UN-HABITAT

3R and Circular Economy towards resilient, low-carbon and sustainable cities and communities

12th Regional 3R and Circular Economy Forum in Asia and the Pacific

Presented by: UN-Habitat

1.   Strengthen City Data and Insights on 3R CE

2.   Planning Project Pipeline & financing

3.   Green transition & creating jobs

Framework jointly released by MoHUA and UN-Habitat at WUF12 in Cairo, Nov 2024

Cornerstones of the framework

The cornerstones of the framework to bring together capabilities for **data and innovation, strategic foresight, and impact monitoring, with unique value addition** are:

Spatial Equity – enhanced and improved access to public goods, services and infrastructure for one and all, reduced localized inequalities so no one and no place is left behind

SDG Localization – recognising subnational contexts and translation of global goals to locally driven actions including co-creation of solutions for the achievement of the Agenda 2030

Climate Resilience – ability of cities to cope and manage the impacts of climate change where nature-based solutions (NBS), blue/green and hybrid infrastructure, and other integrated approaches offer a transformative opportunity to enhance this ability

Inclusive Economy equal and enhanced access by all stakeholders to participate in varied economic opportunities strive towards shared prosperity

SBM 2.0 : Specific Objectives

Vision: creating a "Garbage Free" Urban India.

SBM Mission	SBM Strategies	Value addition to SBM components

SBM Mission
- Sustainable SWM
- Sustainable Sanitation
- Used Water management
- IEC - " Jan Aandolan"
- Capacity building

SBM Strategies
- Creation of enabling environment
- Digital Enablement
- Swachhata Standards
- Partnerships
- Technology promotion
- Focus on planning
- Swachh Survekshan
- Outcomes focus and monitoring
- Funding in 15ᵗʰ Finance Commission Grants
- Aligning with National Priorities
- Urban-Rural convergence

Value addition to SBM components

Urban RAASTA
- (SBM 10.3.6) Capacity building for State /ULBs on GIS for data visuals and insights [MoHUA's App]
- (SBM 2.6.8) Action plans and Gap Analysis

WaCT tool
- (SBM 2.6.1/g) Recyclers and scrap dealers integration
- (SBM 4.3.1| 2.7) PPP funding- Bankable projects
- (SBM 2.6.8) Action plans and Gap Analysis
- (SBM 6.5) Intervention across discrete projects

Others
- (SBM 9.4)   Centre of Excellence
- (SBM 2.6.5)   Fostering key partnerships – Global South-South
- (SBM 6.8)   Supporting Manuals & Guidelines
- (SBM 10.3.8) E-Learning

*** Solid Waste Management Indicators (USAF SWM 5) in direct alignment to CSWAP Reporting

City Solid Waste Action Plan (CSWAP)

➢ ULB's City Profile: (demographic and waste generation details)

➢ Current MSW Management status quo

➢ Assessment of requirement of processing plants/facilities

➢ Other components of MSW Management

  • Sanitary Landfill (SLF) (Filling CELL for 5 years only)

  • Estimated cost for proposed components as per GAP analysis

➢ Financing Planning of Fund Required for Addressing the GAPs (Rs. in Crore)

Aligned Urban RAASTA Indicators

1. Percentage of city's wet waste processed (%)

2. Percentage of the city's dry waste that is separated and classified for recycling/material recovery (%)

3. Percentage of the city's solid waste that is used for energy recovery (incineration) or co-processing (%)

4. Percentage of the city's municipal solid waste that is disposed of in open dumps / controlled dumps, water bodies / is burnt (%)

5. Percentage of waste remediated in the city (%)

6. Percentage of wards practicing source segregation of waste which is maintained till processing/ disposal site (%)

Aligned Urban RAASTA Indicators

7. ICT based Monitoring Mechanism in place for: i) Ward wise Collection and Transportation (C&T) ii) Monitoring of Garbage Vulnerable Points (GVPs) iii) Attendance of Sanitation Staff

8. Percentage of informal waste pickers integrated into sustainable SWM systems (%)

9. Percentage of C&D waste collected of the total C&D waste generated (%)

10. Percentage of hazardous waste processed (%)

11. Total solid waste generation per capita per day (kg/capita/day)

12. Percentage Coverage of wards under Door-To-Door Collection System (%)

Interventions from insights using the tool

Urban RAASTA – Enhancing recovery of waste in cities

GEF investment Pilot Project:
Design, Build, Finance, Operate and Transfer of Bio-CNG (CBG) plant for treatment of 200 TPD biodegradable Municipal Solid Waste on PPP model at Adampur Chhawani, Bhopal.

Bhopal

GEF investment Pilot Project:
Upgrading of Vidyaranyapuram composting facility and development of composting facilities in Rayanakare and Kesare in Mysuru.

Mysuru

0% → **25%**

Percentage of the city's solid waste that is used for energy recovery (incineration) or co-processing

Percentage of the city's solid waste that is used for energy recovery (incineration) or co-processing

5.96% → **100%**

Present treatment capacity of composting facility of the city (27 tons per day)

Projected treatment capacity of composting facility of the city (453 tons per day)

** Composting solid wastes estimated as per 2026 projection **

Indicators Impacted :- Solid Waste Management (USAF SWM 5.3)

Waste Wise Cities programme

Activities

- Interactive knowledge-hub website
- Newsletter
- Stakeholder Network
- City-to-city Partnerships
- Online training courses

Knowledge & Good Practices Sharing

Waste Data & Monitoring

Activities

- Waste Wise Cities Toolkit
- Online training courses
- Regional training workshops face-to-face trainings
- Open waste database
- Publication

Activities

- Advocacy and education campaigns
- Awareness-raising events e.g. Clean Ups
- Building Partnerships

Advocacy & Education

Project Finance & Bankability Support

Activities

- Support for project proposals
- Trainings and workshops
- Partnerships between donors and member cities
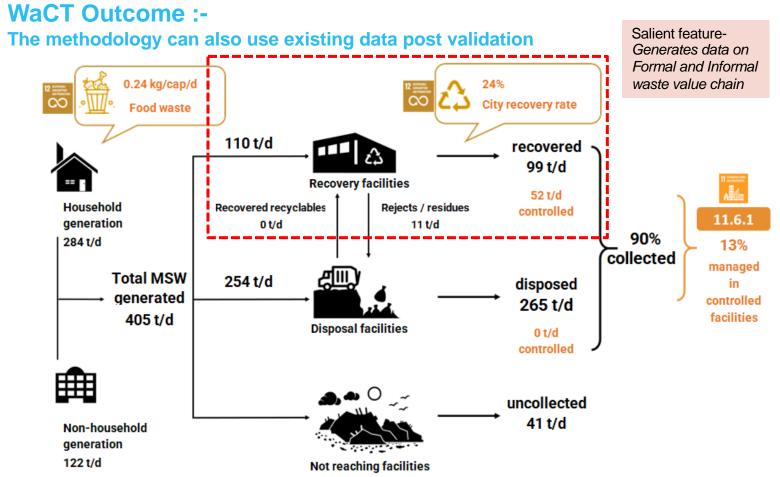- Facilitate public-private partnerships

WaCT tool for evidence-based SWM planning
Generating data for cities to strengthening CSWAP- Example Mangaluru

On site activities

Implementation duration 1 month; 20 field volunteers for 2-week ground assessment, followed by 2 week of analysis

WaCT Outcome :-
The methodology can also use existing data post validation

Salient feature-
Generates data on Formal and Informal waste value chain

SDG 12 — 0.24 kg/cap/d Food waste

SDG 12 — 24% City recovery rate

110 t/d → Recovery facilities → recovered 99 t/d

Recovered recyclables 0 t/d

Rejects / residues 11 t/d

52 t/d controlled

Household generation 284 t/d

Total MSW generated 405 t/d

254 t/d → Disposal facilities → disposed 265 t/d

0 t/d controlled

Non-household generation 122 t/d

Not reaching facilities → uncollected 41 t/d

90% collected

11.6.1 — 13% managed in controlled facilities

2. Characterisation of Households waste

3. Analysing cities waste infrastructure

4. Mapping Waste value chain
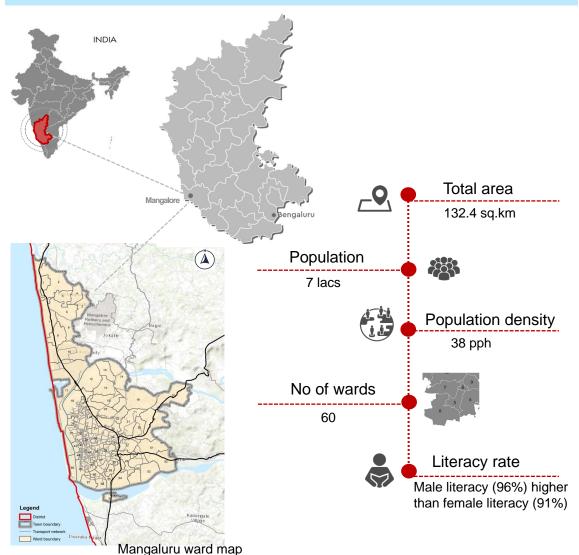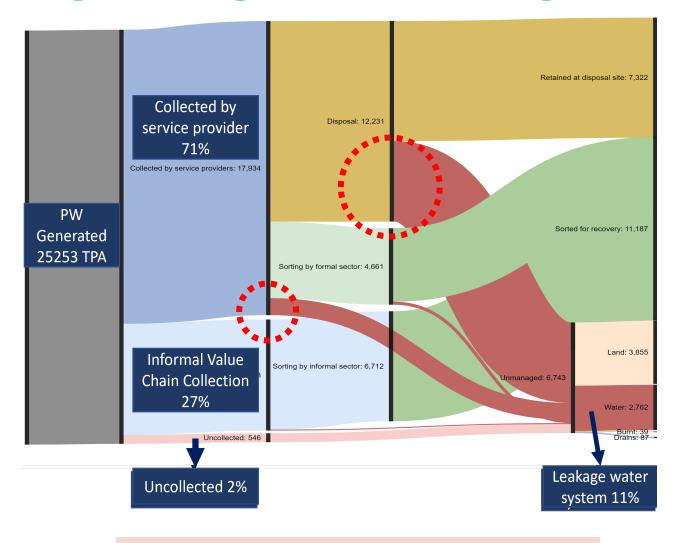
1. Waste quantification at disposal sites

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WaCT - estimation of plastic leakages using waste flow diagram

WaCT Application Mangaluru – Assessing Plastic leakages

INDIA

Mangalore

Bengaluru

Total area
132.4 sq.km

Population
7 lacs

Population density
38 pph

No of wards
60

Literacy rate
Male literacy (96%) higher than female literacy (91%)

Mangaluru ward map

Legend
District
Town boundary
Transport network
Ward boundary

PW Generated 25253 TPA

Collected by service provider 71%
Collected by service providers: 17,934

Informal Value Chain Collection 27%

Uncollected: 546

Uncollected 2%

Disposal: 12,231

Retained at disposal site: 7,322

Sorted for recovery: 11,187

Sorting by formal sector: 4,661

Sorting by informal sector: 6,712

Unmanaged: 6,743

Land: 3,855

Water: 2,762

Burnt: 39
Drains: 87

Leakage water system 11%

Plastic leakages = 151 PET bottles/Cap/Year

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Interventions from insights using tool
Project proposal for circular plastic waste management in Mangaluru

Proposal Details

- Duration – 3 years
- Co-funding modality
- Informal sector inclusion
- Upcycling of Low-Value plastics

** Present Condition

60 wards of Mangalore city

Plastic Waste generated = 70 TPD

2 TPD littered and un-managed

High plastic leakage from collection mechanism

Collection Service (Private)

Major source of plastic leakage from dumping

Dumpsite

Plastic Waste received = 40 TPD

Informal collection/Kabadiwala

Level 1 & 2 Aggregators

Plastic Waste Recovered = 30 TPD

Formal Recyclers

HVP sent to recyclers = 18 TPD

** Developed Proposal

Dry Waste Collection centers

Aggregation center for recyclable plastic and LVPs

Recycling center

UP-Cycling of Low Value Plastics

Impacted Indicator: Percentage of the city's dry waste that is separated and classified for recovery (%)

Recommended Steps
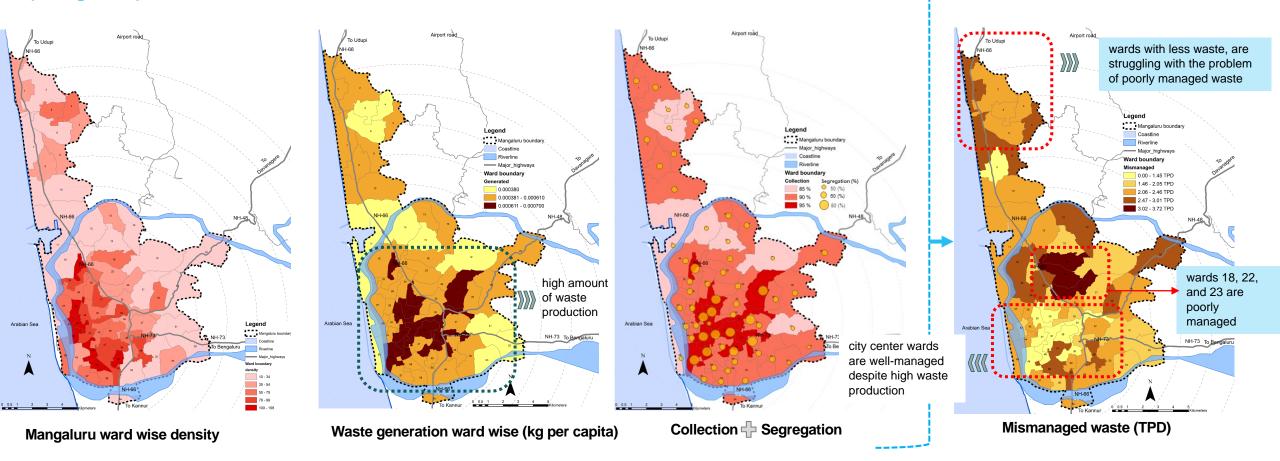
Project Planning, GAP Analysis & Action Plan

Efficient resource allocation for prioritization of development projects and tracking of management and financial decisions. (Mangaluru)
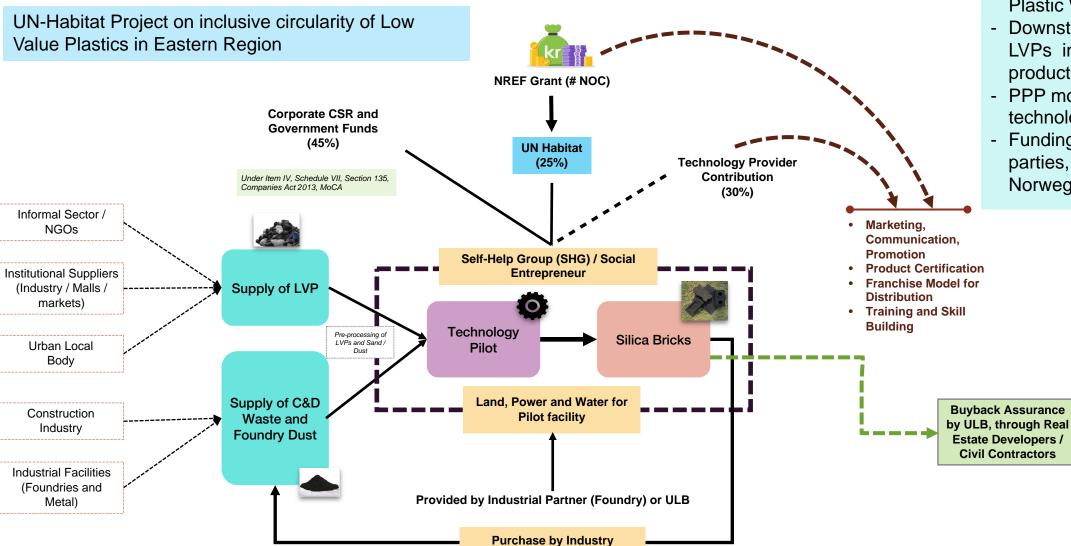

Mangaluru ward wise density

Waste generation ward wise (kg per capita)

high amount of waste production

Collection ➕ Segregation

city center wards are well-managed despite high waste production

Mismanaged waste (TPD)

wards with less waste, are struggling with the problem of poorly managed waste

wards 18, 22, and 23 are poorly managed

Analysis gives insights on mismanaged waste in the city, which is uncollected and not segregated
- Wards with lower waste generations have higher mismanaged waste due to lack of effective municipal services
- Highlighted wards 18,22,23 are low density wards in exterior part of the city, and have lower collection and segregation rates

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Value Addition for Circular Economy projects
WaCT and USAF Strengthen SBM 2.0 by effective data and spatial mapping

Details on NREF CE Project

- Addressing the gap in Plastic Waste Management
- Downstream innovation of LVPs into high value products
- PPP modalities for ULB and technology provider
- Funding – Co funding by parties, CSR funds, Norwegian support as grant

UN-Habitat Project on inclusive circularity of Low Value Plastics in Eastern Region

NREF Grant (# NOC)

Corporate CSR and Government Funds (45%)

Under Item IV, Schedule VII, Section 135, Companies Act 2013, MoCA

UN Habitat (25%)

Technology Provider Contribution (30%)

Informal Sector / NGOs

Institutional Suppliers (Industry / Malls / markets)

Urban Local Body

Construction Industry

Industrial Facilities (Foundries and Metal)

Supply of LVP

Pre-processing of LVPs and Sand / Dust

Supply of C&D Waste and Foundry Dust

Self-Help Group (SHG) / Social Entrepreneur

Technology Pilot

Silica Bricks

Land, Power and Water for Pilot facility

Provided by Industrial Partner (Foundry) or ULB

Purchase by Industry

- **Marketing, Communication, Promotion**
- **Product Certification**
- **Franchise Model for Distribution**
- **Training and Skill Building**

Buyback Assurance by ULB, through Real Estate Developers / Civil Contractors

Silica Plastic Waste Blocks
Frontier Tech pilot in Bhubaneshwar

- **70% sand/dust** from construction & demolition waste + **30% low value plastics** used as bonding agent.

- Can be moulded into paver blocks for use in construction projects as well as other products.

- Pavers produced have comparable strength to traditional concrete blocks.

- Mitigates both plastic and construction waste management issues.

Paver Blocks & Bricks

Drainage Trench

Drainage grates

Lab Test Results: (Rajkot Metlab Services (NABL Accredited), Tested on 20.06.2024)

Characteristic/Feature	Standard / Property	SPWB Brick Paver Block	Cement Concrete Pavers
Moisture Absorption	IS: 15658:2006 (RA2017)	Avg 0.20%	Not more than 6%
Compression Strength 225 x 112.5 x 80 mm	IS: 15658:2006 (RA2017)	Minm – 23.49 N/mm2 Max – 33.38 N/mm2 M30 – M50 as per Thickness	30-40 N/mm2
Flexural Strength		6.58 N/mm2	Tests not available
Abrasion Loss		0.52 mm	
Tensile Splitting Strength		Avg 3.43 N/mm2	Tests not available
Curing time		Instant	Minimum 21 days
Water consumption for processing		Not essential	Required for 21 days
Machinability		Yes	No
Carbon Footprint		Negative – reduces carbon footprint	Positive – adds to emission
Plastic use		30 to 50% by weight	Nil
Recycling possibility		Yes	One time use
Weight	Bulk Density	1.6-1.7 MT/m3	2.3 MT/m3

Benefits

Moisture Resistant, Termite Resistant, UV Resistant, Frost Resistant, Abrasion Resistant, Carbon Negative, Machinable, Recyclable, Good Compressive Strength, Uses Mixed Plastic

Financial and Economic Feasibility

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Capital Structure
(Machinery Costs + 3
months of Pre-
operative Expenses) –
INR 2.87 crores
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NREF Grant – INR 25
lakhs
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Private Sector Entity – INR
2.62 crores
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Revenue, Profit After Tax (PAT) and Return on Capital Employed

Year	Revenue (INR)	Profit After Tax (INR)	Return on Capital Employed (%)
1	98,02,416	12,25,302	15.63%
2	1,04,96,448	13,12,056	15.96%
3	1,08,61,102	13,57,638	16.14%
4	1,12,18,788	14,02,348	16.31%
5	1,15,94,358	14,49,295	16.49%
6	1,19,88,708	14,98,588	16.68%
7	1,24,02,774	15,50,347	16.87%
8	1,28,37,544	16,04,693	17.08%
9	1,32,94,052	16,61,757	17.30%
10	1,37,73,386	17,21,673	17.53%

Source: Powertec Engineering Pvt. Ltd. (Feasibility Consultant)

Plastic UPCYCLED Over 10 Years

Year 1 648 Tons	Year 5 3,240 Tons	Year 10 6,480 Tons

C&D Waste UPCYCLED Over 10 Years

Year 1 1,512 Tons	Year 5 7,560 Tons	Year 10 15,120 Tons

Full-time Jobs Created:

- Skilled jobs – 2 persons (4800 man hours per year)

- Unskilled jobs – 16 persons (38,400 man hours per year)

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Opportunities with Waste Wise India

International Day of Zero Waste

- Showcasing India's good practices

- Utilizing global observance on 30 March for massive awareness raising for zero waste lifestyle

Waste Wise Academy India

Waste Wise Innovation

Waste Wise Action India

Plastic Treaty

- Requiring Member States to monitor and report on progress in addressing plastic pollution, including waste collection, recovery and controlled disposal

- Just transition of informal waste sector, ensuring ILO's decent job conditions for waste workers

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World Cleanup Day

Status: Ongoing (since September 2024)
Regions/ Cities: Global
Funding amount: TBC
Funding source: TBC
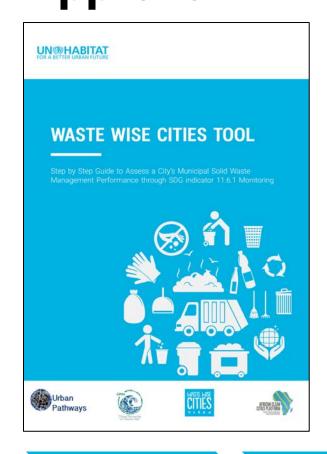
- World Cleanup Day is a global movement that mobilizes millions of volunteers across countries and communities to tackle the growing waste crisis through collective cleanup activities. Organized annually, the initiative aims to raise awareness about the environmental and social impacts of mismanaged waste while promoting sustainable waste management practices. It serves as a catalyst for behavioral change, encouraging individuals, businesses, and governments to adopt long-term solutions for reducing waste and protecting natural ecosystems.

- Mandated by the UNGA, UN-Habitat's role includes advocating for sustainable waste management policies, supporting local governments and communities in organizing cleanup activities, and sharing best practices on zero waste and circular economy approaches. Through partnerships and capacity-building efforts, UN-Habitat helps cities implement effective waste prevention and management strategies that go beyond one-day cleanups.

- Expected impact: Increased public awareness and engagement in waste reduction efforts, strengthened waste management policies, and enhanced cooperation among governments, businesses, and communities. By fostering a culture of responsibility and action, World Cleanup Day contributes to cleaner, healthier environments and accelerates progress toward achieving the Sustainable Development Goals (SDGs).

Waste Wise Cities Tool (WaCT) – data to action approach

- Monitoring methodology of **SDG indicator 11.6.1 "Proportion of Municipal Solid Waste Collected and Managed in Controlled Facilities, out of Total Municipal Solid Waste Generated, by City"**

- Assess MSW generated, collected and treated in controlled facilities

- Identify the MSW recovery chain and its actors while engaging them in an inclusive and participatory way

- Check the environmental control level of waste management facilities

- Establish better waste and resource management strategies that create business and livelihood opportunities

- Provide data for large WM infrastructure investment cases to municipal corporation, waste stakeholders and investors

- Project development and funds mobilization
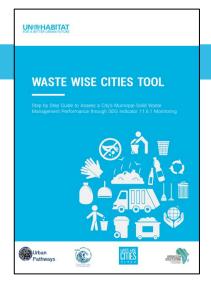
WaCT application → Data Analysis MSW flow design → Planning & projects formulation → Investments & actions → Impacts on the ground

Capacity Development Materials

SDG indicator 11.6.1 monitoring methodology

>50 cities

>70 trainings

>2k people trained

Online course – Data to Tangible Impacts: Achieving Waste SDGs by 2030

UN-Habitat – 3R CE areas of collaboration

Knowledge

- ❑ Centre of Excellence
  - Garbage Free Cities Living Lab – A space for holistic waste management related activities to create garbage free cities and to engage multilateral stakeholders: Chaired by MoHUA and supported by UN-Habitat
- ❑ National and regional events & trainings
- ❑ Build up on existing tools (WaCT & USAF) and learning resources to SBM needs
- ❑ Academy for E-learning courses

Policy Advice

- ❑ Supporting Guidelines and manuals for ULBs and other stakeholders on engaging better with SBM 2.0
- ❑ Support on drafting zero waste circular policies/circular byelaws
- ❑ Guidelines for MoHUA on Zero waste Urban Design with process approaches like mapping of waste utilities, stakeholders' involvement, O&M considerations and finance model
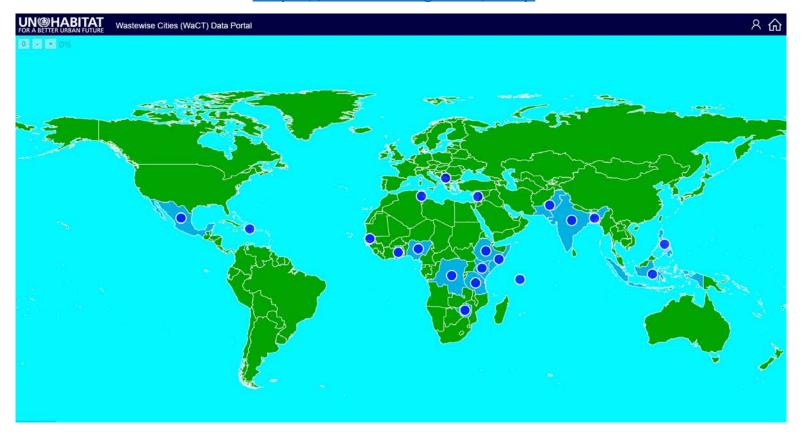
Technical Assistance

- ❑ Focused trainings on Gap Analysis at ULB and state level for CSWAP
- ❑ GIS data generation in MoHUA App and framework for developing insights and translating actions using USAF and WaCT
- ❑ Waste Wise Actions – with aspirational districts
  - Developing waste masterplans for pilot cities to support financing and investments for project promoting circularity by using WaCT
  - Technical support on Fukuoka method for dumpsite remediation

Join us!
Countries with City Waste Data

https://unh.rwm.global/Map

Thank You