SOLID WASTE MANAGEMENT
IN ARUNACHAL PRADESH

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with special reference to the Solid Waste Management Project implemented in the CAPITAL COMPLEX,ITANAGAR

Map Of Arunachal Pradesh

Challenges of MSW in Arunachal Pradesh

- There are 30 urban census towns in Arunachal Pradesh
- These urban Towns has a floating population Ranging from 10000 to 150000
- Due to Rapid Urbanization & changing of living conditions of the people, solid waste management has always been a big challenges for us.

Earlier Systems of Disposal

- Solid waste management was an un-attended subject before 2000 in the state of Arunachal Pradesh.
- No Street sweepings
- No Collection, storage, lifting and disposal system.
- No identified Sanitary landfill/ dumping ground etc.

Systems of Disposal since 2000

- Street sweepings
- Collection and storage in dustbins/collection points
- Collection & lifting from the dustbins/collection points
- Finally dispose off to the dumping ground but in an unscientific manner along the road side

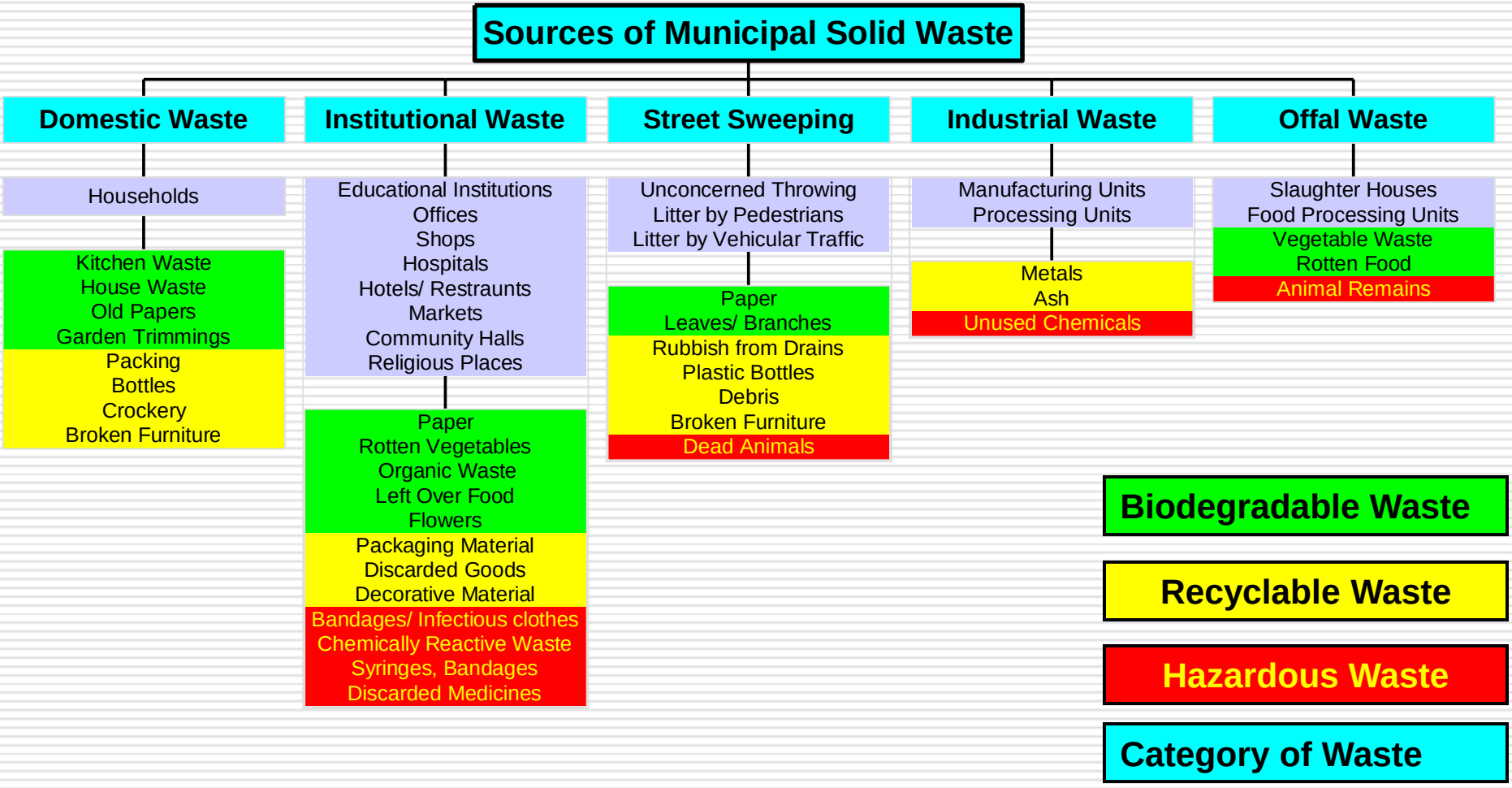
Experiences & problems being faced in Solid waste management , in Arunachal Pradesh

- Lack of awareness or ignorance of people
- Stray animals
- Lack of sewerage and proper drainage system
- Topography & vegetations
- Lack of involvement of community base organizations in the region
- Rapid urbanization & Migration
- In-adequate experts personals in the field of Solid waste management.
- Financial constraints

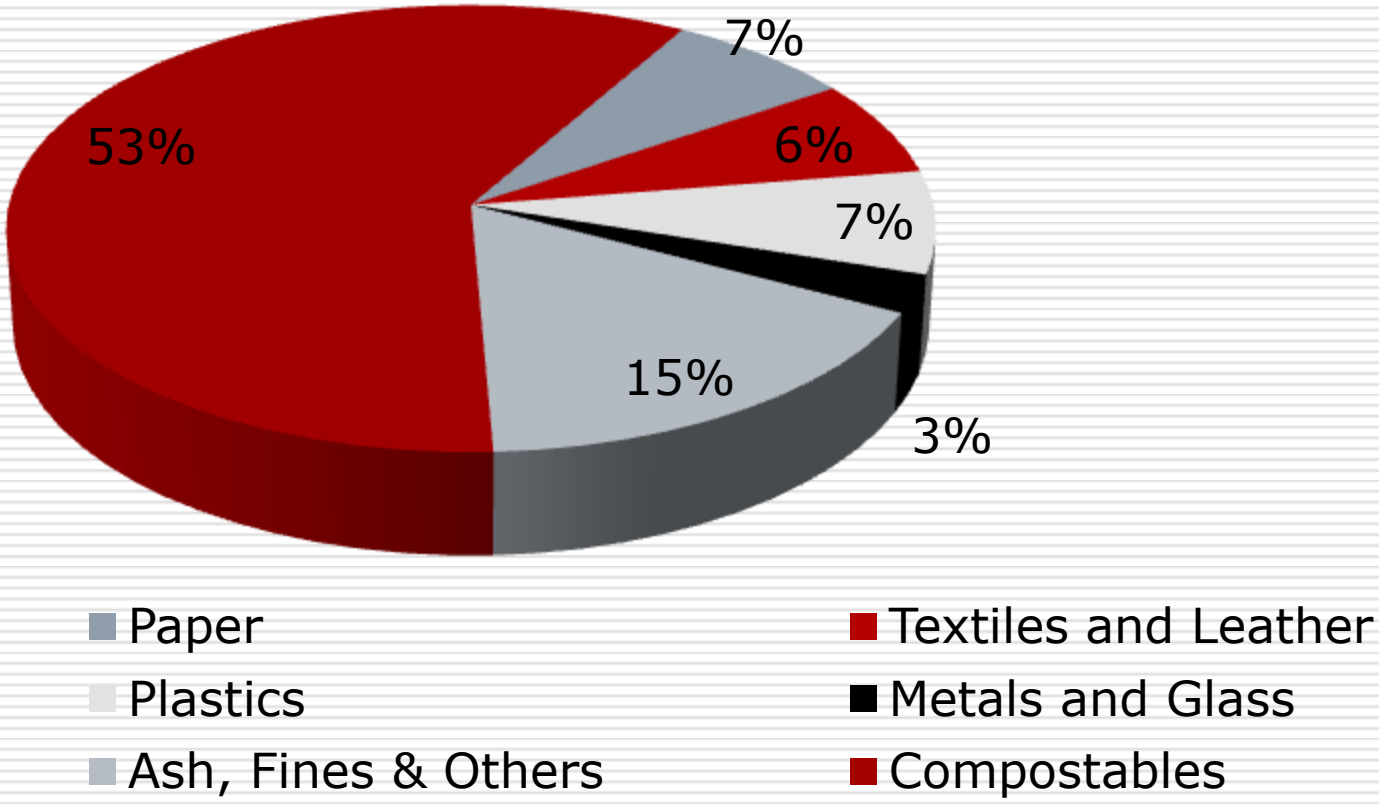
Focusing MSW in an organized & scientific manner

- Govt. of Arunachal Pradesh started given emphasis on MSW in the year 2000 onwards.
- All District headquarters & urban towns have been provided with man power & machineries
- Special emphasis has been given to the state capital, Itanagar & availed project from the GOI in the year 2007 under JnNURM

TYPE OF WASTE GENERATED



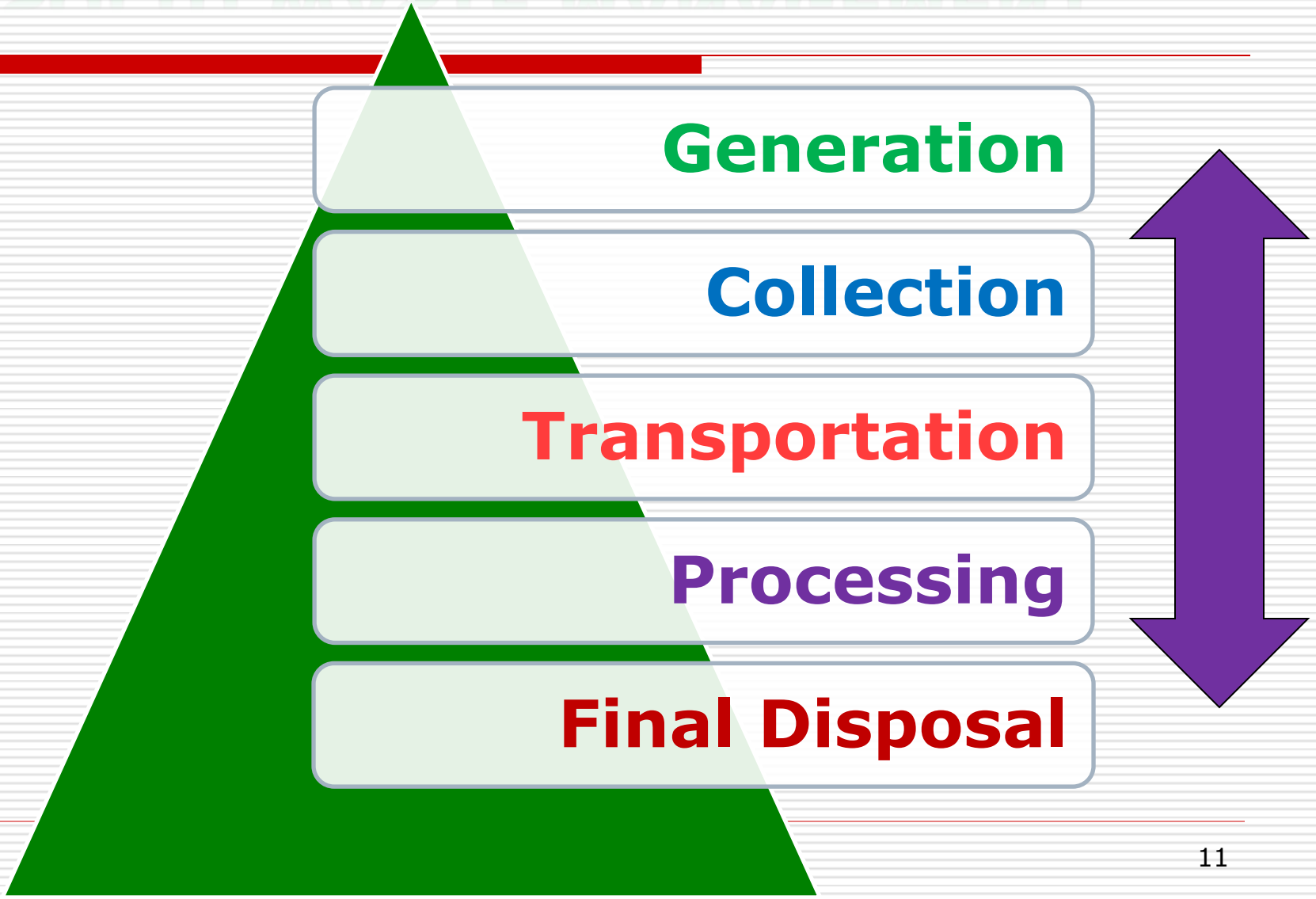
WASTE COMPOSITION



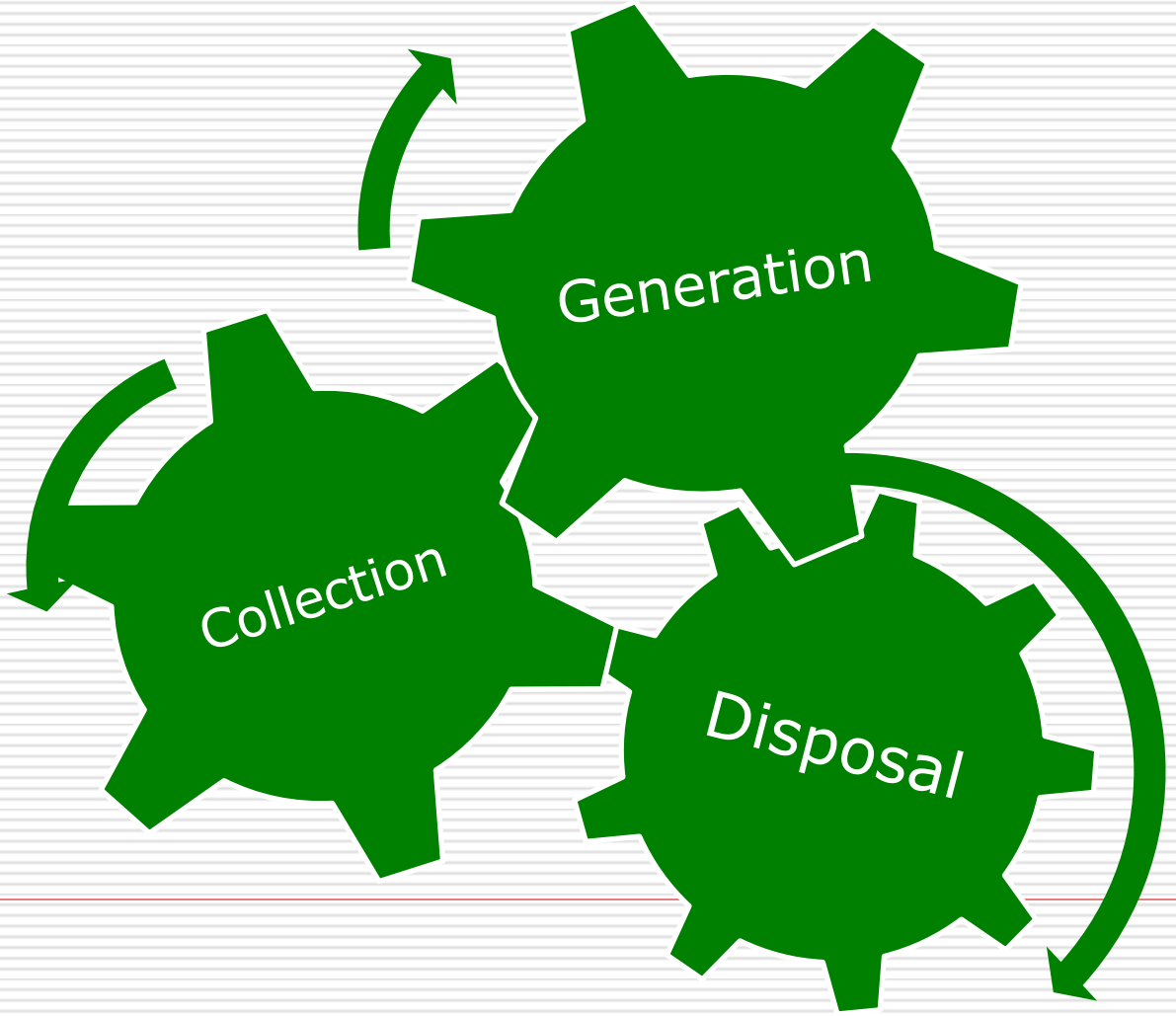
SOURCE OF WASTE GENERATION

Source of Waste	Quantity Contribution
Domestic	34.35%
Institutional	20.51%
Commercial	28.83%
Industrial	7.10%
Agricultural	3.18%
Natural	5.33%

KEY COMPONENTS OF SOLID WASTE MANAGEMENT



THE APPROACH ADOPTED: **INTEGRATED** end-to-end solution



MSW MANAGEMENT AT THE CAPITAL COMPLEX

Interventions at each stage:

1. **Generation Stage**
2. Collection Stage
3. Transportation Stage
4. Disposal Stage

Problems being solved in the GENERATION STAGE…

Problem :

Waste generated disposed off haphazardly

Solution taken:

- No good waste management practices – reduce, reuse, recycle
- Source Segregation of waste
- Storage at source before collection
- Trade Waste not collected systematically
- Construction Debris not collected
- Bio-Medical Waste mixed with MSW.

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GARBAGE DISPOSAL AT ITANAGAR / NAHARLAGUN TOWNSHIP ON AN AVERAGE

GARBAGE GENERATION

Total Population of Capital Complex (Itanagar & Naharlagun) as per 2011 census

= 1,70,000

Garbage Generation Rate = 0.450 Kg per person per day

Total Garbage Generated = 0.450 x 1,70,000

= 76,500 Kg = (76.5 MT)

Name of the Project: - **Setting up of Municipal Solid Waste Management in a Scientific Way for Capital Complex, Itanagar.**

Capacity of Treatment plant	: 50.00 MT. per day and 50MT of secured landfill
Production of manure	:15% of treated garbage i.e. 7.50 MT. per day
Source of funding	: UIG components of JNNURM
Date of Sanction of project	: 23/02/2007
Date of start of the project	: 05/04/2009
Date of completion (compost plant)	: 07/03/2013(Inaugurated by HCM,AP)
Project area: 13.61 acres	Built-up area: 2.0 acres

Problems being solved in the Collection and Transportation Stage…

- PROBLEM: Inadequate Collection infrastructure
- SOLUTION ADOPTED:
  - Segregated waste collected separately
  - Alignment of collection system in terms of numbers and type of waste generated
  - Door to door collection
  - Adequate tools like long handled brooms and protection gears provided for street sweepers
  - Manual handling of waste obviated
  - Multiple handling at various stages reduced
  - Community involvement and private participation
- PROBLEM: Waste transportation not rationalized
- SOLUTION ADOPTED:
  - Route plan - secondary roads can be catered.
  - Systematic analysis of requirement – type and number
  - Closed Container Vehicles instead of Open Vehicles

Primary Collection Vehicles

A. Primary Collection System

- Door to door collection of the garbage from 7 AM to 2 PM has been adopted.
- Sweeping of roads & streets of each colonies/Sectors is being done on daily basis.
- Segregation at source has been adopted by providing two bins for "Dry-Waste" & 'Wet-Waste" separately.
- Twin bins Litter Boxes to collect garbage at public places, parks and so on installed
- Bio-medical waste has not been allowed to mixed with Municipal Solid Waste. Installation of separate incineration in the respective Hospital/Clinical Complex.

Side Loaders for Street Sweeps

Dumper Placer Containers

B. Secondary Collection System

- Temporary waste collection stations like dumper placer containers being provided at convenient or strategic places through which door to door collection of garbage is being deposited.
- The stored depot has been provided for both Bio-degradable & non Bio-degradable separately.
- Waste Collection Infrastructure like refuse collection bins, dumper placers with hydraulic system, twin litter box etc. has been placed.

PPPP-Community Involvement

MSW MANAGEMENT AT THE CAPITAL COMPLEX

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C. Transportation Collection System

- Rationalization of type and number of waste transportation vehicle undertaken
- Waste collected at the temporary storage depot of secondary collection system are being transported to the plant site.
- Waste collected through door to door collection are being transported directly to the plant site.
- The transportation system like refuse collector specially designed for Street Sweeping having 8 cum, closed container vehicles like garbage tipper trucks, dumper placers along with containers are being used.

PRIMARY COLLECTION - ITANAGAR					
VEHICLE REQUIREMENT ANALYSIS					
	Ward No	Population	Projected Pop	Waste Generated in Kgs	Waste Generated per Zone in Kgs
	B Sector	714	2077	945	
	A Sector	1395	4058	1846	
	P Sector	240	698	318	
	Raj Bhavan	2750	7999	3639	
	M Gate	235	684	311	
	N Lapang	330	960	437	
ZONE -1	Adi Bosti	375	1091	496	7992
	O Point	2075	6035	2746	
	M Colony	245	713	324	
	C House	241	701	319	
ZONE -2	Air Road	2675	7781	3540	6929
	Daily Market	2099	6105	2778	
	C Sector	2449	7123	3241	
	C-1 Sector	699	2033	925	
ZONE - 3	C -2 Sector	1049	3051	1388	8332
	D Sector	1420	4130	1879	
	RWD Colony	1049	3051	1388	
	ESS Sector	2350	6835	3110	
ZONE - 4	MLA Cottage	1675	4872	2217	8594

PRIMARY COLLECTION - ITANAGAR

VEHICLE REQUIREMENT ANALYSIS

	E Sector	4898	14246	6482	
ZONE -5	F Sector	1193	3470	1579	8061
	Div IV	1399	4069	1851	
	G Sector	1667	4849	2206	
	G Market	2113	6146	2796	
	G Extension	478	1390	633	
ZONE - 6	U/V Vihar	1191	3464	1576	9063
	H Sector	1905	5541	2521	
	L/v Vihar	1925	5599	2548	
	Poly College	1230	3578	1628	
	Police Colony	245	713	324	
ZONE - 7	Chandranagar	1430	4159	1892	8913
	KV School	714	2077	945	
	G Tiniali	720	2094	953	
	WE & S Colony	238	692	315	
	Bank Tinali	2799	8141	3704	
	MOWB -1	1399	4069	1851	
ZONE - 8	MOWB - 2	699	2033	925	8694
	M Bungalow	974	2833	1289	
	Niti Vihar	952	2769	1260	
	Driver Colony	715	2080	946	
ZONE - 9	Senki View	720	2094	953	4448
	Total		**156103**	**71024**	

MSW MANAGEMENT AT THE CAPITAL COMPLEX

Interventions at each stage:

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4. **Disposal Stage**

Problems being solved in Disposal System…

PROBLEM: Present Disposal system not scientific

SOLUTION ADOPTED:

- Open dumping system with attendant negative effects due to open dumping like breeding of disease vectors
- Requirement of area continue to increase
- No Resource Recovery hence system was unsustainable in the long run
- Development of Recyclable market

D. Compost Plant

- The Bio-degradable waste from the secondary collection system are being sent to compost plant for undergoing treatment process in a scientific way after the segregation.
- Bio-culture components call Bio-cullum (inoculants) which is composition of herbal extracts, Bio-enzyme & additives of Bio-nature are mixed with the garbage to convert the garbagbe into a manure.
- Non Bio-degradable waste are being segregated at the trommel screen chamber which are being dispose off to landfill site with other unwanted waste products in a scientific manner.
- 15% of the waste treated are being converted to manure per day.

Interventions made for Disposal

- Disposal Plant being established scientifically:
  - Aerobic Composting Plant
    - Biological Process
      - Windrow Platform
    - Mechanical Process
      - Screening with 35mm, 16mm until - 3mm
      - Gravity Separator
    - Biological Refining Process
  - Integrated Engineered Sanitary Landfill
    - HDPE Liners, Clay Liners, Drainage Layer
    - Leachate Collection Pipes
  - PPP mechanism for effective operation

Old View of Site at Chimpu

Over View of Municipal Solid Waste Management Plant

Over View of Municipal Solid Waste Management Plant

Semi finished Platform of Municipal Solid Waste Management Plant

Internal Roads of Municipal Solid Waste Management Plant

Internal Roads of Municipal Solid Waste Management Plant

Composting in process


26/04/2013 10:09

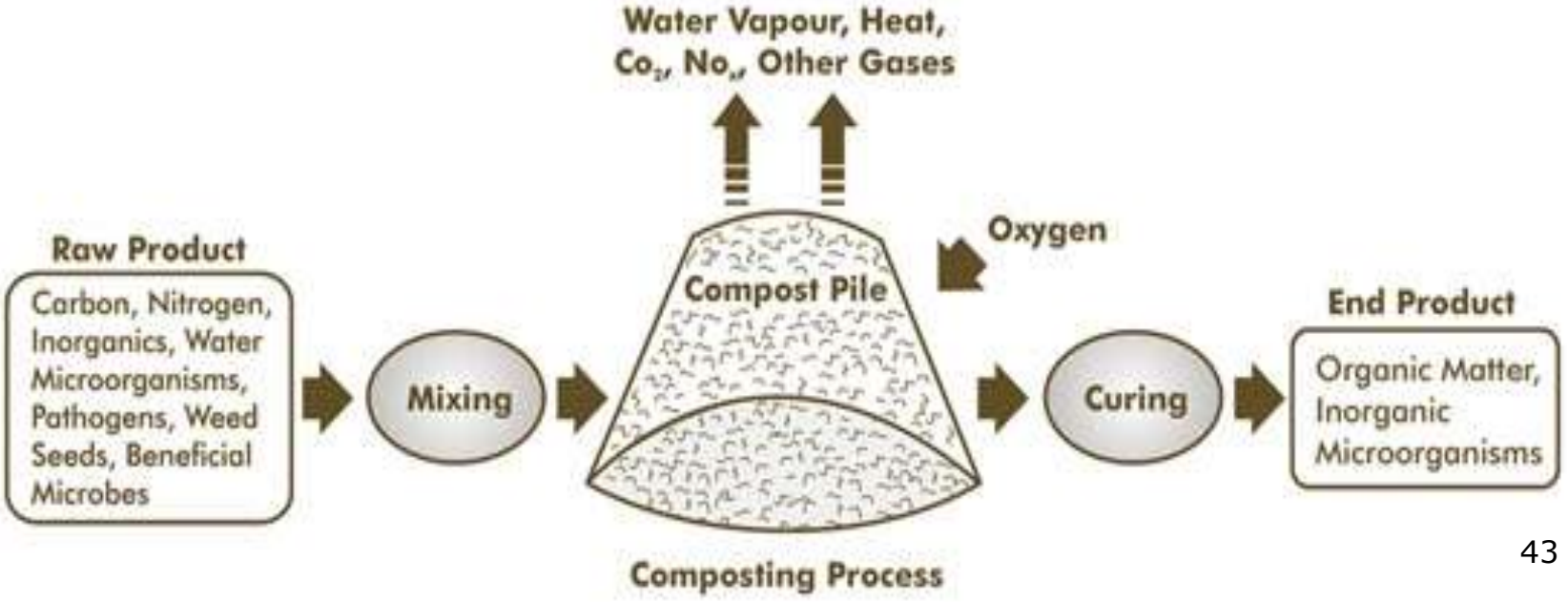
Tilting in process


JCB
JCB
26/04/2013 10:13

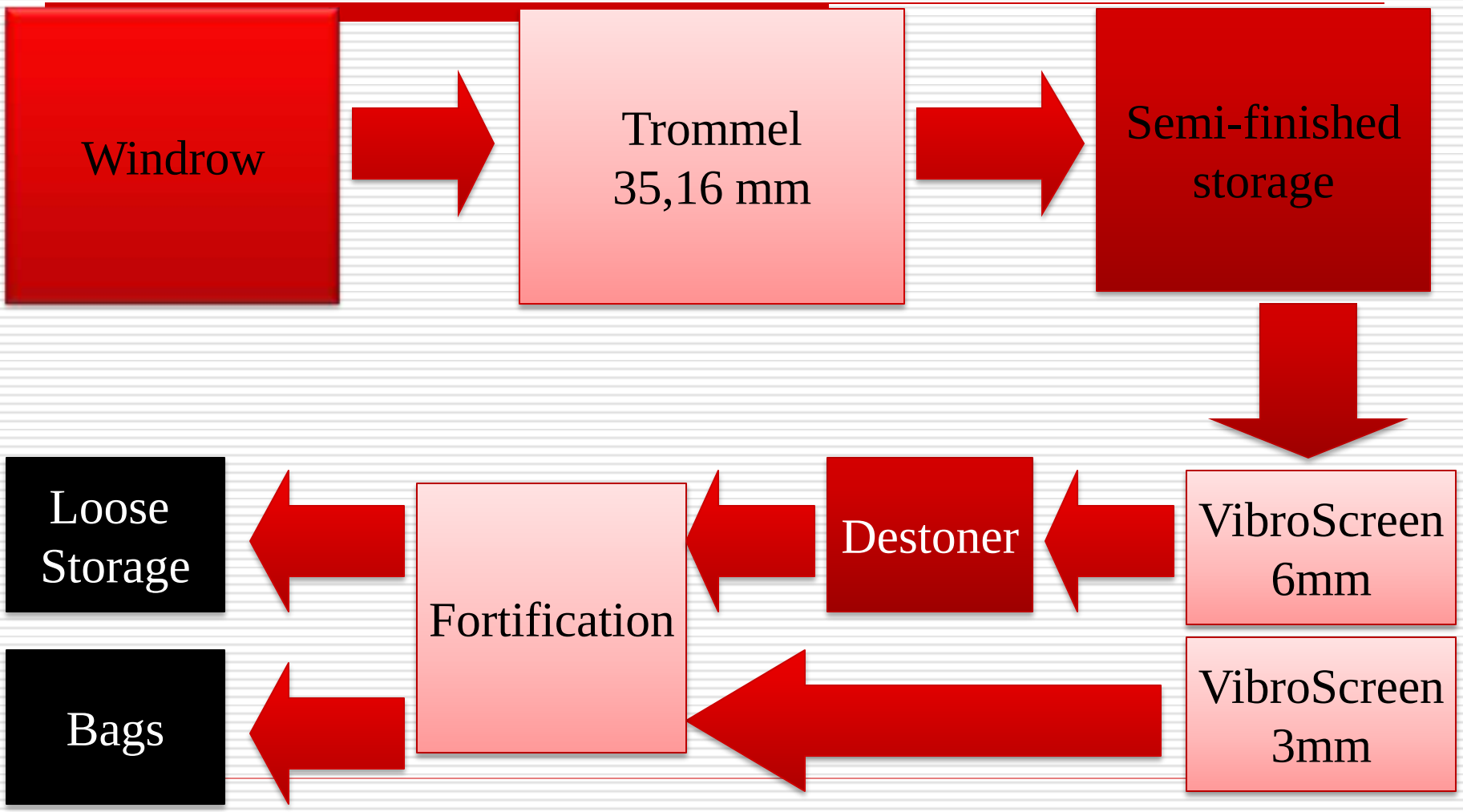
Technology adopted for treatment of Biodegradable Waste:

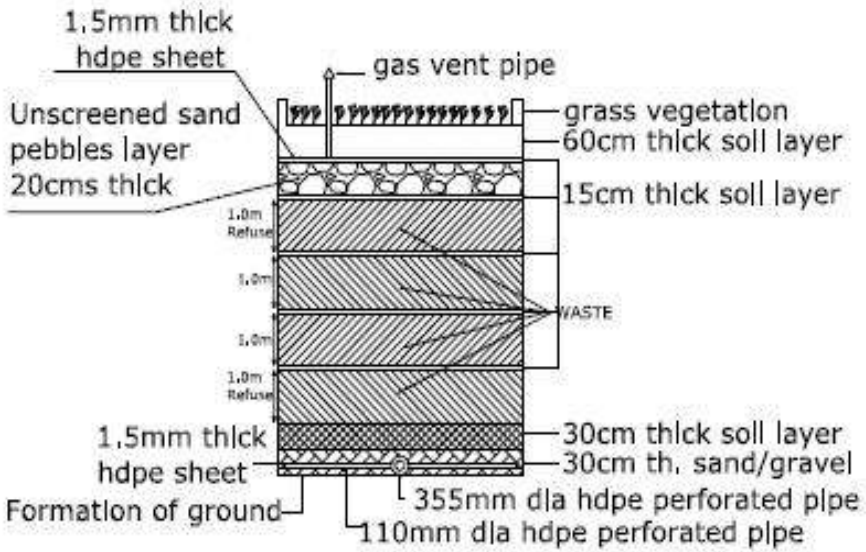
Aerobic Microbial Composting

- Bio-degradable component of waste is composted
- High organic matter , suitable moisture content and low calorific value of waste makes composting viable
- Finished compost can be classified as a 100% organic fertilizer



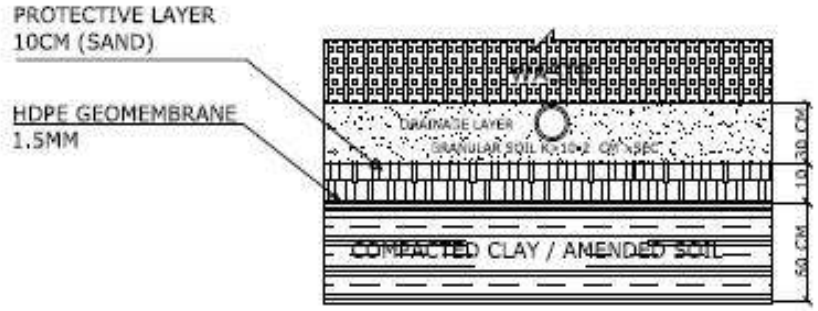
Process Flow – Block Diagram





COMPONENTS OF COVER,
DRAINAGE & VENT SYSTEM

Secured Landfill



LINER SYSTEM FOR BOTTOM

Environmental Impact Assessment (EIA) Environmental Management Plan (EMP)

- Some Mitigation Measures adopted:
  - Water: Leachate Treatment Plant
  - Windrow runoff: Separate drain to take runoff to Leachate sump which is finally drained to the Leachate Treatment Plant
  - Air: Closed Container Vehicles, Regular schedule for inspection of vehicles
  - Green Belt Development with trees with high foliage density to form a dense canopy around the disposal area

Other Interventions under way…

- Financial
  - Inadequate resource base to support high costs of Solid Waste Management so a self-supporting and sustainable system with adequate community participation adopted
  - Zone-wise collection to be outsourced under the purview of the UD&H Department.
- Institutional
  - Capacity building required to develop human resources to develop good waste management practices at the locality level.
- Social
  - lack of awareness towards segregation at source and good waste management practices especially 3R's – Reduce, Recycle and Recover
  - Funding for IEC and manpower being made available to the UD&H Department

Other Interventions under way… Cont'd

- Social … Continued
  - Community sensitization will require continual and sustained efforts and resources
  - Integration of public and private sector efforts in waste management

- Market Development of end-products
  - Support for recyclables market development and Plastic and Paper recycling Plants
  - Market support for compost – Subsidies, Promotion by Agriculture, Horticulture, Soil Conservation, Fisheries and other Departments

SUMMARY OF PROJECT INTERVENTIONS

- Generation
  - Segregation at Source
  - Storage at Source
  - Good waste mgmt. practices: Reduce, Reuse and Recycle
- Collection and Transportation
  - Community Involvement
  - Private Participation
  - Door to Door Collection
  - Secondary Collection through dumper containers
  - Routing and Rationalization
  - Final Transportation to Disposal Site.
- Treatment and Disposal
  - Compost Plant for biodegradable waste
  - Secured Sanitary Landfill for non-recyclable waste
  - Recyclables disposed through existing market mechanisms

MSW Plant in other towns of Arunachal Pradesh

- With the successful commissioning & operational of Compost plant at Itanagar, The Govt. of Arunachal Pradesh is planning to establish MSW plant in another 10(ten) towns of Arunachal Pradesh.
- Project shall be submitted or being submitted to the GOI for sanction.

Thank YOU