

Challenges of Urban Development in India's Hill States with focus on Solid Waste Management

Session II : Challenges of Integrated Management
of Municipal Waste: Segregation, Collection,
Transportation, Recycling and Disposal

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Urbanisation in India-overview

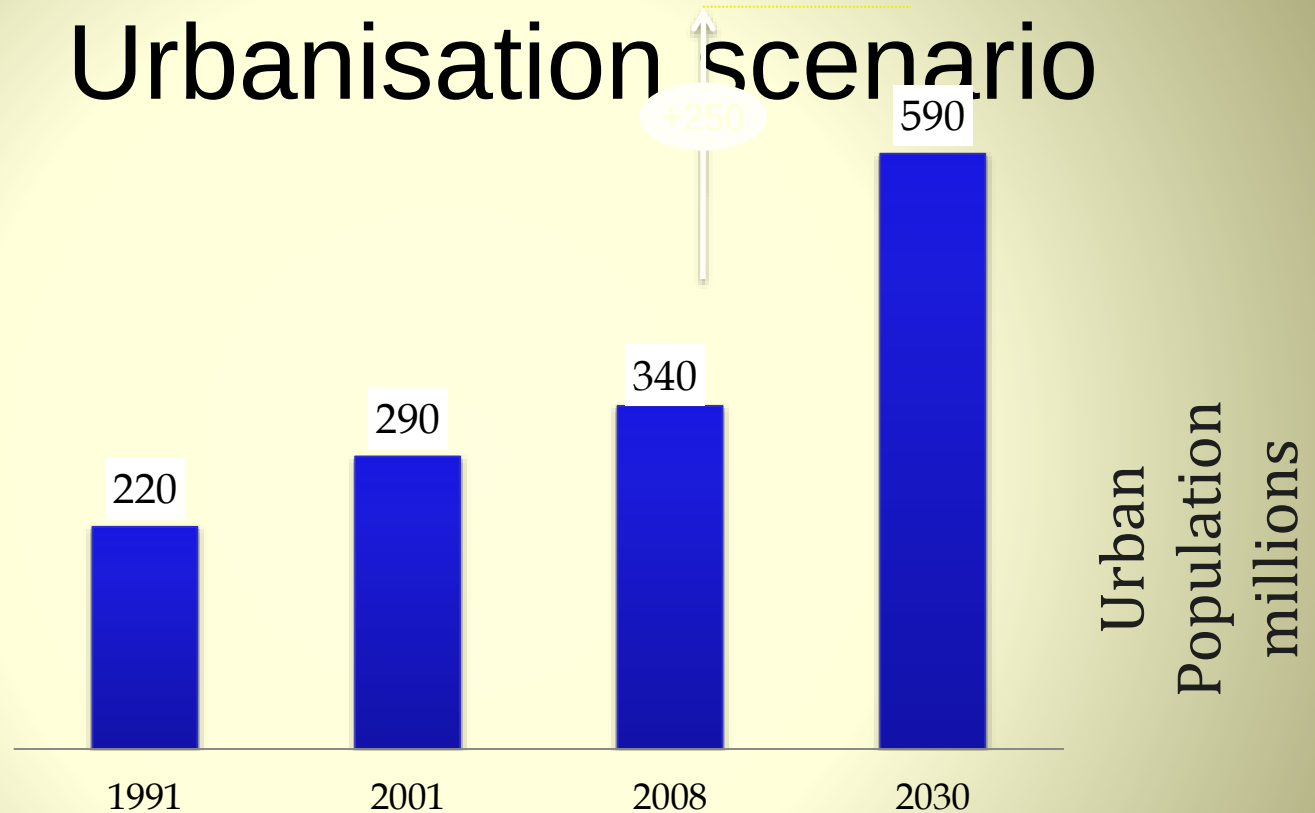
- Indian economy is growing at a faster pace than ever before in the history of the country. With an average growth rate of more than 7% since the year 1997, the India is ranked as having the 12th largest GDP in the world. Urban India is the major driving force of its economic growth contributing to more than 60% of the GDP. It is estimated that by 2030, urban India could generate 70% of net new jobs and contribute to more than 70% of the Indian GDP.

Major Challenges of Urbanisation in India

- Migration
- Housing
- Slums
- Sanitation
- Mobility
- Collective responsibility
- Financing urban projects
- Decentralisation, devolution

In MGI's base case scenario, cities are likely to house 40 percent of India's population by 2030.

Urbanisation scenario



Total Population millions	856	1,040	1,155	1,470
Urbanisation rate %	26	28	30	40

Source: India Urbanisation Econometric Model; McKinsey Global Institute analysis

Why focus on Urban Infrastructure?

Indian rapid economic growth placing huge demands on :
power supply, roads, railways, ports, transportation systems, water supply and sanitation.

But, bottlenecks in both urban and rural infrastructure have been eroding the country's competitiveness.

By 2030 Indian cities could generate 70% of net new jobs, produce around 70 % of Indian GDP, and drive nearly fourfold increase in per capita incomes across the nation.

Surveys show that in India a 10% increase in urban expenditure is associated with a 3.8% increase in rural household income (1988-2005 time series)

FOCUS ON “midsize” CITIES AS ENGINES OF GROWTH

Macro Investment projections

Isher Ahluwalia Report:

- Urban infrastructure investment needs over next 20-years (2012-31) is estimated at Rs 39.2 lakh crore at 2009-10 prices.
- Of this, Rs 17.3 lakh crore (or 44%) is accounted for by urban roads.
- Investment backlog for this sector ranging from 50% - 80% across the cities of India.
- urban services such as water supply, sewerage, solid waste management, and storm water drains will need Rs 8 lakh crore (or 20%).
- Another Rs 4 lakh crore is needed towards investment in renewal and redevelopment including slums.

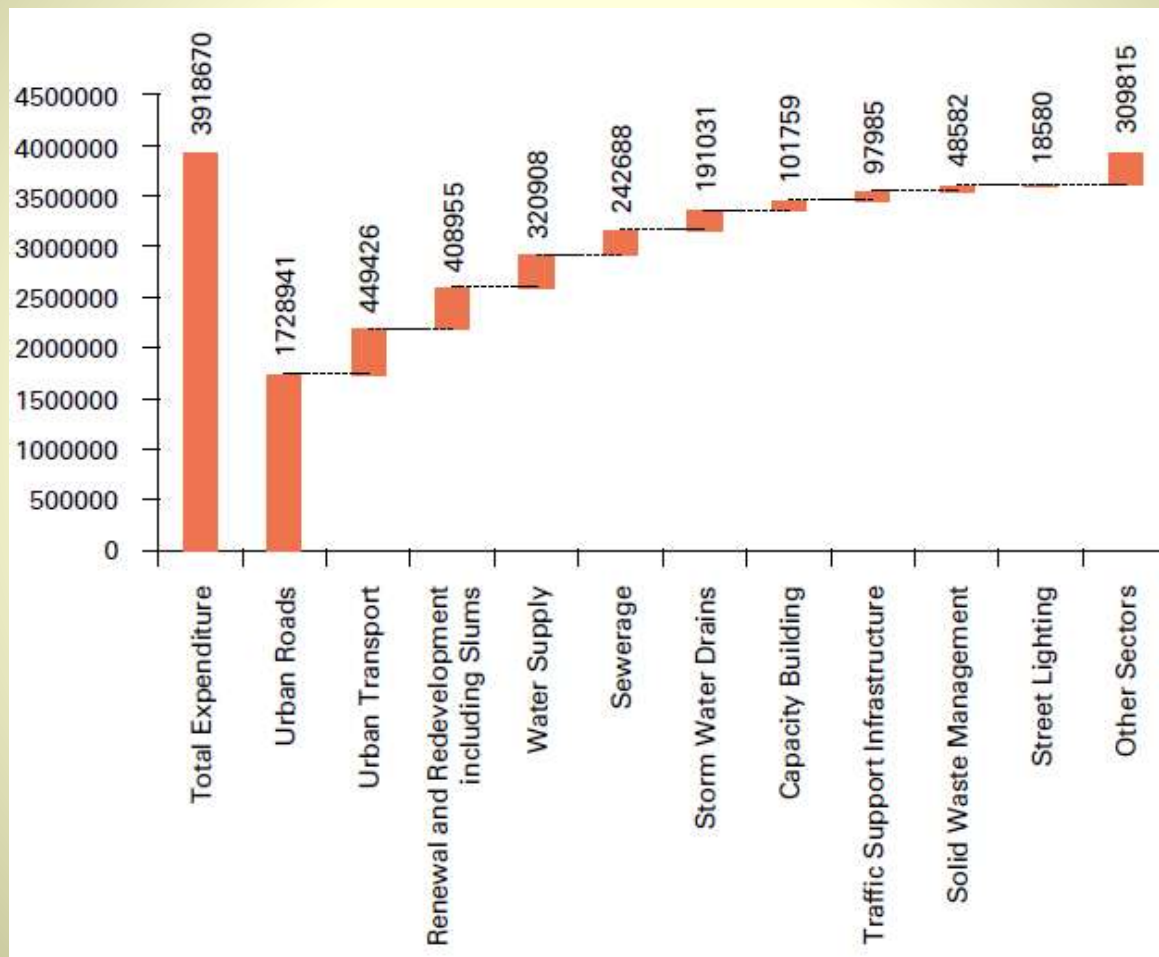
AHLUWALIA REPORT-URBAN POLICY IMPERATIVES

- urban infrastructure investment to go from 0.7% of GDP in 2011-12 to 1.1% by 2031-32
- 90 – 95 % of ULBs not meeting O & M cost, leave alone debt servicing, capital expenditure recovery
- The O&M requirements for new and old assets are projected at Rs 19.9 lakh crore over the 20-year period w.e.f 2012.

Gap Bridging requires.....

- Strengthening and securing the financial base of ULBs
- Need to maintain old and new assets – accrual accounting
- Renewal and redevelopment of urban areas including slums
- NUTP 2006 targets increasing public tpt from 22-60% currently at 27% and 50% is 12th plan aim.

Urban Infrastructure Investment Requirement: 2012-31 (Rs crore)



Financing of Urban expenditure(%age of GDP)

Table- 1

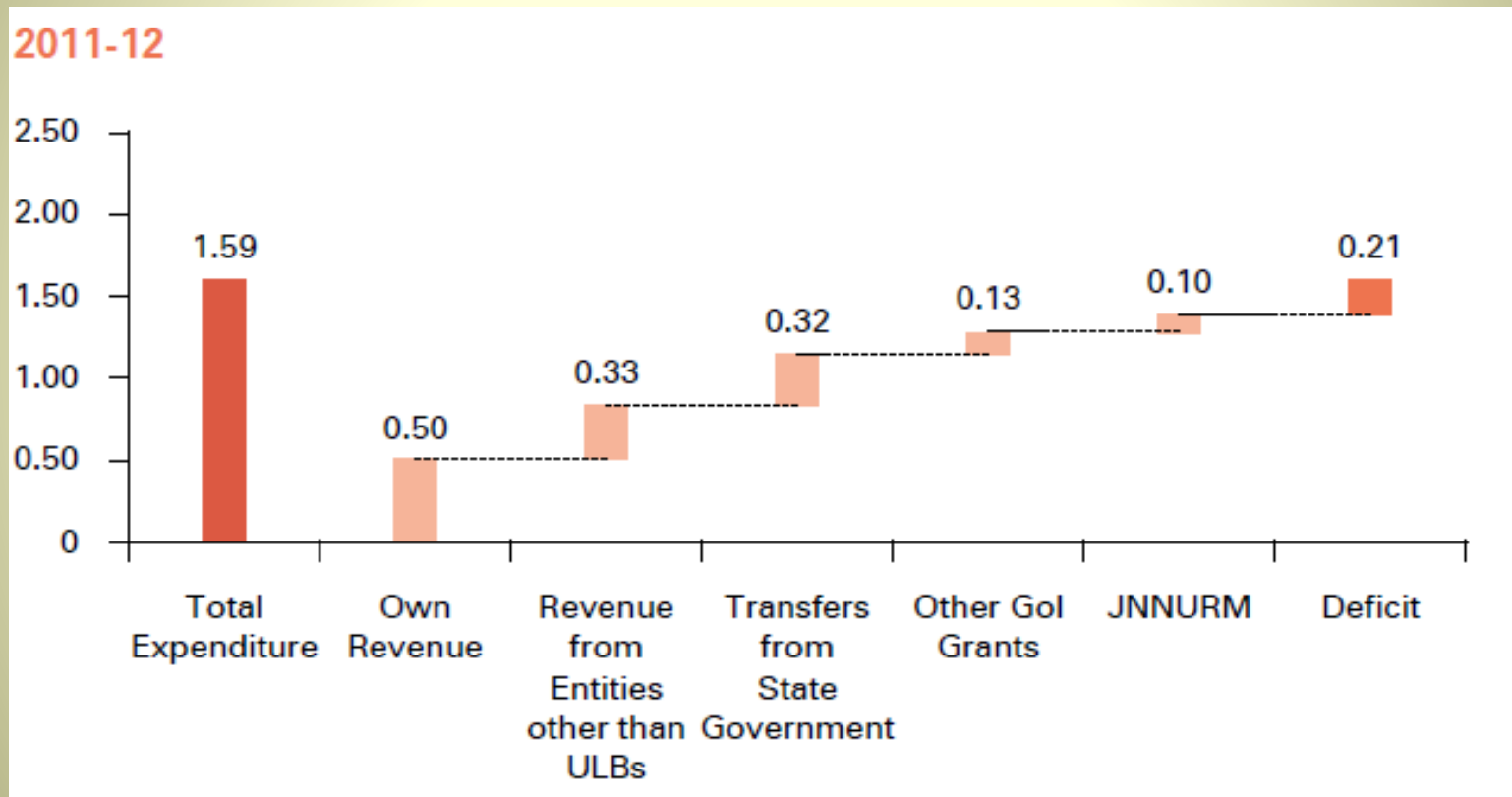


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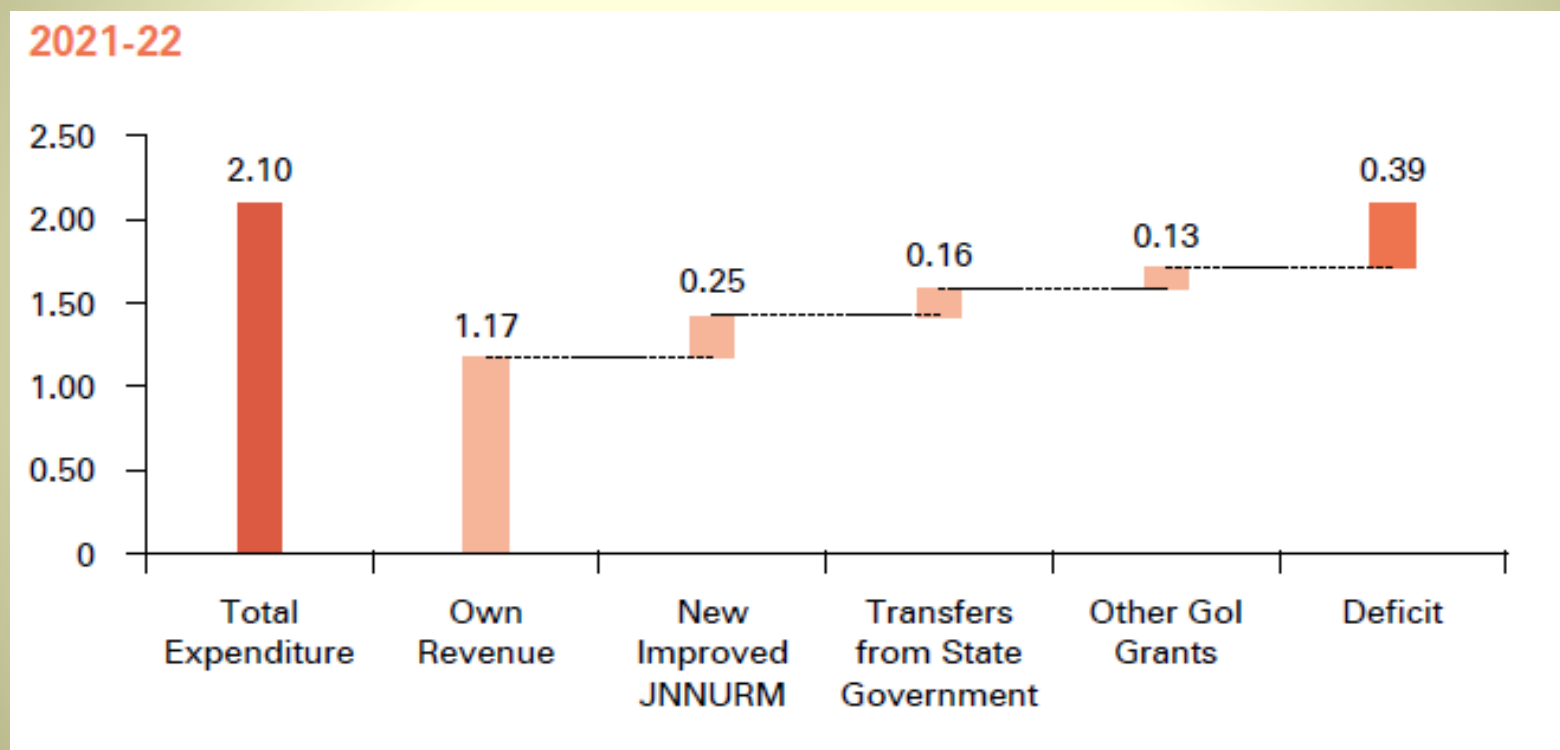
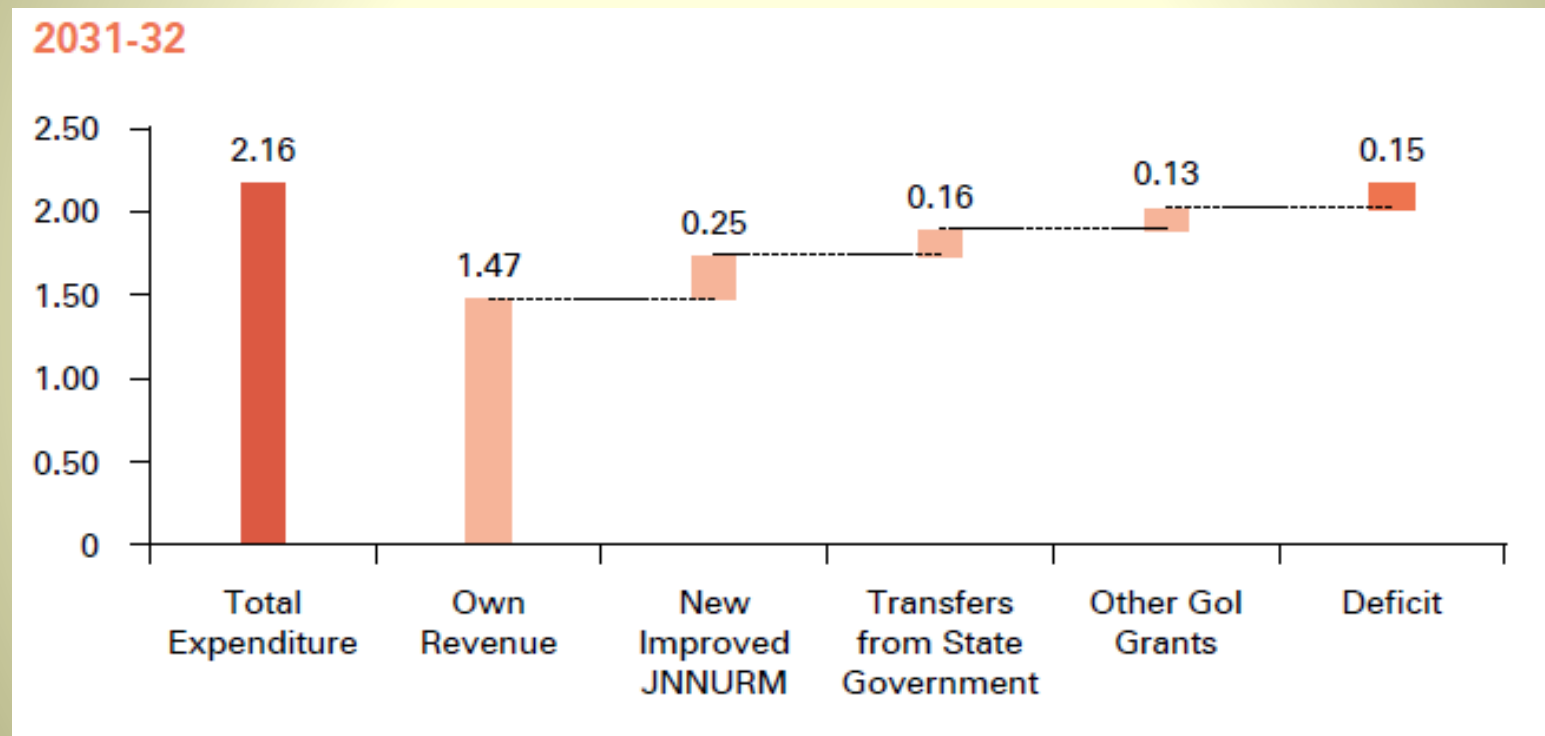


Table-3



COMPLEX CHANGE MANAGEMENT

Urban institutional response to cover supply and demand side issues:



Operational Challenges for ULBs

Demands of a soaring aspirational urban population (Governance)

- proliferation of slums
- Land scarcity, increasing prices

Inappropriate planning (Planning)

- weak database capture and feedback on implementation
- Institutional Weakness –half baked delegation
- Regulatory overlaps
- weak finances and resource mobilisation

inadequate infrastructure(Financing)

- poor services- lack of performance benchmarks indicators
- an erratic water supply despite almost 100% piped supply
- ineffective sanitation

Rapidly deteriorating environment

- Climate change imperatives
- Need for convergence and inter dept cordination

Sub optimal resource usage (Capacity Building)

- Training and Capacity Building
- Changing Mindsets towards a cost benefit based service delivery

INNOVATION/ REINVENTION/ REDEVELOPMENT of Brownfield projects

Broad SWM Components

- Wet waste- Green, food, organic, bio degradable, recyclable
- Dry waste- all other waste, non -bio degradable
- Hazardous waste

WASTE COMPONENTS

Street Sweeping

Unconcerned Throwing
Litter by Pedestrians
Litter by Vehicular Traffic

Paper
Leaves/ Branches
Rubbish from Drains
Plastic Bottles
Debris
Broken Furniture
Dead Animals

Industrial Waste

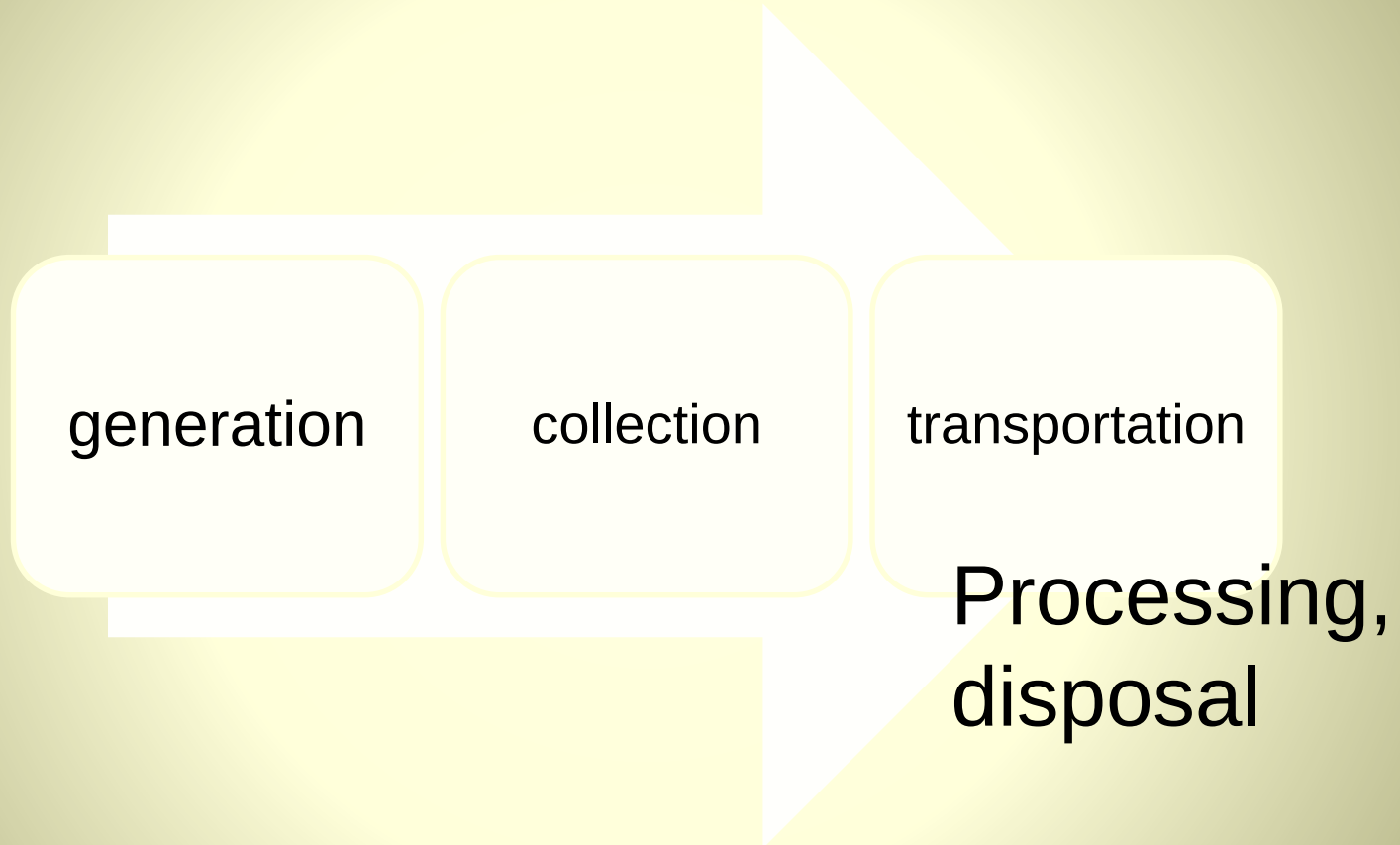
Manufacturing Units
Processing Units

Metals
Ash
Unused Chemicals

Offal Waste

Slaughter Houses
Food Processing Units
Vegetable Waste
Rotten Food
Animal Remains

SWM Process- innovation?



Why debate Waste?

SWM mgt is a major concern for a variety of reasons:

Growing urban migration

Use and throw culture increasing

Public Health & Sanitation

Environment & carbon regime, GHGs

Waste perception-Resource or Nuisance

Aesthetics

Livelihoods

Waste generation contribution

- As per Ministry of Urban Development, Government of India (MoUD)
- 0.1 million+ population cities= 72.5% SWM
- of this the 35 million+ popu cities=35%SWM
- Balance 3,955 urban centres=17.5% SWM.

Future of SWM generation in India

SWM generation is poised for increase as:

- 495 Urban Cities with over 1 lakh population and 7,395 cities and towns in India.
- Additional 18.78 million houses, with 73% deficit in bottom 40%.
- Of the 18.78m shortage 95.62% is for the Economically Weaker Section (EWS) and Lower Income Group (LIG)
- 100 Smart Cities on the anvil.

Issues in SWM

- o Process Issues in SWM
- o Output Issues in SWM
- o Technology issues in SWM
 - RDF - Refuse Derived Funds.
- o Outcome issues in SWM
- o Community issues in SWM
- o Compliance issues in SWM
- o Financial Issues –
 - Creating an investible climate in ULBs – Viability & Gaps.
Viable size of SWM operation to attract PPP?
 - Infrastructure
 - Endemic Urban Slum Poverty

SWM Challenges in mountains

- **Hardin's Tragedy of the Commons- Free Riders**
- Cost – small populations, low SWM generation, dead mileage, viability gap, **short working season**.
- Tariff- high user charge as O&M high, cost recovery low, low ability and willingness to pay
- PPP a remote chance.
- Land- forest conservation, regional landfills
- Legal & Regulatory & Compliance Mechanism not customised to mountains
- Community Size, Participation, behaviour, capacity, awareness,
- Decentralized Governance
- Inter sectoral/ scheme convergence NULM, RAY, Jnnurm
- Contractuals between UI Bs

Customizing for urban Hills

- Land issues.
- Higher cost for provisioning the infrastructure.
- Urban Mobility Challenges.
- Mountains as Ecological Resource Providers.
- Lack of Institutional Hierarchical structure.
- Lack of Trained Urban Professional/Core Competencies.
- Awards in GOI MoUD and MoHUPA.
- Skewness in GOI-MoUD and MoHUPA Policy Parameters (Illustrative).
- Regulatory Commitment on efficient Urban Service Delivery.

Roadblocks vs Reform

Roadblocks

Overlapping roles

Fragmentation

Limited autonomy

Weak citizen links

Lack of incentives

Lack of capacity

**Altering
fiscal
flows**

**Decentrali
sation**

**Citizen
demand**

The reform agenda

Institutions for better services

- Separate policy, regulation and ops roles
- Decentralization (74th Amendment)
- Eliminate fragmentation and overlap
- Operational autonomy
- Citizen empowerment & participation

Reforms linked to service delivery outcomes

- Performance management
- Fiscal flows linked to outcomes
- Reliable information to enable measurement

Integrated financial management

- Multi-year planning
- Hard budget constraint
- Both revenue and expenditure reform
- Accounting reform

Govt. Initiatives

- JNNURM – Mission Cities + Reform
- SLBs
- PSG 2011
- MSW Rules 2000
- HPEC
- 13th FC – Reform
- NUSP -2008

JNNURM & SWM

- As on May 2009, a total of 21,860 million INR (363 million Euros) have been sanctioned for 40 Indian cities to improve their solid waste management.
- Despite huge investments and the encouragement of the Central Government to invest in and adapt to the MSW (M&H) Rules 2000, improvement in this sector is very slow.
- 12th Finance Commission of the Government of India, has sanctioned 25,000 Million INR (415 million Euros) to the MoUD for strengthening the SWM schemes in ULBs.
- 13th Finance Commission of the Government of India, recommends that of all grants to be given to the ULBs, 50% should be for SWM (2010-2015).
- MDGs + SDGs (Public Health)

7 Directives in MSW Rules, 2000

- 1. Prohibit littering on the streets by ensuring storage of waste at source in two bins; one for biodegradable waste and another for recyclable material.
- 2. Primary collection of biodegradable and non-biodegradable waste from the doorstep, (including slums and squatter areas) at pre-informed timings on a day-to-day basis using containerized tri-cycle/hand carts/pick up vans.
- 3. Street sweeping covering all the residential and commercial areas on all the days of the year irrespective of Sundays and public holidays.
- 4. Abolition of open waste storage depots and provision of covered containers or closed body waste storage depots.
- 5. Transportation of waste in covered vehicles on a day to day basis.
- 6. Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.
- 7. Minimize the waste going to scientifically engineered landfills (SLFs) and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down in the rules.

the Rules had not resulted in proper infrastructure development for scientific treatment and disposal of waste. Unavailability of funds was largely blamed for non-compliance of the rules.

National Urban Sanitation Mission

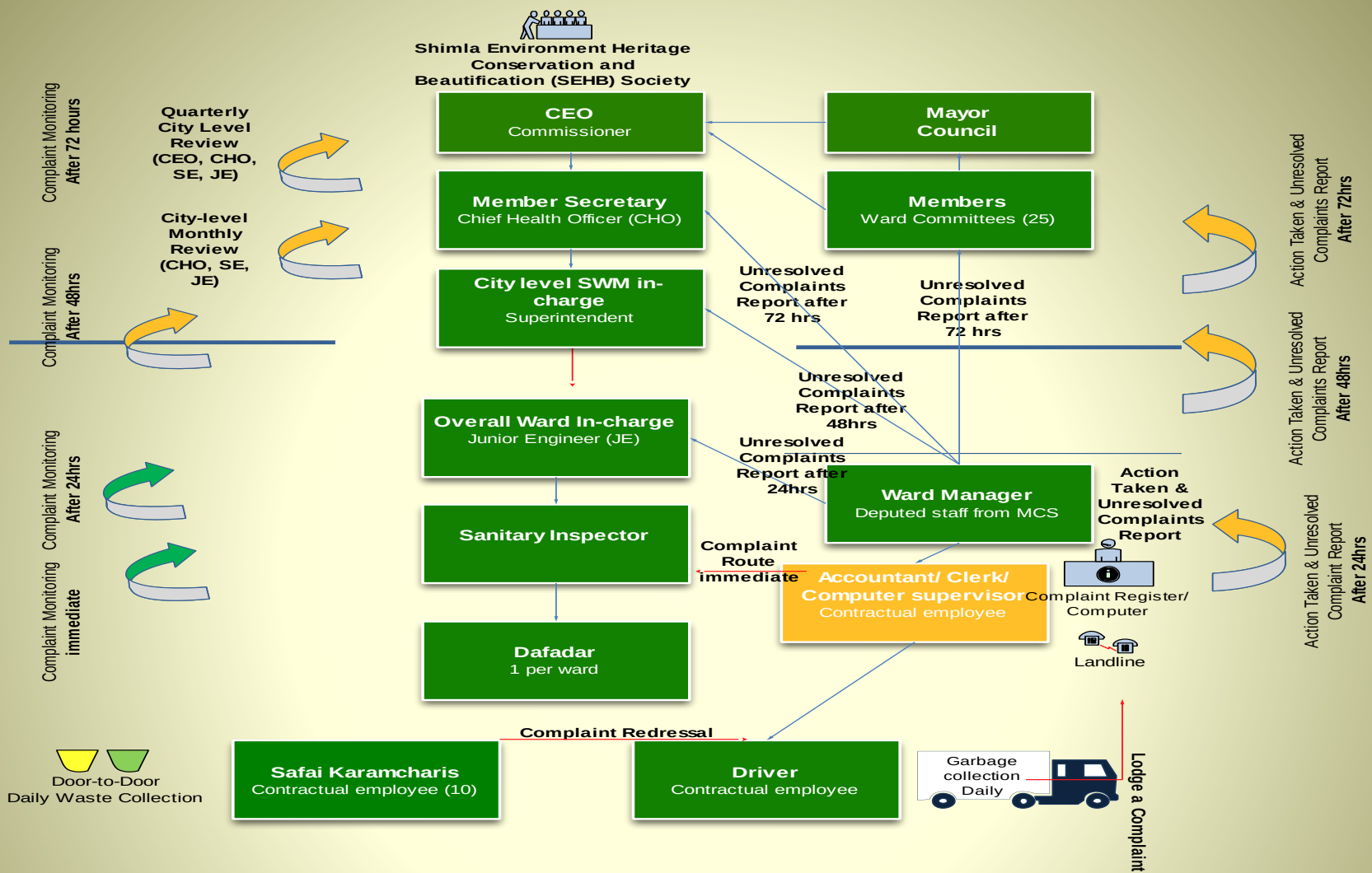
- As part of the National Urban Sanitation Mission, which was launched in December 2008, SWM is addressed through a set of instruments on state and city level (state and city sanitation plans). Therefore liquid and solid waste management are getting strategically connected.
- RAY
- HP State urban sanitation Policy draft includes SWM concerns.

HPAPCC

- The National Action Plan on Climate Change (NAPCC), which was launched in 2008, formulates the Indian strategy towards climate change.
- It consists of 8 missions.
- “National Mission on Sustainable Habitat” addresses SWM
- HP APCC based on environmental vulnerability mapping can be a starting point for all CDPs in our mountain ULBs

Inter dept Stakeholders in SWM

- PCB- a sanitation regulator at arm's length?
- TCP- spatial, zoning
- IPH- Water sources contamination?
- ULBs- 3rd tier of governance, capability?
- Communities
- Industrial estb
- Commercial estb
- Public/ Semi-Public institutions
- Manpower deployed in sanitation



**Ward-Level Solid Waste Management
Organization Structure and Complaint Redressal System**

Possible Scenario I - Impacts

Maintain Status Quo????

(A) Impact on Tourism -

Floating Population.

Core Competencies.

Unlocking Land Value.

(B) Impact on urban Quality of life/ public health.

(C) Complex SWM project roadmap.

Possible scenario ii

Proactive Integrated Management of SWM

- (A) RWAs involved + SLBs capered database
- (B) Sourcing suitable technology.
- (C) Segregation – Primary or secondary
- (D) WOW
- (E) Energy
- (F) PPPs
- (G) Stand alone SWM processing Livelihood Creation.

Economics of SWM

- Polluter Pays Principle- User Charges, tariffs.
- Branding & imaging SWM as a raw material & resource.
- Recycle Reuse Refuse Segregation disposal Reduce.
- WOW- Wealth out of Waste.
- Carbon Credits, CDM, CERs
- Convergence with NULM – for a livelihood angle.
- Aesthetics & impact on the revenues.

Alternate uses/ innovative SWM

- Compost from biodegradable food waste
- Plastic Roads in HP.
- In 1 km of road tarring approx. 1 ton of plastic waste is used which replaces 10% of bitumen.
- Net saving per km to PWD 35,000/
- Plastic Road topping- save O&M costs that accrue to ULBs under normative state fin comm award
- Water refill points.
- MSW in Cement Kiln firing – ACC Barmana + MC Kullu.

Capacity building & Awareness

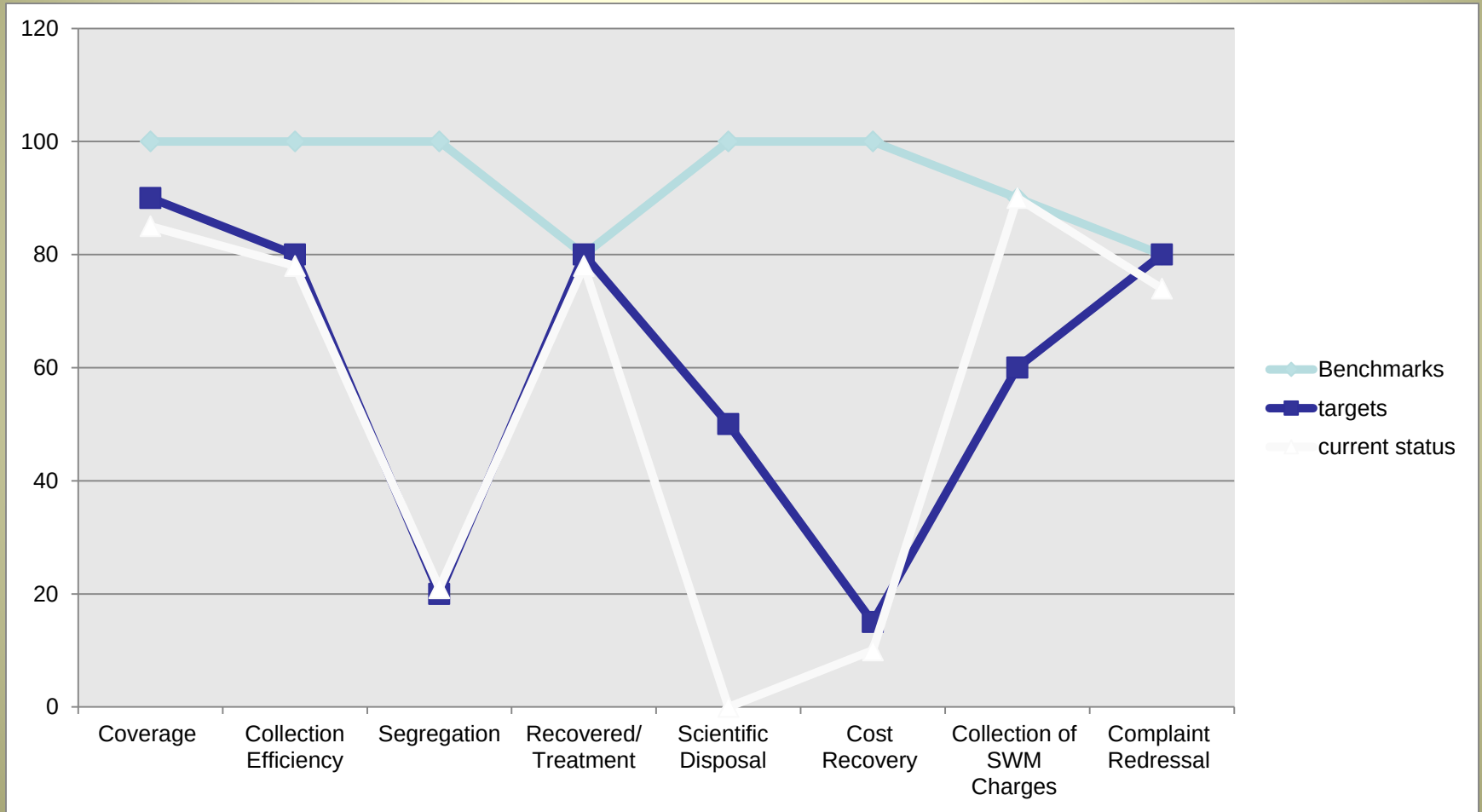
- For teams of Officials and non officials in ULBs.
- MoUD Urban Capacity building funds for H.P.
- 10 distt HQ to have PIUs with 6 sector experts
- 2 pilot towns in H.P. – S'nagar, D'sala.
- Bhariyal SWM plant.
- Training upto Safai Karmcharies & feedback.
- Incentive Motivation through innovative tariffs/
user charge
- VGF

SWM Service Level Benchmarks

- I. Household level coverage of SWM services
- ii. Collection efficiency
- iii. Extent of source segregation at consumer level
- iv. Extent of waste reused/recovered/recycled
- v. Extent of scientific disposal
- vi. Extent of cost recovery
- vii. Efficiency in redressal of customer complaints and
- viii. Efficiency in collection of user charges.

This regime will ensure uniform comparable SWM baseline data collection& trend spotting.

SWM Analysis



The SWM Collection Efficiency

- The collection efficiency ranges between 70 to 90% in major metro cities. In smaller cities, it is often below 50%. It has been estimated that the ULBs spend about INR 500 to 1500 per tonne on solid waste collection, transportation, treatment and disposal (8 to 25 Euros per tonne). About 60-70% of this amount is spent on street sweeping, 20-30% on transportation, and less than 5% on final disposal of waste, which shows that hardly any attention is given to scientific disposal of waste.
- It degrades very slowly in cold mountain climes choking nullahs and contaminating water sources.

MSW Futures in mountains

- SLBs to create a uniform database for performance monitoring
- Capacity building to include how to use energy and nutrient content of MSW to reduce inerts
- Co-processing of MSW fractions as an alternative to landfills
- Capacity Buildings for official non officials
- shelf of **innovative** decentralized solutions to be replicable.
- “Bottoms Up” community engagement.
- Cross subsidising or VGF for cost recovery.

WtE (Waste to Energy)

- WtE disposes MSW, produces energy, recovers materials, and frees up scarce land otherwise used for landfill.
- Hence, although the cost per MW of capacity may be greater for WtE projects compared to other renewable sources, the co-benefits of waste treatment, energy and material recovery, saving in the landfill area and reduction of GHG emissions provide an advantage.

Waste to Energy (MNRE)

- The Planning Commission has set up a task force on WtE.
- A few prominent failures in large scale biomethanisation plants (Lucknow, Viyavada).
- Using energy & nutrient content of MSW.
- Recovery of nutrients in an integrated waste management system.
- Root Zone

Co-processing of fractions of MSW

- synergies between urban development objectives, SWM, waste and storm water management, poverty alleviation and climate change.
- Capacity building.
- Local Representatives
- Innovative decentralised solutions.

12 CDM (Clean Development Mechanism)

- Majority of these projects are composting projects.
- Energy byproduct
- Carbon Bazaar

SWM Challenges ahead

- What are the national and international experiences and lessons ?
- Choosing appropriate/ best technology- customisation to India/ hills?
- What should be the technology assessment framework for WtE?
- How to choose between centralized and decentralized options?
- How effective are financing schemes, related incentives for WtE projects?
- How to structure PPP models and source international trends?
- capacity development needs for such projects? Trg Resources?
- Are the environmental standards for emissions from WtE projects adequate, comprehensive and realistic?
- What are the impacts of SWM projects on the informal sector of waste pickers? How could these impacts be addressed?
- How to carry out economic, environmental, social assessment of SWM and WtE projects in the form of sustainability appraisal?