



Impact of livestock rearing practices on public health and environmental issues in selected municipality areas of Bangladesh

MN Alam, AKMA Kabir, MN Sakib, M Salahuddin, MAK Azad*

Department of Animal Science, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh

Abstract

Livestock keeping at urbanized areas is increasing folds in rate now-a-days in Bangladesh. To characterize the urban livestock keeping practices and its implications on public health and environmental issues in Mymensingh, Gazipur and Shariatpur municipality, Bangladesh, a questionnaire survey was carried out. Ninety livestock keepers were freely characterized and data were obtained through interview. Data were analyzed using percentage and mean. Age does not have any role in keeping livestock at municipal areas. Majority (73%) of the respondents have at least primary education. Male dominates in keeping livestock than female. Local political leader kept the highest number of animals then self-employer or trader takes the second position. Dairy cattle share a lion number (67%) over other species. Ninety five per cent (95%) available breeds in municipal areas are crossbred and the rest is indigenous. More than 75% livestock holders keep their animals over 3 years and only 6% keepers sell their animals within 6 months. Most of the livestock keepers (56%) use their calf as replacement stock. The majority (66%) of the livestock depends on grazing and scavenging for feed from government and municipal lands, unfenced open land, roadsides, rubbish dumps. Most of the livestock owner (66%) does not supplement to their animals with feeds other than free scavenging throughout the rearing time. Most of the farmers (85%) have temporal shed for sheltering their animals during night time. Almost 78% flying herds available in municipal areas drink water from drainage line. Disease outbreaks are 21%, 18%, 17%, 16%, 13%, and 10% of ecto-parasite, mastitis, helminthosis, lumpy skin disease, wounds, and diarrhoea. 14% livestock owner follow vaccination program to keep better their animals from viral or bacterial infections. All the respondents (100%) are aware that livestock keeping could have a negative effect on urban health and environment. More than 50% of the respondents choose dung and urine disposal, malodor and blocked roads are the major damages caused by livestock. Strategies for controlling the damages were as follows: awareness through broadcasting documentary via mass media (4.33), regular health check via veterinary services (3.96), keeping database and regular updated of livestock keepers (3.82), proper disposal of waste (3.69), strengthening rules and policy development for local authority (3.61), reducing numbers of animal (3.48), provision of extension services (3.47), cleaning vicinity daily (3.32). There were some measures taken from public interviewing which need to amend for keeping health and environment free from diseases and pollution.

Key words: Municipal livestock management , Public health, Environmental hazards, Bangladesh

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Introduction

At present, the total population of Bangladesh is about 160 millions of which about 40 millions are living in urban areas. The poverty rate as well as undernourishment is the main triggering issues for the residents of rural areas. In every year, a significant number of people move from rural to urban areas for better livelihood. It is expected that by the year 2025, about half of

the rural population will be living in urban centers and poverty will have increasingly moved from rural to urban areas in Bangladesh. Indeed, with the declining purchasing power in the urban areas, many urban households have responded with diversification of income sources, the most notable one being urban animal agriculture (Greenhow, 1994). Animal agriculture in Bangladesh mainly based on cattle, goat, sheep, and buffaloes and they

*Corresponding Author: azad_animalscience@bau.edu.bd

represents about 28%, 67%, 3% and 2%, respectively (FAO, 2013).

It is assumed that 2% of the total livestock are available in urban and peri-urban areas of Bangladesh. Urban livestock provides a steady food supply, income and emotional value, gives status, savings, and tradition, and also sustains ecological functions (by cleaning waste). Interestingly, urban livestock production system is operating unplanned and densely populated neighborhoods which has negative impact on public health and also introduces environmental pollutions (UNDP, 1996). The prevailing condition of beef or dairy cattle production is not well organized. However, livestock keeping in urban and peri-urban areas is a common and popular practices and now being dynamically popularized throughout the country's municipal areas. In urban areas, it creates a lot of problems such as dung and urine disposal, disease risk, and theft; above all it threatens public health via transmitting SARS and avian influenza, zoonotic diseases and tapeworm infestations (Hans et al., 2012).

A critical issue has grown that most of the "flying herds" in municipal areas eat mixed form of wastes (food and kitchen leftover, green waste, papers, paints, chemicals, fertilizer, pesticides, herbicides, tannery wastes and medical wastes). Smith (2009) reported that all types of municipal waste contain heavy metals than the background concentrations present in soil and will increase their contents in amended soil. Therefore, no doubt such composite form of wastes may contain a significant amount of heavy metals (such as zinc, copper, nickel, lead, cadmium, arsenic, chromium and mercury) and can induce negative impact on human food chain through consumption of most edible parts of meat from those animals. It is postulated that heavy metals introduced in animal body through their food sources could induce some kind of stressful conditions like other stressful conditions (such as heat stress, immune challenges, feed restrictions; parasitic infestations), chronic heavy metal exposure has been associated with increased in generation of ROS (Reactive Oxygen Species) and /or decreased in antioxidant capacity (SOD, GPx and catalase) leading to enhance oxidative

stress in human and other animal models (Azad et al., 2010; Sukhbir and Judit, 2010; Jemova et al., 2011). However, information concerning relationship between livestock keeping at municipality areas and its impact on environmental hazards is limited, except for some novel findings regarding survey, zoonotic diseases, tapeworm infestations (Smit et al., 2001; Kazira and Kanyari, 2010; Boukary et al., 2013). No systematic work has yet been carried out to characterize such diversified production systems in view of environmental hazard as well as its zoonotic implications on general public health. Such information is important in assessing the needs of the farmers, the importance of livestock to improve the households and urban livelihoods, and also to reform the policy. Therefore, the present research was designed to compile the baseline information on livestock keeping practices and to identify the major public complaints against livestock rearing in municipality areas on health and environmental hazards.

Materials and Methods

Selection of study site

Three different stations were selected for conducting the following research plan. Stations were Mymensingh, Gazipur and Shariatpur municipal areas. The study sites were selected on the basis of having a higher concentration of livestock keeping in municipal areas.

Selection of livestock keeper

Ward councilor and/or local community police gives necessary information regarding livestock keepers in those municipal areas. Field visits were undertaken between July and August 2014. The livestock keepers were selected who rear cattle and Goat and were able to give information when necessary. Thirty farmers were randomly chosen from each municipal area. Therefore, total 90 livestock keepers were chosen for collecting data to satisfy the objectives. Moreover, a questionnaire was supplied to 30 people of each site to get information about how such livestock rearing practices induces negative influence on public health as well as environmental issues and also get to know controlling measures of those negative impacts.

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Data collection

Data were collected through direct interview and making frequent personal visit. Before making actual interview, the objectives of the study were explained clearly to the farmers. Then the questions were asked in a very simple manner with explanation whenever necessary.

Parameters in Interview schedule

The interview schedule contained the following items of information: general information about livestock owners, livestock population, rearing system, housing, sources of feed and supplement, management practices, utilization of products, common diseases and their prevention or treatment, public views against livestock keeping practices on health and environmental hazards, and probable controlling measures of negative impacts on health and environmental issues.

Statistical analyses

The survey on different parameters in this study were exploratory descriptive. Therefore, data were compiled, tabulated and analyzed with simple statistical method to fulfill objectives of the study. Tabular technique was applied for the analyses of data using simple statistical tools like average, percentages etc. The process adopted five-point scale to evaluate neutralizing measures for public health and environmental hazards. The scale was assigned values as follows; none = 1; little = 2; more = 3; substantial = 4; and the most = 5. A mean score of 3.0 was obtained. Any item with a score of 3.0 and above was regarded as a neutralizing measure while items with mean less than 3.0 were not taken as neutralizer.

Results and Discussion

Table 1 shows the results of personal characteristics of livestock keepers at municipal areas in percentage. Age does not have any role in keeping livestock at municipal areas. However, young and middle aged person are more active and productive in keeping livestock than the aged groups. Ani (2007) reported that innovators are always in their either young or middle age. Most of the livestock keepers in municipal areas are within lack of formal education (27%) or just finished primary

education (27%). Secondary and higher secondary school completed, and graduate and/or above are 22%, 15%, and 6%, respectively. Thus, majority (73%) of the respondents have at least primary education.

Table 1. Livestock keeper's personal profiles (n=90)

Variables	Percent age of respondents
Age	
25-34 years old	38
35-49 years old	34
Over 50 years old	28
Sex	
Male	88
Female	12
Level of education	
No formal education	28
Primary school completed	28
Secondary school completed	22
Higher secondary school completed	15
Graduate and/or above	07
Current occupation	
Politician	58
Self-employer/Trader	26
Govt. Employees	03
Others	13

The fact that most of them are literate is advantageous to the adoption of any innovation meant to improve livestock keeping in the study area. It has been reported that increased farmer education positively influenced adoption of improved practices (Agwu and Anyanwu, 1996). Male dominates in keeping livestock than female. Poynter (2001) found that male mainly owned cattle, sheep and goats, while women usually possessed the backyard poultry. In case of current occupation, the highest number of animals is kept by local political leader and then self-employer or trader takes the second position. Government employees have no interest to keep livestock in municipal areas. This shows that most municipal livestock keepers practice on part-time basis because of earning extra money with combination efforts. Similar results were reported by Foeken et al. (2004) who found that urban farmers' always took advantageous effort to boast up their financial status.

Table 2. Characterization of livestock reared in the study area (n=90)

Variables	Percentage of respondents
Type of animals	
Dairy cattle	68
Beef cattle	24
Goat	08
Type of breed	
Crossbred	95
Indigenous	05
Times above periods of livestock keeping	
6-12 months	07
13-36 months	18
Over 36 months	75
Sources of replacement stock	
Own	56
Local market	33
Others	11
Utilization of product	
Sale	98
Own	02
Milk marketing system	
Milkman	47
Local market	36
Neighbors	17
Meat marketing system	
Butcher	78
Local market	18
Neighbors	04

Types of livestock reared in the study area

Table 2 shows the results of livestock characteristics in the municipal areas. Dairy cattle share a lion number (67%) over other species followed by beef cattle and goat (24% and 8%, respectively). Lupala (2002) found similar categories of animals in their findings. 95% available breeds in municipal areas are indigenous and the rest is exotic. Indigenous livestock are easily adoptable to rough environmental assault and more disease resistance, too. Opposite picture are seen to

exotic breeds that might leads to keep more indigenous breed in municipal areas.

Ishani et al. (2002) reported that crossbred cattle are common for urban animal agriculture. More than 75% livestock holders keep their animals over 3 years and only 6% keepers sell their animals within 6 months. This implies that keeping livestock over the periods depends on how much monetary returns come from those animals and also depends on keeper's choice. Most of the livestock keepers (56%) use their calf as replacement stock. Only 33% respondents purchase replacement stock from local market. 98% respondents say that they directly sale their product. Milkman, local market and neighbors consumed about 46, 35 and 16% of Milk, respectively. On the other hand, butchers, local market and neighbors buy 78, 17 and 4% of meat from those livestock in the municipal area.

Livestock rearing practices

Table 3 shows the results of manage mental operations such as rearing system, feed supplement, housing facilities and water sources for animals kept in and around municipal areas. The majority (66%) of the livestock depends on grazing and scavenging for feed from government and municipal lands, unfenced open land, roadsides, rubbish dumps. These rearing systems are termed as free roaming or flying herds, which mainly eat mixed form of wastes from garbages. Our results do not support the results reported by Asadu et al. (2012) who found that only 10% of livestock rearing in Enugu urban at Nigeria are free ranger and they eat mainly garbage waste. This might be due to differences in livestock keeper's education and occupation background, availability of grazing land or fallow land, grasses available in the roadside, garbage disposal system in the municipal areas. Only 5% keepers have stall feeding facilities for their animals. This is due to lack of farmer education and transfer of technology. Moreover, 26% keepers follow stall feeding and free roaming practices. Though the free range system is not only a nuisance, but also poses a risk of disease transmission. Therefore, combination of stall feeding and free roaming could be an ideal rearing system in municipal areas.

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Table 3. Distribution of rearing system, supplemented feed, housing and water sources in the municipal areas (n=90)

Variables	Percentage of respondents
Rearing system	
Zero-grazing	06
Free roaming	67
Combined	27
Type of supplemented feed	
None	67
Market and kitchen leftover	20
Commercial supplement	07
Cultivated fodder	06
Type of housing	
None	13
Temporal shed	86
Cemented floor	01
Water source	
Tap	16
Drainage line	79
Lake	05

The present results are almost similar to the data reported by Asadu et al. (2012). Most of the livestock owner (66%) does not supplement to their animals with feeds other than free scavenging throughout the rearing time. The rest of the livestock keeper's supplemented with market and kitchen leftover (20%), commercial supplement (6%) or cultivated fodder (6%). Similar results are reported by Kagira and Kanyari (2010). About 85% farmers have temporal shed for sheltering animals during night time. Almost 78% flying herds available in municipal areas, animals drink water from drainage line whereas only 15% drink from tap sources. This results are agrees with the results of (Kagira and Kanyari, 2010; Ishagi et al., 2011).

Common diseases and their prevention or treatment practices

Table 4 shows the results of outbreaks of the common diseases and their probable prevention or treatment strategies. Disease outbreaks are 21, 18, 17, 16, 13, and 10% of ecto-parasite,

mastitis, helminthosis, lumpy skin disease, wounds, and diarrhoea. Foot-and-mouth disease does not recognize animals in any municipal areas. Only 2% of livestock faces respiratory disorder found in all the surveyed areas. 14% livestock owner follow vaccination program to keep better their animals from viral or bacterial infections. Deworming, grooming and washing, and removal of sick animals are 25, 56, and 13%, respectively.

Table 4. Distribution of common diseases and their possible prevention or treatment program in the study area (n=90)

Variables	Percentage of respondents
Common diseases	
Ecto-parasite	21
Mastitis	19
Helminthosis	18
Lumpy skin disease	17
Wounds	13
Diarrhoea	10
Respiratory problems	02
Foot-and-mouth disease	00
Prevention/ treatment	
Vaccination	14
Deworming	26
Grooming and washing	57
Removal of sick animals	13

Parasitic infestation is a common health risk found in urban livestock production systems (Omudu and Amuta, 2007). Generally, farmers had limited knowledge on the risks associated with livestock keeping. There are risks such as zoonotic disease infection (bacterial, viral, parasitic and protozoa). Nyanjuru (2004) asked farmers to prioritize diseases in order of importance, 46.6% of the respondents gave brucellosis the first priority, 14.7% anthrax, 8.6% intestinal worms and 4.3% bovine

tuberculosis (BTB). Seven percent could not associate any disease with urban livestock keeping. Moreover, Kagira and Kanyari (2010) conducted survey and ranked the common diseases in cattle were lumpy skin disease¹, diarrhoea, helminthosis, foot-and-mouth disease, and respiratory conditions. Our results show ecto-parasite and mastitis are the common health risk for animals reared in municipal areas. The rate of outbreaks of the foot-and-mouth disease and respiratory problems of Animals reared in and around municipal areas are very negligible.

Awareness and types of hazard to public health and environment

All the (100%) respondents are aware that livestock keeping could have a negative effect on urban health and environment. 19% of the respondents mention dung and urine disposal in urban environment as negative effect of urban livestock keeping. A good number (16%) of the respondents perceived that ‘malodor’ from the livestock can affect health and environment while about 14% admit that livestock can cause blocked roads, highways and market place. Other damages as indicated by the respondents included: flies, parasites and dust (11.89%); noise (10.00%); accidents (8.67%); water pollution (4.44%); transmission of zoonoses (1.89%); emission of gases from livestock which cause climate change (1.11%); compromising animal welfare (0.56%) and others (11.33). This implies that majority of them considered livestock as a menace because it generates waste, smell, noise and spread diseases. Only (4.0%) of them perceived that livestock emit gases which can cause climate change. This implies that majority of urban livestock keepers in the area were not aware of the contribution of livestock to climate change. Only few respondents indicated that livestock could cause depletion of water sources. Our results totally agree to the results of Asadu et al. (2012) who identified that urban livestock keeping can cause environmental hazards through destruction of crops, filth in urban areas, noise making, spreading of diseases, causing of accidents and bad smell. Pollution from inappropriate manure disposal is a major environmental concern (FAO, 2007). Gerber

and Steinfeld (2008) reported that water quality could be affected by livestock as a result of the release of nitrogen, phosphorus and other nutrients into water ways, mainly from intensive livestock. Livestock keepers in Mymensingh, Gazipur and Shariatpur municipality areas were aware of hazards posed by livestock on health and environment. They strongly recognize that dung and urine disposal, malodor, blocked roads, highways and market place, diseases, nuisance are straightly caused by livestock rearing in and around urban areas, but unaware that livestock can also have negative impact on climate change.

Table 5. Awareness and complaints against livestock rearing in municipal areas on public health and environmental hazards (n=90)

Variables	Percentage of respondents
Awareness	
Aware	100
Unaware	00
Type of hazards	
Dung and urine disposal	20
Malodor	16
Blocked roads, highways and market place	14
Flies, parasites and dust	12
Noise	10
Accidents	09
Water pollutions	04
Transmission of zoonotic diseases	02
Gas emissions	01
Compromising animal welfare	01
Others	11

It is therefore necessary that extension service and other non- governmental agencies in urban areas should create awareness of the impact of livestock on climate change. This will enable the keepers to appreciate mitigation-strategies to ensure sustainable practices by using environmental-friendly options.

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Table 6. Probable suggestions to control health and environmental issues created by livestock rearing practices in municipal areas (n=90)

Variables	Mean
Awareness through broadcasting documentary via mass media	4.33
Regular health check via veterinary services	3.96
Keeping database and regular updated livestock keepers	3.82
Proper disposal of waste	3.69
Strengthening rules and policy development for local authority	3.61
Reducing numbers of animal	3.48
Provision of extension services	3.47
Cleaning vicinity daily	3.32
Feeding animals well	2.58
Strengthening biogas or recycling program	2.53
Promoted zero-grazing program	2.41
Restraining animals	1.67
Others program	2.04

Note: The questionnaire adopted five-point scale to evaluate neutralizing measures for public health and environmental hazards. The scale was assigned values as follows; none = 1; little = 2; more = 3; substantial = 4; and the most = 5. A mean score of 3.0 was obtained. Any item with a score of 3.0 and above was regarded as a neutralizing measure while items with mean less than 3.0 were not taken as neutralizer.

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Citizen perceived recommendations

Most of the measures are perceived by respondents as strategies for controlling the damages. Such measures included awareness through broadcasting documentary via mass media (4.33), regular health check via veterinary services (3.96), keeping database and regular updated of livestock keepers (3.82), proper disposal of waste (3.69), strengthening rules and policy development for local authority (3.61), reducing numbers of animal(3.48), provision of extension services (3.47), cleaning vicinity daily (3.32) (Table 4).

This finding is similar with Foeken (2006) who reported that various ways of dealing with problems of livestock keeping include restraining the animals, seeking veterinary services, feeding the animals well to limit noise and ensuring proper disposal of waste.

Conclusion

Livestock keeping at urbanized areas is increasing folds in rate now-a-days in Bangladesh because of stakeholders of such livestock systems are the dominant people of the society. Stakeholders did not provide any supplement feed or maintain proper vaccination schedule. They are almost everyone aware about the risks that come from such urban livestock production on health and environment. There are some measures taken from public interviewing which need to amend for keeping health and environment from disease and pollution free.

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