

Role of Proper Policy Implementation and Regulatory Initiatives for Effective Waste Management in Bangladesh

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Abstract

Sound waste management becomes one of the priority issues for ensuring a sustainable environment and considering its invariable impact on the overall economic activities, currently it is drawing its logical attention from all stakeholders. Of them, policymakers are playing a leading role in this regard, as they are the initiator of any good initiative and make them legally enforceable by all parts of the society which is not possible by any other stakeholders. In case of developing economy like Bangladesh, potentials and impacts of efficient waste management is massive, particularly in residential areas and if waste is not properly managed it can create serious health or social problems in a community. On this backdrop, the broad objective of the study is to examine the role of proper policy implementation and regulatory initiatives for effective waste management in Bangladesh. It has been observed that, Bangladesh has got an advanced position on waste management not only by taking a number of policy initiatives, but also have some success implementation of the same. But, effective coordination and positive change in the mindset of all stakeholders is prerequisite of a suitable waste management culture in every sphere of society and to gain a clean and green Bangladesh.

Key words: *Waste, Environment, Policy, Regulation, Sustainable, Bangladesh.*

Introduction

Sound waste management becomes one of the priority issues for ensuring a sustainable environment and considering its invariable impact on the overall economic activities, currently it is drawing its logical attention from all stakeholders. Of them, policymakers are playing a leading role in this regard, as they are the initiator of any good initiative and make them legally enforceable by all parts of the society which is not possible by any other stakeholders. If waste cannot be treated properly in every stage it may eat up a significant portion of the entire yield of any developmental activities. The public concern of the state of environment and waste management has been growing rapidly in the last few years but mainly at developed countries rather than developing countries.

In case of developing economy like Bangladesh, potentials and impacts of efficient waste management is massive, particularly in residential areas. According to Salam (2001), in residential areas the solid waste is 58.7% domestic, 33.08% street sweeping, 7.9% commercial and 0.32% clinical. So, by ensuring proper management it may yield transformation of large volume of waste

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into resources, remarkable positive impact on environment, cost and income besides ensuring employment. On the way to increase the consciousness at mass level in this regard, different initiatives are required to address the vital causes of the problem by attempting to change the current hazardous patterns of production, consumption and finally dispose of the wastage arising from the entire business chain. In offering a sustainable solution for waste management, Government of Bangladesh (GoB), from its driving seat is covering the national level policy formation, implementation and enforcement activities whereas Bangladesh Bank (BB) playing a vital role in the same direction via financial sector as in Bangladesh, 'waste management' is considered as a part of environment friendly banking practices also.

Objective of the study

On the above background, the broad objective of the study is to examine the role of proper policy implementation and regulatory initiatives for effective waste management in Bangladesh. Specific objectives are: *one*, to review different literatures on waste management; *two*, to review the international regulations and country experiences on waste management; *three*, to evaluate the existing policy and regulatory environment for developing sound waste management by Government of Bangladesh (GoB); *four*, to examine the policy initiatives taken by Bangladesh Bank (BB) to facilitate the Government's taken initiatives through financial interventions and *finally*, the study would recommend some critical viewpoints of how can become more accountable and responsible through policy improvements by both GoB and BB to speed up the effort of ensuring sustainable and clean environment in the country.

Methodology of the study

The study is based on mainly secondary information. As to the secondary data, GoB's websites and published research articles in different journals have been consulted for preparing the report. For primary data, a specific issue related to waste management addressed by banks was collected through personal interview of officials from relevant desks of 21 commercial banks¹. A number of cases also have been incorporated in the study to reflect the role of policy implementation and regulatory initiatives regarding waste management.

Rational of the study

Waste that is not properly managed can create serious health or social problems in a community. People can get seriously sick from badly managed waste problems (http://www.health.qld.gov.au/ehworm/waste_management). Generally, the environmental and health problems related to waste affect to the highest extent of those inhabitants who have the least resources and therefore, very little power to change their situation, as they do not affect policy-making (Forsyth, 2002). It is now a very serious issue in third world countries like Bangladesh also. Different forms of wastes are generating in Bangladesh now-a-days from different economic activities. Moreover, increasing trend of industrialization besides agriculture, it surge the volume of waste generated from the sources. Feeling responsible in this regard, Hage et al. (2009) suggested in his study that waste

¹Sonali Bank Limited, Agrani Bank Limited, Uttara Bank Limited, Janata Bank Limited, Southeast Bank Limited, Prime Bank Limited, BASIC Bank Limited, BRAC Bank Limited, Bank Asia Bank Limited, Dutch Bangla Bank Limited, Premier Bank Limited, Mutual Trust Bank Limited, Trust Bank Limited, NRB Commercial Bank Limited, NRB Global Bank Limited, Islami Bank Bangladesh Limited, First Security Islami Bank, Shahjalal Islami Bank Limited, Al Arafa Islami Bank Limited, EXIM Bank Limited and Citi Bank NA.

management should be given the highest attention in policies, programs or projects seeking behavioral change. So, the study attempts to underscore the issue by addressing policy initiatives and their proper implementation.

Literature review

According to Medina (2008), waste is a relative concept. What is waste for one could be a resource for another. What is valueless for some could be useful for others. All our daily activities can give rise to a large variation in different wastes arising from different sources which have been shown in detail in Appendix-1. Waste incorporates all items that people no longer have any use for, which they either intend to get rid of or have already discarded. Moreover, wastes are such items which people are required to discard, for example-household rubbish, sewage sludge, wastes from manufacturing activities, packaging items, discarded cars, old televisions, garden waste, old paint containers etc. There are a number of options available for the treatment and management of waste including prevention, minimization, re-use, recycling, energy recovery and disposal. The integrated approach, addresses for the first time the role of waste producers, as the waste problem is seen through what Clapp (2002) calls a “consumption lens”.

OECD (2001) reveals that, a waste management policy towards waste minimization and changing patterns of consumption was recognized among the solution to the environmental problem. So, it is of vital importance that waste should be managed in such a way that it does not cause any harm to either human health or to the environment. Waste management is no more a technological or logistics matter, nor even the responsibility of the municipality alone. All the city residents are equally responsible to streamline the clean environment efforts of policymakers. But obviously, the micro level success will be accelerated under the policy guidelines of regulators to make them effective and enforceable in real sense.

The urgency in managing waste properly and commercially is severe in case of countries where a significant portion of society comprises with poor or socially disadvantaged people by any ways, like Bangladesh. Sinha(1995) in his study on Dhaka City Corporation (DCC) opines that, the poor and socially disadvantaged people involved in extracting recyclable materials from waste from the streets, waste bins and dump sites total more than 87,000 in number. This informal sector accounts for almost 10% of total employed workforce and is responsible for removing 26% of total generated waste in the DCC area. Waste management also causes Bangladesh a lot of budget allocation. DCC's expenditure on solid waste management is 52.87% more than its income. The per capital expenditure for in Solid Waste Management (SWM) in Dhaka is very low (Tk. 53) compared to other asian cities such as Bombay Tk. 304.00, Manila Tk. 192.00 and Bangkok Tk. 84.00 (Enayetullah, 1994).

Now, it is high time to give attention to waste management involving all stakeholders like Government, central bank, NGOs, employees, customers, suppliers, media and communities. It is mentionable that involvement of financial sector to implement the policy initiatives in this regard, specifically banking sector is keeping its footsteps in different arenas of economic and developmental activities linked with environmental issue. Habib et al. (2015) addressed ‘Minimizing Environmental Degradation, Wastes and Pollutions’ as one of the three basic principles of green growth strategies. Here, waste management is also considered under the functional areas of intervention for green growth of resource efficiency. So, as a key part of the

entire system, policy makers are logically expected to keep praiseworthy contribution in managing wastes properly through policy interventions and to ensure a sustainable economic growth in Bangladesh.

Analysis and findings

International Regulations and Country Experiences on Waste Management

Strong regulatory support is prerequisite for making any initiative implementable. Based on that regulatory initiative, countries can be experienced and developed on their respective target fields. Some of the international regulations and country experiences are articulated below:

International Regulations for Waste Management

A number of international regulatory initiatives were taken linking the waste management issue. Some of the mentionable are Factories Act 1948 (amended till 1987)². In Environmental Protection Rules 1986 (amended till 2004), there is no direct standard which can address pollutants from an electronics manufacturing or recycling industries. However certain units fall in electroplating category and are therefore required to be abide by the effluent disposal norms as given in schedule 1 of this rules. The Basel convention, on the control of transboundary movements of hazardous wastes and their disposal, adopted by a conference in Basel (Switzerland) in 1989, was developed under United Nations Development Programme (UNEP). The Basel Convention, ratified by 172 countries, deprecates movement of hazardous waste from developed to less developed countries. The provisions of the Basel convention have been integrated into the EU waste shipment regulation. With the passage of the '**Electronic Waste Recycling Act of 2003**', a certain portions of the electronic waste stream are defined and the systems to recover and recycle them will be administratively regulated beyond the universal waste rules³. In India, the e-waste (management and handling) Rules, 2011 recognized the producers' liability for recycling and reducing e-waste in the country.⁴

Country Experiences on Waste Management:

Waste management techniques are widely varied among different countries and regions. Domestic waste collection services are often provided by local government authorities, or by private companies in the industry. Some areas, especially those in less developed countries, do not have a formal waste-collection system. Box-1 showcases different methods for waste management practicing in different countries in line with their respective national level policies undertakings in this connection.

² It contained and listed several contaminants arising from manufacturing or recycling of electronic components.

³ <http://www.calrecycle.ca.gov/electronics/whatisewaste/>

⁴ <http://www.business-standard.com/india/news/india-gets-first-ewaste-management-rules/438474/>

Box-1: Country Experiences on Waste Management

Canada: In urban centers curbside collection is the most common method of disposal, whereby the city government collects waste and/or recyclables and/or organics on a scheduled basis. In rural areas, people often dispose of their waste by hauling it to a transfer station. Waste collected is then transported to a regional landfill.

Taipei: The city government charges its households and industries for the volume of rubbish they produce. Waste will only be collected by the city council if waste is disposed in government issued rubbish bags. This policy has successfully reduced the amount of waste the city produces and increased the recycling rate.

India: E-Parisaraa, an eco-friendly recycling unit on the outskirts of Bangalore which is located in Dobaspet industrial area, about 45 Km north of Bangalore, makes full use of E-Waste. The plant which is India's first scientific e-waste recycling unit will reduce pollution, landfill waste and recover valuable metals, plastics & glass from waste in an eco-friendly manner under the required level of policy coverage.

Source: http://en.wikipedia.org/wiki/Waste_management

Waste and waste management in Bangladesh

For Bangladesh, identifying, treating and managing waste in proper manner is must to attain overall environment friendly initiatives taken by stakeholders like Government, Bangladesh Bank, Bank & NBFIs, NGOs, etc. As Bangladesh is an agrarian country, naturally management of agricultural waste got high care. Sustainable Development Goals (SDG) also echoes the same. The 8 targets of Goal-12 include implementing a 10-year framework of programmes on sustainable consumption and production patterns, achieving sustainable management and efficient use of natural resources, halving per capita food waste at consumer level and reducing food losses in production and supply chains. But all these would require massive efforts by the regulatory arms of the government as well as the relevant private and non-government entities and this is largely applicable for Bangladesh. Various types of wastes in Bangladesh along with their sources of origin are delineated in Appendix-2.

Policy Initiatives of Government of Bangladesh Addressing Waste Management

Environment Conservation Act (ECA) 1995 was adopted to conserve and improve the environmental standards and The Environmental Conservation Rules (ECR), 1997 was circulated to broadly define management of toxic and hazardous substances and guidelines for disposal of waste from different categories of industries. The national 3R goal for waste management is achieve higher levels of waste reduction, reuse, and recycling and minimize waste disposal on open dumps, rivers, flood plains and landfills by 2015. Here, municipal solid waste, industrial waste, biomedical waste, agricultural waste, institutional and commercial waste are identified by GoB as priority sectors. Major regulatory initiatives are detailed out in Box-2.

Box-2: Main Policies, Laws and Regulations related to Waste Management and 3R in Bangladesh

Sl.	Policy	Issues
1.	Draft National Policy	Clean Development Mechanism (CDM) and Recycling has been emphasized in this policy.
2.	National Agriculture Policy, 1999	According to this policy the government will promote use of compost/organic fertilizer among the farmers to improve the soil productivity and food security.
3.	National Industrial Policy, 2005	This policy recommended the use of Environmental Management System (EMS) and Cleaner Production practices by the industries.
4.	National Policy for Water Supply and Sanitation, 1998	According to this policy, the government shall take measures for recycling of waste as much as possible and use organic waste materials for compost and biogas production.
5.	Urban Management Policy Statement, 1998	Recommend the municipalities for privatization of services as well as giving priority to facilities for slum dwellers including provisions of water supply, sanitation and solid waste disposal.

Sl.	Act	Issues
1.	Fertilizer Act, 2006	Under this act compost has been promoted and standard of compost has been set by the government on 2008.
2.	Bangladesh Environmental Conservation Act (ECA), 1995	Recommends standards for disposal of different types of waste.

Sl.	Rules	Issues
1.	Biomedical Waste Management Rules, 2008	This rule recommends source separation of hospital waste as well as separate collection, transportation and treatment and disposal of all kinds of hospital and clinical waste.
2.	Lead Acid Battery Recycling and Management Rules, 2006	Under this rules collection and recycling has been improved.
3.	Draft National Solid Waste Management Handling Rule, 2011	3R principle has been used.
4.	Bangladesh Environmental Conservation Rules (ECR), 1997	Recommends waste disposal standards, mainly for industrial wastes.

Sl.	Strategy	Issues
1.	National 3R Strategy, 2010	Made source segregation mandatory and gave directives to municipalities to pursue organic waste-recycling projects through composting, refuse-derived fuel, and biogas via Public-Private Partnership (PPP)s
2.	National CDM Strategy, 2005	This strategy is promoting pro-poor CDM projects on waste sector by harnessing carbon financing.
3.	Poverty Reduction Strategy Paper (PRSP), 2005	Here EMS has been promoted. To improve the solid waste management situation, special focus is given to segregation of waste at source along with the promotion of recycle, reduce and reuse of industrial and other solid waste etc.
4.	National Sanitation Strategy, 2005	Its goal is to achieve 100% sanitation coverage by 2010. Here emphasis on resource recovery and recycling has been given as top priority to improve urban sanitation situation instead of disposal.

Sl.	Action Plan	Issues
1.	Dhaka Environment Management Plan, 2005	Waste recycling has been promoted, less land filling encouraged, EMS promoted among industries.
2.	Solid Waste Management Action Plan for Eight Secondary Towns in Bangladesh, 2005	Under the Secondary Towns Integrated Flood Protection (Phase-2) Project of Local Government Engineering Department, GoB. This action plan is based on 4 R principle i.e. reduce, reuse, recycle and recover of the waste.
3.	National Environmental Management Action Plan (NEMAP), 1995	This is a plan of the Government of Bangladesh (GoB), prepared by the Ministry of Environment and Forest (MoEF) in consultation with people from all walks of life. 3R is being promoted under the Sustainable Environment Management Programme (SEMP) of NEMAP.

Sl.	Other	Issues
1.	Circular to Promote Compost by the Ministry of Agriculture (MoA), 2008, on 23 April 2008	Ministry of agriculture issued a circular to promote use of compost among the farmers.
2.	Private Sector Infrastructure Guideline, 2004	This guideline of the GoB has recommended private sector investment in waste management sector which includes all types of waste. It has also identified waste sector as one of the priority sector for private investment.
3.	Private Sector Housing Development Guideline, 2005	This guideline recommends to space in new housing areas for waste recycling specially composting and biogas generation.

4.	Dhaka Declaration on Waste Management by SAARC, 2004	Countries during 10-12 October 2004 SAARC countries agree to encourage NGOs and private companies to establish community based composting, segregation of waste at source, separate collection and resource recovery from wastes with particular focus on composting.
5.	Bangladesh National Building Code, 1993	Energy efficiency and passive energy design features has been proposed under this code by giving minimum code requirements for achieving the efficiency (for example targeting solar energy use in buildings of 10% to 20% by 2020).

Source: Country Analysis Paper BANGLADESH (2011)

Cases on Waste Management in Bangladesh

Involving different stakeholders based on the merit of the particular project, Bangladesh can successfully fetch some good examples in practicing efficient waste management. All the cases destined to make not only the clean and hygiene environment in Bangladesh but also to gain noteworthy economic value addition and social benefits. Some of the initiatives taken place in Bangladesh is highlighted in Box-3. Government's support has also been vividly observed in this context besides private sector (Box-4).

Box-3: Cases on Waste Management in Bangladesh

Community Based Urban Solid Waste Management in Dhaka

In 1998, with the support from UNDP, Waste Concern in partnership with the Ministry of Environment and Forest (MoEF) of the government of Bangladesh initiated the "*Community Based Urban Solid Waste Management in Dhaka*" under a project entitled Sustainable Environment Management Programme (SEMP). The prime goal of this project is to explore technical and commercial feasibility of labour intensive aerobic composting technique and to promote the principal of 4R's (Reduce, Re-use, Recycle and Recovery of waste) in the urban areas of Bangladesh.

Battery Buy Back for Recycling by Rahimafrooz

Rahimafrooz Batteries Ltd. (RBL), one of the largest lead acid battery producing company of Bangladesh, encouraged by government's policy to promote environment friendly took the initiative of a smelting plant to recycle used batteries in environment friendly manner. In this plant, annually 660,000 batteries will be recycled that will contribute in preventing environmental pollution from used batteries.

Agricultural Waste Composting in ChokSingha by Village

Deterioration of soil health due to reduced use of organic manure, high cropping intensity, less crop rotation, high unbalanced application of chemical fertilizer and pesticides has become an issue of great concern in the rural areas of Bangladesh. In this backdrop, the Special Programme of Food Security (SPFS) Project in ChakSinga, Bagha, Rajshahi, of Food and Agriculture Organization (FAO) took an initiative to replicate Waste Concern's composting technique in its project areas to promote sustainable agriculture and food security for Bangladesh under project entitled, '*Capacity Building for Composting Activities under Special Program For Food Security*' during October 2005 to June 2006.

Biomedical Waste Collection and Disposal

At present health care facilities are growing in a rapid pace in Bangladesh and improper management of waste from these facilities has become serious threat to our health and environment. Poorly managed health care waste (HCW) exposes health-care workers, waste handlers, and the community to diseases like hepatitis and AIDS (HIV), infections, and may damage the environment. *For example PRISM, a local NGO has initiated Biomedical Waste Collection and Disposal service to 75 private clinics including government hospitals in Dhaka city.*

Source: National 3R Strategy for Waste Management (2009)

Box 4: Government's Supports for Relocation and Cleaner Technology for Leather Industry

Over the past decade, the lucrative leather industry of Bangladesh has seen exports grow by an average of \$41 million per year. However, leather exports come at a heavy cost – environmental impacts and health hazards. Outdated and inefficient tanneries in Hazaribagh, which houses 90-95 percent of all tanneries in Bangladesh, are among the worst polluters. It is estimated that 22000 cubic meters of untreated effluent, including chromium, is dumped daily into the Buriganga River. The pollution from the tanneries not only leads to poor water quality but also directly impact the health of 8000-12000 workers. Locals of surrounding areas are also victims of this industry, with skin and respiratory ailments being common. In an attempt to mitigate this problem, the Government has decided to relocate existing tanneries from Hazaribagh to Savar, building a Tannery Estate in the process. During the 7th FYP period, the Government will ensure that all tanneries have an environmental clearance certificate for industrial units. Tanneries that discharge a comparatively large amount of waste, or discharge waste with high concentration of comparatively hazardous will be monitored, and fined if their pollution levels surpass national standards. Stronger penalties for hazardous working conditions will be implemented. Through the Government's active role in regulating tanneries, it is expected that the damages to the environment will be substantially diminished.

Source: Seventh Five Year Plan FY2016 – FY2020

Policy Initiatives of Bangladesh Bank Addressing Waste Management

Efficient management of waste requires an intricate waste management infrastructure such as waste bins, construction cost of primary and secondary waste collection points, sanitary landfills, convoys of trucks for pooling of wastes, waste treatment and recycling facilities, etc. As these are costly arrangement, huge level of financial supports and policy initiatives from Bangladesh Bank (BB) are required. There are a number of initiatives taken by BB aiming to accelerate the green banking or sustainable banking arena where waste management issue got attention but at a very limited scale.

In 2011, the Bangladesh Bank for the first time address the waste management issue in its Environmental Risk Management (ERM) Guidelines for Banks and Financial Institutions in

Bangladesh mentioning the glitches of improper disposal of hazardous waste (BB, 2011a)⁵. Again, in February 27, 2011, BB issued detailed policy guidelines for green banking. The policy noted air pollution, water pollution and scarcity, encroachment of rivers, loss of open space, loss of biodiversity, deforestation and improper disposal of industrial medical and house-hold waste as the key areas of environmental degradation (BB, 2011b). Later on, the issue was made mandatory for the newly scheduled 9 banks also in 2013a⁶. BB also pay heed to solid waste management and

hazardous industry waste in the same circular, when it asked the financial institution to consider the environment and climate change related risk while assessing the overall credit risk of the potential borrower. BB developed a refinancing scheme of BDT 200 crore to ensure financing in renewable energy and environment friendly sector and here it allowed financing in three forms of Effluent Treatment Plants (ETP)- Biological ETP, combination of Biological and Chemical ETP and Chemical ETP attempting to convert to the combination of Biological and Chemical ETP (BB, 2013b)⁷. In 2014, refinancing scheme for renewable energy and environment friendly sector issued by BB widen its arena for financing in waste management feeling its notable importance in environment. It covers 3 eligible products for getting financing facility under solid waste management and 2 are under liquid waste management with specific maximum allowable credit limit under the refinancing scheme (BB, 2014a). The facilities under this scheme were extended for Islamic shariah based banks also in the same year⁸. Banks are under close monitoring and regulatory pressure in attaining the direct green financing annual target which ultimately helps to accelerate their financing in waste management (BB, 2014b)⁹. Very recently, efficient waste management gets priority in BB's 'Guidelines on Environmental and Social Risk Management (ESRM) for Banks and Financial Institutions' in 2015, though it is not finalized yet. As per BB (2015), maximum allowable credit limit for Central ETP under 'Liquids waste management' sector is 15 crore BDT¹⁰. Appreciating all the efforts of BB, it is expected to focus more on waste management under its green banking window through different customized and regulatory interventions.

Banks' Initiatives in Waste Management in Line with Policy Initiatives of Bangladesh Bank

The sample banks took some praiseworthy initiatives in line with Bangladesh Bank's policy initiatives regarding waste management. To ensure the efficient waste management in real sense, banks need to focus on the types of waste producing from the projects financed by them besides paying attention to profit making capacity. Proper mode of disposal for particular type of waste is equally important to safe the quality of our environment as a whole. The study reveals that highest percentage (30%) of waste took in the form of sludge from Effluent Treatment Plant (ETP) or Sewage Treatment Plant (STP) and this picture is mostly observed in Textile industry financed by

⁵BRPD Circular No-1, January 30, 2011.

⁶GBCSRD Circular Letter No- 05, September 11, 2013.

⁷ Maximum credit limit under this refinancing scheme for the three types of ETP arrangements are 4 crore, 2 crore and 1 crore respectively.

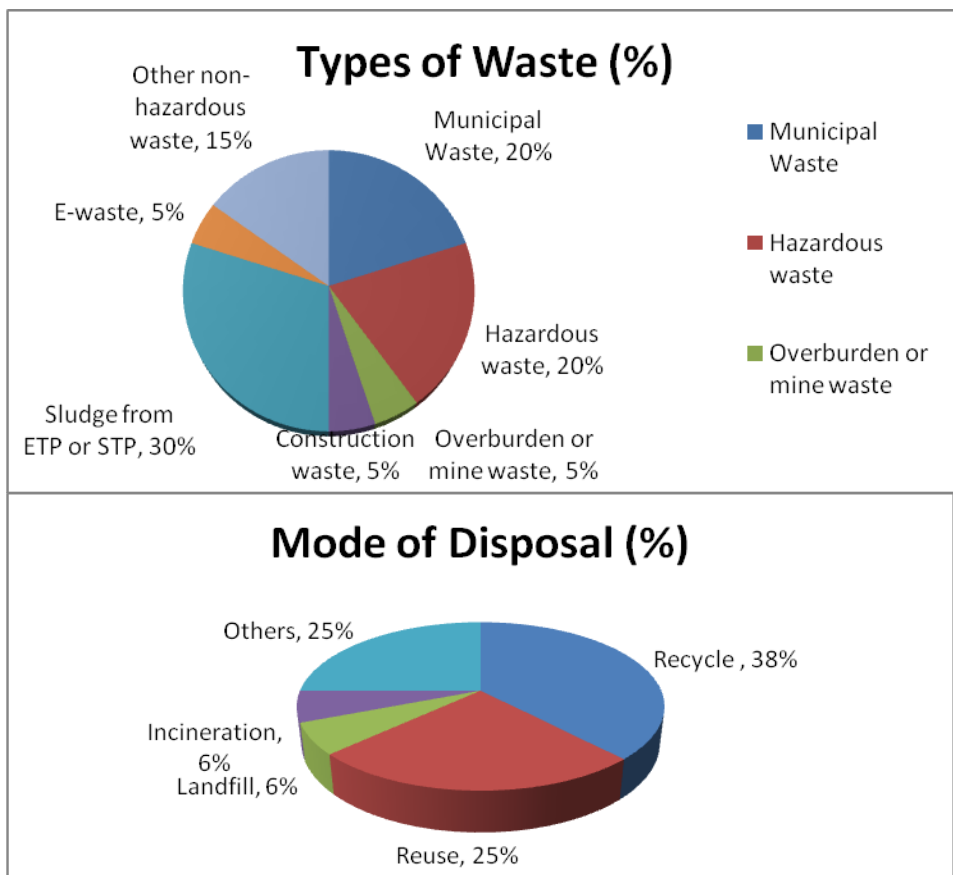
⁸Green Banking and Corporate Social Responsibility Department (GBCSRD) Circular No- 06, October 12, 2014.

⁹ The annual target for attaining direct green finance of total disbursed/invested loan amount for banks scheduled before 2013 is 5% whereas it is 3% for banks scheduled after 2013.

¹⁰Sustainable Finance Department (SFD) Circular Letter No- 03, November 13, 2015.

the sample banks. So, banks need more caution in this regard from the very beginning of project appraisal. Municipal waste and Hazardous waste got second position (20%). The graph also demonstrates the ‘Mode of Disposal’ besides types of waste generated from different sources. 38% wastes are disposed through recycle (municipal and plastic wastes cover significant portion) whereas reuse and other forms of disposal techniques got the second priority in treating waste in environment friendly manner. Reuse is widely practices for paper waste and E-waste (Figure-1)

Figure-1: Types and Mode of Disposal of Waste by Projects Financed by Banks



Source: Survey Findings

Recommendations

Based on the above scenario and challenges observed from the study some recommendations are put forward below:

The concept of inclusive development need to be instigated among local level Govt. Agencies, private sectors and environmental specialists.

Government may charge the households and industries for the volume of rubbish they produce. This initiative will discourage people to create wastes from the very of its source.

Policy on mandatory use of recycled products will be encouraging to give a primary push at mass level. But, it can be started with Government offices initially, private offices and individual households may be positioned subsequently.

Policy should be customized in terms of period (short term, mid term and long term), area (rural, urban, municipality, coastal, disaster prone- flood prone, draught prone, etc.) and budget allocation should also be in line with these policies endeavors.

Positive (for example, duty free) and negative (for example, high cost- if not treat waste properly) incentives may be introduced and implement the same very strictly, particularly addressing different business units.

There should be a logical and regular coordination between fiscal policy of GoB and monetary policy of BB. Because to implement the Govt. initiatives a required level of financial support is must. Any sort of environment friendly arrangements, like waste management, are usually expensive, so to make the people encouraged with this initially, diverse financial supports through tax rebate, subsidy, feed-in-tariff, refinancing facility, loan at lower rate, repeat loan, etc. will be very effective tools.

Need to ensure the positive change in the mindset of all stakeholders which is prerequisite of a suitable waste management culture in every sphere of society.

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Appendix-1: Types, Source, Content, Management Route and Environment Relevance of Wastes

Sl.	Types	Source	Content	Management Route	Environment Relevance
1	<u>Municipal Waste (including Household and Commercial)</u>	Municipal waste is generated by households, commercial activities and other sources whose activities are similar to those of households and commercial enterprises.	Municipal waste is made up to residual waste, bulky waste, secondary materials from separate collection (e.g., paper and glass), household hazardous waste, street sweepings and litter collections.	Municipal waste has traditionally been landfilled and this remains the predominant management option in most countries.	There are numerous potential impacts associated with the landfilling of waste including the production of leachate and landfill gas, odors, flies, vermin and the use of land.
2	<u>Industrial waste (including manufacturing)</u>	Manufacturing industry waste comprises many different waste streams arising from a wide range of industrial processes.	Some of the largest waste generating industrial sectors includes the production of basic metals, food, beverage and tobacco products, wood and wood products and paper and paper products.	Manufacturers can prevent and reduce this waste by: <ul style="list-style-type: none"> eliminating or reducing where possible the use of substances or materials hazardous to health or the environment; and manufacturing products in such a way that they last longer and may be recycled or reused at the end-of-life stage. 	Policies all over the world are increasingly driven by the need to influence manufacturing practices in an effort to decrease the environmental impact of produces during their manufacture, use and end-of-life.
3	<u>Hazardous Waste</u>	Hazardous waste arises from a wide range of different sources including households, commercial activities and industry.	Wastes are classified as being hazardous depending on whether they exhibit particular characteristic. Hazardous waste is classified as any solid waste that could pose a threat to the environment or public health. Like: Industrial aste ¹¹ , Pesticide Manufacturing ¹² , Photo Developers ¹³ , Household Hazardous Waste ¹⁴ etc.	The main disposal route for hazardous waste is landfill, incineration and physical or chemical treatment. On the recovery side, a	Although hazardous waste represents comparatively insignificant portion of total waste, it can

¹¹ The Environmental Protection Agency (EPA) classifies industrial facilities in two categories: large-quantity generators and small-quantity generators. According to the Science Encyclopedia, four types of large-quantity generators, which include chemical manufacturing plants, metal production plants, metal fabrication plants, and petroleum plants, create around 90 percent of industrial hazardous waste. EPA has classified 250,000 smaller plants as small-quantity generators, which make up 10 percent of industrial waste.

¹² Pesticides are frequently used in agriculture and landscaping. Several of the common chemicals in pesticides, such as DDT, diazaron and malathion, are poisonous. The manufacturing of pesticides leads to hazardous waste. EPA also regulates the manufacture of pesticides.

¹³ Stores that process photos generate two kinds of hazardous wastes: silver and washwater. The EPA requires that this waste be recorded, recycled and disposed of. For example, liquid silver can be recovered from the photo-processing solution and rinse water. The solution and rinse water are stored and sent to a recovery center where they are reclaimed for further use.

¹⁴ Households account for a small portion of the hazardous waste generated in the world. The average household has several items that fall under the category of hazardous waste. For example, automotive oil, antifreeze, car batteries and gasoline are all considered hazardous. The chemicals used to regulate and clean pools are generally toxic and hazardous. Even some cleaning products can be considered hazardous wastes. While the hazardous wastes produced by homes is much less than that produced by industrial plants, this waste must also be treated properly to avoid danger to the environment.

				significant proportion of hazardous waste is recycled or burned as a fuel.	present a potential risk to both human health and the environment.
4	<u>Construction and Demolition Waste</u>	Construction and demolition waste is made up of two individual components: <i>construction waste</i> and <i>demolition waste</i> .	It is made up of numerous materials including concrete, bricks, wood, glass, metals, plastic, solvents, asbestos and excavated soil, many of which can be recycled in one way or another.	The main methods used to treat and dispose of construction and demolition waste include landfill, incineration and recycling.	Due to the very large volume of construction and demolition waste produced, it can use up valuable space in landfills. In addition, if not separated at source it can contain small amounts of hazardous waste.
5	<u>Mining Waste</u>	Mining waste arises from prospecting, extraction, treatment and storage of minerals.	It is made up of topsoil, overburden, waste rock, waste from the processing of the ore body (tailings) which may also include process water, process chemicals and portions of the remaining materials.	A number of recent cases of uncontrolled releases of mining waste to surface waters (rivers and lakes) have highlighted the risks of poor mining waste management.	The two major concerns in relation to mining waste are the large volumes that are produced as well as the potential for hazardous substances to be present in the waste stream.
6	<u>Waste from Electrical and Electronic Equipment (WEEE)</u>	Waste electrical and electronic equipment (commonly referred to as WEEE) consists of end of life products and comprises of a range of electrical and electronic items.	Refrigerators, IT and telecommunication equipment, Freezers, Electrical and electronic tools, Washing machines, Medical equipment Toasters, Monitoring and control instruments, Hairdryers, Automatic dispensers, Televisions, etc.	At present, a large proportion of WEEE is disposed of in landfills or incineration plants, depending on local or national practices.	WEEE has been identified as a priority waste stream due to its potentially hazardous nature, the consumption of resources in its manufacture and its expected growth rates.
7	<u>Biodegradable Municipal Waste (BMW)</u>	Biodegradable Municipal Waste (BMW) is waste from households and commercial activities that is capable of undergoing biological decomposition.	Food waste and garden waste, paper and cardboard are all classified as biodegradable municipal waste.	A range of options are used to treat BMW. Alternatives to landfill include composting, mechanical-biological pre-treatment recycling and incineration.	Potential impacts associated with land filling of biodegradable municipal waste and landfill gas, odors, flies and vermin.
8	<u>Packaging Waste</u>	Packaging is defined as any material which is used to contain, protect, handle, deliver and present goods.	Items like glass bottles, plastic containers, aluminum cans, food wrappers, timber pallets and drums are all classified as packaging.	A number of different methods are used to manage packaging waste. These included reuse, recycling (mechanical, chemical and feedstock),	Packaging and packaging waste can have a number of impacts on the environment. In addition packaging may contain some critical substances e.g., PVC and

				composting, thermal treatment and landfill.	heavy metals which may pose a risk to the environment.
9	<u>End-of-Life Vehicles (ELVs) and Tyres</u>	ELVs are defined as cars that hold up to a maximum of eight passengers in addition to the driver, and trucks and lorries that are used to carry goods up to a maximum mass of 3.5 tons.	Thus their sources range from households to commercial and industrial uses.	Approximately 75% of the weight of a car is made up of steel and aluminum, most of which is recycled. Other materials present include lead, mercury, cadmium and hexavalent chromium, etc.	If not properly managed, may cause significant environmental pollution.
10	<u>Agricultural Waste</u>	Agricultural waste is composed of basically organic wastes.	Organic wastes (animal excreta in the form of slurries and farmyard manures, soiled water and silage effluent).	The methods to treat the waste include spreading the waste on land under strict conditions, anaerobic digestion and composting.	There are a number of potential environmental impacts associated with agricultural waste if it is not properly managed.

Source: <http://scp.eionet.europa.eu/themes/waste>

Appendix-2: Types and Sources of Wastes in Bangladesh

Sl.	Types	Sources	Quantity	Data Source
1.	Solid Waste	Municipalities of Urban Areas	16,015 tons per day and upto 5.84 million tons annually	Waste Concern (2009)
2.	Agriculture Waste	Agriculture	65 million metric ton per year	Waste Concern and Swiss Contact 2007
3.	Industrial waste (hazardous) from seven selected sectors	Industries (Textile, hospital clinics, tannery, pesticides, fertilizer, oil refinery and paper and pulp)	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)
4.	Hazardous Medical Waste	Hospitals	12,271 metric ton per year (2007)	Waste Concern and ADB (2008)
5.	E-waste	Electronic goods	Mobile phones: 22,000,000 Personal computers: 600,000 Televisions: 1,252,000	Waste Concern (2008)
6.	Inorganic Waste	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 is recycled daily.	Waste Concern (2005)

Source: Country Analysis Paper (2011)