



جامعة عجمان
AJMAN UNIVERSITY

Effective Waste Management and Recycling SEGREGATION

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Why is waste a problem?

1. LANDFILL FILLING

When waste isn't separated, everything goes to landfills.

2. POLLUTION

Soil and water are polluted by dirty liquids (leachate) and bad gases like methane from rotting food waste.

3. WASTED MATERIALS

When waste is all mixed together:

- Recyclable stuff gets ruined and can't be reused.
- We have to dig up more new materials, which harms the environment.

Why is waste a problem?

4. HEALTH RISKS

People surrounded by landfills can get sick from toxic chemicals and germs in mixed waste.

5. HARDER TO MANAGE

- It is harder and more expensive to sort and treat waste later.
- If we separate waste at home, it's easier to recycle and reduce the trash that ends up in landfills.

Importance of Waste Segregation and AI Automation

Waste segregation means separating different types of waste, like plastic, paper, food, medical, etc. before disposal.

Why it matters:

- Non-segregated waste ends up in landfills, which are **harmful** to the environment.
- Recyclable items get **contaminated** when mixed with food or medical waste, making them unusable.
- It's **much harder and more expensive** to recycle or compost mixed waste.
- **Hazardous** waste (like batteries, chemicals) can leak into soil and water if not separated.

According to the World Bank, over 30% of waste globally could be recycled if properly sorted — but only a fraction of it actually is.

Challenges with Manual Segregation

- People are often **confused** or **lazy** about sorting trash.
- It **takes time and effort**, and even small mistakes (like food in a recycling bin) can ruin entire batches of waste.
- It's **inconsistent**, depends on individual behavior, which is hard to control.



HOW AI SEGREGATION IS A GAME CHANGER:



Artificial Intelligence (AI) combined with sensors can identify, analyze, and automatically sort waste based on type — without needing people to do it.

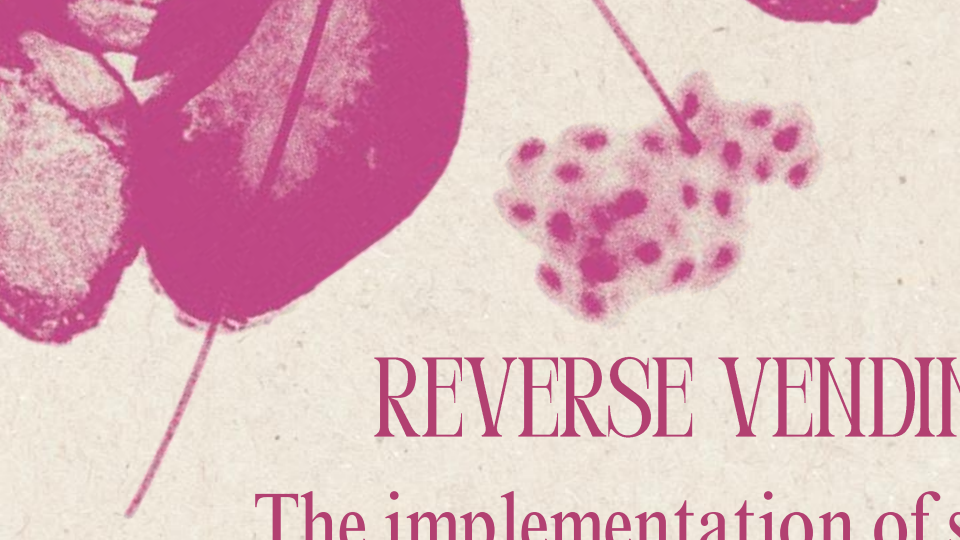
Benefits of Using AI for Segregation

Accuracy:
AI can recognize plastic, paper, glass, metal, organic waste, and even medical waste with high precision.

Speed: Sorting happens instantly: faster than humans can do it.

Consistency:
The process is the same every time, no mistakes due to mood or confusion.

Safety:
Workers don't need to handle hazardous or dirty waste manually.



REVERSE VENDING MACHINES

The implementation of smart bins as default wastebaskets will have consumers feeding their garbage into these machines.

MOBILE APPLICATION

These smart machines are linked to a mobile application where users earn points depending on disposal.

REWARD SYSTEM

The points/reward system innovates sustainability in the community through targeting consumer behaviors.

Segregation in the Community



Reward System



INCENTIVIZE CHANGE

Integrating points and a reward system motivates consumers to partake in sustainable initiatives and lifestyles.



TYPE - DEPENDENT POINTS

More eco-friendly waste
e.g. **biowaste** generates a higher number of points than non eco-friendly waste
e.g. **single-use plastic**.



REDUCE (REUSE, RECYCLE)

By making points type-dependent, users will be encouraged to reduce consumption behaviors of unsustainable products.

Existing Smart Bins



Tadweer Group



Environment Agency
Abu Dhabi



Nadeera



Imdaad



Redeemables

plants

green certifications

reusables



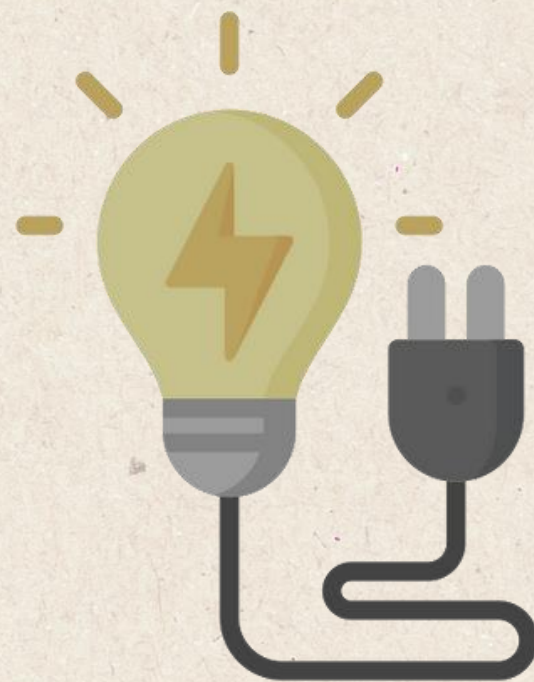
*But what do we do
with the segregated
waste?*

Organic Waste



Bioplastics from Food Waste

- Sources: Banana peels, starch-rich leftovers, potato skins.
 - Use: Cutlery, packaging film, single-use items.



Waste-to-Energy

- Use wastewater or food scraps to grow algae in tubes and that Algae biomass for biofuel, bioplastic, or animal feed.
- Organic waste in anaerobic digesters can generate small-scale electricity

Electronic Waste



UPCYCLED CIRCUIT BOARD
JEWELRY OR WEARABLES



DIY STEM KITS FROM E-WASTE

Plastic Waste

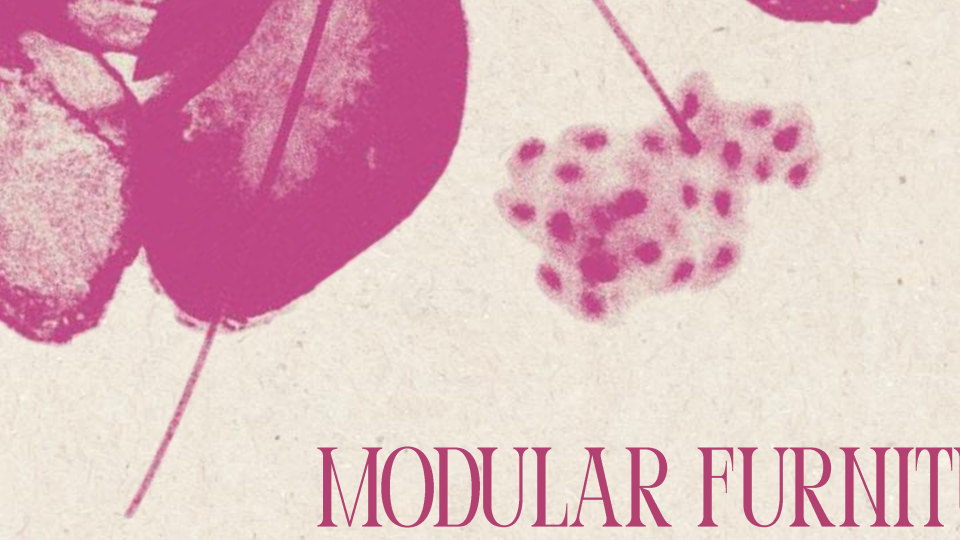


1. Recycled Plastic Filament for 3D Printing

- Shred and melt PET or HDPE to create filament spools for 3D printing prototypes, prosthetics, educational tools.

2. Plastic-Wood Composites

- Combine recycled plastic with sawdust or rice husk to build durable and sustainable furniture, decking, fencing, and construction panels.



Circular Economy Design Product



MODULAR FURNITURE FROM WASTE MATERIALS

- Easy-assemble furniture made from pallets, recycled plastic panels, or compressed cardboard.
- Use: Pop-up offices, low-cost housing, exhibitions.

CLOSED-LOOP PRODUCT LINES

- Idea: A fashion or packaging line that is entirely reclaimable — send back old items for redesign or points.

A hand holding a small globe is positioned in the upper right corner of the image. The hand is rendered in a dark, textured style, and the globe it holds is also textured and dark. To the right of the hand, a portion of a larger globe is visible, showing a grid of latitude and longitude lines. The background is a light, textured surface.

The Power of Collective Action

Organic Waste



Fertilizer- Natural Compost



DIY Herbal Incense or Scent Pouches

Plastic



Eco-bricks



Plastic Art

Glass



Mosaic Art



Glass painting and
lanterns



It's time to
TAKE ACTION!



Questions and Discussion

We invite your questions, thoughts, and ideas.

Let's create a collaborative space where every voice is heard and respected. Feel free to reach out, and let's explore these topics together!