Research on Resource Recovery and Reuse (RRR) Business Cases and Models

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Waste management in cities in most developing countries cannot keep pace with urbanization.
- Insufficient collection systems for wastewater, MSW, faecal sludge;
- Majority of treatment plants do not operate effectively;
- Absence of resources for operation and management is a common cause of failure -
  - Inadequate billing systems
  - Low household ability and willingness to pay
Unsafe waste disposal is a source of health hazard and environmental pollution.
• Investments in infrastructure are required;
• Level of maintenance and related costs set most treatment plants on a trajectory for failure;
• Suggested solutions \[\rightarrow\] additional revenue streams to ensure sustainability.
• Innovative RRR initiatives can help sustain cost recovery via additional revenue streams and close the water, nutrient and energy loops.
Why do we not see more of this and at scale?

• Most initiatives aimed at RRR have been characterized in low-income countries by:
  - High dependence on subsidies;
  - Limited up-scaling potential.

• Fundamental gaps in:
  - Business planning and management strategies, market knowledge;
  - Economic aspects and institutional linkages;

• Resulting in more failures than successes.
What is needed?

- **Business thinking** and market-driven mechanisms in a business-phobic sanitation sector;
  - This involves the analysis, development and promotion of innovative cost-recovery and other **business models** that represent:
    - sources of revenue generation or social benefits for all relevant actors;
    - **incentives** for private sector participation.
Most donors and governments envision investment plans which do not require their continuous support for impact.
IWMI & WLE’s RRR Strategy
+ Partners

Research
Capacity Building
Implementation

World Health Organization
cewas
Swiss TPH
CGIAR
Sandec
Water and Sanitation in Developing Countries
The Science – Research Approach

- Research
- Capacity Building
- Implementation
The Science – Research Approach

Research Phase

- Business case identification and analysis
- Business model description
- Feasibility studies

Analysis of empirical RRR Business cases from a Multi-Disciplinary perspective

Business modeling

- Case 1
- Case 2
- Case 3

Testing feasibility of business models in local context

Implementation Phase

Investment in most promising RRR businesses in diff. locations [implementation research]
### RRR business cases

<table>
<thead>
<tr>
<th>Number</th>
<th>Business case name</th>
<th>Country</th>
<th>Location</th>
<th>Scale (pilot, community, city,...)</th>
<th>Type of waste used</th>
<th>Waste product (biogas, fertilizer, water,...)</th>
<th>Process of waste treatment</th>
<th>Could be a business case because...</th>
<th>Financial data available</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WASTE CONCERN</td>
<td>BANGLADESH</td>
<td>Dhaka</td>
<td>Large-scale business</td>
<td>Solid waste</td>
<td>Fertilizer</td>
<td>Composting, co-c. Replication of Not sure</td>
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<tr>
<td>2</td>
<td>BIOGAS SECTOR PARTNERSHIP</td>
<td>NEPAL</td>
<td>Kathmandu</td>
<td>Large-scale??</td>
<td>Human excreta Biogas and compost</td>
<td>Methanogenic ba- Maybe but specific Possible up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PUNJAB ENERGY DEVELOPMENT AGENCY</td>
<td>INDIA</td>
<td>Punjab</td>
<td>Large-scale</td>
<td>Cattle dung</td>
<td>Biogas and manure</td>
<td>Biologically induced mixing arrangement (BIMA)</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>USAID</td>
<td>INDIA</td>
<td>Uttar Pradesh</td>
<td>Pilot</td>
<td>Cattle dung</td>
<td>Biogas (thermal and Anaerobic digester Potential)</td>
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<tr>
<td>5</td>
<td>TAMIL NADU ENERGY DEVELOPMENT AGENCY</td>
<td>INDIA</td>
<td>Tamil Nadu</td>
<td>City</td>
<td>Wastewater</td>
<td>Biogas, Electrical etc Hybrid</td>
<td>Potential for replication and growth</td>
<td></td>
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</tbody>
</table>

- **Existing database of 150+ business cases across Asia, Africa and Latin America**
- **50+ cases selected for detailed analysis, more under screening;**
- **Development of 25+ business models tailored to different waste sources, processes and products, for different entities is target.**
Development of Business Models

Research Phase

Business model description

Analysis of empirical RRR Business cases from a Multi-Disciplinary perspective

Implementation Phase

Business modeling

Case 1

Case 2

Case 3

Business model
Subsidized composting at district level

- Learning from **100 compost plants** in Sri Lanka;
- **Cost recovery ranges:** 3 to over 100%
- Similar cases from Africa and South Asia;
- Detailed analyses – development of **most successful model** for replication.
Key research questions are…

• What are the characteristics and success factors of viable, scalable business models for the safe recovery and reuse of water, nutrients and energy in a low-income country?

• How much public funding is needed to stimulate business development?

• What programs are helpful in reducing the sanitation sector’s reliance on financial aid, and what roles do resource recovery businesses play in financing and managing parts of the sanitation value chain?

• What is the implementation potential and scale in low-income countries of such business models that provide marketable water, fertilizer and energy products?
Catalogue of RRR cases and models
Testing the feasibility of the business models

The methodology builds on a multi-disciplinary approach:

1. Waste supply and availability
2. Market analysis – WTP, market size
3. Technology
4. Financial analysis
5. Institutions, social and legal settings and acceptability
6. Health and environmental risks and mitigation measures
7. Economic analysis incl. valuation of positive and negative externalities
Testing the feasibility of models – 10 locations (4 funded by SDC)

- Peru
- Ghana
- Uganda
- Vietnam
- India
- Bangladesh
- Sri Lanka
Implementation of business models

Research

Capacity Building

Implementation
Implementation of business models

- Commercialization of fortified excreta pellets
- Wastewater-fed aquaculture
- Dry fuel manufacturing from MSW
Research continues!

Implementation offers significant learnings on the up- and out-scaling of potential BMs:

1. How are multi-party PPP contracts formulated which feed funds back into the sanitation chain?

2. How do we get products, e.g. faecal sludge pellets registered, certified and labeled for safe reuse?

3. How do we address the capacity gaps of partners/actors (public and private) to implement resource recovery and reuse (e.g. agricultural market knowledge)?
Capacity building

- Research
- Capacity Building
- Implementation
Capacity building

• Training workshops for existing and new entrepreneurs, e.g. from cash flow to business modeling;
• Larger lessons will feed into business school curricula;
• Business Modeling Workshop, e.g. 2015 FSM3 conference for practitioners and academia.
No reuse without safety!