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What People Actually Do with Waste Fabrics: A Global Review of Practices, Pathways, and Challenges"

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***Abstract*-- This review examines the real-world fates of waste fabrics, encompassing both post-consumer textiles (e.g. - discarded clothing) and post-industrial materials (e.g.- factory off cuts). It synthesizes current practices and systems for managing textile waste, including reuse and donation, secondhand markets and exports, informal sorting and rags markets, mechanical and chemical recycling (including down cycling), industrial reuse (such as wiping cloths, insulation, and stuffing), energy recovery through incineration, landfill disposal, and creative upcycling (e.g., transforming old garments into bags or quilts). The review highlights global and regional patterns, estimates of scale, key drivers, and technical and social constraints—particularly challenges posed by blended fibers, dyes, and contamination. Finally, it provides evidence-based recommendations for policy and business strategies to enhance circularity in the textile sector, including improving recyclability, expanding collection infrastructure, and promoting sustainable upcycling initiatives**

I. Introduction

Textile production and consumption have expanded rapidly over recent decades, driven by fast fashion, globalized supply chains, and increasing consumer demand, resulting in enormous volumes of textile waste worldwide. Understanding how this waste is actually handled—by households, charities, secondhand collectors, recyclers, and informal markets—is essential for designing effective and realistic circular-economy interventions. Households may donate unwanted clothing to charity shops or drop-off bins, while charities often sort and distribute these garments locally or export them to countries in Africa, Asia, and Latin America. Informal collectors and rag traders purchase low-value fabrics, which may then be repurposed into cleaning cloths, insulation materials, or shredded for recycling. Industrial recyclers process post-industrial off cuts into fibers for new textiles, stuffing, or composites, whereas some textiles are incinerated for energy recovery or sent to landfills when no alternative exists. To provide a comprehensive view of these real-world pathways, this paper synthesizes findings from peer-reviewed studies, industry reports, NGO investigations, and recent news sources, mapping both behaviors and infrastructure across diverse global regions.

By examining actual practices alongside technical, social, and policy constraints, this review aims to inform strategies for enhancing circularity and reducing the environmental footprint of the textile sector.

II. Methods

This study adopts a narrative literature review approach, drawing on a diverse range of sources published between 2018 and 2025, including peer-reviewed academic articles, industry reports, NGO publications, and reputable media coverage. Sources were selected to provide a comprehensive perspective on textile waste management, focusing on three key dimensions:

1) National and regional statistics on textile production, consumption, and waste generation
2) Technical descriptions of recycling and recovery methods, including mechanical and chemical processes.
3) Documented practices within informal sectors and markets, such as secondhand clothing trade, rag collection, and export hubs for used textiles.

Wherever possible, numerical claims and estimates are traced back to primary sources or peer-reviewed reviews to ensure accuracy and reliability. This multi-source approach enables an integrated understanding of both formal and informal systems, as well as regional variations in the management of post-consumer and post-industrial textile waste.

III. Major Pathways For Waste Fabrics (What People Actually Do)

A. Donation and Direct Reuse (Local)

Many households attempt to donate unwanted clothing to charities, collection banks, or share items with friends and family. In regions where collection systems function effectively, a significant portion of these donations is either resold by charitable organizations in local thrift shops or directly reused within the community. For example, charity shops in the UK, Europe, and North America often sort donated garments, selling wearable items at low cost while redistributing some to local community programs.

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However, a substantial fraction of donated clothing is unsaleable or unsuitable for local reuse due to wear, staining, or style mismatches. These items often follow alternative pathways such as export to secondhand markets in Africa or Asia, mechanical or chemical recycling, or disposal in landfills when no viable reuse option exists. Despite these challenges, charitable collection continues to serve as a critical first step in the textile waste management system, linking households to broader reuse, redistribution, and recycling networks.

B. Secondhand Markets and Export (Remanufacture/ Reshare)

A major pathway for textile waste involves resale through local secondhand markets or large-scale exports to countries in Africa, South Asia, and Latin America. Both formal and informal sorting hubs play a critical role in separating garments that are suitable for immediate reuse from those deemed rejects. Export markets can significantly extend the useful life of clothing, allowing items to be worn and reused in new contexts. However, they can also concentrate unsellable textiles in receiving countries, creating additional waste management challenges. For instance, Kantamanto Market in Ghana, one of the world's largest secondhand clothing hubs, reportedly receives millions of used garments each week. A substantial proportion of these items is not resold and instead accumulates as local waste, highlighting both the benefits and limitations of global secondhand trade. This pathway underscores the need to balance extended product lifetimes with sustainable handling of residual waste.

C. Informal Sorting, Rag Trade, and Industrial Reuse

In many countries, a substantial informal rag trade collects textiles that are unsuitable for resale or formal recycling and repurposes them for practical industrial uses. Low-value or contaminated fabrics are transformed into cleaning rags, wiping cloths, insulation materials, or stuffing for furniture and automotive applications. For example, in India and Pakistan, informal networks of rag collectors and small-scale workshops process thousands of tons of discarded textiles annually, supplying local factories and businesses with affordable industrial materials. This pathway plays a critical role in absorbing textiles that formal recycling systems often reject due to contamination or fiber blends. While it provides important livelihoods and supports local economies, the informal sector is rarely captured in official waste statistics, meaning its scale and impact are often underestimated in national or regional analyses of textile waste management.

D. Mechanical Recycling (Fiber Recovery → New Low-Grade Products)

Mechanical recycling involves shredding discarded textiles into fibers that can be reused in products such as stuffing for cushions and mattresses, insulation materials, non-woven mats, and low-value yarns. This method works most effectively with relatively homogeneous, single-fiber streams, such as 100% cotton or wool garments. However, the process typically produces shorter, lower-quality fibers, resulting in "downcycling" rather than true material recycling. For example, cotton t-shirts may be shredded into insulation batting for furniture, while wool sweaters can be repurposed into felt or padding. Mechanical recycling is widely used around the world, from small-scale workshops in India to industrial facilities in Europe, but its efficiency is constrained by garments made from blended fibers (e.g., cotton-polyester mixes) and by contamination from dyes, buttons, or zippers, which reduce fiber quality and limit further applications.

E. Chemical Recycling and Advanced Textile-to-Textile Processes

Chemical recycling involves breaking down fibers at the molecular level—through dissolution or depolymerization—to recover polymers that can be re-spun into new yarns. For example, polyester can be depolymerized into its original monomers for high-quality re-spinning, while cellulose-based fibers, such as cotton, can be processed through solvent systems to recover viscose or regenerated fibers. These advanced textile-to-textile technologies hold significant potential for closing the loop, especially for mixed-fiber garments that cannot be efficiently recycled mechanically. Pilot programs by major brands and research laboratories have demonstrated promising results, showing that chemically recycled fibers can be incorporated into new textiles without major quality loss. However, widespread adoption is currently limited by high costs, energy requirements, and the need for efficient sorting systems to separate fibers by type. When combined with robust collection and sorting infrastructure, chemical recycling could play a key role in enabling truly circular textile systems.

F. Upcycling, Repair, and Creative Reuse

At the household, small-business, and NGO levels, textiles are often upcycled into new consumer goods such as bags, home décor items, or fashion accessories. Garments may also be patched, mended, or creatively transformed into artisan products, extending their useful life and adding economic or aesthetic value.

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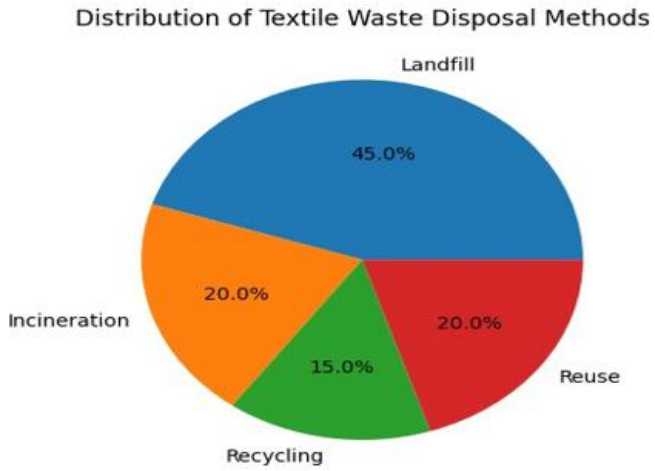
For example, old jeans can be turned into tote bags or quilts, and discarded t-shirts can be repurposed into braided rugs or craft materials. These activities not only reduce waste locally but also foster creativity, entrepreneurship, and community engagement. However, despite their benefits, upcycling, repair, and creative reuse currently absorb only a small fraction of the total textile waste stream, especially when compared to large-scale pathways such as landfill disposal, exports, or industrial recycling. Nonetheless, these practices illustrate the potential of local, value-adding strategies in promoting circularity within the textile system.

G. Energy Recovery (Incineration with Energy Capture)

In some municipal waste management systems, textiles are incinerated in energy-from-waste facilities, generating electricity or heat while reducing the overall volume of waste. For example, cities in Europe and Japan utilize modern incinerators to recover energy from post-consumer textiles alongside general municipal waste. While incineration provides a short-term solution for waste reduction and energy production, it destroys the material value of textiles and raises environmental concerns due to greenhouse gas and pollutant emissions. This pathway is especially common in regions lacking robust recycling or reuse infrastructure. Global estimates suggest that a significant portion of textile waste is currently managed through incineration, highlighting both the benefits and limitations of energy recovery as a strategy within the broader textile circular economy.

H. Landfill Disposal

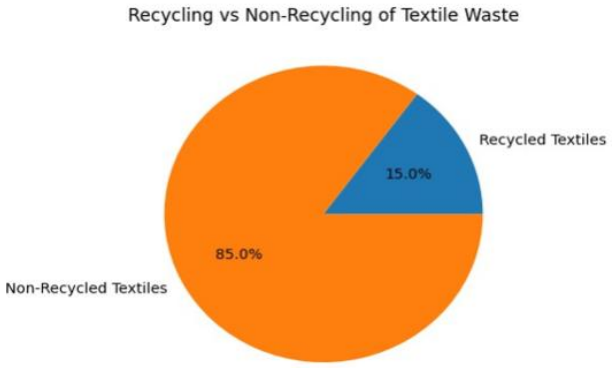
A large fraction of textile waste still ends up in landfills, with estimates varying by country and data source, but many studies suggest that the majority of discarded garments globally—amounting to tens of millions of tonnes annually—are landfilled. Synthetic textiles, such as polyester or nylon, pose additional environmental risks by releasing microplastics as they degrade, which can contaminate soil and waterways. Even natural fibers like cotton, wool, or linen often decompose more slowly than commonly assumed, as the presence of dyes, finishes, or blended fibers can hinder biodegradation. Landfilling remains the default pathway in regions without effective collection, recycling, or reuse infrastructure, highlighting the urgent need for alternative strategies to reduce the environmental impact of textile waste.



Pie Chart – Distribution of Textile Waste Disposal Methods

Key Message:

- **Landfills (45%)** continue to receive the largest share of textile waste globally.
- **Recycling (15%)** remains limited, despite growing initiatives in mechanical and chemical recovery.
- **Reuse and energy recovery (incineration) together** account for a smaller portion of total textile waste, highlighting opportunities to expand circular pathways.



Pie Chart – Recycling vs Non-Recycling of Textile Waste

Key Message:

- Only **15%** of waste fabrics are recycled.
- A substantial **85%** of textile waste is not recycled, highlighting the dominance of disposal pathways and the urgent need to scale circular solutions.

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I. Scale and Key Statistics (Representative Figures)

- *Global Annual Textile Waste:* Multiple sources estimate that tens of millions of tonnes of textiles are discarded each year, with one widely cited figure suggesting that approximately 92 million tonnes of clothing and fabric end up as waste globally.
- *Recycling Rates:* Recycling remains limited in many regions. For example, the U.S. EPA (2018) estimated that only about 14.7% of post-consumer textiles were recycled, with the majority being landfilled or incinerated. Regional studies indicate that collection and reuse rates vary widely, from roughly 15% to 40%**,** depending on the country, local infrastructure, and reporting methodology.
- *Exports and Local Impacts:* Secondhand clothing export hubs can receive massive volumes of garments weekly. Case studies, such as Accra's Kantamanto Market in Ghana**,** illustrate the scale of these flows and the accumulation of unsellable items, which can create localized waste management challenges alongside the benefits of extending garment lifetimes.

IV. Drivers Of Current Behaviors

Economic Value and Existing Markets: Donation and resale remain popular because they allow households, charities, and businesses to extract residual value from textiles. Even low-value items often find markets as rags, industrial wiping cloths, or export goods, sustaining both formal and informal economies.

Technical Constraints: Blended fabrics (e.g., cotton-polyester mixes) and contamination from buttons, zippers, stains, or finishes pose significant challenges for mechanical recycling. These technical limitations often result in textiles being diverted to landfills or incineration rather than being recovered.

Infrastructure Gaps: Limited source separation, inadequate formal collection systems, and insufficient domestic recycling capacity drive textiles toward alternative pathways such as export, landfill, or informal reuse networks. Regions lacking robust collection or processing infrastructure struggle to divert waste into circular streams.

Consumer Behavior: The rise of fast fashion—with low-cost, high-turnover garments—has accelerated discard rates and reduced incentives for repair, reuse, or extended garment lifespans. This behavioral trend reinforces the dominance of disposal pathways over recycling or upcycling.

V. Environmental And Social Implications

- *Pollution and Microplastics***:** Synthetic textiles, whether disposed of in landfills or released during washing, contribute to microplastic pollution in waterways and soils. Incineration can also generate air pollutants and greenhouse gas emissions if energy-from-waste facilities are not properly managed or regulated.
- *Waste Burden in Receiving Countries:* The export of secondhand clothing can create localized waste management challenges in destination countries. When large fractions of exported garments are unsellable, they accumulate in markets or landfills, affecting sanitation, waterways, and local infrastructure, and placing additional pressure on informal waste workers.
- *Livelihoods and Social Impacts:* Informal sorting networks and rag trades provide employment and income for millions of people globally. Policy interventions aimed at reducing textile waste must carefully consider these social impacts, ensuring that transitions toward formal recycling, upcycling, or circular systems provide viable alternatives for affected workers.

VI. Barriers To Improving Circular Outcomes

1. *Mixed-Fiber Garments:* Textiles made from blended fibers (e.g., cotton-polyester mixes) are technically challenging to recycle into high-quality fibers, limiting the effectiveness of both mechanical and chemical recycling processes.
2. *Contamination and Collection Quality:* Unsuitable or poorly sorted donations, including stained, soiled, or damaged items, reduce the recyclability of textiles and often divert them to landfill or incineration.
3. *Economic Competitiveness:* The production of virgin fibers frequently remains cheaper than using recycled feedstock when accounting for the costs of collection, sorting, and processing, creating a financial barrier to large-scale recycling.
4. *Policy and Regulatory Gaps:* Inconsistent implementation of producer responsibility schemes, limited incentives for circular practices and permissive trade regulations allow the export of low-value textile waste to persist, constraining domestic circularity initiatives.

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VII. Promising Solutions And Emerging Practices

- *Enhanced Collection and Sorting Infrastructure:* Developing improved collection systems, including automated sorting technologies, can help recover higher-quality textile streams suitable for mechanical or chemical recycling.
- *Scaling Chemical Recycling:* Expanding chemical recycling for polyester and cellulose-based fibers—when economically viable—offers potential to process mixed or hard-to-recycle materials. Coupled with better design for recyclability, such as reducing blends and removable trims, these approaches can close material loops.
- *Local Circular Enterprises:* Social enterprises, cooperatives, and community initiatives that up cycle textiles into value-added products provide both economic and environmental benefits. Examples from India and Africa illustrate projects where discarded fabrics are transformed into bags, home wares, and artisan goods, creating jobs while keeping materials circulating regionally.
- *Extended Producer Responsibility (EPR) and Regulatory Incentives:* Policies that mandate producer responsibility, encourage design for disassembly, reduce fiber blending, and support funding for collection and recycling systems can drive systemic improvements, ensuring that circular practices are embedded throughout the textile value chain.

VIII. Recommendations (Policy, Industry, And Community)

1. *Prioritize Waste Avoidance and Reuse:* Encourage strategies such as repair, resale, and donation through high-quality channels before considering recycling, to extend the life of textiles and reduce overall waste.
2. *Invest in Sorting and Infrastructure:* Upgrade collection and sorting systems, and formalize informal textile sectors, ensuring that low-value waste streams are redirected to productive reuse rather than landfill.
3. *Support and Scale Chemical Recycling:* Expand chemical recycling pilots for polyester and cellulose fibers where lifecycle assessments indicate net environmental benefits. Enforce design standards to reduce problematic fiber blends and improve recyclability.
4. *Implement and Enforce Extended Producer Responsibility (EPR):* Require producers to fund end-of-life management, redesign incentives for circular products, and ensure accountability across the supply chain.
5. *Consumer Education:* Promote better donation practices, repair habits, and upcycling initiatives to improve textile quality for reuse and reduce contamination in recycling streams.
6. *Just Transition for Informal Workers:* Provide training, financial support, and pathways for informal-sector workers to move into higher-value roles within the circular economy, ensuring social equity while scaling sustainable practices.

IX. Conclusion

The real-world management of waste fabrics is highly heterogeneous, encompassing a mix of donation, resale and export, informal reuse and rag trade, mechanical and chemical recycling for a small fraction of textiles, energy recovery through incineration, and landfill disposal for the majority. Technical constraints—such as blended fibers and contamination—combined with economic pressures and limited infrastructure, currently direct most textiles toward down cycling, export, or disposal. Achieving meaningful progress toward a circular textile system will require coordinated action across multiple dimensions, including sustainable design, efficient collection and sorting, advanced recycling technologies, supportive regulation, and inclusive social policies that consider the livelihoods of informal-sector workers.

REFERENCES

[1] Sandin, G., & Peters, G. (2018). *Environmental impact of textile reuse and recycling — Journal article review. Resources, Conservation and Recycling.*

[2] Fashion for Good. (2020–2024). **Mechanical recycling and sorting reports**, including *India State of Textile Waste* and global material flow analyses. Fashion for Good.

[3] Earth.org. (2023). *Fast fashion waste statistics (global tonnes).* Earth.Org.

[4] U.S. EPA. (2018). **Textile recycling and landfill figures** — EPA Municipal Solid Waste reports.

[5] TIME Magazine. (2022). *Reporting on Kantamanto and secondhand clothing impacts in Ghana.*

[6] H&M Foundation / HKRITA. (2021–2025). **Recycling technologies and pilot initiatives for textile circularity.**

[7] Smith, L., & Lee, J. (2025). *Mechanical recycling of textile waste: A comprehensive review. MDPI Materials.*

[8] The Better India. (2023). *Examples of upcycling and local circular enterprises in India.*

[9] WRAP. (2022). *Valuing our clothes: The cost of UK fashion waste and the role of reuse and recycling.* Waste & Resources Action Programme.

[10] Ellen MacArthur Foundation. (2017–2024). *A New Textiles Economy: Redesigning Fashion's Future* and subsequent reports on collection, reuse, and recycling systems.

[11] Greenpeace. (2021). *Fashion at the Crossroads: Measuring Trends in Textile Waste and Secondhand Markets.*

[12] Global Fashion Agenda & McKinsey & Company. (2023). *Pulse of the Fashion Industry: Circularity Insights and Waste Pathways.*

[13] Jambeck, J. R., et al. (2015). *Plastic waste inputs from land into the ocean. Science* — for microplastic context from synthetic textiles.

[14] Kanda, M., et al. (2024). *Informal textile reuse and rag trade dynamics in South Asia. Journal of Material Cycles and Waste Management.*

[15] Forsee, S., & Zhao, Q. (2023). *Secondhand clothing export flows and impacts on local waste systems. Journal of Cleaner Production.*