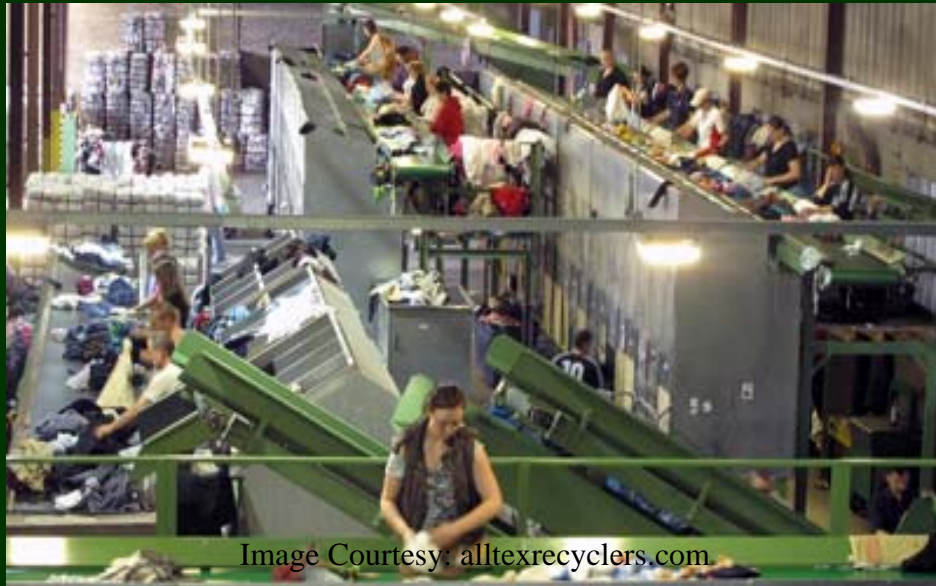


Environment Protection by Textile Recycling



By: K. Saravanan

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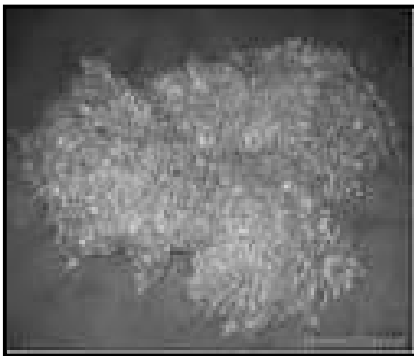
Abstract

Textile recycling is basically refers to the process of making use of clothing and fabrics over again after they have been produced or made from the manufacturing companies which created them. This also means salvaging, reprocessing, reclaiming and reducing these fabrics and clothing into other useful things other than clothes. More industries are now aware of this process and they try to practice this to help and serve the environment. Most companies are also aware that the manufacturing process of these textiles can do harmful damage to the environment so they do something to somehow reduce the problem. Since these textiles are made from biodegradable and non-biodegradable materials, and some natural fibers, the kind of recycling to be done must be according to what these materials are best to be made into that can help protect the environment in more ways than one. This article deals the information related to recycling.

Introduction

Perspective of age old days: population was less, needs were few and resources were abundant. The generation of waste was such that it got naturally recycled, being mostly biodegradable. Conversely, after the advent of industrial revolution, different types of wastes came into existence which are often both non-biodegradable and highly hazardous. *Production is always associated with some form of pollution* and in specific cotton cultivation, production and processing, releases various types of waste at every level.

Problem definition and industrial relevance:



Reports illustrate that, among the total waste from textile, the largest part comes from the spinning mills, most particularly the blow room. Spinning is one of the vital industries of India and the 4000 ginning factories around the country produce considerable amount of waste during cotton ginning operation. Most of the mills, recover the useful short fibers from the blow room waste by passing them through willow machines, that in-turn leaves a non resalable residue called “willow waste”. The scope of the waste from cotton industry extends its products to upholstery cloth, curtain cloths, cover cloths, blanket, towels, shirting, quilts, underwear, carpet, industrial roller cloth, electric cabling, hosiery and in the manufacture of asbestos yarn, paper, linoleum, plastic and regenerated fibers. Focusing on willow waste, it is too short a fiber, to be used for any textile application and thus disposed off in the landfills. An investigation report denotes that, the total amount of

willow waste generated in India is about 80, 000 to 85, 000 tons per annum, and this obviously needs proper treatment apart from disposal as landfill.

A survey report states that 1% of American landfill space was occupied by disposable diapers which take up to 500 years to decompose. Such waste discarded in landfills has no resale value and in addition to polluting the atmosphere, if not degraded, they get accumulated and spread infectious diseases and foul odour. An increasing amount of waste is generated every year from the production and use of textiles and in reality the rate of recycling in textiles, is not very high which is an issue to look forward. For economic and environmental reason, it is becoming increasingly necessary to recycle as much as possible.

It is estimated that more than 1 million tonnes of textiles are thrown away every year, with most of this coming from household sources. Textiles make up about 3% by weight of a household bin.



At the least 50% of the textiles that one throws away are recyclable, but in practical only 25% of wastes are recycled. An outlook on the future market of textiles summit that India is expected to grow around 3-5% in the area of disposals, sequentially that will increase such disposal in landfills. Everyday many researches are being done to innovate new products and technologies but not many focus on the reclaim or a better alternative of used up and waste textiles that is either incinerated (burnt) or discarded in the landfills.

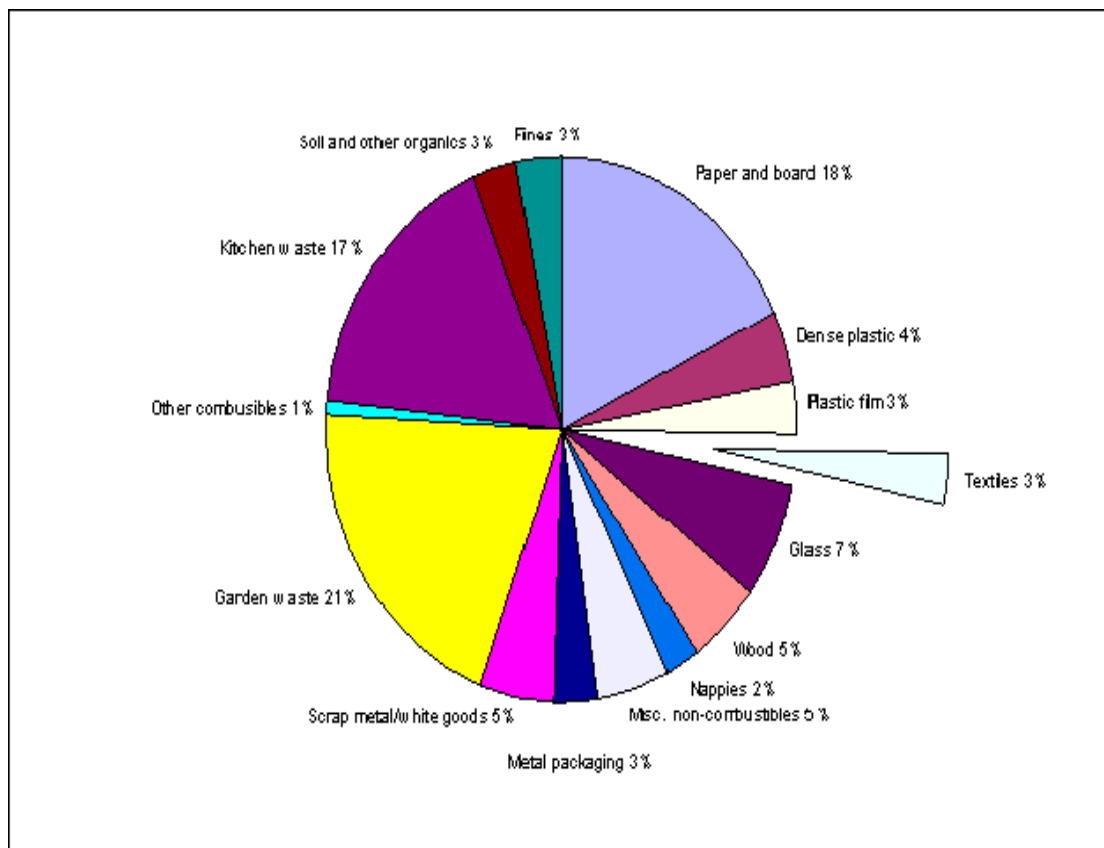
Textile waste can also be classified as either pre-consumer or post-consumer.

- Pre-consumer textile waste consists of by-product materials from the textile, fiber and cotton industries. Each year 750,000 tons of this waste is recycled into new raw materials for the automotive, furniture, mattress, coarse yarn, home furnishings, paper and other industries.
- Post consumer waste is defined as any type of garment or household article made from manufactured textiles that the owner no longer needs and decides to discard. These articles are discarded either because they are worn out, damaged, outgrown, or have gone out of fashion.

Environmental Impact

In the cotton textile industry, using the current processes of producing finished apparel and related goods from raw virgin cotton, 20-49% of the original fiber in the raw material is typically separated as waste in the various processes. Once produced the finished goods have a limited life. When they have ended their useful life they are possibly used as rags for a brief period and then typically discarded to end-up in a landfill or waste incineration facility; where the waste is burned or dissolved with chemicals and pollute the environmental.

This manufacturing and post consumer waste generated in this way is extensive. According to the Byproducts Association of America, in 1990, approximately 7.7 billion pounds of new and used fabric and clothing and related textile products were discarded. Cotton agriculture also has a significant impact on the environment and is the highest or second highest agricultural user of pesticides, herbicides and fungicides.



Source: Analysis of household waste composition and factors driving waste increases - Dr. J. Parfitt, WRAP, December 2002

The society is becoming increasingly aware of the severity of our environmental problems and in particular the scarcity of appropriate landfill sites, and the detrimental impact of waste incineration, industrial discharges, and the use of pesticides and other chemicals in agriculture. As a result of this increasing awareness it is becoming increasingly important to reduce the amount of waste we generate, recycle more of the waste that is generated, and reduce or eliminate as much toxic chemical use as possible.

Governments often regulate these matters making such efforts not only environmentally responsible but often necessary to comply with the law.

By recycling textile wastes, we not only conserve landfill space, we also reduce the amount of land, water, energy, and pesticides that goes into textile production.



The method of textile recycling resulted to a recorded study of about 48% second hand or used clothing, approximately 20% are made into cleaning materials like rags and the rest of about 26% is used to produce fiber to create new products.

These days textile renovation is a good business, which collect textiles for reuse (often abroad), and send material to the 'wiping' and 'flocking' industry and fibres to be reclaimed to make new garments. Textiles made from both natural and man-made fibres can be recycled.

Recovery and recycling provide both environmental and economic benefits. Textile recovery:

- Reduces the need for landfill space. Textiles present particular problems in landfill as synthetic (man-made fibres) products will not decompose, while woollen garments do decompose and produce methane, which contributes to global warming.
- Reduces pressure on virgin resources.
- Aids the balance of payments as we import fewer materials for our needs.
- Results in less pollution and energy savings, as fibres do not have to be transported from abroad.

Reclaiming fibre avoids many of the polluting and energy intensive processes needed to make textiles from virgin materials, including:

- Savings on energy consumption when processing, as items do not need to be re-dyed or scoured.
- Less effluent, as unlike raw wool, it does not have to be thoroughly washed using large volumes of water.
- Reduction of demand for dyes and fixing agents and the problems caused by their use and manufacture.

How's, what's and where's of recycling textiles

The majority of post-consumer textiles is currently collected by charities and sorts the collected material selling it on to merchants in the appropriate sectors.

Left: Making use of tsunami wastage

Right: Women converting torn jeans into school bags.

Images courtesy: [GOONJ](#)



Reprocessed motes and textile waste are used in many different industries, and put into an array of products. Some of the uses as follow:

Regins

- Various Yarn Spinning Applications
- Paper Making
- Automotive and Industrial Filters
- An Array of Non Woven Products
- Medical products (swabs, bandages)
- Blankets
- Diapers
- Bleached Wadding

Willowed Motes and Textile Waste

- Mattress Felt Pads
- Futon Felt Pads
- Oil Absorption Products
- Various Furniture Padding and Stuffing Applications

Textile Thread waste

- Home Furnishings
- Padding
- Mops
- Wiping Cloth

Over 70% of the world's population use second hand clothes. (*Textiles on line*)

Some post-industrial waste is recycled 'in-house', usually in the yarn and fabric manufacturing sector. The rest, aside from going to landfill or incineration, is sent to merchants.

The average lifetime of a garment is about three years. (*Textiles on line*)

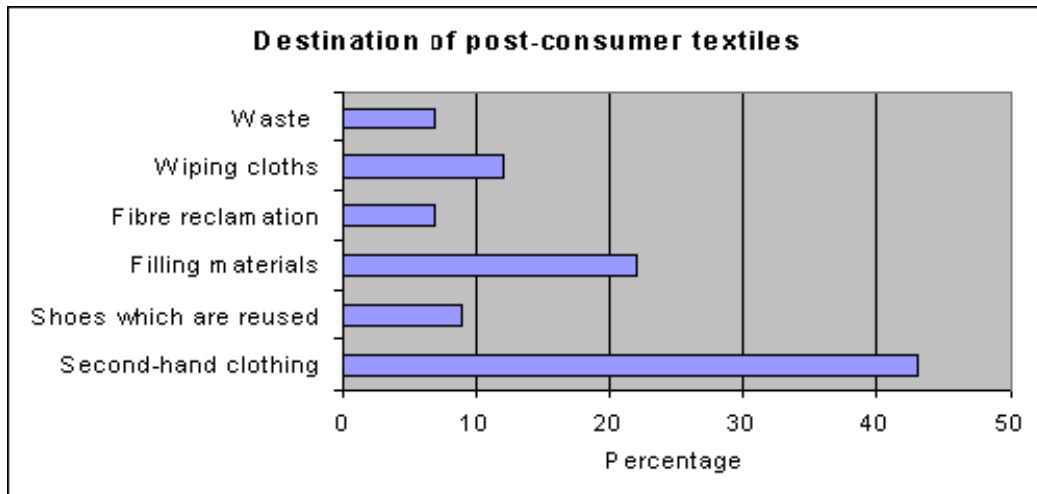
Processing and Outlets for Waste Textiles

All collected textiles are sorted and graded by highly skilled, experienced workers, who are able to recognize the large variety of fibre types resulting from the introduction of synthetics and blended fibre fabrics. Once sorted the items are sent to various destinations as outlined below:

Wearable Textiles		
Shoes	Clothes	
Resold abroad in countries like Pakistan, India, Africa and East European countries.	Resold in the U.K. and abroad. Oxfam's Wastesaver provides clothes to Mozambique, Malawi or Angola for emergency use, as well as providing warm winter clothing to former Yugoslavia, Albania, Afghanistan and Northern Iraq.	
Unwearable Textiles		
Trousers, Skirts, etc.	Woolen Garments	Cotton And Silk
Sold to the 'flocking' industry. Items are shredded for fillers in car insulation, roofing felts, loudspeaker cones, panel linings, furniture padding etc.	Sold to specialist firms for fibre reclamation to make yarn or fabric.	Sorted into grades to make wiping cloths for a range of industries from automotive to mining, and for use in paper manufacture.

Post industrial waste is often reprocessed in house. Clippings from garment manufacture are also used by fibre reclaimers to make into garments, felt and blankets.

Some items will be reused by designers fashioning garments and bags from recovered items, however this is a very small sector within the overall destinations of textiles.



From the Textiles Recycling Association, published in A Way with Waste 1999.

Some of the machines used for recycling:



STARCUT: High production rotary cutter for all textile wastes.



MINITRIM / SUPERTRIM: These machines are designed to open edge trims from non-woven lines back into fibers.



CADETTE: Machine designed to open all types of textiles wastes such as threads, woven, knitted and non-woven materials.

The Fibre Reclamation Process

Mills grade incoming material into type and colour. The colour sorting means no re-dyeing has to take place, saving energy and pollutants. Initially the material is shredded into 'shoddy' (fibres). Depending on the end uses of the yarn e.g. a rug, other fibres are chosen to be blended with the shoddy. The blended mixture is carded to clean and mix the fibres, and spun ready for weaving or knitting.



The export market is rapidly growing as more market points are set up abroad. Some merchants also offer an array of services to encourage more collection, such as security uniform shredding prior to recycling.

What You Can Do

- Take your used clothes to a textile bank. Contact the recycling officer in your local authority if there are no banks in your area and ask why; they may collect textiles through other means. Alternatively you can take used clothing to local charity shops.
- Give old clothes/shoes/curtains/handbags etc. to jumble sales. Remember to tie shoes together: part of the 6% of textiles which is wastage for merchants are single shoes.
- Buy second-hand clothes - you can often pick up unusual period pieces! If bought from a charity shop, it will also benefit a charity.

We use large quantities of water, energy and detergents to clean and dry our clothes. It has been suggested that this is the most polluting stage of the textile life cycle.

- Buy things you are likely to wear a long time - a dedicated follower of fashion can also be a green one if items are chosen carefully.
- Look for recycled content in the garments you buy. This should be on the label, though at present there is no conventional marking scheme and some companies do not always advertise the recycled content.
- Buy cloth wipers instead of disposable paper products as the product can be used repeatedly.

Conclusion

Textile recycling also resulted to better economics since it provided job opportunities for people. More people got into curtain making, making rags, blankets, accessory making like belts, ribbons, laces and others. This also made jobs for people to make socks, handbags, shoes, gloves, hats and other products that could be created with these recycled textiles.

Textile recycling also teaches everyone to reuse, reduce and recycle these products instead of throwing them away. Since most of these are non-biodegradable, they clog out drainage and waterways. If thrown into incinerators, they cause pollution and cause more damage to the air around us. So, it is the time to think and make up our mind to use recycled products to reduce the environmental pollution.

About the author

The author is Assistant Professor in Textile Technology dept of Kumaraguru College of Technology, Coimbatore.