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# Circular Economy in Household Textiles: Upcycling Post-Consumer Garments into Functional Home Textile Products

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**Abstract**
The growing accumulation of post-consumer textile waste has become one of the major environmental challenges associated with the fashion industry. While industrial recycling initiatives continue to evolve, a significant opportunity exists within households, where discarded garments often remain under utilised despite retaining considerable functional value. This study explores household-level up-cycling as a practical approach to extending the life cycle of garments through the development of functional home textile products. Used clothing collected from domestic wardrobes was carefully assessed for fabric quality, durability, and usability before being creatively transformed into products for the kitchen, dining, sewing, study, and living spaces. Garments were systematically deconstructed, with buttons, zippers, pockets, elastics, and decorative trims separated and repurposed wherever possible to ensure maximum material utilization and minimum waste generation.
Rather than viewing worn clothing as waste, this research demonstrates how every household can become the starting point of a circular textile economy by giving existing garments a second life. Beyond reducing landfill disposal and conserving natural resources, the proposed approach encourages creativity, sustainable consumption, environmental awareness, and conscious lifestyle practices. It further highlights how simple household initiatives can collectively contribute to achieving the Sustainable Development Goals (SDGs), particularly Responsible Consumption and Production (SDG 12), while inspiring future generations to adopt sustainable design practices and circular thinking in everyday life.

**Keywords:** Up-cycling, post-consumer textile waste, Householdsustainability, Circulareconomy, hometextiles, Sustainableconsumption, Resourceefficiency, Textile waste management.

## 1. Introduction

The textile and fashion industry is one of the largest contributors to global environmental pollution due to excessive resource consumption, greenhouse gas emissions, water usage, and the generation of enormous quantities of textile waste [1]. Rapid changes in fashion trends and consumer behavior have significantly increased the volume of garments discarded every year. A substantial portion of this waste originates from households, where clothing that is no longer worn is often stored indefinitely or disposed

of despite retaining usable fabrics and functional components. The transition from a linear "take–make–dispose" model towards a circular economy promotes strategies such as reuse, repair, recycling, and up-cycling to extend the life cycle of textile products. Among these, **up-cycling** has emerged as an effective and environmentally responsible design approach because it transforms existing materials into products of equal or greater value without requiring energy-intensive fiberreprocessing [2,3].

### 1.1 Household Textile Waste: An Untapped Resource

Every household possesses garments that have reached the end of their clothing life but still contain durable fabrics, pockets, buttons, zippers, and trims. Instead of becoming landfill waste [4], these materials can be transformed into useful home textile products. Household wardrobes therefore represent the first stage of a circular textile economy, where waste can be prevented before entering the municipal waste stream.

### 1.2 Creativity Begins at Home

Beyond its environmental significance, household up-cycling promotes creativity, innovation, and problem-solving [5,6]. Transforming old garments into functional household products encourages individuals to develop resource-conscious habits while fostering emotional attachment to handmade products. Such activities can strengthen family participation, inspire children to value resources responsibly, and cultivate sustainable lifestyles across generations.

### 1.3 Sustainable Development Goals (SDGs)

This research contributes primarily to SDG 12 (Responsible Consumption and Production) (Ref^14) by promoting the reuse and up-cycling of post-consumer garments. It also supports SDG 11 (Sustainable Cities and Communities) through waste reduction, SDG 13 (Climate Action) by reducing demand for virgin textile production, SDG 4 (Quality Education) through sustainability awareness and creativity, SDG 8 (Decent Work and Economic Growth) by encouraging home-based entrepreneurship, SDG 9 (Industry, Innovation and Infrastructure) through innovative product development, and SDG 17 (Partnerships for the Goals) by encouraging collaboration among households, educational institutions, NGOs, designers, and communities to promote sustainable textile practices.

The objective of this study is to demonstrate how post-consumer garments collected from household wardrobes can be transformed into aesthetically appealing and functional home textile products while extending the life cycle of textile materials and promoting sustainable living.

## 2. Methodology

### 2.1 Research Design

A practice-based sustainable design methodology was adopted to investigate the transformation of post-consumer garments into functional home textile products using circular design principles.

### 2.2 Collection of Post-Consumer Garments

Used garments were collected from household wardrobes. The collection included shirts, jeans, trousers, dresses, T-shirts, kurtas, and other clothing items that were no longer in regular use but remained structurally suitable for reuse.

### 2.3 Material Inspection

The collected garments were subjected to a comprehensive material inspection to evaluate their suitability for the recycling process. Each garment was assessed for fabric quality, fibre composition, thickness, tensile strength and durability, color fastness, wash ability, and the presence of stains, defects, or other forms of physical damage. These parameters were examined to ensure that the recovered

materials possessed adequate structural integrity and performance characteristics for subsequent processing. Based on this assessment, only garment sections that met the required quality standards and exhibited sufficient reusability were selected for further recycling and manufacturing processes.

**2.4 GarmentDeconstruction**

Prior to fabric cutting, the collected garments underwent a systematic deconstruction process to maximize material recovery and facilitate efficient reuse. Reusable garment components, including buttons, zippers, pockets, elastic bands, hooks, decorative trims, laces, drawstrings, and labels, were carefully detached without causing damage to the surrounding fabric. These recovered accessories were preserved and subsequently incorporated into the product development process wherever appropriate, thereby supporting resource efficiency and reducing the demand for new materials.

**2.5 Material Classification**

Following deconstruction, the recovered fabric materials were systematically classified based on their fabric type, color, texture, thickness, and functional suitability. This categorization enabled effective material selection and allocation according to the specific requirements of the product development process. Furthermore, the classification process contributed to optimized material utilisation, minimised waste generation, and enhanced the overall efficiency of the recycling workflow.

**2.6 Product Ideation**

Potential home textile products were identified through observation of household requirements, literature review, and brainstorming sessions. Designs were selected based on functionality, aesthetics, ease of construction, and optimum utilization of available materials.

**2.7 Product Development**

The recovered textile materials and reusable garment components were utilized to develop a range of functional and aesthetically appealing household products for different living spaces. The product development process was guided by the principles of sustainability and resource optimization[2,7,8], ensuring the effective utilization of recovered materials while minimizing textile waste.

**Kitchen Linens:** Storage containers, oven mittens, aprons, cutlery mats.

**Sewing Table Accessories :** Sewing mats, pin holders, storage containers, scissor covers, foot pedal pads.

**DiningTable :** Table mats, table linen, fruit bowls, hot mats, chair covers.

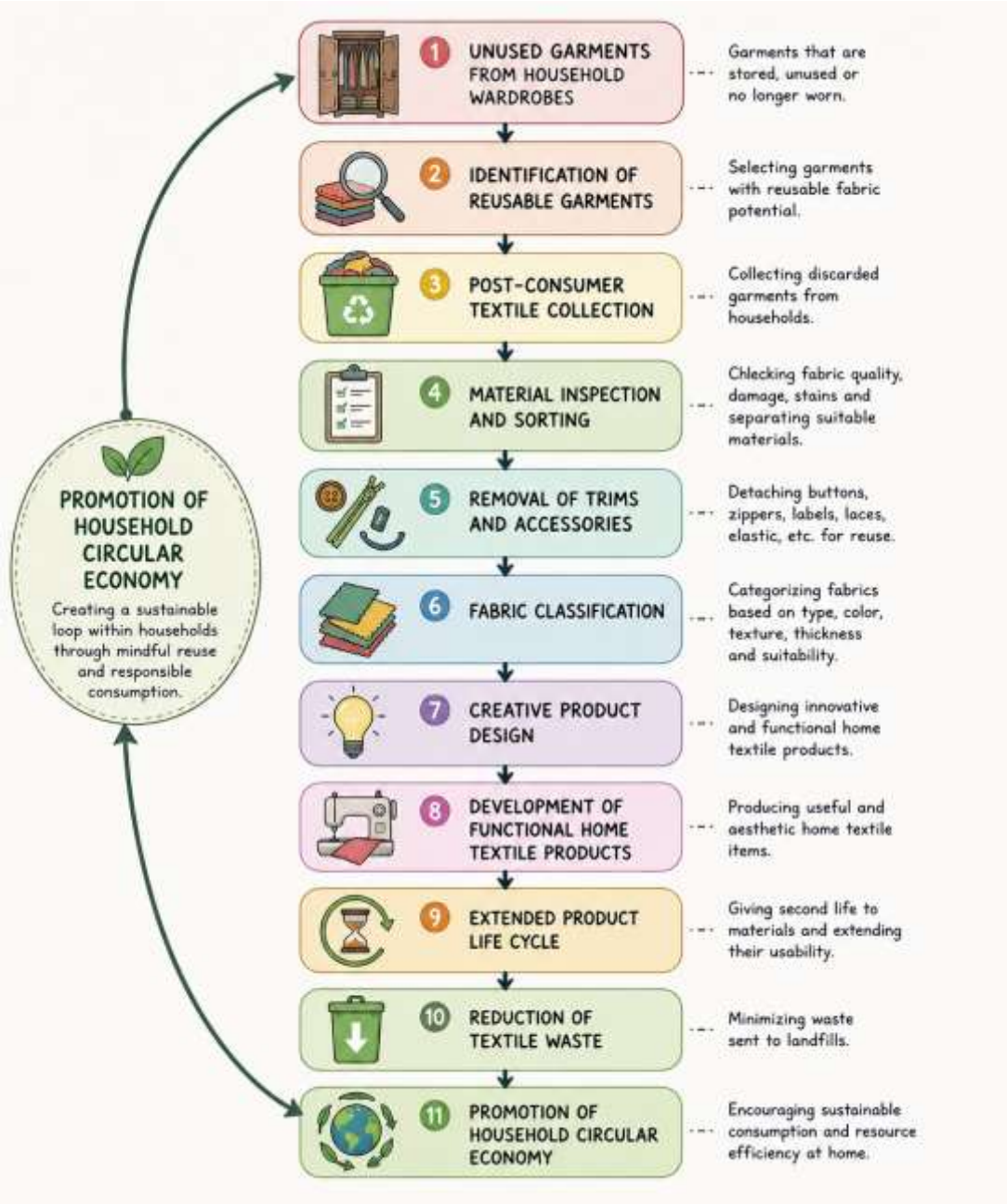
**Living Room:** Cushion covers, wall décor, sofa arm covers, flower décor, door mats.

**Study Room:** Laptop covers, charger holders, iron box covers.

**2.8 Product Evaluation**

The developed products were evaluated to assess their functional performance, aesthetic appeal, stitch quality, durability, ease of maintenance, usability, and sustainability potential. This evaluation was carried out to determine the overall quality, performance, and suitability of the up-cycled household textile products for their intended applications.

### 2.9Wardrobe-to-Home Circular Textile Framework




### 3. Sustainability Contribution

The study demonstrates that post-consumer garments can be successfully diverted from landfill through household-level up-cycling [4]. By extending the life cycle of textiles, the approach conserves raw materials, reduces demand for virgin fabrics, minimizes waste generation, and supports circular economy principles. Although each transformation represents a small intervention, the cumulative impact of widespread household adoption can contribute significantly to sustainable textile consumption.

### 4 Practical Implications

The proposed methodology offers a simple, cost-effective, and easily replicable approach for transforming post-consumer textile waste into value-added household products. It can be effectively

adopted by households, fashion and textile students, educational institutions, self-help groups, non-governmental organizations (NGOs), cottage industries, home-based entrepreneurs, and sustainable lifestyle initiatives to promote resource efficiency, reduce textile waste, and encourage the adoption of circular textile practices at the community level.

## 5. Alignment with the United Nations SDGs

| SDG | Contribution |
|---|---|
| **SDG 4 – Quality Education** | Promotes sustainability awareness, creativity, and design thinking among students and future generations. |
| **SDG 8 – Decent Work and Economic Growth** | Encourages home-based entrepreneurship, skill development, and small-scale sustainable businesses. |
| **SDG 9 – Industry, Innovation and Infrastructure** | Demonstrates an innovative methodology for developing value-added products from post-consumer garments. |
| **SDG 11 – Sustainable Cities and Communities** | Reduces household textile waste entering municipal landfills and promotes sustainable communities. |
| **SDG 12 – Responsible Consumption and Production (Primary SDG)** | Extends garment life, supports circular economy principles, promotes responsible consumption, and reduces textile waste. |
| **SDG 13 – Climate Action** | Reduces the demand for virgin textile production, thereby lowering carbon emissions and resource consumption. |
| **SDG 15 – Life on Land** | Helps reduce landfill waste and minimizes environmental pollution affecting terrestrial ecosystems. |
| **SDG 17 – Partnerships for the Goals** | Encourages collaboration among households, educational institutions, NGOs, designers, researchers, and local communities to advance sustainable textile practices and promote circular economy initiatives. |

## 6. Development Of Home Textile Products

### 6.1 Kitchen Linens

| *Post Consumer Garments* | *Upcycled Home Textile Product* |
|---|---|
|  |  |
| *Post-consumer cotton garments, including shirts, kurtas, towels, and dress materials, were upcycled into functional kitchen textile products such as **utensil holders, pot holders, mug mats, bottle holders, and kitchen organizers**. Cotton fabrics were selected for their absorbency, heat resistance, durability, and ease of maintenance, while towel fabrics provided additional insulation. Existing garment colours and prints enhanced the aesthetic appeal of the products, demonstrating an effective approach to transforming discarded textiles into practical household items while promoting sustainable resource utilization and reducing textile waste.* | |

### 6.2 Sewing Table Accessories

| *Post Consumer Garments* | *Upcycled Home Textile Product* |
|---|---|
|  |  |
| *Post-consumer cotton shirts, kurtas, towels, printed fabrics, and dress materials were upcycled into a **sewing machine organizer**. Materials were selected based on their durability and* | |

*functional properties, with towel fabric providing a stable base and cotton fabrics ensuring flexibility and ease of stitching. Multiple storage pockets were incorporated to organize sewing accessories such as scissors, threads, measuring tape, bobbins, chalk, and needles. The developed organizer enhances workspace efficiency while demonstrating the sustainable reuse of discarded textile materials.*

### 6.3 Dining Table

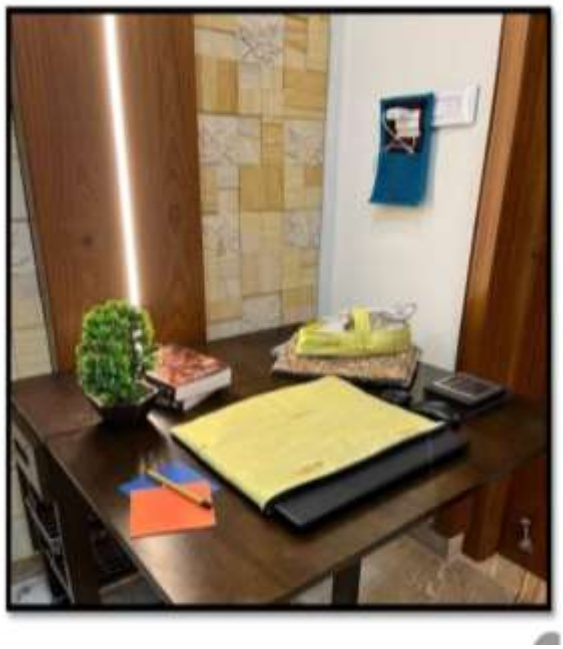
| ***Post Consumer Garments*** | ***Upcycled Home Textile Product*** |
|---|---|
|  |  |
| *Post-consumer garments, including cotton shirts, kurtas, T-shirts, printed tops, sarees, dupattas, and other cotton fabrics, were collected, cleaned, and sorted based on fabric type, colour, and condition before being upcycled into dining room textile products such as **table mats, table runners, chair covers, and decorative accessories.** Cotton fabrics were selected for their durability, absorbency, softness, and ease of maintenance, while printed and coloured materials enhanced the aesthetic appeal of the products. The developed home textiles provide functional protection for dining furniture while extending the life cycle of discarded garments, reducing textile waste, and promoting sustainable home furnishing practices through creative upcycling.* | |

### 6.4 Living Room

| ***Post Consumer Garments*** | ***Upcycled Home Textile Product*** |
|---|---|
|  |  |
| *Post-consumer garments, including cotton shirts, printed kurtas, towels, sarees, dupattas, and* | |

*woven fabrics, were upcycled into functional living room accessories such as **sofa armrest organizers.** Cotton and towel fabrics were selected for their durability, structural support, and cushioning properties, while colourful textiles enhanced the aesthetic appeal. Integrated storage compartments were designed to accommodate remote controls, mobile phones, books, spectacles, magazines, and other household essentials. The developed product demonstrates the effective utilization of discarded textiles by extending garment life, reducing textile waste, and promoting sustainable home furnishing through creative upcycling.*

### 6.5 Study Room

| ***Post Consumer Garments*** | ***Upcycled Home Textile Product*** |
|---|---|
|  |  |

*Post-consumer garments, including cotton shirts, kurtas, and shawls, were collected and sorted based on fabric quality, colour, and usability before being upcycled into functional study room accessories such as **laptop mats, stationery organizers, iron box holders, and storage compartments.** Cotton fabrics were selected for their durability, comfort, and ease of maintenance. The developed products effectively extended the service life of discarded garments while providing practical, aesthetically appealing solutions for study and workspace organization through sustainable upcycling.*

## Conclusion

Sustainable development remains an ongoing pursuit of socio-economic development that do not exhaust the Earth's finite natural resources. Depending on creativity and intended application, clothing components can be reuse, repurpose, and upcycle into a diverse range of product, ithelps us to minimize textile waste, reduce carbon emissions, and conserve valuable resources. The development of these home textile product aims to enhance awareness of sustainable clothing, textile consumption practices and create awareness about sustainable living. This study concludes that sustainable transformation of used textiles is an effective approach to reducing landfill disposal and to promote innovation in home textile products. The implementation of these practices by consumers, industries, and researchers can

contribute substantially to environmental sustainability and inspire future advancement sustainable textile products.

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