



3R For Resiliency- Prospects in Bangladesh (Presentation 5)

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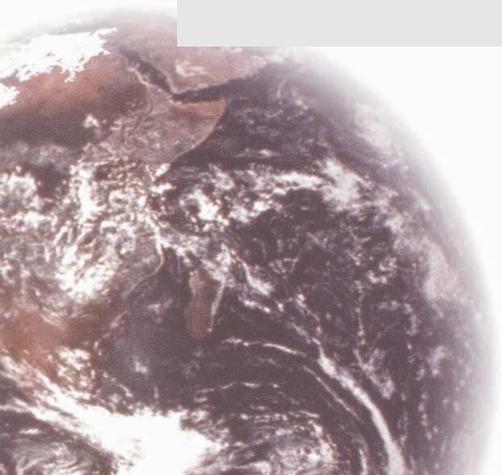
PLENARY SESSION 2

**Enabling a 3R Science-Policy-Business
Interface in Building Smart, Resilient,
Inclusive, Low Carbon and Sustainable
Cities and Communities)**

**Sixth Regional 3R Forum in Asia and the Pacific
16-19 August 2015, Male, Maldives**

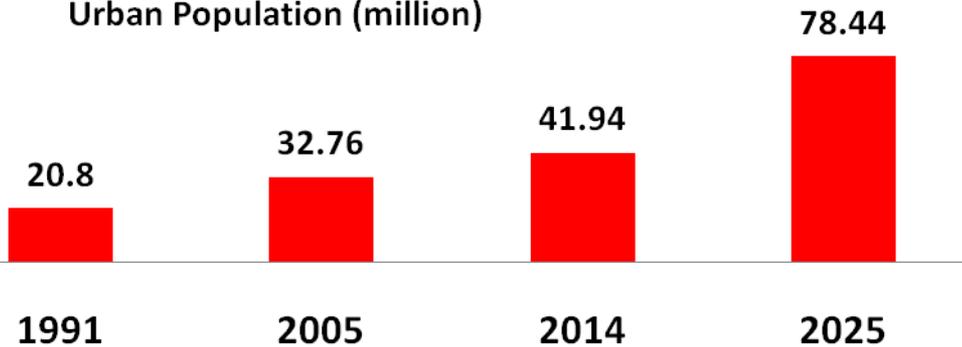


- I. Urban Solid Waste Management Situation**
- II. Problems From Present Practice**
- III. Waste to Resource Approach with Integrated Resource Recovery Center (IRRC)**
- IV. Composting of Organic Waste Replicated in 64 District of Bangladesh.**
- V. Partnership Model**
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Urban Solid Waste Management **Situation in Bangladesh**

Urban Population (million)



Year	Waste Generation Rate in urban areas Kg/cap/day	Per Capita GDP
1991	0.31*	US \$ 220
2005	0.41**	US \$ 482****
2014	0.56***	US \$ 1190
2025	0.60****	-

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



Urban Solid Waste Management Growth in Bangladesh

Urban Solid Waste Management **Situation in Bangladesh**

Present Situation

Source of Waste

Mixed Waste

Waste Bins Demountable Containers

Transfer Stations

Landfill



New Types of Waste Emerging in the Waste Stream

Used Lead Acid Battery

E-Waste

Plastic Waste

Bio-medical Waste



Rapidly changing consumption patterns are generating significantly increasing proportions of toxic chemicals in industrial waste, hazardous hospital waste, large quantities of electronic waste is a growing concern for Bangladesh

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

Waste Generation (urban areas) : 23,688 Tons/day

Waste Collection Efficiency (urban areas) : 50% (Average)

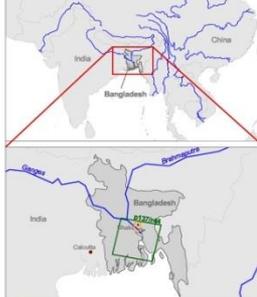
Location of Landfills Shown in the Satellite Image of Dhaka City and Outskirts

BANGLADESH - DHAKA City and Outskirts

1 : 50.000

Center for Satellite based
Crisis Information
- Emergency Mapping & Disaster Monitoring -

German Remote Sensing Data Center
German Aerospace Center



IKONOS imagery of February 19, 2004
LANDSAT imagery of November 24, 1999

Legend

- WATER Surfaces
(derived from LANDSAT imagery, Nov. 24, 1999)
- WETLAND
(derived from LANDSAT imagery, Nov. 24, 1999)
- FOREST
(derived from LANDSAT imagery, Nov. 24, 1999)
- SHRUBLAND
(derived from LANDSAT imagery, Nov. 24, 1999)
- URBAN Areas
(derived from IKONOS imagery, Feb. 19, 2004)
- AIRPORTS
(derived from IKONOS imagery, Feb. 19, 2004)
- ROADS
(derived from IKONOS and LANDSAT imagery)
- RAILWAY
(derived from IKONOS and LANDSAT imagery)

Interpretation

The map displays the Dhaka region in Bangladesh based on Landsat and Ikonos satellite imagery. Water surfaces, forest and shrubland were automatically extracted from Landsat imagery in order to receive a rough land cover basis. The monsoon season in Bangladesh occurs between July and August. The Landsat image was taken in late November, while the Ikonos image was acquired in February. Both images show comparable areas covered by water. Therefore, it is assumed that these images represent more or less the average water distribution in this area.

The infrastructure was digitized on a best effort basis and does not claim to be complete or totally correct. Major roads and railway tracks are hard to differentiate. The only indicators for the separation of the two were curve radii, embankment structures and the rough information of the "Digital Chart of the World". Statements concerning road conditions and accessibility can not be made.



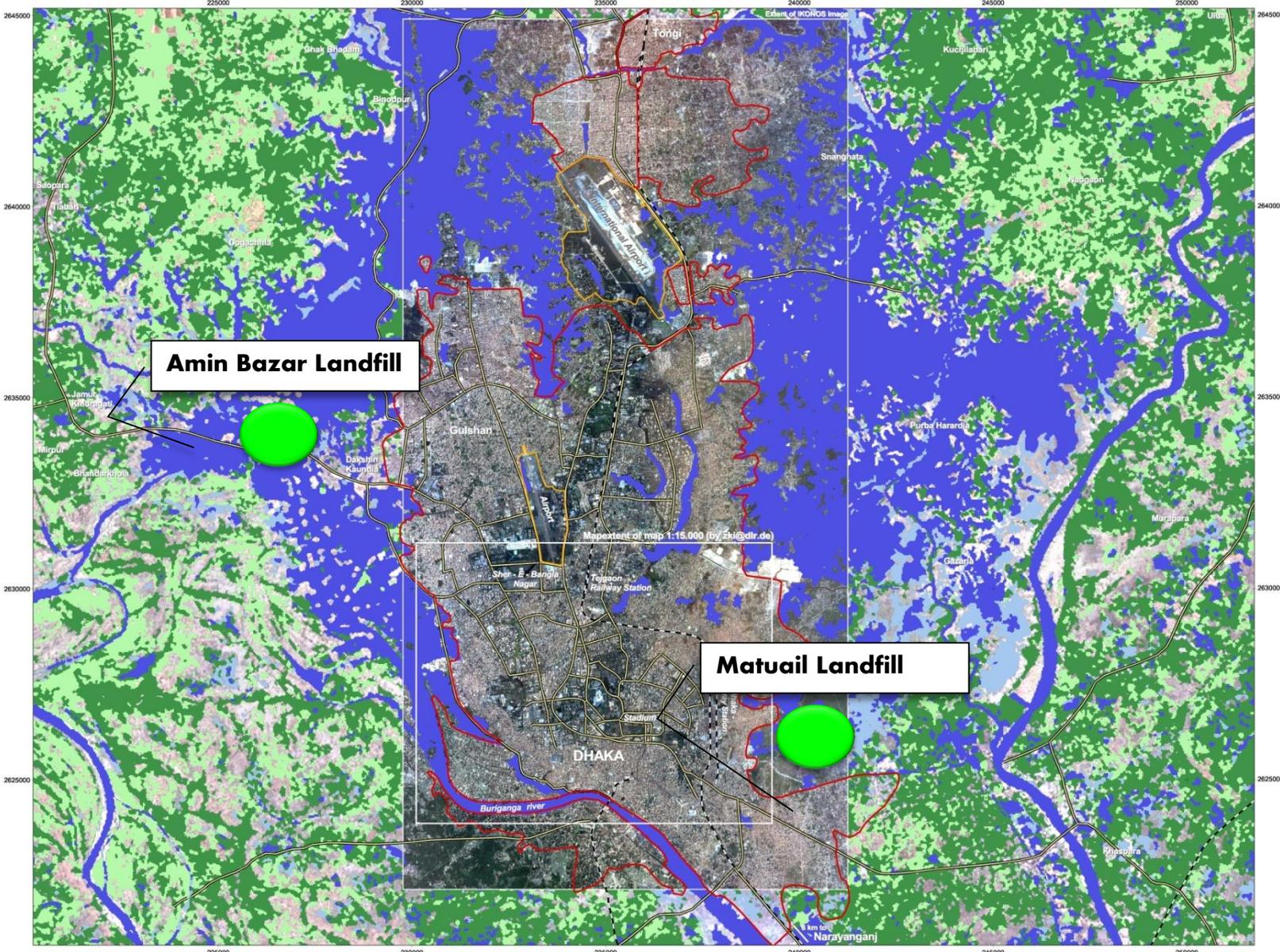
Projection: UTM Zone 46 N
Spheroid: WGS84
Datum: WGS 84

Data Source

Satellite Images provided by: **SPACE IMAGING**
Visual Information. Visible Results.

Landsat imagery from: "Global Land Cover Facility"

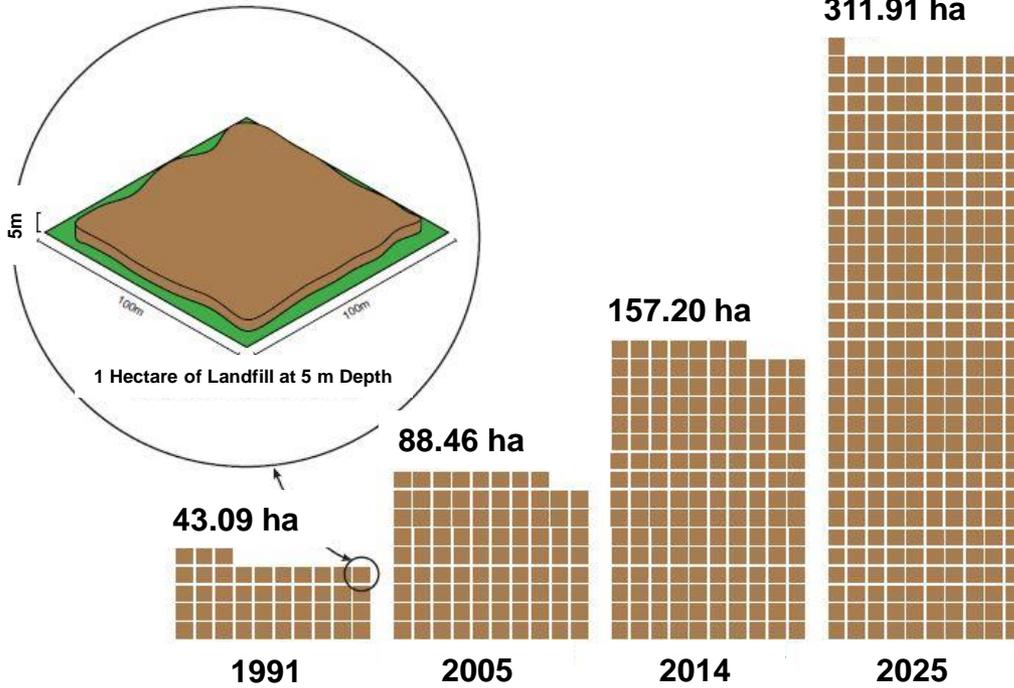
Map created August 08, 2004 by ZKI@DLR.DE



Amin Bazar Landfill

Matuail Landfill

Projection of Future Landfill Requirement and Collection Coverage



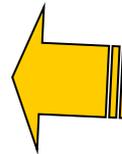
Collection service level remain low with only 50%-70% of resident receiving service. Waste in the drainage system one of the reason for flooding

Problems From Present Practice

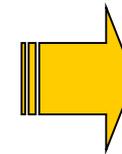
VERMINS
Spreading more than
40 Diseases



METHANE GAS
Bad Odor &
Green House
gas



LEACHATE
Polluting Ground
& Surface Water
Contaminatiohn

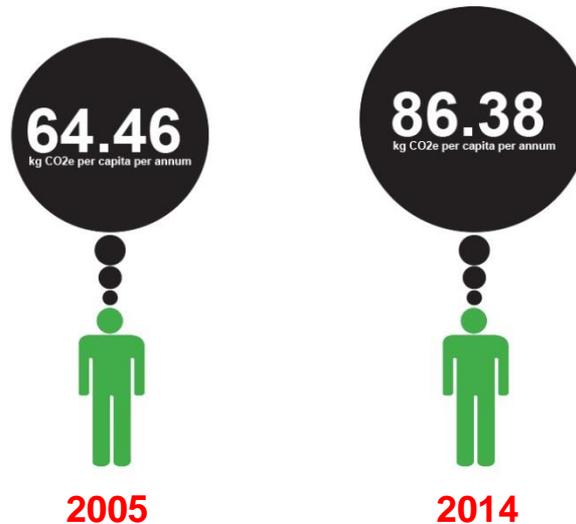


Current approach: waste management not resource recovery...

Green House Gas Emission Potential of Urban Solid Waste

City/Town	TWG*, (Ton/day)	GHG emission potential, million ton CO ₂ e / year
Dhaka	4,634.52	0.76
Chittagong	1,548.09	0.25
Rajshahi	172.83	0.03
Khulna	321.26	0.05
Barisal	134.38	0.02
Sylhet	142.76	0.02
Pourashava	4,678.40	0.77
Other Urban Center	1,700.65	0.28
Total	13,332.89	2.19

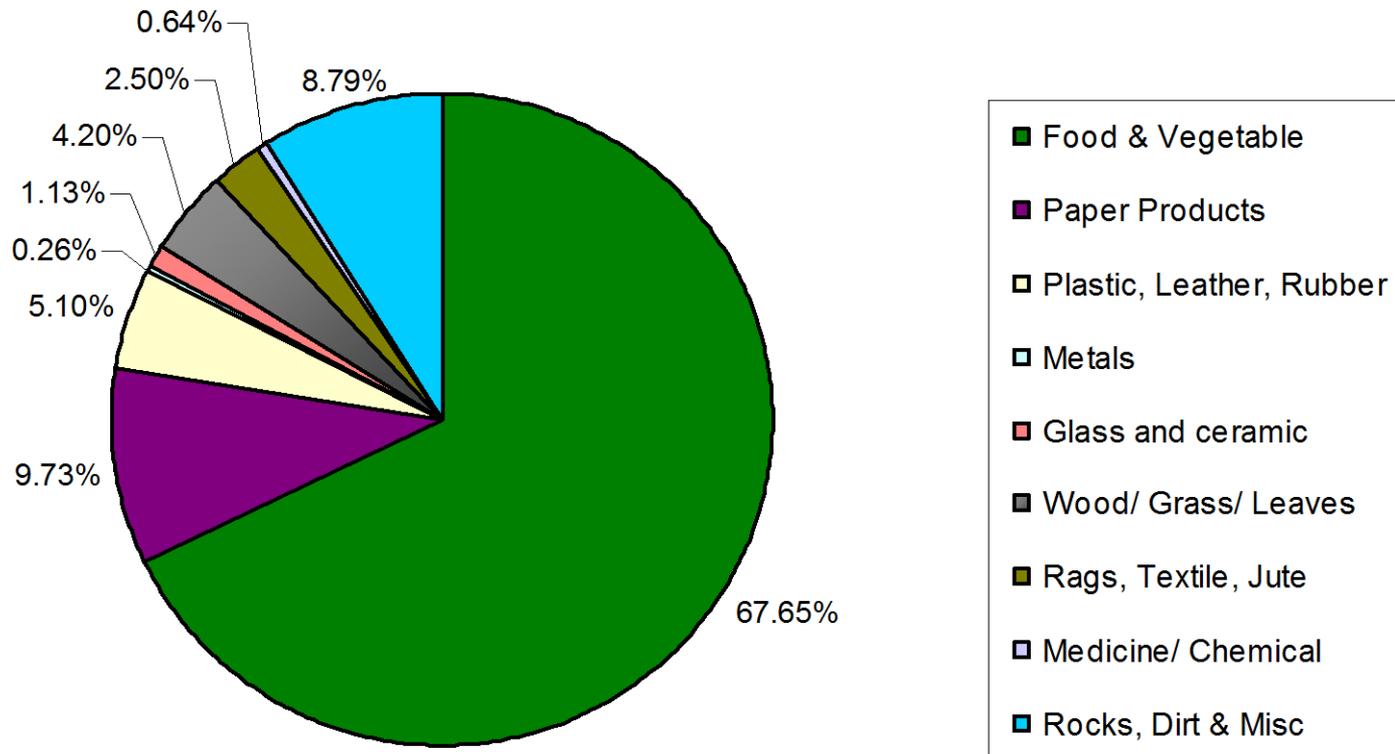
Source: Waste Concern (2005)



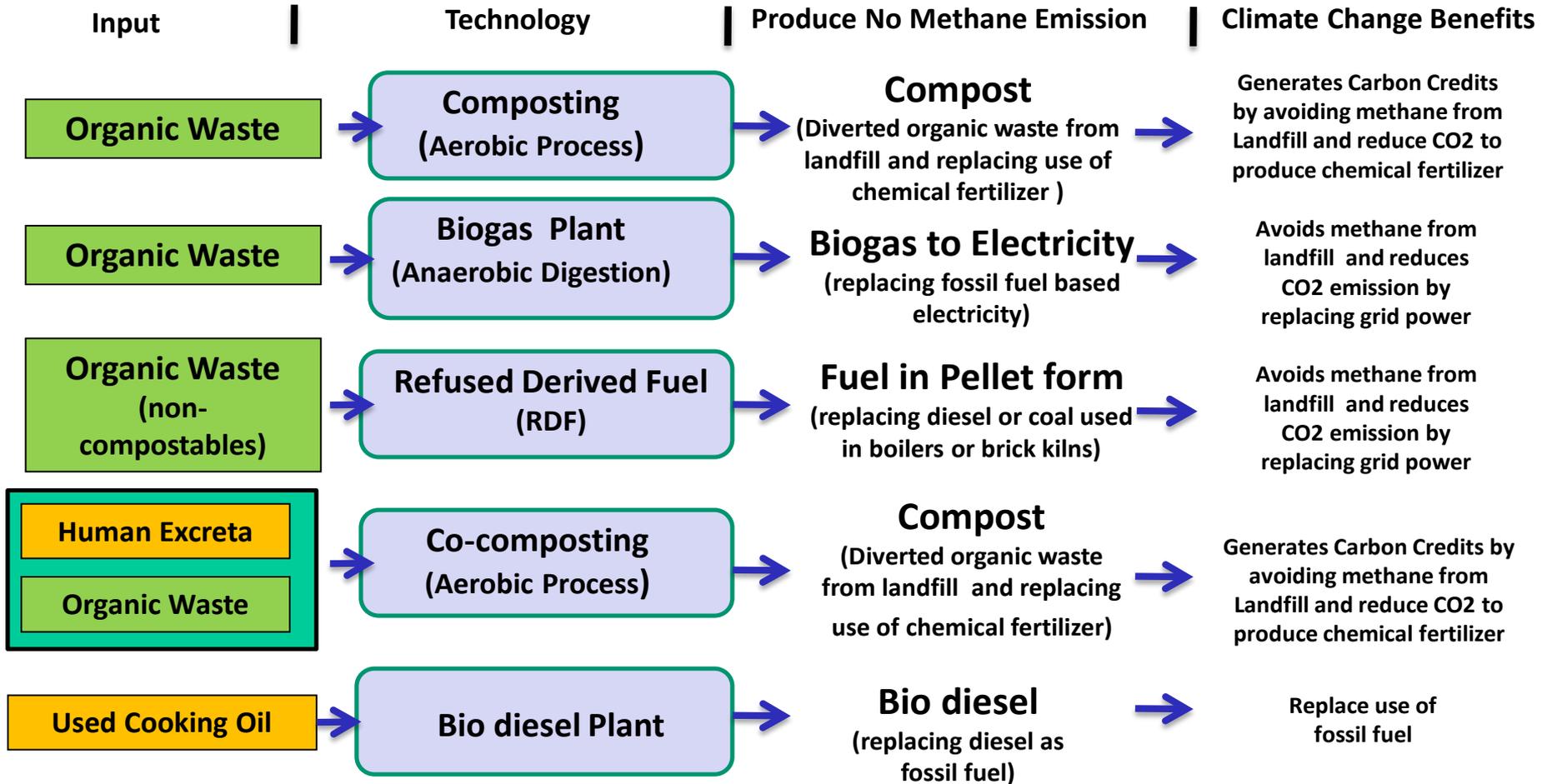
Kg CO₂e/cap/annum from Urban Solid Waste

Solid Waste Management **Situation in Bangladesh**

Average Physical Composition of Urban Solid Waste



Waste to Resource Approach with **Integrated Resource Recovery Center (IRRC)**



In Partnership with UNESCAP, Waste Concern is Replicating the Model in Asia Pacific Countries



Compost



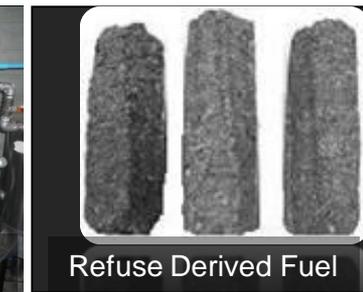
Compost



Biogas

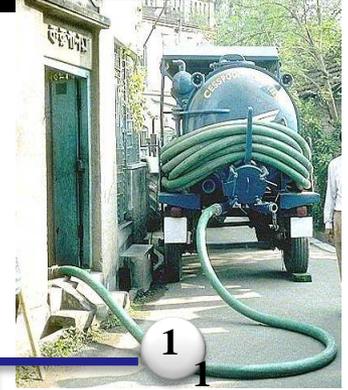
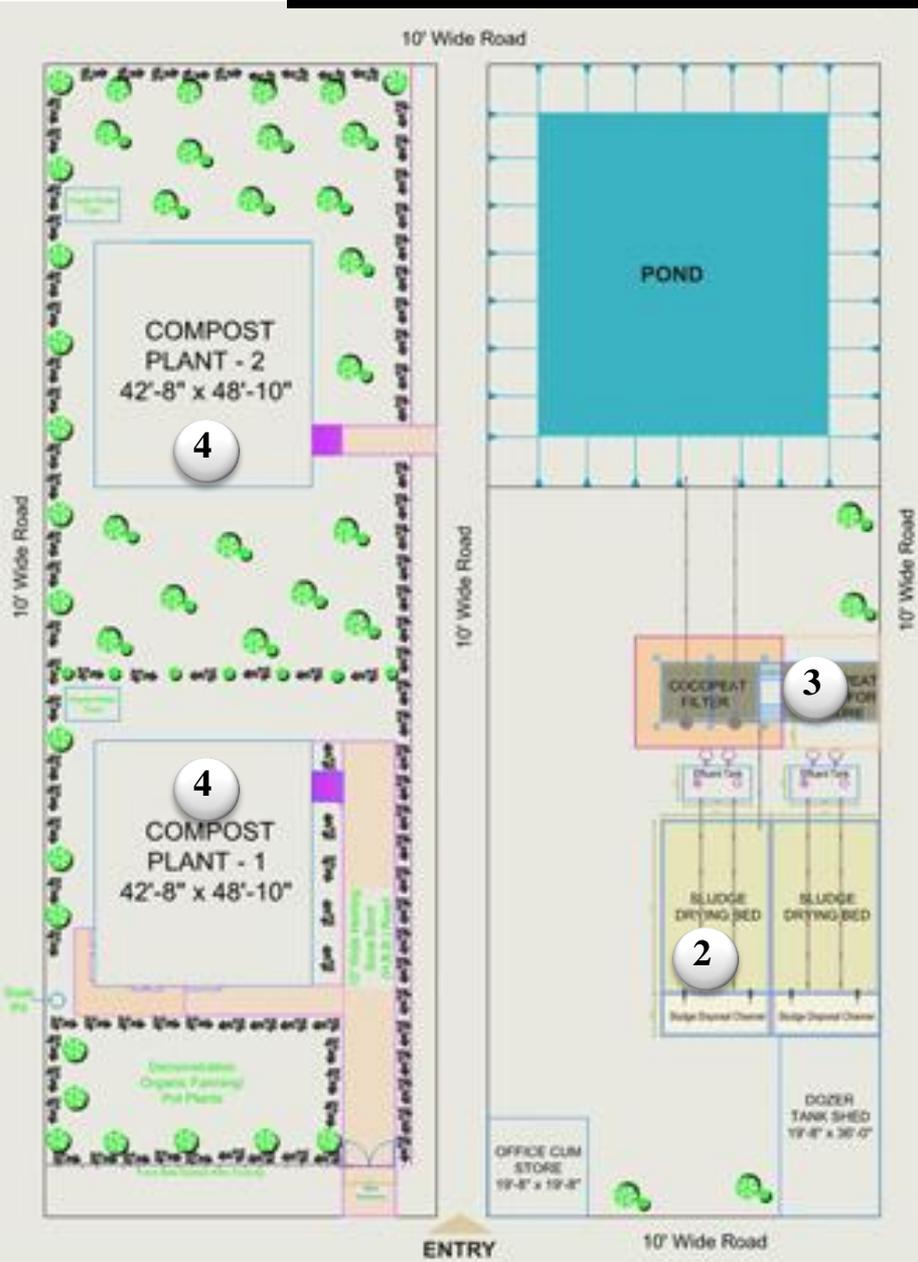


Bio diesel



Refuse Derived Fuel

Pilot Intervention on Co-Composting Project in Kushtia City



Site Plan of the Co-composting (organic waste and Faecal Sludge) Facility, Kushtia

Composting of Organic Waste Replicated in 64 Districts of Bangladesh (Small & Medium Scale)



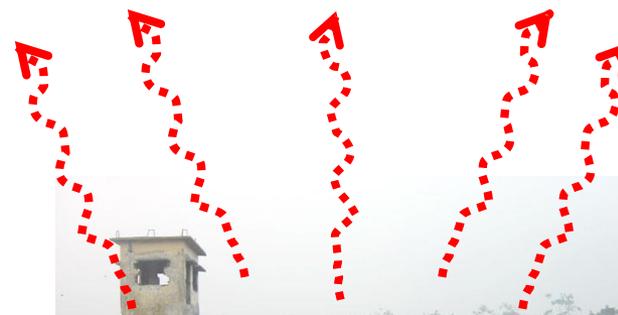
CDM Based Compost Project (130 tons/day) in Bulta, Dhaka

Baseline Situation

CDM project

Methane Emission (Green House Gas)

No Methane Emission



City Authorities
Collecting transport

Waste

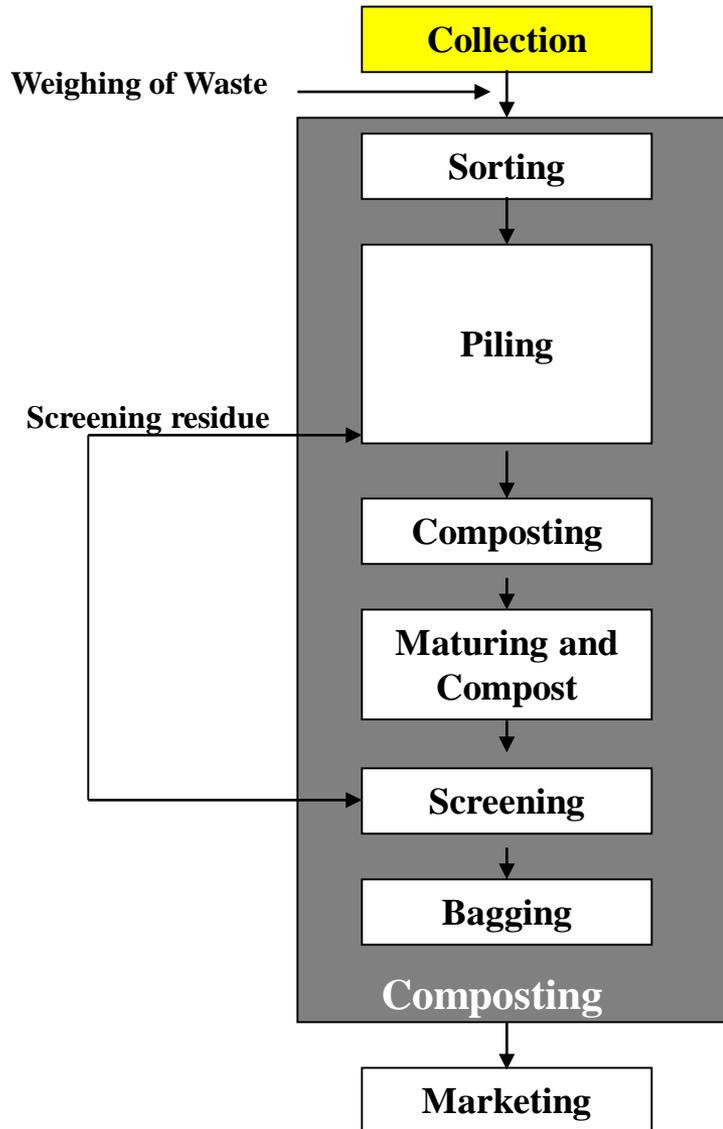


The globally first CDM composting project is already operational in Bangladesh since 2008 and CERs has been issued for this project.

Composting Plant

Existing Practice: land filling of waste

Different Steps of Composting Process



Parameters to be Monitored **During Implementation**



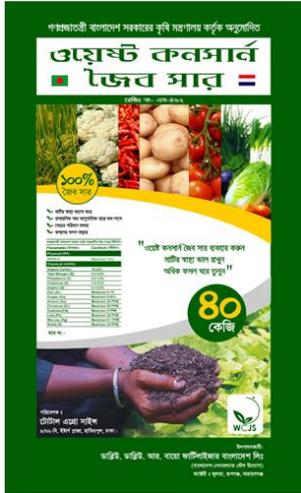
Quality Control Laboratory

Unloading of Incoming Waste and Preliminary Sorting

Process Quality Control



MARKETING OF COMPOST BY WASTE CONCERN (INDIRECT DISTRIBUTION)



PRODUCER OF COMPOST

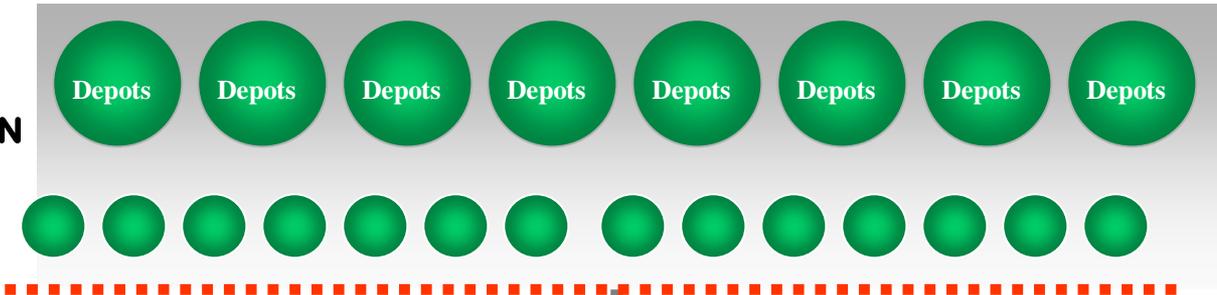
PURCHASING AGENCY
ACI FERTILIZER

MARKETED BY ACI Fertilizer

Compost Produced in
Composting Plants at Dhaka
(8mm 40kg bag @ Tk.8 kg)
Factory Gate Price



DISTRIBUTION CHANNEL



Dealers/ retailers
under distributors

FARMERS AT RURAL AREAS

Retail Price
(8mm 40kg bag @ Tk.12-15 kg)



Improved Working Condition



Informal sector working in unsafe working condition



- *6% of the operational expenditure spent for welfare of the workers in the plant*
- *Day care center for female workers*
- *Free meal for the workers*
- *Health insurance for the workers*

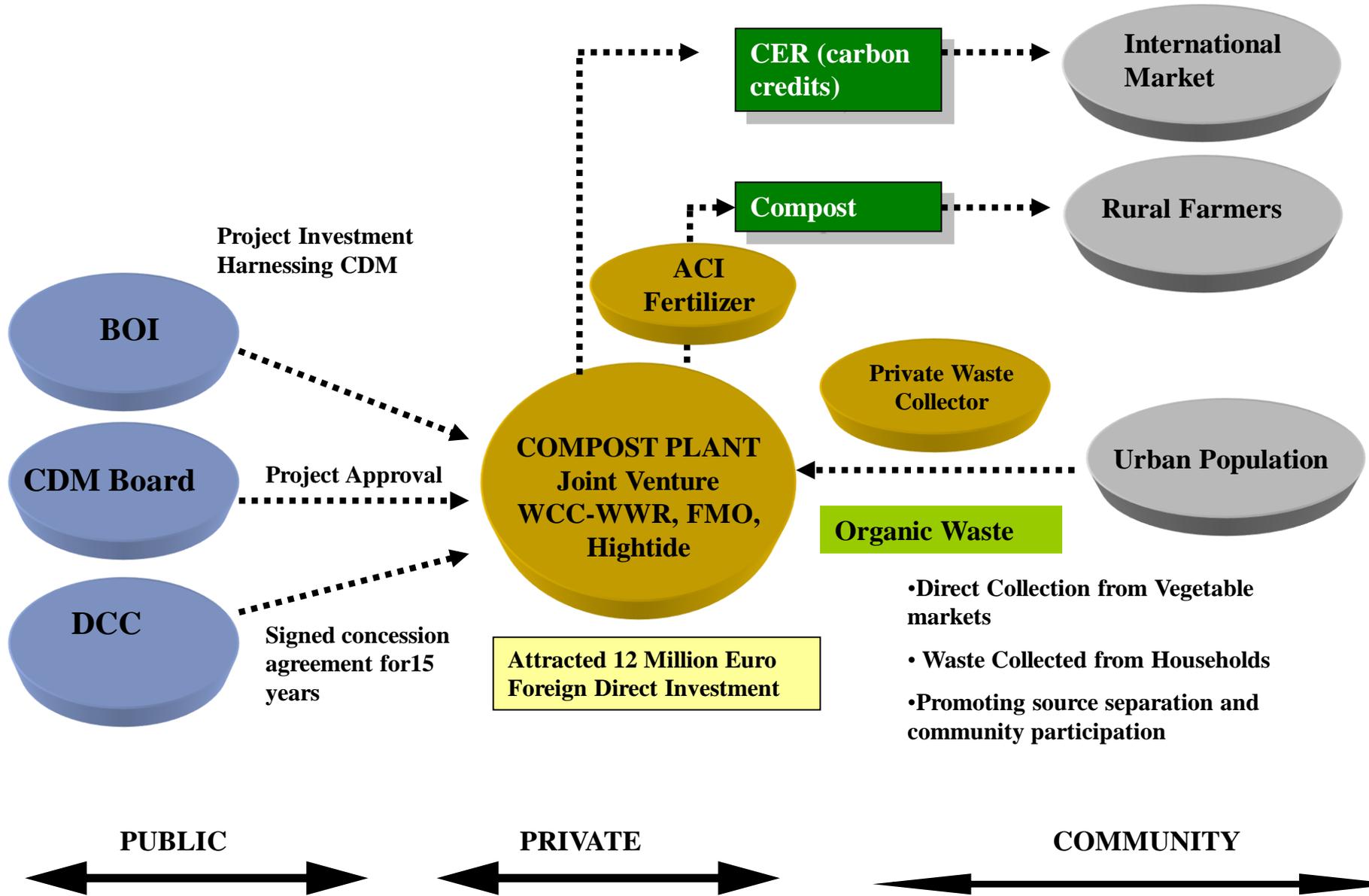
Informal Sector Given Better working Environment

Regional Replication



- Started replication of Waste Concern composting model in Asia Pacific Countries in partnership with UNESCAP
- Established an international training centre in Dhaka supported by Government of Bangladesh
- Establishing a financing vehicle to provide equity fund on waste projects linked with carbon trading

Partnership Model



BOI-Board of Investment; DCC-Dhaka City Corporation; PPCP- Public Private Community Partnership

Recent Policy and Projects

Sixth Five Year Plan (FY 2010 – FY 2015) and Seventh Five Year Plan (FY 2015 – FY 2020)

Low Carbon Path of Development and NAMAs (MOEF, 2011)

In June 2011 Bangladesh presented national communications to the UNFCCC which indicated that Bangladesh plans to reduce emissions from business-as-usual projections by at least one third by 2030.

Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (2009):

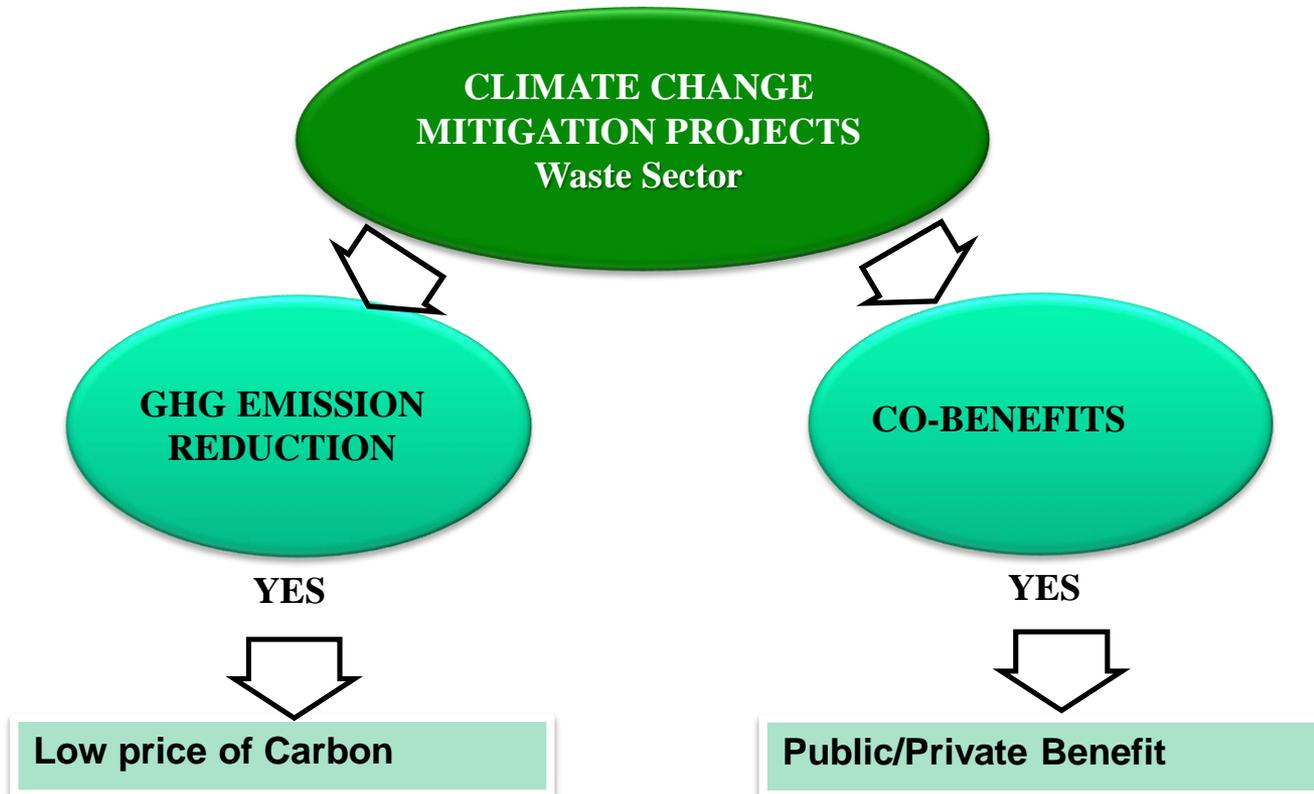
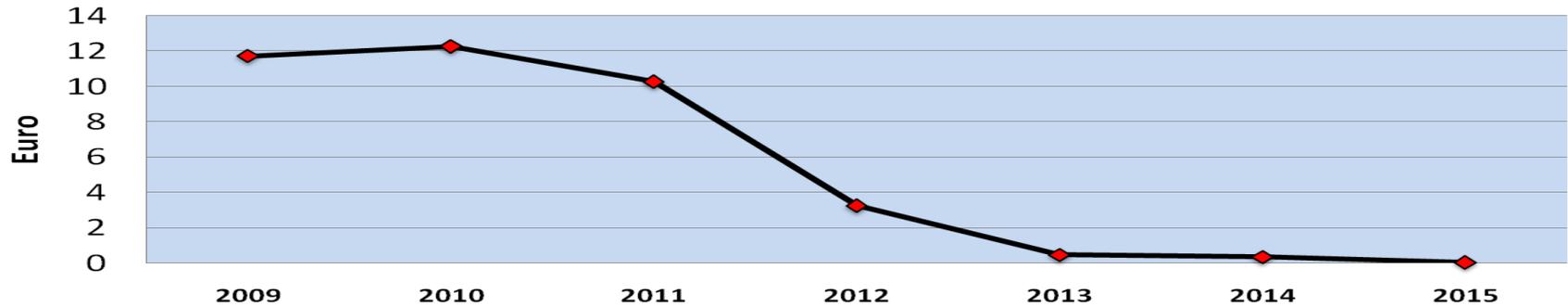
The objective of BCCSAP is to increase the country's resilience to climate change. There are 6 major themes under the action plan and 'Mitigation and Low Carbon Development' is one of these theme where 'management of urban waste' is one of the target to be taken up immediately.

Projects

- Local Government with ADB fund replicating the model in 6 city corporations (2012)
- UNICEF initiated the replication of Waste Concern's Composting Model and Promoting 3Rs in 19 towns of Bangladesh
- Programmatic CDM using organic Wastes of Urban Centres (Phourashava/ Municipalities) throughout Bangladesh (in 64 Districts): Pilot Phase Fund: Government used its Climate Change Fund (2012).
- Implementation of 3Rs (Reduce, Reuse and Recycling) Pilot Initiative in Dhaka and Chittagong Cities to Reduce Green House Gas Emission (Phase 1) (2012)
- Purbachal New Town Project by RAJUK 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.
- Bangladesh Bank's Green Banking Initiatives to promote Green Projects and Products in the country and introduced Taka 2 billion refinance line for these project.
- **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 NAMAs:** with the support from UNESCAP, UNFCCC, SOUTH POLE and Waste Concern

Fall of Carbon Price and Opportunity of Co-Benefits in Waste Sector

Yearly Average Changes of Price of CO₂eq/ton



Co-benefit a New Opportunity

The term co-benefits is defined as all the potential developmental benefits of climate change mitigation actions in areas other than GHG mitigation.



Reduce **0.5 tons of CO₂eq** GHG emissions by recycling 1 (one) ton of organic waste



Aerobic treatment of waste avoids methane generation

GHG Mitigation through Composting of Organic Waste



Creation of New
Jobs= 2 nos.
Create 2 new jobs for the urban poor, including waste pickers



Provides better and more stable income and safer working conditions to waste pickers

Co-benefits of Recycling 1 (one) ton of organic waste



Reduce the risk of diseases directly or indirectly linked with unmanaged municipal solid waste;



Waste bourn diseases can be responsible for high incidence of absence from work.



Between 2,000-3,000 citizens benefit from improved waste collection



Help extend waste collection to underserved communities, especially low income ones



Produce 0.20-0.25 tons of good quality compost



Co-benefits of Recycling 1 (one) ton of organic waste



Save 1.1 cubic meter
of landfill area



Avoid production of
between 0.2-0.3 cubic
meters of polluting waste
water



The use of compost can increase
crop production between 25-
30% and reduce use of chemical
fertilizer by 25-35%.
25% less subsidy on chemical
fertiliser



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

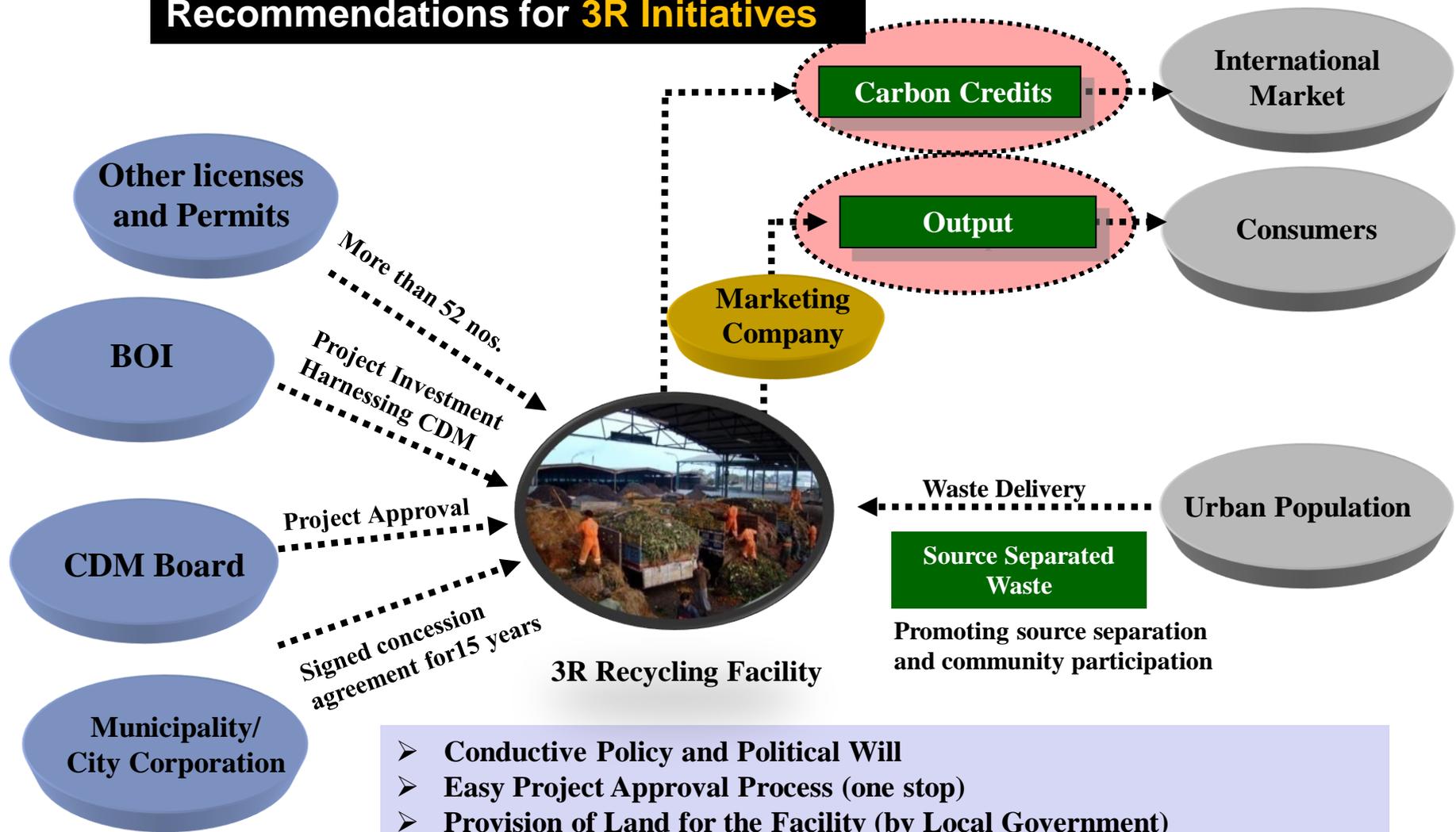
2 Tons
Organic Waste if
Processed into Compost

→ **1 ton**
CO₂eq
Reduced



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 CO ₂ eq	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.	US \$ 4.13
Private and Public	Environmental and 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

Recommendations for 3R Initiatives



- **Conductive Policy and Political Will**
- **Easy Project Approval Process (one stop)**
- **Provision of Land for the Facility (by Local Government)**
- **Free Delivery of Waste (by Local Municipality)**
- **Incentives (TAX, VAT, DUTY etc.)**
- **Soft Finance in 3R initiatives**
- **Level Playing Field for Recycled Product/output**
- **Climate Finance needs to be harnessed (considering co-benefits/NAMA)**
- **R&D and Capacity Building in 3R**
- **Standards and Guidelines for different 3R initiatives**

THANK YOU