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# "Transforming Textile Waste: Value-Added Products from Waste Textiles"

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White paper

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## Introduction

Amount of fabric waste has increased many folds in the past few years due to increasing population and rapidly changing fashions trends. Its larger portion being dumped in the landfills is creating a lot of problem in its management. Natural fabric like cotton, linen, jute, wool, silk, hemp, bamboo are eco-friendly and are fully degradable. Whereas polyester, nylon, acrylic (fake fur), spandex, and rayon are non-biodegradable, they do not compose naturally and remain in environment for hundreds of years.

### Types of fabric and its sources



*Denim is type of fabric made from cotton using twill weave technique*

### Animal based natural fabric

#### Plant based natural fabric

	Types of fabric	source
	wool	
	silk	

Apart from this leather (animal hides) alpaca, camel hair are also used in textile industry for making jackets coats blankets etc


### Synthetic nonbiogradable fabric

	Types of fabric	source
	Polyester	polyethylene terephthalate, type of plastic

"Trash to treasure: creating value from every thread."

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	Nylon	Polyamide petroleum-based fibre 

	Acrylic	acrylonitrile, a type of plastic 
	Spandex	polyurethane
	Rayon	semi-synthetic fiber made from cellulose
	Acetate	

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*"Waste cloth, new beginnings—where sustainability meets creativity.*

Blended Fabrics: they are combination of natural as well as synthetic fibres which includes polycotton wool blends jeans (mix of denim and spandex or polyster)

### **Regenerated fabrics**

They are derived from natural sources but processed chemical includes viscose (made from wood pulp or bamboo), modal (made from beech tree pulp, Lyocell (made from wooden sorces)

Different weaving techniques: satin chiffon

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Chemically, cotton-based fabrics are made up of mainly cellulose with small components of other chemicals and contribute to a big segment of overall textiles. Along with donating the cloths for various purposes, scientific solutions are also feasible for valorizing waste fabrics to value-added products. This review article focuses on important strategies for addressing fabric waste for their possible conversion to significant products of varied applications. It emphasizes on chemical routes suitable for this purpose for producing cellulose, sugar, composites, etc. This will provide an insight to the readers for understanding the chemical significance of waste fabric and exploring the best possible ways for its efficient management, ensuring a step ahead towards sustainable development.

Polyester and blends are also a significant part of the waste

## Value added products after pyrolysis of waste mixed with cloth

catalytic fast pyrolysis of waste mixed cloth in an ex-situ method using hierarchical HZSM and commercial CaO was investigated. Pyrolysis of waste mixed cloth in a temperature range of 450°C to 750°C mainly allowed for the formation of levoglucosan without any catalysts.

## Market analysis

*Every scrap has a story—turning waste into wonders*

India mart provides old clothes for sale

<https://dir.indiamart.com/impcat/cotton-waste-cloth.html>

Tailor shops generate a significant amount of waste fabric due to cutting and stitching processes. On average, 20–30% of the fabric used in a tailoring or garment-making process ends up as waste. small tailor Shops produce around 0.5–5 kg of fabric waste per week.

Medium to Large Tailoring Units: Waste generation could range from 10–50 kg per week, depending on the volume of work



### fashion and Accessories

- **Patchwork Clothing:** Design unique garments like skirts, dresses, or jackets using fabric scraps.
- **Bags:** Make tote bags, handbags, pouches, and wallets.
- **Headbands and Scrunchies:** Use smaller pieces of fabric to create hair accessories.
- **Scarves and Stoles:** Combine similar waste fabrics to make stylish scarves.
- **Jewelry:** Use fabric scraps to create statement necklaces, earrings, and bracelets.

### 2. Home Décor

- **Rugs and Mats:** Weave or stitch fabric strips into durable rugs or mats.
- **Cushion Covers:** Create vibrant patchwork cushion covers.
- **Curtains or Blinds:** Use larger pieces or sew smaller scraps together for decorative window treatments.
- **Wall Hangings and Tapestries:** Design artistic pieces for wall decoration.
- **Table Runners and Coasters:** Stitch or quilt smaller scraps for dining table use.

### 3. Upcycled Products

- **Quilts and Blankets:** Combine waste fabric into cozy quilts.
- **Storage Baskets:** Wrap and sew fabric strips into sturdy baskets or organizers.
- **Laptop or Mobile Covers:** Create padded covers from old cloth.
- **Stuffed Toys:** Use fabric scraps for stuffing and sewing soft toys.
- **Aprons:** Make kitchen or craft aprons from durable waste fabric.

### 4. Artistic and Functional Items

- **Art Canvases:** Use fabric as the base for paintings or embroidery.
- **Fabric Flowers:** Design decorative flowers for various uses.
- **Gift Wrapping:** Use cloth as reusable gift wraps (like Furoshiki techniques).
- **Bookmarks:** Sew sturdy fabric scraps into bookmarks.
- **Fabric Notebooks:** Cover diaries or journals with decorative fabric.

### 5. Industrial and Practical Uses

"From discarded fabric to valuable finds—sustainability stitched with purpose."

Trash to treasure: creating value from every thread

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- **Cleaning Cloths:** Repurpose waste fabric into dusters or cleaning rags.
  - **Insulation Material:** Use scraps as fillers for padding or soundproofing.
  - **Packaging Material:** Utilize fabric for sustainable packaging solutions.
  - **Composting:** Natural fibers like cotton and linen can be shredded and composted.

## 6. DIY Kits and Educational Tools

- **Craft Kits:** Sell fabric scrap kits for crafting and DIY projects.
- **Teaching Aids:** Create alphabets, numbers, or shapes for children's learning.