Waste Management Initiatives and Challenges of Nepal

Presented by
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Outline of the presentation

- Policy and legal initiatives in solid waste management
- Current approach and practices
- Quantity and types of waste generation
- 3R approach in management system
- Public, Private Partnership approach
- Challenges
Policy and legal initiatives

- SOLID WASTE MANAGEMENT AND RESOURCE MOBILIZATION ACT, 1987
- THE TOWN DEVELOPMENT ACT, 1988
- LOCAL SELF GOVERNANCE ACT, 1999
- THE NEPAL ENVIRONMENT POLICY AND ACTION PLAN, 1993
- NATIONAL WASTE MANAGEMENT COUNCIL, 1996
- THE ENVIRONMENT PROTECTION ACT, 1997
- ENVIRONMENT PROTECTION RULE, 1997
Current approach and practices in SWM

- Door-to-door collection
- Source segregation at the household level
- Composting at the household level (Reduce/reuse)
- Initiating User’s fee system-ownership/rights
- Involvement of NGOs and private sectors
- Vermi-composting
- Waste collection and transport to landfill sites not regular
- Garbage of waste remain in the public place for long-time
- Dumping of household waste on the banks of river
Generation of waste in KMC

Population approx. 8,00,000
Population growth rate 3.25%
Waste generation 0.25 kg/day
Others (VDC, Commercial, day pop. etc.) 0.15 kg/day

\[
\text{per capita waste generation} = 0.40 \text{Kg/day}
\]

Total Generation 320 ton/day
Municipal Collection 300 ton/day
Composition of Municipal Waste

- Garbage: 72%
- Paper: 12%
- Plastic: 8%
- Textile: 3%
- Rubber/Leather: 3%
- Others: 2%
An overview of Pokhara
SANITARY LANDFILL SITE
POKHARA SANITARY LANDFILL SITE
Pokhara Environment Improvement Project

1. Public awareness and environment education
2. Sanitation facilities improvement
3. Sanitary Landfill Site
4. Land use concept plan
5. Storm water drainage improvement
6. Urban road improvement
Sanitary Landfill Site:

- Empty Landfill
- Filled Landfill Area
- Sand Drying BED
- Vertical Reed Bed
- Horizontal Reed
Location:

- Bachhebuduwa, ward no.18,
- near the converging point of Seti river and Phurse Khola
- 670m high from MSL
- 9 km away from Prithivi Highway

- Construction started : Poush 2056 (Dec 1997)
- Construction completed: Ashad 2060 (June 2003)
- Inauguration date : 24th Magh 2061 (Jan 2004)
Area:

Landfill Area : 80 Ropani
Treatment Area : 30 Ropani
Buffer Zone, Internal road and other infrastructure : 75 Ropani
Composting Area : 15 Ropani

Total : 200 Ropani
### Construction Cost:

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost (NRS)</th>
<th>Type</th>
</tr>
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<tbody>
<tr>
<td>Access Road Construction</td>
<td>7,42,31,314.00</td>
<td>Donation</td>
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<tr>
<td>Treatment Plant</td>
<td>4,00,85,774.00</td>
<td>Loan</td>
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<tr>
<td>Landfill Area</td>
<td>3,48,52,154.00</td>
<td>Loan</td>
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<tr>
<td><strong>Total Cost</strong></td>
<td><strong>14,91,69,283.00</strong></td>
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<tr>
<td>Equipment Cost</td>
<td>4,92,16,926.00</td>
<td>Loan</td>
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<tr>
<td><strong>Total Cost</strong></td>
<td><strong>19,83,86,209.00</strong></td>
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</table>
Landfill Area:

- Volume = 7,20,000.00 cum
- Bounded by earthen dam at southern part for safe disposal of landfill wastage.
- Vertical cylindrical bolster Gas ventilation (1m dia GI mesh wire, 14 nos.)
GARBAGE UNLOADING BY COMPACTOR
GARBAGE COMPACTION BY CHAIN DOZER
Covering the waste by soil
Soil spreading by loader
Septage settlement Tank (SST):  

- Capacity=150.00cum  
- semi underground septic tank, about 1m below GL
Sand Drying Bed (SDB):

- Size: 41.15m x 41.15m
- Divided in seven compartments
- As a filter material, five different grade of gravel varying large to small from bottom to top.
Function of SDB:

- to settle the solid waste on the sand bed

- to filter the liquid in primary level
Treatment Plant:

1. Horizontal Reed Bed (HRB)
   Area = 1105.00 sqm

2. Vertical Reed Bed (VRB)
   Area = 2203.00 sqm

Treatment Capacity = 75.00 cum/day of septage
   40.00 cum/day of solid waste leachate

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115.00 cum/day
Surface water collection Basin:

VOLUME=270.00 CUM
Composting Area:
## Equipments:

<table>
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<tr>
<th>S.No.</th>
<th>Equipments</th>
<th>Total Nos.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tripper</td>
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<td>2.</td>
<td>Compactor</td>
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<tr>
<td>3.</td>
<td>Loader</td>
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<tr>
<td>4.</td>
<td>Dozer</td>
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<tr>
<td>5.</td>
<td>Septage Tanker</td>
<td>2</td>
<td></td>
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<tr>
<td>6.</td>
<td>Suction cum Jetting</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Tractor</td>
<td>2</td>
<td></td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>21</strong></td>
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</table>
Operation Cost borne by PSMC

For F.Y. 2061/2062 (04/05): RS 65,00,000.00
US$89041

For F.Y. 2062/2063 (05/06): RS 1,56,92,798.00
(US$214969)

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RS 2,21,92,798.00
(US$ 304010.9)

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Land Fill Area Before Disposing Solid Waste
Slope Protection work at Jhakrithan
Treated Leachate from VRB

Outlet to river
Organic Waste
Reusable Waste
Medical waste
Solid waste disposed on the banks of the river
Challenges

- Awareness building within the community - Concept of ADICAS
Challenges

- Enforcement of legal/economic instruments
- Collective approach: empowerment of community participation- 3R approach
- Cooperation and coordination among the private/public sector organization and INGOs
- Adoption of best available technology-NGOs and Private sector-WEPCO-organic compost
- Upstream/downstream approach for extended producer responsibility (EPR) and sustainable waste management
- Extend collaboration/strategic partnership with INGOs for sustainable management of waste (SW, EW, MW and Hazardous waste).
Expectation from 3R Secretariat

- Strengthening regional cooperation for 3R:
  - Technical support
  - Human resource development
  - Institutional strengthening
Thank you!

Arigato Gojaimasu!