What’s the End Goal of Waste Management?

21 September 2015
Zero Waste Inspiration

Bea Johnson

Courtesy of Bea Johnson. Used with permission.
ZERO WASTE
is the aim to eliminate direct and indirect waste generation.

When achieved, having zero waste would also eliminate waste management by providing a closed-loop system.
The Waste Hierarchy

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Prefered environmental option

1. Reduce
2. Re-use
3. Recycle
4. Energy Recovery
5. Disposal

Least preferred environmental option
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Image by MIT OpenCourseWare.

Image from: East Riding of Yorkshire Council
Waste produced by Bea Johnson’s family over one year (2014).

Discussion Questions

1. Did reading about Bea Johnson’s zero waste approach change how you view your own habits around waste?

1. Why does Bea Johnson believe a zero waste lifestyle is necessary?

1. Do you believe a zero waste lifestyle is possible? What factors would make it easier?
“Recycling depends on too many variables to make it a dependable solution to our waste problems”

- Bea Johnson

Recycling requires coordination between many actors.
Requirements for Recycling

• **Manufacturers** must “communicate with recyclers, design products that are durable but also highly recyclable…., and label their recyclability and recycled content accordingly”

• **Consumers** must “be aware of local recycling policies, to recycle responsibly, but also to purchase accordingly and buy recycled in order to create a market for recyclables”

• **Municipalities** must “provide curbside recycling and collection locations for hard-to-recycle items and share residents’ education with haulers”

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Requirements for Recycling (2)

- **Haulers** must “work with municipalities in providing convenient and financially enticing service to residents …, receiving adequate training from MRFs … to answer customer questions”

- **Materials recovery facilities** (MRFs) must “sort effectively and offer the greatest quality of sorted materials (i.e., with the lowest rate of contaminants), to answer customer questions, and to contract local recyclers”

- **Recyclers** must “communicate with manufacturers, to make their products visible and widely available, and to encourage upcycling and recycling versus downcycling (i.e., made into an unrecyclable lesser kind of product) markets “

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“To eliminate the concept of waste means to design things – products, packaging, and systems – from the very beginning on the understanding that waste does not exist.”

McDonough and Braungart, Cradle to Cradle, p 104
What Prompted the Demand for Cradle to Cradle?

• Products are designed with built-in obsolescence

• Systems are not currently built to recycle/reuse products

• Products are made with increasingly complex materials and combinations of materials

• Product designs no longer return material nutrients to where they were found

• Products are often not designed for a life beyond the product lifecycle
“Rather than seeking to minimize the harm we inflict, Cradle to Cradle reframes design as a beneficial, regenerative force—one that seeks to create ecological footprints to delight in, not lament. It **expands the definition of design quality to include positive effects on economic, ecological and social health.**

“Cradle to Cradle **rejects the idea that growth is detrimental to environmental health**; after all, in nature growth is good. Instead, it promotes the idea that good design supports a rich human experience with all that entails—fun, beauty, enjoyment, inspiration and poetry—and still encourages environmental health and abundance.”

- MBDC

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Discussion Questions

1. What are the benefits of the Cradle to Cradle model? Limitations?

1. If all products were designed with a cradle to cradle model, does product consumption need to be limited? Would unlimited consumption of cradle-to-cradle-designed products be harmful to the environment?
INTEGRATED SUSTAINABLE WASTE MANAGEMENT

Includes both the physical and governance aspects of SWM. ISWM is at least partially a WM-focused response to sustainable development.
Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of **needs**, in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of **limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

- **Our Common Future**, Brundtland Report 1987

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Sustainable development recognizes that growth must be both inclusive and environmentally sound to reduce poverty and build shared prosperity for today’s population and to continue to meet the needs of future generations. It is efficient with resources and carefully planned to deliver both immediate and long-term benefits for people, planet, and prosperity.

The three pillars of sustainable development – economic growth, environmental stewardship, and social inclusion – carry across all sectors of development, from cities facing rapid urbanization to agriculture, infrastructure, energy development and use, water availability, and transportation.

- The World Bank

ISWM Framework

1: Public health – Collection
2: Environment – Treatment & Disposal
3: Resource Value – Reduce, Reuse, Recycle (3Rs)
4: Inclusivity – User and Provider
5: Financial Sustainability
6: Sound Institutions & Pro-active Policies

W: Waste Related Data
B: Background Information


Wilson et al. – “Wasteaware' benchmark indicators for integrated sustainable waste management in cities”
What drivers shape waste management?
“The people fleeing the affected zones are heading in all directions and taking the hysteria with them. With the discovery of three people afflicted with plague in a Bombay hospital, panic has gripped that city as well. Tetracycline, an antibiotic for plague treatment, has disappeared from chemist shops not only Bombay but also in Delhi.”

- An excerpt from the newspaper ‘The Hindu Universe’
dated 25 September 1994
What drivers shape waste management?

Image from: Kate Mytty, documented in Muzaffarnagar, India. January 2015.

MIT D-Lab Waste - Fall '15
## Recycle Rates Across 20 Cities

<table>
<thead>
<tr>
<th>Income level</th>
<th>Range: %</th>
<th>Average: %</th>
<th>Average contributed by the informal sector: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>30–72</td>
<td>54</td>
<td>0</td>
</tr>
<tr>
<td>Upper-middle</td>
<td>7–27</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Lower-middle</td>
<td>6–39</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td>Low</td>
<td>6–85</td>
<td>27</td>
<td>26</td>
</tr>
</tbody>
</table>

Data collected in 2009

Table 3. Recycling rates across 20 reference cities (adapted from Scheinberg et al. (2010b), Wilson et al. (2010b) and Wilson (2011))


Waste Management
Stakeholders

• Users and potential users
• Providers (city, informal and formal private sector)
• External agents (national government, regional governments, producer responsibility, etc.)
Financial Sustainability

- US$75 or more per capita in areas where city budgets are $1 – 10 per capita
- 3 to 15% of city budget spent on MSWM
- Cost recovery from users
Institutions and Policies

Final Project

• Art
• Civic Engagement
• Technology
Final Project

Guidelines:
- Action-oriented project
- Incorporates class readings/discussions
- Builds off student interest
- Focuses on a waste-related topic (can be human, solid, etc.)

Assistance:
- Mentorship
- Connecting with other resources (readings, people power, etc.)
- Supplies

Evaluation:
- Engagement/involvement of stakeholders
- Implementation
- Thoroughness of project (research, design, evaluation and implementation)

Deliverables:
- Class presentation (~15 – 20 minutes)
- D-Lab Fall Showcase Presentation (1 minute) – Fri, Dec 4, 5:00 – 7:00pm
- Background report
- Project report/technology prototype/art installation
References


Mytty, Kate. Images from fieldwork in Muzaffarnagar, India. January 2015.

