



Lotus can blossom in cow dung

By Dr Nizamuddin Ahmed

NOT many seminars and workshops in the country can conclude without the participants calling for a need to raise awareness on the subject matter; call for responsiveness and sensitivity of the policy and decision-makers, the users and the general public. The workshop that attempted to find a solution to the menacing state of waste management in capital Dhaka was no different.

And why not? The city receives over 5000 tonnes of untreated human excreta every day, leading to extremely detrimental consequences for life, aquatic and human. A quarter of the city's population defecates in the open. Half of the city's septic tanks are ineffective. Sanitary and storm water drainage have become one below ground. Industries are connecting illegally to public sewerage lines, causing lasting damage to life, plant and animal, including humans. If you would allow me to be a bit brazen, I could safely admit that we are in a lot of shit.

Statistics demonstrate that the higher income group accounts for about 60 per cent of domestic waste and the middle-income group for about 30 per cent. So the much-blamed poor are to be held responsible for only ten per cent of the problem.

The Dhaka City Corporation (DCC) is capable of collecting and dumping only about half of the solid waste generated in the city daily. But that generates yet another dismal situation. Tests have shown that people living in and around dumping sites at Matuail, Lalbagh and Mirpur are having to drink water contaminated with lead and chromium found at concentrations much higher than that recommended. The reason: DCC's unacceptable method of crude dumping of solid waste in low-lying areas. Without any proper control and sanitary landfill, the city's groundwater is being readily polluted.

To add to the despairing state of affairs, hospital and clinical wastes are being dumped into waterways and dumping yards without any treatment. River Turag to the North of the city may have been turned into an open drain because clinical wastes from Suhrawardhy Hospital looks like having been directed to a brick storm sewer that terminates at Gabtali. Frightening revelation indeed!

It is appalling and totally unacceptable that, in this age and time, existing legislation on environment, particularly the DCC Ordinance, does not address specifically the management of solid waste. A whole new set of laws may be needed if legislation is to be contextual to the present and future needs of the country.

It has again emerged in this workshop that the DCC is hopelessly inadequate to manage the city, with speakers claiming that DCC's Conservancy Department lacks the necessary skill. Therefore, the workshop has again raised the cry for city zones to be activated as independent city councils. Even the concept of privatisation of waste management has been considered as an option in the discussions.

The function and character of the Department of Environment (DOE) and the concerned ministry (MOE) have come under the microscope; the results are dismal and leave much to be desired. Their occupation should not be that of only a watchdog over those impacting harmfully on the environment, but also to promote awareness.

It is perhaps in the area of raising awareness, for themselves as well as for the public, that the Scouts could play an important part. With over one million scouts from ages 7 to 70, male and female, spread across the country, practically any institution could use this very organised instrument to impart any worthwhile message.

Dealing with waste is not an altogether waste of time. Among the positive revelations at the workshop was the disclosure that waste can indeed be made profitable, often simply by waste minimisation. Some NGOs have already picked up the positive cue. The good in the litter is recoverable by recycling and composting, the two more feasible and tested methods of retrieval. Such inputs must be in the curriculum of schools, vocational training institutes and polytechnics; universities must indulge in relevant research. Mass education should be brought into the programme.

Those present were convinced that among the urgent necessities were a comprehensive study to ascertain the actual state of affairs of the waste and a pollution prevention programme. An all-embracing plan must include the concerned government agencies and provide impetus to the initiative of the NGOs.

It is now up to the concerned government agencies and the DCC to pick up the constructive tone of the workshop and go for immediate and effective action. There is no need to wait for more funds and skilled manpower. It seems that wonders could be done with the resources and powers already at hand, however minimal. If only the ministry, the DOE and the DCC discharged their duties with greater diligence. For the NGOs there is no room for complacency.

The author is Professor, Department of Architecture, BUET; and Consultant to the Editor, The Daily Star, on Urban Issues



Participants



Moderators

Mahfuz Anam and Dr Nizamuddin Ahmed

Group 1: Human Waste

Nazmul Ahmed, Member, POROSH
Md. Zafar Ullah Nizam, MSS student, Population Sciences, DU
SM Faruque Hossain, MSc student, Geography & Environment, DU
Md. Nurul Haque, Superintendent Engineer, DWASA
Md. Shahidul Islam, MA student, Philosophy, DU
Anisur Rahman Khan, Sanitary Engineer, Chairman, Social & Management Consultants
Prof. Dr Nazrul Islam, Chairman, DWASA
Prof. Dr Feroze Ahmed, Dept of Civil Engineering, BUET

Group 2: Solid Waste

Saifuddin Mahbub

Md. Asaduzzaman, Research Officer, DCC
Md. Sirajul Islam, Asst Town Planner, RAJUK
Dr Mahmudur Rahman, Secretary-General, IPD
Engr. Tassem A Khan, IPD/BAPA
Architect Shaheda Rahman, Dept of Architecture, BUET
Shafiqul Azam Ahmed, Water & Sanitation specialist, WSP, World Bank
Aminul Islam Sujon
Md. Nuruzzaman, Field Commissioner, Community Development & Health, Bangladesh Scouts
Mohidul Hoque Khan
S-M-Mofidul Haque
Engr Anwar Hossain Patwary, DCC
Engr Sunirmal Mondal, Expert Associate, SWM, DCC

Group 3: Industrial Waste

MA Hanif Tipu, Bangladesh Agricultural University
Ahmed Shahriar, DU
Prof. Dr Jasim uz Zaman, Chemical Engineer, Calgary, Canada
Fouzia Nasreen Sultana
Syed Rafiq Ahmed, President's Rover Scout
Prof. Dr Md. Mujibur Rahman, Dept of Civil Engineer, BUET
Abu Nesar Khan, General Secretary, POROSH
Ahmed Qazi Asiful Huq, Asst Field Commissioner, Bangladesh Scouts
Group 4: Scouts in Waste Management
Habibur Rahman
Afzal Hossain, National Commissioner, Bangladesh Scouts

Md. Abul Husain Sikder, Executive Secretary (Acting), Bangladesh Scouts
Md. Anwarul Islam Sikder, PS to the State Minister for Fisheries & Livestock
Natasha Israt, Student, Vigarunnissa College
Nazmul Haque Nazu, Deputy National Commissioner, Bangladesh Scouts

Other participants

Md. Shamsul Alam Monir, DU
Md. Shahnur Rahman Shahan, POROSH
Milu Chowdhury, MD, MASS
Sushil Sutradhar, MASS
M Abdul Alim, ITN, BUET
Prof. Sirajul Islam Khan, Dept of Microbiology, DU
Habibul Alam, Bir Pratik, National Commissioner, Bangladesh Scouts
Omer Sadat, Barrister

Waste Management in Dhaka City: Towards a Solution

Deliberations of The Daily Star-Bangladesh Scouts workshop held at the Scout Bhaban on November 18, 2000)

Dr Nizamuddin Ahmed, Department of Architecture, BUET, as Moderator: In the last workshop on this particular issue, we learnt that we were in deep trouble. We thought that if we got together and simply discussed the problem again, we would not be getting anywhere. So we thought, why not delete five or six steps between the problem and the solution and go straight for a solution. Let's see if we can do something pragmatic and tell the government that this is what needs to be done. We are sure they have some problem somewhere. Either there is a lack of manpower, lack of experts or lack of money. The only thing we don't lack in Bangladesh is 'knowledge'.

When we discussed this issue last time, we found that everybody is aware that there is a big problem. The NGOs are aware, the government agencies are aware, the academicians are aware. Everybody knows that there is a problem. So we thought why not go for a discussion on a solution. In that regard we have invited the Division of Environment, the Department of Civil Engineering, BUET to present us a possible solution.

Somebody has to start the ball rolling. Then we can all criticise that and then, hopefully, together we can come up with a solution that we think is a right way to approach this menacing problem.

Professor Dr Mujibur Rahman of the Department of Civil Engineering will now present the keynote paper, *Waste Management in Dhaka City: Towards a Solution*, or as the Editor has printed in his paper (The Daily Star), *What to do?*

We would also like to see if the Scouts could have a role in tackling this problem. If our 11 to 12 lakh Scouts were aware about waste management, we would have gone a long way.

Keynote paper

Professor Dr Mujibur Rahman, Department of Civil Engineering, BUET: We are all aware of the alarming situation of waste management, particularly in Dhaka City. However, I would like to offer a few points, based on which we can discuss the issue and maybe arrive at a point where we can have a plan of action.

We are really worried about waste management in the city because it leads to environmental pollution in the city.

The three primary phenomena, which can be seen as responsible for the increasing waste, are: a. increase of population in the city; b. Unplanned urbanisation; and c. unregulated industrialisation in the city.

We have identified the following four sources as major causes of pollution: a. human waste, b. municipal solid waste, c. industrial waste, and d. gaseous waste.

Today in this session we are going to discuss the first three. Gaseous waste related to air pollution may be discussed at a separate forum. But these three sources are extremely important as sources of pollution. Let us recap actually what happens due to the pollution from these waste sources.

First, human waste or domestic sewage. The environmental impact of this is mainly water pollution and consequently oxygen depletion primarily endangering aquatic life. That is the main impact of human waste reaching the environment; disease transmission of course follows.

Industrial waste also causes oxygen depletion in water bodies endangering aquatic lives, as well as toxic heavy metal accumulation in the food chain and thereby endangering human lives.

And from solid waste occurs public health problems due to improper storage, collection and dumping, and potential surface and ground water contamination from uncontrolled dumpsites.

These are some of the important impacts on the environment due to poor management of human waste, industrial waste and solid waste.

Let us now start with human waste or, in other words, domestic sewage system of the city. Now this has become a major contributor to environmental pollution as a result of the following factors, particularly in this city:

Fast growing population: We all know that the population is growing at a very, very fast rate and the urban facilities, particularly the inadequate sanitation facilities, are not being able to cope with the growth. Waste treatment system is also not there.

Let us recap the present situation with regard to sanitation in Dhaka City. Assuming an approximate population of eight million within its service area, Dhaka WASA has got a conventional sewerage

system that serves about one-third of the area and 20 per cent of the population of the city area.

As other major waste disposal options in Dhaka City, there are individual septic tanks, which account for about 40 per cent of the total city population. During the last decade or so, sanitary pit latrines are being promoted in low-income areas, which cover roughly 15 per cent of the WASA service area population.

So this 75 per cent population of Dhaka City can be said is covered by some form of sanitation facilities. The remaining 25 per cent resort to unsanitary means, primarily open latrines, drains and so on, including open defecation.

What do we really observe regarding the sewage disposal system in Dhaka City? WASA operates its only sewage plant at Pagla. This is the only sewage plant that we have, in fact, in Bangladesh, that receives domestic sewage. It is meant to receive domestic sewage from the city service area. And the situation is that the treatment plant never receives the expected amount of sewage from its service area. That means a portion of sewage is being lost in the system.

Regarding the level of treatment, laboratory investigations reveal presence of heavy toxic metal in sewer treatment plant effluent, and that indicates connections from industries. Sanitary sewage system is actually meant for both domestic sewage and industrial sewage provided the industrial sewage is made appropriate for connection. Since the effluent of Pagla sewage treatment plant contains high concentration of toxic heavy metals, it indicates that the industrial waste being connected to the sewerage system are not of appropriate level.

More than half the septic tanks in the city are without proper effluent disposal facilities. I've said that about 40 per cent of the population is covered by septic tank system, but of that 40 per cent, more than half of the septic tanks do not have proper effluent disposal facilities. And septic tanks open to drains, storm sewage system, low-lying areas are common. This is primarily because of the increasing amount of water being used and increasing amount of wastewater being generated and also the inability of the soil system to absorb this wastewater.

Sanitary sewerage connections to storm water drainage system are common. These illegal connections are on the rise. Storm drainage system is actually not meant for domestic sewerage. If this continue to increase the storm drainage system is bound to malfunction or is already malfunctioning. We can already see the blockages.

People find it easier to connect to the storm water system whenever they find that there is no sanitary sewerage system in that area or the sanitary sewerage system is overflowing or overloaded all the time. The other possible reason is that the storm water drainage system is free. Therefore, it is very easy for the household, if they have a storm water drainage system nearby, to be tempted to connect to that system. Domestic or industrial sewage connection to storm drainage system leads to non-functioning of the system, as it is not designed to connect and carry these wastes.

Pit latrines in densely populated areas are not always successful because we always consider these low-cost sanitation systems for the low-income areas of the city. These are very densely populated areas and therefore the pit latrines are not always suitable primarily because of the inability of the soil system to absorb the increasing quantity of sewage and, more importantly, the non-availability of pit-emptying services.

In most cases, it is seen that a sanitation option is not always complete. Regarding septic tank system, we have the tank within the household, but we don't have the effluent disposal system.

We promote pit latrine in slums, but then we do not look back when the pit is full. The people either have to dig a new pit or resort to other unsanitary means. So it is an important issue that we make available pit-emptying system, especially when we consider this option for high-density population areas.

If we talk about sanitation coverage in the city, that means of the eight million population, only 1.6 million are served by the sewerage system of Dhaka WASA, another 1.6 million served by septic tanks and 1.2 million by sanitary pit latrines. The remaining 3.6 million discharge directly into the open environment. This leads to an estimated 5400 tonnes of human excreta entering the environment everyday, assuming 1.5 kg of human excreta per day per person. That means over 5000 tonnes of human excreta untreated in the open environment everyday. This means a daily waste load exerting a demand of 72 tonnes of oxygen primarily from the water environment around Dhaka

City. The effects are apparent when we look at the water bodies in and around Dhaka. We can see that most of the water bodies are totally dead in winter and go under septic conditions. Even in the rivers around Dhaka City, we can see there is no fish; aquatic life is not there. That is because of the heavy oxygen demand from the waste load.

What can we do? These are some my suggestions, but the matter is open to discussion.

First of all, all concerned must appreciate the consequences of the lack of sanitation. Do we really appreciate these problems? This is a serious problem and we talk about it in many forums, but we have to be a bit more serious. This lack of sanitation services may cause a destruction of the water environment and aquatic resources. This has already taken place: b. transmission of diseases leading to poor public health, incurring a lot of money in costs of medical services; c. ultimately low productivity, low economic growth, poor quality of life.

This sequential effect must be appreciated by all concerned. It is not only we, the government and all concerned agencies must appreciate the consequences.

High priority must be given to providing and facilitating sanitation services. This is an important factor. Presently sanitation enjoys a very low priority. Traditionally, it has been happening that way. It has never enjoyed high priority. It cannot compete with building roads, bridges, etc. Sanitation always takes the back seat and that probably leads to these serious end results.

The other point is decentralisation of the administration. Dhaka WASA is the central organisation which actually attempts to administer and manage the wastes of the entire city. It's a huge city, a megacity, and for an organisation like Dhaka WASA, a good approach would be to decentralise its sanitation system for providing efficient urban sanitation services.

In decentralising the administration, maybe the organisation can split into 10 or 14 sub-zonal offices with adequate powers and administrative capacity. Everybody, beginning with the executive engineer down to the cleaner, everybody is responsible to the central office. You have to delegate in the real sense. That probably will be helpful in improving the situation.

Promotion of private sector participation in service delivery is another area we talk about in seminars and workshops, but this is not really taking place. We could probably take initiative in some area, I don't know if WASA has some programmes on that, an area that we should really examine. By taking some pilot schemes or areas, maybe we can assess private sector participation.

The data on solid waste management is already known to all of us. Solid waste is discarded waste from domestic households, which are solid in nature. Garbage is a major component of solid waste. This includes kitchen waste. When we say solid waste, it also includes metals and other inorganic waste.

DCC (Dhaka City Corporation) claims that about 3,500 tonnes of solid waste is being generated in the city everyday. DCC claims that about 1,800 tonnes, a little over 50 per cent is the solid waste, which is collected and dumped at its disposal sites. That is what DCC claims. But, there is literature that suggests that a far less amount is being collected. DCC also reveals that about 900 tonnes go to the backyard and land filling. About 400 tonnes remain on the roadside and open spaces, about 300 tonnes are recycled by the rag pickers and about 100 tonnes are recycled at the generation point. These are all DCC estimates. The actual generation of solid waste is not really known. It is not based on a comprehensive study of quality and quantity. This is only a sporadic study from here and there.

DCC also estimates that the residential waste accounts for 49 per cent of solid waste, which is 1,718 tonnes per day. Twenty-one per cent of the solid waste is commercial waste, which is 722 tonnes per day. Industrial waste accounts for 24 per cent, which is 835 tonnes per day, and hospital waste seven percent, that is 255 tonnes per day. That is the estimate of DCC. Also, according to statistics, higher income group accounts for 58 per cent of domestic waste, middle-income group for about 30 per cent and lower income group for about eleven per cent.

Regarding solid waste collection, we have seen this terrible, totally inadequate collection system in Dhaka City. This is all apparent in the city. Over the last few years, there have been some local initiatives through which local areas undertook the primary collection from households by vans. They then dump these into DCC community bins. This was initiated quite some time ago in Kalabagan and that has had a

good impact on the collection system.

The impact is clear. In areas where the local initiative is existing, we can see that the areas are very clean. But, in effect, the people have transferred the waste to the secondary collection point, which are now the main roadsides. The roads have become the main dumping ground. You can call Green Road a dumping ground. Half the road is a dumping place. These are examples. That indicates that DCC is providing a very inadequate service of collection. If we divide this collection into primary and secondary, now the primary collection with local initiatives works very well. But there are of course some issues within that. The secondary collection system of DCC, that is, from the community bins to the city dumping grounds is in a dismal condition.

Waste Concern (an NGO) is taking a good initiative by converting the organic waste into compost, which has high economic value. This is being done on a site in Mirpur as a pilot scheme.

These are some of the initiatives that the local people of a community have undertaken.

Dumping of solid waste of the city is again by a very unacceptable method. Solid waste is dumped in low-lying areas in and around Dhaka City. DCC has already abandoned six dumping sites after filling them to their capacity, such as in Mugdipara and Jatrabari. Three more are expected to be filled up in a couple of years. The process in which they are taking the waste is not acceptable. It's a crude dumping of solid waste in low-lying areas without any proper control of waste being transmitted to groundwater. When solid waste is dumped in a place, the organic parts start decomposing and the liquid that is being generated in the process is called leachate. This moves to the ground-water or surface water, and this is a major concern about the solid waste dumping grounds.

DCC has two different systems of collection. Disposal by container is one. Now we can see large containers being placed haphazardly on the roads. The other is by trucks, including some open trucks that collect garbage from fixed concrete bins along the roads.

The point that I was trying to make regarding leachate is that there are some data on laboratory investigations on leachate. The biochemical oxygen demand, that is the oxygen required for the decomposition process, varies from 980 to 10,000 milligrams per metre, which is extremely high. If this leachate is not controlled and treated before disposal, then it is definitely going to impair the water quality, both surface and groundwater. There is evidence that groundwater and surface water bodies surrounding these dumping sites are being heavily contaminated.

The heavy metals, chromium and lead, are also on the very high side of concentration. Chromium is .18 to 51 milligrams per litre, whereas the discharge standard of chromium in surface water is only .5 milligrams per litre from treated effluents. The drinking water standard suggests that .05 milligrams per litre of chromium are acceptable whereas the leachate composition shows that it can be up to 51 per litre, which is extremely high.

Lead standard is also similar. We can see that the leachate composition varies between 1.58 to 13.51 milligrams per litre. This is also very high. This data is based on some studies on different dumping grounds on DCC during late 1999. This actually shows the range of concentration, from minimum to maximum, taken from five different dumping sites including the current one at Matuail and also Mirpur-Gabati area. We have also taken some samples from tube-wells around the dumping sites. It shows lead concentration varying between .134 and .286 milligrams per litre. This is the water that people drink. This is very high in concentration. So is the case of chromium concentration. This is definitely a matter of great concern.

In surface water, BOD, that is the biochemical oxygen demand, is found to be very high. Lead concentration we found .261 to .543 milligrams per litre, chromium .014 milligrams to .088 milligrams per litre. Total coliform, the total bacterial count, varies from 4.2 to 7.6 million per 100 millilitres sample, whereas it should be less than 5000 per 100 millilitres. We can see the extent of pollution.

So the situation clearly indicates that the pollution of ground and surface water is taking place from these dumping sites. What can we do about this? We know there are some existing legislation. We have Environment Conservation Act 1995. There is the DCC Ordinance 1983, the Town Improvement Act 1953. There are all in place, but they do not specifically address the management of solid waste in the city.

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