Optimization of Municipal Solid Waste Management Systems in India

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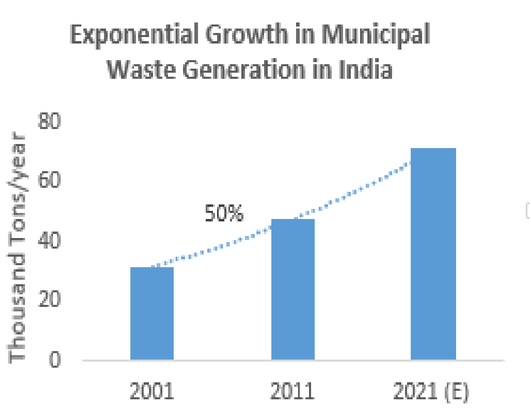
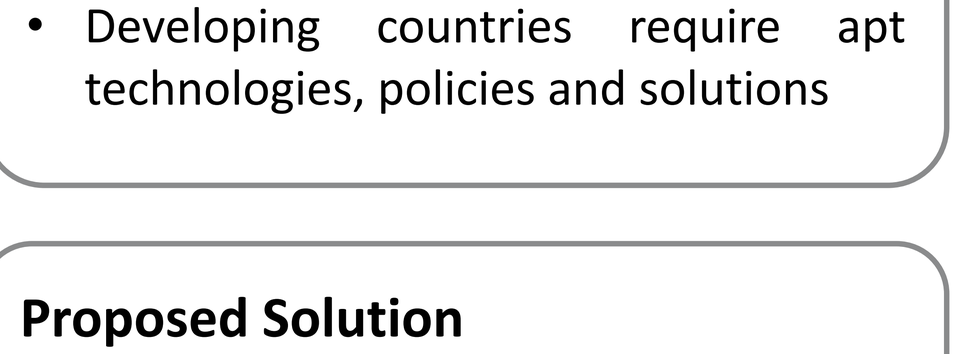
Significance



- Tier 3 (T3) cities (population 0.1 – 1 million) produce ~37% of India's total municipal solid waste[1]
- **Case study of Muzaffarnagar, India:** Urbanization of T3 cities challenge capacity & coverage of waste system
- Developing countries require apt technologies, policies and solutions

Proposed Solution

- Development of a decision support tool for waste management system design, used to optimize:
  - Cost-effectiveness
  - Environmental impact
  - Social impact
- Enables identification of waste system architecture considering unique waste composition, demographics, scale, etc.



Acknowledgments

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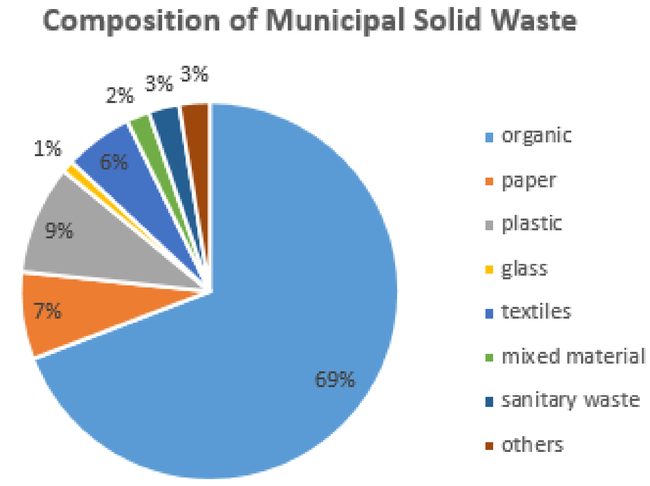
Preliminary Results

- Waste audits were conducted to characterize and quantify household generation (Bottom-Up)
- Operations data from waste managers was collected (Top-Down)



- In India, a much higher fraction of MSW is food waste: Muzaffarnagar – 69% vs. USA – 37%[2]
- Large potential for value from food waste – segregation of food waste by households and bulk generators
- Effective solution involves analysis of different technologies at varying scales – with trade-offs in cost and performance

Scale of operations

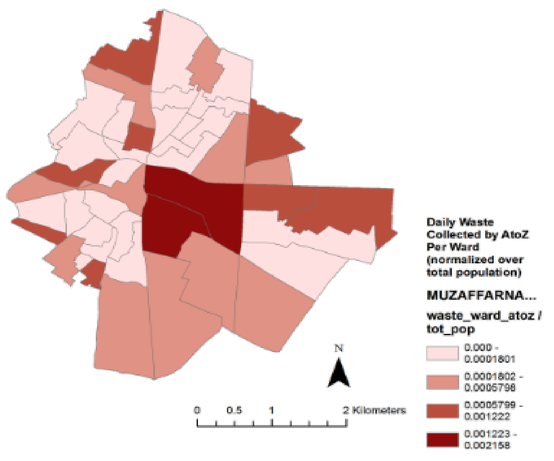
Tons per day (TPD)
0.1 TPD – 200 TPD

Organic waste technologies

Composting ($$$) | Anaerobic Digestion ($$) | Organic Fuel Pellets ($$)

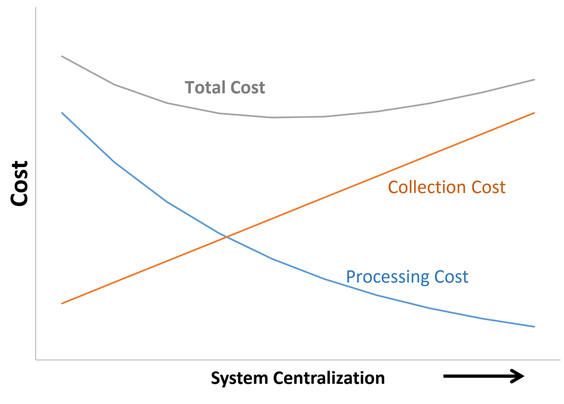
- Informal sector contributes to recovery of recyclables – decentralized systems increase social impact

Next Steps



- Development of a GIS-based decision support tool for optimization of solid waste collection and transportation

- Identification of an optimal decentralized system
  - low cost
  - high energy recovery
  - high recyclable recovery
- Study the impact of the informal sector on waste flows



References

1. Sharholy et al. "Municipal Solid Waste Management in Indian Cities – A Review" Waste Management, 28 (2008)
2. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012, EPA, 2014
3. Annepu, R., "Sustainable Solid Waste Management in India" Columbia University (2012)