CHAPTER- 2

**Review of literature**

**2.1 Related research**

The researchers reviewed are, **Khatun *et al*., (2005)**, **Saleque** ***et al*., (2002)**,**Tohura, (2004)**, **Mandal *et al*., (2005)**, **Alam, (2004)**, **Karim *et al*., (2000)** and **Bhuiyan, (2003)** but none of them addressed the management system of commercial poultry in Bangladesh. The present study is an attempt to identify the socio-economic condition of the farm family and common managemental practice that are performed by the farmers of Bangladesh.

**2.2 Socio-economic status of the farmers**

**Islam *et al.,* (2010)** found in their study that there are no significant difference in variables of age, education, experience, family member, landholdings and average batches per year among the farmers in three groups. Therefore, all sample farmers could possibly have the same socio- economic background. But several researchers showed considerable variation of socio-economic condition in different level.

**2.2.1 Land**

**Rahman *et al*., (2002)** reported that about 45.3% large, 30.7% medium, 12.5% small, 7% marginal and 4.5% landless farmer were involved in broiler farming in Rajshahi distict. It seems that comparatively rich farmers are involved in poultry farming.A number of studies revealed that similar type of rural poor, landless, small and marginal farmers are involved in poultry farming. **(Alam *et al*., 1998; Prodhan, 1995; Verma and Pillai *et al*., 1998 and Rahman *et al*., 2006).** The estimated average land area per farmer family is 1.45 acre in Sujanagar and 1.35 acre in Bera and 1.37 acre in Santhia thana in Pabna district **(Sumy *et al*., 2010).** **Sumy *et al.*, (2010)** also reported that chicken numbers increased with the increasing land size.

Although **Islam *et al*., (2010)** reported that all of the farmers involved in this study were under small categories (having 6-49 decimal land). In Bangladesh, according to the latest census on agriculture, there are almost 12 million farms, of which about 80 per cent are smaller than 1ha and less than 3 per cent are larger than 3 ha **(BBS, 2011)**

**Table 2.**1: Variation in size of the small farms in Bangladesh **(Devendra, 1993).**

|  |  |  |
| --- | --- | --- |
| **Country** | **Landholding** | **Definition** |
| Bangladesh | <0.4 ha | Subsistence farmer |
|  | 0.4-0.8 ha | Viable and potentially viable  owners |

**2.2.2 Educational level**

**Rahman *et al*., ( 2002)** found that, in case of educational level, about 47.3% of the farmers were in above secondary, 36% were in secondary, 12.2% were in primary and rest of the (4.5%) farmers had no educational qualification. It was revealed that 71.43% of the farmer had high level of knowledge about broiler farming.

**Table 2.2:** Educational status of farmers **(Rahman *et al*., 2002).**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Categories** | | **Percentage (%)** |
| Educational level | No education | | 4.5 |
| Primary | | 12.2 |
| Secondary | | 36 |
| Above secondary | | 47.3 |
| Level of Knowledge about farming | | High | 71.43 |
| Medium | 24.29 |
| Poor | 4.28 |

School-going boys and girls of broiler farmers were increased by 52.54 % and 54.43 % respectively after involved in farming **(Ahmed *et al*., 2009). Islam *et al*., (2010)** in their study showed that all sample farmers could possibly have the same socio- economic background in terms of educational level.

**2.2.3 Occupational status**

**Ahmed *et al*., (2009)** reported that in their studyit is clear that the main occupation (from which the respondents earn large part of their income) of 34% respondents was farming and the remaining 66% respondents involved with farming as their secondary occupation. Among these 66% respondents, 4% involved with fisheries, 6% were business, 8% were service holders, and 2% involved with others occupation as their principal occupation.

**2.2.4 Monthly household income**

**Ahmed *et al*., 2009** showed thatthe overall monthly income (calculated by deducting cost incurred for broiler farming from the total return) of the farmers increased from BDT. 6394.00 to BDT.12494.66 due to broiler farming. The income expenditure and changes in income are shown in **figure 2.1**.

**Time period**

**Figure 2.1:** Monthly total household income and expenditure pattern of farmers (Courtesy from **Ahmed *et al*., 2009**).

**Sumy *et al*., (2010)** found, the yearly income of maximum farm owners had above BDT. 40,000 and minimum farmers had income of up to BDT. 10000. **Banerjee, (2004)** observes that in comparison to other livestock, Poultry requires less investment to start the farming. Persons from low income group may also start the business on a small scale. **Islam and Sasaki, (2009)** showed per capita income increase with the increase of farm size. **Islam *et al*., 2010** found, the farmers reared broiler ranging from 1000-5000 are earn similar income which may be termed as First Income Goal Group (FIGG) and farmers reared more than 5000 broilers achieve highest income that may be termed as Second Income Goal Group (SIGG).

**2.2.5 Livelihood Impact**

Despite only being a marginal income increase from poultry, this income nevertheless has a positive effect on the livelihood impact of the beneficiaries in terms of improving the household diet, improving the housing conditions of the family, household assets and educational expenditures of the children. Findings from the survey indicate that some of the poorer beneficiaries who nevertheless managed to qualify for project participation did in several instances graduate out of poverty after which they reduce investment in poultry farming. However, it is unclear the extent to which the initial poultry activities orthe credit access facilitated this positive outcome. Nevertheless as poultry should be perceived as a first step out of poverty **(Todd, 1997)**, and not a goal in itself, it is important to get the targeting right from the beginning **(Jensen and Dolberg, 2002),** as well as avoid viewing drop-out rates as a sole criteria for success or failures.

It has been observed that goat and poultry rising are very effective means for poverty alleviation in Bangladesh. It has also been observed that with 7-8 goats and 15-20 poultry given to a poverty stricken farm family, under traditional feeding systems could easily alleviate poverty **(Saadullah *et al*., 1992).**

**Figure 2.2:** Role played by different personnel of family in farming activities (Courtesy from **Paul and Saadullah, 1991**).

Furthermore from **figure 2.2** it appears that women and children also play a major role in raising livestock and poultry in Bangladesh **(Paul and Saadullah, 1991).**

2.3 **Farming system and managemental practices of poultry farm**

**2.3.1 Farming system- concepts and definitions**

According to **Sharma *et al.,* (1991)** Farming system refers to the farms where in two or more enterprises are integrated with the farm resources with an objective of achieving fuller utilization of available resources to realize maximum profits and also to stabilize returns. It provides an opportunity to utilize the land, labour, water, manure and fertilizers more efficiently.

**Swaminathan, (1996)** lists the principle components of intensive integrated farming systems (IIFS) as seven pillars that, include soil health care, water harvesting and management, crop and pest management, energy management, post-harvest management, choice of crops, farm animals and other components of the farming and information, skill, organization and management empowerment. **Devasenapathy *et al*., (1995)** views farming system approach as one of the approaches where in risk in dealing with single component can be through effective recycling.

**Sharma *et al*., (1991)** viewed that, the farming system also refers to the farm as an entity of inter-dependent enterprises carried out on the farm. The farming system conceptually is a set of elements or components that, are inter-related which interact among themselves. At the centre of interaction is the farmer exercising his control and choice regarding the type of activities.

The farming system of Bangladesh, like all traditional farming systems throughout developing countries of the world, is a system in which various elements, that is family, crop and livestock are tightly integrated. It appears that about 75% of the total household farms comprise crop, ruminant and poultry **(BAU-FSRDP, 1986).**

**2.3.2 Poultry farming systems in Bangladesh**

The present farming systems of poultry in Bangladesh can be broadly divided into two categories: traditional rural backyard or scavenging/semi-scavenging system and commercial farming system. Traditional poultry production is an essential part of rural farm household activities; a few birds are reared with little or no feed supplement to produce eggs and meat for home consumption and any surplus is sold. Commercial poultry farms are defined as those that raise birds in confined conditions based on high yielding breeds, commercial feeds and management practices **(Ali, 1993).** However, the Department of Livestock Services (DLS) and a non-governmental organization (NGO), Bangladesh Rural Advancement Committee (BRAC), have promoted a small-scale semi-scavenging commercial poultry model using local or crossbreeds and partial supplementation with concentrate feeds **(Saleque, 2000; Islam and** **Jabbar, 2005)**.

In response to rapidly increasing demand for animal products and expanding market opportunity in the early 1990s, a commercial broiler and layer sector has emerged in Bangladesh. The sector is characterized by intensive production techniques (exotic and crossbred birds, concentrate feeds and drugs) and technical and policy support (subsidized credit, local production and import of day-old chicks, drugs etc). The traditional poultry sector, where poor smallholder producers dominate, still remains the major supplier of poultry meat and eggs in the rural areas. However, the rural poor have been unable to capture any significant share of the rapidly expanding urban market **(Islam and Jabbar, 2005).**

Most commercial poultry farms in Bangladesh are small-scale (less than 5000 birds per batch). In 1995, large- and small-scale commercial poultry farms respectively accounted for 12 and 2% of total poultry meat production in the country with the scavenging system accounting for the rest **(Alam, 1995).** The newly established commercial poultry farms were fairly small in the early 1990s. Most farms still rear between 1000 and 2500 birds but the average size of farm has been increasing slowly over time. A recent study showed economies of scale in poultry farming, part of which arose from hidden subsidies such as cheap credit and inputs which generally are not accessible to smallholder poor farmers. Rapid industrialization of poultry production could wrongly harm the mechanism of income generation for the poor in the country **(Jabbar *et al.*, 2005).**

**2.3.3** [**Management systems in intensive poultry production**](http://www.blogger.com/post-edit.g?blogID=3330307311599713625&postID=8984397160877967811)

Intensive poultry production is based on special poultry breeds. In intensive management system, producers aim at using recommended practices such as breed of choice, appropriate housing, feeding, health and disease control **(Katalyi, 1998).** The systems involved in intensive poultry production include; slated floor, deep litter and battery cage systems.

1. ***Slated floor system***

Here birds are stocked at a rate of 0.09 square meter per bird and little labour is needed **(Sainsbury, 1993).** The floor is made of wire mesh and is raised to a height of 1m **(Williamson and payne, 1984).**

***b)     Deep litter system***

Most farmers have adopted the deep litter system; however its effectiveness is hindered by poor house construction and spillage of water. Coffee husks, saw dust and wood shavings are used as litter. The success of deep litter system is dependent on decomposition of litter by bacteria **(Sainabury, 1993).** Litter keeps birds clean and comfortable and absorbs moisture from droppings **(Ensimiger, 1992).**

1. ***Battery cage system***

This is the most efficient because egg production and feed conversion efficiency are high. The disadvantages of this system are; it is costly to install, many eggs get cracks and poultry are highly predisposed to vermins and insects **(Williamson and Payne, 1984).** The poultry house unit is constructed and fitted with battery cages that may be communal or individual, fecal matter collects on fecal trays underneath the battery cages that are cleaned manually **(Portsmouth, 1989).**

**2.3.4** [**Poultry environment and housing**](http://www.blogger.com/post-edit.g?blogID=3330307311599713625&postID=8984397160877967811)

1. ***Ventilation and humidity***

The main objective of efficient ventilation is to ensure an adequate supply of fresh air to the birds, remove unwanted gases and excess moisture. Poultry houses may be ventilated naturally or mechanically **(Portsmouth, 1989).** Natural ventilation is commonly used in Africa and depends on the difference in temperature between air inside the poultry house and that outside. If the air outside is cooler than that inside, warm air inside the house is drown out and is replaced by cooler air. The open side walls act as inlets ridge ventilators or openings on the end walls near ridges act as outlets. Air velocity is of importance in natural ventilation because it affects the rate of change of air. Continuous ridge ventilators are desirable for long buildings but for small buildings two outlet ventilators near the roof on each side of the wall are enough **(Kekeocha, 1984).** **North and Bell, (1990)** suggested to provide 1.75 of airflow per minutes per pound of live bird in the house or to provide 0.11 of airflow per minute per kilo of live birds in the house. Relative humidity of 60-80% is desired in the house for optimum production **(Pattison, 1993).** **Ensminger, (1992)** recommends relative humidity of 60-70% for layer houses as high humidity reduces evaporation and increases survival of pathogens.

***b)     Lighting***

Egg production is stimulated by increase in day length. Reduction in day length leads to cessation of egg production and birds molt. Under natural light conditions, day length varies with the time of the year and latitude. At equinox (21rd March and 23nd September), the days and nights are equal in length. At the equator, day length is a little over 12 hours. Open sided houses are a norm in the tropics and therefore supplementing light in normal. In humid areas, where there is little change in day length throughout the year, 2-3 hours of artificial lighting is recommended for laying birds **(Smith, 1993).**

If light intensity is unevenly distributed in the house, with bright and dark areas, birds tend to concentrate in areas with light and this tends to cause development of vices and respiratory diseases **(Sainabury, 1993).** Longer days stimulate egg production and encourage hens to consume more feed. In broilers, too much light may increase their activities and therefore reduce the efficiency of feed utilization **(Smith, 1993).**

***c)      Temperature***

Adequate housing must provide the flock with optimum air quality and warm conditions so that performance may be optimized. Poultry house insulation is a requisite for open sided and environmentally controlled houses. Most insulation is confined to the roof where greatest heat is lost during cold weather conditions and also where sun rays strike **(North and Bell, 1990).**

Brooding temperature is 35-37.7 degrees Celsius in the first week of life. This is reduced by 3 degrees each week as birds grow. Huddling of chicks together around the heat source indicates that the temperature is too low. Chicks are widely spread out if temperature is too high but those that are contented are evenly spread over the brooding area **(Portsmouth, 1989).** Adult hen produce eggs maximally with optimum temperature close to 24degrees **(Austic land Nesheim, 1990)** but in intensively managed birds, optimum temperature should be 21degrees **(Pattson, 1993**). **Oba, ( 2000)** recommends a temperature 75 degrees for broilers. Increase in ambient temperature reduces appetite, water intake increases, egg weight and egg productivity reduces. It also results in laying thin shelled eggs **(Kekeocha, 1984; Smith, 1993; Pattison, 1993).** Temperature below the optimum level depresses hatchability, feed conversion efficiency and egg weight **(North and Bell, 1990).**

1. ***Chicken spacing***

Chicken spacing is of importance in the poultry house to avoid overcrowding since this facilitates disease transmission. Stocking depends on the type of chicken, management system, age and size of chicken. The floor space requirement of broilers is 0.3 sq feet from 0-4 weeks of age and 0.75 sq feet from 4-8 weeks of age while layers need 0.3 sq feet of space from 0-4 weeks, 0.6 sq feet from 4-8 weeks, 1.25 sq feet from 9-16 weeks and 1.5 sq feet for over 16weeks of age **(Ensminger, 1992).**

In the brooder, 7 meters of hover space is allowed per 1000 chicks and feeder space of 2.5cm per chick in the first 4 weeks, 5cm per chick in the second month and 7 cm in the third month. Water space of 2.5 cm is allowed per chick in the first 2 weeks of their life and 5cm in the remaining period **(Kekeocha, 1984).**

1. ***Feeding and nutrition***

Poultry feeds are referred to as complete feeds because they contain proteins, energy, vitamins, minerals and other nutrients necessary for proper growth, egg production and health of birds. Carbohydrates and fats are primary sources of energy needed to maintain body temperature, movement of the body and for chemical reactions involved in synthesis of body tissues and elimination of wastes **(Austic and Nisheim, 1990).**

The conventional foodstuffs used in feed formulation are maize, sorghum, fishmeal, soybean meal as sources of carbohydrates and proteins respectively. Other ingredients added include; mineral salts, vitamins, coccidiostats and antioxidants like ethoxyquine or butylated hydroxytoluene, vitamin and mineral premixes **(Smith, 1993).**

**Table 2.3:** Feeder space requirement per bird **(Banerjee, 1998).**

|  |  |
| --- | --- |
| **Age weeks** | **Feeder space per bird (Lineal cm.) Minimum** |
| 0 to 2 | 2.5 |
| 3 to 6 | 4.0 |
| 7 to 12 | 7.5 |
| 13 and above | 10.0 |

***f)       Water consumption***

Water is normally provided adlibitum. Water consumption increases with increase in age of the bird, protein and sodium chloride levels in the feed. Water deprivation can lead to death of poultry within 24 hours. A 10% restriction of water availability can reduce the growth rate and feed conversion efficiency of broilers. In layers, water deprivation can lead to moulting and cessation of egg production **(Smith, 1993).**

**Table 2.4:** Amount of water required and watering space for chicken (**Banerjee, 1998).**

|  |  |  |
| --- | --- | --- |
| **Age (weeks)** | **Water space per chick in linear cm** | **Amount of water per 100 birds (liters)** |
| 0 to 4 | 0.6 | 2.8-4 |
| 5 to 8 | 1.2 | 12-14 |
| 9 to 12 | 10 | 20-25 |
| 13 to 16 | 12.5 | 35-40 |
| 16 and above | 15 | 45-48 |

***g)      Litter management***

Rice husks, saw dust and wood shavings are used as litter. The success of deep litter system is dependent on decomposition of litter by bacteria **(Sainsbury, 1993).** Litter keep the birds clean and comfortable and absorbs moisture from droppings **(Ensiminger, 1992)**. During the growing period, litter should contain 20-30% moisture. This result in better feather growth close to normal, feed conversion is improved, coccidiosis problems are easily controlled and ammonia in the poultry house is easily controlled **(North and Bell, 1990).** In brooder houses, wet litter can have a calamitous effect on the feet of cocks causing accumulation of infected litter on the feet leading to fall in the level of fertility **(Sainsbury, 1993).**

Drinker points and drinking areas are dangerous due to water splashing and concentration of birds. Therefore it is essential to frequently turn this litter. Wet litter is cold and tends to take up heat in an attempt to dry up. It’s advisable to start with about 70mm layer of litter and add to it with time. Adding litter dilutes droppings and the condition of litter is improved. High ammonia levels are dangerous and unpleasant to operators. Ammonia levels should not exceed 15-20 ppm levels over 40 ppm may reduce feed intake. Levels over 50 ppm affect the mucous membranes lining the respiratory tract, affect respiration and may also cause blindness **(Sainsbury, 1993).**

**2.3.5 Beak Trimming**

Beak trimming has become a very controversial management tool. Trimming beaks involves

removing a portion of the beak. Beak trimming effectively reduces feather pecking, aggressive

pecking and cannibalism in laying hens and turkeys **(Cunningham, 1992).** As a result, it can be

stated that the welfare of beak trimmed birds is improved over full-beaked birds, which are faced

with the pain and resulting fear of being pecked or cannibalized. This will result in reduced stress in the trimmed birds **(Struwe *et al*, 1992).**

The age that birds are beak trimmed has an immense effect on the duration of pain and healing level of the beak **(Hughes and Gentle, 1995).** When chicks are beak trimmed at either 1 or 10 days of age, pain results in the first week following the procedure, but symptoms do not appear after that time **(Gentle *et al*, 1997).** Birds trimmed at 28 days of age showed signs of pain for three weeks post trimming **(Craig and Lee, 1990).** The beak itself re-grows, but will not regain the afferent nervous system or the sensory receptors in the tip **(Gentle *et al*, 1995; Gentle *et al*,** **1997).** However, birds trimmed at 16 weeks of age did appear to be in chronic pain **(Gentle *et al*, 1990).**

**Table 2.5:** Methods of beak trimming at different age of layer chicken (**North and Bell, 1990).**

|  |  |
| --- | --- |
| **Age** | **Method** |
| 1st day | High speed trimming/ Notch type trimming |
| 6 to 8 days | Block trimming/ Side type beak trimming |
| 6 to 12 weeks | Electric beak trimming method |
| 18 weeks | Electric beak trimming method |

**2.3.6 Record keeping**

The key to good business and management is records. Records are kept to provide information from which the poultry business may analyzed so that the operator may develop more effective plans to develop the enterprise, to provide profit and loss accounts, to provide net worth statement showing financial progress throughout the year, to keep production records on birds and to keep a complete historical record of financial transactions for future reference **(Ensminger, 1992).**

Issues recorded by most farmers include; total number of birds housed, the cost of birds or the cost of rearing birds if it’s done by the owner, eggs collected daily, sales made, feed consumption, mortality and labor costs **(Sainabury, 1993).** Records should not be elaborated otherwise they may not be kept properly by workers **(Smith, 1993).**

**2.3.7 Marketing**

In tropical areas, marketing of eggs and poultry is not highly organized. Sale of eggs and poultry depends on the farmer’s initiative. Efforts to establish market schemes in different areas have not yet succeeded and there are few commercial parkers thus making it a problem to farmers and acts as a brake to poultry production. In a glut, price cutting becomes acute and farmers have to sale off their produce at lower price to reduce the stock **(Kekeocha, 1984).**

**Islam, (2003)** reported that traditionally chickens are sold alive till today in Bangladesh , because of lacking trust on slaughtering method (Halal or not), fear of disease or dead birds slaughtered, lack of processing and preserving technology and skill man power. Egg grading and packing has not yet been developed. As a result producers are not getting remunerative price that is why middleman are being gainer.