Community Based Solid Waste Management Through Public-Private-Community Partnerships: Experience of Waste Concern in Bangladesh

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www.wasteconcern.org
Presentation Outline

I. Urbanization in Bangladesh
II. Solid Waste Management Situation in Bangladesh
III. Problems of Solid Waste Management in Urban Areas of Bangladesh
IV. Approach Followed by Waste Concern to Solve the Problems
V. How Solid Waste is Converted into Resource Through Public-Private-Community Partnerships (PPCP)
VI. Impact of the PPCP Model
VII. Lessons Learnt
Brief Introduction of Waste Concern

- In 1995, Waste Concern, a national research organization was established in Bangladesh.

- In 2005, Waste Concern Group was formed as a Social Business Enterprise (SBE) comprising of a number of special purpose companies.

- Our main objective is to promote the idea of converting waste into resource.

Fields of Activity:
- Solid Waste Management and Resource Recovery
- Clinical & Hazardous Waste Management
- Policy on Waste Management
- Climate Change & Clean Development Mechanism
- Industrial Pollution Control
- EMS & ISO 14001
- Organic Farming
- Ecological Sanitation
- Renewable Energy

web: www.wasteconcern.org
## Urbanization in Bangladesh

**Table: Urban Population Density/Sq.Km.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Bangladesh Urban</th>
<th>Dhaka Mega City</th>
<th>Dhaka City Corporation Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>2179</td>
<td>4795</td>
<td>15333</td>
</tr>
<tr>
<td>2004</td>
<td>3008</td>
<td>8573</td>
<td>18055</td>
</tr>
</tbody>
</table>

**Table: Total Urban Population, Percent of Urban Population, Average Annual Growth Rate (%)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Urban Population</th>
<th>Percent of Urban Population</th>
<th>Average Annual Growth Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>1819773</td>
<td>4.33</td>
<td>1.69</td>
</tr>
<tr>
<td>1961</td>
<td>2640726</td>
<td>5.19</td>
<td>3.75</td>
</tr>
<tr>
<td>1974</td>
<td>6273602</td>
<td>8.78</td>
<td>6.62</td>
</tr>
<tr>
<td>1981</td>
<td>13535963</td>
<td>15.54</td>
<td>10.63</td>
</tr>
<tr>
<td>1991</td>
<td>20872204</td>
<td>20.15</td>
<td>5.43</td>
</tr>
<tr>
<td>2001</td>
<td>28808477</td>
<td>23.39</td>
<td>3.27</td>
</tr>
<tr>
<td>2025*</td>
<td>78440000</td>
<td>40.00</td>
<td>-</td>
</tr>
</tbody>
</table>

* source: UMP, Asia News, Summer, 1999
## Total Waste Generation in Urban Areas of Bangladesh in 2005

<table>
<thead>
<tr>
<th>City/Town</th>
<th>*WGR (kg/cap/day)</th>
<th>No. of City/Town</th>
<th>Total Population (2005)</th>
<th>Population** (2005)</th>
<th>TWG*** (Ton/day)</th>
<th>Average TWG (Ton/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dry season</td>
<td>Wet season</td>
</tr>
<tr>
<td>Dhaka</td>
<td>0.56</td>
<td>1</td>
<td>6,116,731</td>
<td>6,728,404</td>
<td>3,767.91</td>
<td>5,501.14</td>
</tr>
<tr>
<td>Chittagong</td>
<td>0.48</td>
<td>1</td>
<td>2,383,725</td>
<td>2,622,098</td>
<td>1,258.61</td>
<td>1,837.57</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>0.3</td>
<td>1</td>
<td>425,798</td>
<td>468,378</td>
<td>140.51</td>
<td>205.15</td>
</tr>
<tr>
<td>Khulna</td>
<td>0.27</td>
<td>1</td>
<td>879,422</td>
<td>967,365</td>
<td>261.19</td>
<td>381.34</td>
</tr>
<tr>
<td>Barisal</td>
<td>0.25</td>
<td>1</td>
<td>397,281</td>
<td>437,009</td>
<td>109.25</td>
<td>159.51</td>
</tr>
<tr>
<td>Sylhet</td>
<td>0.3</td>
<td>1</td>
<td>351,724</td>
<td>386,896</td>
<td>116.07</td>
<td>169.46</td>
</tr>
<tr>
<td>Pourashavas</td>
<td>0.25</td>
<td>298</td>
<td>13,831,187</td>
<td>15,214,306</td>
<td>3,803.58</td>
<td>5,553.22</td>
</tr>
<tr>
<td>Other Urban Centers</td>
<td>0.15</td>
<td>218</td>
<td>8,379,647</td>
<td>9,217,612</td>
<td>1,382.64</td>
<td>2,018.66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>-</td>
<td>522</td>
<td>32,765,516</td>
<td>36,042,067</td>
<td>10,839.75</td>
<td>15,826.04</td>
</tr>
</tbody>
</table>

*WGR= Waste Generation Rate,  
** Including 10% increase for floating population,  
***TWG= Total Waste Generation, which increases 46% in wet season from dry season  
Source: 1 JICA (2004), 2 Chittagong City Corporation, 3 Field Survey, 4 Sinha (2000), 5 Field Survey, 6 Sylhet City Corporation, 7, 8 Field Survey

Average per capita urban waste generation rate is estimated as 0.41 kg/capita/day.
Fig 1: Average Physical Composition of Urban Solid Waste

- Food & Vegetable: 67.65%
- Paper Products: 9.73%
- Plastic, Leather, Rubber: 5.10%
- Metals: 0.26%
- Glass and ceramic: 1.13%
- Wood/Grass/Leaves: 4.20%
- Rags, Textile, Jute: 2.50%
- Medicine/Chemical: 0.64%
- Rocks, Dirt & Misc: 8.79%
### Waste Collection Efficiency in Different Areas

<table>
<thead>
<tr>
<th>City/Town</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhaka</td>
<td>42.00</td>
</tr>
<tr>
<td>Chittagong</td>
<td>70.00</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>56.67</td>
</tr>
<tr>
<td>Khulna</td>
<td>47.70</td>
</tr>
<tr>
<td>Barisal</td>
<td>44.30</td>
</tr>
<tr>
<td>Sylhet</td>
<td>76.47</td>
</tr>
<tr>
<td>Pourashava</td>
<td>54</td>
</tr>
<tr>
<td>Other Urban Center</td>
<td>52</td>
</tr>
</tbody>
</table>

The dotted line represents the average efficiency level.
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) which amounts 475 tonnes/day are recycled daily.
**Informal Recycling of Inorganic Solid Waste and Savings through Recycling (in 2005)**

<table>
<thead>
<tr>
<th>City/Town</th>
<th>TWG* (Ton/day)</th>
<th>No. of City/Town</th>
<th>% of Inorganic Waste Recycling**</th>
<th>Savings through recycling per year, (Tk. million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhaka</td>
<td>4,634.52</td>
<td>1</td>
<td>15.00</td>
<td>170.00</td>
</tr>
<tr>
<td>Chittagong</td>
<td>1,548.09</td>
<td>1</td>
<td>12.45</td>
<td>28.96</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>172.83</td>
<td>1</td>
<td>6.7</td>
<td>1.00</td>
</tr>
<tr>
<td>Khulna</td>
<td>321.26</td>
<td>1</td>
<td>6.00</td>
<td>6.94</td>
</tr>
<tr>
<td>Barisal</td>
<td>134.38</td>
<td>1</td>
<td>5.42</td>
<td>5.14</td>
</tr>
<tr>
<td>Sylhet</td>
<td>142.76</td>
<td>1</td>
<td>4.23</td>
<td>3.44</td>
</tr>
<tr>
<td>Pourashava</td>
<td>4,678.40</td>
<td>298</td>
<td>3.89</td>
<td>8,862.52</td>
</tr>
<tr>
<td>Other Urban Center</td>
<td>1,700.65</td>
<td>218</td>
<td>4.00</td>
<td>1,627.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13,332.89</td>
<td>522</td>
<td>-</td>
<td><strong>10,705.5</strong> (15.29 million US $)</td>
</tr>
</tbody>
</table>

1 US $ = BDT 70
### Relationship of GDP & Population with Waste Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban Population</th>
<th>Total Urban Waste Generation (Ton/day)</th>
<th>Per Capita Waste Generation Rate in urban areas Kg/cap/day</th>
<th>Per Capita GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>20.8 million</td>
<td>6493</td>
<td>0.31*</td>
<td>US $ 220</td>
</tr>
<tr>
<td>2005</td>
<td>32.76 million</td>
<td>13,330</td>
<td>0.41**</td>
<td>US $ 482****</td>
</tr>
<tr>
<td>2025</td>
<td>78.44 million</td>
<td>47,000</td>
<td>0.60***</td>
<td>-</td>
</tr>
</tbody>
</table>

Comparative Analysis of Composition of Waste Dhaka City Between 1992 & 2005

Source: Ahmed, 1992 and Waste Concern 2005
Comparison | 1992* (%) | 2004** | 2005***
---|---|---|---
% of Plastic in DCC waste | 1.74 | 3.2 | 4.1

* BUET/World Bank
**JICA, 2004
*** Waste Concern, 2005
MAJOR PORTION OF THE WASTE IS ORGANIC
Low-lying areas, drains and canals are clogged with waste
Low-lying areas, drains and canals are clogged with waste.
Unsanitary Crude Dumping Practice
Unsanitary Crude Dumping Practice
Unsanitary Crude Dumping Practice

Mymensingh Town
Unsanitary Crude Dumping Practice
## Landfill Volume Requirement per Year for Urban Solid Waste Disposal

<table>
<thead>
<tr>
<th>City / Town</th>
<th>TWG* (Ton/day)</th>
<th>Waste Collection Rate, %</th>
<th>Landfill area required with 4m depth, acre per year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>With existing collection efficiency</td>
</tr>
<tr>
<td>Dhaka</td>
<td>4,634.52</td>
<td>42.00</td>
<td>39.89</td>
</tr>
<tr>
<td>Chittagong</td>
<td>1,548.09</td>
<td>70.00</td>
<td>22.21</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>172.83</td>
<td>56.67</td>
<td>2.01</td>
</tr>
<tr>
<td>Khulna</td>
<td>321.26</td>
<td>47.70</td>
<td>3.14</td>
</tr>
<tr>
<td>Barisal</td>
<td>134.38</td>
<td>44.30</td>
<td>1.22</td>
</tr>
<tr>
<td>Sylhet</td>
<td>142.76</td>
<td>76.47</td>
<td>2.24</td>
</tr>
<tr>
<td>Pourashava</td>
<td>4,678.40</td>
<td>54.42</td>
<td>52.17</td>
</tr>
<tr>
<td>Urban Center</td>
<td>1,700.65</td>
<td>52</td>
<td>18.12</td>
</tr>
<tr>
<td>Total</td>
<td>13,332.89</td>
<td>-</td>
<td>140.99</td>
</tr>
</tbody>
</table>

*TWG = Total Waste Generation
Fig 8: Projection of Future Landfill Requirement

- **4m deep landfill area, acre**
- **Year** 2005, 2025, 2030, 2050
- **Population, million**
  - Without composting
  - 50% composting
  - 75% composting

The graph shows the projected landfill requirements and population growth with and without composting over the years 2005 to 2050.
## Green House Gas Emission Potential of Urban Solid Waste

<table>
<thead>
<tr>
<th>City/Town</th>
<th>TWG*, (Ton/day)</th>
<th>GHG emission potential, million ton CO₂e / year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dhaka</td>
<td>4,634.52</td>
<td>0.76</td>
</tr>
<tr>
<td>Chittagong</td>
<td>1,548.09</td>
<td>0.25</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>172.83</td>
<td>0.03</td>
</tr>
<tr>
<td>Khulna</td>
<td>321.26</td>
<td>0.05</td>
</tr>
<tr>
<td>Barisal</td>
<td>134.38</td>
<td>0.02</td>
</tr>
<tr>
<td>Sylhet</td>
<td>142.76</td>
<td>0.02</td>
</tr>
<tr>
<td>Pourashava</td>
<td>4,678.40</td>
<td>0.77</td>
</tr>
<tr>
<td>Other Urban Center</td>
<td>1,700.65</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,332.89</strong></td>
<td><strong>2.19</strong></td>
</tr>
</tbody>
</table>
Dhaka City Map Showing the only official dumpsite (unsanitary) of the city which will be filled-up within a year.

**Demographic Profile of Dhaka Mega City**

In terms of population Dhaka was the 11th biggest city in the year 2000 and will be the 4th largest city in world in 2015

- Administrative Area : 1353 Sq. Km
- Population Growth Rate : 4.33% (1991-2001)
- GDP (Per Capita) : US $ 500

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**Matuail Waste Disposal Site**

90% FILLED
Negative Impacts of Unmanaged Waste

VERMINS
Spreading more than 40 Diseases

LEACHATE
Polluting Ground & Surface Water

METHANE GAS
Bad Odor & Green House gas

PROBLEMS OF SOLID WASTE MANAGEMENT
PROBLEMS OF SOLID WASTE MANAGEMENT

- Waste generation rapidly increasing
- City authority cannot cope with the situation
- Lack of source separation
- Inadequate waste collection
- Shortage of land for waste disposal
- Polluting surface and ground water
- Organic waste is left unutilized
- Lack of awareness among citizens
- Lack of partnership between stakeholders
- Emission of greenhouse gas
SOIL CONDITION OF BANGLADESH

REDUCES THE HARMFUL EFFECTS OF CHEMICAL FERTILIZER

Graph Showing the Increase of Chemical Fertilizer Consumption in Bangladesh

Pie Diagram Showing Depletion of Organic Matter From the Soil of Bangladesh

83% of cultivable land in Bangladesh has less than 3.5% organic matter (more than 3.5% is considered to be good soil).
`Waste is merely raw material in the wrong place', (Talbot, 1920). Eighty six years ago, Fedrick A. Talbot in his book, Millions from Waste wrote this line.
ENVIRONMENTAL AND HEALTH PROBLEMS IN URBAN AREAS DUE TO UNMANAGED WASTE

ORGANIC MATTER DEPLETION IN THE SOIL OF RURAL AREAS

ADDRESSING TWO MAJOR PROBLEMS

SOLUTION

- Converting Organic Waste Into Compost Using Community Based Decentralized Approach Integrated with House to House Waste Collection
- Use of Compost/Enriched Compost in Agriculture
Conventional End-of-Pipe Solution of Solid Waste Management

- Marketing of Compost
- Promotion of Organic Farming
- Training, Awareness Raising
- Promotion of 4Rs

Approach of Waste Concern Based on 3R Principle

- Training, Awareness Raising, Promotion of 4Rs
- House to House Waste Collection
- Decentralized Composting Community Scale/ City Scale

- Waste Segregation
- Compost
- Recycle

Less requirement for Disposal Site

- Marketing of Compost
- Promotion of Organic Farming
Composting Methods Used by Waste Concern

- **Barrel Type Composting**
- **Aerator Type Composting**
- **Box Type Compost**

**Major Advantage** Using Waste Concern’s Methods are:
- Simple, affordable, labor intensive, low cost
- Suitable to our socio-economic and climatic condition
Community Based Urban Solid Waste Management in Dhaka (component 3.3.2)
Implementing Agency: Ministry of Environment & Forest
Sub-Implementing Agency: Waste Concern
Supported by: UNDP
Different Steps of Composting Process

For a 3 ton/day capacity plant

• 6 Workers for Collection waste (mainly men)
• 10 workers for Composting Process (mainly women)
• Daily House-to-house Collection
• 1430 households
• Capacity of Rickshaw Van = 1.18 m³
Different Steps of Composting Process

Collection

Sorting

Piling

Composting

Maturing and Compost

Screening

Bagging

Marketing

Box Method

- Use of additives for optimizing Process
- Roof Covered Concrete Slab
- Bamboo Aerator/perforated brick box
- Low cost technique
- Labor intensive

Sawdust
Cowdung/ Bokashi
Water
Screening residue
Water

Composting

Marketing
Different Steps of Composting Process

Aerator Method

Box Method

Collection → Sorting → Piling

Sawdust → Cowdung/ Bokashi → Water → Screening residue

Water

Composting → Maturing and Compost → Screening → Bagging

Marketing
Different Steps of Composting Process

**TEMPERATURE CONTROL**

**Thermophilic Phase (40-70°C)**
Takes 27 days

**Mesophilic Phase & Maturation (20-40°C)**
11 + 15 days

- Temperature is monitored and records are kept to assess the trends
Survival Time (in days) of Pathogen by Different Treatment Method

<table>
<thead>
<tr>
<th>Types of Treatment</th>
<th>Bacteria</th>
<th>Virus</th>
<th>Protozoa</th>
<th>Helminths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night soil, faeces at 20-30 C</td>
<td>90 days</td>
<td>175 days</td>
<td>10 days</td>
<td>Many months</td>
</tr>
<tr>
<td>Composting (anaerobic) septic tank/ pit latrine</td>
<td>60 days</td>
<td>60 days</td>
<td>30 days</td>
<td>Many months</td>
</tr>
<tr>
<td>Thermophilic Composting 50-60°C</td>
<td>7 days</td>
<td>7 days</td>
<td>7 days</td>
<td>7 days</td>
</tr>
<tr>
<td>Waste Stabilization Pond Retention time &gt;20days</td>
<td>20 days</td>
<td>20 days</td>
<td>20 days</td>
<td>20 days</td>
</tr>
</tbody>
</table>

Source: IDA (1990)
Screening and Bagging
Different Steps of Composting Process

Collection

Sorting

Piling

Sawdust
Cowdung/ Bokashi
Water
Screening residue
Water

Composting

Maturing and Compost

Screening

Bagging

Marketing

BAGGING

- 40 kg bags
IMPACT OF THE PROJECT

1 ton Organic Waste

Composting

1/4 ton Compost

www.wasteconcern.org
FERTILIZER COMPANY
- Grinding
- Enriching
- Screening
- Distribution through own retail channels
- Directly to Farmers and nurseries
- Own use for demonstration plot

MARKETING OF COMPOST BY PRIVATE SECTOR

Innovation..........
Marketing of nutrient enriched compost (compost blended with fertilizers)

Compost (8mm)  
Compost (4mm)  
Enriched & Granular
Using Existing Country-wide Marketing Network

Existing Storage and Formulation Facility of ALPHA Agro Ltd. at Gazipur, Dhaka

ALPHA Agro

8x

Trucks 10-12 tons

3-4 Vans (2-3 ton capacity)
partly used for retailers too

50-60 X per depot

Distributors

Distributors

Distributors

Distributors

Retailers

Retailers

Retailers

Retailers

Farmers

Farmers

Farmers

Farmers

Farmers
Communities participate in door-to-door waste collection program & contribute towards its cost. Also, they produce compost & sell to private sector.
IMPACT OF THE PROJECT

- Communities are Cleaner and Healthier
- Communities are Participating and Have Ownership of The Project
- Saves Money and Landfill Area for Local Authorities
- Promotes Sustainable Farming

Beneficiary from the project in 38 replication in 20 towns of Bangladesh:

Total Beneficiary:

60,000
(directly from Waste Concern’s project)

2,72,500
(from replications by others)

Excluding Farmers

BEFORE Intervention

AFTER Intervention
IMMITCAL OF THE PROJECT

GENERATES EMPLOYMENT FOR THE URBAN POOR

- Helping the destitute and hardcore people for new employment
- Integrates informal labor for the production of compost
- Reduce the number of waste pickers near the dustbins & landfill sites
- 16,000 new employment can be created for the urban poor of Dhaka City and 90,000 for country
The project is financially viable

- Fixed cost of 3 ton capacity plant is US $ 8800
- Operational cost per year is US $ 10200
- Per year income from the project is US $ 14,800
- 70% is the income from sale proceeds of compost
- 30% is the income from charges for house-to-house waste collection
- Pay back period of the investment is 23 months
40% of the urban population of Dhaka city is below poverty level and 50% of these poor reside in slums and squatter settlements.

- Introduction of `Barrel Type’ composting system
- Build awareness, provide training and create income opportunities from compost for the slum dwellers
Using Public-Private-Community Partnership Approach being replicated in several slums of Dhaka and other communities outside Dhaka city

- Significantly Reduced Littering of Waste
- Improved the solid waste and health problems of the slum

Barrel Type Composting in the Slums
Salient Feature of the Project

• One green barrel (for organic waste) is provided for a group of 5-6 Nos. of households and placed on a raised base with concrete ring.

• Specially designed 200 liter bottomless perforated steel/plastic barrel with a lid used for this system.

• Semi Aerobic Composting Technique is followed in Barrel System. Within three months time period compost is produced.

• Yellow barrels used for disposal of inorganic waste.

• The households sharing the income from sale proceeds of the compost.

• Cost of a compost barrel is around US $ 20

• Compost worth between US $ 10-11 can be produced each year

• Cost recovery 23 months
PROFITS FOR ALL STAKEHOLDERS CAN BE A KEY TO SUSTAINABLE WASTE MANAGEMENT SERVICES

LINKED IN A CLOSED BENEFIT LOOP

PUBLIC SECTOR

PRIVATE SECTOR

COMMUNITY

NGO
**PROBLEMS**

- Water Pollution
- Spread of Disease Vectors
- Green House Gas Emission
- Odor Pollution
- More Land Required for Landfill

---

### Existing Practice

**Waste**

- 55% Collected
  - Collected by Municipalities
- Community Bin

- 55% Disposed
  - Dumped in Crude Dump Site
  - Land Required: 273 acre/year

- Cost Per Ton: US $6 to US $30

**Conventional end-of-pipe solution (based on collection-transportation-disposal)**

- 55% Collected
  - Public Sector: No Partnership
- Community Bin

- 45% Remains uncollected

**Waste**

- 45% Remains uncollected

---

### Decentralized Approach: Based on Partnerships

**Waste**

- 100% Collected
  - House-to-house waste collection method
- Composting Plants
  - small-medium-large

- 86% Recycled
- 70%-80% Composted
- 6% Recyclables
- 14% Non-compostable
- GHG Reduced

**Composting Plants**

- Full cost recovery
  - Community paying for the house-to-house collection
  - Community involved with the activity

- Municipalities are saving cost of managing waste.
  - Govt./ Public Agencies Providing land
  - Private sector purchasing land
  - Operated by Community/NGOs/ Private Sector

**Marketing of compost & recyclable done by private companies**

- Price of Compost: US$ 45/ton
Growth Over Time and Barrier Faced

- Lack of technology
- Lack of finance
- Lack of awareness
- Lack of partnership
- Land for composting provided by Government
- Policy change
- Majority Grant from GoB & External Agencies for Piloting and some private investments

1995
- Waste Concern starts pilot community based resource recovery project in Dhaka

1997
- Regional Urban Development Office (RUDO)-South Asia supports to increase the capacity of the project and to further test the model

1998
- With support from MoEF, UNDP, Waste Concern under SEMP selected to replicate the model in 5 (five) communities of Dhaka City

1999
- Partnership agreement signed between public-private sector-community to implement the project

2000
- Replication of the model in Dhaka, Khulna & Sylhet cities.

2005
- 38 replications of this model in more than 20 cities/towns of Bangladesh
- Regional replication in other Asian countries (Vietnam, Sri Lanka)

2006
- 700 Tons/day capacity
- Decentralized large scale
- Composting project under CDM located in suitable locations of Dhaka city

- Land and waste collection by private sector
Replication in 20 cities and Towns of Bangladesh
Replication in 20 cities and Towns of Bangladesh

- Rangamati, Chittagong Hill Tract
- Barisal
- Patuakhali
- Jessore
Replication in 20 cities and towns of Bangladesh
Replication in 20 cities and Towns of Bangladesh
Replication in Rural Areas of Bangladesh
To promote idea of *converting waste into resource*

A regional recycling training center has been established with the support from UNDP under the Sustainable Environment Management Program (SEMP) for Technology Demonstration and Hands-on training.
Regional Recycling Training Center, Dhaka

This training center consists:

TRAINING CENTER: For 30 participants/batch

TECHNOLOGY DEMONSTRATION:

• 8 (eight) tons capacity composting plant
• Waste Water Treatment
• Eco-toilet
• Rain water harvesting
• Energy efficiency
• Training Room Facility
• Compost Enrichment Facility

□ A Handbook on Decentralized Composting has been developed to help others to carryout waste to resource activities. This handbook jointly prepared by Waste Concern and SANDEC with the support from UNDP, SDC under SEMP
Global Impact

Local Impact

- Reducing poverty by creating jobs for urban poor
- Promoting Public Private and Community Partnerships
- Reducing Solid Waste Management cost of municipalities
- Enhances food security, promotes organic farming
- Reducing Green House Gas
- Reducing health hazards and improves environment
- National Government includes the model in the policy (PRSP)
- 38 Replication in 20 towns of Bangladesh
- Reducing Green House Gas
- Improves the quality of life of the city
- Raises public awareness on Solid Waste Management and recycling
- Attracting Foreign Direct Investment (FDI)
- Complying with the MDG

International replication in Sri Lanka, Vietnam, etc.
3R Principal for Solid Waste Reflected in the National and Local Government Policies and Plan

POLICY

- **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 bio-gas production;

- **Draft National Urban Policy- 2006**
  CDM and Recycling has been emphasized in this policy

RULES

- **Lead Acid Battery Recycling and Management Rules, 2006**: Under this rules collection and recycling has been improved. This rules is based on a detail study carried out by Waste Concern on 2005 under SEMP.

- **Draft National Solid Waste Management Handling Rules, 2005**: 3R principal has been used. This rule has been prepared by Waste Concern under SEMP.

STRATEGY

- **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.

- **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.

ACTION PLAN

- **Dhaka Environment Management Plant 2005**
  Waste recycling has been promoted, less land filling encouraged, EMS promoted among industries.

- **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. Waste Concern is promoting 3R, under the Sustainable Environment Management Programme (SEMP) of NEMAP.

- **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 strategy is based on based on 4 R principle i.e. reduce, reuse, recycle and recover of the waste.

DECLARATION

- **Dhaka Declaration 2004 on Waste Management by SAARC 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.
Strategy for Solid Waste Management

- The present solid waste management practice being followed is based on the end-of-pipe approach, i.e. collect-transport-dispose. This approach is neither sustainable nor cost-effective.
- The strategy for solid waste management is based on 4 R's principle i.e. reduce, reuse, recycle and recovery of the waste.

Main objectives of this strategy is:

- Prioritizing waste avoidance over recycling and recycling over the other forms of environmentally sound disposal methods;
- Reuse non-avoidable waste as far as possible;
- Maintain the content of hazardous substances in waste at the lowest possible level;
- Guarantee an environmentally sound waste collection, transportation, resource recovery and disposal system; and
- Promotion of Public-Private-Community Partnerships in solid waste management