IDENTIFICATION OF ANTIBIOTICS USE PATTERN IN CHICKEN REARING IN SOUTHWEST REGION OF BANGLADESH

A Thesis

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DEDICATION

This thesis is dedicated to my parents.

For their endless love, support and encouragement.

ABSTRACT

Antibiotics use in chicken rearing has increased in our country mostly to prevent the layers and boilers from various diseases. The continued use of antibiotics in chicken production results its residues in products such as eggs and meats that pose a threat to human health. The purpose of the study was to determine the use pattern of antibiotic in chicken rearing in southwest region of Bangladesh. Data were collected from randomly selected ninety (90) respondents involved in chicken farming practices covering three upazilas under three different districts using an interview schedule. Socioeconomic study of the chicken farmers revealed that about half of the respondents (48.9%) belonged middle aged group having small sized family (54.4%). The maximum percentage (54.4%) of the respondents attained secondary level of education. About three-fourth of the respondents (74.4%) had no organizational participation and 41.1% respondents had training on chicken farming. The study stated that most (86.7%) of the farmers had moderately knowledge on chicken rearing. Most (88.9%) of the respondents had medium positive attitude on chicken farming and 6% of the respondents had high positive attitude on chicken farming. Most (98.9%) of the respondents vaccinated their birds and majority (74.4%) of the respondents called doctor for treatments of their birds. Among the respondents (92.2%) used vitamins and minerals supplementation and (32.2%) respondents kept records regularly and 83.3% cases male was the caretaker of their farms. Only 41.1% respondents very rarely visited upazila livestock offices. Most (92.2%) of the respondents said chicken farming is high prospective enterprise in southwest region of Bangladesh and (70.0%) respondents stated chicken farming as medium poverty reduction activities. Most (91.1%) of the respondents had positive reaction to increases their income from chicken farming and 93.3% farmers faced moderate problems during chicken rearing. They stated that 78.9% of the respondents had used antibiotics and among them 82.2% fed antibiotics to their birds through water. Most (94.4%) of the respondents were moderately aware about the effect of antibiotics used in chicken production on human health and only (5.6%) of the respondents were highly aware. Nobody 'not aware' of the effect of antibiotics used in chicken feed on human health. Majority of the (72.2%) of the respondents said that the antibiotics have adverse effect in chicken rearing and 87.8% didn't know the negative impacts of using antibiotics. About half of the (51.1%) respondents kept antibiotics at local vendor and 48.9% veterinary store. About 65% respondents had not maintained the rules and regulation of antibiotics used and 100% of the respondents used fridge for storage of drug. It can be concluded that most of the chicken farmers are to some extent known about the impacts of using antibiotics in chicken production on human health. However, most chicken farmers in the study area used antibiotics in chicken production to prevent disease and keep to farms safe.

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The Author

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Abbreviations

GDP	Gross National Product
EM	Effective Microorganisms
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
AGP	Antibiotic Growth Promoter
CRD	Chronic Respiratory Diseases
FAO	Food Agricultural Organization
NGPs	Natural Growth Promoters
CCRD	Complicated Chronic Respiratory Diseases
DFM	Direct Fed Microbial

CHAPTER I

INTRODUCTION

1.1 Background of the study

Poultry is one of the most widespread food industries worldwide. Chicken is the most commonly farmed species, with over 90 billion tons of chicken meat produced per year (Christian *et al.*, 2018). Over the past 50 years, the use of antibiotics combined with strict biosecurity and hygiene measures has helped the poultry industry to grow by preventing the negative impacts of many avian diseases (Bermudez, 2003).

The main reasons for the use of antibiotics in food producing animals include prevention of infections, treatment of infections, promotion of growth and improvement in production in the farm animals (Mathew *et al.*, 2009).

Antibiotics use in animals feed has increased in our country mostly prevents the layers and boilers from various diseases. After the animal is taken off the antibiotics, the drug residue eventually passes out of their system. The transfer of resistant bacteria from farm animals to human possess a health threat because many of antibiotics given to livestock such as fluoroquinolones and cephalosporins are the same drugs used to cure human afflictions like urinary tract infections and pneumonia (Kummerer, 2009). Over a time, as bacteria in livestock have been increasingly exposed to antibiotics such as penicillin or tetracycline, more resistance has built up. When healthy human guts are colonized by resistant bacteria it makes antibiotics less effective for human medicine. Many people die early due to bacterial infections contracted in hospitals that are resistant to most antibiotics.

The use of feed additives in poultry feeds have been important part for achieving the success in poultry farming in terms of poultry health, high quality and safe chicken meats, eggs and poultry production. But the main constraints for an economic poultry rearing sector are the threat posed by the pathogens that are present the poultry dwelling units. Feed additives arises from beneficially affecting the ecosystem of gastrointestinal micro flora through controlling the potential pathogens (Verma *et al.*, 2020).

Antibiotics

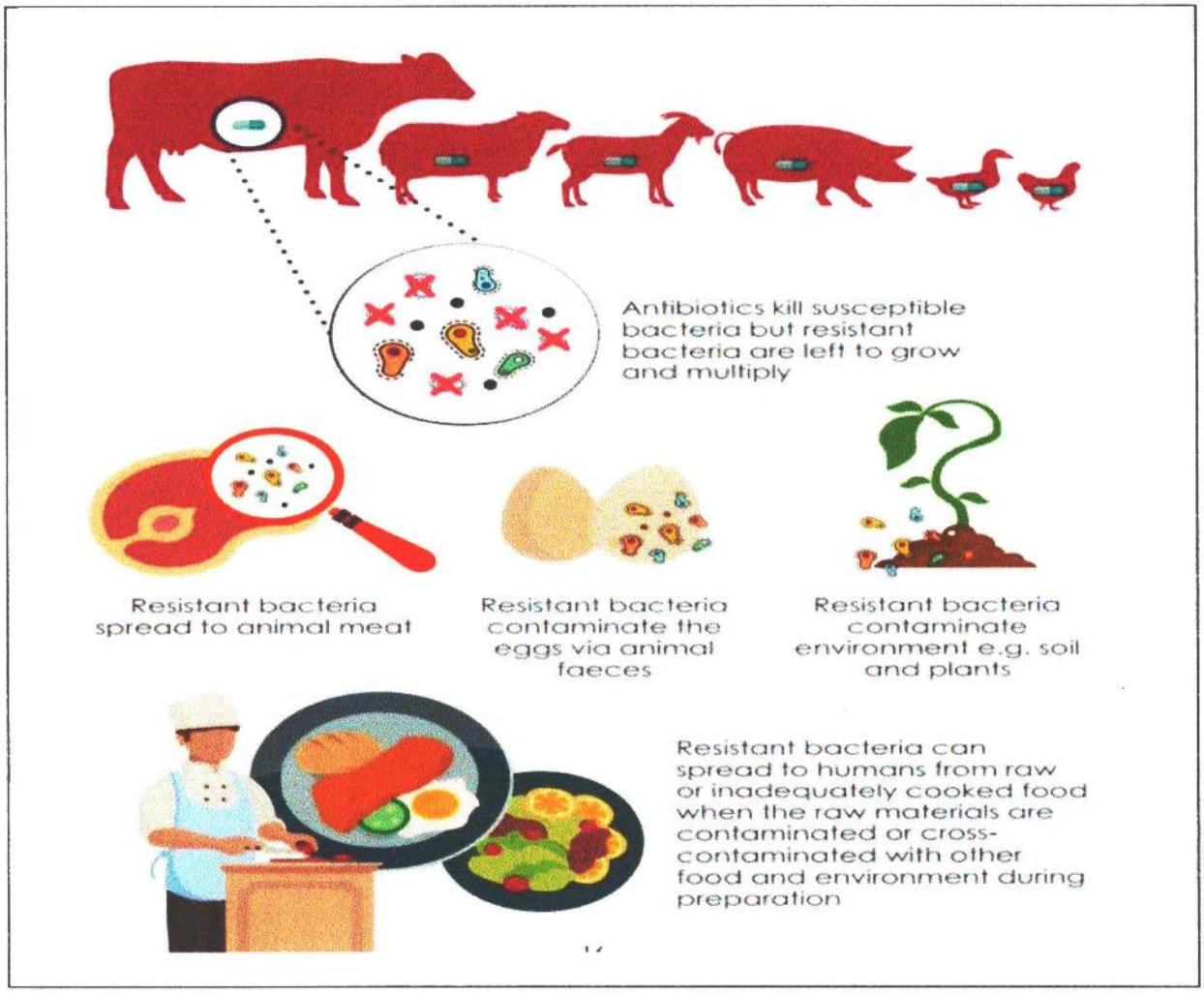
The term antibiotic was coined from the word 'antibiosis' which literally means "against life". In the past, antibiotics were considered to be organic compounds produced by one microorganism which are toxic to other microorganisms (Khan, 2018).

Antibiotics are the substances that can be produced or developed by the microorganisms, which selectively inhibit the generation of or kill the microorganism that are harmful or human health at very low concentrate (Holten and Onusko, 2000).

Antibiotic Resistance

Antibiotics are medicines used to prevent and treat bacterial infections. Antibiotic resistance occurs when bacteria change in response to the use of these medicines. Antibiotic resistance is rising to dangerously high levels in all parts of the world. New resistance mechanisms are emerging and spreading globally, threatening our ability to treat common infections such as pneumonia, tuberculosis, blood poisoning, gonorrhea, and foodborne diseases are becoming harder and sometimes impossible to treat as antibiotics became less effective.

Resistance can negatively impact both animal and human health. Single or multi-drug resistance can occur. Some of these resistant bacteria can directly cause disease in livestock, or they can pass their resistance traits to disease causing bacteria. Humans can acquire these resistant bacteria either through direct contact with infected animals or through contaminated food or water.



Antibiotic resistance-from animals to humans (Sivaraman, 2018)

Infections involving resistant bacteria can be more severe and last longer. Global spread of resistant bacteria can occur quickly through trade and travel.

Antibiotics and poultry production

Poultry may receive antibiotics in their feed (National Chicken Council, 2017). Based on the Food and Drug Administration (2017) categories, these antibiotics fall into two groups:

i. Medically important antibiotics
   - Penicillin
   - Chlortetracycline

- Streptogramin, Virginiamycin
- Macrolide, Trlosin

ii. Not medically important (NMI) antibiotics as they are not used in human medicine and do not exhibit cross resistance

- Bacitracin
- Ionophores, e.g., Monesin and Naracin

Use of antibiotics in animal feeds

The main reasons for the use of antibiotics in food producing animals include prevention of infections, treatment of infections, promotion of growth and improvement in production in the farm animals (Mathew et al., 2009). In the 20th century, livestock and poultry producers also incorporated antibiotics into their comprehensive animal husbandry practices that also include clean water and nutritious food for their animals, shelter from heat and cold, vaccinations and medical treatment when needed. In US alone, about 24.6 million pounds of antibiotics are used in animal agriculture annually and a substantial portion of this is used as growth promoters and not nor the treatment of infections (Oliver *et al.*, 2011). Some antibiotics that are used in livestock and poultry feed: chlortetracyline, procaine penicillin, oxytetracycline, tylosin, bacitracin, neomycin sulfate, streptomycin, erythromycin, linomycin, oleandomycin, virginamycin, and bamnermycins. The Food and Drug Administration (FDA) of USA is working to address the use of 'medically important' antibiotics in food –producing animals for production uses, such as to enhance growth or improve feed efficiency. These drugs are deemed important because they are also used to treat human disease and might not work if the bacteria, they target become resistant to the drug's effects.

Benefits of Antibiotic use in Animal Feed

The benefits of using antibiotic in animal feed to treat and prevent infectious diseases, improving growth rate and production. Antibiotics added to the feed ensure more efficient conversion of feed to animal product and improvement. The daily growth rate of animals subsisting on antibiotic-supplemented food is known to be improved by 1-10% compared to that of animals provided feed without antibiotic. The meat obtained from antibiotic-fed animals is also of better quality with higher amount of protein and less amount of fat

compared to that obtained from animals not supplemented with antibiotics (Hughes and Heritage, 2002). Use of tetracycline and penicillin in chicken feed led to a significant improvement in the production of eggs and hatchability besides feed efficiency (Gustafson and Bowen, 1997). Chlorotetracycline, oxytetracyclin and penicillin are used animal feed that are improved growth rate but little effect on mortality. In animal feed antibiotics are used frequently or regularly for increased efficiency and growth rate than to oppose specific diseases.

Risks of antibiotics use in animal feed

When humans and animals are fed or injected with antibiotics, the drugs accumulate in the body. These accumulated drugs are called antibiotic residue. Antibiotic residue is detectible in the blood, meat and eggs of poultry (Diarra and Malouin, 2014). After the animal is taken off the antibiotics, the drug residue eventually passes out of their system. The transfer of resistant bacteria from farm animals to human poses a health threat because many of the antibiotics given to livestock such as fluoroquinolones and cephalosporins are the same drugs used to cure human afflictions like urinary tract infections and pneumonia (Kummerer, 2009). Over time, bacteria in livestock have been increasingly exposed to antibiotics such as penicillin or tetracycline, more resistant has built up. When healthy human guts are colonized by resistant bacteria it makes antibiotics less effective for human medicine. Many people die yearly due to bacterial infections contracted in hospitals that are resistant to most antibiotics.

Antibiotic using of growth promoters and effects of human health

Antibiotic use in food animals can result in antibiotic-resistant infections in humans has existed for several decades (Landers *et al.*, 2012). The use of antibiotics in animal and poultry feed has been a global practice since the middle of the last century. Antibiotics are used both at therapeutic and subtherapeutic levels to promote growth and feed efficiency. The judicial use of antibiotics in food animals for growth promotion and disease prevention has been controversial for a long time due to the development of antibiotic resistant bacteria in animals and humans, resulting in treatment failure when needed. This problem has also been gradually increasing due to the misuse of antibiotics in animal and poultry feed (Salim *et al.*, 2018). Resistance can negatively impact both animal and human health. Single or multi-drug

resistance can occur. Some of these resistant bacteria can directly cause disease in livestock, or they can pass their resistance traits to disease causing bacteria. Humans can acquire these resistant bacteria either through direct contact with infected animals or through contaminated food or water. Veterinarians and physicians have fewer treatment options for infections caused by multi-drug resistant bacteria, and treatment may fail. Infections involving resistant bacteria can be more severe and last longer. Global spread of resistant bacteria can occur quickly through trade and travel.

1.2 Statement of the study

Chicken farming is comparatively easy for the farmers because it requires a very little investment. Beside this, it does not require a lot of space (if reared in a small range) so that farmers can rear chicken in their homestead area. It may create the opportunity of extra income of the farmers and play role in improving their socio-economic condition and lifestyle.

In order to have a knowledge and idea concerning the chicken farming in Southwest region of Bangladesh, the researchers had undertaken research entitled "Identification of antibiotics use pattern in chicken rearing in southwest region of Bangladesh".

This research was formulated to seek answers of the following questions considering chicken farming in southwest region of Bangladesh:

1. What is the scope of chicken farming in coastal region?
2. How they use antibiotics in chicken?
3. What are the characteristics and socioeconomic conditions of chicken farmers?
4. Are there any benefactions of chicken farming in improving the farmers' economic condition?
5. What problems are arising during rearing of chicken?

1.3 Objectives of the study

Particular objectives of the study are given bellow:

i. To explore the use pattern of antibiotics in chicken rearing in southwest region of Bangladesh.
ii. To describe the socioeconomic status of chicken farmers.

iii. To find out the present status of chicken farming in southwest region of Bangladesh.

1.4 Justification of the study

For betterment of economic status of chicken farmers, our Government and some Non-Government Organizations take on some projects, give loans, training, etc. But the outcome of these attempts will be found when the rural jobless people and farmers will be interested in chicken farming. Accordingly, this research was undertaken to show the present condition of chicken farming in Bangladesh especially in the southwest region and to find out the scopes and problems. The study also focused on the use pattern of antibiotics in chicken rearing in the study area.

1.5 Scope of the study

The study would provide useful knowledge and data to the personnel, researchers, planners and field workers concerned with chicken farming in southwest region of Bangladesh. The findings of the study can be helpful to make plan to make projects, training and loan opportunity for the jobless, landless or marginal rural farmers and thus there may create an additional income source for them which lead to development of their economic condition.

1.6 Limitations of the study

Chicken farming may show some problems. Farmers still need to have capital in place to start a chicken farm in the first place. Some birds do not excel in some environmental conditions. Birds highly sensitive to diseases show a high mortality rate. They require a lot of vaccines and medicines too which costs a lot.

However, despite of some problems, there is a cogent scope of chicken production in Bangladesh and some little steps can overcome the problems. For this reason, Government should take proper steps, giving training, loan, implements, etc. Finally, a lot of public awareness should be created in this field.

CHAPTER II

REVIEW OF LITERATURE

This chapter is designed for critical reviews for comparing past studies about chicken farming to the present study. The literature review would help conduct the research in proper way and it brought about the recent information on this field. Under this chapter I have discussed the findings of different researchers related to my study.

Antibiotics use in broiler production

Aarestrup (2003) reported that in 1986, Sweden was the first country to ban the use of antimicrobials for growth-promoting purposes.

Alavi *et al.* (2012) studied with Ross 308 broiler birds fed different levels of antibiotics, probiotics and synbiotics. They observed that using growth-promoters not only increase humoral immunity but they also improve production factors ($P>0.05$). Antibiotics can be used therapeutically for treatment of poultry diseases, but are more commonly used in a prophylactic manner. Bacitracin Methylene Disalicylate (BMD) and Virginiamycin (VIR) have been included in poultry diets at sub-therapeutic levels since their approval for increased rate of gain and improved feed efficiency (Anonymous, 2007).

Barnes (1958); Elliott and Barnes (1959) said that tetracycline resistance was associated with feeding growth-promoting levels to chickens in the late 1950's.

Billah *et al.* (2013) selected 50 households, 25 from Parakochua and 25 from Baraticry village in the Gaibandha district of Bangladesh. Approximately 64% of the farmers were low producers compared to 30% for medium whereas only 6% higher producers. In terms of consumption, the average among all birds was 8.1, and the highest proportion (74%) of them was in the low consumption category. With regard to poultry knowledge, approximately 78% of the farmers had poor overall poultry knowledge. The three most frequently citied problems faced by farmers in the process of rearing poultry were high prevalence of poultry diseases, inadequate supply of vaccine and medicine and scarcity of feed. Correlations between dependent and independent variables indicate that age, education, farm size, and annual income of the farmers were significantly related to the consumption of poultry, whereas poultry production was positively related to the farmer's poultry knowledge.

By water (2005 reported that the occurrence of AGP-associated resistant bacteria has led to concerns of human health risks. The possibility of zoonotic bacteria with antibiotic resistance

linked to animal use of AGP that could be contracted by human recipients has stimulated change. He also reported that for over 60 years, the US poultry industry has relied on the use of chemoprophylaxis with antibiotics, for the control and prevention of enteric diseases. Potential problems and concerns have resulted in global changes for the use of AGP, with the most drastic changes occurring in the European Union. One potential problem is the increased resistance of pathogenic bacteria to the approved antibiotics used for growth promotion.

Castanon (2007) reported that the mechanism of action for antibiotic growth promoters has been explained as an interaction between the antibiotics and the intestinal microbial population. He also reported that it was determined that the use of antibiotic growth promoter could increase the instance of microbes with resistant genes and pose a potential for humans if they are transferred to persons. Therefore, the World Health Organization and the Economic and Social Commission of the European Union concluded that the use of antimicrobials in food animals is a public health concern. From this conclusion, a plan was set forth to withdraw the use of all remaining approved AGP from all member states by January 1, 2006.

Chowdhury *et al.* (2009) showed that food safety is a term broadly applied to food quality that may adversely affect human health. There are two major areas of concern over the presence of residues of antibiotics in animal-derived foodstuffs with regard to human health. The first is allergic reaction and the second is development of antibiotic resistance in human in the gut bacteria of human.

Diarra and Malouin (2014) said that when humans and animals are fed or injected with antibiotics, the drug accumulate in the body. These accumulated drugs are called antibiotic residue detectable in the blood, meat and eggs of poultry.

Dibner and Richards (2005) also studied that antibiotic fed at sub-therapeutic levels promote growth and feed efficiency in poultry and other animals.

Dibner and Richards (2005) stated that in 1995, Denmark banned the use of avoparcin (a vancomycin-like compound) from use as an antibiotic growth promoter (AGP) in food animals due to reports of resistance in isolates from conventional and organic poultry farms. In 1997, the Commission of the EU banned avoparcin in all EU member states.

Fairchild *et al.* (2001) showed that flavomycin as antibiotics has favorable effects on the weight gain of broiler chickens.

Gassner and Wuethrich (1994) have demonstrated the presence of chloramphenicol metabolites in meat products and have concluded that a link with the presence of these antibiotic residues in meat and the occurrence of aplastic anemia in humans cannot be ruled out.

Hilmi *et al.* (2019) found that poultry does not require large capital investments and labour needs are not excessive. Poultry can provide for a good source of nutrition for the farm family and income source, which does not depend on the harvest cycle common to crops. Poultry provides a number of important products, such as meat and eggs as well as important and complementary services for farm crops and other livestock. **Henry and Ammerman (2000)** reported that feed intake of experimental diets (antibiotics or non-treated control) was restricted to 90% of that of an additional group fed the control diet ad libitum. Feed intake, weight gain, and feed efficiency were not affected ($P>0.10$) by dietary treatments. Virginiamycin decreased intestinal weight an average of 19% as compared with 14% for bambermycins and oxytetracycline, 6% for Zn bacitracin, and 18% for lincomycin. Except for Zn bacitracin, all antibiotics produced intestinal weights which were lower ($P<0.01$) than those of controls. Only virginiamycin increased ($P<0.01$) kidney Mn concentration. Bone Mn concentration was greater ($P<0.01$) for virginiamycin than bambermycins or oxytetracycline in Experiment 2, and greater ($P<0.05$) for lincomycin than virginiamycin or Zn bacitracin in Experiment 2. Feeding Zn bacitracin increased ($P<0.01$) bone Zn concentration whereas feeding virginiamycin caused a decline ($P<0.05$) in bone Zn concentration in Experiment 1. There were no differences in Cu, Zn, or Fe concentrations in liver or kidney.

Jones and Ricke (2003) reported that in 1951, the United States Food and Drug Administration (FDA) approved the use of antibiotics as an animal feed additive without the prescription of a veterinarian. The industry quickly adopted the use of Antibiotic Growth Promoters (AGP) and made it the industry standard for production.

Khan *et al.* (2018) showed that all the broiler meat sellers were male and the number of participants appeared higher in 21–30-year age groups found to vary significantly ($P<0.01$). Among them, 10% sellers were illiterate, 60% sellers merely cross primary education, 25% sellers had secondary education and 5% sellers reached level of higher education. All sellers

were familiar with antibiotics and vitamins. About 57.5% and 22.5% of the broiler sellers had knowledge onto to the use of antibiotics as growth promoter. Only 7.5 % sellers understood the term antibiotic resistance and 12% had little knowledge on human health hazard following indiscriminate use of antibiotics. All broiler sellers provided commercial feed and water throughout selling period, whereas, 77.5% and 17.5% of them used mixed vitamins and antibiotics in water to prevent unwanted mortality.

Landers *et al.* (2012) said that antibiotic use in food animals can result in antibiotic-resistant infections in humans has existed for several decades.

Mbuza *et al.* (2017) was conducted study on 37 randomly broiler farmers. The majority of respondents were males (68%) and most farmers had attended only primary level of education (40.5%). Most of the farmers were in the peri-urban (48.6%) and urban (37.8%) areas and hired male youth (62.2%) mainly aged 19-35 years. Record keeping was well practiced (91.9%) and (62.6%) had permanent poultry house and all farmers used deep litter system.

McEwen and Fedorka-Cray (2002) said that antibiotics are used in food animals to treat clinical diseases, to prevent and control common disease events, and to enhance animal growth.

Mehdi *et al.* (2018) observed that antibiotics are used to fight bacterial infections. A selective pressure gave rise to bacteria resistant to antibiotics. Some strategies can be borrowed to reduce the use of antibiotics in chicken farms. Much research has been carried out to look for natural agents with similar beneficial effects of growth promoters. The aim of these alternatives is to maintain a low mortality rate, a good level of animal yield while preserving environment and consumer health. The most popular are probiotics, prebiotics, enzymes, organic acids, immunostimulants, bacteriocins, bacteriaophages, phytogenic feed additives, phytoncides ad essential oils.

Miles *et al.* (2006) reported that the antibiotics may also prevent the occurrence of the bacterial infection, necrotic enteritis, caused by Clostridium spp.

Moore and colleagues (1946) were the first to demonstrate the beneficial effects of feeding antibiotics at subtherapeutic levels to improve performance in poultry. Streptothricin, streptomycin, sulfasuxidine or a combination of streptomycin and sulfasuxidine did not sterilize the intestinal tract of chickens, but showed a reduction of coliform bacteria in the

ceca, while the combination of streptomycin and sulfasuxidine increased growth rates of the birds.

Nawab *et al.* (2018) showed that poultry industry has gained significance all over the world due to providing economical, healthier food than red meat and other protein sources. FAO estimated 103.5 million tons of global chicken meat production annually in 2012, which contributed about 34.3% to global meat production. But poultry farming system is affected by both environmental and diseases stress. Various viral, bacterial parasitic and fungal diseases affect the production performance of birds by affecting respiratory system, reproductive system, and immune system, gut system which in turn cause loss of appetite, reduction of infection, coughing, bloody diarrhea and higher mortality which cause huge economic losses in poultry industry. So, there is need to control poultry diseases.

Paul *et al.* (2011) reviewed those 240 poultry farmers selected by multistage random sampling from four blocks of Kathua District of Jammu and Kashmir on a well-designed and standardized attitude scale consisting of 18 statements. It was found that majority of them most favorably opined in favor of the positive items and most unfavorable against the negative items. Respondents varied to a great extent with respect to their opinion towards different items under study.

Rimi *et al.* (2018) showed that most 86% raisers sought care for their backyard poultry locally, 14% used home remedies only and none sought care from government veterinary professionals.

Singer and Hofacre (2006) reported that the major driving force of these changes has been the pressure placed on the poultry industry by consumers of animal meat proteins that perceive antibiotic growth promoter associated human health risks to be serious.

Sultana *et al.* (2013) studied the existing broiler farming at Santhia upazila under Pabna District. Data were collected randomly from 50 respondents who were involved in broiler farming. In the study, out of 50 respondents 60% of were engaged in agriculture, 36% businessman and 4% were in services. About 48% of the respondents had small farms (100-500 birds), 40% had medium (501-1000 birds) and large farms (1001-2000 birds). Out of 50 respondents, 30% took necessary suggestions from the experienced farmers, 90% farmers regularly vaccinated their broilers and 70% farmers taken short training on broiler farming. About 78% respondents considered market weight as 1.5 kg per bird. Most of the respondents (64%) sold broiler at 30-33 d of age and about 80% of the respondents marketing their broiler

at 110-115 taka per kg bird. About 36% respondents had production cost approximately 90-95 taka per kg bird. About 36% of the respondents reported more marketing age of birds, 32% reported higher cost of production and 30% reported lack of training facilities.

Tabidi *et al.* (2013) observed that dietary inclusion of probiotic and antibiotic supported a superior performance of chicks and can be applied as antibiotic growth promoter substitutions in broilers diet. They also reported that because of the general problem of increased resistance of bacteria and the decreasing acceptance of the consumers for Antibacterial Growth Promoters (AGPs), different substances, referred to as Natural Growth Promoters (NGPs), have been identified as effective and safe alternatives to AGPs.

Zinea *et al.* (2019) collected data from forty respondents at Mohammad Nagar residential area under Batiaghata upazila of Khulna district and forty respondents from Nirala residential area of Khulna City Corporation, Khulna, Bangladesh. Data were collected through personal interview schedule. Most of the respondents (80%) were highly aware while only one fifth (20%) of the respondents had medium awareness about the effect of antibiotics used in animal feed on human health.

Antibiotics use in layer production

Boyd *et al.* (1960) reported that high level (1 kg./ton) feeding of chlor-tetracycline (Ctc) and of oxytetracycline (Otc) to broilers and laying hens resulted in storage of the antibiotics in the serum, liver and in dark and white meat.

Kabir *et al.*, (2014) showed that the maximum farms used electricity power and tube well water to maintain their farms properly and also contained more than five thousand chicks and used pellet feed for their chicks and followed regular vaccination schedule.

Antibiotics residues in poultry meats

Al-Mashhadany *et al.* (2018) studied that a total of 135 breast muscle, thigh muscle, and liver (45 for each) were examined by direct microbiological method. The incidence rate was 11.1%, the highest rate was found in liver (17.8%), then thigh (8.9%), and breast (6.7%). The value of ($p<0.05$) (0.00) showed significant differences between the presence of antibiotic residues. January, December, and February take the more detection rate of 20.8%, 18.5% and 12.5%, respectively.

Jammoul and El Darra (2019) showed that 80 chicken samples collected from farms located in different regions of Lebanon. The evaluation of antibiotics residues in 80 chicken's muscles samples has shown that 77.5% of samples were at least contaminated by antibiotics residues, out of which 53.75% were exposed to co-occurrence multidrug residues.

Maharjan, *et al.* (2020) said that continuous use of antibiotic in broiler and supplying them in market before with-drawl period had led to development of antibiotic residue in marketed broiler meat of Kathmandu Metropolitan City. A total of 150 meat samples were taken (75 liver+ 75 breast muscle), and 300 tests performed for two group of antibiotics, Group A (Tetracyclines) and Group B (Macrolides, aminoglycosides and sulphonamides). 74 tested were found to be positive for antibiotic residue and 53 of them were above the minimum residue level. The true prevalence was found to be 28.25%. The presence of antibiotic residue in meat found to be statistically significant ($p<0.05$). Antibiotic residue was found higher in liver than in muscle.

Sajid *et al.* (2016) showed that 80 poultry kidney and liver samples were collected and tested for detection of different antibiotics residues. Out of 80 samples only 4 samples were positive for antibiotics residues. The highest concentrations of antibiotics residue found in these tissues were tetracycline (8%) followed by ampicillin (4%), streptomycine (2%) and aminoglycosides (1%) as compared to others antibiotics like sulfonamides, neomycine and gentamycine.

Antibiotics residues in eggs

Coenejo *et al.* (2020) assessed the eggs; those were obtained from 83 BPS and analyzed to evaluate the presence of antibiotic residues. Besides, 66% of the surveyed owners were indicated as giving pharmacological treatments to their chickens. Eggs from 61 BPS were positive for at least one antimicrobial. Fifty-three BPS were positive for more than one antimicrobials, and one BPS was positive for all four antimicrobials tested. There is a risk that poultry eggs produced in BPS in Central Chile carry residues of different families of antimicrobial.

Islam *et al.* (2020) studied with 300 eggs samples for detecting antibiotics residues. Media seeded with *Bacillus subtilli* at different pH values (6, 7, 2 or 8) and a fourth medium seeded with *staphylococococcus aureus* at pH 8 were used for disc diffusion microbial inhibition test.

Out of the 300 samples, 81 (27%) sample contained antibiotic residues. Derivate of Macrolides and Detalactam were detected in 40.7% of positive cases followed by derivatives of Tetracyclines and Betalactam in 39.5% cases and antibiotics residues relevant to Aminoglycosides were detected in 19.8% positive cases.

Meredith *et al.* (1965) studied a pad plate method of assessing residual amounts of chlortetracycline and oxytetracycline using *Bacillus* cereus. The effects of various methods of cooking the tissues and eggs and the patentiating effect of terephalic acid were studied. The largest amounts of residual antibiotic were found in the liver, then breast, and then thigh tissue when assayed for CTC. Terephthalic acid in 0.5% concentration increased the concentration found in all cases. Cooking by poaching and scrambling egg did not destroy the antibiotic in all cases.

Application of probiotics and prebiotics as an alternative to antibiotics in chicken

Barnes *et al.* (1972) reported that the health promoting effect of probiotic in the gastrointestinal tract has been mainly associated with their capacity to stimulate the immune response and to inhibit the growth of pathogenic bacteria.

Fuller (1989) mentioned about some potential alternatives that have been tested including probiotics, prebiotics, competitive exclusion cultures, organic acids, and plant extracts. Probiotics are defined as a live microbial feed supplement which beneficially affects the host animal by improving its intestinal balance. He suggested probiotic as a replacement of antibiotic live microbial supplements which beneficially affect the host animal by improving some beneficial functions in its intestinal microbial balance.

Gibson and Roberfroid (1995) reported that prebiotics are defined as a nondigestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of intestinal bacteria. Several microbial strains have been tested for use as probiotics in food animals, including species of Bacillus, Bifidobacterium, Enterococcus, E. coli, Lactobacillus, Lactococcus, Streptococcus, and varieties of yeast species.

Hassanein and Soliman (2010) said that probiotics have positive effects on poultry meat quality.

Ignacio (1995) reported that the use of prebiotics in the ration of broiler chickens reduces the feed conversion ratio.

Kabir (2009) showed that the use of probiotics for prevention of bacterial diseases in poultry, as well as demonstrating the potential role of probiotics in the growth performance and immune response of poultry, safety and wholesomeness of dressed poultry meat evidencing consumer's protection, with a critical evaluation of results obtained to date.

Kalam *et al.* (2021) showed that poultry production has boomed in Bangladesh in recent years. The poultry sector has contributed significantly to meet the increased demand for animal source proteins in the country. However, increased use of antimicrobials appeared to be a significant threat to food safety in the poultry sector. Studies assessing the poultry drug and feed sellers' knowledge, attitudes, and practices (KAPs) are limited. They determined the respondents' (drug and the feed sellers) KAPs of AMU and AMR using a tested and paper-based questionnaire. The study demonstrated that most respondents have insufficient knowledge, less positive attitudes, and inappropriate practices regarding AMU and AMR. The factor score analysis further showed that the type of respondents and their years of experience, level of education, and training on the drug were the significant factors impacting the current knowledge, attitudes, and practices of AMU and AMR. The adjusted logistic regression analysis revealed that the drug sellers who completed their education up to 12th grade and had training on the drug had adequate knowledge of AMU and AMR. The data also showed that the drug sellers belong to the age group 31–35 and 36–40 years and who completed 12th grade had good attitudes on the same. Likewise, the analysis further determined that drug sellers belonging to the age category 18–25 and 26–30 years, and interestingly, the respondents who completed education up to 12th grade, had better practices. The correlation was fair between knowledge–attitudes, knowledge–practices, and attitudes–practices. Based on the current study results, we recommend educational interventions and appropriate training for the poultry drug and feed sellers to raise awareness and to upgrade their current knowledge on the appropriate use of antimicrobials.

Nurmi *et al.* (1992) reported that the nondigestible ingredients can be fermented by the intestinal microflora and utilized as nutrients, decreasing the competition for nutrients between the microbial population and the intestinal tract. Newly-hatched chicks are inoculated with this disease resistant adult intestinal microflora to provide protection.

Pan and Yu (2014) said that probiotic bacteria produce molecules with antimicrobial activities such as bacteriocins which inhibits toxins production and pathogens adhesion.

Patterson and Burkholder (2003) mentioned that probiotics and prebiotics alter the intestinal microbiota and immune system to reduce colonization by pathogens in certain conditions. As with growth promotant antibiotics, environmental and stress status influence efficacy of prebiotics and probiotics. These products show promise as alternatives for antibiotics as pressure to eliminate growth promotant antibiotic use increases.

Selaledi *et al.* (2020) reviewed that over the years the growth and health of food-producing animals have been enhanced by the use of antibiotics. These have helped reduce on-farm mortalities; lower incidences of diseases and more importantly improve productivity. Generally, the utilization of antibiotics in feed has been reevaluated since bacterial pathogens have established and shared a variety of antibiotic resistance mechanisms that can easily be spread within microbial communities. The use of alternatives has been recommended and some successfully used in other countries as well as Africa, including pro and prebiotics and phytochemicals. This then leads to the core aim of this review which is to (1) determine the extent to which antimicrobial-resistant pathogens have elected Africa, (2) assess the current measures put in place by Africa to reduces antimicrobial resistance and finally (3) explore the alternative use of antibiotics in poultry production. Improved sanitary conditions and farm biosecurity are important alternatives that could be adopted by farmers instead of depending on antibiotic drugs for disease control and prevention.

Spring *et al.* (2000) said that Mannan oligosaccharides (MOS) are nondigestible carbohydrates that are the main component in the outer cell wall of yeast cells (Saccharomycesspp.). While similar to prebiotics, MOS is not thought to selectively enrich intestinal bacteria, instead they are thought to bind to pathogenic bacteria and remove them from the intestinal tract.

Sun *et al.* (2005) reported that while antibiotics and anticoccidials are effective in their own respect, overall intestinal health shows greatest improvement when these products are used in combination in broiler diets. The combination of an ionophore, roxarsone and an antibiotic in the starter and grower diets and an antibiotic alone in the withdrawal diet has become the industry standard.

Tabidi *et al.* (2013) investigated the effects of commercial probiotic mixtures (Liptosafe-L) via drinking water of broiler chickens in comparison with antibiotic (newmycin) on performance of broiler chicks and growth attribute lone in the withdrawal diet has become the industry standard.

Effects of antibiotics residues on human health

Barton (2007) studied that antibiotic resistance in bacteria that cause disease in man is an issue of major concern. Although misuse of antibiotics in human medicine is the principal cause of the problem, antibiotic-resistant bacteria originating in animals are contributory factors, with some types of resistance in some species of bacteria. Antibiotics are added to animal feeds to treat and prevent infections and to improve growth and production. Until recently, the major concerns about incorporation of antibiotics in animal feed related to antibiotic residues in products from treated animals.

Ben Yujie and Chunmiao Zheng (2019) showed that the extensive use of antibiotics leading to the rapid spread of antibiotic resistance poses high health risks to humans, but to date there is still lack of a quantitative model to properly assess the risks. The potential hazard of ingested antibiotic residues in the environment altering the human microbiome and promoting emergence and selection for bacteria resistance inhabiting the human body and the potential hazard of creating a selection pressure of antibiotic resistance in the environment.

Bjorn and Christina Greko (2014) studied that the spread of bacteria resistant to antibiotics among animals relate to the potential impact on public health. But antibiotics are used to treat sick animals, and resistance in animal pathogens may lead to therapy failure. For all animals, there may be a negative effect on health and welfare when diseases cannot be treated. Animals kept as companions or for sports often receive advanced care, and antibiotic resistance can lead to negative social and economic consequences for the owners. As to animals kept for food production, antibiotics are not needed to promote growth, but, if infectious diseases cannot be treated when they occur, this can have a negative effect on the productivity and economy of affected business.

Kyuchukova (2020) showed that use of antibiotics to food animals for treatment, prophylaxis and as growth promoters' results in deposition of their residues in animal products. Consumption of these residues through animal products may cause development of

antimicrobial drug resistance, hypersensitivity reaction, carcinogenicity, mutagenicity, teratogenicity, bone marrow depression, and disruption of normal intestinal flora.

Moyane *et al.* (2013) said that the widespread and intensive use of antibiotic agents in modern food production systems is believed to be contributing significantly to antibiotic resistance among bacteria. Antibiotic usage in food-producing animals tend to be increasing and data show that even those that have been banned in other countries such as growth promoters are still being used in South Africa. Despite poor health status which include a large portion of bacterial infections, as well as HIV/AIDS epidemic and tuberculosis, South Africa has had the most active surveillance for antibiotic resistance of any Africa country. A national surveillance programme of antibiotics usage on the food-producing animals and antibiotic resistance is required to help mitigate the problem of lack of availability of information.

Nisha (2008) reported that the use of antibiotic that might result in deposition of residues in meat, milk and eggs must not be permitted in food intended for human consumption. The use of antibiotics to bring about improved performance in growth and feed efficiency, to synchronize or control of reproductive cycle and breeding performance also often lead to harmful residual effects. Antibiotic residues in food of animal origin occurs in two times: one which produces potential threat to direct toxicity in human, second is whether the low levels of antibiotic exposure would result in alteration of microflora, cause diseases and the possible development of resistant strains which cause failure of antibiotic therapy in clinical situations.

Phillips *et al.* (2004) showed that the use of antibiotics in food animals selects for bacteria resistant to antibiotics used in humans, and these might spread via the food to humans and cause human infection, hence the banning of growth-promoters. Some antibiotics are used both in animals and humans; most of the resistance problems in humans have risen for human use.

Richard and Gustafson (1990) reported that the primary concern addressed have been the generation of antibiotic resistance in animal bacteria and the influence of such resistance on human health. After several decades of research directed at this question, most qualified study groups have reported a paucity of appropriate information necessary to judge the reality of a public health risk

CHAPTER III

METHODOLOGY

Methodology is the whole process of the study. Methodology of research is the specific techniques that used to identify, process, and analysis information about a specific topic. Methodology may be understood as sign of studying how research is done (Kothari, 1990). The present study was a field survey to study the use pattern of antibiotics of chicken farming in southwest region of Bangladesh. The data was collected through a pretested interview schedule from the chicken farmers. The interview schedule was prepared very carefully to meet the objectives of the study. All methods and procedures followed in this research are discussed in present chapter.

3.1 Design of the Study

The present study was done by face-to-face interviewing of the chicken farmers and collection of data from them. It was designed to study on the indomitable use pattern of antibiotics in the chicken farming in some selected areas in southwest region of Bangladesh.

3.2 Sampling of the respondents

The study was conducted at some selected areas that have large number of chicken farms which helped me to complete the survey successfully. chicken farms of these areas produce and supply a significant quantity of chicken which meet the demand of local markets for both eggs and meats. Thirty (30) farmers were selected randomly from each upazila for collection of information and total numbers of farmers were ninety.

Table 3.1 Sampling of the respondents

Sl. No.	Upazila	No. of Respondents (Farmers)
1	Dumuria, Khulna	30
2	Fakirhat, Bagerhat	30
3	Tala, Satkhira	30
	Total	90

3.3 Location of the study

The survey was conducted among the commercial chicken farmers (small scale to medium scale). Three upazilas was selected from southwest regions of Bangladesh which were Dumuria upazila of Khulna, Fakirhat upazila of Bagerhat and Tala upazila of Satkhira districts.

Figure 3.1 Map of Dumuria Upzila of Khulna District

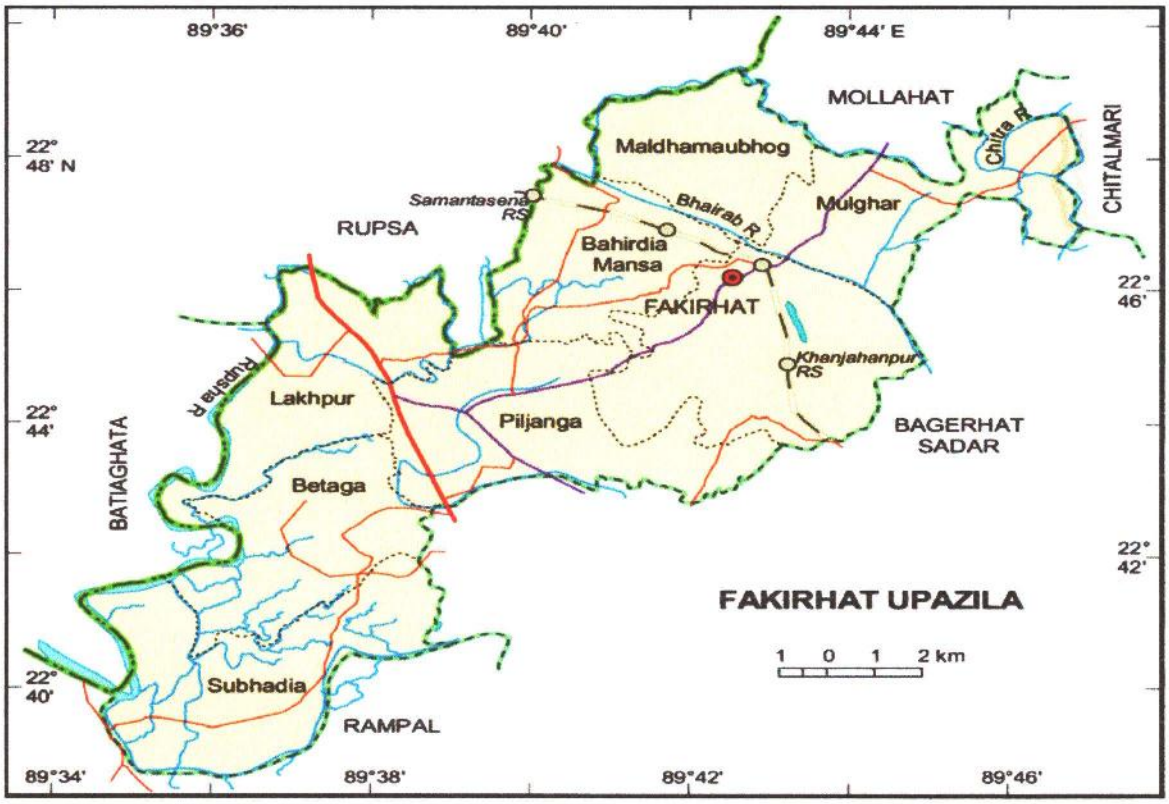


Figure 3.2 Map of Fakirhat Upzila of Bagarhat District

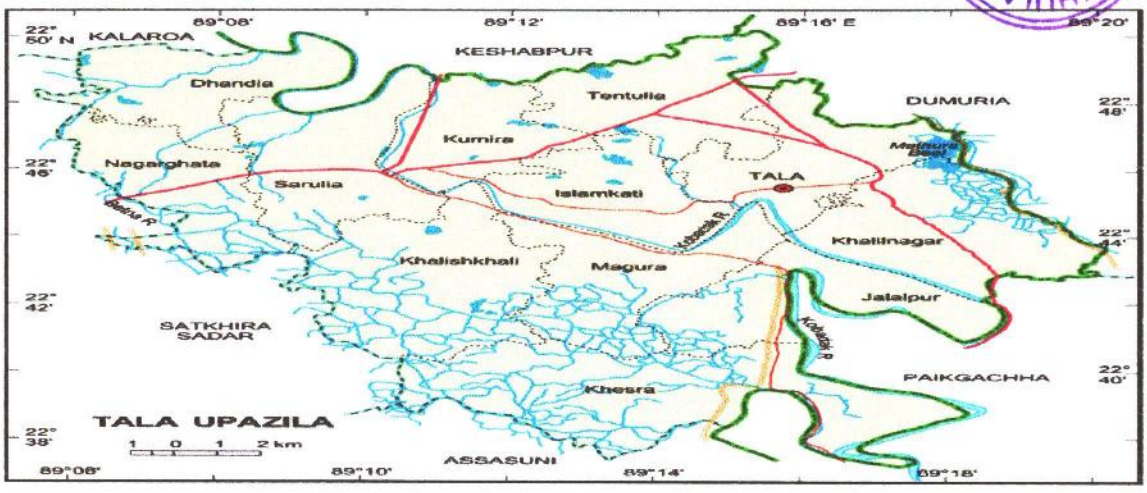


Figure 3.3 Map of Tala Upzila of Satkhira District

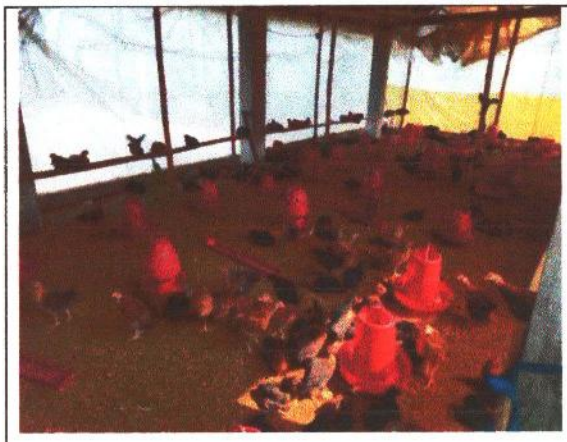
3.4 Preparation of questionnaire

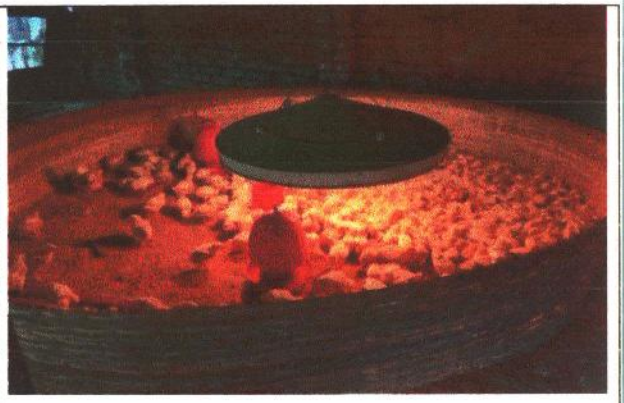
A questionnaire was prepared very carefully to collect the topic related and useful information from the respondents. The questionnaire was carefully designed in Bengali keeping the objectives of the study in view. It contained both open and close ended, simple and direct form of questions to collect data from the selected farmers. The questions were very easy so that the respondents could easily understand it and could give the correct information. After preparation of interview schedule, it was pretested with some chicken farmers. Pre testing involves series of activities designed to evaluate a survey instruments capacity to collect the desired data, the capacities of the selected mode of data collection. The interview schedule was then multiplied in its final form for collection of data. English version of the interview schedule it presented in Appendix 1.

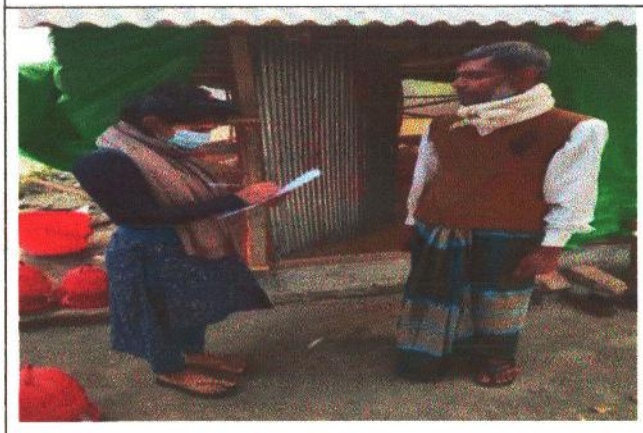
3.5 Collection of the data

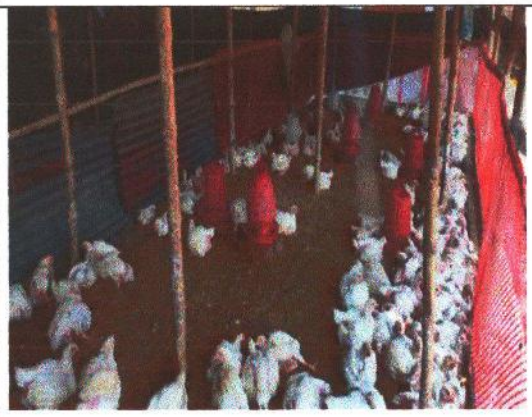
The data for the study were collected from the respondents through face to face by using interview schedule during January to March 2021. Before asking any question to the respondents the purposes of the study were explained to them and requested to cooperate me that they could provide the true and accurate information. The questions were explained and clarified whenever any respondents felt difficulties in understanding properly. All the information was collected without any bias. As the respondents had not any written document, they replied from their own memory. The chicken farmers helped cordially to provide data. The data sheet was checked and verified after every interview to be sure that the responses of the respondents were recorded properly. After completion of each interview, the respondent was thanked accordingly.

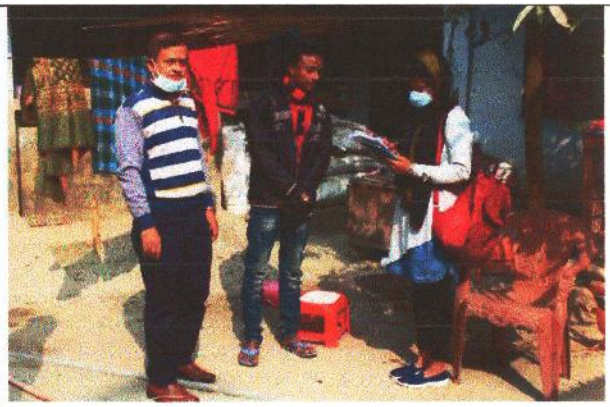
Photographs are given below which were taken during survey data collection:











3.6 The variables included in the study

A. Personal information

-Age of the respondents

-Educational qualification

-Family type and size

-Main occupation

-Experience in agriculture farming

-Experience in chicken farming

B. Economic information

-Farm size

-Annual family income

-Income from chicken farming

C. Social information

-Organizational participation

-Training

D. Psychological

-Knowledge on chicken rearing

-Attitude towards chicken farming (positive and negative)

E. Chicken related information

-Type of chicken farm

-Number of birds

-Name of birds

-Housing for birds

-Vaccination record

-Treatment procedure

-Feeding of chicken

Dependent variables

A. Prospect of chicken farm

-Relative advantages

-Poverty reduction

-Income generation

B. Problem faced

-Breed related problems

-Feed related problems

-Health related problems

-Other problems

C. Antibiotics related information

- Use of antibiotics as growth promoter

- Recommended antibiotics growth promoter

-Feeding pattern

-Application pattern of antibiotics

-Adverse effect of applying antibiotics in chicken farming

-Negatives impacts of using antibiotics in chicken farming on human health

-Source of antibiotics

-Source of prescription

Respondent's statements on antibiotics

- Positive statement
- Negative statement
- Consumer's awareness

D. Probiotics

-About probiotics

-Feed probiotics to chicken

- Feeding pattern of probiotics

Attitude towards probiotics

-Positive

-Negative

3.6.1 Measurement of variables

3.6.1.1 Age of the respondents

The age of a respondent was measured in terms of actual years from his or her birth to the time of interview on the basis of his/her statement. Based on age, the respondents were classified into different categories as shown in Table 3.2.

Table 3.2 Categories of respondents according to their age

Age category	Score (years)
Young age	<30
Middle age	30-50
Old age	51-80

3.6.1.2 Level of education

The level of education was measured by the number of years of schooling. A score of one (1) was assigned for each year of schooling completed. If a respondent did not know how to read and write, he was considered illiterate. The educational status of a respondent who was illiterate was assigned a score 0. Based on level of education, the respondents were grouped into different categories as presented in Table 3.3.

Table 3.3 Categories of respondents according to their educational qualification

Education category	Score (years of schooling)
Illiterate	0
Primary	1-5
Secondary	6-10
Higher secondary	11-12
Graduate and above	>12

3.6.1.3 Family type

The family type of the respondents was measured by total number of his/her family members including himself/herself and other dependents who were eating and staying together accordingly as nuclear, joint, extended family. Family type has been shown in the question number 3 of the interview schedule; (Appendix 1).

Table 3.4 Categories of respondents according to their family type

Family type	Score
Nuclear	1
Joint (horizontal)	2
Extended	3

3.6.1.3.1 Family size

The family size of a respondent was determined on the basis of numbers of members in his/her family including himself, his wife, children and those who are dependents. The total number of family members was considered as the family size score of a respondent. Based on family members, the respondents were grouped into different categories as presented in Table 3.5.

Table 3.5 Categories of respondents according to their family size

Categories	Score
Small	1-4
Medium	5-7
Large	>7

3.6.1.4 The main occupation of the respondents

A respondent might be involved more than one profession in such case the respondents indicated his/her primary/major profession. The profession of every respondent was written specifically in item number 4 of the questionnaire.

Table 3.6 Categories of respondents according to their occupation

Name of occupation	Score assigned
Agriculture/Crop	1
Livestock (cattle, sheep, goat, chicken etc.)	2
Fisheries	3
Mixed agriculture (crop+ livestock+ fisheries)	4
Business	5
Service	6
Day laborer	7
Agriculture+ Livestock	8
Agriculture+ Day laborer+ Livestock	9
Agriculture+ Business+ Livestock	10
Business+ Livestock	11

Livestock+ Fisheries	12
Day laborer + Livestock	13
Livestock+ Service	14
Mixed agriculture+ Business	15
Mixed agriculture+ Service	16
Livestock+ Fisheries+ Business	17

3.6.1.5 Farming Experience

The farming experience of the respondent was measured by the length covered from his/her starting years in farming to the time of interview on the basis of his/her statement. A score of one was assigned for each year of his/her experience.

Table 3.7 Categories of respondents according to their farming experience

Experience of farming	Score (years)
No experience	0
Short term	1-5
Medium	6-10
Long term	>10

3.6.1.5.1 Experience in agricultural farming

Experience of agricultural farming of a respondent was measured by the length covered from his/her starting years in agricultural farming to the time of interview on the basis of his/her statement.

3.6.1.5.2 Experience of chicken farming

Experience of chicken farming of a respondent was measured by the length covered from his/her starting years in chicken farming to the time of interview on the basis of his statement.

Table 3.8 Categories of respondents according to their experience of chicken farming

Experience of chicken farming	Score (years)
Short-term	1-5
Medium	6-10
Long-term	>10

3.6.1.6 Farm size

The farm size was measured in terms of decimal considering the total land area under the possession of a respondent. Finally decimal were converted into standard units (hectare).

Table 3.9 Categories of respondents according to their farm size

Farm size	Score (decimal)
Landless	<10
Marginal	10 to 50
Small	51 to 100
Medium	101 to 200
Large	>200

3.6.1.7 Annual income

The annual income referred to the income of a respondent on the basis of his/her total yearly earnings from agriculture, chicken farming, and non-agricultural sources by the respondent himself/herself and other family members.

Table 3.10 Categories of respondents according to their annual income

Annual income	Score (Tk)
Low income	<100,000.00
Medium income	100,000.00 to 150,000.00
High income	>150,000.00

3.6.1.8 Annual income from chicken

The annual income from chicken referred to the income of a respondent on the basis of his/her total yearly earnings from chicken farming.

Table 3.11 Categories of respondents according to their annual income from chicken farm

Annual income from chicken	Score (Tk)
Low income	<30,000.00
Medium income	30,000.00-50,000.00
High income	>50,000.00

3.6.1.9 Organization participation

The organization exposure was determined by the number of any organization involved by the respondents.

Table 3.12 Categories of respondents according to their organizational participation

Organizational participation	Score
Yes	1
No	2

3.6.1.10 Training exposure

The training exposure was determined by the number of training participated by the respondents.

Table 3.13 Categories of respondents according to their training experience

Training experience	Score
Yes	1
No	2

3.6.1.11 Knowledge on chicken farming

Chicken farming knowledge of the respondents was measured by asking 10 selected questions and a score of 2 was assigned to each question.

Table 3.14 Categories of respondents according to their knowledge on chicken farming

Knowledge	Score
Low knowledge	1-7
Medium knowledge	8-14
High knowledge	15-20

3.6.1.12 Positive and Negative attitude on chicken farming

Positive and negative attitude on chicken farming respondents was measured by some selected questions.

Table 3.15 Categories of respondents according to positive and negative attitude on chicken farming

Positive & negative attitude on chicken farming	Score
Low	>10
Medium	10-20
High	21-30

3.6.1.13 Type of chicken farm

Chicken farming is the form of animal husbandry which raises different types of farm of birds such as broiler farm, layer farm, Sonali /cockerel and other mixed farm.

Table 3.16 Categories of respondents according to their type of chicken farm

Type of bird	Score
Broiler	1
Layer	2
Sonali	3
Cockerel	4

3.6.1.14 Number of birds

The total number of birds per farm at the time of survey.

3.6.1.15 Name of hybrid

The farmers of the study areas reared various hybrids of chicken. The chicken hybrids were collected from Kazi, Nahar, Nourish, CP, Golden, MRM, IR, Paragon, Aftab, Diamon chicken farms. The genotype/hybrids were Hyline, Hi sex, Cock, Sonali, etc.

3.6.1.16 Feed consumption (g/bird/day)

The amount of feed consumed by any type of chicken bird was measured in gram and expressed as per bird per day.

3.6.1.17 Housing condition of chicken

The farm housing condition was assigned by the four types of shed that were permanent structure, semi-permanent structure, all bamboo structure and kacha.

Table 3.17 Categories of housing condition of chicken

Type of housing	Score
Permanent structure	1
Semi-structure	2
Bamboo structure	3
Kacha	4

3.6.1.18 Vaccination

A vaccine is a biological preparation that improves immunity to a particular disease. Different vaccines were provided to the chicken at specific age throughout their lives against various diseases through specific routes which have been also studied. Most of the vaccines were provided before 20 weeks of bird's age. The most commonly used vaccines were marek's, fowl pox, gumboro and salmonella, coccidiosis, ranikhat, fowl cholera and bird flu.

Table 3.18 Categories of vaccination process of chicken

Vaccination	Score
Regularly	1
Occasionally	2
Don't vaccinate	3

3.6.1.19 Treatment procedure

Treatments were applied when birds are attacked by different severe diseases. Farmers treated their birds by various process that are local doctor, veterinarian and own.

Table 3.19 Categories of treatment procedure of chicken

Treatment procedure	Score
Local doctor	1
Veterinarian	2
No treatment	3

3.6.1.20 Feeding pattern

There are two types of feeding pattern of feed of chicken form of feed and source of feed.

3.6.1.20.1 Form of feed

Mostly chicken bird's feed form is pellet and mesh.

3.6.1.20.2 Source of feed

Farmers were collected feeds for their birds from purchase, readymade or homemade.

Table 3.20 Categories of source of chicken feed

Source of feed	Score
Purchase/readymade	1
Homemade	2
Both	3

3.6.1.21 Record keeping

Respondents kept record regularly of chicken farm or not that are assigned 2 questions.

Table 3.21 Categories of respondents according to their keeping records

Keeping records	Score
Yes	1
No	2

3.6.1.22 Vitamin mineral premix

Various vitamins and mineral premixes in the ration are fed to the chicken at a specific dose and duration.

3.6.1.23 Caretaker of chicken farm

Caretaker of chicken farm needs because regular cleaning of farms is very necessary. Monitoring the bird is essential for daily.

Table 3.22 Categories of respondents according to their caretaker of chicken farm

Caretaker	Score
Male	1
Female	2

3.6.1.24 Source of capital for chicken farming

Source of capital for chicken farming is very essential for the starting their business. Some institutions were helped them financially to start their farms.

Table 3.23 Categories of the respondents according to their source of capital for chicken farming

Source of capital	Score
Bank loan	1
NGO loan	2
Lending	3
Others	4
Own	5

3.6.1.25 Visiting Upazila livestock office

Some respondents were visited upazila livestock office for their better knowledge of chicken farming. They also visited for their improvement their farm and increased their income from farm.

Table 3.24 Categories of respondents according to their visiting upazila livestock office

Visiting Upazila livestock office	Score
Frequently	1
Occasionally	2
Very rare	3
Never	4

3.6.1.26 Prospect of chicken farming

3.6.1.26.1 Relative advantages

Table 3.25 Categories of respondents according to their relative advances on chicken farming

Prospect (relative advances)	Score
Low	1
Medium	2
High	3

3.6.1.26.2 Poverty reduction

Table 3.26 Categories of respondents according to their poverty reduction on chicken farming

Prospect (poverty reduction)	Score
Low	1
Medium	2
High	3

3.6.1.27 Appoint labor

Table 3.27 Categories of respondents according to labour appoint to chicken farming

Labor appoints	Score
Yes	1
No	2

3.6.1.28 Problem of chicken farming

Table 3.28 Categories of respondents according to their problems faced on chicken farming

Problem faced	Score
Less severe	1
Moderately severe	2
Highly severe	3

3.6.1.29 Use Pattern of antibiotics

Antibiotics, also known as antibacterial, are types of medications that destroy or slow down the growth of bacteria. Birds were provided with specific antibiotics at their specific age, dose and duration.

3.6.1.29.1 Antibiotics use as growth promoters

Some chicken farmers were used antibiotics as growth promoters and some farmers used antibiotics as therapeutic measures.

Table 3.29 Antibiotic use as growth promoters

Use antibiotic	Score
Yes	1
No	2

3.6.1.29.2 Recommendation of antibiotic as growth promoter

Mainly local doctor, veterinarian, and medical company representatives were advised about the dose and duration when farmers were used antibiotics.

3.6.1.29.3 Feeding pattern of antibiotics

Antibiotics were used through feed, water and directly.

3.6.1.29.4 Negative impacts of using antibiotics

Negative impacts of using antibiotics in chicken farming on human health have been identified which are drug resistance, failure of antibiotics therapy in clinical situations, carcinogenic, toxicity in human and early child maturity.

3.6.1.30 Data processing and analysis

Collected data were compiled, coded, tabulated for processing and analysis in accordance with the objectives of the study. For arriving at a meaningful conclusion, tabular presentation of data was intensively used. The SPSS-v-20 computer package programme was used to analyze the data. Descriptive statistics like number, percentage, mean and standard error were used in describing the selected independent and dependent variables of the study.

3.6.1.31 Processing of the primary data

After completing collection, all the data were compiled, coded and then tabulated for the processing. Local units were converted into standard units. For analyzing the data was transferred into a master sheet and finally they were analyzed.

3.6.1.32 Data tabulation and analysis

Simple statistical method was used for analyzing the data so that the objectives can be fulfilled easily and accurately. Different statistical methods were used like number, mean, SD, minimum, maximum and percentage to explain the variables.

KU-Ub-Acc, No-4869, (T) 11.9.2022

CHAPTER IV

RESULTS AND DISCUSSION

The study was conducted at Dumuria upazila under Khulna district, Fakhirhat upazila under Bagerhat District and Tala upazila under Satkhira District. In this chapter the findings of the research are presented and discussed.

Socio-economic status of the chicken farmers

Data of the table 4.1 shows that the greater number of the respondents were (48.9%) middle aged followed by old aged (26.7%) and younger aged (24.4%). In the studied area the average age of the respondents were 40.73 years with standard deviation 13.09.

Again, the majority (54.4%) of the respondents belonged secondary followed by graduate and above (15.6%), higher secondary (12.2%), primary (11.1%), illiterate (4.4%) and sign up only (2.2%). The average schooling year was 9.39 with standard deviation 4.30.

Table 4.1 Socio-economic status of the chicken farmers

Characters	Categories	Frequency	Percent	Valid Percent	Mean ± SD
Age	Young age <30yrs	22	24.4	24.4	40.73 ±13.09
	Medium age 30-50yrs	44	48.9	48.9	
	Old age 51-80yrs	24	26.7	26.7	
	Total	90	100.0	100.0	
Education	Illiterate	4	4.4	4.4	9.39 ± 4.30
	Primary (1-5)	10	11.1	11.1	
	Secondary (6-10)	49	54.4	54.4	
	Higher secondary (11-12)	11	12.2	12.2	
	Graduate and above	14	15.6	15.6	
	Sign up only	2	2.2	2.2	
	Total	90	100.0	100.0	
Family size	Small (1-4)	49	54.4	54.4	4.67 ± 1.77
	Medium (5-7)	36	40.0	40.0	
	Large (>7)	5	5.6	5.6	

	Total	90	100.0	100.0	
Farm size	Landless (<10 decimal)	15	16.7	16.7	98.64 ± 112.77
	Marginal (10to50 decimal)	29	32.2	32.2	
	Small (51 to 100 decimal)	14	15.6	15.6	
	Medium (101to 200decimal)	15	16.7	16.7	
	Large (>200 decimal)	17	18.9	18.9	
	Total	90	100.0	100.0	
Annual Income	Low income (<Tk100,000.00)	17	18.9	18.9	230355.56 ± 222049.91
	Medium income (Tk.100,000.00 to 150,000.00)	25	27.8	27.8	
	High Income (>Tk. 150,000.00)	44	48.9	48.9	
	No income	4	4.4	4.4	
	Total	90	100.0	100.0	

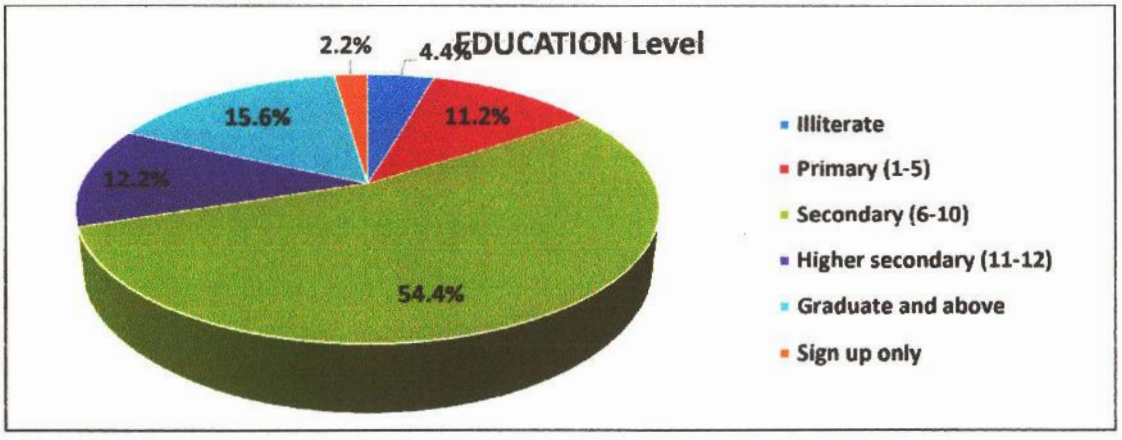


Figure 4.1 Education levels of the chicken farmers in southwest coastal regions of Bangladesh

Khan *et al.* (2018) showed that all the broiler meat sellers were male and the number of participants appeared higher in 21–30-year age groups found to vary significantly ($P<0.01$). Among them, 10% sellers were illiterate, 60% sellers merely cross primary education, 25% sellers had secondary education and 5% sellers reached level of higher education.

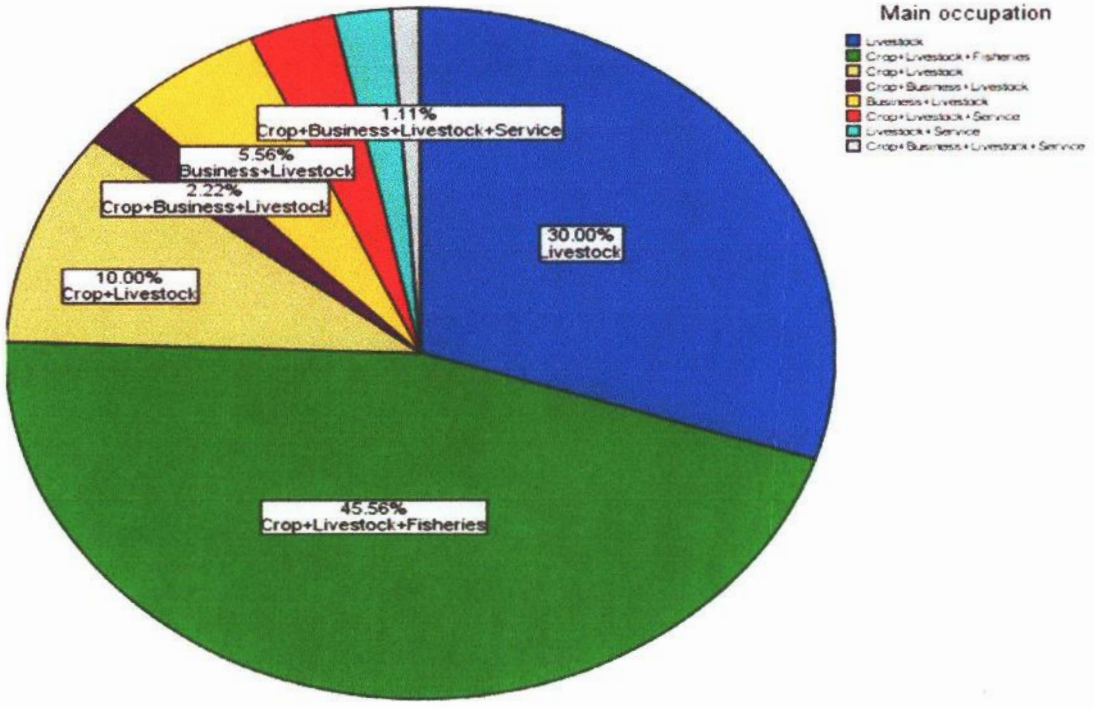


Figure 4.2 Occupation of chicken farmers in southwest coastal region

Figure 4.2 revealed that 45.56% of the respondents had farm type of crop+ livestock + fisheries, followed by livestock (30.00%), crop+ livestock (10.00%), business + livestock (5.56%), was crop+ business + livestock (2.22%) and crop + business + livestock + service (1.11%).

Sultana *et al.* (2013) found that the 60% of the respondents was engaged in agricultural, 36% was businessman, 4% was in services. About 48% of the respondents had small farms (100-500 birds), 40% had medium (501-1000 birds) and large farms (1001-2000 birds).

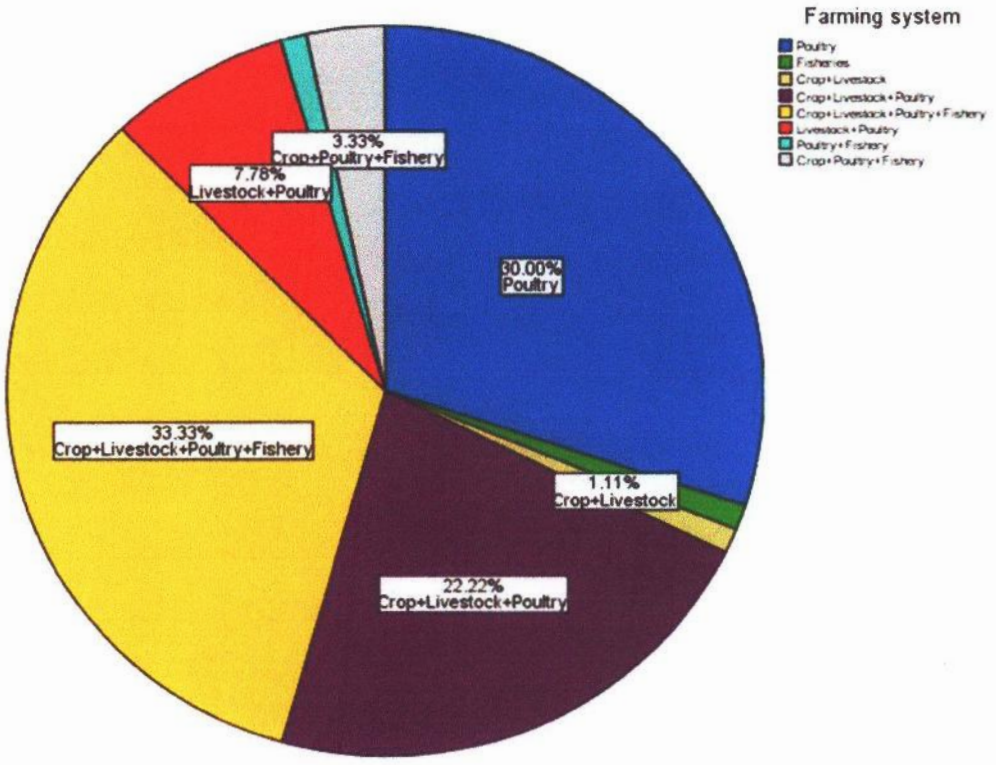


Figure 4.3 Farming systems of chicken farmers in southwest coastal region

Figure 4.3 indicated that one-third (33.33%) of the farmers practiced crop +livestock+ chicken + fishery followed by chicken only farming (30.0%), crop+ livestock + chicken (22.22%), livestock+ chicken (7.78%), crop+ chicken+ fishery (3.33%) and crop + livestock (1.11%).

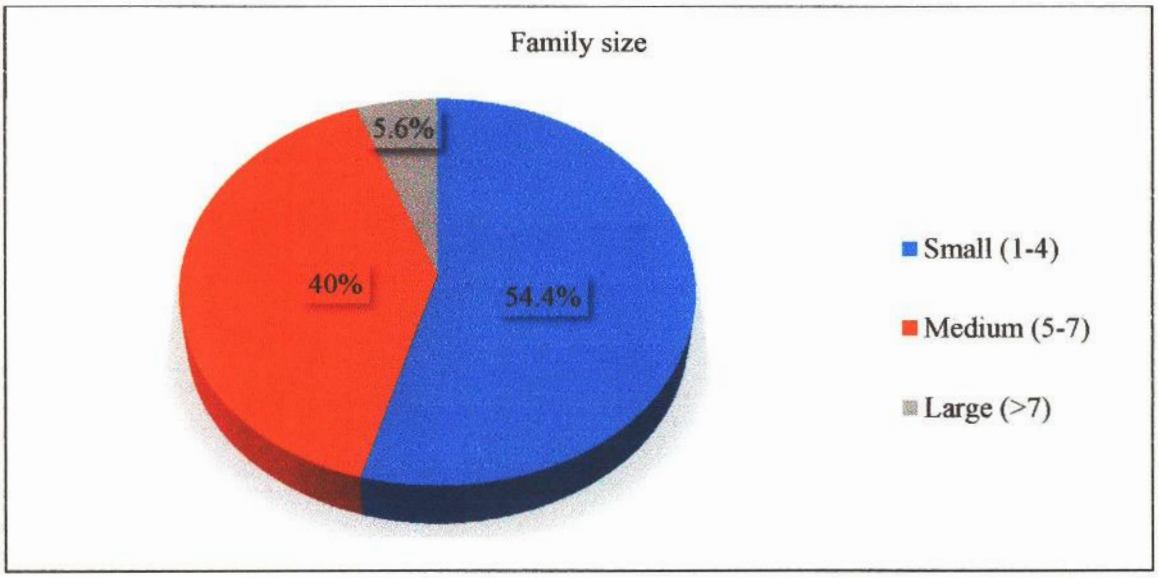


Figure 4.4 Family sizes of the respondents

Table 4.2 Agricultural and chicken farming experience of the respondents according to the location of the study

Location of the study		Experience of agriculture farming (years)	Experience of chicken farming (years)
Dumuria	N	30	30
	Mean	10.8	4.13
	Std. Deviation	10.443	3.569
Tala	N	30	30
	Mean	11.83	12.6
	Std. Deviation	14.042	7.713
Fakirhat	N	30	30
	Mean	10.2	7.33
	Std. Deviation	11.345	4.737
Total	N	90	90
	Mean	10.94	8.02
	Std. Deviation	11.924	6.57
	F-value	0.141	17.376
	Level of Significance	0.868	0*

Figure 4.4 shows that 54.4% of the respondents belonged small family, 40% medium family and 5.6% belonged large sized family.

Data of the Table 4.2 show that the average agriculture farming experience of the chicken farmers of Dumuria upazila was 10.8 years followed by the chicken farmers of Tala upazila (11.83 years) and the chicken farmers of Fakirhat upazila (10.94 years). The average agriculture farming experience of the studied area was 10.94 years. The survey findings also stated that the chicken farming experience of the respondents of Tala upazila was 12.6 years followed by Fakirhat upazila (7.33 years) and Dumiuria upazila (4.13 years). The average chicken farming experience of the studied area was 8.02 years.

Table 4.3 Total number of chicken per household according to three locations of the study

Location of the study		Total number of chicken/farm	Duration of rearing (d)	Age at marketing (d)	Marketing weight (g/bird)	Egg production %
Dumuria	N	30	30	30	30	2
	Mean	855.33	33.43	51.23	1523.33	91.5
	Std. Deviation	540.471	19.753	24.35	630.371	10.6
Tala	N	30	30	30	30	2
	Mean	1604	49.27	109	1631.67	89
	Std. Deviation	1661.5	60.05	180.294	638.76	0
Fakirhat	N	30	30	25	24	22
	Mean	1318.83	183	412.32	1414.58	88.6
	Std. Deviation	963.386	162.214	257.185	337.342	5.22
Total	N	90	90	85	84	26
	Mean	1259.39	88.57	177.82	1530.95	88.9

	Std. Deviation	1180.411	120.114	232.607	566.159	5.29
	F-value	3.228	20.046	32.152	0.984	0.25
	Level of Significance	0.044*	0*	0*	0.378	0.78

The data of the Table 4.3 show that the average total number of chicken per farm in Dumuria was 855.33 where the average duration (d) of chicken rearing was 33.43, age of marketing (d) of the chicken was 51.23, average marketing weight (g) of the bird was 1523.33 and average egg production percentage 91.5. In Tala upazila the average total number of chicken per farm was 1604 where the average duration (d) of chicken rearing was 49.27, the average age at marketing (d) of chicken was 109, the average marketing weight (g/bird) of the bird was 1631.67 and the average egg production percentage of the bird was 89. In the case of Fakirhat upazila the average total number of birds were 1318.83 where the average duration (d) of chicken rearing was 183, the average age at marketing (d) was 412.32, the average marketing weight was (g/bird) 1414.58 and the egg production was 88.9. It was clear from the study that the highest average of total number of chicken was found in Tala upazila.

Table 4.4 Distribution of the respondents according to their organizational participation

	Frequency	Percent	Valid Percent
Participated	23	25.6	25.6
Not participated	67	74.4	74.4
Total	90	100.0	100.0

It was found that 74.4% of the respondents had no organizational participation. Whereas only 25.6% respondents participated the organizational institutions for their better farming.

Table 4.7 Distribution of the respondents according to their positive attitude on chicken farming

a. **Positive attitude**

Category of positive attitude on chicken farming	Frequency	Percent	Valid percent	Mean ± SD
Less (>=10)	4	4.4	4.4	15.87±3.127
Moderately (11-20)	80	88.9	88.9	
Favourable (21-30)	6	6.7	6.7	
Total	90	100.0	100.0	

Data of the Table 4.7 described that, about 88.9% of the respondents had moderately positive attitude on chicken farming whereas 6% of the respondents had favourable positive attitude and 4.4% respondents had less attitude on chicken farming.

Paul *et al.* (2011) reviewed 240 poultry farmers selected by multistage random sampling from four blocks of Kathua District of Jammu and Kashmir on a well-designed and standardized attitude scale consisting of 18 statements. It was found that majority of them most favorably opined in favor of the positive items.

b. **Negative attitude**

Categories of negative attitude on chicken farming	Frequency	Percent	Valid Percent	Mean ± SD
Less (>=10)	4	4.4	4.4	16.71±3.494
Moderately (11-20)	77	85.6	85.6	
Favourable (21-30)	9	10.0	10.0	
Total	90	100.0	100.0	

Data of the Table 4.7 (b) show that 85.6% of the respondents had moderately negative attitude on chicken farming followed by favourable negative attitude (10.0%) and less negative attitude on their chicken farming.

Kalam *et al.* (2021) showed the poultry drug and feed sellers' knowledge, attitudes, and practices (KAPs) are limited. The study demonstrated that most respondents had insufficient knowledge, less positive attitudes, and inappropriate practices regarding AMU and AMR.

Table 4.8 Type of chicken farm

Type of bird			
Type	**Frequency**	**Percent**	**Valid Percent**
Broilers	27	30.0	30.0
Layers	26	28.9	28.9
Sonali	24	26.7	26.7
Cockerel	13	14.4	14.4
Total	90	100.0	100.0

The findings revealed that 30.0% of the respondents reared broilers birds followed by layers (28.9%), Sonali (26.7%), and Cockerel (14.4%).

Table 4.9 Name of hybrids

Purchase of day-old chicks			
Company	**Frequency**	**Percent**	**Valid Percent**
Kazi	18	20.0	20.0
Nahar	8	8.9	8.9
CP	1	1.1	1.1
Golden	2	2.2	2.2
RMR	6	6.7	6.7
Local	43	47.8	47.8
IR	2	2.2	2.2
Paragon	3	3.3	3.3
Aftab	4	4.4	4.4
Diamond	1	1.1	1.1
Aman	1	1.1	1.1
Provita	1	1.1	1.1
Total	90	100.0	100.0

Table 4.10 Performance related information

Location		Total number of chickens	Duration of rearing (d)	Marketing weight(g/bird)	Mortality %
Dumuria	N	30	30	30	30
	Mean	855.33	33.43	1523.33	7.2
	Std. Deviation	540.47	19.75	630.37	9.48
Tala	N	30	30	30	30
	Mean	1604	49.27	1631.67	8.33
	Std. Deviation	1661.5	60.05	638.76	16.27
Fakirhat	N	30	30	24	30
	Mean	1318.83	183	1414.58	5
	Std. Deviation	963.38	162.21	337.34	4.79
Total	N	90	90	84	90
	Mean	1259.39	88.57	1530.95	6.84
	Std. Deviation	1180.41	120.11	566.15	11.18
	F	3.228	20.04	0.984	0.68
	Sig.	0.04*	0*	0.37	0.50

The data of the Table 4.10 show that the average total number of chicken per farm in Dumuria was 855.33 where the average duration (d) of chicken rearing was 33.43, average marketing weight (g/bird) of the bird was 1523.33 and average mortality rate was 7.2. In Tala upazila the average total number of chickens per farm was 1604 where the average duration (d) of chicken rearing was 49.27, the average marketing weight (g/bird) of the bird was 1631.67 and the average mortality rate was 8.33. In the case of Fakirhat upazila the average total number of birds per farm were 1318.83 where the average duration (d) of chicken rearing was 183, the average marketing weight (g/bird) was 1414.58 and the mortality percentage was 5. It was clear from the study that the highest average of total number of chicken was found in Tala upazila.

Table 4.11 Vaccination of chicken

		Frequency	Percent	Valid Percent
Vaccination	Regularly	89	98.9	98.9
	Occasionally	1	1.1	1.1
	Total	90	100.0	100.0

The results of the study showed that 98.9% of the respondents vaccinated their birds to protect from various diseases and 1.1% respondents said that they gave vaccine their birds occasionally.

Sultana *et al.* (2013) reported that 90% farmers regularly vaccinated their broiler.

Table 4.12 Treatment procedure of birds

		Frequency	Percent	Valid Percent
Treatment procedure	Local doctor	67	74.4	74.4
	Veterinarian	19	21.1	21.1
	No treatment	2	2.2	2.2
	Own	2	2.2	2.2
	Total	90	100.0	100.0

The data of the Table 4.12 show that about 74.4% of the respondents called local doctor for treatment their sick birds whereas 21.2% of the respondents called veterinarian, 2.2% of the respondents threated their birds for their self-modification and 2.2 % of the respondents did not take any treatment measures for their sick birds.

Rimi *et al.* (2018) showed that most of the raisers (86%) sought care for their backyard poultry locally, 14% used home remedies only and none sought care from government veterinary professionals.

Table 4.13 Distribution of respondents according to the types of feed used to their bird

		Frequency	Percent	Valid Percent
Form of feed	Pellet	50	55.6	55.6
	Mesh	40	44.4	44.4
	Total	90	100.0	100.0

The results of the study showed that 55.65% of the respondents fed their birds pellet feed and 44.4% fed mesh form.

Kabir *et al.* (2014) showed that the maximum farms used electricity power and tube well water to maintain their farms properly and also contained more than five thousand chicks and used pellet feed for their chicks and followed regular vaccination schedule.

Table 4.14 Distribution of respondents according to the source of feed for their bird

		Frequency	Percent	Valid Percent
Source of feed	Purchase/Readymade	90	100.0	100.0

The results of the study showed that 100% of the respondents fed their bird of purchase or readymade feed that they were collected from their nearest markets (Table 4.14).

Table 4.15 Distribution of the respondents according the use of vitamins and minerals to their birds

		Frequency	Percent	Valid Percent
Use of vitamin mineral supplement	Yes	83	92.2	92.2
	No	7	7.8	7.8
	Total	90	100.0	100.0

Data of the Table 4.15 show that about 92.2% of the respondents used of vitamin and minerals supplement to their birds where only 7.8% of the respondents did not supplement vitamin and mineral to the birds.

Table 4.16 Distribution of the respondents according keeping farm record

		Frequency	Percent	Valid Percent
Keeping records	Yes	29	32.2	32.2
	No	61	67.8	67.8
	Total	90	100.0	100.0

The result of the study showed that about 32.2% of the respondents kept records regularly of their farms whereas 67.8% of the respondents did not keep records regularly (Table 4.16).

Mbuza *et al.* (2017) conducted study on 37 randomly selected broiler farmers. The majority of respondents were males (68%) and most farmers had attended only primary level of education (40.5%). Most of the farmers were in the peri-urban (48.6%) and urban (37.8%)

areas and hired male youth (62.2%) mainly aged 19-35 years. Record keeping was well practiced (91.9%) and (62.6%) had permanent poultry house and all farmers used deep litter system.

Table 4.17 Caretaker of chicken farms

		Frequency	Percent	Valid Percent
Caretaker of chicken farm	Male	75	83.3	83.3
	Female	15	16.7	16.7
	Total	90	100.0	100.0

The results of the study showed that 83.3% cases males were the caretaker of their farms and female caretakers were only 16.7% cases.

Hilmi *et al.* (2019) found that poultry does not require large capital investments and labour needs are not excessive.

Table 4.18 Distribution of the respondents according the source of capital for starting their farm

		Frequency	Percent	Valid Percent
Source of capital	Own	67	74.4	74.4
	Bank loan	15	16.7	16.7
	NGO loan	8	8.9	8.9
	Total	90	100.0	100.0

The data of the Table 4.18 show that 74.4% of the respondents started their farms by their own capital, 16.7% taken bank loan and 8.9% taken loan from NGOs.

Table 4.19 Distribution of the respondents according to frequency of visiting upazila livestock office

		Frequency	Percent	Valid Percent
Visiting upazila livestock office	Frequently	6	6.7	6.7
	Occasionally	14	15.6	15.6
	Very rare	37	41.1	41.1
	Never	33	36.7	36.7
	Total	90	100.0	100.0

The findings indicate that majority 41.1% of the respondents visited upazila livestock office very rare, 15.6% occasionally, 6.7% frequently and 36.7% of the respondents did not visit upazila livestock office.

Table 4.20 Prospect of chicken farming

1) Relative advantages

		Frequency	Percent	Valid Percent	Mean ± SD
Prospect (relative advantage) score	Low 1-13	0	0	0	29.62±2.924
	Medium 14-26	7	7.8	7.8	
	High 27-39	83	92.2	92.2	
	Total	90	100.0	100.0	

The results of the study showed that most of the respondents (92.2%) stated chicken farming is high prospective and 7.8% of the respondents described moderately prospective and nobody stated that chicken farming as low or no prospect in southwest region of Bangladesh. Islam *et al.* (2014) reviewed that poultry industry can provide various opportunities to increase GDP plus equitable distribution through arranging food security as well as ensuring self-employment, creating purchasing power and reducing poverty at a large scale. About 44% of daily human intake of animal proteins comes from livestock products. The poultry industry has been supplying quality protein to the people of Bangladesh at the lowest price in the world.

2. Poverty reduction

		Frequency	Percent	Valid Percent	Mean ± SD
Prospect (poverty reduction) score	Low= (1-6)	21	23.3	23.3	8.07±2.784
	Medium= (7-12)	63	70.0	70.0	
	High= (13-18)	6	6.7	6.7	
	Total	90	100.0	100.0	

The survey findings revealed that 23.3% of the respondents described low prospect of chicken rearing in poverty reduction. About 70.0% of respondents said that medium poverty reduction prospects and only 6.7 % said high poverty reduction.

Islam *et al.* (2014) reviewed that poultry industry can provide various opportunities to increase GDP plus equitable distribution through arranging food security as well as ensuring self-employment, creating purchasing power and reducing poverty at a large scale.

Table 4.21 Rank order of prospect in chicken farming

1. **Relative advantages**

SI. No.	Statement	Score	Percentage (%)	Ranking
1	Short period of rearing	192	71.11	8th
2	Demand of chicken meats than other meats	223	82.59	5th
3	Capital investment than other livestock farming	217	80.37	6th
4	Land requirements than other livestock farming	188	69.63	9th
5	Medicine requirement than other livestock farming	264	97.78	2nd
6	Mortality of chicken than other animals	265	98.15	1st
7	Investment in chicken farming than another animal farming	204	75.56	7th
8	Feed requirement than other livestock farming	240	88.89	4th
9	Cost of housing for chicken than other livestock farming	178	65.93	11th
10	Labor requirement than other livestock farming	143	52.96	13th
11	Susceptibility (sensitivity) to the diseases	248	91.85	3trd
12	Need of skilled person	165	61.11	12th
13	Need of especial training	179	66.30	10th

From the ranking Table, it was found that the statements mortality of birds, medicine requirement, sensitivity to the disease, feed requirement and demand of chicken meats were ranked 1st, 2nd, 3rd, 4th and 5th, respectively as compared to other statements mentioned in Table 4.22. Other advantages of chicken farming described by the farmers are ranked according to their answers (Table 4.21).

2. Poverty reduction

Sl. No	Statement	Score	Percentage (%)	Ranking
1	How was your economic condition before chicken farming?	75	27.78	5th
2	How is your economic condition after chicken farming?	187	69.26	1st
3	How does chicken farming help to change the infrastructure of your house?	167	61.85	2nd
4	How does chicken farming contribute to the education of your children?	126	46.67	3trd
5	How does chicken farming contribute to your clothing?	98	36.30	4th
6	How does chicken farming help to get proper medical treatment of your family members?	70	25.93	6th

Different perspectives of poverty reduction by chicken farming are ranked in table 4.21 (2).

Table 4.22 Distribution of the respondents according to their appoint labour

		Frequency	Percent	Valid Percent
Appoint labour	Yes	7	7.8	7.8
	No	83	92.2	92.2
	Total	90	100.0	100.0

The data of the Table 4.22 show that 92.2% of the respondents did not appoint labour to monitor their farms and only 7.8% of the respondents hired extra labours. Hilmi *et al.* (2019) found that poultry does not require large capital investments and labour needs are not excessive.

Table 4.23 Distribution of the respondents according to their income increases

		Frequency	Percent	Valid Percent
Income increase	Yes	82	91.1	91.1
	No	8	8.9	8.9
	Total	90	100.0	100.0

The results indicate that about 91.1% of the respondents had positive reaction to increases their income from chicken farming and only 8.9% of the respondents had negative reaction to their income. Hilmi *et al.* (2019) found that poultry does not require large capital investments and labour needs are not excessive. Poultry can provide for a good source of nutrition for the farm family and income source, which does not depend on the harvest cycle common to crops. Poultry provides a number of important products, such as meat and eggs as well as important and complementary services for farm crops and other livestock. Nawab *et al.* (2018) showed that poultry industry has gained significance all over the world due to providing economical, healthier food than red meat and other protein sources. FAO estimated 103.5 million tons of global chicken meat production annually in 2012, which contributed about 34.3% to global meat production.

Table 4.24 Problems faced by respondents

	Severity	Frequency	Percent	Valid Percent	Mean ± SD
Problem of chicken farming	Less severe (<=20)	5	5.6	5.6	32.60±5.510
	Moderately severe (21-40)	84	93.3	93.3	
	Highly severe (>40)	1	1.1	1.1	
	Total	90	100.0	100.0	

The results showed that 93.3% of the respondents faced moderately severe problem while 5.6% of less severe and only 1.1% highly severe problems (Table 4.24). Billah *et al.* (2013) observed that the cities of the study areas farmers faced by severe problems in the process of rearing poultry were high prevalence of poultry diseases, inadequate supply of vaccine and medicine and scarcity of feed. Islam *et al.* (2014) reviewed that some problems were outlined like lack of quality chicks, high price of feed, marketing problem, insufficient bank loan, lack of quality vaccine, the vaccine price is very high and bird flu. Nawab *et al.* (2018) showed that poultry farming system is affected by both environmental and diseases stress.

Various viral, bacterial, parasitic and fungal diseases affect the production performance of birds by affecting respiratory system, reproductive system, and immune system, gut system which in turn cause loss of appetite, coughing, bloody diarrhea and higher mortality which cause huge economic losses in poultry industry. So, there is need to control poultry diseases.

Table 4.25 Rank order of the problems faced by the respondents in chicken rearing

Sl. No.	Statement	Score	Percentage (%)	Ranking
A	**Breed related problems**			
1	High price of good breed/hybrid	227	84.07	6th
2	Lack of quality breed/hybrid in time	169	62.59	10th
B	**Feeds related problems**			
3	High price of chicken feeds	266	98.52	1st
4	Scarcity of quality feeds	137	50.74	13th
5	Lack of knowledge of feed production	154	57.04	12th
C	**Health related problem**			
6	High mortality rate	264	97.78	2nd
7	Unavailability of vaccine and medicine	123	45.56	14th
8	High price of vaccine and medicine	244	90.37	4th
9	Lack of veterinary surgeon	85	31.48	15th
10	High disease susceptibility	242	89.63	5th
D	**Other problems**			
11	Low economic return	156	57.78	11th
12	Lack of capital and loan facilities	217	80.37	7th
13	Lack of marketing facilities	194	71.85	9th
14	Lack of Govt. support	251	92.96	3trd
15	Lack of training facilities	210	77.78	8th

Survey findings revealed that the most severe problems faced by the chicken farmers was high price of chicken feeds followed by high mortality rate, lack of Govt. support, high price of vaccine and medicine. Other problems were found like high disease susceptibility, high price of hybrid, lack of capitals and loan facilities, lack of training facilities, lack of marketing facilities.

Table 4.26 Distribution of the respondents according to their use of antibiotics

Use of antibiotics			
	Frequency	Percent	Valid Percent
Yes	71	78.9	78.9
No	19	21.1	21.1
Total	90	100.0	100.0

This study table showed that 78.9% of the respondents used antibiotic and only 21.2% did not use.

Table 4.27 Recommended of antibiotics as a growth promoter

Recommended of antibiotics			
	Frequency	Percent	Valid Percent
Local doctor	46	51.1	60.5
Veterinarian	23	25.6	30.3
Medicine company representative	7	7.8	9.2
Total	76	84.4	100.0
Don't Recommend	14	15.6	
Total	90	100.0	

The results of the study showed that 51.1% of the respondents stated that the antibiotics were recommended as a growth promoter by the local doctor, 25.6% by veterinarian, 7.8% by medicine company representative an 15.6% did not recommend.

Table 4.28 Feeding frequency of antibiotics

Feeding frequency			
	Frequency	Percent	Valid Percent
Feeding occasionally	24	26.7	31.6
Feeding regularly	51	56.7	67.1
Not feeding	1	1.1	1.3
Total	76	84.4	100.0
Don't use antibiotic	14	15.6	
Total	90	100.0	

The results of the study showed that about 56.7% of the respondents feed antibiotics regularly, 26.7% feed occasionally, 1.1% did not feed and 15.6% did not use antibiotic.

Table 4.29 Feeding methods of antibiotics

Feeding methods			
	Frequency	Percent	Valid Percent
Through feed	1	1.1	1.3
Through water	74	82.2	97.4
Directly	1	1.1	1.3
Total	76	84.4	100.0
Don't use antibiotic	14	15.6	
Total	90	100.0	

The data of the Table 4.29 show that 82.2% of the respondents fed the antibiotics to their birds through water, 1.3% directly and 1.1% through feed.

Table 4.30 Adverse effect of applying antibiotics in chicken farming

Adverse effect of antibiotics			
	Frequency	Percent	Valid Percent
Yes	65	72.2	72.2
No	25	27.8	27.8
Total	90	100.0	100.0

Data of the Table 4.30 show that 72.2% respondents stated that the use of antibiotics have adverse effect on human health and 27.8% respondents belief that there is no adverse effect

of applying antibiotics in chicken farming. Chowdhury *et al.* (2009) showed that food safety is a term broadly applied to food quality that may adversely affect human health. There are two major areas of concern over the presence of residues of antibiotics in animal-derived foodstuffs with regard to human health. The first is allergic reaction and the second is development of antibiotic resistance in human in the gut bacteria of human.

Table 4.31 Distribution of the respondents according to their negative impacts of using antibiotics in chicken farming on human health

Negative impact of antibiotics			
	Frequency	Percent	Valid Percent
No negative impact	1	1.1	1.1
Carcinogenic	7	7.8	7.8
Toxicity in human	3	3.3	3.3
Don't know	79	87.8	87.8
Total	90	100.0	100.0

Data of the Table 4.31 show that about 87.8% respondents did not know the types of negative impacts of using antibiotics in chicken farming on human health, 7.8% respondents stated the antibiotics residues as carcinogenic, 3.3% said that the residues can cause toxicity in human and only 1.1% said that no negative impact.

Table 4.32 Reason of antibiotics usage

Reason of antibiotics usage			
	Frequency	Percent	Valid Percent
Treatment	34	37.8	37.8
Treatment Prophylaxis	53	58.9	58.9
Growth Promotion	2	2.2	2.2
Treatment Prophylaxis + Growth Promotion	1	1.1	1.1
Total	90	100.0	100.0

The findings showed that 37.8% of the respondents used antibiotics for disease treatment purpose, 58.9% used treatment prophylaxis, 2.2% used growth promotion and only 1.1%

treatment prophylaxis+ growth promotion. Selaledi *et al.* (2020) reviewed that over the years the growth and health of food-producing animals have been enhanced by the use of antibiotics. These have helped reduce on-farm mortalities; lower incidences of diseases and more importantly improve productivity. McEwen and Fedorka-Cray, (2002) said that antibiotics are used in food animals to treat clinical diseases, to prevent and control common disease events, and to enhance animal growth.

Table 4.33 Distribution of the respondents according to their source of antibiotics

Source of antibiotics			
	Frequency	Percent	Valid Percent
Veterinary store	44	48.9	48.9
Local vendor	46	51.1	51.1
Total	90	100.0	100.0

The data of the Table 4.33 show that 51.1% of the respondents kept antibiotics at veterinary store and 51.1% local doctor.

Table 4.34 Source of prescription

Source of prescription			
	Frequency	Percent	Valid Percent
Veterinary doctor	40	44.4	44.4
Self-medication	5	5.6	5.6
Animal health workers	23	25.6	25.6
Representative of medicine company	22	24.4	24.4
Total	90	100.0	100.0

The data of the Table 4.34 show that 44.4% of the respondents followed prescription by Veterinary doctor, 25.6% animal health workers, 24.4% representative of medicine company and only 5.6% self-medication.

Table 4.35 Current status of using antibiotics

Antibiotic use at present			
	Frequency	Percent	Valid Percent
Yes	88	97.8	97.8
No	2	2.2	2.2
Total	90	100.0	100.0

Data of the Table 4.35 show that 97.8% of the respondents had used antibiotics at survey period and only 2.2% did not use.

Table 4.36 Status of maintaining the rules and regulations of antibiotic use

		Frequency	Percent	Valid Percent
Rule's regulation of antibiotics	Yes	25	27.8	27.8
	No	65	72.2	72.2
	Total	90	100.0	100.0

The finding stated that 65% of respondents had not maintained the rules and regulation for using of antibiotics and 25% maintained rules and regulations properly.

Table 4.37 Storage practice of medicines for their birds

		Frequency	Percent	Valid Percent
Storage of drugs	Storeroom	0	0	0
	Fridge	90	100.0	100.0
	Chicken house	0	0	0

The results revealed that 100% of the respondents used fridge where they storage of drugs.

4.38 Monitoring of the Governmental body for application of rules and regulations for using antibiotics

		Frequency	Percent	Valid Percent
Govt responsibility for ensuring the rules and regulation	Yes	3	3.3	3.3
	No	87	96.7	96.7
	Total	90	100.0	100.0

The findings suggest that 96.7% of the respondents had mentioned no Governmental body monitored the application of rules and regulation and only 3.3% of the respondents had mentioned Governmental body were monitoring the rules and regulations against using antibiotics.

Table 4.39 Rank order of different statements on antibiotics use in chicken rearing on the basis of respondents' perception

a) Positive statement

Sl. No	Statement	Score	Percentage (%)	Ranking
1	Some antibiotics used in chicken feed are same as those used on human.	272	60.44	7th
2	Antibiotic resistant bacteria can be transferred when handle raw meat.	274	60.89	5th
3	Antibiotic resistant bacteria can be transferred when come in contact with farm animal.	273	60.67	6th
4	Antibiotics must be placed in a restricted area and accessed only by specific staff when added.	281	62.44	4th
5	Antibiotics should only be prescribed by a veterinary surgeon/ veterinarian	295	65.56	1st
6	Antibiotics can be passed to humans from consumption of chicken meat.	283	62.89	3trd
7	Antibiotics can be passed to humans from consumption of eggs from chicken.	287	63.78	2nd

According to the opinion of the respondents, the statement of "Antibiotics should only be prescribed by a veterinary surgeon/ veterinarian" was ranked first where the statements of "It will be too expensive to raise chicken without antibiotics" and "Once a bird shows any kind of symptoms, antibiotics should be given to the birds to prevent the entire flock from becoming infected" were ranked 2nd and 3rd, respectively (Table 4.39 a)

b) Negative statement

Sl. No	Statement	Score	Percentage (%)	Ranking
1	Without using antibiotics in feed no profit could be earned from chicken.	143	31.78	7th
2	Chicken will die at alarming rates if we don't allow antibiotics to be used for growth promotion or routine disease prophylaxis.	144	32.00	6th
3	It will be too expensive to raise chicken without antibiotics.	349	77.56	2nd
4	The use of antibiotics in chicken farming is mainly to producer better growth in chicken.	167	37.11	4th
5	Antibiotics should be added to chicken feed at any time to prevent birds from becoming sick.	151	33.56	5th
6	Once a bird shows any kind of symptoms, antibiotics should be given to the birds to prevent the entire flock from becoming infected.	170	37.78	3rd
7	When antibiotics are about to expire, it is better to give medication to the birds to prevent wastage.	399	88.67	1st

Among the negative statements on various aspects of using antibiotics in chicken rearing, "When antibiotics are about to expire, it is better to give medication to the birds to prevent wastage" ranked first according the perception of the respondents (Table 4.39 b).

Table 4.40 Consumers awareness regarding the effect of antibiotics used in chicken feed on human health

Categories	Score	Frequency	Percent	Valid Percent
Moderately aware	11-20	85	94.4	94.4
Highly aware	21-30	5	5.6	5.6
Total		90	100.0	100.0

The findings revealed that most (94.4%) of the respondents were moderately aware about the effect of antibiotics used in chicken feed on human health and (5.6%) of the respondents had highly aware. Nobody found that were not aware on the effect of antibiotics use in chicken feed on human health. Zinea *et al.* (2019) showed that they were collected data from forty respondents at Mohammad Nagar residential area under Batiaghata upazila of Khulna district and forty respondents from Nirala residential area of Khulna City Corporation, Khulna, Bangladesh. Data were collected through personal interview schedule. Most (80%) of the respondents were highly aware while only one fifth 20% of the respondents had medium awareness about the effect of antibiotics used in animal feed on human health.

Table 4.41 Percentage of the respondents using probiotics in chicken production

		Frequency	Percent	Valid Percent
Do you feed probiotics	Yes	43	47.8	47.8
	No	47	52.2	52.2
	Total	90	100.0	100.0

Data of the Table 4.41 show that about 47.8% of the respondents used probiotics and 52.2% did not use it. Kabir (2009) showed that the use of probiotics for prevention of bacterial diseases in poultry, as well as demonstrating the potential role of probiotics in the growth performance and immune response of poultry, safety and wholesomeness of dressed poultry meat evidencing consumer's protection, with a critical evaluation of results obtained to date. Patterson and Burkholder (2003) mentioned that probiotics and prebiotics alter the intestinal microbiota and immune system to reduce colonization by pathogens in certain conditions. Hassanein and Soliman (2010) said that probiotics have positive effects on poultry meat quality.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Poultry is one of the most widespread food industries worldwide. Chicken is the most commonly farmed chicken species. Over the past 50 years, the use of antibiotics combined with strict biosecurity and hygiene measures has helped the chicken industry to grow by preventing the negative impacts of many avian diseases. The main reasons for the use of antibiotics in food producing animals include prevention of infections, treatment of infections, promotion of growth and improvement in production in the farm animals. Therefore, the researcher conducted the study entitled "Identification of Antibiotics Use pattern in Chicken Rearing in Southwest Region of Bangladesh". Data were collected from three target upazilas that were Dumuria upazila of Khulna district, Fakirhat upazila of Begerhat district and Tala upazila of Satkhira district. Data were collected using interview schedule from 90 framers taking 30 farmers from each upazila by direct interviewing.

Socio-economic status of the chicken farmers was studied. The greater number of the respondents were (48.9%) middle aged followed by old aged (26.7%) and young aged (24.4%). In the studied area the average age of the respondents were 40.73 years with standard deviation 13.09. Again, the majority (54.4%) of the respondents had secondary level of education followed by graduate and above (15.6%), higher secondary (12.2%), primary (11.1%), illiterate (4.4%) and sign up only (2.2%). The average schooling year was 9.39 with standard deviation 4.30. Occupations of the respondents had crop+ livestock + fisheries (45.56%), livestock rearing (30.00%), crop+ livestock (10.00%), business + livestock (5.56%), was crop+ business + livestock (2.22%) and crop + business + livestock + service (1.11%).

The average agriculture farming experience of the chicken farmers of Dumuria upazila was 10.8 years followed by the chicken farmers of Tala upazila 11.83 years and the chicken farmers of Fakirhat upazila 10.94 years. The average agriculture farming experience of the studied area was 10.94 years. Chicken farming experience of the respondents of Dumiuria

upazila was 4.13 years followed by the Tala upazila (12.6 years) and the respondents of Fakirhat upazila (7.33 years). The average chicken farming experience of the studied area was about 8.02 years. Majority 74.4% of the respondents had no organizational participation and only 25.6% respondents participated different organizations for their better farming system. Majority (58.9%) of respondents had no training on chicken farming, 41.1% respondents had training on chicken farming. Majority 74.4% of the respondents called local doctors for treatment of their sick birds whereas 21.2% called veterinarian, 2.2% of the treated their sick birds from their own knowledge and rest 2.2 % of the did not take any treatment measures for their sick birds.

Majority (86.7%) of the respondents had medium knowledge about chicken rearing, 10% had high knowledge and only 3.3% had low knowledge. Most (92.2%) of the respondents said chicken farming is high prospective and 7.8% of the respondents described moderately prospective and nobody stated that chicken farming as low or no prospect in southwest region of Bangladesh. Majority (70.0%) of the respondents stated that chicken farming provides medium poverty reduction, 23.3% described as low prospect of poverty reduction and only 6.7 % said it as high poverty reduction prospect. About 91.1% of the respondents had positive reactions to increases their income from chicken farming and only 8.9% of the respondents had negative reaction to their income. Majority (78.9%) of the respondents were used antibiotics and only 21.2% did not use it. About 51.1% of the respondents applied antibiotics as a growth promoter by the recommendation of the local doctors, 25.6% by veterinarian, 7.8% by medicine company representatives and 15.6% used without any recommendation.

Majority (56.7%) of the respondents fed antibiotics regularly, 26.7% fed occasionally, 1.1% did not feed and 15.6% never use antibiotics. About 82.2% of the respondents fed antibiotics to their birds through drinking water, 1.3% fed directly and 1.1% through feed. Majority (87.8%) respondents did not know the negative impacts of using antibiotics in chicken farming on human health, 7.8% had some knowledge as it is carcinogenic, 3.3% had known as toxicity elements in human body and only 1.1% said that no negative impacts. About 37.8% of the respondents used antibiotics for treatment of sick birds, 58.9% used treatment prophylaxis, 2.2% used as growth promotor and only 1.1% treatment prophylaxis+ growth promotor. Majority (44.4%) of the respondents used antibiotics by the prescription of Veterinary doctor, 25.6% animal health workers, 24.4% representative of medicine company and only 5.6% self-medication. Most (96.7%) of the respondents had mentioned that no

Government body monitored the application of rules and regulation regarding the issue of antibiotics use and only 3.3% of the respondents had mentioned Governmental body supervised the application of rules and regulations. Majority (94.4%) of the respondents had moderately aware about the effect of antibiotics used in chicken feed on human health and 5.6% of the respondents were highly aware. Nobody was found that have no awareness on the effect on antibiotics used in chicken feed on human health. About 47.8% of the respondents used probiotics and 52.2% did not use probiotic.

5.2 Conclusion

The results revealed that most of the chicken farmers in southwest coastal regions used antibiotics on chicken rearing. The indiscriminate use of antibiotics can generate its residues in chicken eggs and meats which poses significant health risk to the consumers. Most of the farmers described chicken farming increased their income where the respondents stated that the high prices of chicken feeds is the main problem in this sector.

5.3 Recommendation

Based on the outcome of my study some recommendation given below:

5.3.1 General recommendations

i. The Government should take steps for arranging the training program to create consciousness among the farmers.

ii. The NGOs should take extent to improve chicken farming with Government by giving training, loans, making opportunities and increasing awareness for the chicken farmers.

iii. The Government should take steps to execute the laws regarding the ban of using antibiotics in poultry rearing that are harmful to human health.

iv. Awareness and knowledge building of mass people are important on the negative impact of using antibiotics as growth promoters.

v. The chicken farmers who are not using antibiotics should be rewarded that encouraged other farmers to involve this field.

5.3.2 Recommendations for further studies

i. The present study was done in Dumuria, Tala and Fakirhat upazila at Khulna Division. Further studies on the basis of same characteristics and the objectives can be done in other part of the country.

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Appendix I

Agrotechnology Discipline
Khulna University, Khulna

Survey on

Identification of Antibiotics Use Pattern in Chicken Farming in Southwest Coastal Regions of Bangladesh

(Confidentiality will be maintained and all information will be used only for study purpose)

Respondent No.: .....

Name: ..... Father's/Husband name: .....

Village: ..... Union: .....

Upazila: ..... District: .....

Contact Number: .....

Independent Variables

A) Personal Information

1) Age of the respondents: ..... years

2) Educational qualification:

Please mention your educational qualification

- Cannot read and write/illiterate
- ----------class passed.

3) Family type: a) Nuclear b) Joint (horizontal) c) Extended (vertical)

Family size: Number of family members: .....

Please mention the number of your family members: a) Male..... b) Female.....

4) Main occupation: (put √)

i. Agriculture/ Crop	ii. Livestock (cattle, sheep, goat, chicken etc.)	iii. Fisheries	iv. Mixed agriculture (crop + livestock + fisheries)
v. Business	vi. Service	vii. Day laborer	viii. Others (specify, if any)

5) Experience in agricultural farming: .....years

6) Experience in chicken farming/rearing: .....years

B) Economic information

1) Farm size: Actual total amount of land (ha)

Please furnish information about your lands

Sl. No.	Use of land	Area of land	
		Local unit	Hectare
1	Homestead		
2	Land under cultivation (please consider the lands given to other and taken from others too)		
3	Total land		

2. Farming System: (put √)

- Crop
- Livestock
- Fish
- Crop + Fish
- Crop + Livestock
- Livestock + Fish
- Crop + Livestock + Fish
- Others

3. Annual family income

Please furnish information about your family income (annual) from different sources.

Sl. No.	Source of income	Amount of Taka
1	Crop farming	
2	Livestock rearing	
3	Fisheries	
4	Business	
5	Service	
6	Day laborer	
7	Others	
	Total	

4. Income from chicken farming (Tk. /year): .....

C) Social information

1) Organization participation:

Are you involved in any organization? (Put √) a) Yes b) No

If yes, please mention the nature and duration of your participation in the following organizations.

Sl. No.	Name of organizations	Nature of participation (with duration)				
		Executive committee officer (3)	Executive committee member (2)	Ordinary member (1)	Not involved (0)	Duration (years)
1	Farmers' committee					
2	School/ Madrashah committee					
3	Mosque/Temple/Church/Pagoda committee					
4	NGO committee					
5	Union council					
6	Youth club					
7	Cricket/Football club					
8	Others					

2) Training:

Have you received any training? a) Yes b) No

If yes, Please mention the name of the training with duration you have received from different organization

Sl. No.	Title of training	Duration (d)	Organization	Venue of training
1				
2				
3				
4				

D) Psychological

1) Knowledge on chicken rearing

Sl. No.	Questions	Total Marks	Marks Obtained
1	Mention two hybrids of broilers or layers	2	
2	Mention two problems of chicken rearing	2	
3	Mention two diseases of chicken	2	
4	Mention usual time of chicken disease outbreak	2	
5	Mention two medicines for any disease of chicken	2	
6	Mention two vaccines for chicken	2	
7	What is the appropriate time of vaccination	2	
8	What is the main cause of less production of chicken	2	
9	Mention two feeds for chicken	2	
10	What type of house is required for chicken rearing	2	
	Total	20	

2) Attitude

a) Positive

Statement	Highly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Highly disagree (1)
Chicken farming is easier					
Diseases are lesser than other animals					
Chicken farming is profitable than other farming					
Demand for chicken meats and eggs in the market is high					
Required minimum feed					

b) Negative

Statement	Highly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Highly disagree (5)
Chicken maintenance is very hard					
Mortality rate of chicken is very high					
Demand of chicken meat is low					
Demand of chicken eggs is low					
Chicken are very dirty					
Quality of chicken hybrids is poor					

E) Chicken related information

1. Type of chicken farm: (put√)

☐ Broiler farm ☐ Layer farm ☐ Sonali/Cockerel ☐ Mixed farm

2. Number of birds

Broilers	Layers	Sonali/Cockerel	Total

3. Name(s) of hybrid(s)

Broilers	Layers	Sonali/Cockerel

4. Performance related information

Sl. No.	**Items**	**Broilers**	**Layers**	**Sonali/Cockerel**
1.	Duration of rearing (d)			
2.	Age at marketing (d)			
3.	Marketing weight (g/bird)			
4.	Total feed intake (g/bird)			
5.	Feed intake (g/bird/d)			
6.	Feed conversion ratio (FCR)			
7.	Egg production (%)			
8.	Mortality (%)			

5. Housing for chicken: Please furnish information of your birds shed

Types of shed	**No of sheds**		
	Litter floor	Cage	Slate/macha floor
Permanent structure			
Semi-permanent structure			
All bamboo structure			
Kacha			

6. Vaccination: (put √) ☐ Regularly ☐ Occationally ☐ Don't vaccinate

7. Treatment procedure: (put √) a) Local doctor b) Veterinarian c) No treatment

8. Feeding

a. Form of feed (put √) ☐ Pellet ☐ Mesh

b. Source of feed: ☐ Purchase/readymade ☐ Homemade ☐ Both

9. Do you use vitamin and mineral supplement? ☐ Yes ☐ No

10. Diseases

Sl. No.	Name of the disease	Broilers	Layers	Sonali/Cockerel
1.	Ranikhet			
2.	Fowl pox			
3.	Fowl cholera			
4.	Gumboro			
5.	Bird flu			
6.	Salmonelosis			
7.	Marek's disease			
8.	Coccidiosis			
9.				
10.				
11.				
12.				

11. Do you keep records regularly? (put √) ☐ Yes ☐ No

12. Caretaker of chicken farm: ☐ Male ☐ Female

13. What is the source of the capital for chicken farming? (put √)

☐ Bank loan ☐ NGO loan ☐ Lending ☐ Others

14. How often do you use to visit upazila livestock office? (put √)

☐ Frequently ☐ Sometimes ☐ Very rare ☐ Never

15. Estimated profit per farm: .....Tk

Dependent Variables

A) Prospect of chicken farming

1. **Relative advantages**

Sl. No	Statement	High (3)	Moderate (2)	Less (1)
1.	Short period of rearing			
2.	Demand of chicken meats than other meats			
3.	Capital investment than other livestock farming			
4.	Land requirements than other livestock farming			
5.	Medicine requirement than other livestock farming			
6.	Mortality of chicken than other animals			
7.	Investment in chicken farming than other animal farming			
8.	Feed requirement than other livestock farming			
9.	Cost of housing for chicken than other livestock farming			
10.	Labor requirement than other livestock farming			
11.	Susceptibility (sensitivity) to the diseases			
12.	Need of skilled person			
13.	Need of especial training			

2. Poverty reduction

Sl. No	Statement	Highly improved (3)	Moderately improved (2)	Slightly improved (1)	No improvement (0)
1.	How was your economic condition before chicken farming?				
2.	How is your economic condition after chicken farming?				

3.	How does chicken farming help to change the infrastructure of your house?				
4.	How does chicken farming contribute to the education of your children?				
5.	How does chicken farming contribute to your clothing?				
6.	How does chicken farming helps to get proper medical treatment of your family members?				

3. Employment generation

Do you appoint any laborer for your farm? a) Yes b) No

If yes

i. How many laborer do you appoint? .....

ii. What types of laborer do you appoint? a) Self b) Hired (temporary) c) Hired (permanent)

4. Income generation

Does your income increase after chicken farming? a) Yes b) No

If yes, How much you earn from your farm? ..... per month

If no, Why are you continuing chicken farming? .....

B) Problem faced

Sl. No.	Type of problem	Extent of problem			
		Highly Severe (3)	**Moderately Severe (2)**	**Less Severe (1)**	**Not at all (0)**
A	**Breed related problems**				
1	High price of good breed/hybrid				
2	Lack of quality breed/hybrid in time				
B	**Feeds related problems**				
3	High price of chicken feeds				
4	Scarcity of quality feeds				
5	Lack of knowledge of feed production				
C	**Health related problem**				
6	High mortality rate				

7	Unavailability of vaccine and medicine				
8	High price of vaccine and medicine				
9	Lack of veterinary surgeon				
10	High disease susceptibility				
D	**Other problems**				
11	Low economic return				
12	Lack of capital and loan facilities				
13	Lack of marketing facilities				
14	Lack of Govt. support				
15	Lack of training facilities				

C. Antibiotics related information

1. **Do you use antibiotics as growth promoter?** ☐ Yes ☐ No

2. **Who has recommended you to use antibiotic growth promoter?**

☐ Local doctor ☐ Veterinarian ☐ Medicine company reprentatives ☐ Others

3. Feeding pattern of antibiotics

☐ Feeding frequency ☐ Not feeding ☐ Feeding ocationally ☐ Feeding regularly

☐ Feeding methods ☐ Through feed ☐ Through water

4. Application pattern of antibiotics

Name of antibiotics used	**Generic name**	**Dose of antibiotics used**	**Type of antibiotics application (injection/tablet/powder/liquid)**	**Age of birds**	**Application procedures (With feed/water/orally/injection)**
1. Renamycin	Oxytetracycline				
2. Moxacil vet, Alolin, Renamox,	Amoxicillin				
3. Floor 200	Flofenicol				
4. Levobac vet, Lecovet, Levonon	Levofloxacin				

5. Trimamtsusp, Renatrimsusp.etc	Trimethoprim+ Sulfadiazic				
6. Ciprocin, Ciproflox etc	Ciprofloxacin HCL				
7. Norvet etc	Norfloxacin				
8. Cepha-C 50%	Cephalexin				
9. Doxivet, Doxigard	Doxycycline				
10. Tilvet, Qtil, Silotyl 25%	Tilmycosin				
11. Mycostop, Tylosuf Tamvet etc	Tylosin Tartrale				
12. Denagard, Tialins, Renagard, Stiagen vet etc	Tiamulin Hydrogen				
13.					
14.					
15.					

5. Is there any adverse effect of applying antibiotics in chicken farming? ☐ Yes ☐ No

6. What kinds of negetive impacts of using antibiotics in chicken farming on human health?

☐ No negative impact ☐ Drug resistance ☐ Failure of antibiotic therapy in clinical situations ☐ Carcinogenic ☐ Toxicity in human ☐ Early child maturity

☐ Others..... ☐ Don't know

7. Reason of antibiotics usage: (put √)

☐ Treatment ☐ Prophylaxis

☐ Treatment and prophylaxis ☐ Growth promotion

8. Source of antibiotics: Please furnish the information of antibiotics source (put √)

☐ Veterinary store ☐ Local Vendors

9. **Source of prescription:** Please mention the prescription source of antibiotic (put√)

☐ Veterinary doctor ☐ Self-medication ☐ Animal health workers

☐ Representative of Medicine Company

10. **Antibiotic in use now:** Please furnish the information of antibiotic use now (put √)

☐ Yes ☐ No

11. **Do you market eggs and or chicken meats during or immediate after antibiotics feeding (put√)**

☐ Yes ☐ No

12. **Rules and regulations of antibiotic usage:** Please mention the rules and regulations maintains of drug use(put√)

☐ Yes ☐ No

13. **Storage of drugs:** Please mention the storage of drug (put√)

☐ Storeroom ☐ Fridge ☐ Chicken house

14. **Governmental body responsible for rules and regulations (put√)**

☐ Yes ☐ No

15. **Respondents statements of antibiotics**

a. Attitude towards antibiotics used in chicken feed (positive statement)

Statement	**Rating scale**				
	Strongly agree (5)	**Agree (4)**	**Undecided (3)**	**Disagree (2)**	**Strongly disagree (1)**
1. Some antibiotics used in chicken feed are same as those used on human.					
2. Antibiotic resistant bacteria can be transferred when handle raw meat.					
3. Antibiotic resistant bacteria can be transferred when come in contact with farm animal.					
4. Antibiotics must be placed in a restricted area and accessed only by specific staff when added.					
5. Antibiotics should only be prescribed by a veterinary surgeon/ veterinarian					
6. Antibiotics can be passed to humans					

from consumption of chicken meat.					
7. Antibiotics can be passed to humans from consumption of eggs from chicken.					

b. Attitude towards antibiotics used in chicken feed (negative statement)

Statement	Rating scale				
	Strongly agree (1)	Agree (2)	Undecided (3)	Disagree (4)	Strongly disagree (5)
1. Without using antibiotics in feed no profit could be earned from chicken.					
2. Chicken will die at alarming rates if we don't allow antibiotics to be used for growth promotion or routine disease prophylaxis.					
3. It will be too expensive to raise chicken without antibiotics.					
4. The use of antibiotics in chicken farming is mainly to producer better growth in chicken.					
5. Antibiotics should be added to chicken feed at any time to prevent birds from becoming sick.					
6. Once a bird shows any kind of symptoms, antibiotics should be given to the birds to prevent the entire flock from becoming infected.					
7. When antibiotics are about to expire, it is better to give medication to the birds to prevent wastage.					

16. Consumers' awareness regarding the effect of antibiotic used in chicken feed on human health

Effect of antibiotic used in	Awareness rating scale

chicken feed on human health	Strongly agree (5)	Agree (4)	Undecided (3)	Disagree (2)	Strongly disagree (1)
1.Resistance grow against the antibiotics which are used in patient treatment					
2.Antibiotic can cause stomach upset and other gastrointestinal side effect					
3.Allergic reaction and painful rash are possible with many antibiotics					
4.Some antibiotics may cause cancer					
5.Many antibiotics may adversely affect human fertility					
6.Antibiotics raise the risk of weight gain and obesity					

D. Probiotics:

1. Do you know about probiotics? ☐ Yes ☐ No

2. Do you feed probiotics to chicken? ☐ Yes ☐ No

3. Feeding pattern of probiotics

☐ Feeding frequency ☐ Not feeding ☐ Feeding ocationally ☐ Feeding regularly

☐ Feeding methods ☐ Through feed ☐ Through water

4. Attitude about probiotics

a) Positive

Statement	Highly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Highly disagree (1)
Probiotic is a suitable alternate to antibiotic					
Probiotics are cheap and available					
Probiotics have no bad impacts on human health					
Probiotics enhance growth and egg production of chicken					

Probiotics reduces disease susceptibility of chicken					

b) Negative

Statement	Highly agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Highly disagree (5)
Probiotics are costly					
Probiotics are not good as antibiotics					
Probiotics are not available					

(Thank you for your nice cooperation)

Signature of data collector.....