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ASSESSMENT OF POULTRY WASTE MANAGEMENT IN TRISHAL UPAZILA, MYMENSINGH

Md. Shahadat Hossen[1*], Ziaul Hoque[2] and Begum Samsun Nahar[3]

[1]Department of Environmental Science, Bangladesh Agricultural University, Mymensingh; [2]MS Student, Department of Environmental Science, Bangladesh Agricultural University, Mymensingh; [3]Centre for Environmental Studies, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

***Corresponding author:** Md. Shahadat Hossen; E-mail: mshossen@bau.edu.bd

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ABSTRACT

A study was conducted to assess the present status of poultry waste management by poultry farmers in Trishalupazila of Mymensingh district, Bangladesh during July to November 2013. A structured, pre-tested questionnaire was used for collecting data. The highest 52% respondents were involved in layer farming and majority of the respondents did not use any litter materials where 36% and 12% used rice husk and sawdust respectively as litter. The availability of storage and treatment facilities was in 24% farms but their storage system was uncovered. Fifty per cent of the farmers sold their litter while some other used as fish feed, soil amendment and for biogas production. Only 16% farmers faced diseases related to poultry waste and the rest (84%) never faced any disease. It was noticed that 54% farmers faced environmental problems and 46% were unconcerned about environmental problem. They considered odor, flies and mosquitoes and leaching as environmental problem. Only 24% farmer mentioned financial problem as barrier of poultry waste management and majority claimed about unconsciousness. It is concluded that poultry waste management by farmers in the study area is inefficient, implying inadequate awareness of the potential negative impact of poor handling of poultry wastes. More extensive work is required to train-up the poultry farmer for proper handling and utilization of poultry wastes.

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INTRODUCTION

According to the Environmental protection act 1990, the waste is a wide ranging term encompassing most unwanted materials. The term poultry wastes refers to poultry excreta, bedding materials, feather and other debris normally generated in the poultry farms at the time of waste handling operations. The production of poultry results in some accessory output: hatchery wastes, manure (bird excrement), litter (bedding materials), and on-farm mortalities. The processing of poultry results in additional waste materials, including offal (feathers, entrails and organs of slaughtered birds), processing wastewater and bio-solids. Commercial poultry industry is growing rapidly in Bangladesh and annual growth rate of chicken population is 5.3 percent (GoB, 2010). Presently poultry, mainly chicken (broiler and layer) industry is a rapid rising and prospective sector in Bangladesh. There are about 1, 50,000 commercial poultry farms (broiler and layer farms) and near about 130 Parent stock farms in Bangladesh (ICDDRB, 2008). Poultry wastes are produced as a result of the normal everyday processes of the poultry industry. The weight of fresh poultry manure is estimated as 15% of the total dry matter intake. It contains about 28-30% crude protein in which 36-50% is true protein (Bhattacharya and Taylor, 1975). Most of the by-products contain organic and inorganic nutrients that are of biological value if managed and recycled properly, regardless of flock size. However, they also give rise to potential environmental and human health concerns as the sources of elements, compounds, vectors for insects and vermin, and pathogenic microorganisms.

About 3079 metric tons poultry manures are produced daily from a total of 42 million chickens in Bangladesh (Waste concern, 2005). The large quantities of poultry waste production pose serious socio-economic problems, the most prominent of which is the protection of our environment and our environmental resources particularly polluting the surface water, groundwater and air environment at high level (Alabadan et al. 2009; FAO, 2008; Dahal, 1993). Poultry manure also contains pathogens which may potentially affect soil and water resources and can remain viable in the environment for long periods of time (Bowman et al., 2000). Continuous dumping can lead to serious health concerns (Akinbile, 2012). It is therefore necessary to timely dispose of wastes in an efficient method which is an important management tool for raising healthy and profitable poultry industries. Therefore, the present research work was conducted to identify the types and amount of wastes generated in the poultry farms in TrishalUpazila and environmental consideration of poultry waste management.

MATERIALS AND METHODS

Study area

TrishalUpazila with an area of 338.98 sq km, located in between 24°28´ and 24°41´ north latitudes and in between 90°18´ and 90°32´ east longitudes (Banglapedia, 2013). The population constituted 180 poultry farms from where 50 farms were randomly selected as sample for this study.

Data collection procedure

In order to collect relevant information, a semi-structured questionnaire was prepared to collect data. The questionnaire was carefully designed keeping the objectives of the study in view. The schedule was translated into Bengali (Native language) to facilitate data collection. The questionnaire was pre-tested with selected Livestock Officers at the Trishal Upazila so as to ensure that the questionnaire did not contain any ambiguity and that it could be easily understood and completed by respondent. Data were collected through personal interview during July to September 2013.

Information was obtained on litter management knowledge, barrier of waste management, disease related waste, about environmental problem, about storage and treatment facilities, utilization of waste. There were also some questions to evaluate the knowledge level about environment and waste management. Additional information was collected through personal communication during farm visits. Collected data were analyzed using simple statistical techniques for calculating frequencies and percentages and the results are presented in tables and figures.

RESULTS AND DISCUSSION

Type of farm and wastes

Three types of farm were found in this study area. Those were broiler, layer and cockerel farms. In this study, 52% respondents were involved in layer farming, 40% in broiler and 8% in cockerel farming (Fig. 1). Layer hens produced high quality of dropping wastes, because laying hens are usually reared in cages.

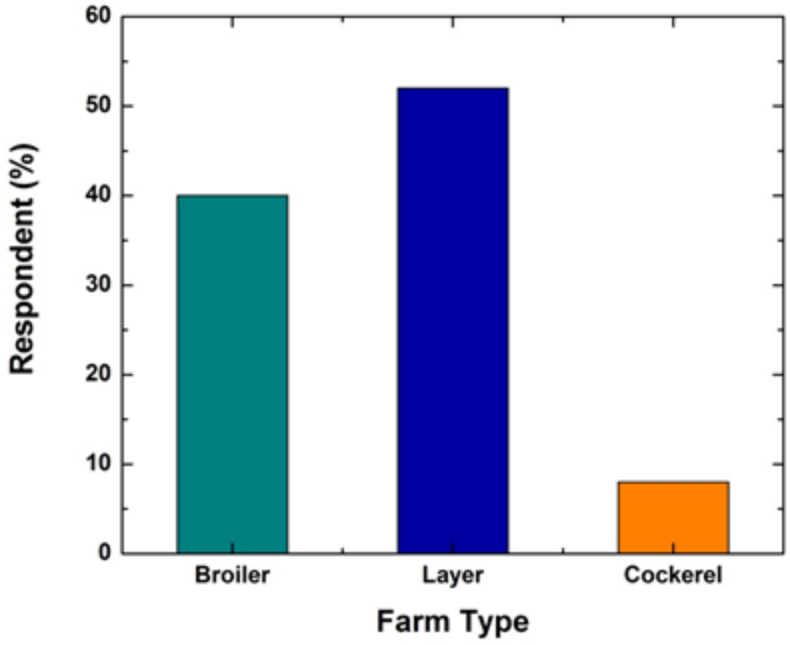

Figure 1. Number (%) of farmers engaged in different farm types in the study area

The wastes obtained in the study area were mainly solid in nature and composed of excreta, feed, feathers, and bedding materials. The distribution of the different litter materials are presented in Figure 2. About 45% farm owner did not use any litter materials as majority of our studied farm was layer type and grown in cage houses and least 7% used other than sawdust and rice husk. For broiler houses they prefer rice husk (36%) to sawdust (12%) because rice husk is more available than sawdust. Litter quality will affect the environmental hygiene of the birds by influencing dust levels, air humidity and ammonia levels. Litter materials with a high water holding capacity, such as sawdust, are believed to result in better litter quality than litter materials with poorer absorption capacity such as rice husk. According to Adeyemi and Malomo (2014) wood shaving is the most popularly used (44%) litter material followed by sawdust used by 11% of respondents while crushed corn cobs and grasses were used by 3.29 and 6.59 % of the respondents while 18.68% of the respondents did not use any litter materials in Nigeria.

The quantity of litter is directly linked to the number of birds reared. On the basis of quantity of litter, farms were classified into four categories. The interval between two categories was 100. About 26 percent farms produced up to 100 kg litter per day while 54 percent farms produced 101-200 kg litter per day. Only 6 percent farms produced more than 300 kg per day while 14 percent farms had a range of 201-300 kg per day (Table 1).

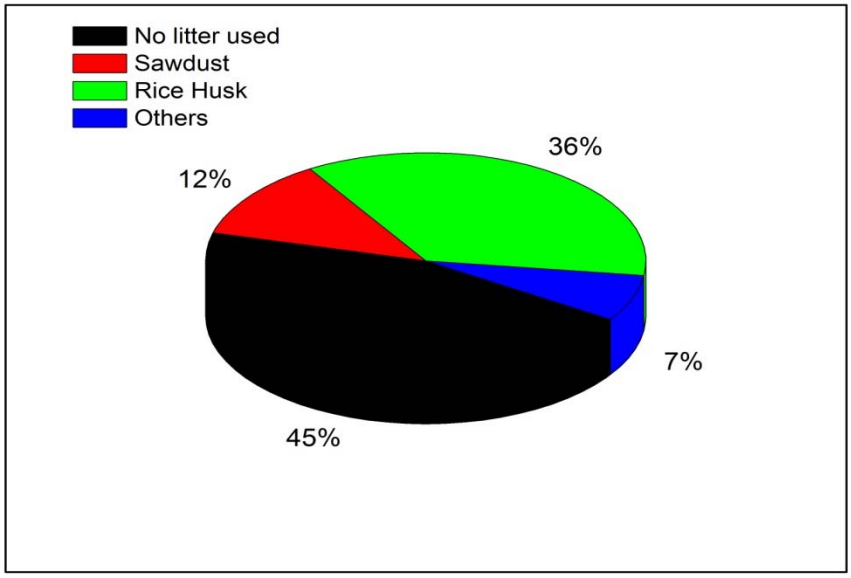

Figure 2. Types of bedding or litter material used in poultry farms

Table 1. Quantity of litter production in farms in the study area

Quantity of litter (in kg)	Respondents	
	Number	Percent
Up to 100	13	26
101 to 200	27	54
201 to 300	07	14
> 300	03	06
Total	50	100

Waste management

Sustainable waste management system requires storage and treatment facilities. This study shows, 24 percent farms had these facilities partially or fully and the rest 76 percent farms had no storage facility (Table 2). The storage capacity of those 12 farms undergoes three categories. Nine farms had capacity of less than 200 kg. Two farms had capacity ranged between 200 to 500 kg while one farm had a capacity of more than 500 kg and the percentages were 75.0, 16.7 and 8.3, respectively (Table 2). In another study, it was found that among farmers, 83.3% store in pit, 8.3% on the roadside and 8.3% in the bio-gas plant (Amin et al., 2009). Proper storage of poultry litter maintain litter quality for further use and prevent contamination of surface waters on poultry farms (Dan et al., 2009).

For the answer of cover of storage tank and monitoring facilities of waste disposal system, it was found that every farm had no cover of storage tank and monitoring facilities of waste disposal system (Table 2). Storage tank means that is covered using plastic sheets anchored to the earth or other devices to protect against rain and atmospheric losses. Due to uncovered storage tank, litter washes out with rain water and enhanced environmental pollutions. Amin et al. (2009) reported that 90% of storage systems were uncovered in poultry industries.

Table 2. Storage and treatment facilities of poultry waste in the poultry farms of the study area

Storage and treatment facilities	Respondents	
	Number	Percent
Available	12	24
Unavailable	38	76
	Category of storage capacity (kg)	
Less than 200	09	75
200-500	02	16.7
More than 500	01	8.3
	Availability of cover of storage tank and monitoring facilities	
Available	00	00
Unavailable	50	100

Waste utilization

Proper management and utilization of poultry wastes pose little environmental threat. About 50% of the poultry farm owner sold their excreta and litter to others where 20 percent of farm utilized for community based biogas production. About 16% used their excreta and litter in the crop field as soil amendment. Very few percent of farms used for fish culture and household composting. According to Sarker et al. (2009) among the small farm owners 20% farmers could not use their poultry litter for any particular work, 40% of them sold their poultry litter in the market, 30% of them used their poultry litter for crop production and, 10% of them used their poultry litter for fish culture. About 50% of the medium farm owners used their litter for fish culture and all the large farm owners sold their litter after a particular time.

Table 3. Methods of poultry waste utilization

Using type of poultry waste	**Respondents**	
	Number	**Percent**
Biogas production	10	20
Household Composting	4	8
Used in crop cultivation	8	16
Used in Fish culture	3	6
Sell to others	25	50
Others	5	10
Total	50	100

Health and environmental effects of poultry waste

Poultry litter may contain human and animal pathogens, so good hygiene has to be practiced when handling poultry waste. Farmers were questioned about their health problems related to poultry waste in answer 16% farmer responded that they faced disease outbreaks and the rest 84% farmers reported that they never faced any disease related to waste. Among the farmers who faced disease, five farmers suffered from infection in their leg, two of them suffered from physical weakness and the rest one suffered both infection and gastrological problem (Table 4). Ammonia emissions from poultry waste can have multiple health hazards including nasal irritation and cough for both human and animal (Evans and Woolf, 2013).

The proximity of many poultry farms to residential households has often raised a lot of concerns on human and environment. In the study area, 54 % farmers considered poultry waste as an agent which has impact on environmental. They also faced some environmental problems. The rest 46% farmer's opinion was that they never faced any environmental problems.

Table 4. Diseases faced by farmer in the study area

Name of disease	Respondents	
	Number	Percent
Infection	05	62.5
Physical weakness	02	25.0
Infection and gastrological problem	01	12.5
Total	08	100

The above 54 percent farmer faced several environmental problems. The highest 74.1 percent of them (54% farmer) faced odor as well as flies and mosquitoes and the second highest 14.8 percent of the farmers faced flies and mosquitoes. Leaching of wastes and problems with flies and mosquitoes faced by 3.7 percent farmers and other 3.7 percent faced odor only while odor as well as flies and mosquitoes problems faced by 3.7 percent farmers (Figure 3). Waste created environmental problem in the forms of bad odor, water contamination, unwanted insects/vermin breeding, over fertilization, indoor air pollution (Waste concern, 2005). About 65.0% respondents claimed that the droppings do not cause environmental pollution, while 35.0% gave opinion in the favor of environmental pollution (Amin et al., 2012). Hossain and Ali (2009) and Griffiths (2004) reported that faulty use of droppings can cause environmental pollution. Poultry production activities enhance environmental pollution of air, water and emission of foul odour which causes huge discomfort to both the human and animal lives (Anosike, 2007).

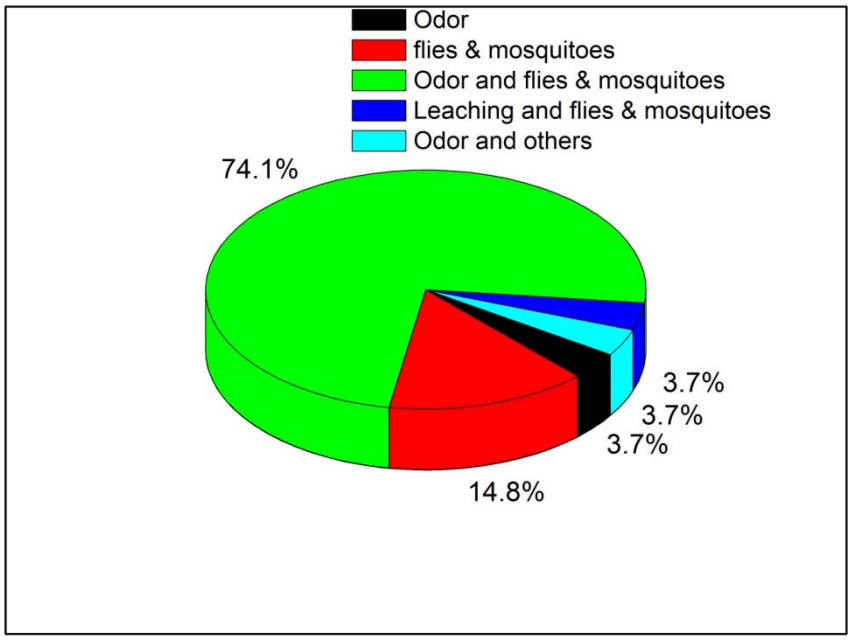

Figure 3. Types of environmental bad effects of poultry waste faced by farmer in the study area

Barriers of waste management

The results of the present study indicated that 46 percent farmers were not concerned about proper disposal and environment friendly management of wastes and 16 percent considered waste management as unnecessary. About 24 percent encountered financial problem and the rest 14 percent had no comment (Fig. 4). Environmental negative impacts from poultry wastes could substantially reduce by using proper technologies but the problem is one of cost, corresponding incentives/disincentives and awareness (Gerber et al., 2007).

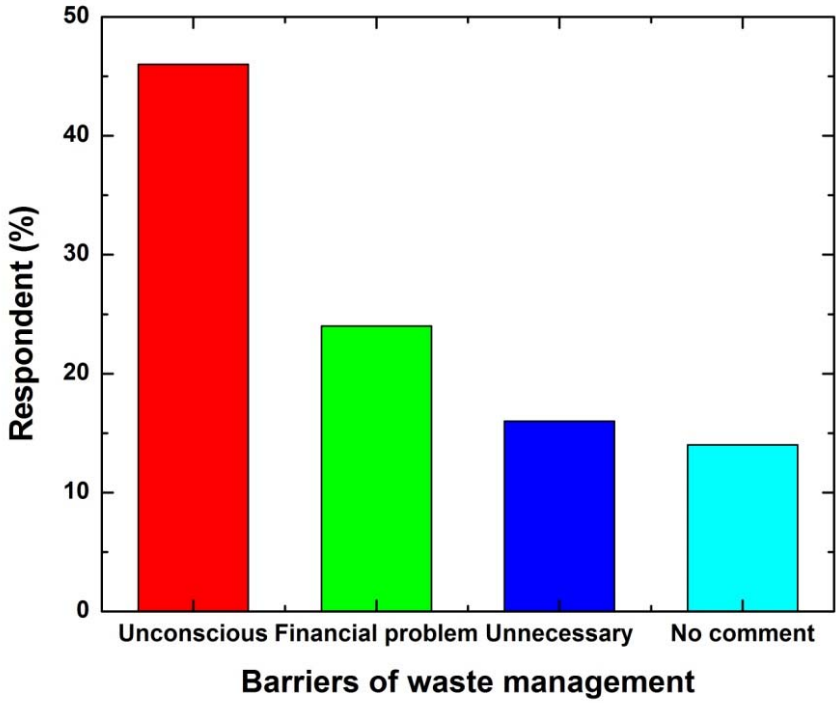

Figure 4. Barriers of poultry waste management in the study area

CONCLUSION

From the above finding, it can be concluded that the present system of litter management in the study area is neither satisfactory nor adequate. Farmers choose their litter based on availability rather than environmental and health concern. A great percent of poultry farmers have faced environmental and health problem related to waste. Unconsciousness is the major barrier of sound waste management therefore awareness building is one of the important approaches to address this issue. Environmental impacts of poultry production are not always confined to specific areas they also include impacts of global greenhouse gas emission related to energy use in animal production processes and manure management. A sustainable waste management system is a crying need to save our environment from pollution and greenhouse gas emission. Government, non-government, and community based organizations and community people should work together to make poultry farming environment friendly in our country.

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