Implications of 3R Policies and Programmes Toward Resilience of Dhaka City

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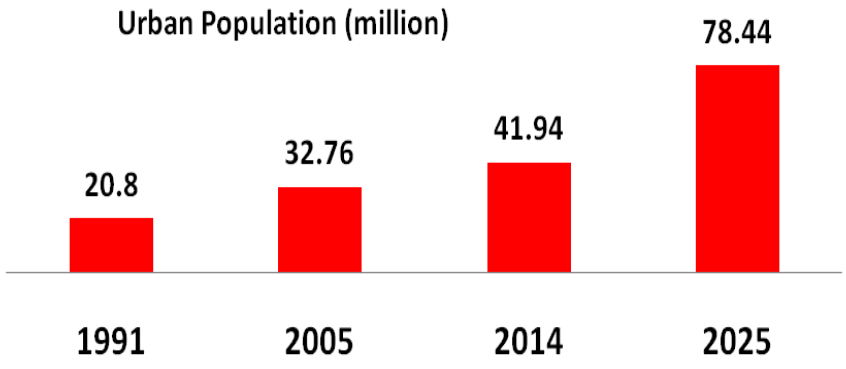
Presentation Outline

I. Introduction
II. Present Situation
III. The National 3R Strategy for Waste Management 2010
IV. Implications of the 3R Strategy
V. Major Challenges
VI. Way Forward

Present Situation

- Bangladesh has a population of over 167.9 million people and the country is rapidly urbanizing
- in 2010 it was about 26% of the country's total population and by 2030 it is expected to be 31.1% of the country's total population

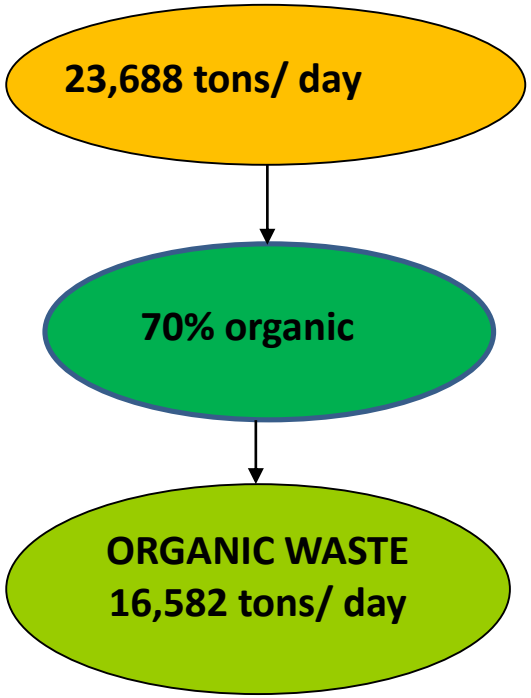
Present Solid Waste Management Situation of Bangladesh

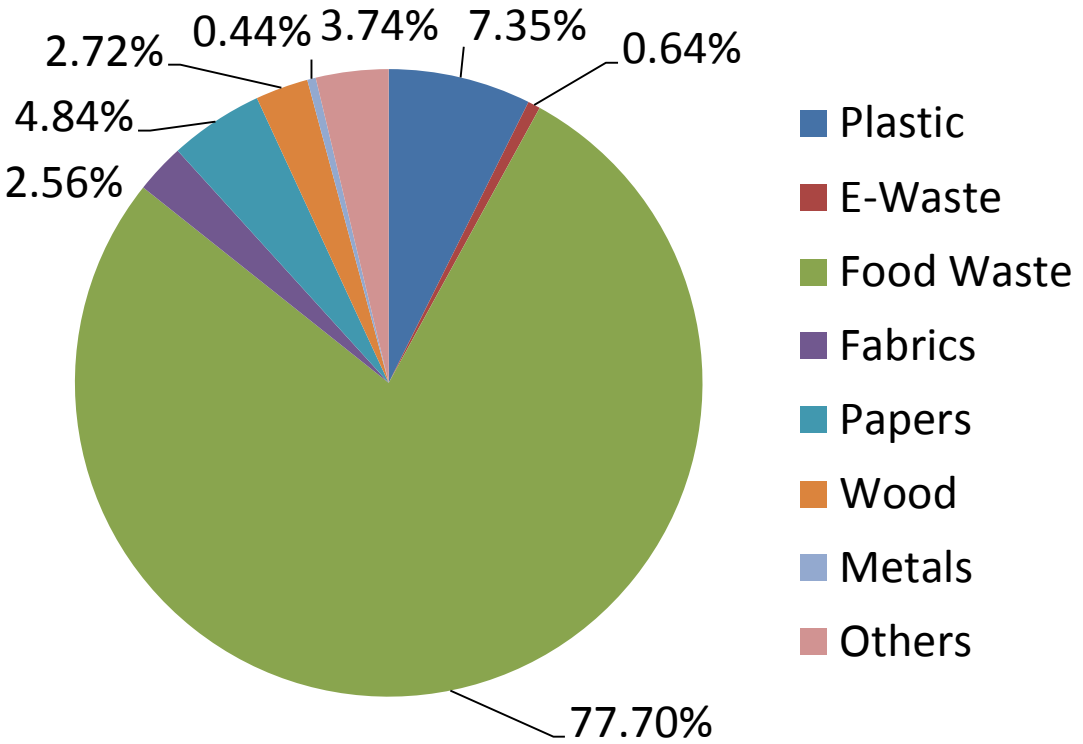


* World Bank, 1998, ** Waste Concern, 2005, *** Waste Concern, 2013 **** UMP, 1999,

The total amount of waste generated every day in Bangladesh has been increasing annually since 1991. Whereas in 1991 the urban areas of Bangladesh were generating approximately 6,493 tons per day of municipal solid waste, by 2005 that figure had more than doubled to reach 13,330 tons per day. In 2014, it is estimated that Bangladesh generated 23,688 tons per day in its urban areas. The total urban population is estimated to be as high as 78.44 million by 2025, and the total waste generation is expected to reach 47,000 tons per day. There is an obvious link between greater amounts of waste generated and a higher urban population.

Waste Characteristic of Urban Areas of Bangladesh

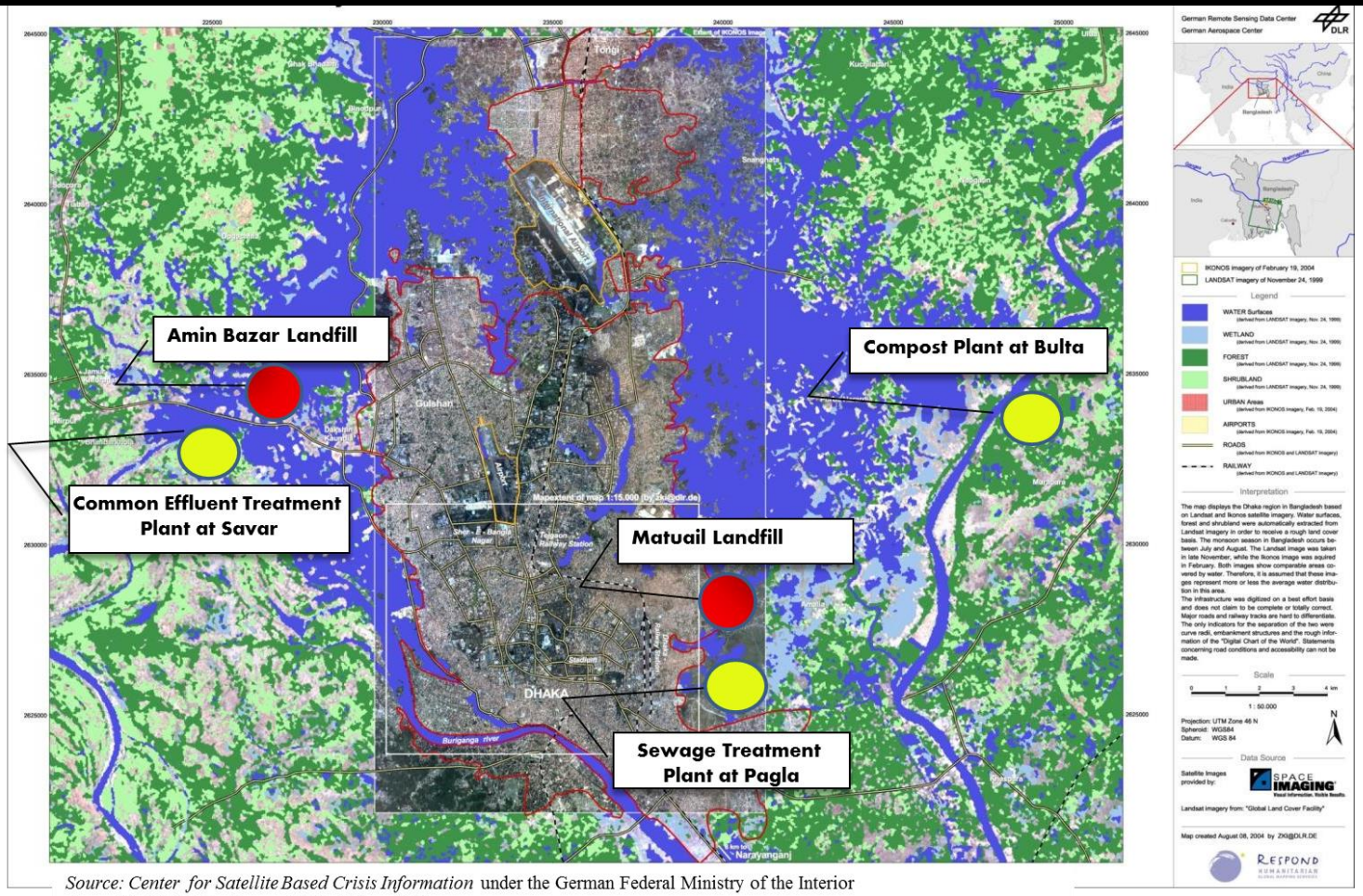




High organic matter >> (more than 70%)
High moisture content >> (more than 50%)
Low calorific value >> (less than 1000 Kcal/Kg)

A large portion of waste is organic with high moisture content and low calorific value shows the need for appropriate and cost effective solution.

Locations of Landifill Sites, Treatment & Recycling Facilities in Dhaka



Source: Center for Satellite Based Crisis Information under the German Federal Ministry of the Interior
August 8, 2004, **http://www.zki.dlr.de/map/812**

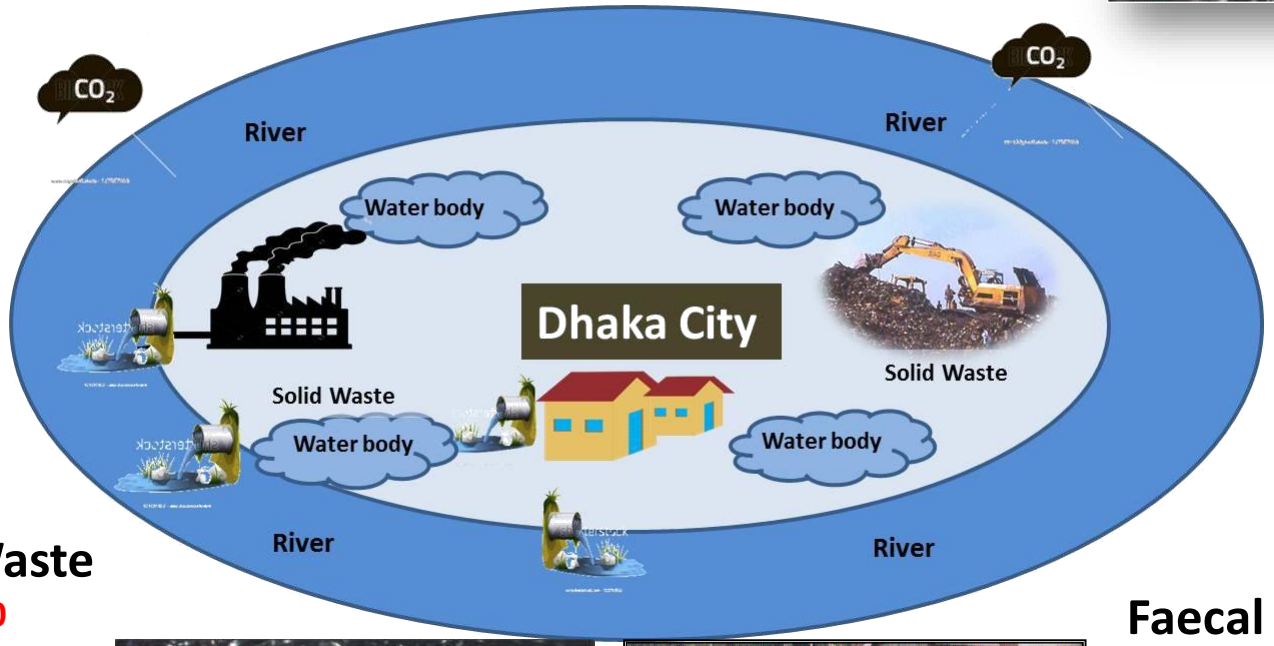
- Dhaka City Corporation (DCC) area with an estimated population of 7 million covers an area of 126.34 Sq. Km (BBS, 2011). Recently the DCC is divided into two city corporations in November 2011 - Dhaka South City Corporation (DSCC) and Dhaka North City Corporation (DNCC) covering 57 wards with an area of 43.96 sq km (DSCC) and 36 wards with an area of 82.38 sq.km (DSCC, 2015) respectively.

- Map showing two official landfill sites, the only sewage treatment plant at Pagla, a under construction Common Effluent Treatment Plant (CETP) in Hamayetpur, Savar and large organic waste compost plant in the fringe of Dhaka city.

Waste and Sanitation Related Problems of Dhaka City

Municipal Solid Waste

Dhaka city generates **4000-5000 tons/ day** of waste and only 50-60% of this waste can be collected by the city and the rest remains uncollected which means that the rest of mixed waste is dumped daily in the city's roadsides, drains or lakes (which used to be flowing canals) and rivers.



Industrial Waste

More than **60,000 M^3/day** of untreated toxic waste is discharged in the river. These industries include textile, dying, printing, washing and pharmaceuticals

Faecal Sludge

99.7% of faecal Waste is entering the local water bodies via drains or discharged directly in the drains, water bodies and rivers..

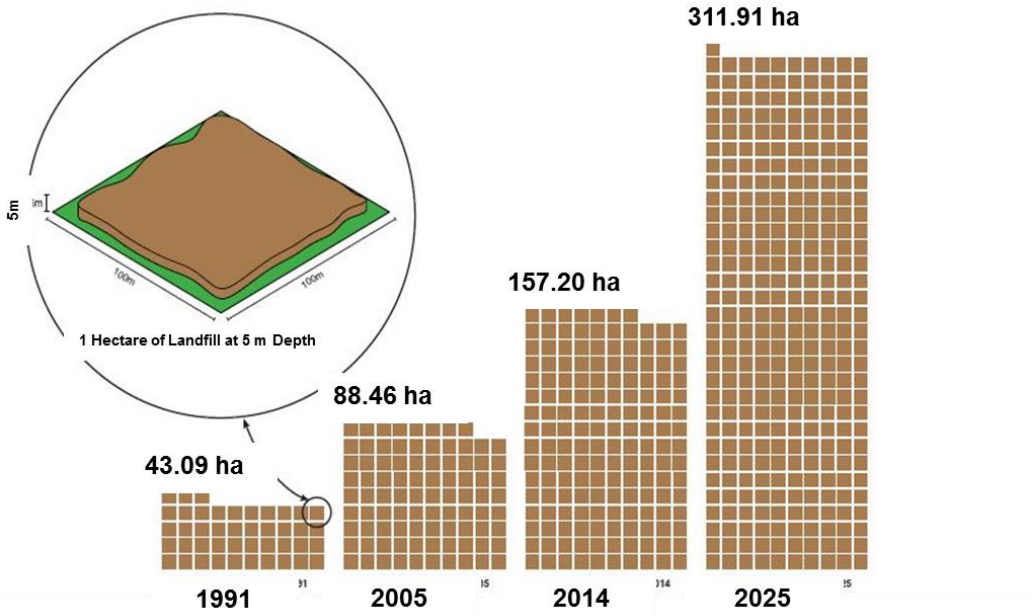
Problems with the Present Solid Waste Management Practice

Conventional System of Solid Waste Management which end of pipe solution

Collection of Waste → **Transportation of Waste** → **Disposal of Waste**

- No Segregation of waste, resulting low-level of recycling.
- Increasing amount of non-recyclable packaging materials are accumulated in waste.
- Multiple Handling of Waste (4 to 5 times from the source to disposal)
- Low level of awareness on 3R/Source Separation of waste
- Crude method of waste collection and disposal.
- Low collection efficiency of waste is a one of the cause of drainage problem
- Environmental pollution from waste causing health hazards.
- Increasing amount of Land required for landfilling
- Increasing waste management cost
- Greenhouse gas Emission

Present Solid Waste Management Practice

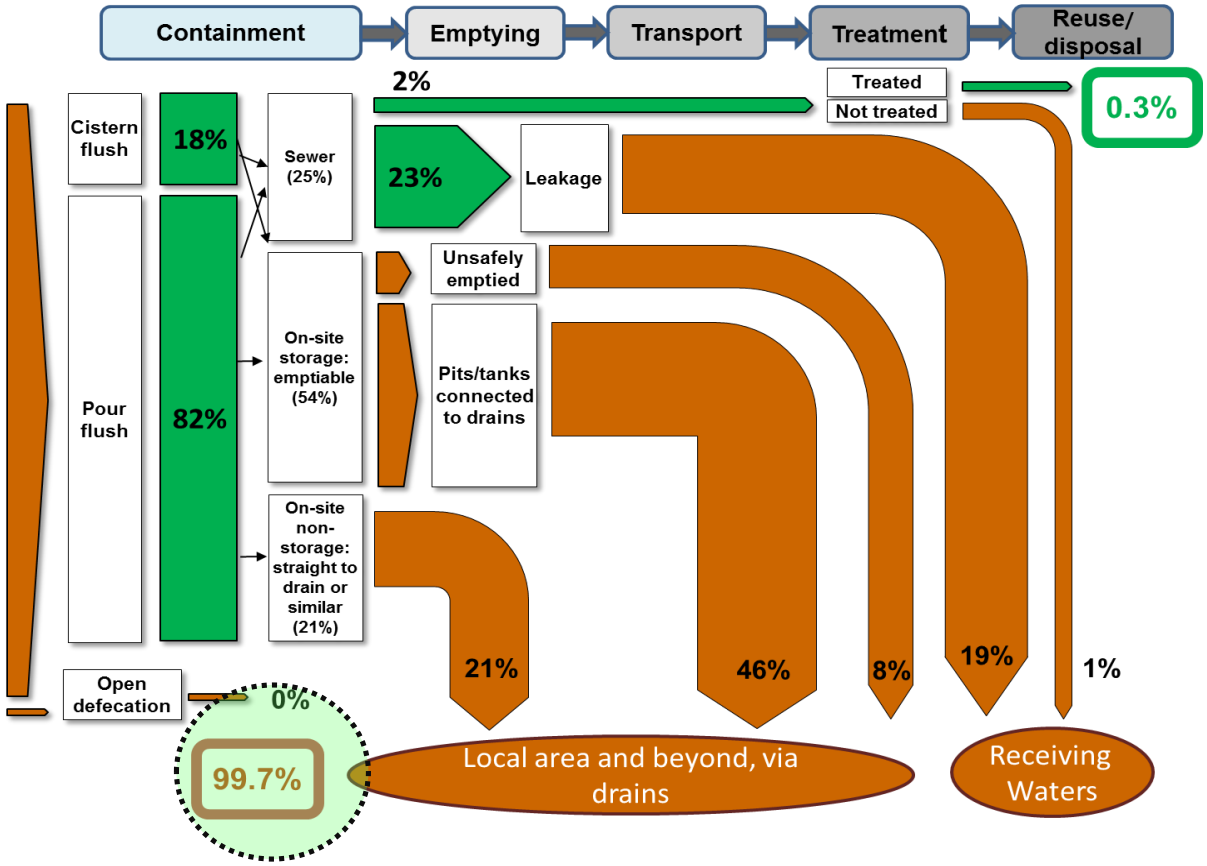


Increasing Land Requirement for Urban Areas of Bangladesh

SWM management is landfill based. Waste is simply collected transported and dumped in landfill sites. Dhaka city has two official landfill sites which not environmentally sound. Availability of new landfill site is a challenge for the local bodies.

Bangladesh is a land hungry country. In 2014 land requirement for waste disposal site was 157.20 Ha/year and in 2025 the land demand for waste disposal is estimated to be 311.91 ha/year.

Present Faecal Waste Management Situation of Dhaka City



- Use of “sanitary” latrines approaches 95%, but almost none of the resulting FS is effectively contained. **99% of the waste enters the drains and local environment**, either by a “long route” (e.g. pits/tanks with overflow to drains) or a “short route” (e.g. directly to drains with no intermediary containment).
- (iii) a defective sewer system theoretically serving 20% of the population, but with only 3% of wastewater entering the system actually being treated.

Source: Fecal Sludge Management: Diagnostics for Service Delivery in Urban Areas: Case study in Dhaka, Bangladesh Supporting document, Final Report , April 2016 (WSP-World Bank Group)

Present Tannery Waste Management Situation of Dhaka City

About **250 tanneries** are clustered in the Hazaribagh area of Dhaka city (UNEP 2001) and discharging **22,000 M^3/day** untreated liquid toxic effluents in the nearby rivers, drains and canals. Government has decided to move the tanneries to northern part Dhaka city.

Impact of Waste on the Resilience of Dhaka City

- *Landfills are located in the flood plains causing environmental and health hazards.*
- *Indiscriminate disposal of waste in the drainage system is one of the reason for flooding and pollutions.*
- *Due to lack of segregation of waste, a large portion of waste with economic value is becoming soiled and contaminated.*
- *Contamination of surface and ground drinking water due to unmanaged waste and sewer of the city.*
- *Poor slum dweller are affected by unmanaged waste and floods as they are concentrated on the fringes and low lying areas of the City.*

UNISDR defines resilience as *"the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions".*

Implementation of the National 3R Strategy for Waste Management, 2010

To improve the situation the National 3R (Reduce, Reuse, Recycle) Strategy for waste was launched in 2010. Under this strategy a National 3R Wing has been proposed for the Ministry of Environment and Forests to properly implement waste prevention activities with the help of an inter-ministerial committee to coordinate activities across ministries. A 3R Cell has been constituted within the Department of Environment to monitor implementation of 3R strategies.

National 3R Goal: The national 3R goal for waste management is to 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

Some of the recommendations of 3R strategy are as follows:

1. Encouraging public private partnerships to improve public services with regard to environmental management system,
2. Collaboration with scientific research bodies to promote recycling and recovery of waste.
3. To develop a mechanism to correspond between services received and payments made by citizens.
4. Supporting informal sector for recycling.

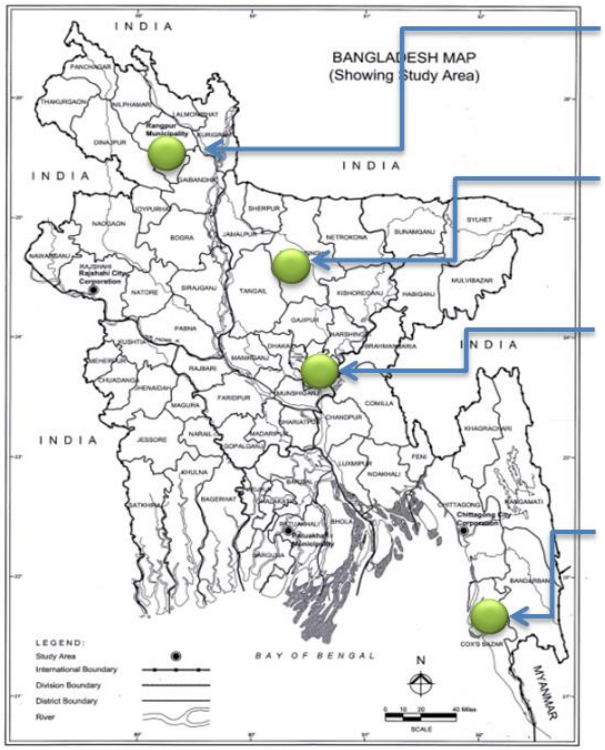
Policies Related to 3R Principle

- **National Renewable Energy Policy- 2008:** This policy seeks to promote production of biogas and other green energy from waste and also providing incentives for development of CDM to promote green energy projects.
- **Bangladesh Climate Change Strategy and Action Plan 2009:** Mitigation and low carbon development is one of the key pillars of this strategy, and waste sector has been considered potential contributor towards achieving the mitigation objectives of the country
- **Bangladesh Environment & Climate Change Outlook 2012:** Waste management has been considered one of the priority issues under this report
- **Sixth Five Year Plan (FY 2010 – FY 2015)** and **Seventh Five Year Plan (FY 2015 – FY 2020):** the overall objective of disaster management during 7 FYP is to build resilience of the poor and reduce their exposure and vulnerability to geo-hydro-meteorological hazards, environmental shocks, man-made disasters, emerging hazards and climate related extreme events to make our cities, human habitat and resources safe, resilient and sustainable".
- **Solid Waste Master Plan of Dhaka City (2005)** with financial and technical assistance from the Japan International Cooperation Agency, Dhaka designed a Solid Waste Master Plan in 2005 that set out to transform the municipal solid waste management system by 2015.
- **Intended Nationally Determined Contributions (INDC) (2015):** A number of mitigation actions are set out to help limit the country's GHG emissions. These mitigation actions will play a key role in realizing the move to a low-carbon, climate-resilient economy and to becoming a middle-income country by 2021.

Policies Related to 3R Principle

- **Acts**
  - **Bangladesh Environment Conservation Act 1995 (Amended in 2010)**
- **Rules**
  - **Bangladesh Environment Conservation Rules 1997**
  - **Medical Waste (Management & Handling) Rules 2008:** Source Separation, transportation, treatment and disposal of all kinds of hospital wastes
  - **Hazardous Waste and Ship Breaking Management Rules 2011**
  - **Draft Electrical and Electronic Waste (Management & Handling) Rules and Solid Waste Management Handling Rules:** To ensure proper management of E-Waste and Solid Wastes and involve private sectors in waste management

Composting & Recycling for Small and Medium Sized Towns under the 3R Initiative



Rangpur Municipality
Capacity: 12 tons/day

Mymensingh Municipality
Capacity: 8 tons/day

Narayanganj City Corporation
Capacity: 22 tons/day

Coxesbazar Municipality
Capacity: 12 tons/day

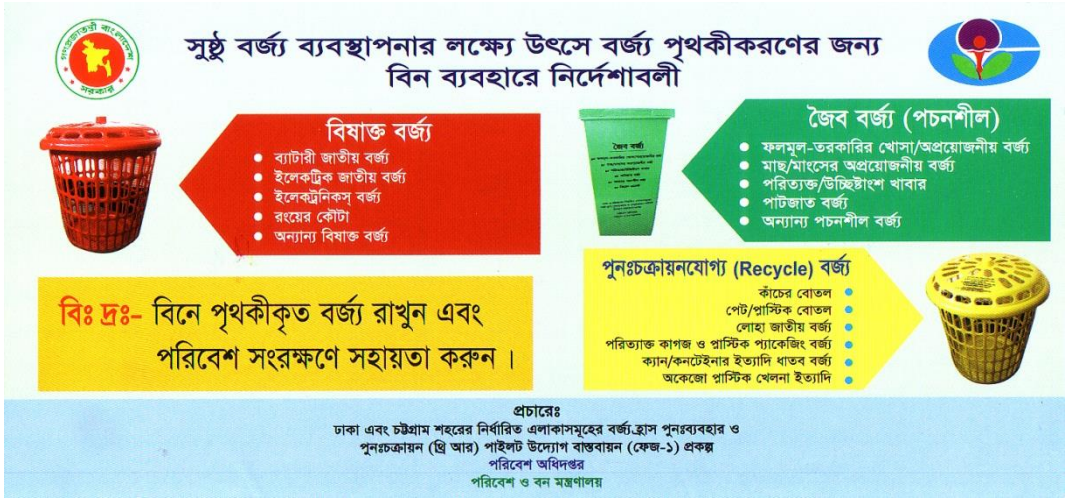
Programmatic CDM using organic Wastes of Urban Centres (Phourashava/ Municipalities) throughout Bangladesh (in 64 Districts): Government used its Climate Change Trust Fund.

Project is implemented by the Department of Environment (DoE) under the Ministry of Environment and Forests (MoEF) and funded by government's own fund called `Climate Change Trust Fund'.

3Rs (Reduce, Reuse and Recycling) Pilot Initiative in Dhaka and Chittagong Cities to Reduce Green House Gas Emission (Phase 1) (2012)

- This project aims at promoting the concepts and practices of 3Rs in order to raise public awareness about the benefits of source segregation of wastes and recycling.
- It aims to avoid landfilling of waste by promoting recycling and composting along with generating awareness of the citizen and create jobs for the poor.
- Project is implemented by the Department of Environment (DoE) under the Ministry of Environment and Forests (MoEF) and funded by government's own fund called `Climate Change Trust Fund'.

Toxic Waste



Organic Waste (Biodegradable)

Recyclable Waste

- Colored bins (wet, dry and toxic waste) were distributed among 80,000 families under the project area.
- 2 (two) Compost plants (each having 20tons/day capacity) for Dhaka City Corporations along with vacum cleaner trucks.

Projects Relevant to 3R Principle

- **Co-composting Project based on Faecal Sludge and Organic Waste (2012)** Initiated by Waste Concern, UNESCAP, Local Government Engineering Department and Kushtia Municipality.

- **CDM Based Composting Project (capacity 130 tons/day) In Dhaka (2008).**

- **Local Government with ADB (2012)** Adopted 3R Concept in Waste Recycling Projects in 6 city corporations.

- **Purbachal New Town Project by RAJUK (Capital Development Authority of Dhaka)** incorporated the National 3R Strategy in their master plan. They kept the provision of source separation of waste and earmarked land for waste recycling projects.

- **Coastal Towns Environmental Infrastructure Improvement Project (CTEIP) and City Region Development Project (CRDP),** projects being implemented by the Local Government Engineering Department (LGED) funded by Asian Development Bank aims to adopt integrated approach for municipal waste management using 3R principal and integrated landfill and resource recovery concept.

Projects Relevant to 3R Principle

- **Bangladesh Bank's (Central Bank of Bangladesh) Green Banking Initiatives** to promote Green Projects and Products in the country and introduced Taka 2 billion refinance line for these project.

- **UNICEF initiated Composting Initiative and Promoting 3Rs in 19 towns of Bangladesh.**

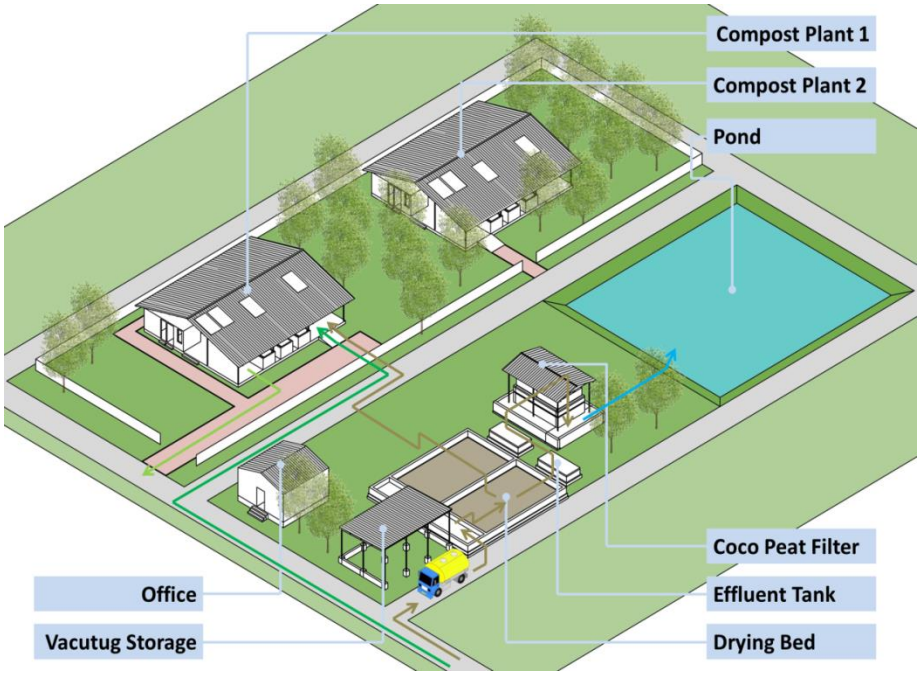
- **Feasibility Study On Conversion of Multi-technology Poa-DD on Solid Waste Management into NAMA in Bangladesh** Study supported by KfW and UNESCAP, Waste Concern and W2RF.

- **Valuing the Sustainable Development Co-benefits of Climate Change Mitigation Actions: A case of Waste Sector and Recommendations for the Design of Nationally Appropriate Mitigation Actions (NAMAs):** with the support from UNESCAP, UNFCCC, SOUTH POLE and Waste Concern.

Carbon Trading Based Composting Project from Organic Waste of Dhaka City

- The project is operational since 2008 and CERs has been issued for this project up to 2012
- Joint venture with the Netherlands.
- The plant can process 130 Tons of organic waste everyday

Co-composting of Municipal Solid Waste and Faecal Sludge in Kushtia Bangladesh



- In order to develop a low cost replicable model for co-composting organic waste and faecal sludge affordable for Bangladesh this pilot project was initiated. Waste Concern is in partnership with UN-ESCAP, Kushtia Municipality and Local Government Engineering Department of the Government of Bangladesh initiated this project
- **Project Initiated:** November 2012
- The pilot project has the following Features:

  1. **Compost plant Capacity** = **4 tons/ day**
  2. **Faecal sludge drying bed** (with a coco peat filter) to treat = **9 M3/day**
  3. **Land Area: 668 M2** (dedicated by the Kushtia Municipality)

Relocation of Tannery Industries from Dhaka city and Introduction of CETP

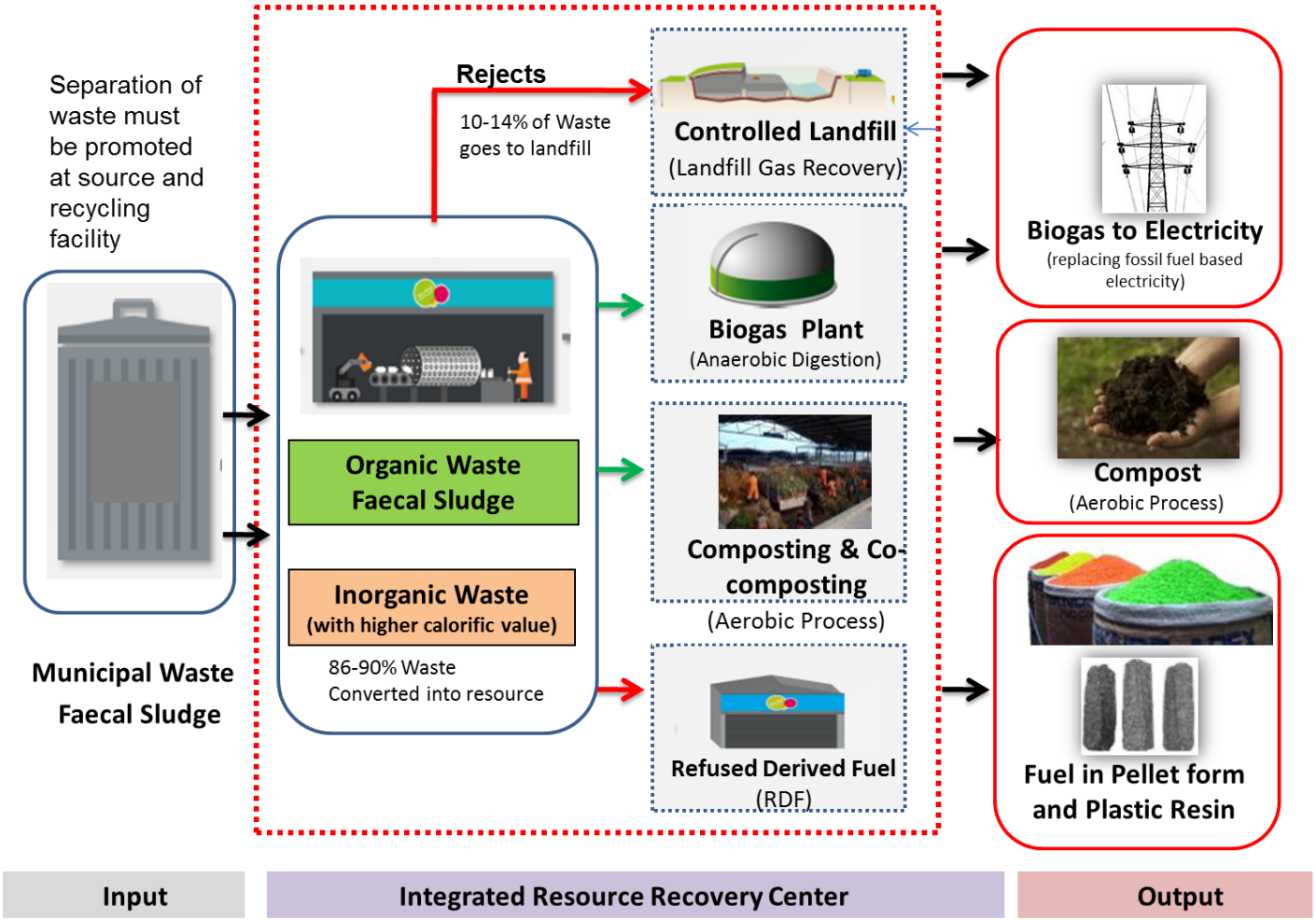
- The first significant step to relocate Hazaribagh tanneries outside Dhaka came through a High Court order in 2001. Till 2016, construction and relocation of these industries under progress. The idea is simple: to create an environmentally sustainable tannery zone that would protect Dhaka city's water supply from toxic contamination.

- To improve this situation the Government of Bangladesh took the initiative of this relocation from Hazaribagh, Dhaka to Hemayetpur, Savar having 200 acres of land. The new location will be able to accommodate 155 tannery industries, which is 16 KM far from the city.

- Government of Bangladesh dedicated its own financial resources to bear the entire cost of the Common Effluent Treatment Plant (CETP), and 80% of the total project cost that is estimated at BDT 1078 crore (US$ 130.82 million). A (CETP) with a capacity of treating 25,000 M3/day is constructed in the new location. In addition to this a Common Chrome recovery Plant with capacity of 350 m^3/day with 3 modules, and a Sludge Power Generation System is planned to be built in the new tannery industrial estate subsequently.

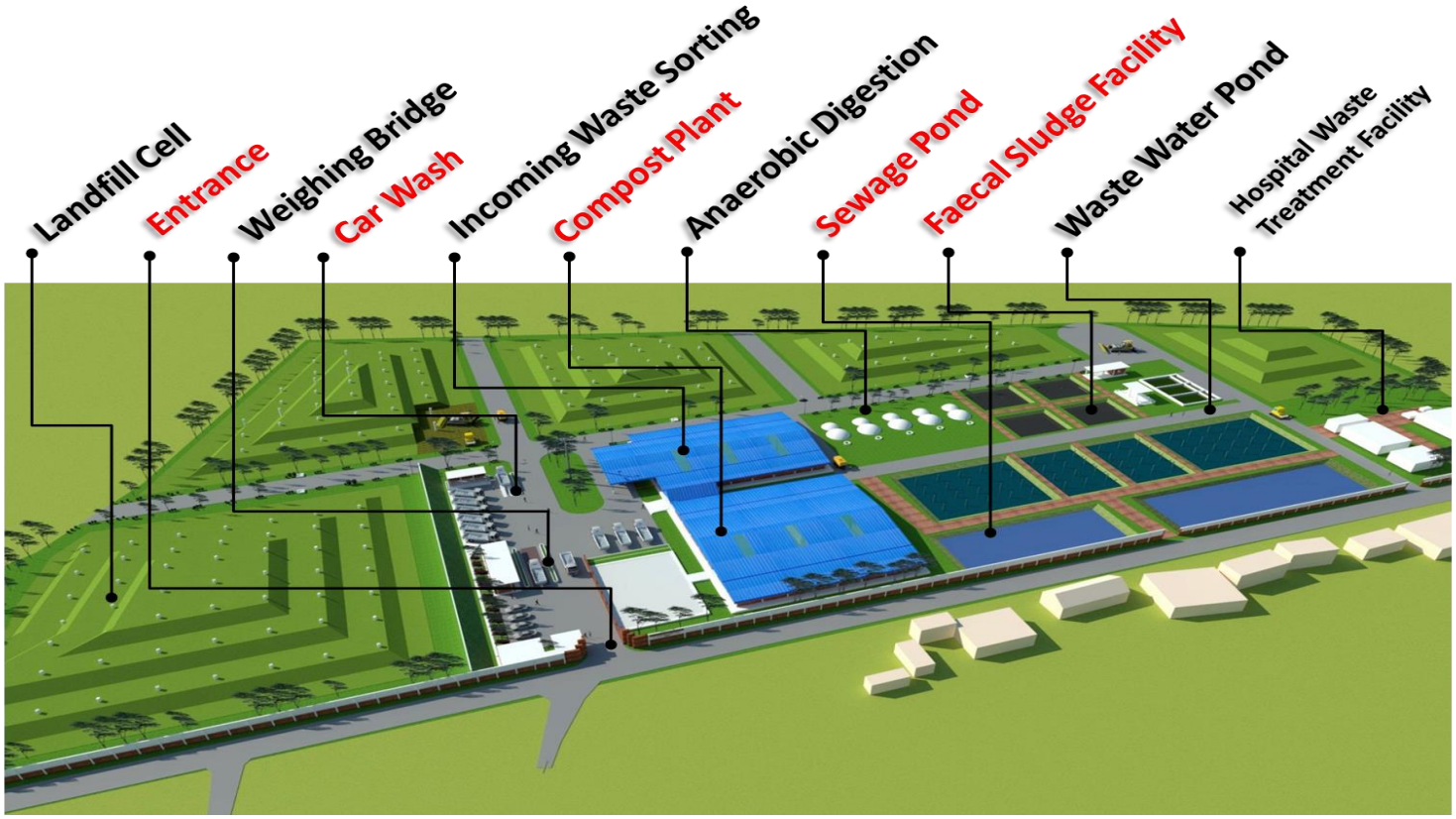
Integrated Resource Recovery Center Concept using 3R Principal

IL&RRF can be implemented in the cities and towns of Bangladesh. The primary objective of the proposed IL&RRF is to provide effective control measures to prevent, or reduce as far as possible, negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, as well as the resulting risks to human health arising from land filling of waste. The IL&RRF can utilize significant portion of the incoming waste into economic outputs (compost, biogas and recyclables for sale) and a small proportion goes to controlled landfill cells. Figure below shows that an Integrated Landfill and Resource Recovery Center (IL&RRC) can convert waste inputs into different economic outputs



Integrated Landfill and Resource Recovery Facility (IL&RRF) for Medium and Large Cities

The primary objective of the proposed IL&RRF is to provide effective control measures to prevent, or reduce as far as possible, negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, as well as the resulting risks to human health arising from land filling of waste. The IL&RRF can utilize significant portion of the incoming waste into economic outputs (compost, biogas and recyclables for sale) and a small proportion goes to controlled landfill cells.



Adopting the 3R Principles the Jessore Municipality of Bangladesh has initiated the Integrated Landfill and Resource Recovery Center under the project entitled `City Region Development Project (CRDP)' being implemented by the Local Government Engineering Department of the Government with the financial support from the Asian Development Bank

Potential Co-benefits by Reducing 1 (One) Ton of CO2e

2 Tons
Organic Waste if Processed into Compost

→

1 ton CO2eq Reduced

Opportunity of co-benefits from 3R related projects needs attention. Projects using the 3Rs principle can harness co-benefits apart from income opportunity from emission reductions. Today income from emission reduction has become unattractive due to the present low market value of Certified Emissions Reduction (CER). Calculations show that savings from co-benefits in both public and private sector can be many folds higher compared to present carbon price. A study shows that for Bangladesh this amount can be as high as US$ 93.82 by reducing 1 (one) tons of CO2eq for composting municipal organic waste. There are number of co-benefits such as creation of new jobs, solid waste management cost of city authority, savings from reduced use of chemical fertilizer in agriculture and subsidy, additional income from increased crop yield etc.

Potential Co-benefits : Bangladesh Case

Type of Benefit	Sector of Benefit	Co-Benefits/ GHG emission reduction	Value of Co-benefits/ GHG emission reduction
Public and Private	Social Sub sector: Employment generation	**Creation of additional income for four waste pickers by working in the compost plan Consideration:** 4 jobs created to process 2 tons of organic waste to reduce 1 ton CO2eq	**US $ 7.53**
Public	Economic Sub-sector: urban/municipal	**Cost saved for the municipality from disposal of waste** **Consideration:**1.1 cubic meter of landfill area per ton of organic waste composted. US$ 23.36 saved by avoiding 2 tons of organic waste to be land filled. Presently USD 11.68/ton spent for (transportation and land filling cost)	**US $ 23.36**
Private	Economic Sub sector: agriculture	**25% saving in chemical fertilizer usage by use of compost** **Consideration:** 25% savings in use of chemical fertilizer resulting in savings of Taka 1515/ha.	**US $ 9.71**
Public	Economic Sub-sector: Agriculture	**25% less subsidy on chemical fertilizer** **Consideration:** At present Government of Bangladesh (GOB) is giving BDT 7793.17/Ton on chemical fertilizer (urea).	**US $ 4.13**
Private and Public	Environmental Economical	**Increase in crop yield of 0.21 ton per of rice per half ha** **Consideration:** from 2 tons of waste 0.5 ton of compost can be produced	**US $ 49.09**
Total value of co-benefits per ton of GHG emission reduction through composting			**US $ 93.82**

Source: UNESCAP, UNFCCC, SOUTH POLE and Waste Concern (2015)

Major Challenges

- Significant portion of solid and liquid hazardous waste disposed untreated in the drains, low-lying areas, water bodies and rivers are the cause of drainage blocking, flooding, environmental and health hazards.
- Lack of proper collection, transportation and treatment system in every stage is hindering proper source separation and containment of waste.
- Lack of legal Policy/Rules on solid waste, source separation and recycling is delaying the success.
- Gap between policy and ground situation of implementation. Lack of incentives for private investment in waste and sanitation sectors is hindering the progress. Public Private Partnerships (PPP), incentives linked with land for facility, TAX & VAT incentives, soft loan, free delivery of waste to recycling/treatment facility needs more attention.

Major Challenges

- Lack of level playing field for recycled green products.
- Lack of capacity of private sector and government sector to implement 3R related projects.
- Extended Producers Responsibility (EPR) is not addressed.
- Level of public and private awareness on waste related issues still needs proper attention
- Attention needed for harnessing climate financing in waste and sanitation sector (co-benefits, NAMA etc. and similar initiatives)
- Lack of R&D prevailing in Waste sector.
- Strengthening of relevant institutions along with inter-ministerial co-ordination needed.

Way Forward

After launching of 3R Strategy in Bangladesh a number of positive changes happened since 2010

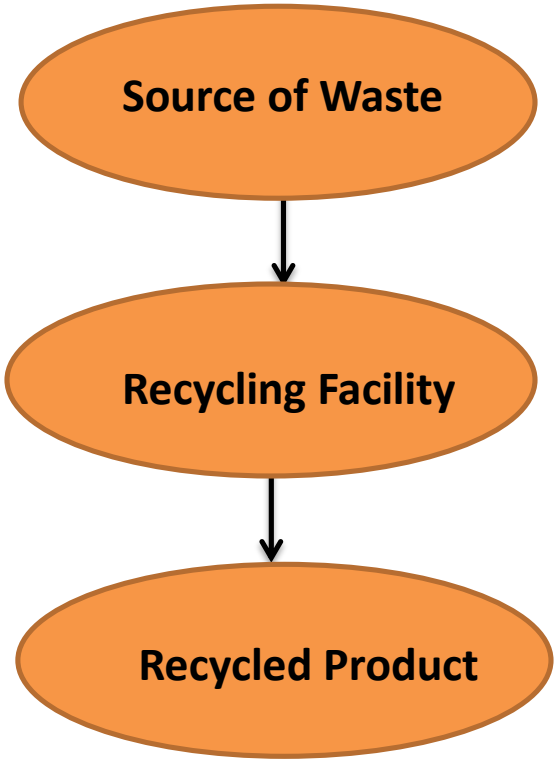
- Government endorsed and adopted the 3R Strategy in a number of projects, programs and policies. Government of Bangladesh utilized its own fund like `Climate Change Trust Fund' to initiate pilot projects which are directly relevant to source separation and recycling of waste.

- It is also observed that international development banks like Asian Development Bank (ADB) & World Bank, United Nations, GiZ and other External Support Agencies (ESA) are financing waste management projects which are linked with the idea of 3R principles and integrated landfill and resource recovery facility. In addition to this more attention needed to be given to co-benefits issues.

- Waste recycling and treatment services can be a profit making industry. Minimization of gap between existing relevant policies and barriers faced during project implementation phase at the ground level.

Way Forward

With proper attention in the following 3 (three) areas, a win-win situation can be created. A number of issues are identified below to improve the situation:



- **Promotion of 3Rs** (Reduce, Reuse and Recycling)
- **Waste Segregation** of waste at the source.
- **Containment and Treatment of Waste at Source** as far as possible.
- **Raising awareness** on source separation of waste
- **Reduction of Multiple Handling of Waste.**

- **Promotion of Integrated Resource Recovery Centers**
- **Provision to Land by Government**
- **Free delivery of waste to recycling facilities**
- **incentivize composting** and recycling initiatives (lower VAT &, TAX, Land etc.)
- **Easy access to soft loans**.

- **Create level playing field** (for example chemical fertilizer is subsidized)
- **Facilitate Marketing of** recycled products/recyclables/renewable energy by the government.
- **Green procurement** i.e., procurement of compost or recycled product, renewable energy etc.

- **Legal Policy backing to promote source separation and recycling.**
- **Extended Producers Responsibility (EPR) needs to be implemented.**
- **Promote Public-Private and Community (PPPCP) partnership in recycling initiatives.**
- **Promote capacity building and training for municipal staffs and private sector.**
- **Strengthening inter ministerial co-ordination to increate the recycling rate**
- **Promote NAMA and Co-benefit to harness carbon emission trading.**

Two (2) Policy Driven Discussion Questions

1. How government can make a city sustainable and resilient by improving the waste, sanitation and environmental issues with the active participation of all the stakeholders?

2. How government can encourage investment and participation by private sector and community in 3R related projects by incentivizing and creating level playing field?

THANK YOU