



Review Paper

Waste Management in Bangladesh: Current Situation and Suggestions for Action

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Abstract

There is no doubt that environmental condition is degrading day after day in Bangladesh. Recently, Bangladesh faces serious problems due to huge amount of wastes which stress on the carrying capacities of its natural ecosystems and its human service systems. While having a cope with these growing problems of wastes that the government confesses that it will not possible to protect the environment by itself. Waste is one of the problems that need appropriate policy, law, effective strategy, management and cooperation. The article seeks to provide the information about the present waste management system and existing legislation in Bangladesh. It also focuses on the waste management practices at public and private initiatives. Through an extensive review of literatures, this article attempts to shed light on the need for emergent integrated cooperation between public and private initiatives at all levels. The faulty system of waste management in both cities and villages are threatened due to dumping of household, medical, industrial waste and other waste products simultaneously. With a strong and integrated cooperation effort by the government, NGOs, the media, the community leaders, municipalities, city corporations, concerned authorities, political leaders, the civil society, professional organizations and voluntary organizations, the faulty system of waste management in Bangladesh can be reduced and the situation can be improved for its citizens.

Keywords: Waste, Management, Government, Public-Private Cooperation, Awareness.

Introduction

The present waste management system has become so acute that the future of the people is threatened with boundless destruction. The situation is worst in both cities and villages. Environmental problems like unplanned urbanization, industrialization, removed of garbage, disposal of hazardous wastes (both industrial and hospital), encroachment of city parks, rivers, lakes and roads, air pollution, soil pollution, water shortage, water contamination and water logging are only a few to mention. Its management is increasingly becoming a challenge. It is a mistake to think that all governmental policies will be prepared and implemented properly unless there is a cooperation and collaboration between public and private. The waste management is concerned with collection, transportation, disposal and treatment of solid waste. In this situation, the community leaders, municipalities, city corporations, concerned authorities, political leaders, civil society, NGOs, professional organizations, media and voluntary organizations can play an active role in this regard. They can work with increased environmental concerns and interests. They become important to identify the issues of concern in the waste management system in the concerned area. Thus, they motivate people and concerned authorities to follow the system of waste management and influence the government for taking concrete, comprehensive and effective policy in favor of the people. Thus,

good and effective environmental governance can solve the waste management problems with a commitment to establish sustainable development in Bangladesh. We have to ensure that the commitment must apply equally in the cities and rural areas.

The Status of Waste Management System in Bangladesh

The environment of Bangladesh has been deteriorating rapidly during the last couple of years. It is evident that the situation of environment is distinctively severe in Dhaka and it has been declared as the top most polluted cities of the world. The Dhaka city generates 6,100 tons of household waste a day¹ and collects only 4,582 tons of the total waste in 2016. If we see the past scenario of waste in 2005, the city generated 3,200 tons waste a day¹. It means waste generation has increased by 90% in the last 10 years. About 86% residents are displeased for mismanagement of waste management system in Dhaka city². 57% residents think that the whole footpath is covered by wastes and there is no place for public. 49% residents demand that waste is the one of the major reasons of traffic jam. As Dhaka turns into a Mega city infested with bustees (slums) and squatters, its environmental problems are becoming complex. Haque (2000:153)³ added some issues of concern such as unplanned population growth and migration, poverty and malnutrition, frequent natural hazards, threats to sustainable

agriculture, water quality and availability, pressure on land, depletion of forests, threats to fisheries, loss of bio-diversity, hazards of industrialization, pollution related to energy and transportation and unplanned urbanization.

Despite of rising awareness about deteriorating environment, the country's ecology has been destroyed. National Environmental Management Action Plan, 1995 (NEMAP) identified waste related environmental problems: i. wastes generating from industries are polluting the surrounding environment at different level(water, air and land); ii. almost non-existence of pollution control measures considering the waste treatment and maintain the level at the lowest stage; iii. financial expenditure increased to control wastes and environment pollution due to use of old and backdated technology, use of old equipment up to their maximum ability, etc. instead of using modern method; iv. no initiative from government to provide financial support and other incentives for setting up plant for treatment of materials those come from industries and factories.

It is believed that limited budget and environmental pollution are some significant challenges for waste management program⁴. Although cleaners are supposed to collect waste products from 6 p.m. to 10 p.m., they actually do not maintain the time⁵. As many as 81big waste collection containers have been installed and 10 secondary transfer stations (STS) in Dhaka South City Corporation (DSCC)⁶.

On the other side, 5,700 waste bins will be installed soon in the Dhaka North City Corporation (DNCC)⁷. DNCC has taken a campaign named "Clean Dhaka Program". A study done in 1997 showed that the cost of pollution from the tanneries exceeded taka 29,551 million- a figure much higher than the relocation cost. The cost has been calculated in terms of human health losses, loss of property values and loss of real income due to pollution. According to a Food and Agricultural Organization (FAO) report (1991), every day the tanneries of the country produce 8.47 million liters of liquid waste and 98 tons of solid waste. Of these tanneries, 7.70 million liters of liquid waste and 88 tons of solid waste are discharged each day from the Hazaribagh tanneries alone. These liquid wastes are extremely harmful to aquatic plants and animals. Every day tanneries of Hazaribagh discharge almost 22,000 cubic meters of toxic liquid into the Buriganga⁸.

It reports more that people face various diseases caused by pollution. The industry sector does not follow firm waste management policy. Recycling of waste material is virtually non-existent. Furthermore it will be extremely difficult to stop industries (like tanneries) dumping wastes or farmer's over-using chemical fertilizers and pesticides by regulation alone⁹. According to a report of ADB (2004)¹⁰, DCC faced some problems like lack of responsibility, lack of accountability, bureaucratic hindrance, and lack of observation, monitoring, supervision and coordination and lack of sincerity of the cleaning staff of DCC in waste management.

Dimension of Waste

There are various wastes generated in cities and villages. These are as follows:

Household waste: Most of the human waste at Dhaka city are directly mixed with water of the Buriganga, Turag and Balu Rivers every day. At present WASA (Water Supply and Sewerage Authority) operates the sewerage treatment plant in the country at Pagla which treats 20% of the city waste. Domestic wastes are placed generally on footpaths, open spaces and dustbins by city dwellers. The people face grave health risks due to an alarming rise of pollution from rotten and pile of garbage. The concerned authority collects waste from the different waste collection points and then dumps in the depots.

Medical Waste: Average waste generation in hospital and clinics was estimated at 1 kg /bed/ day¹¹. Although medical waste constitutes about 5.7 percent of total waste and collected by Dhaka City Corporation every day. When mixed with other waste, it creates contaminate the entire lot. The hospital and clinical wastes are responsible for degradation of environment in the city corporation and increasing the silent epidemics of infectious diseases e.g. Viral Hepatitis, Typhoid, Pneumonia, Gangrene etc. There are four types medical waste¹²: clinical waste, laboratory waste, non-clinical waste and kitchen waste. The medical wastes do not maintain safe management and mixed up with domestic solid waste and disposed at the city corporation's common dumping place.

Industrial Waste: Around 7,000 industries at Dhaka city are discharged tons of untreated hazardous wastes and polluting the four rivers, canals and low-lying areas. A newspaper report¹³ states that 1,176 industrial units are identified as the biggest polluters. Experts say Biological Oxygen Demand has reached a very high level in the rivers. Official at DoE (Department of Environment) said that condition of the river Balu and Turag is most dangerous. Buriganga fed oil, chemicals and river pollution goes unabated¹⁴. The report mentioned that the riverbank near Keraniganj shows the accumulated thick residue of chemicals, engine oil and other waste dumped freely here. The washing plants of readymade garment factory are gurgling effluent into the nearby water bodies. According to another study, 67.7 million liters of untreated liquid industrial wastes are dumped into the nature every day. During a survey covering 11,149 industrial units conducted during 2002-2005, DoE had identified 524 falling under the red category as per ECR (Environment Conservation Rule), 1997. Among the above-identified 524 red-listed industrial units, 417 were found to have constructed their ETPs (Effluent Treatment Plants) on their own initiatives while 105 had no ETP at all. Thus, the liquid wastes of industrial units are dumped into Buriganga, Balu, Turag and Sitoulakha contributing to severe water pollution.

Polythene: Polythene is a new dimension of wastes in Bangladesh. Polythene causes health hazards and affects soil

quality and agriculture. The research wing of Philippines based International Rice Research Institute (IRRI) said in a bulletin that polythene is harmful to soil. When it comes to contact with soil, it kills a kind of bacteria, which is helpful for land fertility. The soil fertility is gradually decreasing due to the adverse affect of polythene. It also possesses a serious threat for human when burnt in open air by creating poisonous gas that causes lungs cancer. Polythene also creates water logging problem, which played a vital role during the floods of 1998. Korean institute of Health Research warned that workers at polythene factories are more exposed to cancer, skin disease and other fatal health problems. In Bangladesh, the use of polythene bag started in 1982¹⁵. City dwellers use 6 million to 7.5 million polythenes every day¹⁶. Of this, only 20 per cent are collected and recycled. Every year 180 to 200 million polybags are abandoned.

Existing Legislation on Waste Management

The Dhaka Municipal Ordinance, 1983: The ordinance authorizes Dhaka City Corporation (DCC) to take the responsibility of removal, collection and disposal of refuse, management of latrines and urinals, control on dyeing and tanning skins, bricks, kilns, medical practice on infectious diseases and direction towards house scavenging, cleaning drainage, cleansing of streets etc. i. 78(1) The Corporation shall make adequate arrangement for removal of refuse from all public streets, public latrines, drains and all buildings and land vested in the corporation and for the collection and proper disposal of such refuse. ii. 78(2) The occupiers of all buildings and lands within the corporation shall be responsible for removal of refuse from such buildings and lands subject to the general control and supervision of the Corporation. iii. 78(3) The Corporation may provide public-dustbin or other suitable receptacles at suitable places. The Corporation may, by public notice, require that all refuse accumulating in any premises or land shall be deposited by the owner or occupier of such premises of land in such dustbins or receptacles. iv. 78(4) all refuse removed and collected by the staff of the Corporation or under their control and supervision and all refuse deposited in the dustbins and other receptacles provided by the Corporation.

The Environment Policy, 1992: The Environment Policy, 1992 intends to restrict disposal of municipal, industrial or agricultural wastes in any water bodies like rivers, ponds and drains. It also discourages open truck transportation during daytime collection of waste.

Urban Management Policy Statement, 1998: The policy considers the interest of providing economic, efficient and reliable services; municipalities shall endeavor to contract out solid waste disposal, public sanitation, drain cleaning and road maintenance.

The penal Code: It provides with six months imprisonment or fine to Taka 2000(BDT) or both for causing public nuisance

with respect to negligence about spread of life threatening infectious disease, causing damage to climate, negligence about poisonous substances. It also empowers a magistrate of jurisdiction to pass conditional order for removal of nuisance.

Environment Conservation Rule, 1997: According to Environment Conservation Rule, 1997, landfill activity by industrial, household and commercial waste is categorized as Red Category activity and therefore undertaking any landfill project must consider environmental impact assessment and NO Objection Certificate (NOC) need to be obtained.

The Factory Act, 1965: The act address with cleanliness, disposal of wastes and polluted liquids, air circulation and temperature control, control of dust, sand and smoke, artificial ventilation, heavy traffic arrangement of sufficient light, drinking water, toilet, latrines etc. within the mills and factories.

Directions from the High Court to stop dumping waste in the Buriganga River, Dhaka

Human Rights and Peace for Bangladesh served a legal notice to save the water of Buriganga River in the High Court in 2010. The High court in 1 June, 2011 came up with a judgment and gave some directions to the concerned authority. All sewerage lines which are connected with Buriganga and waste treatment lines from industries have to obstruct to discharge liquid wastes in the rivers within one year. The Chairman was ordered to implement the work. The responsibility of BIWTA (Bangladesh Inland Water Transport Authority) was to eviction of illegal possession of lands from the river bank. According to the direction of the High court, DCC will organize awareness program to create awareness among people to stop dumping waste along with the river and will hang the placard of High Court direction. Everyone will know about it.

3R (Reduce, Re-use and Recycle) Policy

Waste management program are implemented through national 3R (Reduce, Re-use and Recycle) policy. It has been developed with the support of United Nations Centre for Regional development (UNCRD) and Ministry of Environment of Government of Japan. Waste Concern gave technical support to prepare it. The strategy was prepared in participatory manner with series of workshops participated by all relevant stakeholders from central to grass root level. The national 3R goal for waste management is achieve complete elimination of waste disposal on open dumps, rivers, and floodplains by 2015 and promote recycling of waste through mandatory segregation of waste at source as well as create a market for recycled products and provide incentives for recycling of waste. The program has been introduced in the domestic level. It does not take consideration the implementation issue in the production sector, industry, commerce, property consumption. Recently, 5R (Re-think, Reduce, Recycle, Recovery, and Re-use) is so effective from 3R. So, we have to shift to 5R soon.

Waste Management Practices at Public-Private Level in Bangladesh

South and North City Corporation in Dhaka: It is responsible for solid waste management in the metropolitan area. It collects wastes from residential areas, markets, commercial establishments, industries, clinics, hospitals and diagnostic centers etc. It is very difficult to calculate accurately how much waste is generated in the capital a day. According to JICA, Dhaka city produces 3,200 tons of waste a day. But, Waste Concern¹⁷ claimed that it will be 4,500 to 5,000 tons. 15,000 tons wastes are polluted the environment in the cities beside Dhaka city. It was estimated that approximately 6,110 tons of waste is generated everyday in Dhaka city from various sources like resident, commercial and industrial units with per capita generation about 0.5 kg/day. The DCC collects 44 percent of the total waste with its 7,156 manpower for 82 wards¹⁸ and financial capabilities. There were three dumping depots in Dhaka city such as Matuail, Mirpur and Lalbagh. The areas have been filled up. Bhasantek, Aminbazer, Kamrangirchar, Badda are also filled up soon. The concerned authority is looking for new dumping waste depots in new area in city. It creates new additional problems. Dumping most of the Waste at the residential area of Nababganj in the Dhaka city has polluted the environment and health hazard making the area unsuitable for human habitation¹⁹. Corruption has taken place in waste management system of DCC and core taka was spent officially for waste transportation²⁰. The concerned people of DCC are not conscious to dumping wastes in the proper place. The local people accused that the staff are corrupted to save money from oil cost²¹.

Chittagong City Corporation (CCC): The city produces over 2,220 tons of wastes daily. The CCC is responsible for waste management program. CCC took up a pilot project for garbage treatment plant in 2004. The project at the CCC garbage dumping ground at Haliashahar had gone to into operation to produce fuel from rubbish. The project was implemented with its own technology and manpower at a minimum cost. CCC also set up a plan to produce fertilizer (compost) from the by-product at the plant. However, CCC cannot perform properly the waste management program due to manpower, finance and transportation problems. Once upon a time, Chittagong was considered as the clean city. But, current management is far from satisfactory due to absence of proper management system.

Waste Concern: It is local NGO, has added a new dimension to make organic solid waste a profitable commodity. It aims to improve the environment by promoting waste recycling activities in Bangladesh through conduct research, experiments on solid waste management, recycling, clinical and hazardous waste management, waste water treatment and organic farming, develop community-private sector-municipal partnership for improvement of urban environment. It has created job for the poor. Waste Concern recently initiated Clean Development Mechanism (CDM) for collection and treatment of waste in a plant. It is funded by Netherland Government.

Prism: It started its works on community based urban waste treatment project in Khulna city in 1989. It has also organized awareness building workshops, meeting, seminars, rallies to concentrate on waste water treatment and domestic waste management. The main focus of Prism was the waste management of government and non-government hospitals, private clinics and diagnostics centers at Dhaka city. It is the first step in Bangladesh in waste management system.

Dustha Shasthya Kendra (DSK): It works in Dhaka and Chittagong. It provides Health and Hygiene Training on waste management. 100 slums are trained about health, how to keep the home clean and the importance of disposal waste in specified dustbins. It also monitors the activities. It undertakes cleanliness drive with its own water management committee in DSK project areas after every three months.

CARE: It takes initiatives in Tongi, Dinajpur, Mymensingh and Jessore through 'Shahor project' funded by USAID since 2000. It is new project in the slums of those areas.

Prodipan: It started with domestic wastes in Khulna city in 1997. It got financial support from Swiss Development Cooperation. Later, it involved with medical wastes. Khulna City Corporation also helped Prodipan to dump waste in a particular place.

'Clean Kalabagan': Some local initiatives have also been remarkable in some areas of Dhaka city such as Kalabagan, Kanthal Bagan, Dhanmondi, Uttara, Mirpur, Banani and Shamoly for solid waste management. Among them 'Clean Kalabagan' is the first initiative in the waste management by private initiative. Mr. Karam Mahub set it 10 years ago. He took initiative first experimentally and did not take any fee for collecting waste. When it has been successful in waste management then, it became a community based private initiative in waste management. There is important that solid wastes are collected from door to door of the participating households under the private initiatives. Then, wastes dump into DCC waste dustbins.

Suggestions for Action

Create awareness among the citizens: It may be said that people are not aware enough. Not only the illiterate people, but the educated people are also not aware about the environment. We do not have environment oriented eternal attitude. We do not care to know about law or act or if we know the law, we do not follow. We do harm to nature, human beings and our next generation. Waste is a great concern for the city. We throw household waste in the streets and do not use the dustbins for waste disposal. Waste management system should be started from every family. Most of the households throw the waste on the streets, lane and outside of dustbins as and when waste is generated. Thus, dumping of wastes blocks the manhole, drains and creates water stagnation in many areas on a permanent

basis. It should be maintained to dispose waste in particular time and place. Another issue is important that if waste is separated and packaged them into separate bags according to kitchen waste, paper, plastics and electronic parts, it will be easy for concerned authority to dump waste. It is an urgent need that people of the city should aware about waste management system through media (print and electronic). It should be prohibited to dump waste openly in dustbin. We know that if we dump waste openly in dustbin, mosquitoes and others carry poisonous bacteria's from it. About 40% diseases can spread from waste.

Create responsibility among the concerned authority: The concerned authority is responsible for five steps of waste management such as collection, transportation, recycling, treatment and dumping of wastes. Although cleaners are supposed to collect waste products from midnight till dawn, they actually do it in the morning. It is common in Dhaka and Chittagong. So, concerned authority should think about it. Every step should move with modern, proper technologies and proper time.

Use modern technology: The concerned authority should use modern technology to destroy the harmful waste. Only the ICDDR²³ use modern technology to destroy medical waste in Bangladesh. But, it is very expensive. Another technique is decomposing system. It is less cost and more viable. Wastes are buried in different layers of soil at the ground in this method. Bangladesh can follow this practice.

Make a Committee at ward level and establish of strong collaboration and partnership among various stakeholders: It will include government, municipalities, city corporations, NGOs, industries, restaurants, markets, factories, local community to provide appropriate waste management. Support services from government should be provided to the stakeholders to take responsibility of their waste, and participation in waste minimization. It can manage by a community based waste management committee in an every ward of City Corporation or municipalities.

The both City Corporation in Dhaka have to set up permanent and portable dustbins in all slums. A committee may be consisted of ward member, political leaders, school teachers, health workers of family planning, youth groups, voluntary organizations, mass people, religious leaders, social worker, media, *bazer* committee, chairman and members of Union parishad, local NGOs and government officials will be included with this mobilization process. In the family, elders can teach children about the harmful effect and management of waste. In this regard, television, radio, internet and newspapers should give a campaign for wide publicity. The committee should have a waste action plan which will be harmonized with national action plan. The best committee will be awarded by government in every year and concerned area will be declared as clean area.

Low Cost in management: Now, 2,400 TK is spent for one ton waste²². If community-based committee can work with commitment and proper management, then the cost will be less.

Take a movement for mobilization: To succeed the waste management campaign, concerned committee has to make aware the mass people about the effects and management of waste and they will have to start a new movement for people's awareness. It will be started from the grassroots level. In the case of waste management, it will better for raising a movement from ward level mobilization. Then this mobilization process will be merged with Union, Union to Upazila, Upazila to Zila, and Zila to national level or ward to ward and then the whole municipalities or City Corporation. Though it will be time consumed, the mobilization process will be the key strength of the movement. The concerned committee has to monitor and inform the concerned authority about the present situation. To implement the decision, the national committee has to continue work and negotiation with the government.

Education and training: NGOs and the government need to play an important role in providing education and training on environmental concerns including waste management through workshops, rally, human chain, posturing, leaflet, print media and electronic media.

Law and monitoring: Disposal of wastes should be dealt with by both public and private sectors (perhaps under government license), while standard setting and monitoring, establishment and control of legislation should rest with the government. Waste related law should be implemented in the city. None of the residents know the law. For example, Dhaka City Corporation ordinance (1983) provides for punishment of jail and penalty of BDT 50 to 10,000 for littering wastes on the streets if anyone is found violating the rule. But, the rule is never followed as there is no monitoring body to oversee the violation of the law. The mayor of DSCC told in a meeting²³ the residents have to dump waste in the city corporation dustbins or containers after 7 p.m. It is a rule of DSCC, so the resident should follow the rule for cleaning the city. If needed, new regulations on wastes have to make in such a way so that they fit into an existing framework of laws on municipal waste, on chemicals and pesticides, on public health and safety, on industrial permits, on public sewer systems, on the management of air and water pollution, and on transport safety.

Advocacy for public awareness, motivation on different aspects of waste management: It is encouraging that voluntary civil environment movement has taken shape in Bangladesh. Several specific issues-based movements were conducted by some environmental organizations that emerged in 1990s. Islam²⁴ writes that many members of the civil society are coming forward with initiatives. These initiatives have produced some positive results. They can take initiative for cleaning city campaign. "Cleaning the City" campaign has been started regularly on the last Friday of every month to build awareness

among the residents. It was a regular program of DCC. But, none of residents are aware of it. It is also urgent need to create awareness among the citizens.

Encouragement for recycling of waste materials: It will include office papers and ensure assistance in creating markets for recycled products. Waste can be treated as resources. It is proved that waste is not waste, waste is resource. Recently, waste means organic fertilizer; waste means electricity, waste means energy, waste means source of income.

However, China uses 95% human waste as fertilizers in the agricultural sector. If organic fertilizers are produced, 350 million TK will be saved per year. Our dependencies on chemical fertilize will decrease. The latest invention 'Plasma plus Technology' can produce electricity from waste materials. Nearly 35 lakh people live in 4,500 slums in the Dhaka city. More than one lakh poor collect 13% waste and use them in the recycling industrial sector. In this regard it is necessary to create awareness about the recycling system of waste management among the slum dwellers. Waste also creates job opportunity for the poor people. Thus, waste management system will bring better efficiency, economic development and minimize the cost of the operation.

Develop Sewage and industrial waste treatment plants: It is vital necessity to develop sewage and industrial waste treatment plants for the millions of people in the capital city. At least five major effluent treatment plants should be urgently required for treating millions of liquid waste.

Conclusion

Unabated environmental degradation has far-reaching effects on both the physical and mental health of the people and by implication on the future of the country. To say the least, environmental pollution of waste practice is in a deplorable state. Volume of waste products will also increase due to increased urbanization.

If effective steps are not taken immediately, the whole environment will be polluted. The government should deal with the management program more importantly both policy including formulation and implementation level and administrative level including management, monitoring and enforcement of law. Beside this, adequate manpower and budget, modern technology, adequate number of transports and dustbins are necessary in the management level.

All City Corporations have to setup permanent and portable dustbins in all slums and all wards. We hope that government will consider it urgently. There is necessary to remain coordination among policy makers, civil society, stakeholders, NGOs, concerned administration, WASA, Scouts, media and City Corporation to implement a waste management program. It will be possible if their effective coordination works.

References

1. The Daily Kaler Khanto. (Publish in Bangla). Dhaka, 30.11.15
2. Sankar Saha Partho (2016). 86% people are dissatisfied with waste management program. see the report in the Daily Prothom Alo. Dhaka, 04.05.16 from www.prothomalo.com.
3. Haque Mahfuzul (2000). Implementation of International Conventions, Treaties and Protocols on Environment and Development. Bangladesh: State of Environment. *FEJB*, Dhaka, Bangladesh.
4. The Daily New Age. Dhaka, 29.02.08
5. The Daily Prothom Alo. Dhaka, 04.05.16
6. Dhaka Tribune. Dhaka, 13.05.16
7. The Daily Prothom Alo. Dhaka, 04.05.16
8. The Daily Star. Dhaka, 02.08.09
9. Mahtab Shahabuddin (1993). The Role of NGOs in Conservation and Population Activities. A National Symposium Proceeding from People, Development and Environment: Complex Interlinkages in Bangladesh, IUCN and Bangladesh Rural Development Board, Dhaka, 3-4 November.
10. ADB (Asian Development Bank) (2004). Reforming Dhaka City Management. Report of Asian Cities in the 21st Century, V-03, ADB, Dhaka.
11. Kazi N.M. (1998). Waste Management in Dhaka City. Souvenir from 5th June 'World Environment Day'. Department of Environment, Dhaka, 5th June.
12. Tabassum S. (1999). Hospital Waste Management in Dhaka City. Unpublished under-graduate thesis, Department of Environment Studies, North South University, Dhaka.
13. The Daily Star. Dhaka, 20.06.09.
14. The Daily Star. Dhaka, 17.09.09.
15. ESDO (2001). A study of ESDO. Environment and Social Development Organization, see in the website of ESDO, www.esdo.org.
16. Action Aid (2001). Bangladesh: Disaster Report. Action Aid, Oxfam and Save the Children (UK), Dhaka.
17. Waste Concern (2016). Waste Concern is a non-profit organization and it is famous for waste management program in Bangladesh. See the detail in the web site of Waste Concern www.wasteconcern.org.
18. The Daily Star. Dhaka, 09.05.05
19. The Daily Prothom Alo. Dhaka, 31.08.06
20. The Daily Prothom Alo. Dhaka, 04.08.11
21. The Daily Prothom Alo. Dhaka, 31.08.06

22. The Daily Prothom Alo. Dhaka, 31.07.11
23. Mayor Sayeed Khokan (2016). Comments from official Meeting. May 3, 2016, See for more detail in the Daily Prothom Alo. Dhaka, 04.05.16.
24. Islam Nazrul (2016). Protecting Bangladesh Environment: The Role of the Civil Society. See for more details in the web site www.eng-consult.com/ben/papers/paper-nislam.pdf, access on 29.09.16.