

Table of contents

| Chapter | Contents | page |
|-------------|----------------------------------|-------|
| | Table of contents | 1 |
| | List of Figures | 2 |
| | List of table | 2 |
| | List of abbreviation | 2 |
| | Abstract | 3 |
| Chapter I | Introduction | 4-6 |
| Chapter II | Methods and Materials | 7-8 |
| | 2.1 study area | |
| | 2.2 study period | |
| | 2.3 Data collection and analysis | |
| Chapter III | Results and Discussion | 9-11 |
| Chapter IV | Conclusion and Recommendations | 12 |
| ChapterV | Limitations | 12 |
| | References | 13-14 |
| | Acknowledgement | 15 |
| | Biography | 16 |
| | My Goal | 17 |

List of Figers

Figure 2.1 Geographical location of study area

- a. Map of Bangladesh07
- b. Map of RanguniaUpazila 07

List of tables

| Table No | Content | Page |
|-----------------|---|-------------|
| Table 1 | Prevalence of diseases and abnormalities that spread more | 11 |
| Table 2 | Percentage of people resistant of Several Antibiotics | 11 |

List of Abbreviation

- ARB Antibiotic Resistant Bacteria.....5
- ARGs antibiotic resistance genes.....5

ABSTRACT

Indiscriminate disposal of poultry manure has been identified as a major source of environmental degradation in production areas through air and water pollution associated with nitrogen and phosphorus emissions and losses from manure. Methods of disposing of poultry manure which might have negative consequences on the environment and the farmers were investigated in Rangunia Upazila, Chattogram District. Data collected using structured questionnaires as well as direct field observations from a random sample of 20 farming households showed that the commonly used methods of manure disposal are burning (87%) and application on crops (13%). Almost all of the farmers (95%) had no proper manure management facilities. Ammonia is the major air pollutant perceived by farmers in the study area. Farmers suffered from discomforts ranging from various combinations of sneezing (65%), eye irritation (38%), coughing (34%), headache (20%), stomach ache (13%) and diarrhoea (6%). Many fecal bacteria create a massive condition of zoonosis in the area. The awareness of farmers and authorities needs to be raised regarding the management of poultry manure and the need for protective equipment during its disposal. The 2 month long study helped to make awareness in the area.

Chapter I

INTRODUCTION

Poultry litter is one of the best organic fertilizers available and is an extremely valuable resource. It improves soil fertility and enhances the development of the roots system and the vigor of the plants and makes them less susceptible to diseases and pest attacks. But poultry litter is also harmful to environmental health as well as environmental health.

Most would agree that the smell of manure is not pleasant -- but describing the scent as dangerous is another thing entirely. Still, the description is accurate. In concentrated enough doses, the gasses that cause the smell are toxic and can cause health problems in people and animals, including asphyxiation.

Odorous compounds generated from poultry farmhouses are a potential nuisance to the environment and public health. Odours are formed by microbial decomposition of excreta from litter and direct emissions from the birds in a poultry farm. They can originate from fresh and decomposing waste products such as manure and also from feathers and bedding. Strong odours have been reported to intensify the symptoms of people with asthma or allergies. Odours may cause a variety of adverse reactions in people, such as emotional stress, headaches, acedia, insomnia, vomiting, irritation and depression.

Of the several manure-based compounds, the most frequently reported compound is ammonium, which can cause health problems in both animals and human workers. Ammonium is produced as a product of microbial decomposition of nitrogen containing organic compounds in the manure and hydrolysis of uric acid, which is favoured by $\text{pH} \geq 8$. Evaporation of aqueous ammonium is the source of gaseous ammonium, which is a soluble and a reactive gas. Gaseous ammonium can readily dissolve in water and react with other chemicals to form ammonium-containing compounds. The concentrations of ammonium in the air are greatest in areas where there is intensive livestock farming. The production of bird odours is caused by an inappropriate diet with overabundance of amino acids and proteins. In practical poultry diets, approximately one-third of the nitrogen is incorporated into the tissues and eggs of the birds, and two-thirds is excreted. It was suggested that ammonium should not exceed 25 ppm in poultry houses], however it was found that prolonged exposure to levels as low as 20 ppm compromises the immune system of chickens, making them more susceptible to diseases, bacterial infections—especially with *Escherichia coli*—and damage to the respiratory system. Ammonium gas has a sharp

and pungent odour and can act as an irritant when present in elevated concentrations. High ammonium concentrations have an effect on chicken eyes causing inflammation of conjunctivae and damaging the cornea of the eyes . Both concentration and exposure time may influence the effect of ammonium on both the poultry and the health of the farmers. It also decreases the egg production, food intake and body weight of chickens. Symptoms of poisoning in poultry include tracheal irritation, air sac inflammation, conjunctivitis, dyspnoea and respiratory tract damage.

. One study on the mutagenic effect of ammonium noted an increase in chromosomal aberrations, sister chromatid exchanges and increased mitotic index in workers from a fertilizer factory. Another study on poultry litter aqueous leachate, of which the main compound was ammonium, revealed its toxicity.

Like other animal wastes, chicken manure and litter may harbor pathogens, such as E. coli, Salmonella, Cryptosporidium and others. To reduce risk to humans and pets, proper handling and precautions are necessary. Stockpiled manure should be kept in a protected area where children, pets and livestock do not have access.

Studies have shown that poultry workers exposure to poultry dust can be substantial. Workers with occupational respiratory disease may develop permanent breathing problems, becoming disabled, and unable to work.

Bird droppings are a breeding ground for disease-causing parasites. Not only can these organisms attack the substrata of a building, they can spread disease to humans. One health hazard that is a concern when dealing with bird guano is Histoplasmosis.

Breathing dust or water droplets containing contaminated bird droppings can lead to several diseases, including a flu-like illness called psittacosis. Salmonella - a bacterial infection that can cause diarrhea - may also be present in some bird droppings. Salmonella and Campylobacter are common public health hazards potentially associated with chicken contact. These bacteria are carried by healthy chickens and are communicable to people through direct contact, exposure to manure, or consumption of undercooked chicken and eggs.

Chicken manure is especially degrading to waterways because it contains 2 to 4 times more nutrients (particularly nitrogen and phosphorous) than the manure of other types of livestock;⁸ while this can make chicken manure a useful fertilizer, it can also have disastrous effects on water and soil quality.

Moreover, Antibiotics are growing environmental contaminants leading to public health concern. Antibiotics are commonly used as growth promoters and therapeutic agents in poultry feed that are not completely metabolized in the body tissues of chicken, get deposited in meat as parent compounds, and ultimately excreted via poultry droppings into the environment. These antibiotics in the soil result into the creation of antibiotic resistance in bacteria via activation of antibiotic resistance genes (ARGs). The development of ARGs and antibiotic-resistant bacteria (ARB) lead to huge physical and economic losses, as these bacteria cannot be treated with commonly used antibiotics. Moreover, these antibiotics after entering into food chains seriously affect the human immune system, growth, and metabolism of the body.

Therefore, to reduce the future health risks of antibiotics, there is a dire need to understand the fate of poultry antibiotics and spread of ARGs in the soil environment.

The aim of my study was to

- a. Develop insight about harmful effect of undisposed poultry manure
- b. To create an awareness about right disposal of poultry manure among the farmers.

Key words: ammonia, bacterial diseases, antibiotic resistance.

Chapter II

MATERIALS AND METHOD

2.1 Study area

The study was performed at Rangunia Upazilla in Chattogram district, Bangladesh. Rangunia Upazilla is surrounded by Chandanaish Upazilla on the south; Patiya Upazilla, Boalkhali Upazilla, Raozan Upazilla & Kawkhali Upazilla of Rangamati district on the west; Kawkhali Upazilla of Rangamati district on the north and Kaptai Upazilla & Rajasthali Upazilla of Rangamati district and Bandarban Sadar Upazilla on the east (Fig. 2.1).

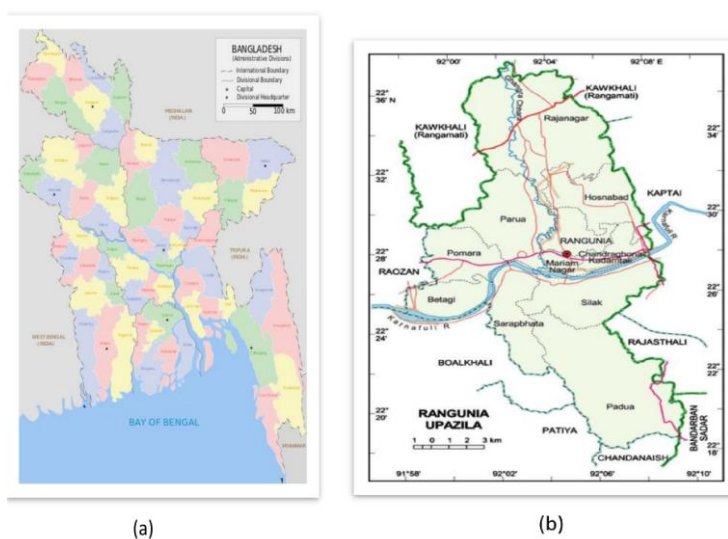


Fig. 2.1 Geographical location of data collection site.

(a) Map of Bangladesh, (b) Map of Rangunia Upazilla.

2.2 Study period

The study was conducted from 13th February, 2021 to

10 April 2021 for duration of about 2 months.

2.3 Data collection and analysis:

By visiting to the many poultry farm of Rangunia upazila,,talking with the farmers following by building up a questionnaire. These question including there managerial process of farming, litter management, feeding etc.

After that data collection from 20 large and small scale poultry farm, i have come to a point that, most of the farmers don't know about the proper management of the litter, either they use it on field, or they remain it undisposed. Actually, most of the farmers don't know the actual system and importance.

That's why, they are suffering from various problem like immunological weakness, short tempered due to anemia, as well as respiratory problem for excessively ammonia emission.

Besides, various bacterial contamination occur due to fecal bacteria. This problem is mostly suffered by the household near to the farm. This causes diarrhea mostly to the young child and the eldest. The pollution in the environment of the area mainly due to fecal contamination of soil, water and uncontrolled disposal.

After this analysis, a counseling was done to safe disposal of the manure of the farm.

The best way is to make a biogas plant which create no mess. But in small scale farming, this is not applicable due to more cost. But in large scale farming its needed to make this. A family can be served with gas to cook and electricity power to make household chores. As well as The dry waste can be used in land which have less ammonia to create toxicity.

Chapter III

RESULTS AND DISCUSSION

Some diseases become more prominent in the study area, the diseases are fecal born diseases and zoonotic. Here some most prevalent diseases are given below:

Salmonellosis

Salmonellosis is a bacterial disease. Typical symptoms include diarrhea, fever, and stomach pain that starts 1 to 3 days after infection. These symptoms usually go away after 1 week. In some cases, medical attention is required because the diarrhea is severe or the infection has affected other organs. Usually, people get salmonellosis by eating contaminated food, such as chicken or eggs. However, many different species of animals—including poultry, reptiles, amphibians, and farm animals—can carry *Salmonella* and pass it in their feces. Baby chicks and ducklings are especially likely to pass *Salmonella* to people. Parents and day-care workers should be aware that children under 5 years old should not handle baby chicks and ducklings, as salmonellosis can be very severe in young children.

Psittacosis

Psittacosis is a bacterial disease associated with pet birds, including parrots, parakeets, macaws and cockatiels, and with poultry, including turkeys and ducks. Infection is acquired by inhaling dried secretions from infected birds. Symptoms of human infection include fever, chills, headache, muscle aches, and a dry cough. Pneumonia is often evident upon chest X-ray. Since 1996, fewer than 50 confirmed cases were reported in the United States each year. Complications and fatalities may occasionally occur. Infected birds are often asymptomatic.

Collibacillosis

Escherichia coli (*E. coli*) live in the intestines of humans, chickens and other animals. Although this group of bacteria helps to maintain a healthy intestinal tract, *E. coli* becomes pathogenic when passed in chicken droppings. Some types of *E. coli* produce a toxin called Shiga toxin. These Shiga-toxin producing *E. coli*, also known as STEC, cause disease. The young and the elderly are most vulnerable to *E. coli* infections, but people of all ages can become infected. Symptoms of an *E. coli* infection are diarrhea, stomach cramps and vomiting. Fever and blood in the stool may also be present.

Symptoms generally appear within one to 10 days after becoming infected with the bacteria. Most people recover from an E. coli infection within week. but severe E. coli infections can be life threatening.

***Campylobacter coli/jejuni*infection**

a fragile organism that is unlikely to survive any drying or heating process e.g. spreading on pasture or composting. known to survive on pasture for 10 to 20 days poultry are a primary reservoir where Campylobacter can be normal flora aswell as cause of disease.

Its a major cause of human gastro-enteritis. Potential contamination of pastures can be reduced by: exposure to the elements for three weeks prior to grazing composting chicken litter prior to application.

Staphylococcosis

Infections are common in poultry. 50% of poultry strains of S. aureus are capable of causing food poisoning in humans. A relatively resistant organism that remains a risk to the dairy farmer handling chicken litter.

Clostridium infection spore-forming organisms with a capacity to survive for prolonged periods in the environment

Cl.perfringens and *Cl. botulinum* are widely distributed in the environment

- *Cl.perfringens* can cause gas gangrene and food poisoning in humans: if present in chicken litter used as a fertilizer, there is no direct exposure of the consumer to the bacteria. The risk to farmers is considered low as there is no strong link of human infections back to poultry litter. *Cl. botulinum* can cause botulism - an acute intoxication.

Pasteurellosis

causes fowl cholera, a severe septicaemic disease of chickens. Infection is rare in humans, generally being associated with cellulitis resulting from animal bites or licks. A fragile organism that is not likely to present a significant risk in use of chicken litter.

Antibiotic-resistant bacteria

Antibiotic-resistant forms of Salmonella, Campylobacter, E. coli and Listeria are either known, or are expected to exist. Overseas there is emerging evidence of a link between animal production facilities and infections in humans associated with antibiotic resistant bacteria.

Table 1:Prevalance of Diseases and abnormalities that spread more:

| Diseases condition | farm workers | near to farm | away from frm |
|---------------------------|---------------------|---------------------|----------------------|
| Salmonellosis | 20% | 70% | 10% |
| Colliacilosis | 35% | 62% | 3% |
| Respiratory problem | 90% | 10% | 6% |
| Irritation to eye | 90% | 10% | 0% |
| Histomoniasis | 40% | 55% | 5% |

Table 2:percentage of people resistant to several antibiotics

| Antibiotics | farm workers | near to farm | away to farm |
|--------------------|---------------------|---------------------|---------------------|
| ciprofloxacin | 60% | 65% | 30% |
| metronidazole | 60% | 70% | 20% |
| amoicillin | 40% | 40% | 10% |
| azithromycine | 50% | 30% | 5% |
| penicilline | 98% | 90% | 65% |

Chapter IV

CONCLUSION

As above the following discussion done, I have come to conclusion that more of the farmers in the rural area dont know the actual way of disposal of the poultry mannure and litter. Maximum they do only compost the feces and litter scatteredly which is a great source of bacterial transmission. Which make a public health hazard in the farm workers. As well as the household near to the farm.

The most problem which hampers most is ammonia emmision from farm. Awaeness should be built up to upgrade the knowledge of farmer. Proper disposal should be made like biogas plant. The whole study taught me a great lesson about this undiscussed matter.

RECOMMENDATION:

Access of wild birds in farm area should be controlled. Bio-security measures should be taken more strictly. Management policy should be followed more strictly.

Chapter V

LIMITATIONS

Data keeping was not done properly sometimes. Some data were collected indirect way. No fixed protocol was practiced for management. The period of the study was short to analyse. Direct Regular follow up of management practices was not possible. Moreover, due to pandemic of the CoViD19 outbreak, data collection was not possible directly at the ending of the study.

REFERENCE :

- Sharma N.K., Choct M., Wu S.B., Smillie R., Swick R.A. Dietary composition affects odour emissions from meat chickens. *Anim. Nutr.* 2015;1:24–29. doi: 10.1016/j.aninu.2015.02.003. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- Enticknap J.J., Nonogaki H., Place A.R., Hill R.T. Microbial diversity associated with odor modification for production of fertilizers from chicken litter. *Appl. Environ. Microbiol.* 2006;72:4105–4114. doi: 10.1128/AEM.02694-05. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
- Nicell J.A. Assessment and regulation of odour impacts. *Atmos. Environ.* 2009;43:196–206. doi: 10.1016/j.atmosenv.2008.09.033. [CrossRef] [Google Scholar]
- Jiang J.K., Sands J.R. Odour and Ammonia Emission from Broiler Farms. Australia: A Report for the Rural Industries Research and Development Corporation. [(accessed on 10 December 2015)]; Available online:
- Adegbola, A.A., 2008. Utilization of agro-industrial by-products in Africa [online]. Food and Agricultural Organization Corporate Document Repository. Available from: <http://www.fao.org/docrep/004/X6503E/X6503E08.htm> [Accessed 10 December 2008]. [Google Scholar]
- Adeoye, G. O., Sridhar, M. K.C. and Mohammed, O. E. 1994. Poultry waste management for crop production: Nigerian experience. *Waste management and research*, 12(2): 165–172. Doi:10.1177/0734242X9401200206 [Google Scholar]
- Alimi, T., Oluwasola, O. and Adejobi, A. O. 2006. Optimal farm size for achieving enterprise objective and sustainability in poultry meat production in Osun State, Nigeria. *World's poultry science journal*, 62(3): 525–539. [Taylor & Francis Online], [Google Scholar]
- Architect Africa Network, 2009. A Pan African built environment [online]. Available from: <http://architectafrica.com/NETWORK/AFRICA/> [Accessed 15 April 2009]. [Google Scholar]
- Cantrell, K. B. 2008. Livestock waste-to-bioenergy generation opportunities. *Bioresource technology*, 99(17): 7941–7953.

Doi:10.1016/j.biortech.2008.02.061 [Crossref], [PubMed], [Web of Science
®], [Google Scholar]

Journal of Soils and Sediments 20 (1), 486-497, 2020

Juma Muhammad, Sardar Khan, Jian Qiang Su, Abd El-Latif Hesham, Allah Ditta, Javed
Nawab, Abid Ali

Department for Environment, Food and Rural Affairs (DEFRA), 2009. Protecting our water,
soil and air. A code of good agricultural practice for farmers, growers and land
managers [online]. Available
from: www.defra.gov.uk/farm/environment/cogap/pdf/cogap090202.pdf [Accessed
7 February 2009]. [Google Scholar]

S. Atidéglá, Effets des différentes doses d'engrais minéraux et de la fiente de volaille sur
l'accumulation de biocontaminants et polluants (germes fécaux, composés azotés et
phosphorés, métaux lourds) dans les eaux, les sols et les légumes de Grand-Popo au
Bénin [Ph.D. thesis], EDP/FLASH, Université d'Abomey-Calavi (UAC), Bénin,
West Africa, 2011.

M. Delgado, C. Rodríguez, J. V. Martín, R. Miralles de Imperial, and F. Alonso,
“Environmental assay on the effect of poultry manure application on soil organisms
in agroecosystems,” *Science of the Total Environment*, vol. 416, pp. 532–535,
2012. View at: [Publisher Site](#) | [Google Scholar](#)

T. Garcia-Armisen and P. Servais, “Respective contributions of point and non-point sources
of *E. coli* and enterococci in a large urbanized watershed (the Seine river,
France),” *Journal of Environmental Management*, vol. 82, no. 4, pp. 512–518, 2007.

D. L. Swerdlow, B. A. Woodruff, R. C. Brady et al., “A waterborne outbreak in Missouri
of *Escherichia coli* O157:H7 associated with bloody diarrhea and death,” *Annals of
Internal Medicine*, vol. 117, no. 10, pp. 812–819, 1992. View at: [Publisher
Site](#) | [Google Scholar](#)

ACKNOWLEDGEMENT

All praises are due to the immeasurable grace and immense kindness of Almighty “GOD”, the supreme authority and supreme ruler of universe, who has empowered me to complete the work successfully. I would like to express my gratitude to my supervisor, **Professor Shahnaz Sultana** Dept. of Agricultural Economics and Social Science, Chattogram Veterinary and Animal Sciences University.

My heartfelt thanks to her for valuable guidance, suggestion, supervision and encouragement during the entire period of this study to complete this production report.

I would like to express my deep sense of gratitude and thanks to **Professor Dr. Md Alamgir Hossain**, Dean, Faculty of Veterinary Medicine, and CVASU.

I express my sincere gratitude and thanks to **Professor Dr. A. K. M. Saifuddin**, Director of External Affairs, for his supervision and kind co-operation during the period of internship.

I am also grateful to **Md. Mustafa Kamal**, Upazilla Livestock Officer (ULO), Rangunia Upazilla, Chattogram and **DR. Harun Ar Rashid**, Veterinary Surgeon (VS), Rangunia Upazilla, Chattogram for his cordial information and guidance at the time of farm visiting. Thanks to the owner of the farm and other helping hands who helped me in collecting data for this study.

A special thanks has to given to my friend **Labonya Barua** who was my intern mate in Upazila veterinary hospital. She also helped me in taking data.

Last but not least, I am profoundly grateful to my family members for their endless sympathies, kind co-operation, sacrifices and prayers.

The Author

November,2021



**Intern Doctor, Faculty of Veterinary Medicine
Chattogram Veterinary and Animal Sciences University**

E-mail: laboni206barua@gmail.com

Mobile: +8801521566906

Personal Profile:

Name: Himaddry Barua

Father's Name: Nandan Barua

Mother's Name: Rinku Barua

Permanent Address: Village: Betagi; P.O: Betagi; Upazilla: Rangunia; District: Chattogram

Birth Date: 17th March, 1998

Nationality: Bangladeshi

Religion: Buddhism

Blood group: A+

Academic qualification

| Name of the examination/ Course | Name of the institution | Board | Passing year | Grade |
|------------------------------------|---|------------|--------------|-------|
| SSC | Chittagong Engineering University School and College | Chattogram | 2013 | 5.00 |
| HSC | Chittagong Engineering University School and College | Chattogram | 2015 | 5.00 |
| DVM | Chattogram Veterinary and Animal Sciences University | CVASU | ---- | |

My goal

As a human being, I have a long-cherished dream to serve my nation through my knowledge, creativity and profession. As a veterinarian, I think I have a great opportunity to fulfill my dream by developing my career in the field as a veterinary practitioner. By dealing as a veterinary surgeon, I would be able to expand and spread my knowledge also. I have also a high interest in Medical Research and Public health approach..