

WASTE MANAGEMENT

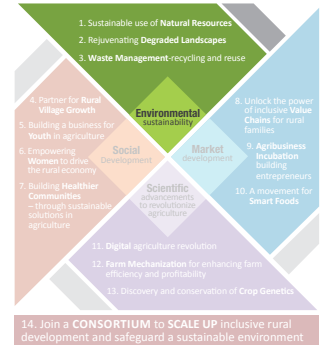
Recycling and Reuse

3

Better health in communities

Safe foods

Improved agricultural livelihoods



Why is waste management critical?

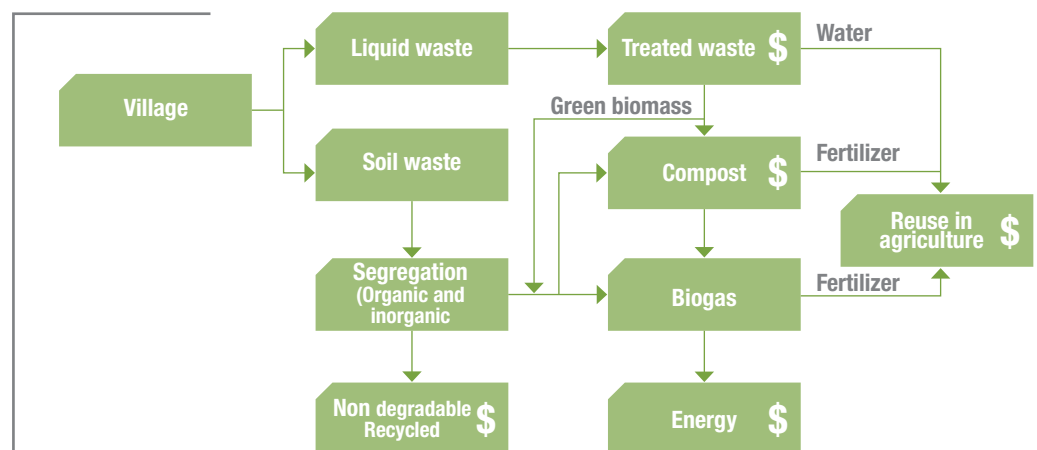
- In developing countries, a large portion of population resides in villages where formal waste management systems do not exist.
- Approximately 90% of disease burden is due to absence of clean water and poor sanitation.
- Recycling and reuse of available waste in villages provides sustainable solutions for a waste management system and reduces environmental degradation.
- Inappropriate reuse of untreated wastewater is unsafe for farmers and consumers.



The impact pathway -

How can it be implemented through a green business model

- **Decentralized Waste Management Systems (DWMS)** for rural areas
- Increased use of waste through **reuse of treated wastewater in agriculture** and **recycling solid waste as compost or bioenergy**
- **Involving community-based organizations**, like women's Self-Help Groups (SHG), for planning, implementing and managing the DWMS as a green business model.



Green Business Model for Decentralized Waste Management System (DWMS) in Villages

What has been implemented so far?

Decentralized wastewater treatment system

- The wastewater treatment system that treats wastewater through phytoremediation (plant-based) processes.
- The quality of water regenerated is sufficient for irrigation and agricultural activities.
- ICRISAT-led consortium has developed and constructed a wetland model for wastewater reuse in agriculture.
- Constructed wetland is used for treating domestic as well as industrial wastewater.
- Constructed wetlands consist of a filter bed of locally available sand/gravel and vegetated with wetland plants such as *Canna indica* and *Typha*.
- 20,000 liters of wastewater regenerated and reused daily to grow crops in one hectare of farmland throughout the year (Kothapally, India)
- Biomass generated from the constructed wetland may be used for biogas/compost generation.



Constructed wetland at Kothapally village in India. Treated water being used to irrigate one hectare farmland.

Solid waste management

- Biodegradable solid waste subjected to either composting, vermicomposting for producing a solid biofertilizer or directed to anaerobic digester for producing biogas.
- Organic manure in form of compost improves soil health and reduces use of chemical fertilizers, which also reduces the cost of cultivation.
- Biogas can be used for cooking at the household or community level, reducing indoor air pollution.
- A biogas plant can be specifically designed to suit any type of organic waste.



Farmers are trained to maintain vermicomposting units (left). Biogas generated from waste is used for cooking and lighting in Lucheba watershed in China (right).

Observed impacts

1 Enhanced nutrient use efficiency through recycling of waste as a part of green technology

2 Closing the nutrient cycle by transferring nutrients back to the agricultural fields

3 Improved quality of health particularly in women and children

4 Improved livelihoods and economy due to technology interventions at the village level

5 Improved crop yields leading to higher income and safe practices leading to fresh and non-toxic food grains and vegetables



International Crops Research Institute for the Semi-Arid Tropics



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