State Minister
Ministry of Environment and Forests

MESSAGE

In the absence of proper collection, segregation and disposal practices, waste management has become a growing concern in Bangladesh. Therefore, a National strategy for waste management has been an essential need for reducing environmental, social and economic impacts associated with present day disposal practices based on end of pipe solutions.

I am pleased to know that the Department of Environment (under the Ministry of Environment and Forest), with support from UNCRD and Ministry of Environment of the Government of Japan, developed a National 3R (Reduce, Reuse, Recycle) Strategy for Waste Management. This was undertaken in order to solve waste management-related environmental issues. The National Strategy covers waste reduction, reuse, recycling and thereafter final disposal of the residual waste in an environmentally sound manner for different types of waste.

This Strategy has clearly spelt out the roles of government, citizens, industries, private sector, NGOs, informal sectors, SMEs, media, and research bodies in the implementation of the Strategy.

I would like to take this opportunity to express my gratitude to the officials of the Ministry, the Department of Environment, other related government and non-government organizations, experts and individuals for their dedication and commitment in the development of this strategy through an extremely participatory process, which included a series of workshops and seminars involving all stakeholders.

I would like to thank UNCRD and the Ministry of Environment of the Government of Japan for providing support to develop this strategy under a project entitled "Formulating National Strategy on Waste Reduce, Reuse and Recycle (3R) for Bangladesh".

I have no doubt that the implementation of the National 3R Strategy for waste management will help improve the physical environment and quality of life of our people. It will also help build a resource recirculation based country. Implementation of this Strategy will simultaneously help prevent disposal of waste in environmentally sensitive areas such as rivers, wetlands, and low-lying areas and reduce the impacts of climate change - issues which the present government is endeavoring to address in a priority manner.

I sincerely anticipate the support and cooperation of all relevant sectors in this effort to create a clean and sustainable environment for our present and future generations.

Dr. Hasan Mahmud, MP

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CONTEXT

1.1 Introduction

Rapid urbanization has made waste management a serious problem today. The perception of the people has always been that it is a responsibility of the local government bodies. Local authorities are bound to keep their area clean. For some time now, many municipalities, city corporations and industries have been experimenting with several innovative and participatory methods of Reduce, Reuse and Recycle waste. Over the past few years, Bangladesh has been engaged in experimenting with new technical options and administrative processes to find innovative methods to address waste management more effectively. There are more than 522 towns and cities, which are hubs of rapid economic development and population growth, generate thousand of tons of waste from domestic, industrial, commercial, health care facilities and agricultural sources that must be managed daily. Low collection coverage, unavailable transport services, and lack of suitable treatment, recycling and disposal facilities are responsible for unsatisfactory waste management, leading to water, land and air pollution, and for putting people and the environment at risk.

A shift in thinking about the definition of waste is essential for a transition to more resource-efficient societies. Waste is traditionally thought of as having no value. Moreover, waste is widely assumed to be inevitable. This leads top economic and management practices that actually tend to promote the generation of waste. Rather, in a resource- efficient economy and society, the term “waste” would refer only to those residual materials that have no economic value. Under this definition, traditionally “valueless” streams of waste can be considered resources for a new tier of the economy. They can be recovered (or prevented from being lost) through greater efficiency and management at every stage of production and consumption.

Figures 1.1and 1.2 illustrate the changes in the flow of resources as different resource- saving measures are applied to an economy, from resource extraction and production to consumption and final disposal. The first diagram show’s a “one- way” economy in which little effort is made to either reduce the amount of materials consumed in production (and thereby the wastes produced) or to reuse or recycle those wastes. Both the materials embodied in the production and the wastes produced make a one- way trip from extraction to the landfill, with that portion of the materials captured in the products only being delayed in completing the journey. The second diagram illustrates the achievement of greater resource efficiency by reducing consumption and waste of materials, as well as by reusing and recycling by-products. By implementing measures on both the production and consumption sides, countries may be able to reduce (per unit of product) the quantity of the residual materials flow (Lower right) that ultimately reaches disposal sites.

At the far end of the resource efficiency spectrum is the “closed cycle”, where any output either becomes an input to another manufacturing process or is returned to natural systems as a benign emission rather than a pollutant causing environmental stress. For example, a closed cycle processing plant takes in fresh water and does not discharge any liquid effluents. Rather the water is constantly recycled and possibly utilized in the final product itself.

- There is a need to build local capacity in the developing countries to address the flow of e-wastes, in particular, the shipment of e-waste to developing countries as second-hand and near-end-of-life goods needs to be urgently addressed - in this regard, electronic companies take full responsibility for the safe recycling of their products.

Development and implementation of a national strategy for waste management is essential in order to reduce environmental, social and economical problems associated with the present disposal practices. In the past more attention had been given to waste disposal system as an end of the pipe solution with little attention to overall solid waste management. The proposed strategy is focused on the entire aspect of waste management from generation to final disposal site.

1.2 What is 3R?

The principle of reducing waste, reusing and recycling resources and products is often called the "3Rs."

- *Reducing* means choosing to use items with care to reduce the amount of waste generated.
- *Reusing* involves the repeated use of items or parts of items which still have usable aspects.
- *Recycling* means the use of waste itself as resources.

Waste minimization can be achieved in an efficient way by focusing primarily on the first of the 3Rs, "reduce," followed by "reuse" and then "recycle." The waste hierarchy refers to the "3Rs" i.e., reduce, reuse and recycle, which classify waste management strategies according to their desirability. The 3Rs are meant to be a hierarchy, in order of importance. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

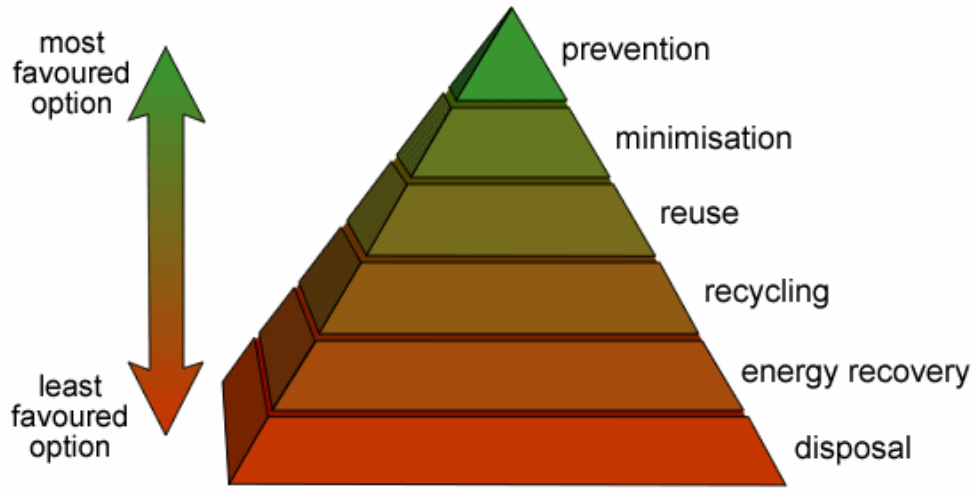

Figure: 1.3 Waste Hierarchy

The concept of minimizing waste impacts in terms of quantity or ill-effects, by reducing quantity of wastes, reusing the waste products with simple treatments and recycling the wastes by using it as resources to produce same or modified products is usually referred to as “3R”. Purchasing and using resources with care can reduce the pace of consumption of resources and further connected energy and resources, ultimately reducing wastes multifold for waste streams. When long lasting goods are reused time and again, it offsets harvesting of new similar or same products. This saves fresh resources exploitation and waste generation quantity. Some waste products can be consumed as resources for production of

different goods or the same product, meaning recycling the same resource. This too saves fresh resources and offsets waste generation. All in all, the 3Rs individually or collectively saves fresh resources exploitation, add value to the already exploited resources and very importantly minimizes the waste quantity and its ill effects. Waste minimization efficiency is stated to be better achieved applying 3Rs in a hierarchical order- Reduce, Reuse and Recycle.

1.3 Baseline Information on Selected Sectors of Waste

It is estimated that approximately 13,332 tons of waste is produced per day in the urban areas of Bangladesh, which is over 4.86 million tons annually. It is projected that this amount will grow up to 47,000 tons/day and close to 17.2 million tons per year by 2025, due to growth both in population and the increase in per capita waste generation. Waste collection rate ranges from 44.30% to 76.47% in major cities. Based on the present total urban population, per capita waste generation rate is found at 0.41 kg/capita/day in urban area.

Existing infrastructure for waste management shows that waste collection efficiency in different urban areas varies from 37% to 77% with an average of 55%. The overall waste collection situation is not very satisfactory. Huge amount of uncollected waste, (a high proportion of which is organic), creates nuisance and pollutes the local environment quickly. Therefore, frequent removal is absolutely necessary for avoiding unsightly and unhygienic surroundings.

Table 1.1 Current Situation of Wastes in Bangladesh – at a Glance

Category	Statistics	Data Source
TOTAL VOLUME OF WASTES (tons/year)		
Total volume of municipal solid wastes in urban areas	4,866,505 (2005) = 13,332.89tons/day x 365 3,000 tons/day in Dhaka (2005)	Waste Concern (2005) JICA (2005)
Agricultural Waste	65 million metric ton per year	Waste Concern and Swiss Contact (2005)
Industrial waste (hazardous) from seven selected sectors*	109.47 million/cubic meter/year (waste water) 0.113 million ton/year (sludge) and 26, 884 tons/year (solid waste)	Waste Concern and ADB (2008)
Hazardous Medical Waste	12,271 metric ton per year (2007)	Waste Concern and ADB (2008)
WASTE PER CAPITA (kg/per/day)		
	Urban: 0.41 (2005) Dhaka City: 0.56 (2005) Agricultural:1.68 (based on 2008 rural population)	Waste Concern (2008) JICA (2005)
FUTURE WASTE PROJECTIONS (Total Waste Generation)		
By 2025 (solid waste) 2012 (hazardous waste)	17,155,000 tons/year = 47,000tons/day x 365 0.60 kg/per/day in Urban Areas 2472.07 million/cubic meter/year (waste water), 2.81 million metric ton/year (sludge) and 53,874 metric ton/year (solid waste)	UMP (1999), as cited by Waste Concern (2008) Waste Concern and ADB (2008)
SOLID WASTE MANAGEMENT		
Collection of waste (% of waste generated)	44.30% - 76.47% in major urban cities 43.5% for Dhaka City	Waste Concern (2005) JICA (2005)
Solid waste disposal facilities	Mainly uncontrolled land-filling (except for the sanitary landfill at Matuail site in Dhaka, supported by JICA). No site or facility for treatment, recycling and disposal of hazardous waste.	JICA (2005)
E-WASTES		
Use of electronic goods in year 2006	Mobile phones: 22,000,000 Personal computers: 600,000 Televisions: 1,252,000	Waste Concern (2008)
RECYCLE		

Informal Sector	120,000 urban poor from the informal sector are involved in the recycling trade chain of Dhaka City.15% of the total generated waste in Dhaka (mainly inorganic) amounting to 475 tons/day are recycled daily.	Waste Concern (2005)

*These are textile, hospital clinics, tannery, pesticides, fertilizer, oil refinery and paper and pulp)

In the midst of limited capacity of municipal authorities to manage the waste, informal sector is playing a vital role by recycling a certain quantity of wastes - mainly the inorganic portions. Around 4 to 15% of the total generated waste is being recycled by the informal sector. It is estimated in the study that every year Tk. 10,706 million is being saved through recycling. In Dhaka alone, approximately 120,000 urban poor are involved in the recycling trade chain. It is also found that the average rate of recycling varies with the size of the city, e.g. in the city corporations it is around twice as much as in the pourashavas and other urban centers.

Ultimate disposal of all types of waste is done crudely in open dumps, lowlands or water bodies in an unsanitary manner. As a result, the surrounding environment of the dumpsites is barely hygienic. The increasing demand for landfill is also a big problem for the authority to find suitable lands for dumping wastes. At current waste generation rate the total land required for municipal solid waste per year with existing collection efficiency and 100% collection efficiency will be 141 acres and 273 acres respectively with a depth of 4 meters.

1.4 Key Issues Related to Waste Management

Several major issues affecting waste management in Bangladesh include:

1.4.1 Inadequate National Policy and Support

Coercion without assistance: Present national policy and rules are not adequately harmonized with the needs and capabilities of the local governments and industries. Coercion without assistance will not help deliver the goods. The local authorities are handicapped by an array of problems, which are insurmountable in the short term without adequate financial and technical support from the national governments.

Lack of landfill site: Local government bodies have been struggling to find suitable land for sanitary land filling. Due to high population density in a highly urbanized region, finding large extents of land away from main habitations is difficult. A large part of the country consists of low-lying areas which are generally active flood plains. As a result suitable landfill sites are not available within the city.

Lack of hazardous waste disposal facility: At present there is no secured landfill site available in the country for disposal of hazardous industrial waste. Apart from secured landfill site there is no facility in the country for treatment and recycling of hazardous waste. Industrial units are facing problems with off-site management of waste.

Lack of guideline for efficient use of agricultural waste: Of 65 million tons of agricultural waste generated in the country, 90% used as domestic fuel in an inefficient manner. There is no clear government policy or guideline on efficient use of agricultural waste for production of energy or fertilizer.

Lack of rules for management of municipal solid waste: At present there is no guideline or rules available for management of solid waste in the country.

Lack of Incentives for Environmental Management System (EMS) and Cleaner Production (CP): No incentive or support is available from government to promote and support cleaner production practices amongst the industries. To manage industrial waste, EMS and CP are the important tools.

1.4.2 Absence of a Strategy

The absence of waste management strategy: The country does not have a waste management strategy. As a result, waste management is viewed solely as an engineering responsibility for collection and disposal. Waste management is no more a technical issue. It needs social, fiscal and administrative solutions as well.

Conventional approach: Most of the cities current approach to waste management system is conventional i.e. end of pipe solution. Its stress is on collection and disposal and not on reuse and reduction. 'We dump – They collect' is the general attitude that had been cultivated among the residents, institutions as well as industries by this approach over a long period. Waste management is not their concern. It is a municipal responsibility.

Non-recognition of the role of informal sector: The informal sector service providers such as the waste pickers, including young children, remove a considerable quantity of daily waste from the city streets and dustbins. Together, they make an enormous contribution to urban solid waste management in the city, which is not well recognized or appreciated. The way the informal sector waste pickers remove and collect recyclable waste without any protective measures and involving young children is an area of concern.

1.4.3 Lack of institutional capacity

Lack of Resources: The City Corporations/Pourashavas claim that they lacks financial and human resources to address waste issues effectively. Undoubtedly, a human resource issue is affecting the efficiency and effectiveness of the waste management team of the City Corporations and Pourashavas. Under the present circumstances, they have had very little opportunity to expand their knowledge horizons and enhance the technical know-how. They need exposure to modern waste management applications.

Lack of database and record keeping: Most of the cities do not have a functional record keeping method to asses the ward-wise and street-wise volumes of waste handled. Stress is that, without adequate record keeping and realistic databases it is difficult to improve the quality of planning and delivery of basic services in the cities. Industries also do not have data base and records of amount of waste generated or treated.

Slow pace of new initiatives: As a local authority, City Corporation and Pourashavas stand out in its efforts to address the waste problem. Moving away from depending solely on conventional approaches, it has experimented with several new technical options to address the issue. Composting, bio-gas generation, separation at source and promotion of collection centers are some these initiatives. However, the Pourashavas neither have funds nor the partnerships to take the associated administrative risks to make the required city-wide quantum jump to ensure that these solutions are universally replicated.

Lack of partnerships: City Corporations and Pourashavas have engaged the services of some private sector to assist it in waste collection and disposal. It appears to be working well. Nevertheless, for better results, more partnerships must be built.

Modal defects in privatization: Privatization is a tool to strengthen municipal services but private monopolies can defeat this purpose by holding city authorities hostage through flash strikes and work-halts as is experienced in some of the other privatized sectors of the country. Moreover, the payment mode currently agreed with the private sector partner appears to contradict the 3R principle. Because they are paid for the volume of garbage collected, the private sector partners are not inclined to play a constructive role in promoting waste reduction and separation at the point of origin.

1.4.4 Lack of Public Cooperation

Negative public perception: The average resident as well as industrialist views waste management as a City Corporation's or Pourashava's responsibility. The public carries a negative perception of the role played by the local body mainly because of the conspicuous quantities of waste lying uncollected on city roads for days. At the same time, there is widespread resistance to the call for separation of waste at household level. The City Corporation or Pourashava tends to shy away from one of its customary responsibilities and hand over the same as a responsibility of the households, who reflect the blame back at the Pourashava. This lack of civic awareness and public cooperation has always plagued the City Corporation or Pourashava efforts to keep the city clean.

Absence of participatory mechanisms: The city administration does not have adequate institutional mechanisms to engage the residents, public organizations, NGO and other stakeholders on a regular basis to assist in decision making and programme implementation. The role that these stakeholders can play in educating the masses and mobilizing their communities has not been adequately recognized.

1.4.5 Financing and Cost Recovery

The fact is proper management of waste requires an elaborate waste management infrastructure such as waste bins, construction cost of primary and secondary waste collection points, sanitary landfills, fleets of trucks for collection of wastes, waste treatment and recycling facilities, etc. All this costs money. No explicit strategy for mobilizing the necessary investment is in place. Absence of collection cost for cost recovery makes funding drive unreal.

Any future strategy to streamline 3R principles for waste management in the city will be effective only if it can directly address these drawbacks. The strategy proposed here is an attempt in that direction.

1.5 National 3R Goal

The national 3R goal for waste management is achieve complete elimination of waste disposal on open dumps, rivers, flood plains 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.

1.6 Objectives of the National 3R Strategy

The main objective of this 3R strategy is to delineate ways and means of achieving national 3R goals through providing a uniform guideline for all stakeholders. Specific objectives of this strategy are to:

- address the key issues and challenges of waste management acting as a barrier for promotion of 3R in the country ;
- define the roles of various actors to promote 3R in the country; and
- guide the creation of enabling conditions for success regarding implementation of 3R in the country.

1.7 Priority Sectors for 3R

Following sectors are identified by the government as priority sectors:

Municipal solid waste, industrial waste, biomedical waste, institutional and commercial waste and agricultural waste.