequency of problems indicated by farm.

The analysis revealed that the major problems were high feed cost, high cost of day old chicks, mortality and diseases, high labour cost, high cost of medicine and miscellaneous charges. The results are presented in Table 4.13.

#### Table 5.1 Garrett ranking of problems in the production of broiler farming

|  |  |  |
| --- | --- | --- |
| **Constraints** | **Garrett value** | **Rank** |
| High feed cost | 76 | I |
| High cost of day old chicks | 63 | II |
| High labour cost | 58 | III |
| High cost of medicine | 49 | IV |
| Mortality and diseases | 43 | V |
| Miscellaneous charges | 35 | VI |
| Inadequate veterinary services | 25 | VII |

Source: Field survey,2019.

Table 5.1 shows the problems in the production of broiler farming. The study revealed that high feed cost Garrett value is 76, high cost of day old chicks is 63 high labour cost is 58, high cost of medicine is 49, mortality and diseases is 43, Miscellaneous charges is 35 and also inadequate veterinary services is 25.

 It is observed that the problems of high feed cost ranked first, high cost of day old chicks ranked second followed by high labour cost, high cost of medicine, mortality, diseases, miscellaneous charges and inadequate veterinary services ranked third, fourth, fifth, sixth and seventh positions respectively.

The study revealed that high feed cost Garrett value is 76, High cost of day old chicks is 63 High labour cost is 58, high cost of medicine is 49, mortality and diseases is 43, Miscellaneous charges is 35 and also inadequate veterinary services is 25.

**CHAPTER – VI**

**CONCLUSION**

The involvement of adult members and child was greater in small farms compared to medium and large farms. Capital investment per bird was inversely related to farm size whereas per farm capital investment was directly proportional in the study. Sample farms exhibited a positive relationship between the value of assets and farm size in Broiler farm. Production costs per bird were inversely related to farm size, indicating efficient utilization of resources in production process.

The Feed Conversion Ratio indicated that as the farm size increased the feed efficiency also increased due to better management and techniques adopted by larger broiler farmers. Variable costs and fixed costs per bird showed an inverse relation with all the farm size. Feed cost was the major cost component in the variable cost. Gross returns per bird showed an inverse relationship in Broiler production in farm.Net returns per bird has been showed a direct relationship.

Sale of birds constituted the maximum amount in returns received followed by sale of manure and sale of gunny bags in farm. Small, medium and large size broiler farms are indicating increasing returns to scale with all the inputs included put together. However, pooled farms showed constant returns to scale in farm production.

Maximum profitability in broiler farming could be increased by increasing the flock size and reducing the costs on feed. The common problems can be faced by the broiler farmers were high feed cost, high cost of day old chicks, uneconomic prices and unorganized marketing system in our country.

 In occupation distribution show that highest number of large size farmer involves in subsidiary occupation on the other hand medium size farmer involve in main occupation.

 Statistic data of education show that large number of small size farmer educated from primary and high school but medium size farmer educated from intermediate and both equal in number medium and large size framer educated from graduate.

The broiler farmers are to make efficient utilization of resources available with them. In order to operate the broiler business at an economic optimum level, the broiler farmers make some adjustments in the allocation of their resources. The use of production function analysis could be help planning resource use at the farm level. Hence, an attempt has been made to discuss the resource productivity, returns to scale and resource use efficiency on all sizes of broiler farms with the help of production function analysis.

According to land amount, among farm size, small size farmer has more owned land farm on the other hand more rented farm present in large size farm.

In infrastructure asset, rearing cost more in small size farm but low cost for large size farm that will help less production cost in large size farm.

Due to large scale of bird present in large size farm which lead less cost of production but high cost for small size farm production on the other hand tot6al return is high in small size farm and low in large size farm. For the cost and return analysis show that net income high in large size farm but low in small size farm.

More capital need for rearing of large size farm production but low capital need for small size farmer rearing .For this reason, Most of the farmer like to rear in small size farming. to Small size farmer .

The study revealed that the major problems were high feed cost, high cost of day old chicks, mortality and diseases, high labour cost, high cost of medicine and miscellaneous charges.

So, it can be concluded that commercial broiler farming is profitable for all categories of broiler farming such as small size farm, medium size farm and also large size farm.

#### Recommendations:

* The following recommendation are implications emerged from the study:
* There was a need to provide proper technical training in broiler farming to reduce the risk.
* Proper veterinary medicine aid should be provided by Department of veterinary medicine. The cost of the feed should be reduced without compromising on the quality or may be provided at subsidized feed ingredients.

#### Limitations of the Study:

As with all similar studies, this investigation also suffers from certain limitations. One of the most important limitations of the study is that the data collected to a particular climatic region and a particular year does not reflect the same for other regions. Therefore, the extent of generalization has to be cautiously made.

Secondly, many broiler growers are not maintaining systematic records of the cost of production and were hesitant to give the correct information, as most of the data concerned their economic status and financial matters were kept concealed. The information obtained by survey method and presented in the study is based on the recall memory of sampled growers, which have certain limitations in costs and returns.

Since there are frequent fluctuations in the price of broilers, only the average prices have been taken for the calculation. Hence, it can be one of the limitations of the study.

However, every care was taken to elicit reliable and accurate information from the clientele.

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